

A background image showing several vertical streams of water falling, with numerous droplets of various sizes suspended in the air, creating a sense of motion and freshness. The color palette is various shades of blue and cyan.

# DEVELOPMENT OF LAKE CONSERVATION PROJECTS, KARNATAKA



**Final Pre feasibility Report**

**Submitted to  
Infrastructure Development  
Department**



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## Foreword

Lakes are an inherent part of the ecosystem. Lakes have traditionally served the function of meeting water requirements of the populace for drinking, household uses like washing, for agriculture, fishing and also for religious and cultural purposes. Apart from these functions, which involve direct use of the lake water, lakes are also known to recharge ground water, channelize water flow to prevent water logging and flooding. Lakes are also host to a wide variety of flora and fauna, especially birds.

The need to initiate efforts to restore, conserve, manage and maintain the lakes as a valuable part of the whole ecosystem could no longer be ignored. Government of Karnataka realizes that if the lakes are not conserved without loss of time, the restoration costs later will not only reach phenomenal heights, but will more importantly cause a permanent ecological damage. This may lead to scarcity in potable water, cause heat islands in the cities and affect biodiversity in cities as well as villages.

With this background Government of Karnataka intends to develop and conserve the lakes in Karnataka. There are 36,000 lakes in Karnataka. The Rural Development and Panchayat Raj Department owns 33,000 small lakes, and the rest are under the jurisdiction of the Minor Irrigation Department. The Government of Karnataka intends to explore the possibility to work in close partnership with the private sector in protection, conservation and sustainable management of lakes.

This study has been conducted to assess the feasibility of conserving the lakes at identified locations (identification based on pre-defined parameters) in Karnataka and the possibility of taking up the conservation of identified lakes on a PPP model. The Government of Karnataka may consider providing funds through the viability gap funding (if required) for the implementation of the project.

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## Abbreviations

BMRDA	Bangalore Metropolitan Regional Development Authority
CPCB	Central Pollution Control Board
CPR	Common Property Resources
EIA	Environmental Impact Assessment
EPA	The Environment (Protection) Act, 1986
ESG	Environment Support Group
GIS	Geographical Information System
IDC	Interest During Construction
LDA	Lake Development Authority
MOEF	Ministry of Environment and Forests
MSW	Municipal Solid Waste
NEP	National Environment Policy (2004)
NGO	Non-Government organization
NLCP	National Lake Conservation Plan
O&M	Operation and Maintenance
PCB	Pollution Control Board
PIL	Public Interest Litigation
PPP	Public Private Partnership
PWD	Public Works Department
WTP	Water Treatment Plant

## Introduction

### 1. Project Background

Tanks and lakes play an important role in helping irrigation as well as recharging ground water in the surrounding areas. Lakes are an inherent part of the society in Indian culture and serve a variety of purposes. There are totally 36,568 inland water bodies in Karnataka. Out of these 33,364 tanks fall under the control of the State Zilla Panchayats and are used mainly for the purpose of irrigation.



Figure 1: District wise distribution of lakes in Karnataka

#### 1.1 Key Issues leading to degradation of lakes

Key issues leading to the degradation of lakes are:

- ◆ **Anthropogenic stress:** Many lakes and ponds of Karnataka have been lost in the process of various anthropogenic activities and population pressures leading to unplanned urbanization and expansion. Rest of the surviving lakes are reduced to cesspools due to direct discharge of industrial effluents and unregulated dumping of solid wastes.





