



Conservation Measures: Current Initiatives and Future Necessities

INTRODUCTION

Conservation of natural resources is one of the most significant indicators of a country's development. There is not any compulsion of equity, poverty alleviation programmes, education for the child or health care for the poor that thwarts conservation of natural resources. Just as one or two rich countries are not signing the Kyoto Protocol so also some of the members of our society are not recognizing their obligations towards natural resource conservation. Wetlands everywhere, everyday, are being silently filled up. In India, the government initiatives and scholarship on two major conservation issues - forest and water resources - are fairly well known all over the world. Yet there is no immediate sign of decrease in conflicts related to forest and water and of rise in good practices of conservation of water. Matters related to wetlands are somewhat different. Wetlands unlike forest and water have hardly any constituency. Even good research in the field of wetlands is scarce.

The conservation oriented literatures show a direct conflict between traditionally viewed local community welfare and development. Development is often identified as a main causal agent of biodiversity loss (Brown, 2002). In the past two decades there have been a major paradigm shift in thinking about conservation. These shifts are reflected in contemporary discourses on conservation and development. Blaikie and Jeanrenaud (1997) identified three conservation paradigms: the classical approach, populist approach and neo-liberal approach. The classical approach sees local people as a direct threat to biodiversity; the populist approach sees participation and empowerment of local people as a key to finding

solutions to more sustainable use of biodiversity, whereas the neo-liberal approach sees institutional, market and policy failures as undermining biodiversity, and the solution in adding economic value to biodiversity (Brown, 2002).

Within the broader context of environmental management and sustainable development, conservation aims to improve the total quality of life as well as maintain the ecological character of the natural resources, while loss of natural resources are obvious in order to meet the demand for new developmental projects, new agricultural land and other economic development which is demanded by increasing population growth, foreign aid, and modern technology (Maltby, 1986). In India, as a growing economy country and its percentage of share to GDP is switching from primary or agricultural sector to tertiary or service sector. This sectoral shift of India's GDP implies that the dependency of Indian economic growth is declining from primary sector, including agriculture, forestry, fishing, and mining from 44.8% in 1972-73 to 27.6% in 1999-2000 (Bhalla and Hazell, 2003) in contrast to more secondary sector including, manufacturing, construction and tertiary sectors including, trade, transportations, communications, real estate, public and private sector services. The continuous increasing trends of Indian economy growth in the tertiary sectors have lead to several controversial issues. This sectoral shift accelerates the process of urbanization and industrialization. In addition, continuous pressure of population growth become a threat to natural resources in terms of filling up of agricultural land, loss of inlands and wetlands, and degradation of forests.

Instances of loss of natural resources are observed worldwide. Government of Netherlands allowed some drilling in the Wadden Sea for gas exploration, irrespective of the fact that this wetland area has an international importance for

migrating birds from Scandinavia. The United States has lost as estimated 54% (87 million hectares) of its original wetlands (Maltby, 1986). In USA Everglades are suffering from shortage of water as its river water supply is used for cotton field. In Ireland extensive peat lands are dug up for fuel and in south East Asia Mangrove forests have been converted to fish and shrimp cultivation ponds (Turner et al., 2000). Some conversions of wetlands are in benefit of human society and yields higher return but sometimes wetlands are used only for limited benefits. Wetlands have been identified as one of the key life support systems on this planet in connection with agricultural lands and forests. The importance of our wetlands goes beyond their status as the habitat of many endangered plant and animal species. They are a vital element of national and global ecosystems and economies.

Wetlands are highly productive ecosystems being only second to the tropical rainforests. They perform many functions that maintain the ecological integrity and also provide many goods and services (Groundwater recharge, shoreline stabilization and flood storage are particularly important). The functions and benefits provided by wetlands are especially important for the general public as they support agriculture, tourism, industry, biodiversity conservation, social, economic and cultural activities.

Apart from being biodiversity hotspots, the wetland resources are equally crucial for income generation, livelihood and wellbeing of the communities. However, due to lack of effective management mechanisms and proper appreciation of their true worth, wetlands have continued to be degraded through unsustainable activities, conversion and overexploitation of their resources. The pressures on wetlands have been exacerbated by catchment degradation and pollution leading to proliferation of invasive species.

In the State of West Bengal the only Ramsar site is the East Kolkata Wetlands. The Ahirom Bil in Murshidabad and the Rasik Bil in Koch Bihar have been identified as Wetlands of National Importance and are under the National Wetland Conservation Programme. The Sundarbans National Park is a World Heritage Site and a Biosphere Reserve. A wide variety of wetlands are found in the State including the freshwater inland wetlands like mountain wetlands, rivers and lakes, marshes and swamps and also coastal wetlands like mangroves, tidal flats, swamps etc. Numerous human-made wetlands in the State include fish and shrimp ponds, farm ponds, irrigated agricultural land, reservoirs, borrow pits, sewage farms, and canals.

Urbanization brought intense competition for land, increasing land values and driving land use change with consequent deterioration and loss of access to natural resources traditionally used for livelihoods (Gregory et al., 2009), and compel them in joining to the unskilled daily labor force of the cities newly developed. Direct dependence of people of developing countries on the natural resource base is conspicuous (Pearce, 1988). "Spatially localized natural assets are of the utmost importance to the worlds" poor" (Dasgupta, 2002). Damage of wetlands, inlands and coastal fisheries, woodlands, ponds and lakes and grazing fields for urban extensions or the construction of large dams, push traditional dwellers, which are among the poorest in the society into further vulnerability. Frequently there are no ready alternative sources of livelihood to their local resource base in contrast to rich eco tourists for whom there are alternatives often somewhere else. "The range between a need and a luxury is enormous and context ridden" (Dasgupta, 2002).

The process of conservation is not always easy as desire as it comes along with conservation of their dynamism as well. Decisions about the conservation or use of coastal areas always raise conflicts of values, interests and political power. Conflict in the wetland area can be seen as the outcome of diverse interests and come down to whose values count in the society (Adger et al., 2002). Thus, conservation and degradation may take place simultaneously within a small holder community owing to the diversity of household strategies, due to heterogeneity within the rural communities in terms of access to and control over resources (Birch-Thomsen et al., 2001). Lists of threats to wetlands have been compiled but these rarely address the non-ecological reasons that have resulted in so many wetlands being lost or de-graded” (Finlayson and Rea, 1999). The non-ecological causes of wetlands loss and degradation need to be as well understood as the ecological causes like; economic development in wetlands, bureaucratic obstacles, lack of information or poor access to information and poor general awareness of the values and benefits derived from wetlands (Finlayson and Rea, 1999). In the process of conservation success stories always focused on the outcome of success, but stories of loss, marginalization and poverty are always under estimated in the process (Birch-Thomsen et al., 2001). Their conviction was conservation and degradation may take place simultaneously within a small holder community because of the presence of heterogeneity within the rural community in terms of access to and control over resources (Birch-Thomsen et al., 2001). The study on waste recovery system of EKW area recommended saving the people to save the wetland (Kundu et al., 1994).

As a consequence of developmental processes, proximity to a city present barriers as well as opportunities for livelihood change, potentially forcing the poorest people into greater vulnerability where this transition is poorly managed (Gregory et al., 2009). “Casual unskilled laboring was the primary income

generating activity for many peri-urban poor people whose lack of education and skills barred them from salaried employment” (Gregory et al., 2009). The process of urbanization forced livelihood transition is complex, fragmented and chaotic and a dichotomy of opportunities prevail (Gregory, et al., 2009). Gregory and Mattingly (2009) also observed two particular characteristics a trend away from natural resource based livelihoods and the acquisition of new livelihood thread. The priority for local people is for immediate livelihood improvements and not long-term environmental protection (Copsey et al., 2009).

Despite of all its value contribution to the society, importance of wetlands are still neglected . The failure to properly account for the total value of environmental and natural resources results in socially undesirable overexploitation and degradation of complex ecosystems (Kaplowitz, 2000).

Drawing lessons from Ramsar guidelines in general and experiences in wetland conservation in India and other countries in context, a policy document should support a set of immediate programmes comprising:

- Identification, inventorisatio n and classification of all wetlands and water bodies.
- Delineation of catchment areas as the basis of analysis and activities for large wetlands.
- Reduction in non-point source (agro-chemical) pollution.
- Establishment of water quality standards of wetlands and water bodies.
- Development of policy and legal framework.

- Setting up of proper institutions for easier implementation of the wetland conservation programmes.
- Dissemination of information and awareness generation
- Seeking funds for natural resource conservation as a part of development agenda.

Fund for wetland conservation will have to be sought from various development allocations, State or otherwise, in addition to the allocation of the Department of Environment.

National Environmental Policy (NEP) has recognized the various ecological services provided by wetlands and emphasized on the need for setting up a legally enforceable mechanism for the identified wetlands on the basis of their usages for preventing their degradation and strengthening conservation efforts. A special multi-disciplinary expert group constituted for this purpose providing a draft regulatory framework for wetlands to be notified under the provisions of Environment Protection Act, 1986. The proposed regulatory structure has provision of Central Regulatory Authority, State Regulatory Authority and District Regulatory Authority. The classification of wetlands is based on their size, threat perceptions and importance at various levels. The Ministry has identified 94 wetlands under National Wetlands Conservation Programme. The Central Government invites the comments of State Governments and other stakeholders on the draft regulatory framework before the regulatory regime for the wetlands is finally approved and notified.

Between 1994 and 2001, not a single question on the disappearance of urban and peri-urban wetlands and water bodies has been tabled in the Lok Sabha.

During that time only 4 starred and 16 un-starred questions were asked on wetland conservation. The disappearance of large areas of wetlands in general was accepted by the Environment and Forest Ministry and the absence of corroborative data on the loss was conceded. With this understanding of the context, the wetland conservation activities to be initiated by the State of West Bengal should include:

- Prohibition of further filling up of any wetland, water body or paddy field irrespective of its size, on any grounds including so called public interest projects. This will have to be made mandatory by the government throughout the State.
- Disapproval of all construction plans proposed by any authority on a land that is described in the State Land Records as wetlands or water bodies (or any such description like jala, khal, bil, doba etc.) or are paddy fields (where at least one crop of paddy grows in one calendar year) on the basis of the last Cadastral Survey.
- Restoration of all degraded and filled up wetlands and water bodies (including paddy fields and borrow pits) within the fold of District Development Plans.
- Undertaking extensive awareness programmes among the people as well as the development functionaries for a sustained period (minimum 10 years). This can be compared with the kind of effort made for population control or polio eradication at the national level.

Unless the above tasks are undertaken without any further delay, there will be little chance of any success in the Governments' effort for conservation of wetlands and water bodies in West Bengal. Finally, conservation of natural resources in general and wetlands in particular, will require an unfaltering political support and

spontaneous participation of the citizenry. Without these the implementation of this policy will be largely ineffective.

Wetlands are defined as "*areas of marsh, fen, peat land 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 tides does not exceed six meters*" (This definition is included in the text of Ramsar Convention, Article 1.1, 1971).

