From Conflict to Co-production
A Multi-stakeholder Analysis in Preserving the East Kolkata Wetlands

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Dedicated to the ecologist of the poor

Dr. Dhrubojyoti Ghosh

(1947-2018)

who often said referring about the East Kolkata Wetlands

...let there be poverty but sunshine, I shall give you food, livelihood and, sanitation, add to it carbon sequestration too...

Table of Contents

List of Figures

List of Tables

List of Boxes

List of Acronyms

CIFRI – Central Inland Fisheries Research Institute

EKWMA – East Kolkata Wetlands Management Authority

DWF – Dry Weather Flow

SWF – Storm Weather Flow

SFDC – State Fisheries Development Corporation

Foreword

Urbanization has been one of the key drivers for rapid depletion and degradation of natural resources, especially urban water bodies. Rabid urbanization also leads to other issues like pollution, excessive demand of natural resources like water and energy, and loss of livelihood options for the local people. Forum for Policy Dialogue on Water Conflicts in India (Water Conflict Forum to be brief) has always been trying to understand conflicts around water as it believes that understanding conflicts in all its nuances is the first step towards conflict transformation. It also believes that conflicts can be avoided if natural resources are managed and shared amicably and equitably.

The East Kolkata Wetlands is a natural wetland, spread over 12,500 ha and is situated to the eastern side of the Kolkata city. The wetland is a Ramsar site and is one of the largest wastewater fed aquaculture system, providing fishing opportunities for the local people. In addition, people grow paddy in small plots situated in and around the wetland. Off late, the wetland is facing issues of degradation, threatening the livelihood of the local communities, especially fishworkers, due to large scale encroachment from the private real estate.

As Water Conflict Forum has been actively engaging with the emerging issues in the water sector, it felt the need to make a quick assessment of the impact of rapid urbanization on the East Kolkata Wetlands, in terms of social and ecological implications, especially on the fishing community. Therefore, in the third phase of Water Conflict Forum's work, it decided to support a short study on East Kolkata Wetlands to understand the present condition of the wetland, the main causes for its degradation, growing contestations around the wetland and the impact on the fishworkers. The study was done by Institute of Development Studies Kolkata (IDSK).

We are thankful to IDSK for collaborating with the Water Conflict Forum and also to Dr. Gorky Chakraborty and Ms. Dhruba Das Gupta for undertaking this study and bringing out a very insightful report. The current report highlights the emerging issues in and around the East Kolkata Wetlands through a historical analysis of the changes supported with micro case studies. It clearly shows that due to rapid urbanisation, the quality and quantity of sewage have changed over time, which has a direct impact on the fish production affecting the livelihoods of the fishing communities. In addition, the study also points out that the implementation and management of the East Kolkata Wetlands (Conservation) Act, 2006, has been very poor. In order to protect the rights of the fishworkers and the ecology of the system at large, there is an urgent need to strengthen the institutional, legal and governance system in the area. We hope this report would be useful to civil society organisations, citizen's forums and government departments engaged with the issues of urban wetlands and their restoration in the country.

K.J. Joy
On behalf of Water Conflict Forum

Acknowledgement

Our sincere thanks are due for Forum for Policy Dialogue on Water Conflicts in India (Water Conflict Forum) for supporting us for this study, especially to K.J. Joy and Neha Bhadbhade for their constant encouragement and comments on the earlier drafts of this report.

While during the course of the study Dr. Dhrubo Jyoti Ghosh, the engineer cum ecologist, who is credited for highlighting the importance of East Kolkata Wetlands (EKW) in India and world over, has been an inspiration. We are bereaved to believe the unbelievable, he is no more, a loss so sudden, a loss so huge, a loss which will remain uncompensated.

The different stakeholders in EKW, the fish workers, the *bheri* owners, managers and caretakers who helped us with information, stories and lived experiences which enabled to conceptualise this study and the report. Their time, patience and hospitality will remain etched in our memory. They deserve special thanks.

We would also take the opportunity to thank Basudev Banerjee who has been an inseparable part of our field work, whose presence allowed us to overcome all obstacles in the field. His excellent communication skill and humane concern for the people helped to 'reach' far and wide in the EKW. Dr. Subhamita Chaudhuri, Department of Geography, West Bengal State University, and Barasat helped us with the GIS programmes and Naba Dutta, General Secretary, Nagarik Mancha, a Civil Society Organisation for their insights and documents should also be credited for their untiring efforts.

The help and co-operation of the staff and faculty members of the Institute of Development Studies Kolkata (IDSK), where this study was located, has been very encouraging. We take the opportunity to thank them from the core of our heart.

With the hope that the EKW will remain a distinct part of our ecology and culture, we offer thanks to all the concerned citizens who are concerned with conserving these wetlands and its natural system.

Gorky Chakraborty and Dhruba Das Gupta

1. Introduction

The East Kolkata Wetlands, situated between latitude 22°25' to 22° 40' North and longitudes 88°20' to 88°35' East, have the rare distinction of being an ecosystem that treats city sewage leading to food production for the city populace[1] (Figure 1). City-based ecologist Dr. Dhrubajyoti Ghosh has termed Kolkata 'an ecologically subsidised city'[2] for a variety of reasons, one of them being that the wetlands provide cheap food and vegetables for the city and livelihood for the poor. Out of this, the livelihood aspect involves a robust population of more than about 1,18,000 according to conservative estimates[3]. This population not only ekes out a living by successively using sewage for fish growing, vegetable cultivation and paddy cultivation, but in this manner, the wetlands also serve as a stable urban fringe. They keep the wetland inhabitants productively engaged instead of looking to Kolkata for employment.

In 1997-98, the state government commissioned and published a research study which was a Baseline Document for Management Action Plan for these wetlands, in sync with a proposal put up with the Government of India for Ramsar listing of the East Kolkata Wetlands. This research found out that the estimated productivity of the functional fish ponds or *bheris* as they are called in local parlance was more than 10,000 metric tonnes a year. Out of all the resource recovery practices in the East Kolkata Wetlands, fish farming is practiced covering the largest area. This livelihood activity is the basic, most widespread and continuing for many decades.[4] It is by far the largest employer in this area, and production is fraught with a large number of challenges. Though production in the wetlands consists of fish, vegetables and paddy and all of these add economic value, it is not possible to discuss the diversity of issues involved with each kind of production within this report. Each of them is a project by itself. Therefore the focus of this research will be entirely on fish-farming in this Ramsar site, which got recognition because of its wise use by the community.

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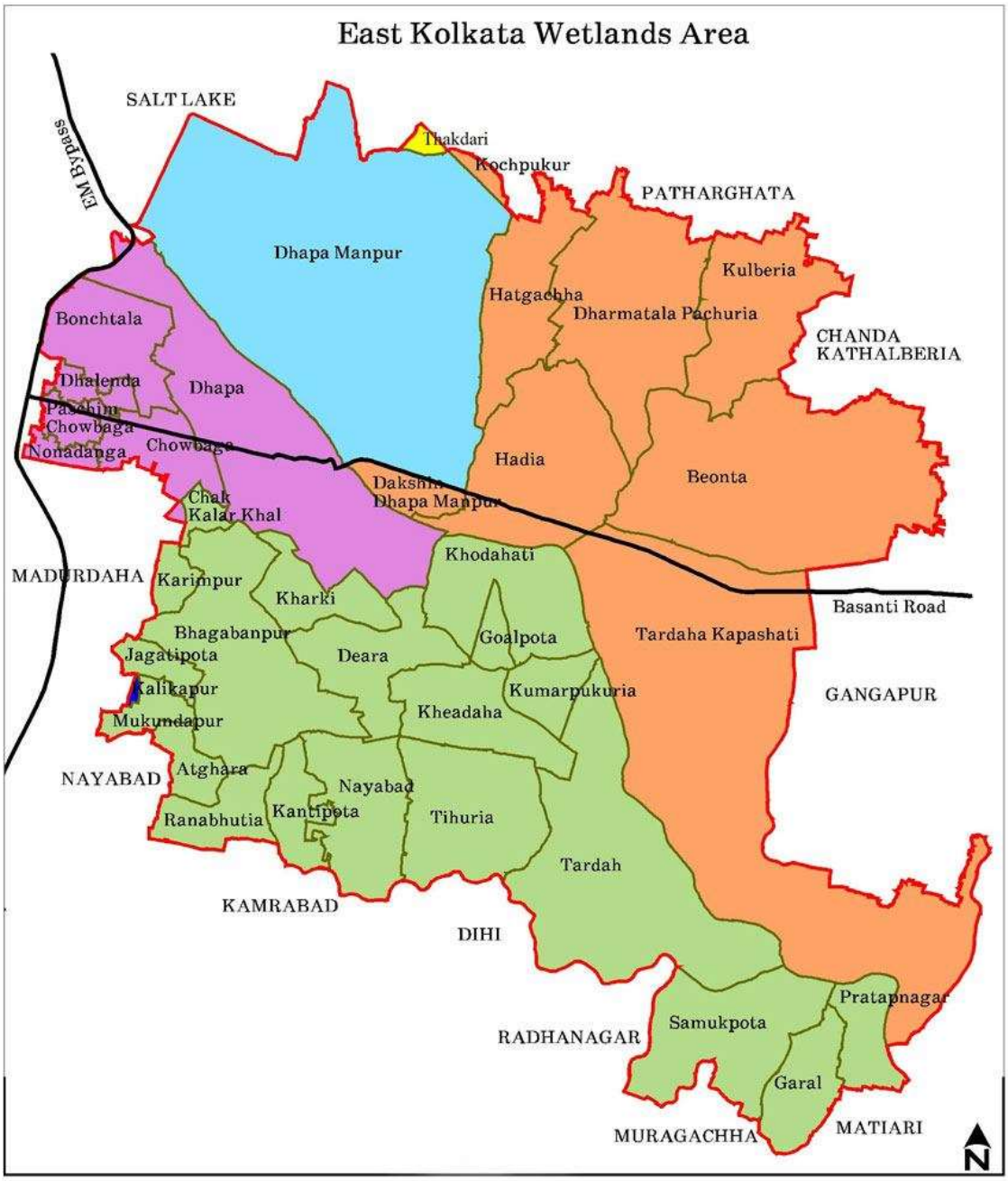
[1] The most comprehensive account of the ecological history of these wetlands is given in the article titled 'Ecological History of Calcutta's Wetland Conversion' by Ghosh and Sen (1987). A recent update to that history can be found in 'Revisiting East Kolkata Wetlands: Globality of the Locals' by Ghosh (2016).

[2] 'Kolkata: An Ecologically Subsidised City' by Dhrubajyoti Ghosh (2004) argued that unlike any other city, Kolkata is situated between two rivers – Hooghly from which water is abstracted for drinking and another, Kulti where treated sewage is disposed off. Also, the city has copious groundwater and wetlands to its east that treat its sewage free of cost, giving it food in the bargain.

[3] 'Not a Single Billboard' a recently released report by Das Gupta, Chaudhuri and Ghosh has studied Bhagabanpur, one of the largest mouzas in East Kolkata Wetlands and puts the population estimate in this wetland area at 1,18,000.

