

Briefing Paper: Legal, Institutional and Technical Framework for Lake/Wetland Protection

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Introduction

Lakes and wetlands, whether man-made or natural, fresh water or brackish, play a vital role in maintaining the environmental sustainability of the urban areas. These water bodies perform significant environmental, social and economic functions, ranging from being a source of drinking water, recharging groundwater, and acting as sponges to control flooding, supporting bio-diversity and providing livelihoods. However, they have become the biggest casualty of urbanization today. Acknowledging the significance of lakes, recently released Nation Capital Regional Planning Board's draft revised plan for 2021 projects has also suggested that lakes/ponds should be revived and conserved and, should be used as surface storage reservoirs and ground water recharge basins to meet the challenges of increasing water demand. The report further recommended that water from tail cluster of canals and harvested rainwater should be used for revival of lakes and ponds (NCRPB, 2013).

Despite knowing their environmental, social and economic significance, these water bodies are being continuously ignored. Today these water bodies are encroached by the land mafia, full of sewage and garbage thanks to apathetic urban authorities. Because of unplanned urbanization, much of the landscape around the lakes has been covered by impervious surfaces. As a result, instead of rainwater, it is the sewage and effluents that are filling up urban water bodies. Once the sponges of urban area, today urban lakes are turned into a hazard that get choked even with low rainfall and overflow into the blocked canals during high rainfall causing floods in the city. It is the disappearance of these sponges of the city that has exacerbated floods and sharpened the pain of droughts (Churning Still Water, 2012).

Considering this alarming situation of negligence urban water bodies, this paper intends to evaluate the legal and institutional protection available for the conservation of urban water bodies in India and in other parts of the world, particularly in the developed countries. The paper will also explore the technical tools for the management of water bodies.

Issues and Threats: The Indian Scenario

For the last two decades, urban water bodies have been a victim of unplanned urbanization in India. There are a number of treats that urban water bodies are facing today ranging from

pollution, encroachment, eutrophication, illegal mining activities, ungoverned tourist activities and cultural misuse.

Pollution: For the last two decades, there has been an explosive increase in the urban population without corresponding expansion of civic facilities such as adequate infrastructure for the disposal of waste. Hence, as more and more people are migrating to cities the urban civic services are becoming less adequate. Often, many parts of the city are not connected to sewage lines. As a result, the water bodies are used for disposing untreated local sewage and solid waste, and in many cases the water bodies have been ultimately turned into landfills. For example, many man-made lakes in Vadodara, such as Wadi Waddi, Akota, Varnama, Sevasi and Dasrath.

Encroachment: Encroachment is another major threat to water bodies particularly in urban areas. As more and more people are migrating to cities the availability of land is getting scarce. Today, even a small piece of land in urban areas has a high economic value. Hence, these urban water bodies are no more acknowledged for their ecosystem services but as real estate. Both for the government and the private builders these lakes and wetlands are extremely profitable opportunities. Both for the government and the private builders these lakes are extremely valuable opportunities. Charkop lake in Maharashtra, Ousteri lake in Puducherry, Deepor beel in Guwahati are well known examples of encroachment. The encroachment of Deepor Beel was so rampant that there are a number of dwelling units and structures including the laying of railway track inside the wetland, that made the wetland to shrink by 40 sq. Km.(Report on visit to Deepor Beel in Assam, 2008). Another interesting example of encroachment and pollution, not by some private builder but the government itself is Pallikaranai marshland in Bangalore. The size of this city wetland is decreasing rapidly. Once a bird sanctuary, it is now the dumping yard of Chennai City. The dumping of solid waste, sewage discharge, and construction of new buildings such as a railway stations and a new road have shrunk this wetland to a great extent. Today, Pallikaranai wetland is also one of Chennai's largest official dumping sites. Similarly, the case of government encroachment of Sola Beel in Guwahati where the state revenue department allotted lake-bed for construction in spite of Guwahati High Courts order to protect all wetlands in the state.

Eutrofication: Primarily being lentic water systems, lakes and wetlands are almost closed ecosystems. Hence, a large part of the substances that enter in the lakes and wetlands become a permanent part of the system as only a part of that can be removed depending on the water exchange system. As a result, the entry of nutrients through raw sewage become the part of lake system and cause various destructive changes in the water body such as prolific growth of aquatic weeds in lakes and ponds that ultimately disturb and kill the ecology of the water body. Beels of Assam is a well known example of high growth of hyacinth due to pollution.