*Bangalore City Bus Stand, once Dharmambudhi Tank*



*The KGA Golf Course stands on what was once the Challaghatta Tank*



*The Koramangala Tank is today a sports complex*

**Figure 2: Extinct Lakes in Bangalore**

**Table 1: Sources of pollution in lakes**

Source		Type of problem
<b>Point Sources</b>		
	Power plants	Combustion of fossil fuels emit nitrogen products into the atmosphere, which are carried down by rainfall and other processes, causing eutrophication in water bodies
	Sewage Treatment Plants	Treatment process releases oxides of nitrogen and phosphorous in effluents, which drain into water bodies
	Industrial Plants	Industrial processes release nitrogen and phosphorous products in effluents, which drain into water bodies
<b>Non-Point Sources</b>		
	Agriculture	Farming practices, including use of fertilizers rich in nitrogen and phosphorous, deposit increased amounts of these nutrients in the soil. Run-off from these farms cause eutrophication in water bodies.
	Sewage	Direct discharge of sewage from domestic sources, not connected to treatment plants, will eventually make its way into water bodies

- ◆ **Deficiency in proper management:** The number of lakes has been gradually decreasing because some of the tanks have been converted into residential localities and some have been used by State Departments for public purposes like bus stands, stadiums and residential layouts etc. Most of the live Lakes have silted up due to faulty land management in the catchments and indiscriminate mud lifting from the lake beds consequently their water impounding capacity has been reduced considerably apart

from rendering the water turbid. Conflict of interests among various land & water use sectors and their failure to evolve common strategy. Paucity of overall understanding of the nature and benefits of lakes in economic and ecological terms.

- ◆ **Social composition of land ownership:** Increasing population and growing economies leading to unplanned development and greater pressures on land resources. Lakes are often seen as main targets for development particularly in urban area due to pressure of human activities like, urbanization, industrialization etc. As a result of these activities most of the urban lakes are getting degraded beyond the point of recovery.
- ◆ **Spread of well irrigation:** As the population increases, the demand for water continues to increase. Bore wells are dug indiscriminately. If the rainwater-harvesting is not done to recharge ground water the colossal investment in bore wells is simply washed away.
- ◆ **Lack of governmental commitment:** Insufficient cohesive academic research centered on wetland in understanding the importance and essence of conservation and management, owing to financial constraints and lack of infrastructure and required expertise. Also the change in the institution mechanism and their weakening over the years is an issue.
- ◆ **Lack of data bank:** Census of lakes and identification and assessment of their problems both in the urban and rural areas is not available. Lack of access to scientific data and scientific norms for restricting building activity around the lakes.

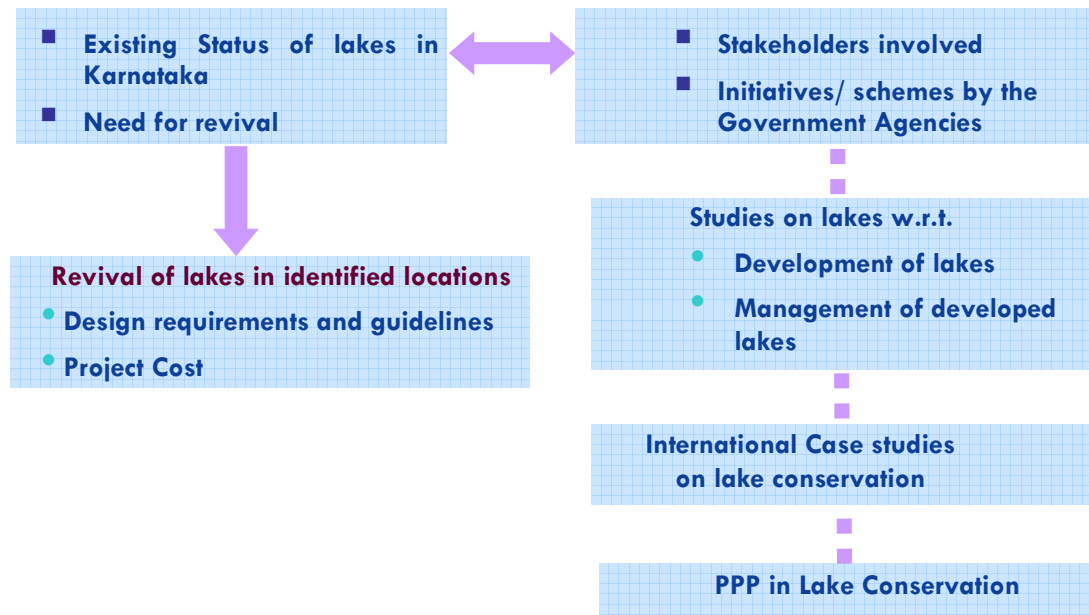
## 1.2 Need for Conservation

Infrastructure Development Department (IDD), Government of Karnataka realizes that Lakes being major sources of accessible fresh water require well planned, sustainable and scientific efforts to prevent their degradation. It as an imperative to restore and conserve lakes and IDD intends to explore the possibility to work in close partnership with the private sector in protection, conservation and sustainable management of lakes.