[4] Fish farming began on a commercial scale at around 1930, and thereafter it spread quite widely over the wetlands. Today, there are about 200 *bheris* that fully engage in commercial-scale fish farming, down from the 264 counted in 1997-98.

Figure 1: Map of East Kolkata Wetlands



Source: http://ekwma.in/ek/maps-2/

In the early days of the formation and functioning of these wetlands[5] when fish cultivation was entirely controlled by the landlords the production process looked upon the labourers as human resource to be over-exploited and kept at a distance. The fishworkers did not participate in the management of this process. From the late 1980s till the threshold of the first decade of the 21st century, when the production process began slowly passing on to the leaseholders or even much later, the fishworkers organised themselves into cooperatives, production planning took a different shape and threw up its own set of challenges. Included in this was the political backdrop of conflict with the displaced landowners, issues of availability of finance and internal differences within the *bheris* themselves[6]. Today, these fisheries are confronted with a host of external and internal issues, the former being the imminent threat of real estate takeover as well as legal complexities and the latter being tenurial uncertainties and production crises.

This research focuses on the backdrop of fish production, and the perceived instances of conflict and cooperation that have evolved over the years. It also deals with the current ecological scenario associated with fish production in this 12,500-hectare wetland ecosystem. It covers the background of the ecosystem and its people, glimpses of the current ecological history and then examines the challenges associated with fish production as a whole. It then explores through case studies the fish production conditions of individual *bheris* and seeks to point out to the future issues that need to be addressed, preferably through research and familiarisation with the community in question.

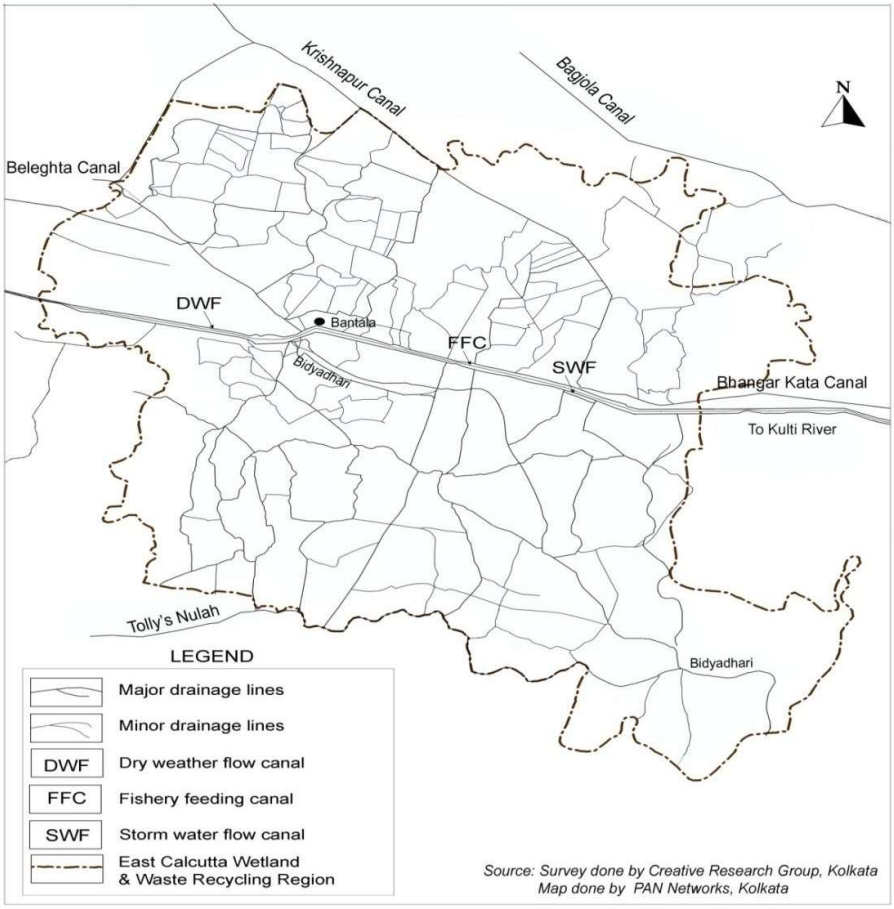
[5] For a detailed description of the ecological history of this place see Ghosh and Sen (1987).

[6] All these issues have been discussed in detail in a series of interviews with wetland fish farmers by the authors. A part of the ecological history of this place has been published as a continuing interview with a community elder in the popular Bengali science magazine *Utsa Manush*.

2. The Ecosystem and the People

The Kolkata Municipal Corporation area generates roughly 750 million litres of sewage every day, according to the Baseline Document. The wastewater is led by underground sewers to the pumping stations in the eastern limit of the city and then pumped into open channels (called Dry Weather Flow or D.W.F. channels of the Kolkata Drainage Outfall system). After receiving the sewage, the fishery owners draw the wastewater into the fisheries of the East Kolkata Wetlands either directly from the tributary wastewater canals or where there is a paucity of wastewater, it is pumped from the canals. Here, following detention for two to three weeks, the organic compounds of the wastewater are biologically degraded.

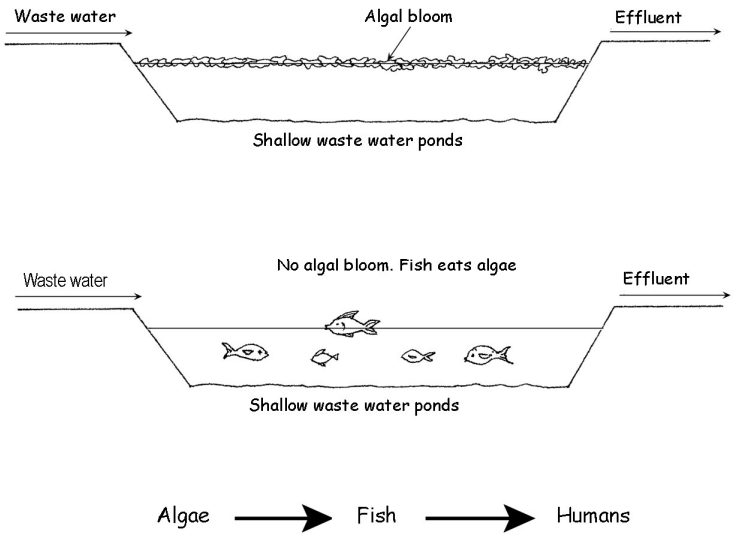
Figure 2: Diagrammatic Representation of the Drainage Channels, Tributaries and Distributaries in East Kolkata



The East Kolkata Wetlands has within it about 60 km of canals, taking into account the drainage channels within the wetlands that is the tributaries and distributaries connected to the main wastewater channels. This facilitates wastewater flow within the wetland ecosystem, to the fish ponds, vegetable gardens and paddy fields. Source: Ghosh, (2005)

Organic loading rate in these fishponds appears to vary between 20 to 70 kg per hectare per day (in the form of biochemical oxygen demand). There is a network of channels that are used to supply untreated sewage and to drain out the spent water (effluent) (Fig.1). The cumulative efficiency in reducing the BOD (a measure of organic pollution) of the wastewater is above 80 per cent and that in reducing coliform bacteria is 99.99 per cent on an average (Ghosh, 2005). The solar radiation here is about 250 langleys per day and is adequate for photosynthesis to take place. In fact, the sewage-fed fishery ponds act as solar reactors (Ghosh, 2005). This solar energy is tapped by a dense plankton population, which, in turn, the fish consume. While the plankton plays a highly significant role in degrading the organic matter in the wastewater, tackling plankton overgrowth does become a problem in terms of pond management. It is at this critical phase of the ecological process that the fish play an important role by grazing on the plankton. The two-fold role played by the fish is indeed crucial–they maintain a balance of the plankton population in the pond and convert the available nutrients in the wastewater into readily consumable form (viz. fish) for the humans (Fig.2). This is the complex ecological process that has been adopted by the fish farmers of the East Kolkata Wetlands. They have developed a mastery over these resource recovery activities.

Figure 3: Fish as an Ecological Manipulator



Source: Ghosh (2005)

The uniqueness of the people living in the East Kolkata Wetlands lies in their capacity to convert, through natural resource management, an ecologically disadvantageous situation into one that offers much better livelihood opportunities. When, after the decaying of the Bidyadhari, the brackish water fishing could not be sustained in the wetlands, a creative fish

producer and the local people successfully developed a system to farm fish in a water area using city sewage. Subsequently, they grew a second crop of paddy using pond effluent, a practice that continues, reviving the fortunes of the poorer fish farmers for the next few generations. This population was thus saved from the need to migrate to alien pastures in a renewed search for livelihood.

The East Kolkata Wetlands area can be divided on the basis of three basic wetland practices: wastewater fisheries, effluent-irrigated paddy cultivation and vegetable farming on garbage substrate. The wetlands and resource recovery area form a good example of productive commercial activities and support one of the largest clusters of livelihood opportunities for the poorer section of the community.

The areas under different land uses have been estimated by the Department of Environment, Govt. of West Bengal in Table 1 (DoE, 2004).

Table 1: Land Use in the East Kolkata Wetlands

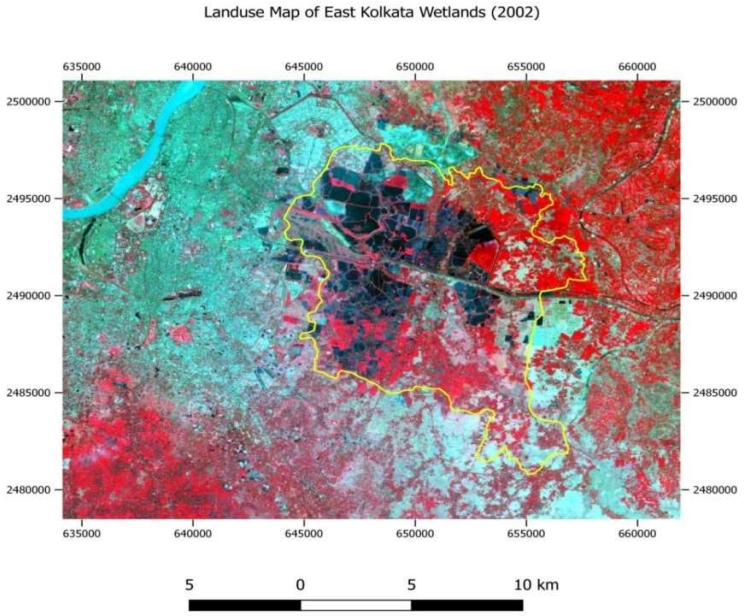
Categories of land use	Area in ha.
1. Substantially water-body oriented area (primarily sewage-fed fishery activities)	5852.14
2. Agricultural area	4718.56
3. Productive farming areas (Dhapa)	602.78
4. Urban and Rural Settlement	1326.52
TOTAL	12500.00

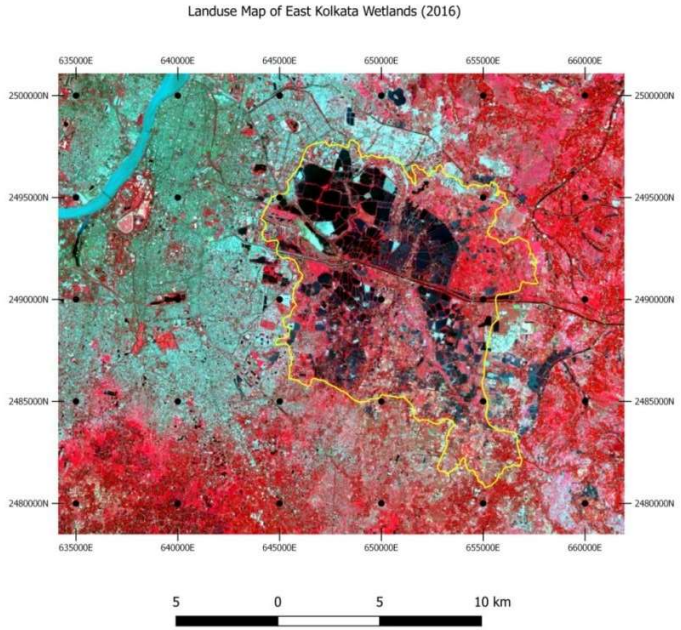
Source: Ghosh, 2005

In 2002, the East Kolkata Wetlands got Ramsar recognition for their wise use. Today, 15 years have passed, and the level of threat to the wetlands has only gone up, as a recent report on encroachment in one of the mouzas (colloquially meaning revenue village) in the wetland was found[7]. Below are two maps that have used Landsat imagery of 2002 and 2016. The difference is all too clear to warrant any comment.

