

Planning for Aquatic Production in East Kolkata Wetlands

Wastewater aquaculture, as practised in the East Kolkata Wetlands, has attracted much international attention as a model system for the reuse of urban wastewater and resource recovery. At present the multifunctional wetland ecosystem covers approximately 12,500 ha, and is comprised mainly of 254 fisheries managed for wastewater aquaculture, agricultural land, horticultural plots and residential areas. It constitutes a unique system of resource recovery, in which nutrients are extracted from the city's wastewater through fish farming and agriculture.

Wastewater flows through fish ponds covering about 4,000 ha, within the area known as the East Kolkata Wetlands, with these ponds facilitating a wide range of physical, biological and chemical processes which help improve the quality of the water. Consequently this wetland system is popularly known as the kidney of the city and has been described as one of the rare examples of environmental protection and development management in which a complex ecological process has been adopted by the local farmers for mastering resource recovery activities. The wetland also supports the livelihoods of around 60,000 residents through the fisheries and other socio-economic activities. The existing land-use pattern of the East Kolkata Wetlands (EKW) is summarised in Table 1.

In August 2002, the EKW area was included in the list maintained by the Ramsar Bureau established under Article 8 (site no.1208) of the Ramsar Convention, which recognises the EKW as a “Wetland of International Importance”. The Ramsar convention is playing a vital role by providing certain basic guidelines to draw up suitable plans for the maintenance and sustenance of the wetlands. Among these, the three most important guiding principles are: maintenance of the special characteristics of the ecosystem, wise use of its resources with an eye towards sustainability, economic development for the wetland community. The major forms of cultivation prevalent in the region are sewage-fed agriculture, garbage farming i.e. growing crops on composted or decaying garbage and sewage-fed aquaculture. In more peripheral rural areas rice paddy farming dominates production whilst potatoes and other vegetables are cultivated using traditional methods. These farming systems are central to the livelihoods of many local poor people (Bunting *et al.*, 2001 and 2002).

Garbage farming is largely confined to

the Dhapa region (Figure 1). This area is the disposal site for garbage from the city of Kolkata, which has been used as fertiliser since cultivation began here in the 18th century. The irrigation system for vegetable cultivation is completely dependent on the city sewage in the Dhapa area. The city receives a substantial supply of vegetables from the garbage farms of the Dhapa and adjacent areas. Despite the close proximity to city markets, local farmers are reluctant to sell their produce directly to the urban markets mainly due to the costs involved and risks associated with transporting perishable products, notably live fish. It should be mentioned that since part of the wetland falls under the Kolkata Metropolitan Area (KMA) it is classified as periurban, however further from the city the wetlands have a more rural character.

Fish cultivation in Kolkata's sewage-fed fisheries is a unique feature. There are more than 154 big fisheries or bheries, as they are known locally, although fish culture is also practised in numerous small ponds or jhils spread throughout the region. The most important function

Table 1. Land use in the East Kolkata Wetlands

Land use	Area
Water bodies	5,852 ha (about 3,899 ha used for fish farming)
Agricultural land	4,960 ha
Garbage farming	603 ha
Rural settlement	1,235 ha
Urban settlement	91.5 ha
Total area	12,500 ha

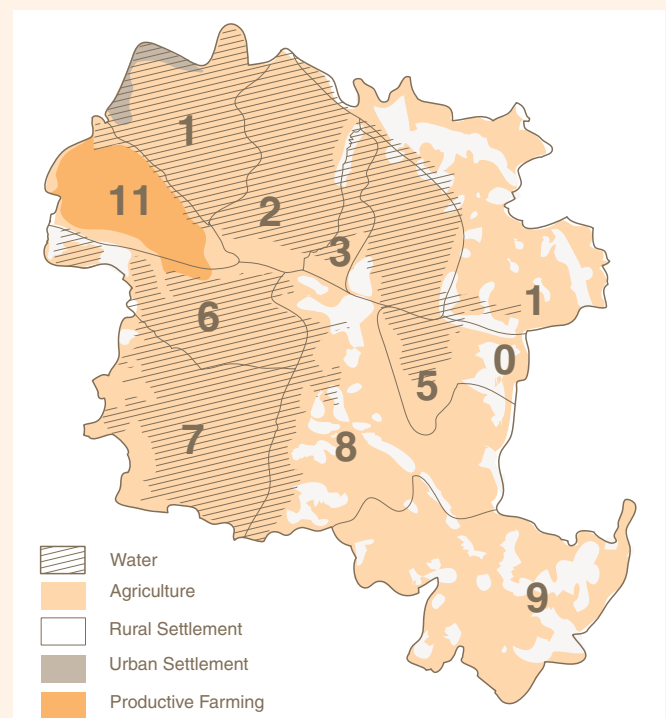
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Wetland area divided into 11 zones

