Inland wetland ecosystems are cradles of biological diversity. They provide water and primary productivity. Countless species of plants and animals depend for their survival in these areas\(^1\). Inland wetland includes different types of land situated between marine wetlands and forest wetlands. A comprehensive definition of inland wetland is lacking. Analysis of Ramsar definition and the Wetland (Conservation and Management) Rules, 2010\(^2\) gives a picture of the areas covered under the term. Understanding of the term ‘inland wetland’ is highly necessary to make a proper study and evaluation. Improper use or abuse of inland wetlands leads to a number of disasters to the ecosystem and environment. Causes of deterioration are to be analysed to devise a mechanism for control of wetland degradation. There are some central and state legislation bearing on conservation and protection of inland wetlands. Certain provisions under those legislations help to protect these areas. There is a need to identify the legislative measures to prevent the threats and to upgrade these areas. Specifically protection of rivers, river beds, river banks and lakes are assuming great importance as primary source of drinking water to the increasing population. Sand mining has become a major problem. In spite of strong controls this menace still continues. Administrative and legislative measures bearing on the inland wetlands need analysis. Various enforcement mechanisms

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adopted under these legislations also need a critical study. Contributions of judiciary to these attempts are also examined.

Land cover changes, deforestation, habitat fragmentation, pollution and indiscriminate disposal of liquid and solid wastes are issues related to economic productivity and ecological security of inland wetlands. All these have led to the degradation of inland wetlands. Structural changes are brought in the inland wetlands due to land use changes. This has influenced the functional aspects such as hydrology, bio-geo chemical and nutrient cycle. These changes are evident in many regions. Conversions changed recurrent streams to seasonal and sometimes have led to disappearance of water bodies. This makes serious water crisis. Changes are also brought in the biological diversity of the areas. Hydrological changes could bring in climate change too. Due to this snowmelt and evaporation rates increases. Droughts, storms and floods intensify. Much of the hydrological changes will be reflected in changes in freshwater ecosystems including most of the inland wetland areas. These cumulatively affect the biodiversity and habitat of various organisms in these areas. Conservation of natural resources through sustainable ecosystem management and development is the key to a secured future. Formulation and implementation of action plans that best conserve inland wetland resources require an understanding of issues, concerns and threats to water resources.

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As per the *Ramsar* definition\(^6\), wetlands are “areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salty including areas of marine water, the depth of which at low tide does not exceed 6 meters.” It may also incorporate riparian and coastal zones adjacent to the wetlands and islands or bodies of marine water deeper than 6 meters at low tide lying within the wetlands. From this definition it is clear that wetland originally indicates the areas of intermediate character. It means a character between deep water and terrestrial habitats. This is transitional in nature. The flora and fauna of these areas are adapted to such shallow flooding and water logging of ground. Thus these can include riparian\(^7\) areas, flood plains of rivers, river banks and shoreline beds of rivers, fresh water lakes, fresh water swamps, reservoirs and large ponds. These types of wetlands are classified as inland wetlands. They are defined by soil type. The soil types of wetlands are poorly drained, very poorly drained, alluvial and floodplain\(^8\). These wetlands may not always appear wet. These inland wetlands are very precious and their economic value is very high\(^9\). But in India these areas experience high pressures from various fields. Thus their protection is in dilemma. Centre and states had enacted various legislations for the same. But this could not bring any remedy to the existing situation. Thus it is necessary to address the issues relating to inland wetlands in India.

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\(^6\) See the *Ramsar Convention*, 1971, Art.1.1.

\(^7\) Wetlands that are present along the rivers and streams are called riverine or riparian wetlands. Their water supply depends on the precipitation in upstream areas and ground water inflow to the stream.


Types of Inland Wetlands in India

As per the definition under the *Ramsar* convention\(^\text{10}\) inland wetlands fall under number of categories. A wetland protection guide given by the Dover conservation commission\(^\text{11}\) defined inland wetlands to include bodies of water such as lakes, streams and rivers, land always covered with water such as marshes and swamps and land that is covered by water for part of the year such as vernal pools\(^\text{12}\). Based on the above inland wetlands available in India can be categorized as follows

\textit{i) Rivers and Allied Ecosystems}

The river\(^\text{13}\) channels and riparian vegetations, flood plains and river mouths associated with river provides diverse habitat for a variety of aquatic and terrestrial species and also provide important ecological services. Wetlands of river occur in estuaries also. River valleys, river basins, river beds and banks are the most productive and biologically diverse inland wetlands\(^\text{14}\). Drainage basin of river acts like a funnel collecting all the water within the area covered by the basin.

\(^{10}\) The categories of inland wetlands are permanent inland deltas and permanent rivers, includes waterfalls, permanent freshwater lakes, saline marshes pools, permanent freshwater marshes or pools; ponds, marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season, non-forested peat lands; includes shrub or open bogs, swamps, fens etc. for more details see http://www.environment.gov.au/water/wetlands/ramsar/wetland-type-classification accessed on 2 March 2013.

\(^{11}\) For more details on Dover Conservation Commission to assess the wetland management in Dover Massachusetts see http://www.state.ma.us/dep see also http://doverma.org/codes.html visited on 07-07-2015.


\(^{13}\) A river is a natural watercourse. Usually fresh water is available in this area. It flows towards the ocean, a lake, a sea, or another river. In a few cases river flows into the ground and vanishes from the surface.

and channelling it into a waterway. Thus this area also forms part of inland wetlands. The mouth of a river is a good place for fishing. In this place along with the alluvium, a river swills out many different species into the lake or sea. Thus it forms a peculiar ecosystem supporting the activities of various types.

**ii) Lakes**

Lakes are another ecosystem which comes under inland wetlands. According to the little oxford dictionary 'lake' means large body of water surrounded by water. In India Ministry of Environment and Forest has defined lake under the National Lake Conservation programme.

Lakes are “standing water bodies which have a minimum water depth of 3m, generally cover a water spread of more than ten hectares and have no or very little aquatic vegetation”.

Based on the Geographical location they are categorised as Himalayan lakes, peninsular lakes and coastal lakes. According to limnological criteria, lakes are categorised as fresh water lakes and brackish water lakes. Ephemeral lakes such as lakes of Ganga-Bramputra basin such as Beels and Jheels are also present in India. Their functional criteria can also be one of the methods of classification. Along with lakes certain ecosystems covered under the regions nearby the lakes.

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18 The little oxford dictionary of current English (7th edn., 1994).