With this background this feasibility study has been conducted to analyze the various scenarios to take up the conservation under the PPP model.

## 1.3 Approach & Methodology

The methodology adopted for the feasibility study is as follows:



**Figure 3: Methodology adopted for lake conservation**

The goals for conservation of lakes have to be tailored to individual regions, specific to the problems of degradation and based on the level of dependence. This requires reconstruction of the physical conditions; chemical adjustment of both the soil and water; biological manipulation, reintroduction of native flora and fauna, etc.

The interpretation of existing trends and scenarios in the process of conservation of lakes as presented in this report is based on interactions with limited key players namely government stakeholders, developers involved in similar projects and personnel involved in the field work. Hence, they are indicative of the situations prevalent at the time of conducting the study.

The study is based on market information, whether from public and private sources, and it has been ensured to the best of its ability, the correctness and the validity of the same, by cross checking from various sources.

## Sector Profile

### 2. Overview on Lake Conservation

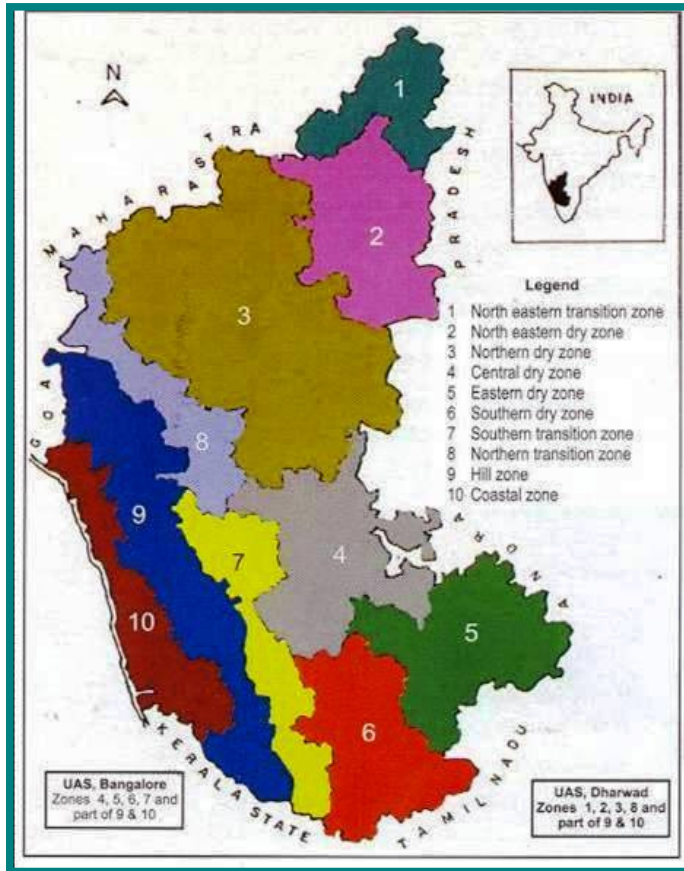


Figure 4: Climatic zones in Karnataka.

Groundwater is the major source of drinking water in Karnataka and in rural areas. Groundwater levels are fast declining in the state with 34 taluks considered as critical due to over exploitation. Factors such as population pressure, discharge of effluents and addition of agricultural chemicals into water bodies have contributed to deterioration of water quality, depletion of water levels and unhygienic sanitation.