Illegal Mining Activities: Illegal mining for building material such as sand and stones both on the catchment and on the bed of the lake also have extremely damaging impact on the water body and one of the reasons behind the destruction of water bodies. As a result of excessive mining the water bodies lose their ability to store water. For example, the Basamand lake in Jodhpur, once the only source of drinking water for the city of Jodhpur, has been suffering from illegal mining for the last 20 years despite the court's order to stop mining in 1999. Surajkund lake in Haryana is another example of illegal mining activities that have destroyed the lake as the catchments have been mined for building material. Downstream, Faridabad has mined groundwater that caused several lakes in the region to dry up.

Unplanned Tourism Activities: Unplanned tourism activities without systematic planning and regulation proved to be another major threat to urban water bodies. Disturbance of wildlife, pollution because of waste left behind by tourists, changes in local lifestyles and loss of cultural heritage are some of the impacts of tourism on the local environment. In the absence of garbage disposal facilities, the practice of dumping garbage into nearby water bodies has become quite common in recent years and has contributed to the degradation of water bodies especially at the high altitude lakes. For examples, Dal Lake in Srinagar, Tso Morari and Pongsho Lakes in Ladakh where the unplanned and unregulated tourism has posed long-term negative impacts both on biodiversity of the area and as well as on the local environment.

Cultural Misuse: Adding to the sorrowful state of urban water bodies is also the misuse of these water bodies by local communities for their cultural or religious believes such the immersion of idols during specific festivals. These activities are particularly a source of serious metallic

pollution in lakes. These idols are often painted with pigments containing lead, chromium, nickel, cadmium, zinc and other heavy metals. For example in Guwahati a large amount of idol immersion happens in river Brahmaputra during the pujas. Similarly examples are river Pampa in Kerala and River Yamuna in Delhi during Ganesh Chaturthi.

Critique of the Existing Legal and Institutional Measures for the Protection of Water Bodies in India

The article 48A of the Constitution of India clearly states that “The State shall endeavour to protect and improve environment and to safeguard the forests and wild life of the country”. Similarly, the article 51A of the constitution of India says it is the fundamental duty of each citizen to protect and improve the natural environment. “It shall be the duty of every citizen of India, to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures.” The Indian courts also acknowledge the importance of urban water bodies and can issue a mandamus under the current constitutional provision and legislation. Under such mandamus, a superior court can order to an authority to act according to the regulations that the authority is obliged to act upon. However, currently there is no specific law aimed at the protection and conservation of lakes, wetlands or other aquatic ecosystems. Nevertheless, there are a number of policies, plans and programmes, acts/bills and rules for the conservation of water bodies. A brief description of these measures is given below.

Policies for the Conservation of Water bodies

The first National Water Policy was formed in 1987. However, the conservation of water bodies was only addressed in 2002 at the national level at the time of the revision of the first National Water Policy (National Water Policy, 1987). Furthermore, the revised policy mentioned about the revival of traditional systems only.

Before this, the Ministry of Environment and Forests (MoEF) had developed the National Wetland Conservation Programme in 1983 for conservation of lakes and other water bodies. Since most of the lakes that are in urban areas face more threats of pollution and encroachment, the Ministry developed a separate programme in 2001 called National Lake Conservation Plan

(NLCP) for the conservation of lakes in urban areas. The NLCP focuses on the development of the national level policies and actions for the urban lakes. However, it must be noted here that water being a State subject, Centre has a limited authority when it comes to the implementation of the policies for the management and protection of urban water bodies. Under the NLCP, the Central and State governments shared the costs in the ratio of 70:30. To improve the process of implementation and coordination between the centre, state or urban local bodies MOEF directed all the states to constitute City Level Monitoring Committees (CLMCs). So far, NLCP has spent 352.19 crores for the restoration of more than 40 lakes in 14 states (Gopal, B., Sengupta M., Dalwani, R., Srivastava, S., 2010). However, unfortunately the results are still far from satisfactory as in most cases the focus remained on short-term solutions only, for example, the majority of funds provided under the government schemes such as NLCP projects have been spent on high cost technological solutions and beautification around a water body rather than on ecological restoration and improvements in water quality, for example Pushkar lake in Ajmer. The water quality of Pushkar lake did not meet nation water quality standards even after its restoration (Verma & Sudha, 2012).

There has been also a lack of stakeholder participation and capacity building in the projects under NLCP, which is one of the main objectives of NLCP. However, in February 2013, the two programmes Nation Lake Conservation Plan (NLCP) and National Wetland Conservation Plan (NWCP) has been merged into a single programme called National Plan for Conservation of Aquatic Eco-systems. The guidelines of the programme are still being prepared.