19 Here in after referred to as NLCP.
also fall with the term inland wetlands. They are i) shallow lakes and ponds such as vernal ponds, spring pools, salt lakes and volcanic crater lakes\textsuperscript{20}.

   ii) bogs are waterlogged peat lands. They are nutrient poor and acidic in conditions. They have developed their own unique flora\textsuperscript{21}. Thus they offer an undisturbed habitat for a wide range of species\textsuperscript{22}.

\textit{iii) Marshes and Swamps} known as palustrine wetlands\textsuperscript{23} also form part of inland wetlands in India. These marshes, swamps and fens account for half of all wetlands throughout the world. But these water bodies are polluted heavily and their restoration is very difficult to be achieved\textsuperscript{24}.

**Threats to Inland Wetlands**

More than half of the wetland areas disappeared due to human oriented activities in wetlands\textsuperscript{25}. These include direct extensive and intensive users, exploiters who dredge sediments or exploit mineral resources, agricultural producers who drain and convert wetlands to agricultural land, water abstractors who use wetland as source of drinking or irrigation water, human settlements expansion and indirect users who benefit from flood control use of the wetland\textsuperscript{26}.

Rivers are indeed facing numerous environmental problems. Most of the rivers are polluted and are unsuitable for basic community needs such as fishing and swimming. Pollution of drinking water and fresh water of rivers and lakes are top two environmental concerns. Along with industries non-point sources of pollution also causes great threat to rivers. Thus the inland wetlands face multifaceted problems.

Watershed degradation, deterioration in water quality, alteration in hydrology and shoreline modifications are other problems faced by inland wetlands. Man alters the hydrology and shoreline of the inland wetlands through land fill, beautification and intensive aquaculture. Increase in aquatic crops cultivation and uses for religious and recreational purposes add to these threats.

Sand mining exceeding the capacity of river basins and consequent degradation of river is another major threat. Despite many measures adopted through legislation, administrative measures and judicial decisions this menace continues unabatedly all over India. For the last two decades, inland wetlands have been victims of unplanned urbanization in India. This results in pollution, encroachment, eutrophication, illegal mining activities, un governed tourist

activities and cultural misuse of these precious ecological systems. Thus the major threats to inland wetlands can be categorised under the following heads.

i) **Pollution:** Population explosion took place in the last three decades. But there was no consequent increase in civic facilities and waste disposal mechanisms. More and more migration to cities takes place. The urban civic services are unable to meet this increase. This consequently affects the inland wetlands. Now most of them are used for disposing untreated local sewage and solid waste. In many cases the water bodies have been ultimately turned into landfills.

ii) **Encroachment:** Encroachment is another major threat to inland wetlands. This is more particular in urban areas. Migration to cities affects the scarce land resources. Land has turned to be most precious and speculative commodity rather than a common resource. Hence the ecosystem services gave way for real estate mafia. Both for the government and the private builders make use of this situation to encroach the wetlands.

iii) **Deforestation:** Land use changes and conversion of watershed area has altered the hydrological regime. It enhanced the silt movement and lowered water yield in the catchment. It also affected the groundwater recharge. Large-scale deforestation in the Western Ghats and introduction of plantation crops in highlands replaced the natural vegetation. It reduced the storage capacity of soil.

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35 Charkoplake in Maharashtra, Ousteri Lake in Puducherry and Deeper Beel in Guwahati are well known examples of encroachment.
and resulted in surface soil erosion in watersheds and sedimentation in rivers\textsuperscript{37}. This has affected summer flow in rivers. Some perennial rivers have become seasonal in the last few decades due to large scale land cover changes.

iv) \textit{Eutrophication}: Most of the inland wetlands are closed water bodies. A large part of the substances that enter the lakes become a permanent part of the system. Only a part of this can be removed depending on the water exchange system. The entries of nutrients through raw sewage become the part of lake system. It causes various destructive changes in the wetlands such as prolific growth of aquatic weeds in lakes and ponds that ultimately disturb and kill the ecology of the water body\textsuperscript{38}. All rivers in India are highly polluted due to inflow of untreated domestic and industrial wastes and agriculture runoff. Most of the industries are near the thickly populated riversides, often near cities and towns. There is no efficient water treatment system in industries and city municipalities. Pollution level in some of the sites is far above permissible limits.

v) \textit{Illegal Mining Activities}: Illegal mining for building material such as sand and stones both on the catchment and on the bed of the wetlands extremely damages wetlands\textsuperscript{39}.

Sand quarrying in rivers and watersheds are killing the rivers\textsuperscript{40}. Such activities lead to river bank erosion, lowering of water table and create a number


\textsuperscript{38} Bheels of Assam, water hyacinth are well known examples of exotic species introduced to lakes.

\textsuperscript{39} 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. For more details see Baisali Adak, “Surajkund through History”, Deccan Herald (6\textsuperscript{th} October, 2015), p.3, col.4.

\textsuperscript{40} See The National Green Tribunal order dated Aug 05 2013 New Delhi. Also see the order of Supreme Court in Deepak Kumar v. State of Haryana, A.I.R.2012 S.C.1386 apex court said
of environmental problems. Ground water level in some of the watersheds has gone down by nearly one meter in the last two decades. Agricultural practices in the riverbanks and also inside the dry riverbeds during non-rainy months also add to bank erosion and sedimentation in rivers.

vi) **Unplanned Tourism Activities:** Inland tourism has acquired greater momentum today. Activities without systematic planning and regulation proved to be another major threat to urban water bodies. Disturbance of wildlife, pollution, 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 many inland wetlands. 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.

vii) **Land Reclamation and Construction:** Sand filling of ponds, lakes and other inland wetlands affects natural water flow and groundwater recharge. Construction of new roads and buildings has blocked many canals, which were important for navigation and freshwater. Vast areas of inland wetlands have been converted into settlement and industrial areas in recent times.

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41 See the environmental problems on sand mining http://www.downtoearth.org.in/content/swami-and-sand-mafia visited on 10-10-2014.


viii) **Cultural Misuse:** Adding to the sorry state of urban water bodies local communities misuse these water bodies for their cultural or religious festivals. These activities are a source of serious pollution of lakes.

### Legislative Measures for Protection of Inland Wetlands in India

Traditionally Indian society shared collective responsibility for protecting the water bodies. After the independence government took the duty of protecting these bodies. Constitutional provisions and mandate of public trust doctrine upheld by judiciary cast on them the duty to protect and preserve them.\(^{45}\) This shift from community ownership to government ownership proved to be detrimental to the very existence of wetland areas. Several legislations operate in the field of conservation of wetlands bodies. Quite a few government departments with conflicting interest also operate for this purpose. Department of public health, irrigation, water supply, urban development, tourism, environment and forest are some among them.