In the dry central and southern India that fall in the rain shadow region, the lakes store rainwater and ensure supply for domestic use and for agriculture. They also help in recharging groundwater. In cities enjoying perennial river sources and high rainfall the lakes serve as flood cushions, act as a resource recovery area, releasing nitrogen, inactivating phosphates, removing toxins and treating wastewater.

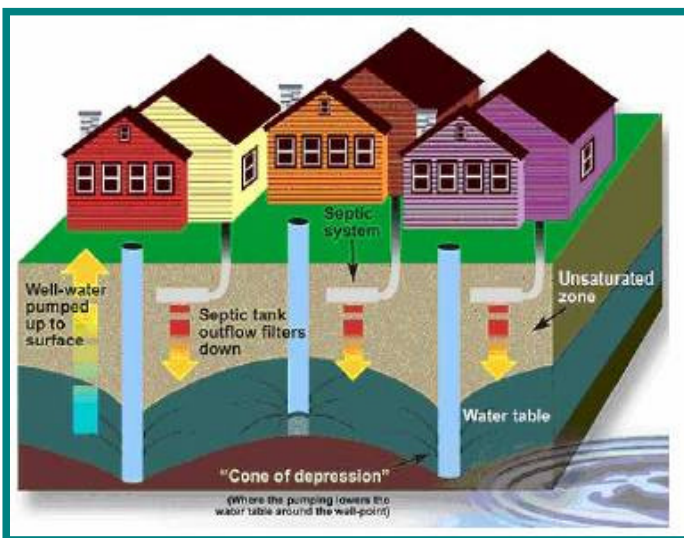


Figure 5: Effect of urbanization on ground water.

Apart from the water supply, lakes are home to many aquatic animals and plants, source of minerals, source of recreation and aesthetic enjoyment.

## 2.1 Overview of lakes in Karnataka

Karnataka state is endowed with numerous rivers, lakes, and streams, and has a coastline of about 320 km. Spatial extent of the state is 1,92,204 sq km (5.35% of the country's total geographical area) with a population of 52 million. The occurrence and distribution of rainfall in the state is highly erratic. It is estimated that nearly 75% of the state's area is drought prone, and the rain fall has coefficient of variation of variability of more than 30%, which leaves the state exposed to the risk of drought.

Karnataka has more than 36,508 big and small tanks. In the Malnad region – Shimoga, parts of Dakshina Kannada and Uttara Kannada, tanks are generally small and a great number only harvest rain. They are not supported by channels which divert stream water. Malnad's tank accounts for nearly 25% of the total tanks of the state.

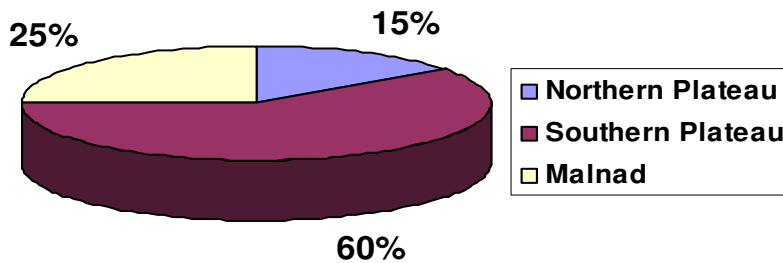


Figure 6: % wise distribution of lakes in Karnataka

In the Northern Plateau – Dharwar, Belgaum, Bijapur, Bellary, Raichur, Gulbarga and Bidar, tanks are very few and account for only 15% of the total tanks of the state.

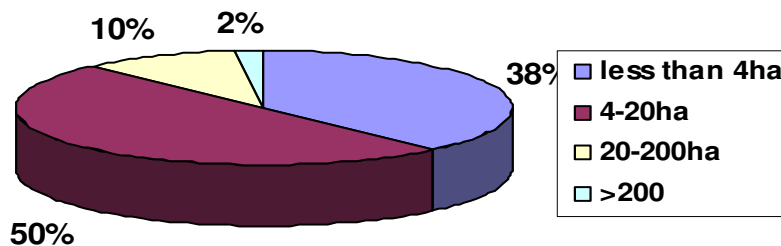


Figure 7: % wise size of lakes in Karnataka

In the southern plateau - Chitradurga, Tumkur, parts of Chikmagalur, Hassan, Kodagu, Mysore, Mandya, Bangalore and Kolar there are numerous tanks and they account to 60% of the total tanks of the state.