performed by these wetlands is to recover nutrients from a major proportion of the 1,300 million litres of wastewater discharged from the city daily. The total area of sewage-fed fisheries is around 3,900 ha, privately owned bheris account for 93% of this area, farms managed by co-operatives cover 6% and ponds managed by the State Government account for less than 1%. Large areas of the fisheries are taken on lease and operated by commercial producers, however, several fisheries became cooperatives, either registered or non-registered, because of the inability of the owners to sustain their fishing activities owing to land reforms and past problems with the labour unions. The fisheries range in size from over 50 ha down to around 5 ha. Various sewage canals supply water to these fisheries, and the water enters the fisheries either via gravity, by siphoning or pumping.

Marketing of fish originating from the wetlands has been studied, and almost without exception the total production is sold through wholesale markets at Bantala, Bamanghata, Choubaga and Chingrighata located in the wetlands. From these four major sources fish are distributed to retail markets scattered throughout the core of the city, but there is also increasing evidence that fish are increasingly being transported out and marketed in provincial towns.

Recent field surveys showed that 8,500 people are directly engaged in sewage-fed fisheries, of which about 90% are from local villages falling within the EKW, the others mainly coming from adjoining areas of Districts 24-Parganas (North) and 24-Parganas (South), Midnapore and sometimes from neighbouring states. Fish culture presents opportunities for various types of specialised labour, including security services, harvesting work, loading, unloading, packing and distribution of fish, and as a consequence such opportunities often attract migrant labourers from other districts and states. In general however, traditional economic activities, namely sewage-fed agriculture and fish culture, primarily involve the inhabitants of the EKW. The main stakeholders are the fishermen, farmers, labourers engaged in fish culture and agriculture, night guards and carriers.

Furthermore, there are a number of people who stay in the East Kolkata Wetland area and commute to the city for their livelihoods; these people are part and parcel of the system as it has evolved.

DIFFERENT REGIONS

At present the wetland is vulnerable to a number of threats. Not every problem of the EKW can be labelled a real “threat” to the wetlands, so in the course of delineating these problems, what became apparent was the need for geographical demarcation of the entire zone into a number of parts in order to facilitate proper planning for its conservation. The East Kolkata Wetland system has been broadly divided into eleven major regions depending on the following factors: proximity to main sewage canals, type of land use, area of land use, accessibility, proximity to area of environmental hazard and proximity to areas of massive urbanisation. This has helped facilitate the preparation of detailed conservation plans in line with the Ramsar principles, and has also assisted greatly in ensuring that stakeholders in each of the regions have had the opportunity to participate in the planning process.

Since the city sewage is a major input for the periurban production systems, location of area with respect to the sewage canals is of the utmost importance. The type and size of land use in the area also constitute important criteria upon which the demarcation was based. For example, region 1 consists of larger water bodies than region 3, which is characterised by smaller, more fragmented holdings. Another factor is the accessibility of the regions to the highway or other major roads, which can have a strong influence on activities and livelihoods. Though the wetland system is also a waste-recycling region, some wastes are environmentally hazardous and cannot be treated naturally. These wastes are primarily non-biodegradable and some of them are extremely toxic, such as medical wastes and wastes from the information technology sector. These can affect both the quality and quantity of produce. Consequently possible health hazards associated with production in each of the regions must be considered. Last but not least proximity to the city makes areas more vulnerable to urbanisation and land speculation.



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COMMON PROBLEMS

Though there are regional variations as far as constraints and threats associated with the EKW are concerned, there are certain significant issues common to all regions, for example siltation in the canals and fishponds. Siltation has reduced the quantity of sewage flowing to the fisheries and made many of the fish ponds much shallower; consequently production has reportedly declined. Chemical contamination constitutes a widespread threat and difficulties in marketing fish and agricultural products represent a further problem.

Proper planning is only possible with the participation of all stakeholders

Additionally, proper infrastructure is absent throughout most of the periurban area, and despite living in the Kolkata Municipal Area many residents do not have access to basic services such as sanitation, drainage, electricity, schools and hospitals.