### The National Water Policy

Various policy measures were adopted by national and state governments to protect the wholesomeness of water. The National Water Policy, 1987\(^ {46} \) was one of such attempt. It was an orderly document and its structure and contents were vast. It covered the aspects of water as a limited and valuable national resource to human environment and ecology. After the adoption of the National Water policy an official-level body was constituted by government of India. This was named as the National Water Board and its duty is to find ways of implementation of Indian water policy. A revised version of the same was

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announced in 2002\textsuperscript{47}. It recognized private sector participation and the need for a standard shift from resource development to efficient utilization of the developed resources. Earlier policy was a wholly informal government exercise, with no consultations with people and institutions outside. Two reasons for failure of the 2002 water policy were in relation to water harvesting and community management of water. Important controversies such as those relating to water as “commodity” versus water as “commons” or a “basic right” and the desirability of water markets were ignored\textsuperscript{48}.

The new water Policy was adopted in 2012\textsuperscript{49}. Under this due consideration is given to the holistic approach needed for the sustainable development of water resource. There is a realisation that rather than treating water as a single unit, an ecological approach is the need of the hour. It says that all the elements of water cycle namely evapo-transpiration, precipitation, runoff, river, lakes, soil moisture, and ground water and sea are interdependent and the basic hydrological unit is the river basin, which should be considered as the basic unit for planning\textsuperscript{50}. It also stresses the need for river basin authorities for the holistic approach towards development.

**Water Policy of Kerala, 2008**

The existing water policy of Kerala was formulated before the new National Water Policy 2012. The Kerala water policy was formulated in 2008\textsuperscript{51}. The water policy of Kerala tries to address various problems emerging from the

\textsuperscript{47} See the National Water Policy, 2002, Ministry of water Resources, Government of India(2002).


\textsuperscript{49} See the National Water Policy 2012, Ministry of water Resources, Government of India (2012).

\textsuperscript{50} *Ibid*.

\textsuperscript{51} See the Kerala Water Policy, 2008, Water Resource Department, Kerala(2008).
use of water from the rivers. It addresses the problem of protection of river basin. But the approach is not holistic. A mention regarding the protection of this vulnerable area can be observed in the policy. Another aim of the policy is the optimum utilisation of the resources in or in relation to water bodies\(^{52}\). The real problem is how the protection and sustainable utilisation can go hand in hand meeting the aspirations of the community and the protection of environment. The policy itself suggests that in order to achieve this measure there should be a master plan regarding the resources management in each river basin and micro water basins. Then it will become the basis of development in the state regarding the integrated approach of land and water resources. Every plan relating to the resources in the rivers can be done only with environment impact assessment. It should be environment friendly and sustaining the ecology\(^{53}\). Thus the participatory approach from the stakeholders becomes necessary. The planning envisages the involvement of various departments involved in the management of various sectors. The co-relation between the central and the state government is also necessary to meet the challenges\(^{54}\).

**Legislations Bearing on Land Use Controls in Inland Wetlands**

Water is a state subject\(^{55}\) and states have the competence to make laws, formulate and implement plans and schemes for development of water resources, for water supply, irrigation and hydropower. Several states have enacted laws relating to water. But, most of these laws do not address the present concerns in the water resources sector.

\(^{52}\) *Ibid.*


\(^{54}\) *Ibid.*

\(^{55}\) See the Constitution of India, Schedule VII, List II, Entry 17 “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of entry 56 of List I”.
The current legislations governing the protection of rivers are many. During British period the River Conservancy Act, 1884 was enacted for the protection of rivers. This was an Act to regulate the use of land within the river banks rather than the river itself. But later legislations reflected only water conservation and its management rather than the related land system associated with the river. There are clear conflicts between the existing legislations and the societal outlook regarding development. If the provisions of the Acts are strictly implemented it would go against the aspirations of the society. Thus mass violations occur regarding the implementation of the law. The land and sand mafia has acquired greater momentum by the increase in the value of land and its allied resources. Any measures adopted by government to curb the menace of depletion of resources have resulted in loss of life of many people.

Since independence a number of attempts had been made by the Parliament to protect river beds and banks. The first attempt at river bed management was through an Act of parliament. It had the most comprehensive mandate. But it failed in achieving its objectives. Consequent to that the Government enacted the Brahmaputra Board Act, 1980. Its aim was comprehensive development of river

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56 See state Irrigation and Drainage Acts, the Interstate River Water Disputes Act, 1956, the River Boards Act, 1956, the Interstate Water Dispute Tribunal Awards, the 73rd and 74th Constitutional Amendment Acts and the Panchayath Extension to Schedule Areas Act, 1996.


58 See the River Boards Act, 1956.


60 The Damodar Valley Corporation Act, 1948.

61 Id., s.12.

62 See the River Boards Act, 1956.
ecosystem. In 1976 the Betwa River Board was set up under the Betwa River Board Act. Brahmaputra Board was set up under the Ministry of Water Resources. It covered the Brahmaputra and the Barak Valleys for planning, investigation and implementation of water resources projects. Thus different approaches towards different rivers were followed. In Kerala only in 2002 an Act was passed to protect the river basins and beds from the indiscriminate sand mining.

**Tribunal Orders and Statutory Instruments**

The Narmada Control Authority was formed following the order of the Narmada Water Disputes Tribunal Award of 1979. Similarly the Cauvery Tribunal and the Second Krishna Tribunal have recommended formation of basin authorities. Several basin management entities have been created through statutory orders. The Water Quality Assessment Authority of 2002 had authority wider than a single basin. These powers included ensuring water quality and environment flows in rivers. Various states also constituted various authorities. The order of the Supreme Court resulted in constituting the Central Ground Water Authority. It was constituted in the year 1996, under the Environmental Protection Act, 1986. This authority had mandate wider than a single river basin. This is also an attempt at water management over large area.

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63 *Id.,* ss.13 and 14.
64 The Brahmaputra Board Act, 1980.
65 Quality assessment of both surface and ground water through integrated management of river basin was stressed in the 2002 policy. This authority was for the implementation of the measures under the 2002 National Water Policy.
66 The Tripartite (Centre, Andhra Pradesh and Karnataka) Tungabhadra Board (with very limited mandate) was constituted by the President of India to regulate supply of the Sutlej, Ravi and Beas and to distribute power from the Bhakra Nangal and Beas projects.
67 The Central Ground Water Authority was constituted with a mandate to develop and disseminate technologies, and monitor and implement national policies for the scientific and sustainable development and management of India's ground water resources.
Inter-state agreements, union government orders, organisations basin level corporate entities and basin authority set up under environment clearance conditions have a role in basin management. Voluntary corporate bodies, community efforts and lessons from basin management experience are some other existing helping hands in developing a comprehensive management of river beds and basins.