OBJECTIVES

THE MAIN OBJECTIVES OF THIS CHAPTER ARE AS FOLLOWS:

Through maintenance of open space, the wetlands provide the much-needed oxygen and recreation facilities to the fringe population. In his famous judgment on a case between 'People United for Better Living in Calcutta – PUBLIC and others' versus the state of West Bengal and others (matter no 2851 of 1992 in the Calcutta High Court), the Hon'ble Justice U C Banerjee has - noted the following :

"...In this region 1 square meter of surface water can produce 23.75 gm. of oxygen per minute after meeting the requirement of aquatic animals. Average individual human being needs 2.1 gm. Oxygen per minute and per day, therefore, it is 3024 gms. And any loss of wetland, therefore, will have tremendous impact on to the living organism as also human beings on the surface..." (dated September 24, 1992).

There are three fundamental problems with the wetlands under discussion. First, most of the potential benefits as specified above are in the nature of public goods and hence are subject to free rider's problem. The benefits flow to the country as a whole or even to the humanity at large---in fact, both present and future generations. How to make those people who are at present distantly connected to the wetlands pay for the protection, promotion and development of such resources? The second major problem is that the current yield rate of most wetlands in this region – whether in crops or in fisheries – is awfully small so that they tend to be easily attracted to alternative uses other than pisciculture. Third, the weak economics of pisciculture on wetland and the consequent lack of economic strength

of the traditional dwellers on wetland make them very susceptible to various negative externality effects from non-pisciculture activities, which they cannot resist.

Here lie the contradictions between the facts and fictions around wetland, which need to be satisfactorily resolved in a property rights framework. The precise question raised in this article is: Does the current policy frame provide a suitable platform for trading in property rights across the stakeholders on wetland so as to achieve generation of the highest value out of these resources?

However, the East Kolkata wetland (EKW) is threatened by the continuous expansion of the city, and heavy pollutant particles causes' loss of biodiversity of flora and fauna and socio economic valuation of Kolkata. As a result people are willing to pay (WTP) for conservation and protection of wide variety resources of EKW. The present study has attempted to

- Identify the environmental and biological threads
- Case study on EKW
- Review of Existing Wetland Policies and Institutional Mechanisms,
- How the policies are violated against protection of wetlands and
- Policy recommendations for Conservation and Management Plan (CMP)

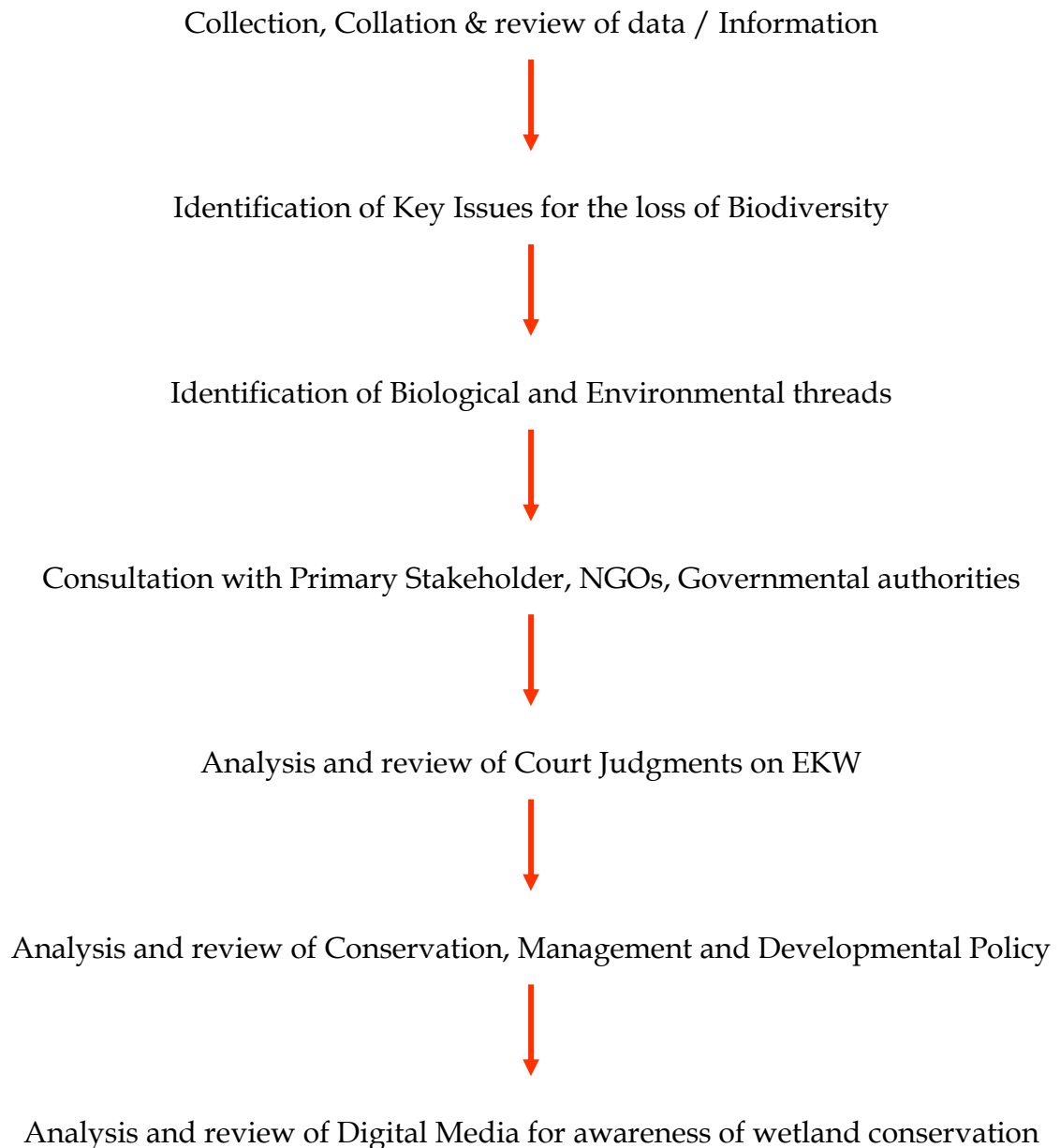
METHODOLOGY

Remote sensing data in combination with Geographic Information System (GIS) methods are effective tools for the wetland conservation and management. The application encompasses water resource assessment, hydrological modeling, flood management, reservoir capacity surveys, between the different ministries, energy, industry, fisheries, revenue, agriculture, transport and water resources, is essential for the protection of these ecosystem.

Generation of data base and information appears to be very useful in outline methodologies. Capacity building now a day is considered as state of the art in time development process for understanding the problem in depth. Capacity building will attempt developing a holistic approach to training with focus on strengthening the capacity of national, regional and local institutions of training. In this study, a comprehensive method for collection of data from different secondary sources i.e., report from local & state authorities, and digital media , analysis of research inputs and formulation of strategies has been adopted. Present mechanisms of operation in terms of technical inputs, institutional and legal framework, demographic situation, resource generation, role of different interest groups/NGOs have been discussed. This study is intended to formulation a national strategy towards the protection and utilization of periurban wetlands.

The methodology for management planning is based on the New Guidelines for Management Planning for Ramsar Sites and other Wetlands as adopted by Contracting Parties to the Ramsar Convention on Wetlands in their seventh

meeting held in 2002 at Valencia, Spain. The methodology is based on critical evaluation of ecological, socio-economic, and cultural features to identify objectives and operational limits for effective restoration and management of wetland ecosystems. The management planning methodology for EKW is given bellow:



OBSERVATIONS

Causes of Loss of Biodiversity

Increasing population and changing lifestyle leads to commercial exploitation of the natural resources. This results in loss of biodiversity. Consequently it is adversely affecting the ability of the nature to continue delivering the goods and services for human existence. The loss of biodiversity affects not only the physical environment but also the social, cultural, religious and spiritual well being of human life.

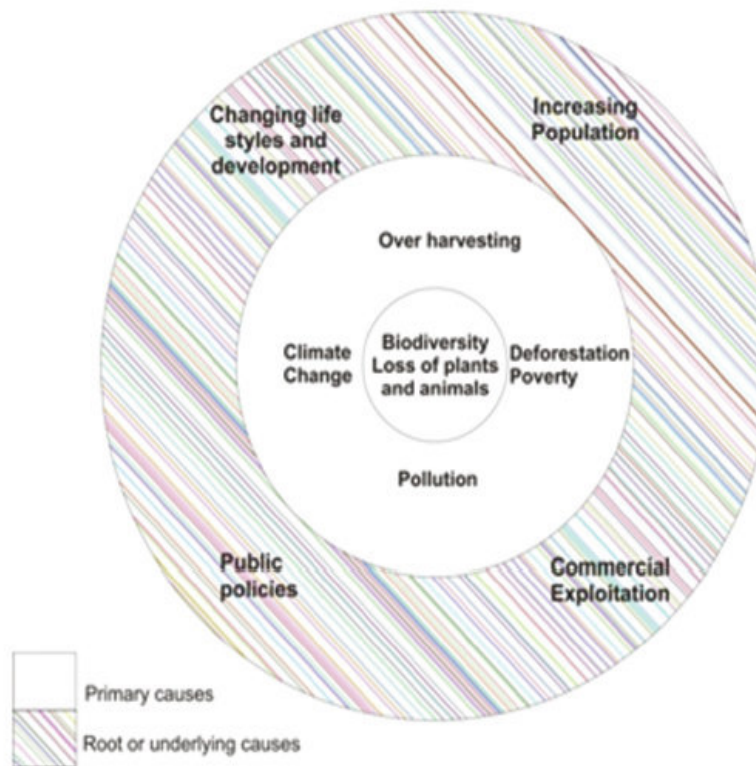


Figure 4.1: Causes of Loss of Biodiversity

Environmental and Biological Threads

The major threat to the management and conservation of the East Calcutta Wetlands may be understood in the historical framework as an area that has been controversial throughout the various developmental phases. The threats, as such have to be understood in the context of the management systems and issues of the area that is resource rich, has a tremendous real estate value, is politically volatile, represents various vested interest groups, and demonstrates a wide variety of human activities.

The major threat to the development and implementation of a management and conservation plan has been summarized as below (Basu, 2003):

1. Institutional and Regulatory Problems

- Coordination among the various government departments/agencies.
- Lack of institutional credit from rural banks
- Absence of life/health insurance facilities
- Absence of crop insurance facility
- Information asymmetry
- Disappearing traditional skill and wisdom
- Absence of conservation policy guidelines and legislation

2. Physical Factors

- Siltation in the canals and fishponds
- Inadequate availability of waste water in fishponds
- Discharge of effluents into the wetlands

3. Human Interference

- Theft, poaching and pilferage
- Volatile and sensitive employer-employee relationship
- Non-cooperation among bheri owners themselves for sharing sewage
- Improper inlet-outlet management of sewage for operating bheris and cultivating paddy
- Tenurial instability in the garbage farms
- Contamination of wastewater due to untreated industrial effluent
- Tenurial instability in the workers' managed co-operative fish farms
- Fragmentation and conversion of land
- Threats of real estate takeovers

Analysis and Review of Judgments on EKW

Apart from the above Ecological and Biological threads, the two most important threats in these wetlands are that of encroachment due to urban development and siltation. The constant change of land use pattern has affected the ecology of these wetlands. Many large pisciculture ponds have been converted to paddy fields. The industries in the adjacent areas have made unauthorized connection to the sewers to empty their untreated wastewater. The sewers on the other hand empty the water into the channels that later on join the wetlands. This is causing a deposition of the heavy metals in the canals and ultimately the quality of fish and vegetables produced in the wetlands is far below the edible standard.