[7] The report on the Bhagabanpur mouza referred to earlier has found that water body area was 88% in 2002 in the mouza at the time of Ramsar recognition, it has come down to 19 per cent in 2016.

Figure 4: Landsat Imagery of 2002 (4a) and 2016 (4b)





LANDSAT Images: The dark blue areas are water body with clear water, the bright red indicates vegetation, reddish but not very bright agriculture or grass. (maps prepared with the assistance of Dr. Subhamita Chaudhuri, West Bengal State University)

3. Administrative and Institutional Backdrop

The 12,500 hectares of designated wetland area is a cluster of 32 mouzas or revenue villages spread over two districts- North 24 Parganas and South 24 Parganas – that make up the East Kolkata Wetlands. These are administered by municipalities as well as by Gram Panchayats (GPs). There are two municipalities and seven Gram Panchayats covering the entire wetlands area. The majority of the wetlands area in North 24 Parganas comes under the jurisdiction of the Bidhannagar Municipality, Ward 36. In South 24 Parganas, there are seven Gram Panchayats – Beonta I, Beonta II, Bamanghata, Tardaha, Kheyadaha I, Kheyadaha II, and Pratapnagar – that cover a majority of these mouzas. There are five mouzas within the Kolkata Municipal Corporation jurisdiction.

The provision of the sewage for discharge into the wetlands remains the task of the Kolkata Municipal Corporation. The distribution of the sewage is the responsibility of the Department of Irrigation & Waterways and the wastewater is regulated through a set of ten manually operated sluice gates at Bantala. The sewage reaches the fish ponds/ *bheris* through a network of channels and the management of sewage in the wetland area is entirely the responsibility of the fish farmers. Out of the fish ponds that are fully functional and producing fish round the year, a few have become cooperatives under the Department of Fisheries. These are provided with fishing equipment, incentives to opt for government schemes in their fishery, and have to pay the government a yearly lease in return. But the Department of Fisheries has a limited presence in these wetlands.

Glimpses of Ecological History

Large scale fish production started in the present wetland area since the 1930's but before the beginning of large-scale perennial wastewater fishponds which were started apparently by the Late Bibhuti Bhusan Ghosh, small-scale short–term (six months at a time) wastewater fisheries were started in Dhapa *Jheel*[8]. This was innovated and introduced by Bengali entrepreneur Bhabanath Sen who started his creative intervention in Dhapa Square Mile which as the name indicates was one square mile area that was a dumping ground for Kolkata's garbage.

There are a few facets of fish production that need to be remembered for the sake of clarity:

1. In addition to those Indian major carps (*Rohu-Katla-Mrigal*) which share among themselves three separate layers (surface, bottom, and column) in the ponds, *Tilapia Nilotica* has been the most prolific product. This is the only fish that breeds spontaneously and needs no specific care or management.

[8] Dhapa lies within the designated area and serves as the waste recycling region of the entire core Kolkata, receiving its solid waste, largely organic.

Box 1: Dhapa-The 'Other' part of the East Kolkata Wetlands

Ecologically, the metropolis Kolkata seems to be fortunate in more than one ways (of course if the residents are aware to appreciate). While the sewage water, generated by the city, is designed to flow through the channels depending on which the *bheris* of the EKW cultivate fish; the municipal wastes of the city are, on the other, dumped, recycled and re-used at an area called Dhapa, which is also an integral part of the EKW.

Dhapa land area comprises of one square mile. It is owned by Kolkata Municipal Corporation. It is tax-free land grant as allotted as a Crown Grant during the colonial period. But the interesting part is that this land was leased to a local gentleman named Shri Bhabanath Sen (1853-1914) in 1879 for cultivating vegetables. This was a unique experiment considering the historical times – one of the earliest instances of cultivation on municipal waste and secondly, a rare example of urban agriculture.

What began in 1879 continues till date but data regarding the inhabitants, agricultural practices and changes therein are scarce. In fact, the only study titled Dhapa Study was undertaken by Dr. Dhrubojyoti Ghosh in 1985 and the findings of the study remain the only authentic estimates concerning various aspects concerning this area. There were 2,640 farmers active on this land and according to the estimates of the study, the area produced in an average of 147 tonnes of vegetables per day. One can note 15/16 different varieties of vegetables grown in these stretches. This produce is supplied to the urban markets of Kolkata at minimum time and least cost. Dhapa has almost 40 per cent of its area under water which is referred as *jheels* where fish is cultivated in purified wastewater. Fish cultivated in these *jheels* are also supplied to the Kolkata fish markets.

A garbage substrate is another part of the Dhapa land where municipal waste is dumped and thousands of people are involved in sorting and making arrangements for recycle and re-use of these wastes. The people involved in these activities reside in the villages surrounding the Dhapa dump site. The waste picking community will not less than 5000 in numbers although there are no authentic studies to quote their actual numbers. They are not covered by any social security schemes either although they dig through the 30- meter high garbage dumps. In other words, they are the wretched of the earth in these areas.

Like the *bheris* of EKW, the Dhapa land area is also subject to steady conversion. While the conversion of the *bheris* is towards filling them up and converting them into sites for real estate, the conversion in the Dhapa sites is also towards a new use pattern which is not only equally informal but also markedly polluting in nature. The Dhapa sites where the waste workers worked and lived as well are being occupied by impromptu 'leather mills' that survive on the wastes of the tanneries located nearby. The workers in the so-called 'leather mills' reported that they produce manures which is used in tea gardens. These units boil the tannery shreds to finally produce the manure. It emits lots of smoke (with an eerie odour) and dust which one can 'feel' during the winter months in the eastern fringes and areas surrounding the Eastern Metropolitan by-pass in Kolkata. Since the land belongs to the Kolkata Municipal Corporation no individual titles are allowed in these lands, so settlement and change in the use of these lands happen following informal patterns.

Field visit suggests that the settlement of waste workers, farmers and now emerging 'leather mills' include both locals and outsiders comprising of ten different caste groups. Yet there are no proper studies throwing light on the population groups, their activities and produce in the Dhapa square miles. Can a metropolis like Kolkata survive on such collective amnesia!

(Based on Ghosh Dhrubojyoti, *The Trash Diggers*, Oxford University Press: 2017)

2. All the fish which is grown and sold reach seven auction markets spread out around the waste-recycling region. Out of these, Chingrighata and Kestopur markets are in North 24 Parganas while Bamanghata, Bantala, Chowbaga, Garia, and Gangajoara are in South 24 Parganas. Chingrighata is the biggest market with an average daily sale of 12.6 MT. There is a continuous demand for fish in Kolkata markets. None of these auction markets are registered with the city municipal corporation as of now and they do not seem to pay government revenue. There has not been any exhaustive study done of these auction markets. They appear to be fair - at least the producers have not generally been able to assert influence on auctioned prices of fish. Advance selling is the dominant system to date.

3. Most workers in wetlands fishery area have always tried to utilise the residual time of the day, after completing their working hours in the fish ponds, working elsewhere to improve income. The type of work they do may vary from working in vegetable gardens, working as unskilled labour, assistant in a shop and the likes. This tendency is more pronounced in recent times than that in the older times. Working in other places is sometimes mistaken as a willingness to shift from fishing activity.

4. Sewage, which is the mainstay of the production process, is carried through the outfall channels starting from Topsia and Dhapa Lock pumping stations which carry sewage to the *bheris* of both North and South 24 Parganas. The most important point of distribution is the Bantala Lock Gate, a set of 10 sluice gates which are manually operated to distribute sewage to the fish ponds by interconnected carrier channels through flow by gravity. The sewage is best distributed when the height of sewage is 9 ft GTS (Great Trigonometric Survey) at the Lock Gate. This is rarely achieved nowadays, which is very surprising considering that it was easily possible to achieve this height 20 years ago with a far less population and sewage levels. This is for a variety of reasons, all of which are not clearly known and there is no current information or research on this. It was reported during our field survey that this primarily happens because of the lack of coordination among the different departments that manage the quantum of flow in the channels e.g. KMC (Kolkata Municipal Corporation), KMDA (Kolkata Metropolitan Development Authority), DoIW (Department of Inland Waterways), etc.

5. Sewage is distributed through 61 km of carrier channels or a network of canals that carries sewage to the *bheris*. But due to inadequate supply and distribution of sewage, all fish ponds face problems. This is especially true for the *bheris* of South 24 Parganas, where lack of availability of sewage led to a very high dependence on pump sets, and additional costs.

6. For a number of decades since the 1930s, fish production was completely controlled by the owners of large landholdings and water bodies. One of such landlords were the

Sarkars of Beliaghata. Another well-known landlord was Lakshmikanta Pramanik. There were many others. They exercised control starting from sourcing the seedlings to the upkeep of the fish ponds, maintenance of the navigability of the carrier channels, sale of fish at auction markets and regulating the work of the labourers. There was no way in which the fish workers could feel any sense of belonging to the *bheris* they worked for. On the other hand, they felt overexploited. The historical turn of events whereby control was wrested from the fish pond owners due to the change in dispensation opened a new chapter in the history of these wetlands. This also saw the fishworkers pushed to the centre of a situation where their lack of experience threw up unforeseen challenges even as they attempted to play a greater role in the production process.

7. The main event that saw power wrested from landholders was the application of the Land Ceiling Act of 1956 (subsequently amended in 1976), whereby a maximum of 17 acres could be possessed by a single landowner. This necessitated demarcation of the boundaries of the water body that belonged to the landowner so that the exact extent of vested land could be known and redistributed among the fishworkers to work on their livelihood activities. The demarcation was sporadic and very sparse, with the result that the landowners found the tenurial uncertainty hampering their ability to earn from fish production and so they became disinterested in the fish production business.