**Legislative Measures for Lakes Conservation**

Plethora of legislations operates for the protection of lakes and allied wetland ecosystems in India. It can be seen that various departments and ministries shares the responsibility of protection and upgradation of lakes in India. Ministry of water resources, Ministry of environment and forest, agriculture ministry and fisheries ministry are some of them. Municipal corporations, developmental authorities, tourism departments and water supply boards are the main departments which shares responsibility to protect the urban and rural lakes in India.

In 2001 a Central Government initiative was made through the National Lake Conservation Plan to protect the lakes in India. It was an ecosystem based approach. The 12th lake conference held at Jaipur made the Jaipur Declaration for protection of lakes and wetlands associated with them. They adopted a specific strategy for protection of each lake in a holistic manner. MoEF operates at the apex for the protection of lakes. It develops the national level policies and plans for the protection and conservation of urban lakes. In order to remedy the management problem of lakes situated in various states, MoEF has directed the states to set up

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68 Legislations such as the Water(Prevention and Control of Pollution) Act, 1974 as amended up to 1988, the Environment( Protection) Act, 1986, the Wildlife(Protection) Act, 1972 and its amendments, the Forest (Conservation) Act, 1980, the Indian Fisheries Act, 1857, Coastal Regulation Zone Notification, 1991, Municipal Solid Waste (Management and Handling) Rules, 2000, the Bio-diversity Act, 2002 and the Environment Impact Assessment notified under the National Environmental Policy, 2006 are some prominent ones.

69 Hereinafter referred to as MoEF.

city level management committees. They carry out the river and lake conservation programmes. They act in co-ordination with the Centre, state and urban local bodies for carrying out the conservation measures. This mechanism if implemented will bring out holistic development of lakes. But just like any other government initiative it is not implemented properly. In order to carry out the programme effectively special purpose vehicles\(^71\) were also constituted under the programme. Along with this a number of NGO’s\(^72\) also operate in the field of lake conservation.

The *Jaipur Declaration* adopted for the conservation of lakes adopts an integrated approach towards lakes and allied wetland ecosystems. The declaration acknowledged the importance of lake wetlands for domestic, agricultural and recreational uses. It also considered the critical contribution of lakes wetlands in providing host of major ecosystem goods and services. They stressed the wise use of lake wetlands in terms of their values and functions. The Jaipur conference expressed concern over the rapid deterioration of lakes and wetlands from developmental and anthropogenic pressures. It is clear that even though lakes are recognized for their services, their economic value is not well documented or understood. They recognized the significant role of basins in water bodies. Their quantity and quality are the determining factors of ecological health. They stressed the need for integrated lake basin management. Need for urgent action at national, regional and global level was called to prevent the degradation of lakes and wetlands. They have laid down an action plan calling upon governments to

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\(^71\) Bhoj Wetland Authority for the restoration and management of Bhoj wetlands in Madhya Pradesh, Chilka Development Authority in Orissa for the Chilka Lake, the Loktak Development Authority for Loktak lake in Manipur, the Lake Development Authority Bangalore (Karnataka) for Bangalore lakes, the Jammu and Kashmir Lakes and Waterways Development Authority for Jammu and Kashmir Lakes, the Hyderabad Urban Development Authority for Hyderabad Lakes in Andhra Pradesh, East Kolkata Wetlands Management Authority for the conservation and management of a large number of water bodies in district 24 Pargana in West Bengal and the Jal Vikas Samiti in Udaipur (Rajasthan) are examples of special purpose vehicles.

\(^72\) For example WWF, UNEP, UNDP, ADB, World Bank, citizens groups are some of the NGO’s operating in this field.
implement them with the help of community. The realisation of community involvement in conservation of valuable resources will add momentum to the measures taken.

The Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2001

The Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2001 tries to protect the river beds and river banks from unnecessary encroachment and removal of sand\(^\text{73}\). Removal of sand affects this resource by changing its biophysical environment. Thus the preamble of the Act reflects the approach of the legislature. It is obviously towards sustainable development. It is stated in the preamble of the Act that the Kerala government had taken note of the indiscriminate and uncontrolled removal of sand from the rivers causing large scale river bank sliding and loss of property. The Government had also taken note of large scale dredging of river sand disturbing the biophysical environment system of the river. It was felt expedient to provide for regulatory measures for the protection of river banks and for removal of sand from rivers. The constitution of Kadavu committee\(^\text{74}\) and the powers and functions assigned to them are measures for conservation of the bio physical environment\(^\text{75}\) of river ecosystem. Regarding the removal of sand, studies\(^\text{76}\) are to be conducted for the assessment of sand that can be removed from the particular river from time to time. This is carried out through the sand audit conducted at regular intervals. Even then, removal of sand near the river banks and bridges are completely prohibited\(^\text{77}\). This measure is

\(^{73}\) The Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2001, preamble.

\(^{74}\) Id., s.3.

\(^{75}\) Id., s. 12.

\(^{76}\) Id., s.29.

\(^{77}\) Id., s.12 (4) and (5).
particularly for the protection of river banks. Along with this the obligations cast up on the Kadavu committee makes it clear that bio physical environment of the river can be protected only by adequate protection of river beds and banks\textsuperscript{78}. The provisions for river bank development plan and the constitution of river fund makes the Act more suited to the protection of the river banks and beds and its ecology\textsuperscript{79}. Stringent penalties\textsuperscript{80} prescribed under the Act for the violations, makes it more deterrent towards the violators. Thus the Act clubs within it the twin needs of development and environment. Even after this enactment the encroachment for plundering the wealth of river continued unabatedly sometimes with the help of officials\textsuperscript{81}. The sand mafia acquired great momentum and they were not hesitant to take up the life of anyone who comes in their way\textsuperscript{82}. Thus the Act could not be implemented for many years. The involvement of public in this matter has changed the situation\textsuperscript{83}. Now the stringent prohibitions regarding the sand removal has become the order of the day\textsuperscript{84}. Construction industry is in search of the other alternatives for the sand.

\textsuperscript{78} Id., s.15 explains the obligation of Kadavu Committee: “Every Local Authority in the Slate having Kadavu or river bank for sand removal shall maintain such Kadavu or river bank in a safe condition and protect its bio-physical environment system by taking effective steps to control river bank sliding. Every local authority shall erect concrete pillars at the Kadavu or river bank in such a way that no vehicle shall have direct access to the bank of the river The local authority shall establish a check post at each Kadavu or river bank and maintain proper account of the sand removed from the Kadavu. Bamboo and "Attuvanchi" may be planted on the river bank with the help of Forest Department to control river bank sliding”.