There are several reasons why experts do not find further expansion on the city's east advisable. However, the development pressure is immense. Land prices tend to rise close to the metropolitan centre; especially since the Eastern Metropolitan Bypass and its connecting roads have made the area now quickly and easily accessible (Kundu, 1994). City-based non-governmental organizations took up the cause of wetland protection and conservation in 1991. Members of the administration actively mobilized agents of civil society when they felt that the state government was deviating from its earlier policies. This led to what many local experts consider the most important case of environmental litigation in Calcutta. In court, a sense of public sphere was established, forcing the state government to take its own programmatic statements into account. This was the first incidence of a movement building up with an explicitly environmental goal in the metropolitan area. Also, the High Court case *PUBLIC v State of West Bengal* led to Calcutta's first

widely cited judgment on an environmental matter. It forced the State Government to take public opinion into account in its urban planning, again for the first time.

During the 1990s, the Calcutta tanneries became an issue in this case, with the Supreme Court finally ordering their relocation to an area within the wetlands, to a site many believe to be protected by the initial High Court ruling. Development planning on Calcutta's eastern fringes was at stake yet public interest litigation, *Surojit Srimani v the State of West Bengal*. In this case the environmentally motivated petitioners did not achieve any of their goals. Overall, the track record of judicial intervention is mixed. To a certain extent, it does make sure that environmental issues are respected. The judiciary has neither assertively forced government bodies to clean up their act nor systematically tackled urban planning, the core issue of Calcutta's environmental crisis.

The role of the state government in the wetlands issue has been ambiguous. Some of its agencies propagate and devise conservation strategies, while others tolerate or even promote urbanization. Some government servants actively supported the pro-conservation NGOs. On the other hand, the state government also proposed and promoted the conversion of wetland areas. There are strong signs that the administration as a whole is neither organized nor equipped to adequately deal with the delicate issue of urban fringes. Informal and illegal changes of land use threaten the ecological balance of the area, as do unplanned encroachments on the fringes of the region. The struggle for wetland protection is therefore far from over. Court intervention must be seen as a resource in the dispute, but not necessarily as its final settlement.

The first phase of the court proceedings of *People United for Better Living (PUBLIC) v The State of West Bengal* are analysed. It began with the first write petition in early 1992 and has led to repeated judgments prohibiting changes of land use in the Waste Recycling Regions of the wetland area.

Section 5.4 deals with *M.C. Mehta v Union of India* as far as it concerns the East Calcutta wetlands. It will become apparent that this judgment is potentially in serious conflict with the High Court judgments. The Supreme Court has ordered that the tanneries in Calcutta must relocate to an area that may fall into the protected area. The available maps are not detailed enough to tell. So far, neither court has taken up the challenge of determining which borderlines are legally binding.

Section 5.5 again elaborates on the issue of the imprecise borders of the protected area, returning to the PUBLIC case. In 1995, this NGO had accused leading government officials of contempt of court, a criminal offence, for not having adequately safeguarded the wetlands, particularly with respect to the leather complex and several other minor encroachments.

Section 5.6 examines the third public interest litigation concerning East Calcutta, *Surojit Srimani v State of West Bengal*. In this case, citizens were trying to tackle the complex issue of urban planning. They focused on those areas of the East Calcutta wetlands region not protected by the High Court.

Section 5.7 deals with several state government initiatives in favour of wetland conservation.

The Chronology of the Court Proceedings for Protection of EKW

1865: Land filling started in Salt Lakes. A 2.59 sq.km area was acquired for dumping city's garbage and for sewage farming and fisheries.

1928: The Bidyadhari River was officially declared dead.

1962-67: Reclamation of Salt Lakes for the extension of the city, race for huge conversion of wetlands into urban facility.

1980: Eastern Metropolitan Bypass constructed forming western boundary of East Calcutta Wetlands.

1992: A Kolkata based NGO; People United for Better Living (PUBLIC) in Calcutta filed a petition in the High Court (HC) against the changes of land use in the Waste Recycling Regions of the wetland area. This case is still under the consideration of Supreme Court (SC) of India. The followings are some of the highlights of court verdicts, government and people actions.

PUBLIC filed Public-Interest Litigation (PIL) in the SC.

1995: PUBLIC had accused leading government officials of contempt of court, A criminal offence, for not having adequately safeguarded the wetlands, particularly with respect to the leather complex and several other minor encroachments.

A report was prepared by the National Environmental Engineering Research Institute that detected that presence of chrome-based tanning among Kolkata tanners, with inappropriate wastewater drainage and collection systems, was causing serious environmental, health and hygiene problems.

1996: Supreme Court order directed these and other inner city tanners from Tiljala, Topsia and Pagla Danga districts to shut shop and relocate to the Bantala Leather Complex, 15 km away from Kolkata as a judgment of M.C. Mehta Vs Union of India.

2001: The judges expressed their dissatisfaction over the inability of the Ministry of Urban Development to specify the time frame for amending the buildings by laws. Delhi Jal Board (DJB) was fined Rs 2,500 for not submitting the report on the leaking water pipes.

The HC took up the issue of protecting the natural lakes of Delhi during this hearing. The bench observed, "We understand that natural water bodies that exist in Vasant Kunj and Prasad Nagar areas would vanish if not taken care." The Municipal Corporation of Delhi (MCD) was directed to submit an affidavit with regard to steps taken to protect these water bodies. As a prelude the court directed the DJB, MCD and the New Delhi Municipal Council (NDMC) to collect information on the water bodies in Delhi.

2002: East Kolkata Wetlands was designated as a Ramsar Site.

2004: The tanning association formed. The association of the tanners approached the state government to manage and operate the common effluent treatment plant.

2005: East Kolkata Wetland Management Act was formed. The act has the power to demarcate the boundaries of the wetlands as well as to take measures to stop, undo or prevent any unauthorized development project or illegal use of the wetlands.

2006: East Kolkata Wetlands Conservation and Management Bill, 2006, which aimed at including 12, 571 hectares of land into the East Kolkata Wetlands, were passed. Any illegal construction will be penalized up to Rs. 1 lakh according to the bill. The state government decided not to dislocate 50,000 villagers who were already living in the five moujas that had been included in the wetlands. According to the bill all the pre existing constructions within the wetland had to be demolished.

PUBLIC filed another petition in the HC alleging that Kolkata Municipal Corporation (KMC) had selected an area for its water supply project at Bointala in Dhapa which fell under the purview of the East Calcutta Wetland Management Act (2006).

The tannery association emphasized that J. Dalmiya, 2006 had failed to construct the common effluent treatment plant, as promised. Worldwide Fund for Nature (WWF), other environmental groups and Ministry of Environment and Forest (MoEF) protested the action.

2007: 433 of the 550 tanners have been allocated land at the Bantala Leather Complex and 125 tanners have already started operations.

2008: The state environment department was “in principle” against the Kolkata Municipal Corporation’s (KMC) plan to set up a water treatment park on the East Kolkata Wetlands, where the high court has banned construction activities.

An order was issued barring local authorities (municipal corporations, Panchayat, etc) from issuing licenses or sanctioning building plans for commercial

activity without a clearance from the East Kolkata Wetland Management Authority (EKWMA).

Calcutta High Court granted conditional approval to Kolkata Municipal Corporation (KMC) to set up a water treatment plant in the East Kolkata Wetlands. While giving the nod, the division Bench imposed strict conditions, including compensatory greening, creation of water bodies, minimization of ecological damage and specifying the quality and nature of materials to be used. The court also appointed a three-member committee (comprising two former university Vice-Chancellors and a Professor) to monitor and report on the KMC's compliance with the restrictions.

2009: The Supreme Court admitted the matter filed by Kolkata's non-government action group PUBLIC, objecting to Kolkata Municipal Corporation's plan to locate the facility of Rs.100-crores water treatment plant at Dhapa inside East Kolkata Wetlands, a Ramsar site.

2011: In March, scooping out silt from the canals of EKW, that carry 1,300 million liters of wastewater into the *bheris* (small ponds) everyday has made them deeper, changing the natural gradient and obstructing the flow into some parts. Fish production had dropped in these areas.

In March it was found that about 33 water bodies in the Ramsar-protected East Kolkata Wetlands were filled illegally for the construction of the Newtown-Rajarhat Township. A letter (No. HIDCO/planning 13/99) dated 19 November, 1999, written by the erstwhile managing director of HIDCO, West Bengal, Mr. Sanjay Mitra, to the secretary of the fisheries department, sought permission for relaxation of the provision of Inland Fisheries Act, 1984 and West Bengal Inland Fisheries (Amendment) Act, 1993 for filling up of water bodies for the

implementation of the New Town Calcutta Project. The 33 water bodies that were filled by the HIDCO without permission from the fisheries department ranged from 6.05 cottahs to 114.95 cottahs.

The government prepared a draft management plan to conserve East Kolkata Wetlands (EKW). The state government has been forced to prepare the draft plan after the Centre recently imposed a ban on discharging sewerage into any kind of water body by framing a new Wetland rule. The new rule has left the state in real trouble as the EKW serves as the natural sewerage treatment plant for the city.

Review of Existing Wetland Policies and Institutional Mechanism

The management and conservation of the EKW is a coordinated approach that necessitates planning and appropriate institutional and administrative arrangements. Also a periodical review of existing legislation is required to ensure that these are compatible with the wise use principles (Basu, 2003).

At present there are several institutions involved in the management of some aspects of the EKW. These include Kolkata Municipal Corporation, Kolkata Metropolitan Water and Sanitation Authority (KMWSA), West Bengal Pollution Control Board (WBPCB), Department of Environment (DoE), Department of Irrigation and Waterways (DoIW), Institute for Wetland Management and IW MED, Department of Fisheries (DoF), Department of Minor Irrigation, the Department of Agriculture and the Land and Land Reforms Department. Multiplicity of agencies has prompted some planners to consider appropriate coordinating cell to synchronize the inter-agency management. In addition to the governmental agencies listed here there is a multiplicity of stakeholder involved. These include bheri owners, real estate developers, farmers, fishermen, NGOs, etc. All of whom have some stake involved either in the better management of the wetland area or in maintaining the status quo or in its conversion and development into built-up areas. A stakeholder analysis needs to be undertaken to assess the Primary, Secondary and Key stakeholders and the relative importance and influence of each on any project on the conservation and management of the wetland system.