8. Leaseholders began to play a lead role in fish production, after the landowners, who anyway did not find favour with the ruling political party due to their exploitative ways, had to forcibly accept curbs on their former practices. The landowners started giving out their property on lease. But even though they found comparatively greater acceptance among fish workers, the leaseholders soon faced a crisis of availability of capital because they had limited abilities to raise finances.

9. When this crisis of capital showed itself up such that leaseholders started backing out and the threat of real estate takeover became more and more apparent – fish pond owners also started showing an active interest in selling out to real estate - workers started facing a great political vacuum and their ability to carry on with their livelihood activities was severely challenged. It is at this juncture that the fishworkers thought of organising themselves into cooperatives and investing whatever little capital they could muster from earlier known sources, as well as their very modest personal savings. These were the circumstances under which a number of cooperatives came into existence, both in North and South 24 Parganas. Of course, they were unregistered cooperatives formed out of the exigencies of the situation. Cooperatives managing fish-ponds of various sizes were formed but most of them have remained unregistered till today.

10. Today, the ownership and tenurial patterns (nature of the occupancy of the land) are such that private fish pond owners rarely participate directly in fish growing but have leased out to leaseholders, who basically concentrate on how to minimise the cost of production. Many worker-run non-registered cooperatives have also leased out to leaseholders due to inability to generate capital.

11. In 2014, a perception survey and familiarisation study was held under the Indian Council of Social Science Research (ICSSR) which included a number of *bheris* under various tenurial arrangements – owner-led, leaseholder run, and co-operative run. An unforeseen outcome was a set of unpublished notes which showed that fish production via cooperatives (each cooperative has a management committee) face the issue of lack of interest among the ordinary cooperative members[9]. Such members are inclined to relegate the responsibility of fish production and associated governance to the members of the committee in charge of the production, without active participation by themselves. This can often result in accountability issues, especially if the committee does not communicate enough with its members.

12. When exploitative control of the *bheris* largely passed away from the clutches of landowners they were forced to agree to change the working conditions in the *bheris*. Such changes included not more than eight hours of working time per day for the fishworkers (with only 4 hours in water for fish catching work), umbrellas during rainy season and warm blanket during winter season, at least one paid leave every month, bonus once a year before the pujas, sometimes advance is given for other festive occasion such as Manasha Puja. These conditions came to exist for workers across all tenurial patterns.

We will now explore through a series of case studies the various issues related to conditions of production in the various *bheris* and see how much they uphold the conditions of conflict or co-production. For the sake of convenience, the *bheris* have been divided as falling under two districts – North 24 Parganas and South 24 Parganas.

[9] The report is titled 'Making Conservation an Inclusive Agenda: Perception Survey and Familiarisation Studies in the East Kolkata Wetlands' (Ghosh and Das Gupta, 2015).

4. Case Studies

Bheris in North 24 Parganas

A. Government *bheris*

Goltala and Nalban, two state-owned/government fisheries in the East Kolkata Wetlands were owned by the Sarkars of Beliaghata. But since the land ownership was in excess of the ceiling limit specified in the Ceiling and Regulation Act of 1976, the land was ultimately vested with the Government of West Bengal. In 1979, Nalban and Goltala came under State Fisheries Development Corporation (SFDC).

i. The Goltala Fisheries Project

Location: Dhapa Manpur of South Bidhan Nagar Police Station.
Size – 114.34 ha [10]

The fishery was divided into three parts to increase productivity and tackle the problem of siltation temporarily. It is observed that production occurs more quickly when the depth of the pond remains 3.5-4 ft. After some cycles of production, the depth level decreases to 1-1.5 ft due to siltation from sewage water. So recently, the water area has been divided into three parts to enhance production and this has been done under the Rashtriya Krishi Vikas Yojana (RKVY) scheme 2007 that also includes livestock, poultry, and fisheries.[11]

There are three types of ponds used to produce sewage-fed fish: nursing (where spawns and fingerlings are distributed), rearing (where spawns grow in size/spawns are reared), stocking (where fish are grown in size to be sold in the market). In addition, for quite large-sized *bheris* which are located close to Sector V (New Town Area where real estate expansion has been phenomenal along with the location of the IT hub of Kolkata), there's also a marketing pond. Fish is carried to the auction market in the early morning between 5 and 6 am. For easy catch during the early morning, fish is moved from the stocking pond to the marketing pond, the day before it is sold.

No inorganic or strong chemical substances are used in pond preparation. Only harmless chemicals used are lime/calcium oxide (CaO) and a very small amount of calcium carbonate ($CaCO_3$). When pisciculture has to continue in spite of siltation of the pond bed then gypsum and sometimes (very rarely) dolomite is used.

There are some permanent workers (around 40) including the project manager or project in-charge who receive around Rs. 8,000/month. There are around 100 share catchers who are

[10] From the State Fisheries Development Corporation Ltd. Website: http://wbsfdc.com/fishery-projects/ (date of access: July 2, 2016)

[11] From the Rashtriya Krishi Vikas Yojana Website: http://rkvy.nic.in/# (date of access: July 2, 2016).

employed on a temporary basis and provided daily wages and also some amount of fish per day depending on the daily catch. Apart from these staff, there are fish carriers who carry the fish in an aluminum container (36 kg/per container) to the auction market. Goltala *bheri*'s fish is carried to Chingrighata and Chowbhaga auction markets. Price of fish depends on availability in the auction markets; price falls when there's an over-supply of fish. Price also depends on the size and quality of fish and the price of fresh fish always remain high. From the auction markets, fish are delivered and sold in the numerous retail markets of the city.

Table 2: Production details of Goltala bheri

Average output (Hectare/year)	Turnover (in Rs)	Species produced
3-3.5 MT	20 million/year	Species produced • Since the beginning: Common carp (*Cyprinus carpio*) Silver carp (*Hypothalmichthyes molitrix*) Indian major carp (IMC) – Pona (*Labeo rohu*) Tilapia (*Oreochromis mossambicus*) Nilotica (*Oreochromis niloticus*) *Pangasius* • Recently added: Vietnam koi[12], Monosex tilapia • Declined/reduced to none: *Jiyol* fish like mrigal (*Cirrhinus mrigala*), shoal, koi, singhi, latha, etc.[13]

Fish Feed and Fish Production

Natural fish feed e.g. rice bran, mustard cakes, fish dust etc. is used. During the rainy season, when the availability of sewage is less, fish feeds of several companies like CP, Anmol, Next Gen, Grow Well, etc. are used sparingly. However, no antibiotics are used, only probiotics are added wherever necessary. The recently added Monosex Tilapia is, however, a hormone-

[12] In a report on the future recommendations for increased productivity in the fisheries of West Bengal in July 2013, import of species like *koi* and crab from South East Asian countries like Vietnam, etc. was emphasized (http://www.wbfisheries.gov.in/wbfisheries/do/viewPDFCgo;jsessionid=661BAFE65735913C28801DC0D3F6C906?val=SGCGO-6(7)ZAQQZ42264; date of access: July 2, 2016). Vietnam Koi arrived a few years ago, via Bangladesh but now there is a hatchery in *Bheri* Gopalpur in North 24 Parganas' Gaighata block and it is being extensively cultivated in the district. It is bigger in size than the well known native variety, poorer in taste and sells at half the price of the prevailing variety.

[13] *Jiyol* is a native term. *Jiyol* fish means those varieties of fish that can survive longer than other fish outside water as their lungs and heart can absorb oxygen outside water for long. These are considered of high food value especially during monsoons and good for the stomach.

induced fish variety to check unconditioned propagation. Male Tilapia grows more rapidly than female. Separating the male tilapia and raising them separately across two ponds – nursing and stocking is the method for Monosex Tilapia fish farming.[14] According to information provided by the project manager, when the reaction of the hormone stops, the male species are transformed into females. The hormones are injected during the breeding season in a captive pond hatchery. It is safe to consume the fish as the hormone injected gets diluted naturally. It is a standard practice among fish eaters in Bengal to consume fish skull and there have been no adverse health problem reported while consuming this variety. Even, the consumption of the Monosex Tilapia also does not have adverse health impacts. The *bheri* dwellers suggested that as this fish variety has a higher ability to consume natural feed from the wetlands, the hormonal effects, if any are neutralized. Their experiences suggest that the Tilapia has the natural strength to survive in adverse weather conditions and are highly disease-resistant as well.

To enhance *jiyol* fish production, it is being planned to introduce artificial fish feed in ponds. This has not yet started though.

Challenges in fish production:

- Reduction in the quantity and quality of sewage mainly due to silting of the inlet canals and lack of organic matters in the wastewater largely due to the shifting of the livestock rearing activities outside the city area, as a result, the wastewater from the city does not carry the organic wastes as it happened earlier.
  - Those fisheries located at a distance from the main inlet sewage canal receive an insufficient quantity of sewage.
  - According to the project manager, the organic sewage component has reduced and been replaced by inorganic sewage component, affecting the quantity of fish production. For example, there were many cowsheds in Kolkata. Cow dung was an important organic resource for sewage. But these have been destroyed and the urban population pressure and urban ways of life (the use of more detergents, shampoos, etc.) has increasingly added to the inorganic component of the sewage, leading to the decline in production of several varieties of high protein fish like *jiyol* variety.

[14] http://www.roysfarm.com/monosex-tilapia-farming/ (date of access: July 2, 2016). Monosex Tilapia are cultivated not only in government-owned *bheris*, but also in fishery farms run by leaseholders in the South 24 Parganas part of the wetlands. Development of Sex Reversed Tilapia (SRT) seed production technology by the Asian Institute of Technology (AIT) has brought an addition in tilapia aquaculture in the wetlands.

ii. The Nalban Fisheries Project

Location: Dhapa Manpur of South Bidhan Nagar Police Station.

Size – 147.16 ha[15]

There are 15 nursing ponds, one rearing pond and one stocking pond. No inorganic, chemical substances are used in pond preparation. Only harmless chemicals used are lime/calcium oxide (CaO) and a very small amount of calcium carbonate ($CaCO_3$). There are around 97 permanent workers including the project manager or project in-charge and administrative staff who receive between Rs. 6,000 and Rs. 8,000/month. There are around four teams of share catchers (each team consisting of 14 members) who are employed on a temporary basis and provided daily wages and also some amount of fish everyday depending on the daily catch. Apart from these staff, there are fish carriers who carry the fish in an aluminum container (36 kg/ per container) to Chingrighata and Chowbhaga auction markets. Government has also introduced air-conditioned mobile vending cars to carry fish in the auction market. Fish is also provided at a subsidised rate to the Nalban Food Park, an eco-friendly tourism project (with restaurants and amenities like luxury boating, etc.) developed on the waterfront of Nalban Fisheries Project.[16]

Table 3: Production details of Nalban bheri

Average output (Hectare/year)	Turnover (in Rs)	Species produced
4.4 MT	25 million/year (Annexure – Table on monthly catch and sale report of a particular variety, March 2016; collected from the project office)	• Since the beginning: Silver carp (*Hypothalmichthyes molitrix*) Indian major carp – *pona* (*Labeo rohu*) Grass carp (*Ctenopharyngodon idella*) Tilapia (*Oreochromis mossambicus*) Nilotica (*Oreochromis niloticus*) Black carp *Basa* • Recently added: Monosex Tilapia • Declined/reduced to none: *Jiyol* fish like Mrigal (*Cirrhinus mrigala*), shoal, koi, singhi, latha, etc.