\textsuperscript{79} Id., ss.16 and 17

\textsuperscript{80} Id., ss.22-25.

\textsuperscript{81} K.S.Sudhi, “River Sand Mining may be Resumed for Six Months”, The Hindu, Kochi edn.(24\textsuperscript{th} March 2014), p.8, col.5.

\textsuperscript{82} Anupam Chakrabarty, “Sand Mining Lobby Uses Tricks to Evade MoEF Scrutiny”, Down to Earth (13\textsuperscript{th} August, 2013).

\textsuperscript{83} M. Suchitra, “Mother of Three Wages Lone Battle Against Sand Mining Lobby”, Down to Earth(7\textsuperscript{th} August, 2013).

\textsuperscript{84} Anupam Chakrabarty, “No Sand Mining Without Environmental Clearance NGT”, Down to Earth (5\textsuperscript{th} August, 2013). See also Press Trust of India, “Centre Asks State to furnish Details of Illegal Sand Mining”, The Hindu Business Line (24\textsuperscript{th} November, 2013).
Role of Judiciary in Protection of Inland Wetlands

Application of Environmental Jurisprudence for Conservation of Inland Wetlands

Indian courts have been positive on the issue of protection of inland wetlands. Some remarkable principles and doctrines propounded by the Indian judiciary for protection of wholesomeness of environment are helpful in conservation of inland wetlands from various threats faced by them.

i) **Doctrine of Absolute Liability**

Doctrine of absolute liability is an available mechanism to make an enterprise which is occupied with an inherently dangerous or a hazardous activity liable for any harm to anybody by virtue of a mishap in the operation of such dangerous or unsafe activity. This can include the poisonous materials or hazardous wastes let into the inland wetlands without treating them properly. The industry or body is strictly and completely obliged to repay every individual who are affected end for damage to the environment. Such risk is not subject to any exemptions\(^{85}\).

ii) **Polluter Pays Principle**

Polluter pays principle\(^{86}\) does not adhere only to finding fault. Instead it supports a remedial methodology which is concerned with repairing the harm. It is a rule in international environmental law where the polluting party pays for the harm or damage done to the natural environment.

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iii) Precautionary Principle

Precautionary principle applied by judiciary developed three basic concepts. They are, environmental measures must anticipate, prevent and attack the causes of environmental degradation. Lack of scientific certainty should not be used as a reason for postponing measures. Onus of proof is on the actor to show that his action was benign.

iv) Doctrine of Public Trust

The public trust doctrine is another development for the protection of natural resources. It rests on the principle that certain resources like air, water, sea, and forests have such great importance to people as a whole that it would be unjustified to make them a subject of private ownership.

v) Principle of Sustainable Development

Finally the doctrine of sustainable development highlights the concept of sustained development. It tries to strike a balanced approach towards resource use. In Rural Litigation and Entitlement Kendra v. State of UP, the court for the first time dealt with the issue relating to the environment and development. The court held that, it is always to be remembered that resources are the permanent assets of mankind and are not intended to be exhausted in one generation. In Vellore Citizen’s Welfare Forum, the Supreme Court observed that sustainable

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87 Ibid.
88 M.C.Mehta v. Kamal Nath, (1997)1 S.C.C. 388 Supreme Court made the observation that public at large is the beneficiary of the seashore, running waters, airs, forests and ecologically fragile lands. The state as a trustee is under a legal duty to protect the natural resources. These resources are meant for public use and cannot be converted into private ownership. Every generation owes a duty to all succeeding generations to develop and conserve the natural resources of the nation in the best possible way. It is in the interest of mankind. It is in the interest of nation. Thus public trust doctrine is a part of the law of land.
89 Ibid.
development has come to be accepted as a viable concept to improve the quality of human life while living within the carrying capacity of the supporting eco-system.

All the above said measures are the creation of judiciary particularly for the protection of environment and various ecosystems. Right to water was incorporated as fundamental right through the judicial decisions. In *Narmada Bachao Andolan v. Union of India*\(^2\), the Supreme Court of India held,

“Water is the basic need for the survival of human beings and is part of the right to life and human rights as enshrined in Article 21 of the Constitution of India … and the right to healthy environment and to sustainable development are fundamental human rights implicit in the right to life”.

### Balancing of Concepts of Environment and Development

In a number of decisions the Supreme Court and High Court, have observed the need for a balanced approach emphasizing the sustainable development. In *M.C. Mehta v. Union of India*\(^3\), the Supreme Court dealt with ground water depletion. On 20-3-1996 the court took notice of the news item under the caption “Falling Groundwater Level Threatens City,” appearing in *the Indian Express* dated 18-3-1996. The Court issued notice to the Central Groundwater Board and the Delhi Pollution Control Committee. The news item was brought to the notice of the court by Mr. M.C. Mehta, Advocate. Pursuant to this the court issued notice to the Municipal Corporation of Delhi and the Delhi Waterworks and Sewerage Disposal Undertaking. While dealing the case the court

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incidentally dealt with the need for “hological” approach towards the water resource management. The Court said,

“Sustainable solutions to water-resource and land-use problems should be achieved through appropriate interventions, and supply and demand management options. Regulation on exploitation through legislation and effective administration with focus on water conservation, recycle or reuse, restrictions to ensure equitability in water availability and pragmatic land use. Management of water resources to achieve overall inspirational goal of sustainable development warrants legal interventions based on the principle of inter and intra-generational equity, the precautionary principle, conservation of natural resources and environmental protection”.

There is thus adequate reason to take recourse to the Environment (Protection) Act, 1986 for implementing hological approach to water resources management.

“In order to address the complex issues in water resource management it is prudent that the Central Government considers constituting an authority under the Environmental (Protection) Act, 1986 and confers on this authority all the powers necessary to deal with the situation created by the depletion of groundwater levels, dwindling surface water resources, deterioration of surface and groundwater quality and haphazard land use. The authority should be headed by a retired scientist with the expertise in the field of hydrology, hydrogeology and information technology”.

94 The Environment (Protection) Act, 1986, ss. 3, 4 and 5.
Recommendations to be adopted for this purpose was set out by the court. It said,

“A Central Groundwater Resource Management Authority, with the composition as delineated . . . with mandate for coordination and implementation of all activities of planning, development, allocation, implementation, research and monitoring of all water resources need to be established to promote intra and inter-generational equity, as also to operationalise the precautionary principle in sustainable water resource management”.