Figure 4.2: East Kolkata Wetlands during Netting Time



Figure 4.3: Pisciculture Practices of East Kolkata Wetlands

WETLAND POLICIES

- *The Bengal Act II of 1889 referred to as the Private Fisheries Protection Act 1 of 1939 and West Bengal Act XXI of 1959)*

This Act for the first time recognized –theft or destruction of fish in private waters as a cognizable offence. ‘Private Waters’ in this Act has been defined as waters "*which are exclusive properties of any person or in which any person has exclusive rights in fish*".

- *Indian Forest Act 1927*

It empowers the Forest Department to make rules to regulate, hunting, shooting, fishing, poisoning of water and selling up of traps and snares within reserved and protected forest areas except in water bodies where tidal effects are there (though the Forest Department in reality restricts fishing operations even in tidal areas in contradiction to the permission given to traditional fishermen to carry on fishing in such waters). All such activities are totally prohibited in Class A forests, which later came to be known as Wild Life Sanctuaries or National Parks. Only under Class B forests (beyond Class A) such activities are permitted as per rules through issue of permits by the relevant department.

➤ *The Bengal Tank Improvement Act, 1939 & West Bengal Tank Acquisition of Irrigation Rights Act, 1939*

These Acts enable the government to excavate derelict tanks for irrigation purpose, though these have remained largely ineffective due to certain inherent weaknesses and lack of an overall perspective on utilization of water.

➤ *The Wildlife (Protection) Act, 1972 (amended till 1991) and the Forest (Conservation) Act 1980*

The Wildlife Protection Act (WPA) and other central laws like the Forest Act, wetlands are not defined as a separate category of ecologically important areas but generally form part of protected areas. They are included in protected areas only when wetlands are the habitat of endangered wildlife (and exist within sanctuaries or national parks). The WPA is also based on the principles of acquisition of land from local communities though there is an increasing consensus on the viability of joint protected area management. The Wildlife (Protection) Act of 1972 provides for the establishment of sanctuaries (section 18) and national parks (section 35) and thus offers protection to wetlands that are or fall within the boundaries of protected areas. However, National Wildlife Law places a strict ban on grazing within a National park and hence prohibits the human impact and influences on the wetland ecosystem once this is declared as a National Park. However, studies have proved that regulated grazing is required to control the profusion of aquatic macrophytes that otherwise colonize the wetland. Thus there are some contradictions between wise use obligation under the Ramsar Convention and the national Wildlife (Protection) Act that is designed for strict protection within a national park.

➤ *The Bengal Canal Act of 1864 and The Bengal Ferries Act of 1885*

These Acts put certain restrictions on the use of water bodies in the interest of irrigation and ferry service.

➤ *The Environment (Protection) Act, 1986*

The Environment (Protection) Act, 1986 is an umbrella Act, which was enacted with the objective of protecting and improving the environment and for, matters connected therewith. The Environment (Protection) Act, 1986 has been instrumental in protecting wetlands and groups of wetlands. Several significant regulations and Notifications have been passed under this broad Act for monitoring pollution and safeguarding the environment. The Environment (Protection) Act can be used to notify certain ecologically harmful industries, operations and processes particularly in cases of wetlands, which are on the brink of extinction.

➤ *The Indian fisheries Act of 1897*

This broad-based law, which is also applicable to the sea within a distance of one marine league of the sea coast, was enacted with the objective of supplementing other fishery laws. This Act made use of poison lime or any noxious material or dynamite or other explosive substances with the intent of catching or destroying fish a punishable offence. It also empowered the state government to frame rules and issue notifications to regulate and/or prohibit (a) erection and use of fixed engines, (b) construction of weirs, and (C) the dimensions and the kind of the nets to be used and the mode of using them. The government was also empowered to prohibit fishing in any specified waters for a period upto two years.

➤ *The West Bengal Town and Country (Planning & Development Act) 1979*

Under the West Bengal Town and Country (Planning and Development) Act, 1979, the Kolkata Metropolitan Development Authority (KMDA), in respect of Kolkata Metropolitan Area, has been empowered to call for return with respect to any development work, so as to consider feasibility and permissibility of such work . The KMDA has notified that ‘ No permission for filling of tanks/ponds/water body/ marshy land etc. will be given if it is considered necessary for being used as a) public water body, (b) maintaining drainage facility, (c) fire-fighting purpose, (d) environmental and ecological reason, (e) pisciculture purpose’. But conversion of such wetlands, which are used for agricultural purposes, has not been included as an item under KMDA notification.

However, later the KMDA submitted “The Land use and Development Control plan for Eastern Fringe of Kolkata” to the state government U/S 37 (2) of West Bengal Town and Country Planning Act. Under Chapter 34, Clause 34.3, it is mentioned that “No canal, pond, water body or wetland shall be filled up provided that after taking in view the drainage, ecology and environment, pisciculture, fire-fighting or any other material consideration the KMDA may, for reasons to be recorded in writing with the previous approval of the State Government allow any canal, pond, water body or wetland to be filled up”. This development has diluted the provision of conservation of wetlands.

➤ *The West Bengal Estates Acquisition Act, 1953*

It establishes fisheries rights of the state in rivers the ceiling-surplus *beels* and *baors*, which have been classified as non agricultural land. It also includes those tank fisheries which are not retained by the owners or where the leasing rights granted

earlier to intermediaries had expired. Under this Act 'tank fishery' is defined as "*a reservoir or place for storage of water, whether formed naturally or by excavation, or by construction of embankments, which is used for pisciculture, or for fishing together with the sub-soil and the banks of such reservoir or place except such portions of the banks as included in a homestead or in a garden or in a garden or places*". Thus, *beels* and naturally formed *baors*, which are used for fishing or pisciculture, before the date of vesting, also fall under this definition. As per the estimates of the Master Plan Committee for Fisheries Development in West Bengal, over 95 thousand acres of tanks and *beels* have been vested under this Act.

➤ *The West Bengal Fisheries (Requisition and Acquisition) Act, 1965*

For the purpose of improvement and development of fisheries and for supplying fish to the public, the government can requisition and subsequently acquire water bodies. In this context fisheries mean any land where on water is confined naturally or artificially-whether periodically or throughout the year—for pisciculture or for fishing, and include 'tank fisheries' as defined in West Bengal Estates Acquisition Act, 1953.

➤ *The West Bengal Land Reforms (Amendment) Act, 1981*

The Land Reforms Act of 1955 states that the land use of an area cannot be changed without the permission of the District Collector. This power vested in the Collector also contributes to the conservation of the wetlands areas by controlling their conversion.

➤ *Water (Prevention and Control of Pollution) Act - 1974 (Amended,1988)*

The Water (Prevention and Control of Pollution) Act of 1974 prohibits discharge of poisonous, noxious or polluting matters into any stream or well, directly or indirectly. In case of the East Kolkata Wetland system, the law therefore prohibits pollution and contamination of the canals and other running water system feeding the wetlands, vide Article 24.

➤ *The West Bengal Inland Fisheries Act, 1984 (amended in 1993)*

This Act regulates for the first time the growing trend in general and especially stronger in urban areas and urban fringes to convert water bodies into building, constructions, besides conserving different species of fishes and also allowing take-over of the management of water bodies under multiple ownership, if the latter implies non-utilization of the water bodies for the practice of pisciculture. The amendment to this Act puts a restriction on conversion of water bodies larger than 5 cattaahs or 0.035 hectare in size into uses other than pisciculture. This amendment also allows the government to transfer management and control of water bodies inclusive of embankment and naturally/ artificially depressed areas to any competent person or authority in the interest of better utilization of water bodies. Conversion or destruction of water bodies has been prohibited through a provision by which the owner can be asked to restore within a stipulated period and at his own cost the damaged resource to its original conditions.

The Committee preparing the Master Plan for Fisheries Development in West Bengal in 1975 cited two important flaws of the provisions under the earlier Acts. First, the provisions were not strong enough to protect and conserve estuarine fisheries, believed to be highly depleted due to overfishing and other causes—at

least during the breeding season. Second, the existing laws were found 'quite inadequate' in handling present-day pollution of natural resources and the resulting decline in fisheries potential following from discharge of harmful refuse into rivers and other water bodies by the factories, large-scale release of pesticides and pesticide residues into ponds and water reservoirs by practicing agriculturists and retting of jute in inland waters. The fact that such problems still persist raises some doubt about the efficacy of subsequent Acts and provisions in arresting the threats. For the purpose of achieving better utilization of privately owned water resources and also to put some curb on private property rights on fisheries, several other acts have been made.

➤ ***National Conservation Strategy and Policy Statement on Environment and Development - 1992***

The Policy Statement of Government of India (GoI) clearly mentions the steps to be taken for sustainable use of land and water under 5.2.1.4. It has emphasized on 'Protection of land near water bodies and prevention of construction thereupon. It also mentions the need for 'conservation of wetlands for ensuring sustainable ecological and economic benefits'.

➤ ***The Waste Lands (Requisition & Utilization) Act. 1952***

For exploiting wastelands to produce food crops or fish or for any other public purpose as defined in the Act, the government can acquire such lands, against payment of compensation, at stipulated rates. As per the record of rights published under the Bengal Tenancy Act of 1885 wastelands include any land classified as *nutan patit*, *puritan patit*, *layek patit*, *garlayek patit* or *layek jungal* and any land or water bodies which in the opinion of the state have not been adequately utilized for

production of crops or fish for a continuous period of more than two years. Such land however does not include homestead, farm house, burning or burial ground or any place of worship.

INSTITUTIONAL APPRAISAL

In order to undertake an appraisal of the institutional mechanism having a bearing on the management and conservation of the East Kolkata Wetland system, it is important to distinguish between the institutions/agencies that have direct relationship with the management issues and those that have an indirect, but nevertheless significant relationship.

➤ *Kolkata Municipal Corporation (KMC) Department of Irrigation and Waterways (DoIW)*

The Kolkata Metropolitan Corporation (KMC) is primarily responsible for drainage of sewage at the outfall point and the Department of Irrigation and Waterways is responsible for drainage from there to the river Kulti. The major feeding canals to the East Kolkata Wetlands are also under the purview of these two agencies. Therefore these two agencies are key for the distribution of the wastewater to the wetlands to the east of Kolkata. However, these departments do not have any obligation to supply the needs of the fisheries in the area. Individuals involved in aquaculture have no say in the control of the water level in the supply channels and consequently the supply of sewage is largely unpredictable.

➤ *Panchayat and the Department of Fisheries (DoF) and the Department of Cooperatives*

The *Panchayat*, the Fisheries and the Cooperatives department work in close collaboration for the overall socio-economic development of the residents of the East Kolkata Wetlands area. The *Panchayats* provide the support towards the formation of cooperatives for undertaking Fisheries through the various schemes it runs like the Jawahar Rojgar Yojna, etc. It provides the seed money to start the cooperative and also supports infrastructure inputs like excavation of fishery feeding canal, creation of embankment, etc. *Panchayat* also plays an instrumental role in the identification of the beneficiaries for the formation of the cooperative and also channels loan and other support like seeds etc. through the Department of Fisheries.