## 2.2 Impact of urbanization on lakes

The rapid urbanization has the following impact on the lakes:

- ◆ **Eutrophication:** Industrial effluents, run-off from agricultural fields, refuse and sewage, domestic wastes like food remnants, soaps, detergents and sewage are dumped into lakes which break down and release nutrients in the lake. Microscopic organisms ingest these nutrients and survive on them. Following ingestion of carbonic elements, carbon dioxide is released, while some of the elements are converted into nitrates and phosphates. This is called oxidizing and uses up a lot of dissolved oxygen. The depleted levels of dissolved oxygen in water lead to a situation where other aquatic life-forms cannot survive. This process is called eutrophication.

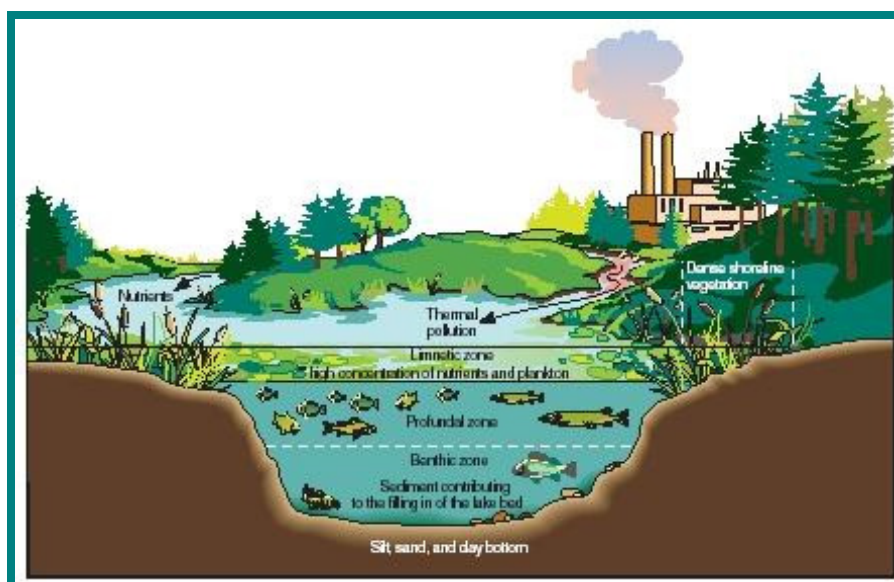


Figure 8: Eutrophication in lakes

The effect of eutrophication and the benefits of reducing eutrophication are provided in the table below:

Table 2: Eutrophication and its effects

Effect of eutrophication	Benefits of reducing eutrophication	How benefits can be measured
Increased taste and odor problems in water supply	<ul style="list-style-type: none"> <li>• Lower costs of treating water</li> <li>• Consumers happier</li> <li>• Less need for substitute water (e.g., bottled water)</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment cost savings</li> <li>• Increased consumption of water and differential between prices of substitutes and municipal supply</li> </ul>

Reduced visual and tactile qualities of water body	<ul style="list-style-type: none"> <li>• Happier nearby residents</li> <li>• Increased development around water body</li> <li>• Increased recreation</li> <li>• More diverse biota</li> </ul>	<ul style="list-style-type: none"> <li>• Increased value of properties</li> <li>• Increased development of land</li> <li>• Increased expenditures on recreation</li> <li>• Prices for different species caught</li> <li>• Public WTP for improved ecosystem</li> </ul>
Increased possibility of toxins in water	<ul style="list-style-type: none"> <li>• Increased commercial and recreational fishing</li> <li>• More diverse biota</li> <li>• Increased water contact</li> </ul>	<ul style="list-style-type: none"> <li>• Increased number and value of fish caught</li> <li>• Public WTP for improved ecosystem</li> <li>• Increased expenditures on recreation</li> </ul>
Loss of water depth, surface area, and storage capacity	<ul style="list-style-type: none"> <li>• Reduced need for alternative water supplies</li> <li>• Values of shoreline property preserved</li> <li>• Continued viability of fisheries</li> <li>• Continued viability of recreation</li> </ul>	<ul style="list-style-type: none"> <li>• Avoided costs for dredging and substitute water supplies</li> <li>• Avoided losses in property values</li> <li>• Value of fish catches, which would not have taken place</li> <li>• Recreational expenditures which would have been lost</li> <li>• Public WTP for existence of lake, apart from use values</li> </ul>