All the States need to constitute similar authorities with functions in the state as of the central authority. As per the direction of the Supreme Court the mandate of the authority needs to include the following:

“Land use of river basins should act as the basis for regional planning for sustainable water resource management. To equip the nation for an integrated land use practises medium and long-term national use plans should take care of agricultural practices, human settlement patterns and industrial topology. It must be done in consultation with ministries and departments concerned based on the regional water supportive capacity. Present cropping pattern is to be assessed to lay down National Agricultural Water Use Policy to encourage judicial use of water resources. Review of groundwater levels and quality levels is a necessary thing. Entire river basin need to be protected to ensure maintenance of minimum flows in the rivers so as to full fill the riparian rights to protect the flood plains, to as also protect the vital ecological functions of the rivers. Techno-economic feasibility of

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95 \textit{Supra n. 67. Constitution of ground water authority.}
programmes on reuse of appropriately treated sewage for agriculture, reuse of industrial waste waters as industrial process water, use of treated sewage in social forestry and public parks in municipal areas and reuse of treated wastewater in new housing complexes for non-consummptive usages is also necessary for the river basin protection. This will protect, conserve and augment natural and manmade wetlands in the country. Catchment area treatment, including construction of checkdams, contour bundling, control of river bank erosion and plantation of endemic fast-growing tree species to arrest soil and water loss in all river basins is to be ensured. All these can be achieved through ensured community participation with a view to connecting traditional knowledge at all stages in the holological approach to water resource management.”

In M.C. Mehta case\(^\text{96}\) the Supreme Court considered the need for environment protection and the fundamental duty under Article 51 A(g). Highlighting the ‘polluter pays principle’, it was held that the natural resources like air, water and soil cannot be utilised if the utilisation results in irreversible damage to the environment. According to the Court, life, public health and ecology have priority over unemployment and loss of revenue. The principle of ‘sustainable development’ and the ‘precautionary principle’ were reiterated and explained, making it clear that development and protection of the environment are not enemies. A balance has to be struck. In case of doubt, environment concerns take precedence over economic interest.

Similar observations were made by courts on land use. *Association of Environment Protection v. State of Kerala*\(^97\) and *Parishithi Samrakshana Samithi v. State Of Kerala*\(^98\).

In *M.C.Mehta v. Union of India*\(^99\), the Supreme Court had occasion to consider the issue of sustainable development and its impact on environmental problems. The Supreme Court said,

“The development and the protection of environments are not enemies. If without degrading the environment or minimizing adverse effects thereupon by applying stringent safeguards, it is possible to carry on development activity applying the principles of sustainable development, in that eventuality, the development has to go on because on cannot lose sight of the need for development of industries, irrigation resources and power projects etc. including the need to improve employment opportunities and the generation of revenue. A balance has to be struck. We may note that to stall fast the depletion of forest, series of orders have been passed by this Court in T.N. Godavarman’s case regulating the felling of trees in all the forests in the country. Principle 15 of Rio Conference of 1992 relating to the applicability of precautionary principle which stipulates that

\(^97\) (2013) 7 SCC 226. The Supreme Court discussed the Public Trust Doctrine its theoretical and philosophical background and the Judgement of *M.C. Mehta v. Kamal Nath*, (1997)1 SCC 388 Various other judgments such as *Illinois Central Railroad Co. v. People of the State of Illinois*, 146 U.S. 387, *Gould v. Greylock Reservation Commission*, 350 Mass 410 (1966); *Sacco v. Development of Public Works*, 532 Mass 670; *Robbins v. Dept. of Public Works* 244 N.E. 2d 577 and *National Audubon Society v. Superior Court of Alpine County* 33 Cal. 3d 419 court observed that “The State is the trustee of all natural resources which are by nature meant for public use and enjoyment. Public at large is the beneficiary of the sea-shore, running waters, airs, forests and ecologically fragile lands. The State as a trustee is under a legal duty to protect the natural resources. These resources meant for public use cannot be converted into private ownership”.


where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for proposing effective measures to prevent environmental degradation is also required to be kept in view. In such matters, many a times, the option to be adopted is not very easy or in a straight jacket. If an activity is allowed to go ahead, there may be irreparable damage to the environment and if it is stopped, there may be irreparable damage to economic interest. In case of doubt, however, protection of environment would have precedence over the economic interest. Precautionary principle requires anticipatory action to be taken to prevent harm. The harm can be prevented even on a reasonable suspicion. It is not always necessary that there should be direct evidence of harm to the environment.

This is the complete answer to the issue regarding the use of river beds and river basins. In a conflicting situation of irreparable injury to the environment and severe damage to the economic interest, protection of environment would have precedence over the economic interest. Towards such protection, anticipatory action on precautionary principles is necessary and it is the duty of the State to take such action and direct the expert committee headed by the District Collector to ensure that there is no sand mining within the prohibited distance of bridges, river banks, bathing ghats and irrigation projects. Steps should also be taken to see that the river basin is protected. The mining could be permitted without affecting the river basin.

100 In paragraph 48 of the judgment
Measures Taken by Judiciary to Combat Pollution of Inland Wetlands

Both the Supreme Court and High Courts in many occasions addressed the threats faced by the inland wetlands. They have applied the environmental principles and doctrines to remedy the situation. Water pollution has always been the serious concern of the Supreme Court in many cases. In *M.C. Mehta v. Union of India* \(^{101}\) the Supreme Court dealt with pollution of Ganga river basin. This was mainly due to the negligence of tanneries located near to it. They were reluctant in establishing the primary treatment plants for treatment of effluents. After the consideration of the issue the court directed the tanneries to set up the primary treatment plants and get it approved form the state pollution control boards. Principle of sustainable development was applied while deciding the case. Thus court tried to protect the cradles of civilization and biological security of the river Ganga. Authorities are empowered to take steps to control pollution\(^{102}\). It was a follow up action in the earlier Ganga pollution case. Here the municipalities and pollution control boards were directed to take immediate action against the polluters of water bodies. In *F.K. Hussain v. Union of India* \(^{103}\), dispute arose regarding the administrative scheme evolved to augment the water supply by digging wells and drawing water from the existing wells to meet increasing needs. Petitioner objected the scheme on the ground that if implemented it would lead to the salinity of fresh water aquifers and would lead to the collapse of the existing water supply. The Court found that many suggestions from the authority was not satisfactory and asked them to wait until they get the nod from the Central Government.