➤ *Department of Environment (DoE)*

The Department of Environment, GoWB, operates through the West Bengal Pollution Control Board that is a regulatory body and the IWMED that provides technical support to the WBPCB. The Department of Environment is perceived to be playing a major role in the conservation and management of the East Kolkata Wetlands through both these agencies. While the WBPCB, which is the command and control wing, can contribute towards bringing the polluting industries discharging their effluents into the East Kolkata Wetlands under the regulatory cover, the IWMED can provide the requisite research and technical support through carrying out epidemiological and other studies.

➤ *Land and Land Reform Department*

The Land and Land Reform department plays a crucial role in maintaining the ecological character of the East Kolkata Wetlands through the exercise of the Land Reform Act as any change in the land use requires its permission.

➤ *Department of Minor Irrigation and the Department of Agriculture*

The Minor Irrigation Department provides support to the economic activities of the East Kolkata Wetland area as it is responsible for the lifting and pumping of the wastewater. The agriculture department provides support to the cultivation activities by providing loans, seeds, fertilizers, etc to the farmers.

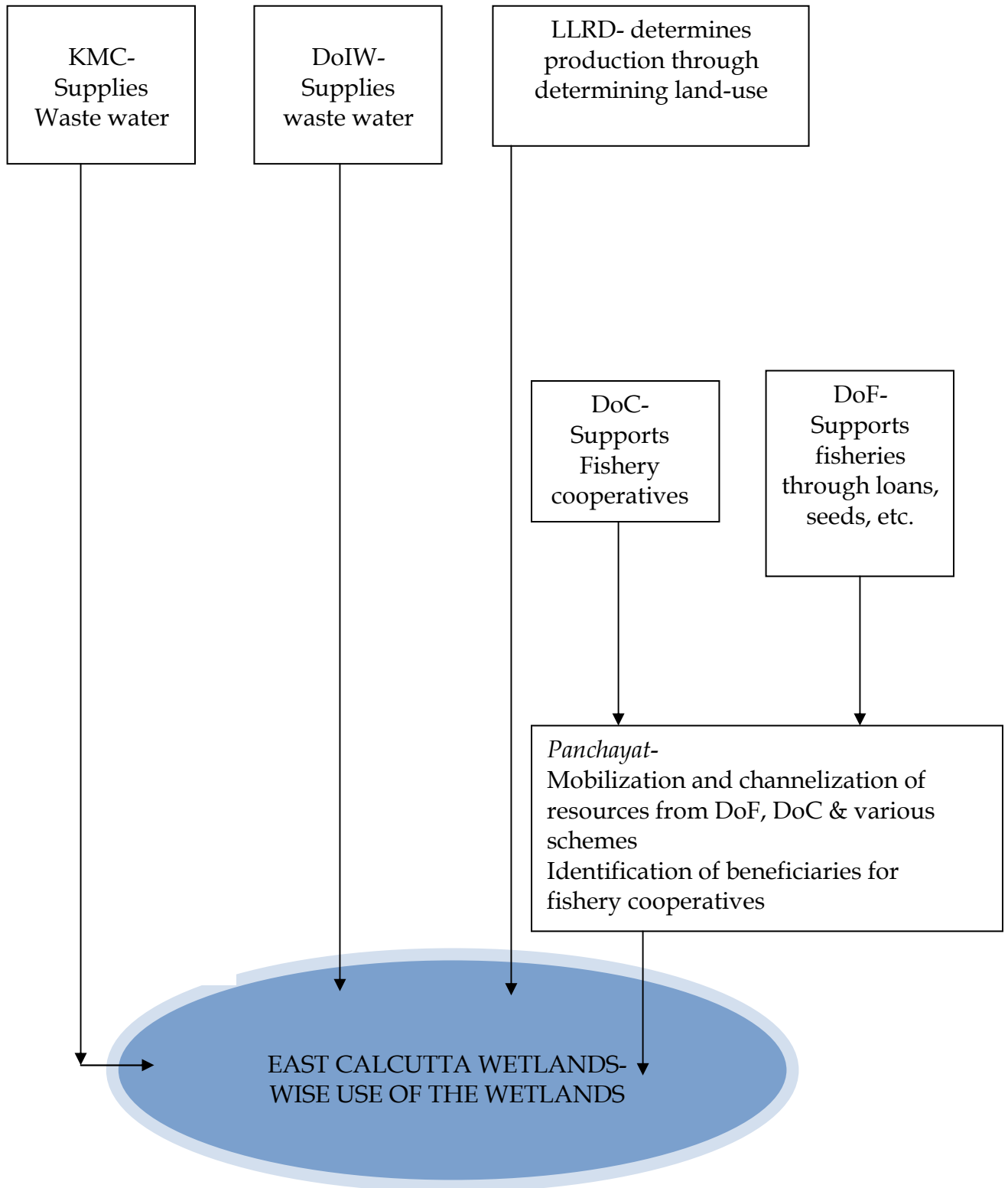


Figure 4.4: Institutional Matrix: East Kolkata Wetlands (Sources: Basu, 2003)

Although the list of relevant Acts and Rules are not exhaustive, it covers the most prominent ones. This brief account of the legal framework governing use of wetlands in the state of West Bengal that although the government had initially started protecting the private property rights in wetlands and water bodies so as to promote pisciculture, later on the thrust shifted towards development under active government ownership and control, so much so that the private or even common property rights earlier extended to promote fisheries were severely cut back and put at the disposal of various government departments. So, the process, the property rights regime on wetlands seems to have shifted from one extreme to the other, as if private or common property management of these resources were invariably 'bad' (meaning inefficient and/or inequitable) and direct government ownership and/or control constituted a panacea. Two fundamental and interrelated questions arise in this context; First, can pervasive government ownership and control of wetlands meet the growing ecological and social concerns around wetland use? Second, wouldn't suitable modifications and refinement in private and common property regimes better serve the sustainability issues of wetland resources?

The urgency of nature and biodiversity conservation is not the only valid argument for the protection of these particular wetlands. Much attention has been paid to what the state government's Institute of Wetland Management and Ecological Design (IWMED) calls the 'Waste Recycling Region'. This term is sometimes used interchangeably with East Calcutta wetlands, but has the advantage of having been defined by a map. The definition is ambiguous, however, as the map is of inadequate scale and exists in various versions, none of which has been officially published by the authorities. It is the Waste Recycling Region that was protected by the High Court rulings.

The Government of West Bengal is in favor of wetlands conservation. Legislation for the protection of wetlands is included in the West Bengal Town and Country (Planning) Act of 1987.

With regard to East Calcutta, the KMDA paper stated in 1990. With the widening of Diamond Harbor Road and Raja Subhodh Mallick Road as well as construction of Eastern Metropolitan Bypass along with its connectors, the accessibility of eastern and southern areas has improved to a very great extent. This has generated a spurt of private land transaction and development activity in these areas. As a result, indiscriminate encroachment on green areas, wetland and water bodies are taking place. This tendency should be ... properly controlled and guided. ... The direction of development should be reoriented to restore it to the north and west.

In November 1990, the State Planning Board presented its draft of a 'Perspective Plan for Calcutta: 2011'. It made explicit reference to the East Calcutta wetlands (p.204): 'Functional importance of wetlands towards flood control, regulation of water quality, treatment of waste water, recharging ground water, pollution abatement, and a strong pisciculture is recognized.'

Perception the Role of Media in EKW

The mass media especially digital media have enormous potential in creating a change in public awareness on biodiversity conservation. It is a powerful tool that can galvanize public support to protect the EKW where laws are violated. The environment in which we live in is becoming degraded at an alarming rate. This is occasioned by a number of factors such as population explosion, urbanization, deforestation, bush burning etc. There is therefore the need for its conservation if it must sustain livelihood. Appropriate intervention to conserve the environment could be effectively initiated by the use of mass media for public awareness and involvement. This chapter focuses on the role of mass media in environmental conservation and violation of rules which are supported my previous arguments. It is recommended that media houses should improve upon their information unit to complement their role. Government should implement policies on environmental conservation and offenders must be punished. NGO's should be more involved and encouraged to assist in environmental conservation.

Communication, with the help of mass media, not only brings people but also communities together, thus contracting the globe into a village (McLuhan, 1964). The frontier between mass media, individual and cultural transition has been the subject of investigation for many social scholars since the dawn of the 'information and communication age' (Lerner, 1958; Hagen, 1962; Schramm, 1964; Rogers & Shoemaker, 1971; Rogers, 1986; Alahari, 1997; McDonald, 2000). The new theory assumes that the effects of the media are selective and dependent on the characteristics of a society and individual differences, and is supported by many empirical findings (Peterson & Thusrstone, 1933; Cantril, 1940; Schramm, 1979;

Kazee, 1981; Lowery & DeFleur, 1988). Janowitz (1968) describes mass communications as comprising specialized institutions employing technological devices such as press, radio, film, etc., to circulate important subjects to large, diverse, and widely distributed audiences. This chapter therefore, drawn on the Newspaper coverage in the Times of India, Telegraph and Statesman and virtual dashboard in blogs.

Bloggers' Point of View

Souvik Lal Chakraborty posted his views in a blog¹ on July 7, 2012 EKW is deprived by the Government. There is no development in this area. Bheri (small fish ponds) owners don't get any protection from the police and their livelihood is at stake! There have been several issues of encroachment, but those attempts were stopped by the interference of several civil societies. But, no significant action has been taken on behalf of state government (*Government of West Bengal*). People of Kolkata and International community should take some significant steps to save this amazing place (*World's largest Sewage Fed Fishery*)

EKW have often been termed as wastelands. As a result, wetland have been actively drained and converted to other uses.²

Partha Bhattacharya posted his comments in a blog³ on June 30th, 2007 that the development and incessant pressure by environmental groups in the city, the state government has promulgated controls to preserve the vast water body. The state government has decided to pull down more than 30 illegal structures built on the

¹ <http://www.global-changemakers.net/environment/east-kolkata-wetlands-a-deprived-ramsar-sight-in-india>

² <http://ekwsafe.webs.com/>

³ <http://kolkatamusing.com/2007/06/east-kolkata-wetlands.html>

wetlands over past few years. It has been found that there are 2 types of encroachers who pose threat to the wetlands and will be asked to leave the place as soon as possible.

Some of them are local people who are living there for many years and have extended their homes due to increase in family-size. For them the rules may be relaxed because their non-concrete structures do not pose as much threat as the outsiders who have built facilities there for business interest.

The outsiders will have to pull down their structures and move away at the earliest. It inspires confidence that the government has woken up to look after the wetlands in earnest. Plans are now afoot to create a park there on the lines of the famous Hong Kong Wetland Park that will have world-class conservation, education and tourism facilities.