Such problems are compounded by the adverse effect of notable management failures, including a failure to properly maintain sluice gates and run the pumping system regulating the storm weather flow and the dry weather flow channels of the Kolkata drainage system in line with the requirements of farmers in the area. As a consequence, sewage-fed agriculture is on the verge of collapse. A number of lift irrigation facilities installed on drainage channels which could have alleviated some of these problem’ are now mostly defunct. Furthermore, a major friction point has

emerged between the Kolkata Municipal Corporation and Department of Irrigation and Waterways on the one hand, and the inhabitants of the wetlands who earn their livelihood from the cultivation of rice, fish and vegetables on the other. Many farmers have come to depend on using sewage and garbage from the city as sources of water and nutrients, however, the appropriate and reliable management of wastewater and solid organic waste originating from the city is vital for maintaining such a system. While environmentalists advocate the preservation of the wetlands, speculators are exerting increasing pressure for the right to develop areas for residential and industrial purposes. The wetland is bordered by the city of Kolkata to the west, Salt Lake township to the north-west, and the new township of Rajarhat to the north-east. The Eastern Metropolitan Bypass also runs along the western side of the wetlands making the area easily accessible. In combination these factors are making it increasingly difficult to protect the EKW from developers and real estate agents. Public agencies have also shown a tendency to encroach upon the wetland area for various developmental activities such as locating industries, commercial hubs or public utilities. It is increasingly apparent that the existing legal provisions and agencies responsible for implementing them are unable to prevent such encroachment.

INSTITUTIONS

Another source of confusion has been the existence of a plethora of agencies amongst which the control of the wetland has been distributed. They often work at cross-purposes leading to inaction or in many cases the wrong action. The Kolkata Metropolitan Development Authority was given the responsibility to coordinate developmental activities in the KMA area, which includes all municipalities and corporations coming within its jurisdiction under the Town and Country Planning Act (1979). However, only part of the EKW lies within KMA whilst the remainder is under the jurisdiction of the District Planning Organization under the Panchayats. This convergence of rural and urban governance has been far from effective in the preservation and management of the EKW. An improvement plan for the EKW must

address the different types of problems related to the various land-use patterns. Such a plan should also explore possible alternative and better uses that might be permitted within the parameters of the Ramsar Convention. For example, the water courses need to be widened and de-silted in a manner which is economically viable and which meets the demands of agriculture and fish farming.

Both agriculture and fish culture are suffering due to shortage of wastewater. With proper planning and development of water courses and water bodies, and proper management of the sewage disposal system, this major constraint could be addressed. But this would only be possible by ensuring the participation of all stakeholder groups in the decision-making process and subsequent supervision of the proposed activities. In the case of the EKW, the major agencies that should facilitate conservation and development include the Department of Land and Land Records (the major regulatory authority for land transfer and registrations), the Department of Irrigation & Waterways (responsible for disposal of sewage, regulation of lock gates and maintenance of storm and sewage channels), the Ministry of Fisheries (responsible for the improvement and promotion of fish culture through the formation of fishery cooperatives), Ministry of Agriculture (involved where paddy and vegetable cultivation are concerned), and the Department of the Environment (which is responsible for the overall protection of the EKW and operates through the West Bengal Pollution Control Board [WBPCB] and Institute of Wetland Management and Ecological Design [IWMED]). Participation of the Kolkata Municipal Corporation, Panchayats, District Administration of 24-Parganas (North) and 24-Parganas (South), various NGOs and CBOs (community-based organisations) is also required. It should be emphasised in this context that ground level coordination, control and management are often impeded because of the existence of a plethora of often contradictory legislation originating from different authorities. The major pieces of legislation which are now in operation are given in the box below.

Formulation of comprehensive guidelines to protect existing practices both in the

Legislation affecting EKW

The Environment (Protection) Act, 1986
 The West Bengal Inland Fisheries Act (amended in 1993)
 The West Bengal Town and Country (Planning & Development) Act, 1979
 Water (Prevention and Control of Pollution) Act, 1974 (Amended 1988)
 Other existing legislative provisions like the The Wildlife (Protection) Act of 1972 (as amended until 1991) and the Forest (conservation) Act of 1980, The West Bengal Land Reforms (Amendment) Act of 1981 and the National Conservation Strategy and Policy Statement on Environment and Development of 1992 are also relevant to the discussion.

vicinity of Kolkata and rural areas is the major requirement at present; however, this also demands the provision of proper legal tools and will require administrative backing. The integrated policy initiative being proposed here should embrace the interrelated problems of waste management, air pollution abatement and livelihood problems of the local poor in a sustainable way. Sustainability is another variable that has to be kept in mind. Close observation has revealed a complex array of problems and issues facing the wetlands community, economy and ecology. With the march of urbanisation the rural context is increasingly in transition, creating a complex socioeconomic parameter. Only by understanding this complexity and by ensuring the participation of all stakeholders related to the EKW, and in particular the traditional farming communities, can any policy development or planning activity achieve success. Development and conservation cannot leave behind the populace for whom it is intended.

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