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\(^{103}\) A.I.R. 1990 Ker. 320.
In *Ajay Construction v. Kakateeya Nagar Co-op Housing Society Ltd*\(^{104}\), Ajay constructions made its multi-storeyed open flats illegally. They obtained permission to construct sewage of its building connecting to the drainage pipeline laid by the respondent society. This led to uncontrolled sewage flow to the premises of Osmania University causing tremendous water pollution\(^{105}\). The Court pointed out that there is the “absolute liability”\(^{106}\) on the part of those who are engaged in construction work, particularly of multi-storeyed structures, not to commit nuisance by letting out effluent from their drainage system.

In *M.C. Mehta v. State of Orissa*\(^{107}\), the Court considered the unsanitary conditions created to the Taladanda canal due to untreated waste water from hospital and other parts of the city. This area was expected to remain dry throughout the year except on rainy season. Sewage from various parts of the city got into river. This created health problem in cities. The Court while deciding the case discussed the inactive mode of operation undertaken by the authorities concerned. The Court directed the authorities to take proper action to restore the wholesomeness of water which was supplied for human consumption.

The Court come down heavily up on the activities of authorities responsible for the protection of natural resources. More over the court applied the public trust doctrine to decide the case. In *Nature Lovers Movement v. State of Kerala*\(^{108}\), the High Court of Kerala reiterated the principle evolved in *M.C. Mehta v. Kamalanath*. The Court said,

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\(^{106}\) *Union Carbide Corporation v. Union Of India*, A.I.R. 1992 S.C. 248


\(^{108}\) AIR 2000 Ker 131.
“Our legal system involves the Public Trust Doctrine as part of its jurisprudence. The State is the trustee of all natural resources. They are by nature meant for public use and enjoyment. Public at large is the beneficiary of the seashore, running water, air, forest and ecologically fragile lands. The State as a trustee is under a legal duty to protect the natural resources. These resources meant for public use cannot be converted into private ownership. Thus, the Public Trust Doctrine is now part of the law of the land”.

In the instant case, the Kerala State Government sought to grant approval. This and consequent proceedings for issue of Pattayams in favour of occupants of forest was challenged on the ground that there was environment degradation in de-reserving forest land or using it for non-forest purposes by occupants affecting environmental equilibrium. It was held that each occupier who prays for regularization on the basis of compensatory afforestation scheme and consequent issue of title deed in his favour shall pay reasonable of compensation to state for injury caused by him to general public. This was based on the polluters pay principle evolved by the Supreme Court in *Vellore Citizens’ Welfare Forum’s* case. The Court observed that ‘the polluter pays principle’ and ‘the precautionary principle’ are essential features of ‘sustainable development’. In *Indian Council for Enviro-legal Action* case, the Apex Court adopted ‘the polluter pays principle’ as a sound principle to be reckoned with and followed by all agencies, responsible for environmental pollution109.

In 1995, in response to a public interest litigation by a New Delhi–based nongovernmental organization *the Research Foundation for Science, Technology, and Ecology*, the Supreme Court asked relevant agencies for information on the

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amount of hazardous waste imported and generated domestically, as well as how it was being disposed of. But the state pollution control boards were not collecting data properly, for two years and the MoEF and the Central Pollution Control Board had no authentic data to provide. So the Court convened a panel to investigate and make recommendations known as the High Powered Committee on Management of Hazardous Wastes (HPC). This panel submitted its final report in 2001. Pursuant to this the Supreme Court passed the judgment in 2003. A committee was appointed by the court to assess the creation and disposal of hazardous wastes by industries and other means of import of waste in the country. The monitoring committee found clear violation of rules by many industries like the Travancore Titanium Products. Industry was asked to be closed. But up on the writ petition made by the company the Kerala High Court interfered and granted an interim stay up to 2006. This committee approached the Supreme Court for strong directions and the court allowed it. Through this order, High Court or any other authorities were prohibited from interfering with the working of the monitoring committee. Similarly pollution caused by Hema was analysed as “deliberate poisoning of communities with toxic wastes, contaminating water, soil, and air.” They were asked to pay a fine of 3.9 US dollars. Thus the committee works with more vigour to eradicate pollution and consequent eutrophication of water bodies. This a welcoming attempt by the judiciary when the responsible authorities are inactive in their function.

i) Measures to Address the Illegal Mining of Inland Wetlands

Illegal mining and removal of earth and sand from the inland wetlands and allied regions are another threat to these wetlands. The Green Tribunal, Supreme Court and High Court are very vigilant to protect the water bodies. But most of the time their orders are disobeyed. Awareness and participation of people is
necessary to change the situation. In *Soman v. Geologist*\(^{110}\), petitioners challenged two conditions imposed by the geologist, while granting the quarrying permits to them for quarrying ordinary sand and brick clay from their properties. Quarrying permits were issued with 18 conditions, subject to which the minor mineral could be mined from their property. The petitioners were aggrieved by two condition in those permits. Those restrictions were that no quarrying shall be done within 75 meters of railway line and 50 meters of public road, water course, residential building, boundary wall of place of worship, burial grounds or burning ghats, except under and in accordance with the previous permission of the State Government or the competent authority". "No dewatering the mine pit using pump is permissible and mining has to be ceased once this becomes necessary and mining should be done manually".

The High Court of Kerala observed that any developmental activity without considering the rights of future generations is not a sustainable use of the land. Naturally, the resources cannot be extracted at a rate faster than the nature's capacity to regenerate them and it is absolutely necessary that the basic qualities of the land have to be maintained for the succeeding generations.

The National Green Tribunal through its order prohibited the sand mining from river beds across the country without environmental clearance\(^{111}\). It was based on a petition submitted before the tribunal by the bar association\(^{112}\) alleging the illegal sand mining that takes place in the river beds of Ganga, Yamuna and


\(^{111}\) The National Green Tribunal on Aug 5\(^{th}\) 2013 restrained sand mining without any license or environmental clearance from river beds across the country on a plea alleging that such activities were going on in UP with the "willful connivance" of its state machinery. See http://www.greentribunal.gov.in/Writereaddata/Downloads/671-2013(MApp)_26Sep2013.pdf visited on 20-04-2014.