The constant change of land use pattern has affected the ecology of these wetlands. Many large pisciculture ponds have been converted to paddy fields. The industries in the adjacent areas have made unauthorized connection to the sewers to empty their untreated wastewater.⁴

⁴ <http://www.cseindia.org/content/cases-protection-lakes-9>

Digital Print Media's Point of View

Encroachments on the East Kolkata Wetlands

On March 1, 2008, reported in *Time of India*

State government has restricted its own departments from allowing the sale of wetland plots. Buildings have come up on these plots with the promoters obtaining permission from local municipal bodies.

On January 8, 2010, reported in *Time of India*

The East Kolkata Wetlands Management Authority (EKWMA) had earlier tried to stop construction on the plot in Boinchtala mouza but had been restrained by an injunction of Calcutta High Court. Three buyers had purchased the land from the owner for development without permission of EKWMA. Sources said a racket was flourishing in illegal transaction of land at the East Kolkata Wetlands despite the notification of the Act.

Incidentally, scores of single unit houses are being built within the East Kolkata Wetlands area under the Kolkata Urban Services for the Poor (KUSP) scheme. These 1 lakh units will invariably change the character of land in the area where they are concentrated. Environmentalists worry if concentration of such houses increases in the wetlands, it will result in fragmentation of wetlands, altering the ecosystem and leading to habitat and biodiversity loss.

On March 7, 2009, Stuff Reporters in *Telegraph* told

The high court on Friday indicated the state for its failure to implement orders to protect the East Calcutta Wetlands and other water bodies.

On March 18, 2009, Suman Chakraborti reported in *Time of India*

A government department is constructing a new office building within the wetlands. "It is unfortunate that a government department is violating the norm, ignoring our repeated pleas to stop construction work. We will move court," said an official.

A building has been built by a reputed private educational institution near Bantala Leather Complex on the wetlands. "Most structures around the complex are illegal. These include godowns and garages. In fact, most illegal structures on the wetlands surround BLC. We are constantly keeping an eye on the wetlands and have lodged police complaints so that the illegal structures are demolished," said an official.

A reputed telecom service provider was installing a tower within the wetland area.

Nine illegal structures were formed that had come up before the EKWMA was formed. But the structures still exist as their builders got stay orders from the court.

On March 24, 2009, Ajanta Chakraborty reported in *Time of India*

The study, 'Optimization of Sewage Intake in East Kolkata Wetland' had showed a serious concern over the clogging of the canal network flowing into the wetlands. Most of the canals have silted up within two feet of the surface. The silt has cut potential fish production by two-thirds and can wreak havoc during the monsoons.

On January 1, 2010, Stuff Reporter in *Statesman* reported

The state government has altered its original plan and decided to shift only aquatic and water-based animals to the proposed eco-park at Bhagabanpur in South 24-Parganas.

On February 18, 2010, reported in *Time of India*

Twenty-one illegal structures, including several single-storey buildings that housed car showrooms and marble godowns are set up in Wetland area.

Encroachments on the East Kolkata Wetlands have been the biggest hurdle for EKWMA in its bid to develop the area as an eco tourism spot. The high court had, in 2008, observed that illegal structures were rampantly coming up at the wetlands. The court had directed EKWMA to ensure that no new illegal structures came up.

On July 24, 2010, Saikat Ray reported in *Time of India*

A year-long effort of locals in Chowbhaga to protect an 18-bigha water body has gone in vain. Another encroachment has been detected less than a kilometer away. A 30-bigha bheri (water body) is being slowly filled up despite protests from local residents. In this case, the needle of suspicion points to an academic institute located close to the *jheel*. A third of the water body has already been filled up.

In KMC records, the 18-bigha site under Nonadanga Mouza is clearly marked as a wetland. But a spot visit on Friday revealed that the character of the site had been surreptitiously altered beyond recognition. There is no water any more. All that remains is marshes. And the telltale signs of deliberate destruction.

According to locals, over the past 12 months, trucks have made hundreds of trips to the site and dumped earth and fly ash to cover the waterbody, gradually reducing it to marshland.

In the complaint sent to KMC a year ago, residents alleged that despite their opposition, a company which has an office in Salt Lake began filling up the waterbody. Locals lodged a complaint with Tiljala police station. But no action was taken to protect it.

On August 1, 2010, Stuff Reporters in *Telegraph* told

The high court on Thursday directed four traders, who claimed to have purchased a part of the East Calcutta Wetlands from the Calcutta Municipal Corporation (CMC), to hand the plots back to the civic body by February 15 2010.

On September 15, 2010, Stuff Reporters in *Telegraph* told

Submitted guidelines are allowing limited construction by the residents of the wetlands.

On September 15, 2010, reported in *Time of India*

Around 28,000 dwellers on the protected East Kolkata Wetlands will now be allowed to build houses but in strict accordance with eco-safety laws.

The East Kolkata Wetlands Management Authority (EKWMA) has prepared guidelines for how the houses will be built. It was approved by the Chief Secretary, Ardhendu Sen at Writers' Buildings on Tuesday.

But also there are several illegal structures inside the wetland and EKWMA had earlier carried out a demolition drive with the help of the police. "There are still quite a few unauthorized structures in the area and we have already sent notices to them. We are working on plans to carry out more demolition drives to remove the illegal structures," an official said.

On December 16, 2010, Swati Sengupta reported in *Time of India*

KMC has three treatment plants at Bangur, Garden Reach and Behala through which the sewage water is processed and cleansed. However, majority of the sewage still goes into the EKW. As a Result the heavy pollutant particle goes to EKW cases the decreasing for fish and agricultural production and loss of biodiversity.

On January 4, 2011, Suman Chakraborti reported in *Time of India*

Water bodies and wetlands in and around the city are under siege due to rapid unplanned urbanization. Ponds have been filled up to make way for apartments, particularly in wards 100 to 141, a list of which is with the Kolkata Municipal Corporation. Illegal structures have come up on either sides of Kolkata-Basanti Road passing through the East Kolkata Wetlands even after it got the international Ramsar site status. Garbage and construction sludge inundate water bodies on either sides of EM Bypass and Rabindra Sarobar, which has earned national lake status.

On June 26, 2011, Suman Chakraborti reported in *Time of India*

Allegations of encroachments have also come from the boundary areas, which fall within the jurisdiction of the Bidhannagar Municipality.

On July 18, 2011, Subhro Niyogi reported in *Time of India*

When the satellite images-based National Wetland Atlas was prepared by SAC to enable Union ministry of environment and forest (MoEF) evolve a comprehensive wetland conservation strategy, EKW mysteriously disappeared from the map.

Green activist Bonani Kakkar, who was one of the first to take up the cause of wetlands in the late 1980s and early 1990s, said, "A fortnight ago, there was an attempt to push through an 'eco-tourism' project without detailed project report or environment assessment impact study. We have to be on our guard again."

On January 5, 2012, Stuff Reporter reported in *Time of India*

43-acres water body at Nonadanga near the Eastern Metropolitan Bypass is being filled-up illegally by people with sufficient clout to defy the establishment.

On January 22, 2012, Subhro Niyogi reported in *Time of India*

The powerful land mafia, backed by a section of politicians and policemen are engaged illegal encroachment of a sprawling 43-bigha bheri off EM Bypass.

On January 24, 2012, Suman Chakraborti reported in *Time of India*

Unregulated use of fertilizers and pesticides is having adverse effects on human health, food security and biodiversity stock.

On March 14, 2012, Stuff Reporters in *Statesman* reported

About 33 water bodies in the Ramsar-protected East Kolkata Wetlands were filled illegally for the construction of the Newtown-Rajarhat Township.

On June 4, 2012, Jayanta Basu wrote in *Telegraph*

The East Calcutta Wetlands Management Authority has accused police of sitting on as many as 200 complaints about filling up of ponds or building structures in the fragile ecological zone in violation of a high court order and a state act.

The high court order and the state act, in an attempt to prevent an ecological disaster, have banned all activities within the wetlands that could lead to a landfill or a change in the character of the region.

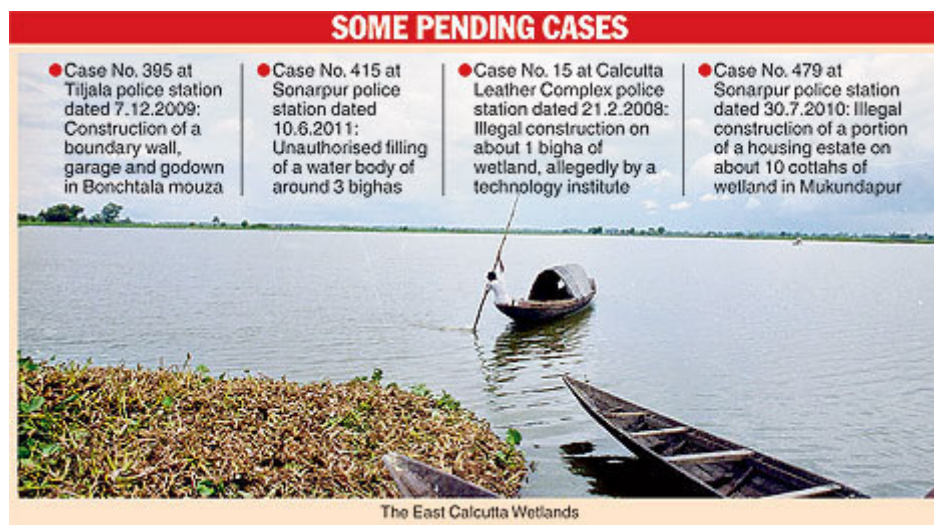


Figure 4.5: Some Pending Cases relating to East Kolkata Wetland
(Source: The Telegraph, June 4, 2012)

An authority official said the maximum number of complaints – 107 – have been lodged with Sonarpur police station, followed by Calcutta Leather Complex police station (46), Tiljala police station (25), Pragati Maidan police station (17) and Bidhannagar South police station (5).

Most of the complaints are related to setting up of small factories, godowns and garages by filling up water bodies. In some cases, walls have been erected around water bodies as the first step towards landfill.

“So far, I know 15 cases (42, according to the wetlands authority) have been lodged with Tiljala and Pragati Maidan police stations and 35 people have been

arrested. We try to keep a watch on the East Calcutta Wetlands,” said Basab Dasgupta, deputy commissioner (southeast), Calcutta police.

On July 20, 2012, Subhro Niyogi reported in *Time of India*

Over the past few years, the land mafia has been operating with impunity in EKW over the past few years, grabbing bheris, filling them up and selling them for crores of rupees to real estate developers.

With hardly any land available for the development in Kolkata proper and plots selling at a premium in Rajarhat, unscrupulous builders are eyeing the vast wetlands to make a killing. Surreptitious attempts are constantly on to encroach on the wetlands.

Encroachment is particularly rampant in the Tiljala-Sonarapur belt where land sharks operate in broad daylight.

A nexus between builders, politicians, goons and a section of police is proving too strong to break. And with para dadas luring youths, conservationists fear the wetlands are as good as lost unless there is decisive action against offenders.