◆ **Siltation:** Water flowing into a lake brings silt. Increased deforestation loosens the top soil, which finds its way into lakes. Some of the silt is washed out when the lake overflows. However, the outflow of silt does not always match the inflow and the silt settles at the bottom of the lake.

◆ **Flooding:** Traditionally tanks were made in chain or cascade system so that no water was wasted. In this method of construction, the tanks are mostly constructed on connected system of streams. The naturally undulating terrain of Karnataka, with its hills and valleys, lends itself perfectly to the development of lakes that can capture and store rainwater. Each valley at the ridge top gives birth to small streams which cascade down to form major stream systems.

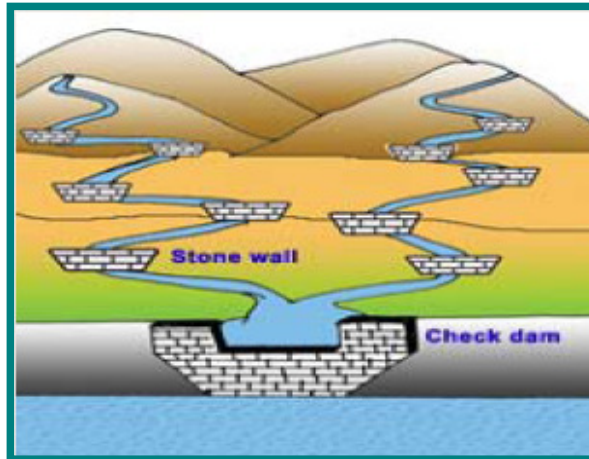


Figure 9: Chain or Cascade system of lakes prevent flooding

These streams between ridges and valleys are used to create man-made lakes by damming the streams at appropriate places. Each of these lakes harvest rain water from its catchments and the surplus flows downstream spilling into the next lake in the chain. During monsoons, the surplus water from the upstream lake flows down into the next lake in the chain and from there further down. This connectivity did not allow an overflow of water out of the lake into the surrounding area as the additional quantity of seasonal water is transferred to other lakes. The system hence serves as excellent flood controller. Supported by a network of storm water drains, these lakes thus trap and store rainwater and are suppose to serve as the means of rainwater harvesting for agriculture, drinking and washing thereby meeting one-third of the total demand of the city.

With the growth of the urbanization, small lakes and tank beds have vanished because of encroachment and construction activities. This has resulted in storm-water drains reducing to gutters of insufficient capacity, leading to flooding during monsoon. Dumping of MSW in the drains compounds the problems, leading to blockages. To control floods, it is important to remove silt and widen these storm water drains to maintain the chain flow or cascade system and avoid water from stagnating at one point.

In this scenario it is crucial to preserve and maintain lakes and tanks for improving the quality of ground water, fulfilling irrigation needs and preserving creating a healthy environment.



## Project Concept

### 3. About the project

Lake development has several advantages such as fast Construction, little displacement, small investments and benefits are quickly realised. Unfortunately there is no scope for constructing new lakes in three regions of the State - the coastal belt, Malnad and Southern Plateau. In Northern Plateau there is some possibility of finding new sites for lakes but the history of lake construction in the region indicates that their role is limited. In southern half of the state, the construction of additional lakes would only reduce flows to the lower lakes. Hence new investments on lakes can be made only on restoration and conservation of existing lakes.