In 1992, The National Conservation Strategy and Policy Statement on Environment and Development by Ministry of Environment and Forests also stressed on the priority action towards the conservation of water bodies by controlling pollution of water bodies from municipal and industrial wastes generated from urban habitats by intercepting and diverting such wastes away from the water bodies and protection of land near water bodies and prevention of construction there upon.

In 2005, the regional plan-2021, National Capital Region was designed under which it was made mandatory for NCR towns to protect the identified water bodies and to reserve 2-5% of land for ground water recharge (Regional Plan-2021, 2005).

The National Water Mission under National Action Plan on Climate Change also recommended conservation of lakes and other water bodies including expeditious implementation of programme for repair, renovation and restoration of water bodies in areas/situations sensitive to climate change, developing an inventory of water bodies, especially those with unique features, mapping of catchments and surveying and assessing land use patterns with emphasis on drainage, vegetation cover, silting, encroachment, conservation of mangrove areas, human settlements and human activities and its impact on catchments and water bodies, creating awareness among people on the importance of ecosystems of the water bodies. Formulation and implementation of a regulatory regime to ensure wise use of water bodies at the national, the state, and district level was also recommended.

Acts/Bills for the Conservation of Water Bodies

Apart from the above mentioned policy statements, there is also a plethora of acts/bills which are meant for the restoration of the lakes and the other water bodies in India, such as Ramsar Convention on Wetlands 1971, Water (Prevention and Control of Pollution) Act 1974, The Environment (Protection) Act 1986 etc. Please see the box for a list of acts for the conservation of water bodies.

However, only a few states in India have passed and implemented bills specifically targeted to the conservation of water bodies. These include Guwahati (Assam), Kolkata (West Bengal), Andhra Pradesh and Kerala. In Guwahati, the state government, pushed by the judicial intervention,

Acts/Bills for the Conservation of Water Bodies

The Indian Wildlife (Protection) Act, 1972
The Indian Fisheries Act, 1897
The Indian Forest Act, 1927
The Territorial Waters, Continental Shelf, Exclusive Economic Zone
The Water (Prevention and Control Of Pollution) Act, 1977
Water (Prevention and Control of Pollution) Act, 1974
The Maritime Zones of India (Regulation Of Fishing By Foreign Vessels)
Forest Conservation Act, 1980
The Environment (Protection) Act, 1986
Coastal Zone Regulation (Crz) Notification
Wildlife (Protection) Amendment Act, 1999
National Conservation Strategies On Environment & Development
The Biological Diversity Act, 2002
Convention on Wetlands (Ramsar, Iran, 1971)
Convention on Biological Diversity, June 1992
Bonn Convention on the Conservation Of Migratory Species of Wild Animals
International Convention for the Protection of Birds
National Water Policy, 2002
National Policy for Hydro Power Development
Convention on Conservation of Migratory Species of Wildlife Animals (CMS)
Source: *Churning Still Water, 2012*

passed the Guwahati Water Bodies (Preservation and Conservation) Bill 2008. The aim was to preserve wetlands and reacquire lands in the periphery of the water body for their protection. Earlier in 2006, the East Kolkata Wetland Conservation and Management Bill was passed to protect some 12,000 ha of wetland. This bill includes provision for penalties of Rs. 1 lakh for encroachment. The Andhra government's 'Water, Land, Trees Act' empowers state agencies to take steps to protect water bodies and to prevent conversion. The act also requires measures to permanently demarcate the boundaries of the water bodies and to evict and prevent encroachment. The Kerala Government has also come out with Kerala Conservation of Paddy Land and Wetland Act, 2008. This Act has provided imprisonment for not less than six months and fine up to Rs. 1 lakh.

Rules for the Conservation of Water Bodies

Ministry of Environment and Forests (MOEF) has also published rules for the protection the water bodies in India. Giving in to the clamour for a national regulation, in December 2010, under the provisions of the Environment (Protection) Act 1986, called the Wetlands (Management and Conservation) Rules, MOEF issued a set rules for conservation and management of wetlands (Wetland Rules, 2010). However, at present the rules are under review.

Authorities for the Conservation of Lakes

Technically, in urban areas, water bodies are owned by land owning agencies. However, their survival and protection depend on the role of a number of other institutions /agencies such as Ministry of Water Resources, Ministry of Environment and Forests, Agriculture Ministry, Fisheries Ministry and other local authorities i.e. Municipal Corporations, Development Authorities, Tourism Department, Water Supply Boards etc. This multiplicity of agencies further makes the situation more complex rather than effective. Apart from these institutions and agencies, special purpose vehicles (SPVs) for lake management and conservation known as Lake Development Authorities have also been set up in many parts of the country. Although, these SPVs helped in the conservation of many water bodies to some extent, but unfortunately, these authorities are just another bodies without any power to legally implement the required measures for the conservation of water bodies. These authorities also lack the representatives of involved stakeholders.