On August 10, 2012, Stuff Reporters in *Statesman*

The East Kolkata Wetland Management Authority (EKWMA) had served stop work notice to a proposed vocational training centre for an illegal construction.

Losses of Fish Diversification and Production

On February 3, 2009, Subhro Niyogi reported in *Time of India*

Nearly one third of the fish varieties recorded at the East Kolkata Wetlands (EKW) have become rare and are on the verge of extinction following a rise in salinity level and lack of oxygen in water due to the overload of the city's sewage dumped in the area. The disappearance of some fish variety would not only change the character of the wetlands, it'd also be a social disaster for the 60,000-odd fishermen who live and farm on the 12,500-hectare Ramsar site. The endemic mrigal is changing its habitat preferences during breeding seasons, which refers to changing ecology of the wetlands.

On May 25, 2011, Saugata Roy reported in *Time of India*

"The brackish water in the maila khal that feeds the fish bheris has undergone a change. Effluents from the Calcutta Leather Complex as also from the industrial units of Topsia and Tiljala are drained out into the khal. It is doing much damage to the fish population," .

"Increasing industrial pollution load is changing the bio-chemical nature of the wastewater that flows to the fisheries. A number of scientists have voiced their concern about the quality of fish produced in the EKW. It is important to look at this threat before it breaks into a disaster. Continuous study of wastewater quality, the fish, the paddy and vegetables should be the basic schedule of work," Ghosh writes.

On May 29, 2011, Prithvijit Mitra reported in *Time of India*

Parts of the East Kolkata Wetlands (EKW) could be polluted but the contamination is not strong enough to render the fish in the water bodies unfit for consumption, claimed scientists at the Central Inland Fisheries Research Institute (CIFRI). Along with the South Asian Federation for Environment (SAFE) - a green NGO which has been working at the EKW for a decade - CIFRI is set to commence a study of the water quality at the Ramsar site and find out if the contamination has spread to the fish produced in its waters. The chances of that happening were low since most of the fish were taken off the waters in less than 12 weeks - the minimum period required for the pollutants to affect them, said the scientists.

A study of fish conducted recently by SAFE has revealed that they had very little lead in their tissues, well within the permissible limit. "The water at the wetland ponds are naturally detoxified through biochemical reaction induced by sunlight. As a result, the chances of bio-accumulation in fish were low. But it can't be denied that the nature of effluents flowing into the wetlands has changed. They are more toxic now, pushing up the pollution levels in some areas. But there has not yet been any study to prove that the fish has turned unfit for consumption," said B.C. Jha, senior scientist at CIFRI. Conservation scientist Dhrubajyoti Ghosh, who is also the vice-chairman of the Commission on Ecosystem Management, International Union for Conservation of Nature (IUCN), has claimed that effluents from the tanneries of Tangra and Topsia have turned the bheris toxic and the fish were likely to have been affected as well.

On September 19, 2011, Suman Chakraborti reported in *Time of India*

30 million liters a day effluent treatment plant is required in place of the 20 million liters per day plant operating at present. A higher capacity plant is needed for proper discharge of industrial effluents. Also, there are complaints of improper disposal of solid waste, thus polluting the air and water bodies, a senior WBPCB official said.

On December 4, 2011, Suman Chakraborti reported in *Time of India*

The fisheries department on Saturday cited the imbalance in wastewater distribution as the reason behind the death of fishes in the East Kolkata Wetlands. The directorate of fisheries discussed the issues of falling fish production at a recent meeting held with officials of EKWMA and Kolkata Municipal Corporation (KMC) as well as representatives of South Asian Forum for Environment (SAFE), an NGO. Last month, TOI had reported that fishes were dying in bheries behind Sector V. The fisheries department secretary visited the wetland area and the Bantala lock gate on Saturday. There were also complaints of industrial effluents from Bantala polluting the waterbodies.

Though some of the drainage canals have been dredged, abandoning the project has led to an imbalance in wastewater distribution as fish pond beds are at a higher level than the canals. This leads to an outflow of water from the fish ponds.

DISCUSSION

Until recently, wetlands were virtually considered as "waste lands" or areas that only served for breeding mosquitoes. As such, in the past, they were dredged to facilitate drainage of the water, reclaimed for other uses, or simply considered as dumping grounds for all types of refuse. Wetlands resources, such as fish, reeds, mangroves and thatched materials were harvested indiscriminately without any attempt to regulate their exploitation.

However, since 1971, when the Convention on Wetlands of International Importance (Ramsar Convention, 1971) came into force, wetlands have been Internationally recognized as ecosystems of considerable importance, comparable to our forests, range lands and marine ecosystems.

February 2 of every year is observed as World Wetlands Day. It marks the date of the signing of the Convention on Wetlands on 2 February 1971, in the Iranian city of Ramsar on the shores of the Caspian Sea. Therefore, this Convention came to be known as the Ramsar Convention (1971). Making an encouraging beginning in the year 1997, each year on 2 February, government agencies, non-governmental organizations, groups of citizens at all levels of the community commemorate this day by undertaking actions aimed at raising public awareness of wetland values and benefits. Ramsar Convention on Wetlands, an intergovernmental treaty with more than 150 member-countries, deals with conservation aspects of inland waters and the near-shore coastal areas.

The Government of Ghana recognizes the importance of wetlands as habitat for wildlife, in the maintenance of the water table, mitigation of flood conditions and water purification. Wetlands resources are also known to be of socio-economic importance and have been harvested for construction of poles, fuel-wood, timber for furniture and craft work.

Facility, funded Coastal Wetlands Management Project from 1993 to 1999; carried out public education and awareness- creation programmes to enlighten the general public on the values, benefits and functions of wetlands and the need for their conservation and sustainable use. In order to integrate wetlands issues into national land - use planning and decision-making in other sectors of the Ghanaian economy, the Ministry of Lands and Forestry has, in consultation with key stakeholders, prepared this document –*Managing Ghana’s Wetlands: A National Wetlands Conservation Strategy* – to promote participation of the local communities and other stakeholders in the sound management and sustainable utilization of Ghana’s wetlands and their resources.

The Delaware Wetlands Conservation Strategy is a collaborative effort among DNREC, other State agencies, and conservation partners to show wetland loss and improve existing wetland conditions. This strategy will guide improvement of Delaware’s wetland resources through increased agency coordination, data availability, education, monitoring, and restoration efforts. Initiatives will be implemented over the next five years and will be reevaluated in 2013. We encourage other government and private wetland stakeholders in Delaware to adopt this strategy and collaborate on enhancing our capacity to conserve wetlands.

Wetlands should be conserved by ensuring their wise use. Wise use is defined as 'sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem' – sustainable utilization is understood as 'human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of the future generations'. 'Wise use' may also require strict protection (Ramsar Convention).

Different wetland conservation policies have been implemented at national, state and local levels. There are three major kinds of conservation strategies e.g., migration, creation, and restoration. Direct losses of coastal wetland due to sea-level rise can be offset by inland wetland migration. However, protection structures of developed areas, such as bulkheads and dikes, will keep wetland from migrating inland. So the migration strategy is basically to preserve the undeveloped land within a few feet above wetlands so that to keep the opportunity for wetland migration anywhere that is not already developed by constructing buffers and maintaining surrounding natural processes. As indicated by Environmental Protection Agency (EPA), the amount of available dry land is much less than the amount of wetlands that would be lost. Therefore, creation and restoration strategies need to be carried out in order to meet the national goal of "no net loss" of wetlands. Creation is the "construction of a wetland in an area that was not a wetland in the recent past (within the last 100-200 years) and that is isolated from existing wetlands (i.e., not directly adjacent)" (Gwin, et al., 1999). Ecological restoration is defined as the "return of an ecosystem to a loose approximation of its condition prior to disturbance" (NRC, 1992). Identifying potential sites with appropriate physical conditions and historical land use is essential to the success of wetland restoration. Considering only the cost factor, migration is the best choice because it only incurs

the cost of buying land. Comparing creation and restoration, creation is more difficult undertaking because it essentially tries to produce a new ecosystem. In addition, the outcome of a creation project is often difficult to predict. Therefore, the wetland conservation strategies we consider in this study will focus on migration and restoration.

Many areas of wetlands and shallow water have disappeared under the pressure of rapid population growth and facility construction. These losses of habitat and resultant degradation of water quality from pollution have led to significant impacts to the biota of the Elizabeth River that have compromised its function as an estuarine system (Priest, 1999). In recent years, the continued loss of coastal wetlands has become an increasingly important issue. Legislation aiming at improving water quality at the Chesapeake Bay also requires the conservation of wetlands. State and local government has been initiating efforts to preserve the wetlands in the watershed. In Virginia, a formal wetlands management policy began 20 years ago with passage of the Virginia Wetlands Act , 1972. The goal of the Act was to preserve tidal wetlands to “prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation” (Broomhall and Kerns, 1997).

In May of 1990, the Oklahoma Legislature directed the Oklahoma Conservation Commission to develop a wetland management strategy for the state. A draft plan was set forth then reviewed and enhanced by private landowners; interest groups; and local, state, and federal entities. The strategy entitled *Oklahoma's Comprehensive Wetland Conservation Plan* was completed in July 1996. Plan development, coordinated by the Conservation Commission, led to a framework in which an interagency working group could work to conserve, enhance, and restore

the quantity and biological diversity of Oklahoma's wetland resources. This interagency working group is comprised of tribal, state, and federal entities which have an interest and/or regulatory responsibility toward wetlands.

A tool that States, Territories, and Tribes are using to protect wetlands is the State Wetland Conservation Plan (SWCP). A State Wetland Conservation Plan is not meant to create a new level of bureaucracy. Instead, it improves government and private sector effectiveness and efficiency by identifying gaps in wetland protection programs and finding opportunities to make wetlands programs work even better. State Wetland Conservation Plan is strategies for States to achieve no net loss and other wetland management goals by integrating both regulatory and non-regulatory approaches to protect the wetlands.

India is facing a crisis due to loss of wetlands and water bodies and deterioration in the water quality of these life sustaining systems. Apart from depletion of biodiversity and silent assault on human health due to non-point source (agro-chemical) pollution other resultant environmental risk factors include the reduction in rainwater retention capacity and the loss of livelihood support for the wetland dependent communities who are among the poorest. Welfare of the people of the State of West Bengal depends largely upon the proper functioning of the natural resource systems wherein wetlands are among the foremost which draw attention.

The challenge here is to overcome the lack of understanding among the implementers of different development sectors and service providers about the significance of wetland ecosystems in maintaining and supporting human health and welfare. The challenge becomes daunting as the section of the community

suffering most from the loss of wetland resources are occasionally the poorest and their demands are not easily visible or audible. The proposed policy direction therefore will be to adopt a participatory and community-based approach to ensure conservation and wise use of wetlands and water bodies. Apart from Government regulation, development of better monitoring method is needed to increase the knowledge of physical and biological characteristics of each wetland resource, and to gain, from this knowledge, a better understanding of wetland dynamics and their controlling process.