[15] Information from the document in the project office

[16] http://www.wbfisheries.gov.in/wbfisheries/do/CallViewPublic;jsessionid=6FF7F9672A951E100CA20AC8038BEE57?val=Nalb-Nort-67891 (date of access: July 2, 2016)

This year the *bheri* has started a hatchery of its own. Before that spawns were bought from Bankura, Naihati, Bishnupur, etc.

Fish Feed:

Type of fish feed – natural which includes – rice bran mixed with paddy husk; no additives, hormones induced. However, protein-based fish feed is being provided since the last two years due to the decline in the quality of sewage. Antibiotics (in a very small amount) mixed with protein is also being provided.

Challenges in fish production:

- Reduction in the quantity and quality of sewage.
    - The fishery is located far away from the main inlet sewage canal. This also affects the quality of sewage as when sewage enters this *bheri*, due to the heavy amount of deposition in the near-by (to the inlet canal) *bheris*.
    - The organic sewage component has reduced and replaced by inorganic component, affecting the quantity of fish production, especially the *jiyol* variety.
- Siltation of pond bed and problems related to de-siltation as it is expensive and requires a number of days.

B. Cooperative *bheris*

iii. Baro Chaynavi Matsya Samabay Samiti

Location – Bidhannagar ward 36

Size – 30 ha

The *bheri* is registered as a cooperative. It is a government undertaking cooperative which was vested from a private landholder. Baro Chaynavi practices integrated aquaculture and activities like horticulture, cattle rearing, poultry, and so on using municipal wastewater and biodegradable solid waste. There are 67 cooperative members. During peak season, additional temporary share catchers are involved. The fish is carried to Bantala, Chowbhaga and Chingrighata auction markets.

Fish Feed:

Type of fish feed – natural; antibiotics and additives are not used. However, during pond preparation, along with lime, rarely potassium permanganate is also used, especially during the winter when fish get affected with disease.

State Fisheries Development Corporation (SFDC) provides nets and fish feed to producers. It has also constructed roads and bridges for easy communication with the auction and retail

markets. Recently, SFDC has also encouraged Baro Chaynavi to produce big fish to reduce imports from Andhra Pradesh.

Table 4: Production details of Baro Chaynavi bheri

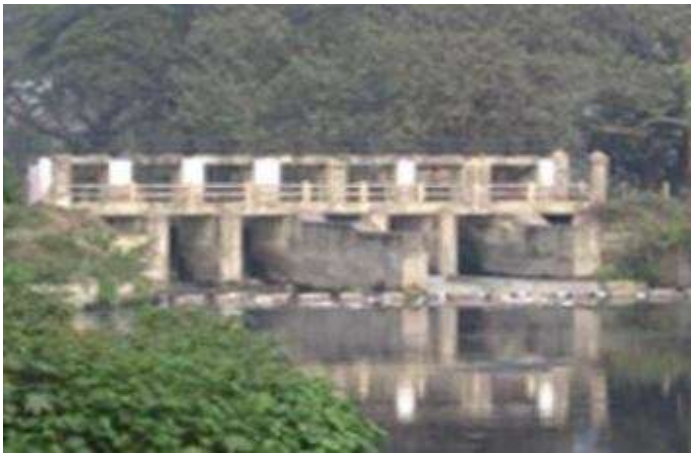
Average output (Hectare/year)	Turnover (in Rs)	Species produced
6 – 7 MT	10 million/year	• Since the beginning: Silver carp (*Hypothalmichthyes molitrix*) Indian major carp – *pona* (*Labeo rohu*) Tilapia (*Oreochromis mossambicus*) Nilotica (*Oreochromis niloticus*) • Recently added: Vietnam koi • Declined/reduced to none: *Jiyol* fish, Bele, Punti, Pakal

Challenges and potentials/ opportunities/ways forward:

- Though the secretary and producers identified some challenges in fish production, yet they seemed to be very enthusiastic to overcome those with their own plans and initiatives, many of which are receiving government support as well. Interestingly, there are four cooperatives in Bidhannagar 36 no. ward – 4 no. fishery, Chaker *bheri*, 1 no. Patrabad Samabay Samiti and Baro Chaynavi with the lowest member strength of 67; yet, they claimed to be the most active of all *bheris*, with production rate sometimes touching twice or even thrice that of government *bheris*.
- The problem of the increase in inorganic waste in place of organic waste from cow dung, etc. was reported by members. But the secretary added that to check this, they have designed a plan to create a cowshed in this cooperative which would soon be executed.
- They also encounter the problem of siltation, yet out of their own initiative, fund and labour, every year they carry out some de-siltation activity and increase the depth of the pond bed by 3-4 feet and the sides by 20 feet to enhance productivity level.
- The fishery reported the problem of insufficient flow of sewage in the *bheri* and the problem is associated with the diversion of sewage from the Bantala Lock Gate — a set of 10 gates built from 1944 to 1946 by Chief Engineer of Calcutta Municipal Corporation, B.N. Dey to divert sewage from the outfall channels into the wetlands. In recent times there has been an escalating conflict amongst the Kolkata Municipal Corporation (KMC), Department of Irrigation and Waterways and Fish Producers Association over the operation of the lock-gates on the Bantala sewage canal, which controls the flow and supply of wastewater into the *bheris*. Though the secretary is aware that sewage is diverted to the Storm Water Flow channel and reaches the Sunderbans

untreated yet, he said this is done to directly drain out wastewater from Kolkata rapidly to check the problem of water logging especially during the rains.

Figure 5: Bantala Lock Gate



iv. Captain *bheri*

Location: Tapuriaghata, Eastern Metropolitan Bypass Road
Size – 12.15 ha

The *bheri* is registered with the cooperative section of the Department of Fisheries. The government has recently (2014) identified it as an eco-tourism aqua hub promoting recreational activities here including boating, angling, awareness relating to pisciculture and such like. The fish producers maintain all these along with fish production. State Fisheries Development Corporation Ltd. provides 40 per cent of the profit to Captain *bheri*. It is a combination of bureaucracy, cooperative fish producers and common people.
The secretary added interesting insights on the traditional practice of ensuring good quality of water after checking which only varieties of fish are introduced. He explained in detail how sewage is treated for a stipulated time period and how the sewage load is ascertained not only by observing the light brown colour but also drinking the sewage. When he described the process it was awe-inspiring, he mentioned how familiar he was with the "sweet, good taste of water."

The producers mentioned the use of a wooden instrument and bricks attached to it called *horra* in the native language in water used by two fishermen from two sides for three consecutive days. The function of the *horra* is to properly mix the lime in pond water.

Before three hours of introducing spawns in the pond, hoxidol power mixed with kerosene oil is introduced in the pond followed by which netting is done to catch insects, frogs, duck-insects, etc. that consume fish spawns.

The secretary said fishermen use their discretion regarding the appropriate situation to receive sewage via the inlet into the pond. When the colour of the sewage water in the inlet remains deep green, indicating heavy sewage content load, sewage is not received.

Fish pond systems in the East Kolkata Wetlands are sewage-based and fish do not breed in sewage. So there is no in-house hatchery in these fish ponds but this *bheri* conducted an experiment to use pumped up groundwater to breed fish. The groundwater showed high iron content, as is the case all over this region, locals have said. So the effort to breed was not fruitful.

There are around 40 permanent/ direct members and 150 temporary members. It also has a primary school run by cooperative members.

Table 5: Production details of Captain bheri

Average output (Hectare/year)	**Turnover (in Rs)**	**Species produced**
5.6 MT	6.6 million/year	• Silver carp (*Hypothalmichthyes molitrix*) Indian major carp – *pona* (*Labeo rohu*) Katla Tilapia (*Oreochromis mossambicus*) Nilotica (*Oreochromis niloticus*) Mrigal (*Cirrhinus mrigala*) • Declined/reduced to none: *Jiyol* fish

<u>Challenges to fish production:</u>

- Siltation of pond bed and problems related to de-siltation exist and the solution is expensive and time-consuming.
- Insufficient quantity of sewage. Both inlet and outlet canals are severely blocked. In recent times, sewage has to be pumped in using electricity-run pumps not needed earlier
- Increase in inorganic waste in place of organic waste from cow dung, etc.

Bheris in South 24 Parganas

A) Cooperative *bheris*

i. Nalban-1 Matsyajibi Samabay Samity

Background

This *bheri* has an interesting story. It was owned by a person named Sushil Sapui who sold the *bheri* to Purnendu Chatterjee. It is alleged that Chatterjee wanted to change the land use (maybe convert) as well as lay off a number of people (workers) associated with the *bheri* by paying compensation. It is narrated that few of the workers agreed with the compensation amount while the majority declined to accept the offer. Along with the help of various local political leaders, they organised themselves, a case was filed and the litigation continued. During this process, the workers formed a co-operative and continued with their activities related to the *bheri* as usual. The *bheri* was leased from the government for three years and it was renewed at the end of that period. This process has now been replaced by tender, which the workers allege is a threat to their existence.

In terms of assistance from state agencies, the workers said fish seedlings, fishnets, different utensils for fish storage and sale and a small boat was provided but of late due to lack of initiative on part of the managing committee of the *bheri* these benefits have stopped.

The members and their daily routine

The co-operative consists of 62 members, 12 of them are women. The workers are paid Rs 150/- per day (since 2012). They are also provided with a blanket during winter and umbrella during the rainy season. A bonus of Rs 5,000/- is paid to them during the Durga Puja festival. The workers also get 250 grams of fish when they catch fish for sale.

For the regular workers, the day starts at 5:00-5:30 am when they move into the *bheri* for a fish catch. Around 15-20 people are engaged in this activity. Mainly women are involved in the clearing of weeds and other plants from the water as well as from the land area surrounding the *bheri*, usually from 9 am to 12 noon. During the day, 6 members are engaged as guards while during the night, 20-22 members are involved as guards. Temporary workers are involved occasionally for repairing the fishing nets as well as bamboo and wooden works necessary with different activities of the *bheri*. These temporary workers when employed are paid a wage of Rs 350-400 daily.

Challenges facing production

- The workers said that there has been a change in the style of the functioning or in other words, managing the affairs in their *bheri*. According to them earlier the decisions were more or less transparent and the workers had a say in managing the *bheri*. Meeting of the members were held at regular intervals. But as things stand today, the co-operative spirit in overall *bheri* management is defeated.

- The workers in the *bheri* fear that of late there has been a growing tendency amongst the management committee to convince them for focusing more on utilising the *bheri* for recreational purposes e.g. picnic, shooting of films, TV serials etc. what the workers complain is fish production and maintenance of *bheri* is no more a priority for the managing committee and instead promotion of recreational activities has become the most important subject of discussion. As these activities help generate cash income, the management committee is more interested in highlighting these aspects rather than fish production and workers issues related to livelihood activities. Workers believe this to be a precursor to conversion.
- Another major problem which is specific to the *bheris* in this locality is the functioning of the Bantala Lock Gate.

ii. Chochoria Fisherman's Co-operative Society

Background

This is a registered co-operative with 146 members. The nine-member Committee that manages the affairs of the *bheri* is elected for five years. Proper meetings are held and minutes are noted. Annual General Meeting is organised and general meetings are held 3-4 times in a year. This co-operative received prize from the Central Government during 2007 when their *bheri* was declared to be the best in India in terms of fish production.