As discussed above, it is obvious that although there is a plethora of policies and acts for the protection and restoration of urban lakes and wetlands, urban water bodies are in extremely poor condition. These numbers are declining rapidly. For example at the beginning of 1960s Bangalore had 262 lakes, now only 10 hold water. Similarly, in 2001, 137 lakes were listed in Ahmadabad city, and over 65 were reported being already built over (Excreta Matters, 2012). In Delhi in 2010-11 to check the changes in water bodies in last 10 years the status of 44 lakes was ascertained and it was found that 21 out of 44 lakes were gone dry due to rapid urbanization and falling water tables (Singh & Bhatnagar, 2012). Another example exhibiting this increasing loss of urban water bodies is Hyderabad, within last 12 years, Hyderabad has lost 3245 ha. area of its water in the form of lakes and ponds (Times of India, 2012). The city municipal corporation has a list of over 3000 water bodies. There are endless examples in India that show such devastating state of urban water bodies.

Legal Protection for Lakes/Wetlands in Developed Countries

There are no direct laws specifically framed for the protection and conservation of lake/wetlands. The water bodies receive indirect protection through conservation acts at different levels depending on the institutional and legislative systems of the country. Lakes/Wetlands are protected through policies and agreements but these although being significantly valuable do not have the same clout as legislation. For example, in Canada water bodies receive indirect protection through measures/acts at a federal level through the Canada Wildlife Act, Fisheries Act, Migratory Birds Convention Act, Species at Risk Act and Canadian Environmental Assessment Act.

Similarly, in UK also there is no such water related Acts exclusively for the management of lakes and wetlands. The regulations are much more general pertaining to water bodies as a whole. However, The European Union adopted Water Framework Directive (WFD) in December 2000. The purpose of the Directive was to establish a framework for the protection and conservation for a whole general set of water bodies, which states that all member states were required to establish river basin directives and a river basin management plan which will be then reviewed through a cyclical process every 6 years.

In USA, Federal Environmental Governance body is consisted of the USEPA (United States Environmental Protection Agency). The Congress authorizes EPA and other federal agencies to write rules and regulations that explain the critical details necessary to implement environmental laws. There are a number of sub agencies also which look after different aspects of the environment and there is also a particular governing body for water called Office of Water.

All state level governance teams such as the FDEP in Florida (Florida Department of Environmental Protection) report to the central USEPA. The state- level organizations also have their own subsidiary list of regulations e.g. in Florida, Army Corps of Engineers and Florida Department of Environmental Protection (FDEP) regulate wetlands and are primarily responsible for wetland protection. Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the United States. The goal of this section is to restore and maintain the chemical, physical, and biological integrity of the nation's waters, which includes all rivers, streams, lakes, wetlands, and coastal waters. There are also some penalties/civil liabilities for damage caused to water from unlawful dredging, filling, or destruction of wetlands. Fines may run as high as \$10,000 per offense. Crimes involving pollution or contamination which are third degree felonies fines up to \$50,000 per offense and imprisonment for up to 5 years. Reckless indifference or disregard to the state's water resources is a second-degree misdemeanour with a fine of \$5,000 maximum or six months' imprisonment. Failure to obtain a permit, failure to comply with regulations, or making false statements to the permitting authorities are all first-degree misdemeanours punishable by a fine of \$10,000 or six months' imprisonment. Similarly in Washington, failure of landowners to protect wetlands can lead to legal penalties, loss of federal benefits, or both.

Technical Tools for the Management of Lake/Wetland Management

There are a number of technical tools that can be practiced for the management of lakes and wetlands. Some of these major practices/tools include:

- Adoption of floodplains, stream buffer or “Hydric Soil Ordinance” that can protect or act as a buffer zone between the water body and the terrestrial ecosystem.
- Preservation of ecotones (the transition area) by restricting any form of construction

within a 50 to 100 m radius from the lake shore line to keep the transition area or ecotone intact.

- Perimeter control practices along wetland buffer boundaries
- Prohibiting use of natural wetlands for storm water treatment
- Restricting discharge of untreated storm water to natural wetlands
- Discouraging installation of storm water treatment practices within wetland boundaries
- Conducting discharge surveys for all outfalls to wetlands
- Actively enforcement of restrictions on dumping in wetlands and their buffers
- incorporation of wetlands into watershed education programs
- Managing invasive wetland plants.