A participatory approach looks into the interconnectedness and interrelations between society and nature contextually. Differences in local conditions which can be occasionally striking (both social and ecological) should be carefully factored in. It also attempts to remain focused on defined landscapes or geographic units, so that it becomes easy for everyone to recognize the conservation activities. Particular care is taken to avoid exclusion of the poorer communities who tend to avoid or sometimes are purposively left out of the conservation exercises. The crucial message that any policy document on the conservation of wetlands and water bodies must primarily carry is that no wetlands and water bodies can be filled up, degraded, drained, converted or subjected to any kind of activity which is incompatible with ecological integrity of the wetlands.

In addition to compulsory prohibition of further filling up of any wetland or water body irrespective of its size, the present wetland conservation policy has come up with two new directions. This essentially is in the context of the conditions and constraints specific to the State as well as the country. Firstly, as wetlands are the primary receptacles for agricultural discharge containing agro-chemicals, it has brought the crisis of non-point source pollution into the forefront. Unregulated use

of fertilizers and pesticides is already having telling effects on human health (especially the children and the farmers), food security and biodiversity stock. Secondly, for the purpose of conserving larger wetlands and water bodies, the concept of catchment area is considered, specifically to delineate the primary boundary for conservation activities specific to the wetlands. This is necessary because most of the larger wetlands in this sub-continent lie outside any protected area under the Forest Act.

RECOMMENDATIONS

The following recommendations were drafted with the help of Department of Environment in West Bengal Government.

1. Wetland Assessment and Monitoring on the basis of District Land Records

Collection and/or collation of core information for wetland conservation, protection and management will provide an information base for preparing site specific management action plan followed by specific assessment and monitoring activities in wetlands. The mapping procedures, especially for large wetlands, should be participatory in nature so that the mapping process itself will be a work of awareness and better understanding of wetland as a crucial resource. Detailed records of various categories of lands including wetlands, together with their extent, character and ownership are available. Wetland locations can be identified on the basis of these records on cadastral maps (Scale 16 inches to 1 mile or 1: 3960). The locations can further be verified by coordinates to be obtained through GPS survey. However, in case of any controversy or a difference of opinion a stakeholder can appeal to the Department of Environment to get the specific land examined and assessed on the basis of accepted scientific criteria to determine whether the land in question is a wetland or has recently been filled up. The description of the land in question as laid out by the Department of Environment will remain valid irrespective of whatever is stated and described in the existing land records of the state. The entire inventory of wetlands and water bodies should be in the public domain. The core information should include:

- a. Wetland delineation for identifying wetland regions, complexes and individual sites or habitats.
- b. Catchment identification and characteristics.
- c. Wetland description – physical, chemical and biological with the following information:
 - i. Location, altitude, area and boundary
 - ii. Geology, geomorphology, climate, soil, bio-geographical location, linkages with other habitats
 - iii. Hydrology including surface and groundwater regime, water quality
 - iv. Wetland functions
 - v. Biota
 - vi. Any other special biophysical features
- d. Wetland information – cultural with the following features:
 - i. Demography
 - ii. Land and water use
 - iii. Ownership and administrative jurisdiction
 - iv. Traditional practices
 - v. Socio-economic status of the users
 - vi. Resource recovery
 - vii. Ecosystem stresses onsite and in the catchment
 - viii. Management issues
 - ix. Conservation status
 - x. Legislative support and customary law
 - xi. Socio-cultural reserves 10
 - xii. Users’ right
 - xiii. Conflict situations
 - xiv. People’s choice and political decision

- xv. Level of participation of local people in decision making and planning
 - xvi. Ongoing programmes of the government and others
 - xvii. Status of monitoring
 - xviii. Awareness among users and government personnel about ecosystem approach
 - xix. Capability assessment, training need and facilities
 - xx. Existing role of NGO's, people's groups, other institutions and individuals
 - xxi. Access of public to information about government programmes relating to the wetland and the catchment
- e. Maps and digital data for obtaining and monitoring spatial and temporal information

A major problem in West Bengal is that tracts of wetlands are declared as *shali* or agricultural land as a first step and thereafter converted to industrial or residential land. This entire process is not always transparent.

2. Identification and Evaluation of Wetlands

Assessment of wetlands will involve identification of the status of, and threats to, wetlands which are more specific information on these ecosystems. Water quality assessment by measuring selected physico-chemical parameters, identification and evaluation of biodiversity values using biological parameters and determining socio-cultural and economic values in relation to wetland use and ecological services (groundwater recharge, flood mitigation, shoreline stabilization etc.) will help monitoring activities. Mapping using GIS is an effective tool in understanding the spatial distribution of wetland resources. Evaluation and identification of benefits of wetlands are specialized tasks. It will require appropriate institutional arrangements with the State-level coordination mechanism at the top.

3. Wetland Classification

The Wetlands Conservation and Management Rules 2010 under the Environment (Protection) Act 1986 have categorized selected wetlands for conservation and management. However, for the purpose of conservation of wetlands and water bodies in West Bengal a primary classification of wetlands for the State will be:

- a. Class A Wetlands - Forested wetlands (wetlands within protected areas declared by the Forest Department).
- b. Class B Wetlands - Non-forested wetlands (wetlands outside forested areas as described above) will comprise:
 - i. Public wetlands – natural and man-made.
 - ii. Private wetlands – natural and man-made.

4. Planning, Assessment, Evaluation and Monitoring for Selected Wetland Sites

- a. Management action plans for selected sites such as wetlands of International and National importance.
- b. Some wetlands perform vital ecological functions like flood mitigation, groundwater recharge, urban sewage treatment etc. for which specific conservation projects should be envisaged.
- c. Immediate restoration of degraded wetland sites.

5. Maintenance of Ecological Characters of the Wetlands

- a. Prohibition on change in character i.e. , excavation detrimental to the wetland, filling up, discharge of pollutants, introduction of alien species.
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- b. Compatible use for revenue and livelihood generation.
- c. Maintenance of hydraulic regime and hydro pulses

6. Institutional Development

Establishment of Institutional arrangement with the help of wetland experts, scientists, administrative personnel, wetland users, active NGOs for achieving wetland conservation and protection, identifying priority actions in wetlands, integrating wetland priorities in the planning process and integrating multidisciplinary approach in planning and executing wise use projects.

7. Financial Support

- Natural resource conservation is a developmental issue.
- Conservation efforts can be supported by allowing incentives to wetland owners/operators for conservation initiatives in the form of new and better economic opportunities (conservation incentives).
- Encouraging fund-raising activities by the corporate sector (particularly under corporate social responsibility) may facilitate conservation activities. However, objectives of such initiatives should adhere to the policy on wetland conservation of the state of West Bengal.

8. Acquisition for Conservation and Better Wetland Management

Acquisition of degraded wetlands particularly those which are important as potential resource base may be necessary to prevent further deterioration and for better management.

9. Increase in Knowledge and Awareness of Wetlands

a. Increasing awareness and understanding of decision makers and the public of the benefits, values and wise use of wetlands including:

- sediment and erosion control,
- flood control,
- maintenance of water quality and abatement of pollution,
- maintenance of surface and underground water supply,
- support for fisheries, grazing and agriculture,
- outdoor recreation and education for human society,
- provision of habitat for wildlife, especially water birds, and
- contribution to climatic stability;

b. Demonstration of traditional wise use techniques and elaboration in projects.

c. Training of appropriate staff in the disciplines which will assist in implementation of wetland conservation action and policies.

d. Stewardship generation for wetland conservation and management targeted to owners/operators and responsible NGOs.

e. Inclusion of wetland awareness themes in school curriculum including adoption of local wetlands for education.

f. Establishing state-wide awareness campaigns and programmes involving students in particular.

10. Wetland Legislation and Related Policies

- Review and amendments incorporating the experiences in implementing existing legislation and policies.
 - Enactment of new wetland legislation.
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11. Promotion of Wetland Science and Research

- Establish priorities for wetland scientific research with regular review.
- Establish communication network between science agencies, researchers and managers to fulfill conservation, management and policy objectives.
- Establish exclusive centers of expertise and wetland research.
- Establish national wetland scholarships to promote innovative scientific, socio-economic and technological research on wetland issues of importance to the people of the country.
- Support effective wetland research according to regional priorities and initiatives for conservation of biodiversity and wise use of the wetlands.

12. Wetland Data Management

- a. It is necessary to establish a comprehensive database and management information system for defining standardized modus operandi for conservation of functions and values and of the biodiversity of wetland ecosystems.
- b. Regular cycles of surveys and reviewing status of wetlands will be necessary. A monitoring network should be established.

SUMMARY

1. EKW is one of the largest assemblages of sewage fed fish ponds and garbage farming areas, together with settlements and agricultural land.
2. The sewage fed fishery and garbage farming linked waste recycling practices have traditionally been the only option for management of the urban waste of the Kolkata Municipal Corporation (KMC).
3. These practices that have been found beneficial both economically as well as ecologically have since received worldwide recognition. Government decision to change land use in certain areas were turned down by the Honorable Calcutta High Court and the weight of the judicial pronouncement has gone in favor of maintaining the existing status of land use in EKW.
4. The Government of West Bengal, considering the importance of EKW and its time-honored practices also took a pro-conservation approach by recommending it to the Government of India for EKW Ramsar accreditation.
5. EKWMA has since started implementing the Management Plan with financial assistance from the MoEF, Govt. of India.
6. The Government of India issued a notification in December 2010 for the Conservation and Management of all Ramsar Sites in India. The Government of

India also desired that agricultural land should not be included within wetlands. Accordingly, the East Kolkata Wetlands has been classified into 2 categories:

- i) Core Wetlands Area
- ii) Non Core Wetlands Area

7. East Kolkata is known for recycling of waste water through pisciculture. East Kolkata Wetlands has also been practicing Solid waste recycling through garbage farming. Both these activities will come to a grinding halt in the East Kolkata Wetlands if the discharge of untreated waste water and disposal of domestic solid waste of the Kolkata city would be prohibited as per Wetlands Rules of Government. of India which would lead to the veritable extinction of the EKW as a historically evolved eco-friendly system.

8. To improve livelihood of the people by micro enterprise development; vegetation based micro enterprise development, ornamental fish culture, goatery and piggery, fish cum duck rearing. For the betterment of the general living condition of the local people efforts have been taken to supply safe drinking water, proper sanitation and accommodation facilities.

9. Implement the Management Plan for the purpose of Conservation and Management of Wetlands which emphasizes biodiversity conservation, water bird conservation and enhancing fish biodiversity. Also promotion of ecotourism development has been undertaken as a part of Communication, Education and Public Awareness programme .

10. Finally, EKWMA has been acting as the nodal agency for the implementation of EKW Act, as well as for the enforcement of the Wetland Rules of Govt. of India.



Figure 4.6: Lack of Proper Roads makes the Whole Process of Supply-chain Process of East Kolkata Wetland