Members and production details

Except for 20 odd members (both male and female) who are involved in vegetable cultivation only, the remaining members divide their tasks as night and day guard, fish catchers, etc. There are no female members in the Governing Committee.

A daily wage rate of Rs. 130 prevails in the *bheri*. It is paid for 365 days in a year. Throughout the year various payments are paid to the members, which includes Poila Boisakh (first day of the Bengali New Year) Rs. 500-1000, Rath Yatra – Rs. 1000, Ranna Pujo (cooking festival) – Rs. 1000, Durga Puja – Rs. 7500, and Kali Puja (Diwali) – Rs. 1000. Along with these payments in cash, umbrella during the rainy season, blankets in winter, shawls and mosquito nets are also occasionally distributed to the members during the Annual General Meeting.

Various vegetables such as ladies finger, cauliflower, cabbage, *borboti* (cow pea), potato, onion along with coconut and papaya are cultivated in the dry land.

Government support in the form of a boat, fishing net, fish feed, and lime was made available but off late this has become irregular. Earlier once they were supplied with the fish seed of 'Air' (*Macrones seenghala*) by the government. Members of their co-operative have recently attended a training programme on fisheries at Kalyani University.

Table 6: Chochoria bheri's land use and fish production

Area of *bheri*	40 hectares water and 15 hectares vegetable growing area
Fish production	74 tonnes/ hectare
Yearly profit	Rs. 1 to 1.5 lakh

Challenges faced in fish production

- Siltation is identified as one of the main problems. There has been no effort towards excavation during the last 10 years. Maintaining the ideal bed level is a problem in the *bheri*. It is only during the rainy season that the standing water level is 2.5 to 3 feet; otherwise it falls to 1.5 to 2 feet only. At this level, it's very difficult to cultivate fish efficiently. They mentioned that 4 to 5 feet of standing water is necessary for proper fish production, in its absence the production is affected adversely.
- Pump set and fuel expenditure (diesel, for running the same) for transferring water from the sewage carrier channels to the *bheris* is an expenditure which is continuously rising thereby adding to the cost of production.
- Fish feeds such as company feed (processed), mustard husk and so on are used during the rainy season when the availability of quality sewage is less. They also undertake lime treatment for cleaning water in the *bheri*.
- Now *Jiyol* (live) fish is not available as there has been a decrease in the organic component in the sewage whereas chemical content has increased. The fishworkers attribute this mainly to the tannery effluence from Topsia and Bantala.
- They demanded immediate excavation of the sewage canals along with de-siltation of the *bheris*. According to them, both this process should take place simultaneously. When during 2008 the sewage canals were desilted the *bheris* were not included in the process as a result of which the sewage levels in the canals fell (as the bed was cleared of sediment) while the level in the *bheris* became higher in comparison to the canals. So relatively speaking bringing the sewage from the canal to the *bheris* became more difficult and this further increased their dependence on the pump sets.
- The members narrated that when the first lease was given to them during 1999 they had to pay Rs. 41,200 annually. For the subsequent 10 years, they paid at similar rates. However, of late there has been a shift in the process and government is moving towards issuing tenders. This they alleged was a process towards corporatisation which they treat as ominous.

B. Private *bheris*

i. Dino Makal Khasgeri Fishery

Background

This is a private unregistered fishery (KLC Police Station) with four owners and no assistance from the government. The total area is 250 bighas (roughly 83 acres). There are 53 workers in this *bheri* which includes 21 night guards, 14 netters, 12 marketing persons, four female labour mainly for removing weeds and two for running errands. Those workers who have been employed for a long time are issued with individual identity cards.

Challenges to production

- There has been a fall in the sewage quality which has adversely affected the quality of fish production in the *bheri*. The respondent alleged that the absence of *khata* (traditional) latrine in the urban dwellings of Kolkata as well as shifting of cowsheds (*khatal*) has also affected fish production. The absence of these has depleted the organic component in the sewage. As a result of this fish production in the *bheris* are dependent on other feed that is harmful for the fish. Interviewees alleged that the relocation of tanneries has resulted in effluents getting mixed with sewage water, which as fish feed is also harmful to the fish. However, the veracity of this statement needs to be ascertained separately.
- Workers informed that in order to reduce the feed cost they use *Jhilli*[17] (treated skin waste from tannery used as fish feed). They are also dependent on restaurant wastes, biscuits, and cakes that remain unsold after they cross expiry dates.
- There has been no reclamation of the canals which have adversely affected the availability of sewage in the *bheri* and has thereby affected fish production. Fish production is at its peak during the summer and rainy season while during the winter, production is at its lowest ebb. According to them, they are in the business of fish production approximately for 6 months where it peaks from March to September. Per day netting in 250 bighas is around 8/9 *maunds* or in other words 300/350 kg.
- Since fish catch is not increasing over the years it is difficult for them to provide with increment and bonus for their workers.
- They also told that there is no unity amongst the owners now; their association is neither active nor united as earlier, so the *bheri* business suffers from lack of vision. Considering the present economic status of the *bheri* the owners do not want their children to join this business.
- The owners identified conversion as the biggest threat along with lack of regular supply of quality sewage to the *bheris*. According to them, there should be at least 5 feet of standing water in the *bheri* to optimise fish production. They also alleged that

[17] Treated skin waste from tannery used as fish feed

bheri owners suffer from lack of capital, rising maintenance cost, and an uncertain future.

- Minimising the cost of production happens to be their main factor for their survival in the business.
- Their suggestions for improving the business includes proper re-excavation of the canals, improvement in the amount and quality of sewage and input support from the government such as fish feed, fishnet, small boat, etc.

ii. Dhalir *Bheri*

Background

This is a private unregistered *bheri* where seven members have leased in from an absentee landlord at an annual fee of Rs. 3 lakh. These recent leaseholders are local youths who are associated with this *bheri* from last five years. Those who were earlier associated with this *bheri* left it as they incurred losses. Land and water area are 15 bigha (5 acres) and 60 bigha (20 acres) respectively. The prevailing sewage level is 1.5 feet which they can raise through pumping water from the Fishery Feeding channel originating from Bantala and it can[18] reach a maximum height of 3 feet. However, this means incurring huge diesel costs.

There are 14 fish catchers (*jele*) and six security guards. In addition, the leaseholders themselves are engaged as night guards since theft during the night is very high in these areas.

Production details and challenges faced

- When enquired about the production process in the *bheri* and its contradictions if any, they responded that *bheris* signify co-production and there are no conflicts amongst different stakeholders associated with their *bheri*.
- They use mustard husk and mahua husk for cleaning and maintaining the water quality. Mahua husk is applied four times in a year, where each bag costs around Rs. 35 and they apply three bags at a time. Mustard husk is available at Rs. 70 per bag and 50 sacks of this food supplement are applied in a year. They never apply *Jhilli* as feed.
- The leaseholders narrated that their maintenance cost is increasing at a faster rate than their income from selling of fish. According to them, fish sprawls require three months to mature as big enough to be sold in the market. However, due to the requirement of cash, they seldom wait for three months for the fish to mature and sell them after 2 months or 70 days.

[18] Information collected during fieldwork

- For pumping in sewage from the main sewage canal to the *bheri*, the leaseholders incur a cost of Rs. 22,000 to 23,000 per month, mainly for buying diesel and maintenance of pump sets.
- Immediate de-siltation of sewage canal and *bheri* are required in order to maintain the adequate flow of sewage to their respective *bheri*.
- They also pleaded for reducing the number of intermediaries in the marketing channel of their fish produce which may fetch them with higher returns.

iii. Pirtola *Bheri*

Background and production perspective

This is an unregistered co-operative. This *bheri* is divided into three parts. The owner is an absentee landlord staying at Kolkata. There are 103 members, among them 12 managers. The managers and workers replied that they follow the rules of co-production and coexist as if the members associated with the *bheri* are bound together by kinship ties.

They get an adequate supply of sewage and therefore pumping is not required which minimises their cost of production. Moreover, the bed of the *bheri* has also been de-silted. On being asked about the de-siltation process of their *bheris* they replied that earlier when the soil was required for filling construction sites at Kolkata, the builders sent their trucks which carried their silt and waste from their *bheris*. This proved to be very lucrative for them as it has increased pond depth and hence its ability to receive sewage.

They mentioned that their profit levels are decent and they want to continue with their *bheri* activities in the forthcoming future. They were against the conversion of their *bheri* and said that no matter whatever compensation is given will only last for a while and majority of them will be forced to search for other livelihood options which will not be lucrative in nature.

Workers and production details

- The workers in the co-operative received Rs. 125 as wage per day. They are provided with this wage for 25 days a month. Bonus is provided amounting Rs. 500 during *Ranna Puja* and Rs. 2500 to 3000 during the *Durga Puja*.
- They net in their *bheris* every day and have a catch of 7.5 maunds per bigha. The authorities informed that they provide fish from the regular catch to their members at a reduced price. The produce from this *bheri* is sold at the Chowbhaga wholesale fish market and the members of the co-operative carry their catch to the market. Water tax is paid to the Kolkata Corporation fixed on an acre rate.

iv. Chandi Haldar *Bheri*

Background and production details

This is a private unregistered *bheri* with an area of 6 bigha (2 acres). There are eight permanent workers who are provided with a daily wage of Rs. 150 throughout the year. Temporary workers are employed for weeding, earth cutting, and bamboo works. Weeding is done by women labourers who are paid Rs. 150, while the second group is paid Rs. 250 and the other variety, Rs. 300 per day.

- Average fish is around 2 *maunds* per bigha.
- Cost of feeding includes hotel waste (Rs. 3500 per month), *jhilli* (Rs. 100 pm) and mustard husk (Rs. 170 pm)
- Supply of sewage is relatively stable and his dependence on pump and diesel is less.
- Major varieties include Indian major carp (*Labeo rohu*), Tilapia nilotica (*Oreochromis niloticus*), Mrigal (*Cirrhinus mrigala*) and *Catla catla*

v. Nitish Sapui's *Bheri*

Background and production details

This is a private registered *bheri* with an area of 200 bigha (about 67 acres). There are 49 workers. Out of them, five are involved in various maintenance activities, 30 are employed as night guards and 14 are fish catchers. Seven women are employed as temporary workers.

The women are employed for maintaining the water hyacinth skirt in the *bheri* and are paid a wage of Rs. 150 per day. The permanent workers, who are male, earn Rs. 158 per day. They have an adequate supply of sewage but also use pumps occasionally for pumping in sewage to their *bheri*.

Jiyol fish (*Koi*) is available but their numbers have depleted over the years. Workers mentioned that *jhilli* is never used as fish feed in their *bheri* but they use hotel waste and other processed fish feed.

The workers have a cordial relation with the management and the private owner. This was, in fact, the only *bheri* where we came across both the flags of the ruling party and opposition closely flying together.