Case Studies: Examples of Lakes/Wetlands Management

Case Study A: *Conservation of Iranian Wetlands*

Iran possesses a wide variety of wetlands ranging from inlets and marshes. The major threat to its wetlands include the inflow of drainage and sewage deposits as well as reduction of the floodwater inflow, climate change, introduction of invasive species and leakage of petroleum materials from the pipes which causes disturbances for the wild life. Furthermore, large volumes of water are being unsustainably utilized for irrigation purposes draining the wetlands of the water.

Under a restoration project called ‘conservation of Iranian Wetland Project’, funded by the Global Environmental Facility and the United Nations Developmental Program, the project has helped create an ecological framework to preserve some of Iran’s most valuable natural resources. The project was started in 2005 and initiated by Iran’s Department of Environment, now is in its final year. The project was aimed to mitigate threats to biodiversity and environmental sustainability faced by Iranian wetlands by creating a national wetlands management system and was employed in three demonstration sites, namely, the Lake Urumeih Basin (West and East Azerbaijan, Kordestan), Lake Parishan (Fars Province), Shadegan Wetland (Kouzeestan Province).

Over the course of the eight years the project has created solid institutional bases as well as

securing a large amount of financial commitment from the Iranian Government to ensure that the project's results will be consolidated long after the finishing of the project.

Some of the main transformational changes over the last 8 years have strengthened governance mechanisms at national, provincial and local level. Moreover, acceptance of participatory methods – i.e. community involvement, improved women's involvement in community affairs and institutionalized awareness about threats to Iran's wetlands and wise use.

The main solution used in Iran's case was to build floodplains which would slow down the inflow of drainage as well as protect the wetlands from unwanted material such as the chemicals found within petroleum leakages. This also acted as a buffer zone. Furthermore, more efficient or rather sustainable use of farming which involved smaller plot sizes for farmers needing lesser volumes of water also helped to preserve the wetlands since much less water now is being pumped out for irrigation purposes.

Case Study B: Zoning for Management of Wuliangsu Hai Nature Reserve, China

Wuliangsu Hai Nature Reserve is located on the eastern Ho-t'ao Plain in western Inner Mongolia. The most important part of the study area was a large shallow lake covering an area of 293 square kilometers which is the largest water body associated with the Yellow River in Inner Mongolia.

During last few years, there has been shifting of natural features due to sediment overloads within and around the Yellow River. The sediment loads have increased within the Yellow River due to excess flooding. When the load displaces there is a large amount of sand and silt which raised the river bed above the surrounding lands. This also moved the Alxa desert eastwards. This eastward movement caused the eventual isolation of Wuliangsu Hai Lake in an area otherwise dominated by semi-arid grassland.

To restore the lake the practice of zoning which is basically a tool for effective management of nature reserves which involves the use of a three zone model – the core zone, the buffer zone and the experimental zone was employed. This zonal model was applied to all nature reserves in

China in the 1980's as a conservation technique but more specifically within wetlands.

Case Study C: *Nainital, Uttarakhand, India*

Naini lake is located 2000 metres above sea level in the Hills of Kumaon. Recently, however there have been widespread problems related specifically to the water quality of the lake. With an increasing influx of tourists into Nainital a large amount of turban waste was making its way into the Lake through surface runoff. Adding to this, there has been the problem of direct discharge of sewage into the lake. As a result, the lake's water quality degraded. To make matters worse the lake is the only source of drinking water for the people of Nainital.

To revive the lake, certain technical tools and institutional measures have been employed to counter the contamination and act as a 'damage-control' procedure. One of the technical tools that were used to clean up and revive the lake is the use of the bio-manipulation technique (the science of deliberate alteration of an ecosystem by adding or removing species especially predators).

The main aim of the bio-manipulation project was to revive the indigenous fish species and increase oxygen levels of the lake through an aeration process. Under this project, the population of 'Gambusia' fish was controlled, which was responsible for increasing nitrogen and phosphorous quantity in the lake. This resulted in decreasing the oxygen levels and collection of blue-green algae that harm lake's ecosystem.

Along with the technical tools, the community involvement has also led to the improved condition of the lake as a whole. The residents of the various communities around the lake have now switched on to a scientifically designed garbage disposal system under the project titled, "Mission Butterfly". Mission Butterfly involved sweepers who collect waste from each household, schools and hotels and then directly transfer it to specially designed compost pits where it is then converted into manure. As a result the amount of discharge of urban waste into the lakes has gradually minimized. Interestingly the amount of community involvement doesn't end there. The schools also started educating students about waste management to support this mission. As a result, the lake's water quality improved immensely.

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