Hindol without getting prior Environmental Clearance. They alleged that it affects the integrity of the river basins and the entire ecology is tilted. The Supreme Court\footnote{Deepak Kumar v. State of Haryana, (2012) 4 SCC 629, the Court ordered that sand mining on either side of the rivers, upstream and in-stream, is one of the causes for environmental degradation and also a threat to the biodiversity. It had also ordered that mining activity even in less than 5 ha shall obtain Environment Clearance for MoEF /SEIAA.} added to this order that any person carrying out sand mining which is less than five hectares requires clearance from the Ministry of Environment and Forests or the State Environment Impact Assessment Authority [SEIAA]. In \textit{Himmat Singh Shekhawat v. State of Rajasthan}\footnote{See http://www.indiaenvironmentportal.org.in/files/sand%20mining%20Yamuna%20NGT%2014%20Jan%202015.pdf visited on 10-01-2015.}, illegal sand mining in the Yamuna riverbed going on in violation of law, without taking prior environmental clearance. Court considered all aspects of the problem and gave number of directions. It directed the Ministry of Environment and Forest to formulate a uniform cluster policy in consultation with the states for permitting minor mineral mining activity including, its regulatory regime, in accordance with law

\textbf{ii) Unplanned Tourist Activities and Cultural Misuse}

Unplanned Tourist activities without monitoring and compliance with the environmental legislations always create problems. It mainly affects the inland water bodies as they are the attractions for the tourists. In \textit{EIH Ltd. v. State of Rajasthan}\footnote{A.I.R.2001 Raj.236.} the dispute was whether a hotel could be allowed to be constructed in no-construction zone near Udaipur Lake. The zone was declared to be no construction zone as per the notification in 1997. But the permission for construction was granted prior to the notification. Considering the total situation the court justified the construction. Condition of some important tourist area lakes such as Dal Lake of Kashmir is one of the important concerns of judiciary. The lake originally occupied 18 Km in the area. Later on it shrunk to 15Km. due to
encroachment for tourist activities. Moreover, the wastes generated were deposited to the lake without any treatment. This supported the growth of weeds and contaminated the whole area of lake. The Jammu Kashmir High Court prohibited the use of polythene in these areas. The Court also directed the officials to take steps against violators and report the actions.

i) Illegal Constructions

Land reclamation and construction is another threat faced by inland wetlands. Judiciary has considered this problem on many occasions and given proper directions for the same.

A public interest litigation was filed by Balwant Singh Mehta in 1982 to save the lakes of Udaipur. The High Court of Rajasthan ordered the administration of Udaipur to constitute a committee that can develop a viable plan to protect the city’s lakes. Administration was also asked to provide potable water to all citizens. But these orders were disregarded by the authorities.

Jheel Sanrakshan Samithi, an Udaipur based NGO filed a public interest litigation in Supreme Court against the Rajasthan Government. They sought urgent judicial intervention to clear the lakes of Udaipur and to check the flow of pollutants into these bodies. They also sought intervention to protect the land area from illegal encroachment and construction. The Supreme Court passed the case to the Rajasthan High Court for consideration. The Court directed the Government to establish a Lake Development Authority, no construction zone, desiltation of lake on regular basis, prohibition of conversion and construction in around the lake and the catchment areas. The authority was also directed to specify the catchment areas of lakes.
In *M.C.Mehta v. Union of India*\(^\text{116}\), the Supreme Court recognised the need to control construction near Badhkal and Surajkund lakes. The Court emphasised the role of municipalities and development authorities in protection of the water bodies which are the precious gifts of nature.

In 2008 an environment support group approached the Karnataka High Court with a public interest litigation\(^\text{117}\). They sought commitment from private lease holders to maintain the status quo of lakes privatisation programme\(^\text{118}\). The High Court upheld the privatisation of lakes in Bangalore but subjected it to various conditions\(^\text{119}\). The public interest litigation also addressed the larger issue of bringing together all departments involved in lake protection and management. The task was to formulate a scheme to protect lakes for future and water security for urban population. Justice Patil committee was appointed to study the matter. The HC accepted the ecologically wise and socially sensitive guidelines proposed in the report of the committee. The Court directed the state to take immediate action to protect Bangalore lakes.

But storm water run-off, waste from religious activities, dhobi ghats, idol immersions, animal waste and washing of vehicles are polluting many of water bodies across the country. Along with this is increasing quantity of chemical fertilizers and pesticides are being washed into the river because of agricultural activity taking place on the banks. The toxic chemicals from surface run-offs could be from farmlands, nurseries, orchards, construction sites, gardens, lawns and landfills.

\(^{116}\) 1997(3) S.C.C. 715.


\(^{119}\) The High Court observed that issuing directions were necessary for the preservation of lakes. The court added that it was necessary to undertake a survey of lakes and tanks, demarcate boundaries and fence such water bodies.
All the above attempts show certain positive signs of improvements towards the conservation of wetlands. People should also be aware of the need for protection of these fresh water bodies.

**Conclusion**

Each inland wetland ecosystem is an integrated system. It must be treated holistically. India’s river basins have been degraded quantitatively and qualitatively. The inland wetland water bodies have become extremely polluted due to various reasons. Village areas almost rely on ground water for drinking and irrigation. Now the ground water contamination is widespread. An alternative source for safe drinking water is a challenge before the whole community. Rain water harvesting and river interlinking programmes are treated as best available solution. The National Water Policy, 2012 demands nationwide information system. Therefore it caters to the planned development and management of river basins. Water uses are to be allocated on priority basis. Ground water harvesting is to be minimized and due regard is to be given to the maintenance of quality. To protect these inland wetlands integrated management strategies are to be designed.

The success of integrated water management strategies depends on striking a balance between human resource use and ecosystem protection. Watershed based planning and resource management is a strategy for more effective protection and restoration of aquatic ecosystems. This approach emphasizes all aspects of water quality. It includes chemical water quality, physical water quality such as temperature, flow and circulation. It includes habitat quality as stream channel morphology, substrate composition and riparian zone characteristics. Biological health and biodiversity are also part of this watershed based approach\(^\text{120}\).

To deal with non point source pollution comprehensive scale of analysis and management is required. Non-point source strategies recognize that small sources of pollution are widely dispersed on the landscape and their cumulative impact on water quality and habitat are great. A whole basin approach to protect water quality has proved most effective. This includes addressing the issue of water quantity, protection of riparian areas, control of aquatic non native species, protection of water quality, protecting the integrity of permanent and intermittent seeps, streams, rivers, wetlands, riparian areas and conducting comprehensive all seasonal water quality monitoring. Watershed restoration should be an integral part of the conservation program. Most important measures among them would be control and prevention of pollution and sediment production, restoration of the condition of riparian vegetation and restoration of in stream habitat complexity. But in all environmental management activities the importance of community perspectives and values should not be overlooked. Public support, co-ordination with people and organizations will ensure long term protection of these precious areas. Along with this equitable access to these resources through transparent management and improved policy, regulatory and institutional frameworks will help in sustainable inland wetland management.