Box 2: Civil Society, Political Mobilisation and the EKW

The conversion of wetlands is nothing new in Kolkata and its vicinity. It should be remembered that the Salt Lake Township, which started gaining ground during 1950s and 1960s, witnessed the acquiring of 44 hectares along with 58 fisheries, particularly in the Northern part of Salt Lake. The 1970s witnessed more than 200 hectares being encroached which obviously included a large number of *bheris* as well. Once the urban spread of Kolkata gained spree, large parts of the peri-urban areas that included agricultural land and wetlands, were converted. Interestingly, during this period, the axes of urban expansion changed as well. Earlier, Kolkata's expansion has been along the North-South direction but during the 1980s, the expansion took the East-West directions. As a result, large parts of the EKW, which lies in the Eastern fringe of the city was adversely affected. With a rapid increase in housing and hospitality sector along the eastern part of the city added to the process. In the 1990s, as India moved into the neo-liberal global order, showcasing cities through construction in the name of development of infrastructure became an inseparable part of the 'development' agenda. Kolkata has not been an exception to this agenda. The booming real estate in the 1990s and early 2000s witnessed the inclusion of the peri-urban into the urban as well construction of Rajarhat and Sector V, the IT hub of Eastern India, transforming large swathes of the marshes, swamps, agricultural and wetlands got included into the urbanscape.

Citizenry in Kolkata remained unaware about this conversion either as beneficiaries of such conversion and/or due to scanty awareness on environmental issues. There were, of course, few CSO's e.g. People's Science Organisation, Forum for Calcutta, Calcutta 36, etc. along with journals namely, Bigyan O Bigyan Kormi, Utsa Manush, etc. where environment related issues were discussed and published. But this was more focused on raising environmental awareness. Things started to change and it rallied around the wetlands. During 1991-92, when West Bengal Industrial Development Commission (WBIDC), mooted a proposal for constructing a World Trade Centre and expressed its willingness to convert three *bheris* of EKW to build the Centre. The number of CSO's along with individuals mainly technical professionals, teachers, lawyers, journalists along with activists came together to raise a banner of revolt against the construction of the Centre. Rallies, conventions, and meetings were organised frequently. The deputation was submitted to the Governor of the state to put pressure on the administration. The watershed moment came when an organisation named People United for Better Living in Calcutta (PUBLIC) filed a petition in the Calcutta High Court where the respondent was the State of West Bengal. The verdict was delivered where the Court stalled the proposed construction and highlighted "the wetland being a bounty of nature does have a significant role to play in the proper development of the society, be it from an environmental perspective or from an economic perspective". This judgement also marked the area of EKW as 12,500 hectares comprising of 32 mouzas (later increased to 37 mouzas).This judgement thereby brought not only the *bheris* in the public domain but also placed the environment as a part of the dominant discourse thereby refusing to allow a change in land use in EKW.

The CSO's along with individual crusaders like Dr. Dhrubojyoti Ghosh have played an important role in the journey thereafter as well from the inclusion of EKW in the Ramsar list in 2002 to the UN Declaration in flagging the EKW as one among the two wetlands in the world where wastewater is treated naturally, in 2017. Awareness programmes, seminars, workshop along with undertaking

projects to study the intricacies of this wetland system and the threats to it has been done by various civil societies. Two organisations, namely CEMPD (Centre for Environmental Management and Participatory Development) and SCOPE (Society for Creative Opportunities and Participatory Ecosystems) continue to work on EKW and generate information on the wetlands. The latter organisation also undertakes livelihood support programmes among the fish workers and their households in this area. However, the role of CSO's has been largely focussed on environmental campaigns and they undertake their activities as solitary campaigners instead of building up a joint action-oriented platform.

The presence, involvement, and mobilisation of the political formations concerning the EKW also present with an interesting picture. During the 1960s and 1970s, when the land struggle was the main plank for mobilisation politics in West Bengal through a process of identification of ceiling surplus agricultural land and its distribution as 'vest' land to landless peasantry, the Left organisations took the lead and mobilised the peasantry. The landlords, mainly absentee, used different 'ploys' to subvert the system to preserve their hold over these lands. Frequent litigation, transfer of ceiling surplus land to fake individuals (benami), changing the land use pattern by excavating land and letting in water for fish cultivation (since initially water bodies remained outside the purview of land reforms, which was later changed) etc. has been different subversive 'practices' to 'escape' ceiling legislation. Although various amendments in The West Bengal Estates Acquisition Act 1953 and West Bengal Land Reforms Act 1955, the change in land use were prohibited, its implementation remained an arduous task.

The Left formations had a strong sway over the politics through mobilisation of the peasantry during this period and the leadership also enjoyed command over a vast section of the working people. A large section of the people in EKW still maintains that imagery of the past. However, contradictions emerged after there appeared to be a gap between the slogans of mobilisation and the 'fruits' that was delivered after the Left came to power. Although one can cite glorious examples from land distribution and recording of rights through Operation Barga, *bheris* in EKW remained half bound. In other words, while the politics of mobilisation helped the users and landless peasantry to get hold of these sites from absentee landlords, recording rights and issue of deeds fell short. It created a bizarre scenario, where those *bheri* dwellers were de facto owners but de jure occupiers. A patron-client relationship between them and the political bosses became entrenched. The *bheri* dwellers supported their bosses and they looked after them under an uncertain proprietary regime.

This situation continued for long until the mobilisation against the World Trade Centre and the subsequent High Court ruling on PUBLIC vs. State of West Bengal (1992) made 'face' saving for the state Government difficult. The same Left formations were then in office in the state and ascribed this as a 'conspiracy against the Left' and labelled those opposing 'development by a Left-led government as bourgeoisie environmentalists'. It resulted in a chasm between the existential realities in the EKW and content of politics through mobilisation. The EKW, the *bheri* dwellers, the fish workers, their households and other stakeholders associated with this area was left in a mess, an alley without hope, where the politics and environment looked askance without walking together.

5. Fish production and the Pressing Issues

The above case studies point to the following types of issues:

A. **Governance issues** – cooperatives are apprehensive of the imminent threats of corporatisation since the fisheries department has opted for the tender route of awarding licence in recent years. Sewage-fed fishing is unique in not only India but also the whole world and the fishworkers and their skills cannot be put on par with other types of fishing skills. As such, this is a problem or which an immediate discussion and solutions are required.

B. **Institutional issues** – They all centre around sewage and the distribution network and can be divided into the following:
   - The decline in the quality and quantity of sewage is a persistent problem in both the districts surveyed and across all *bheris*. This negatively affects institutional management of fish production and at the end the amount of fish supply to Kolkata as well as the well-being of the community that nurtures the fish. This is actually also a governance issue as adequate sewage supply to the wetlands has to be ensured by the government for Kolkata's sewage to be treated comprehensively.
   - De-siltation of the fish ponds along with re-excavation of the canal distribution network is an issue to be urgently addressed as can be understood through the case studies
   - The quality of sewage supplied needs to be examined and the results declared in the public domain. For all these years, no heed has been paid to sewage quality

C. **Production issues** – It appears that the fish varieties popularly called *jiyol* variety, have disappeared, and the fish farmers declare this to be directly linked to the decline in sewage quality. Use of supplementary fish feed has also increased. What is more disturbing is artificial fish feed like *jhilli* is slowly but surely making inroads into fish production. Another aspect is the introduction of new fish varieties like *Monosex Tilapia* and *Vietnam Koi*, although they have happened only in government-run fisheries

D. **Fish safety** – This stems from urban perceptions. On the other hand, field findings corroborate that it is safe to consume wetland fish. The argument that till now the wastewater pumped into the ponds goes through no pre-treatment or filtering is questionable as Ghosh have described in detail the various stages of traditional pre-treatment and filtering that occurs when sewage water passes across the chain of waste stabilisation ponds. Moreover, water hyacinths not only play a major role in removing metal toxins from sewage water, but the recent field surveys captured that these are also used to cover fish to arrest contamination when fish is carried by carriers.

More on Fish Safety

The interviewees in this report mentioned that till now no single case has been reported of skin problems of fish producers or catchers or other labourers who work in sewage ponds. Till now no case has been reported of stomach problem or disease after consuming wetland fish. This is quite evident from the remark made by the secretary of Captain *Bhery* who pointed out how they drink and test sewage and then introduce varieties of spawn in the ponds (mentioned above). Moreover, the secretary of Baro Chaynavi mentioned that it is standard practice to catch 'live' nilotica; buyers also buy it 'live' from the market. But sometimes when the fish die in captivity or while being caught, the families of the fisherfolk cook the dead fish and consume the stew prepared with vegetables, which includes 'neem' and bitter gourd. Even then a single case of disease e.g. stomach ailment etc. has not been reported. Moreover, a number of tests conducted by CIFRI (Central Inland Fisheries Research Institute) till date could not come out with negative results.[19]

But in spite of all problems, the production and sale of fish from wetland have increased in recent times despite a decline in the area. Tilapia account for around 50% of production and the trends suggests that this will continue to increase further. It is in high demand among the economically poor consumers as its price remains low due to relatively less production cost. The Indian Minor and Major Carp and *Tilapias* appear compatible within the *bheri* production system and to meet different market needs the larger frozen Indian Major Carp (IMC) are supplied to other areas of the state and beyond. Even large quantities of the smallest live fish are transported to other districts of the State. [20]

The secretary of Captain *Bheri* made a stern remark, "*Kotobari to safety niye koto parikha dite holo, tao to kichu pawa gelo na. Ekta kathai bolbo, amra garib mach chasi, roj sakale kom dame Kolkata y protein ta amrai pouche di*" (So many times so many tests were undertaken to assess 'how safe it is to consume fish from the wetlands', but no negative results have been found. I would like to say only one thing, we are poor fishermen, everyday in the early morning we deliver in Kolkata market the source of rich protein at a cheap price). And the secretary of Baro Chaynavi said, "*Amra garib tao ei jala r doulote pate ar kichu poruk ban a paruk, sabar pate antoto mach ta pore*" (We are poor, still, due to these wetlands even if we do not have anything to eat, every day we can survive on wetland fish).

Another remark made by the secretary of Captain Bhery on the law of contradiction seemed to be extremely significant: "*Jagoter niyom i ulto; prithbi surjey r charidike ghore amra vabi surjo prithibir; mach jaler current er ultodike palay; ar jole mayla thaklei tate valo macher valo chash hoy, jol porishkar holei mach more jay; ar sab thke mojar holo jara aj mach utpadone chemical er byabohar korche tara amader abar bolche naki amader mach khele*

[19] http://www.cifri.ernet.in/ (date of access: July 3, 2016)

[20] Also refer to Little et al. 'Marketing of fish from peri-urban Kolkata', Working Paper 6, Dec. 2002. Available at: http://www.dfid.stir.ac.uk/dfid/nrsp/download/market.pdf (date of access: July 3, 2016).

cancer hobe; ki abak kando!" (All laws of nature are contradictory; the earth moves around the sun, but we think the opposite; fish moves on the opposite direction of the water current; if there's sewage in water then only can fish remain healthy and grow in size by surviving on it, if the water is transparent/clean, the fish would die; and the funniest of all is those who are actually using chemicals in fish today for making profits at the cost of human health, they are victimising us with the argument that wetland fish is unsafe to consume and might lead to cancer; how astonishing!).

Box 3: EKW: The Ways Ahead

Co-existence of the sites of 'petty production' and 'global capital' is always full of contradictions. Engulfing the former, while acknowledging the 'aesthetics' by the latter follows the known trajectory of capital. The question is whether one can withstand it with an alternative vision or succumb to the whims of appropriation, thereby leading to the conversion of the sites of petty production vis-à-vis metropolitan capital.

To any observer of EKW, the question remains as to why large scale conflicts do not emerge in these areas? The answer certainly requires a detailed research study focusing on the multi-dimensional nuances of this traditionally managed sewage treatment along with its co-existence primarily with fish production as well as small scale agriculture. However, at the conjectural level based on insights from the fieldwork, it seems that a lethal strike at a Ramsar site may generate widespread repercussions with global ramifications. Instead, of such an ultimate blow, subversive acts of 'thousand cuts', appears to be a rational choice for various stakeholders sans the *bheri* (fish) workers. The state, the litigant landowners, the political establishment, the 'apolitical' CSO's, the 'rightless' owners as well as the managers of the *bheris* foresee an uncertain (read hopeless) future ahead. For the state, it is at its peripheral vision; to the litigant and absentee landowners it is a source of renewed hope of renter income; to the political establishment, it's a source of manpower required during the show of strength; while for the managers, it's a wait till the next best opportunity for an alternative source of income. Within this web, the fish workers are caught between a daily routine and production pattern which is difficult to negotiate with the principles of collective bargaining in industrial sites. To them, the glitters of the metropolis remain visible in the background, yet the reality remains distant separated by a deep chasm. It is a boundary-less 'seen' but more 'felt', where alcoholism and gambling co-exist along with the serene mixture of land and waterscapes.

Lack of proper proprietary rights appears to be one of the major issues that obfuscate the scenario. Lack of properly recorded rights adds to the probability of conversion. A condition of apathy on the part of the administration and an uncertain future added with improper proprietary rights creates a situation where succumbing to the land sharks appears to be the only option for larger cash flow and better laboring conditions. The perception prevails that despite the presence of the East Kolkata Wetlands Management Authority, conservation of the EKW is a far cry; a toothless authority either turns a blind eye or registers cases in the police stations. Actions on these complaints are seldom undertaken and when undertaken, it is mainly to legalize the conversion with a hollow warning of not to repeat the offence thereafter. Moreover, the fish workers reported that there is a politico-administrative nexus that augments the process of conversion. The absence of a single signboard

highlighting that EKW as a Ramsar site along with the absence of an updated map manifests that the boundaries are deliberately kept porous so the gradual changes miss the view of a casual observer. But the question remains how can administration allow any changes in a Ramsar site which is after all is a stretch of wetlands?

EKW has long been highlighted as a 'kidney', 'liver' etc. for Kolkata which treats the city's waste traditionally and in the process the city becomes an 'ecologically subsidized city'. The days of these epithets although true are not there to last long until the environmental concerns are brought forward to the people to create 'pressure' on the political establishment for safeguarding the rights of the workers associated with the *bheris* in EKW. Settlement of the issues related to proprietary rights in the wetlands remains a burning issue which if sympathetically mobilized will have a strong impact in these areas. The backlash from vested interest groups particularly the absentee landowners along with the political bosses has to be withstood with the strength of mobilization. Politics in Bengal has long been motivated by the slogan of land to the tiller, now it needs to be reactivated in the *bheris* e.g. Jaal jar Jol tar or the water belongs to the fish workers who use the fishing nets. In such a situation of embedded but unrecognized proprietary rights of the workers who use the net for a fish catch, can genuine co-operatives come up in EKW? Instead of remaining strange bedfellows, environment and politics need to intermingle from a political ecology perspectives related to EKW. Conservation *sans* the rights of the fishworkers will continue to be an empty slogan augmenting conversion.

6. Conservation or Conversion!

A. Fishworkers and conversion attempts

Looking at the above state of play regarding sewage-fed fish production in the wetlands, internal co-operation seems to be the keyword among the poor fish workers, though there are some signs of conflict internally, they are by and large eager to continue to make a livelihood out of fishing and sustain themselves up to the extent that they can. A study by Ghosh and Das Gupta (2015) found that more than 90 per cent of the fishworkers thought fishing was productive and they wanted to continue on with this livelihood.

The conversion has always loomed in the horizon, and as the past history shows, right from the time of the change in political dispensation and the passing of the Land Ceiling Act, realtors have taken advantage of the prevailing uncertainty and made every attempt to convert the wetlands into real estates. Private enterprise even attempted to build a World Trade Tower way back in 1990 and the then state government attempted to award land in the wetlands area. The NGO People United for Better Living in Calcutta (PUBLIC) went to court and won a verdict in favour of wetland conservation where the land use of the wetland area was frozen, on the strength of a map delineating the area, prepared by wetland specialist and environmentalist Dhrubajyoti Ghosh. The judgment gained prominence all over the country as the first environmental judgment which set the tone for many other cases. However, its relevance has entirely fallen by the wayside since the judgment was not adequately circulated among the panchayat functionaries in a language that they could understand (they had no knowledge of English). So wetland conservation, though it was part and parcel of the duties of a number of government departments, it was never provided adequate importance.

B. Ramsar recognition

The next milestone in conservation was the inclusion of the East Kolkata Wetlands in the Ramsar list as a wetland of international importance in 2002. However, even this recognition and the Ramsar tag that upheld the importance of wise use of these wetlands by the local community have not served as a deterrent to the land mafia who have slowly and silently continued to build illegally. The East Kolkata Wetlands (Conservation and Management) Act 2006 which was formed for administering these wetlands only has at best been an incomplete and imperfect legislation and mandate. The Authority that is statutorily created to conserve these wetlands has not been able to put up a single signboard announcing the existence of the Ramsar site and warning people that conversion is prohibited here. A recently released report shows that Bhagabanpur, one of the large-sized mouzas in this area, has lost its water bodies from 88 per cent in 2002 to 19 per cent in 2017.

C. Tenurial issues

Why is the state of affairs like this? These wetlands were largely privately owned, and the changes that occurred with the passing of the land ceiling act required that the government

demarcate the land that belonged to the private *bheri* owners and that which was vested with the government. The tenurial status at present is a mixture of leaseholder *bheris* and informal cooperatives, with very few registered cooperatives producing fish. However, these informal cooperatives face a lot of uncertainty and takeover attempts and generally, are left to themselves for their protection. This has a strong impact on the overall sense of security prevailing among the fishermen.

So security is missing, so is the right to livelihood. And add to this a lack of clarity on part of the government regarding inter-departmental cooperation on the issue of conserving these wetlands. So when the fishermen complain reading lack of availability of sewage, no department or set of departments come forward to redress this. The East Kolkata Wetlands Management Authority (EKWMA), which has the direct duty of conservation of these wetlands, sees itself as chiefly warding off encroachments in this area, and nothing much beyond, though they are reluctant to publicly admit this.

With so much of uncertainty regarding their livelihood, the fishermen can easily be browbeaten to give up their livelihood and attempts even made to fill up the *bheris* by miscreants, at least beginning with the smaller ones. Once one set of *bheri* workers is cowed down, it serves as an example to threaten fishworkers of adjoining *bheris* as well.

Conflict here does not exist among the fisher community themselves on any large scale, rather, it is imposed from outside, specifically from the real estate and the case studies have shown that fishworkers feel that institutional management is being deliberately made difficult for them by trying to reduce sewage supply, the lifeline that sustains these wetlands and the community. Not just that, the recent barrage of remarks by the incumbent environment minister that the wetlands need to be developed and civic amenities provided to the wetland people, or that the space lying open near the bypass needs to be made into a bird-park and zoo[21] has alarmed both the wetland community and also the people of Kolkata. Even more disturbing was the amendment to the East Kolkata Wetlands (Conservation and Management) Act 2006, which now empowers the minister to be at the top of East Kolkata Wetlands Management Authority by appropriating power, where the Minister can grant permission to build if s/he deemed fit.

A look at the internal and external issues suggests that a qualitative picture of the ground realities of these wetlands and the way forward for conservation needs further research along the following lines:

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[21] Times of India reported on 1 February 2017, ironically, the day before World Wetlands Day this year, that the Mayor wished to set up an eco-park and zoo in East Kolkata Wetlands and the news appeared in all leading newspapers

i. Institutional practices in the management of sewage-fed fisheries and their changes over the years – and the gaps that need to be addressed
ii. Governance and legal framework – what are the challenges involved in the conservation of the East Kolkata Wetlands
iii. Status of wise use in East Kolkata Wetlands

Research in these areas may lead to useful pointers in future conservation and protection initiatives.

The future of these wetlands can be robust because the governance and institutional problems need the political will to solve them, they are not unsolvable. As such, the production issues, whatever they are, are possible to be addressed by all stakeholders coming together. However, the elements of external conflict look much stronger and the threat of real estate looms large, lurking around for a chance to tighten its grip. Thus, no element of arbitrariness should be allowed to decide the future of the East Kolkata Wetlands.

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Plate 1: Life in East Kolkata Wetlands through Photographs from the Fieldwork

Plate 2: Separate Ponds to Rear Fish and Pumping in of Wastewater

Plate 3: Fishing Implements

Plate 4: Looming Threat of Conversion

Plate 5: The Dhapa Substrate

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The Forum and Its Work

The Forum (Forum for Policy Dialogue on Water Conflicts in India) is a dynamic initiative of individuals and institutions that has been in existence since 2004. Initiated by a handful of organisations that had come together to document conflicts and supported by World Wide Fund for Nature (WWF), it has now more than 250 individuals and organisations attached to it. The Forum has completed two phases of its work, the first centring on documentation, which also saw the publication of 'Water Conflicts in India: A Million Revolts in the Making', and a second phase where conflict documentation, conflict resolution and prevention were the core activities. Presently, the Forum is in its third phase where the emphasis is on backstopping conflict resolution. Apart from the core activities like documentation, capacity building, dissemination and outreach, advocacy and policy dialogue, the Forum is intensively involved in right to water and sanitation, agriculture and industrial water allocation and use, environmental flows in the context of river basin management and competition and conflicts around groundwater as part of its thematic work. The right to water and sanitation component is funded by WaterAid India. Arghyam Trust, Bangalore, which also funded the second phase, continues its funding for the Forums work in its third phase.

The Forum's Vision

The Forum believes that it is important to safeguard ecology and environment in general and water resources in particular while ensuring that the poor and the disadvantaged population in our country is assured of the water it needs for its basic living and livelihood needs. The Forum is committed to the core values of equity, environmental sustainability, efficiency, livelihood assurance for the poor and democratisation.

The Forum's Mission

The Forum's mission is to influence policies and actions at all levels and work towards resolving, and preventing water conflicts in an environmentally and socially just manner, and creating awareness for achieving participatory, equitable, and sustainable water use. The Forum aims to carry out these through stakeholder interactions, knowledge creation, policy advocacy, training, networking and outreach.

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