The identification of lakes has been done on the certain defined parameters which are detailed out in the subsequent sections. While the causes of degradation of lakes are many, in view of the limited resources available, it is not possible to take up all degraded lakes for conservation. It is, therefore, necessary to prioritize lakes along with the catchments, where conservation needs to be taken up first.

It is important to give priority to revive those lakes that would have lost without any form of intervention. A framework can be developed categorizing by the level of interventions required for prioritization as follows:

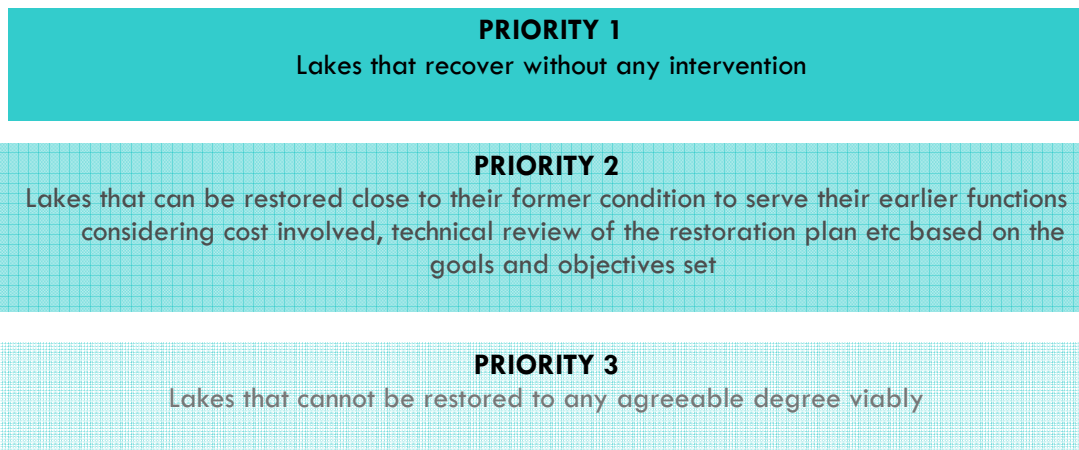


Figure 10: Prioritization of lakes

This report targets at selecting important degraded lakes in Karnataka which can be taken up for conservation.

The conservation of lakes needs to be dealt on the following two levels:

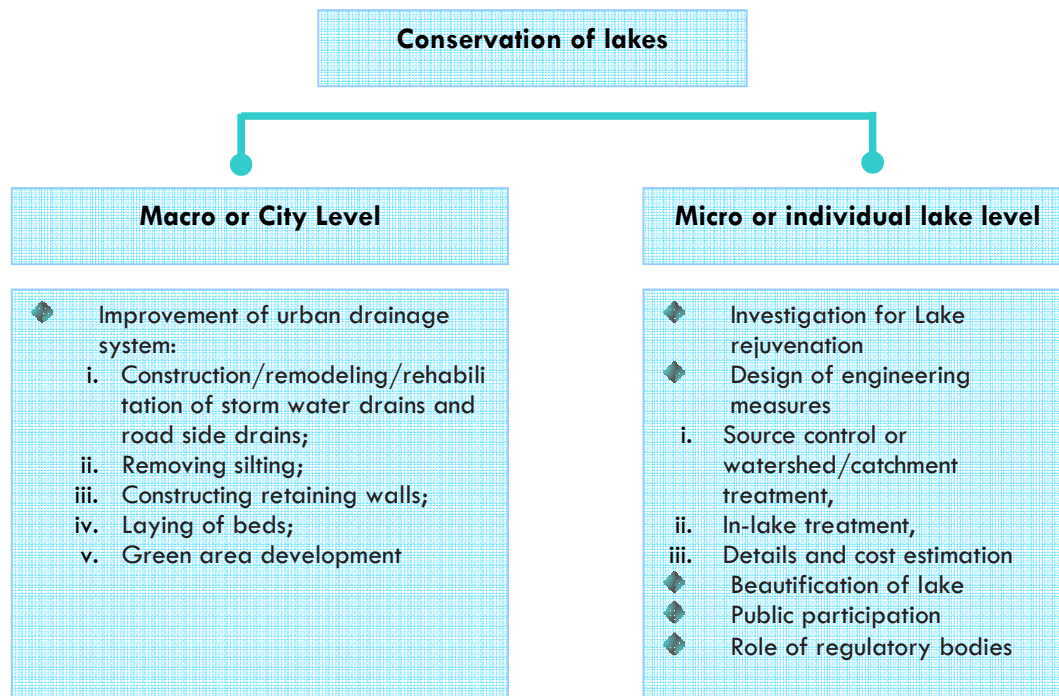


Figure 11: Approach towards lake conservation

### 3.1 Intervention required at Macro or City Level

Urban drainage has a direct impact on the City's image, citizens' life, and health. If the system does not work properly, it leads to environmental hazards. Improving the urban drainage system requires not only capital infusion, but also ongoing funding for operation and maintenance. A single point obstruction in a storm-water drain would have a cascading overall impact. The steps involved in upgrading storm water drainage include:

- ◆ Constructing roadside drains;
- ◆ Extension of the storm water drain network into surrounding municipal council areas;
- ◆ Clearing all encroachments that come in the way of the storm water drain network in the city;
- ◆ Aligning the drain network and checking blockage and overflowing of drains;
- ◆ Reviewing existing storm water drains, ensuring connectivity of primary, secondary and tertiary drains;
- ◆ Redesigning for current load conditions along with building barriers between roads and open drains at crossings;

Citizen awareness is therefore a critical issue, and citizens and NGOs can play a key part in monitoring development in the region to ensure that drainage is not obstructed, and dumping of debris and MSW in drains does not occur.

### 3.2 Intervention required at micro or individual lake Level

The intervention required at the micro level shall be in two phases:

#### Phase I: Selection of lake

The short-listing of lakes is based on the following factors:

- ◆ Location of the lake (lakes located in urban areas and degraded and given priority)
- ◆ Lakes with tourism potential
- ◆ Source of water supply (lakes which serve as source for drinking water supply or irrigation to the surrounding areas are given priority)
- ◆ National Lake Conservation Plan (NLCP) guidelines which capture hydrological, scientific and administrative criteria for the selection of lake to be taken up for conservation. (the guidelines are enclosed as Annexure 6)

Based on the above factors the following lakes have been identified for conservation. The details of the major lakes in Karnataka and lakes identified for conservation are furnished in Annexure 1 and 2 respectively.

Table 3: List of identified lakes for conservation

S.No	Name of Lake	Name of City	District
1	Kolar Ammani Kere, Kolar	Kolar	Kolar
2	Kamalapura Lake,	Kamalapura,	Bellary District
3	Shanti Sagara	Davengere	Davengere
4	Konanhalli Lake,	Mandya	Mandya
5	Siddapura Tank,	Chitradurga	Chitradurga
6	Hoskote Lake,	Hoskote	Hoskote
7	Amani Hirikere, ,	Hole Narsipura	Chamarajnaragar
8	Gopashetty Koppa	Shimoga	Shimoga
9	Chikka Begur Lake	Bangalore	Bangalore

From the above short-listed list, following are the two lakes selected for First phase of Lake Conservation.

#### 1. **Gopashetty Koppa, Shimoga:**

Shimoga is situated on the banks of Tunga River in the central region of Karnataka. Shimoga district has a bird century where around 191 varieties of birds are found. The city does not have major lakes and the existing lakes need to be restored. Gopashetty Koppa is one such lake in Shimoga. The stakeholders have expressed the need and urgency for revival of this lake. The details of the lake are as given below:

**Table 4: Gopashetty Koppa, Shimoga**

SNo.	Item	Details
1	Name of the Lake	Gopashetty Koppa
2	Location	Shimoga
3	Area	29 acres approx.
4	Irrigation source	Yes
5	Source of drinking Water	Yes
6	Tourism Potential	
7	Qualification under NLCP	



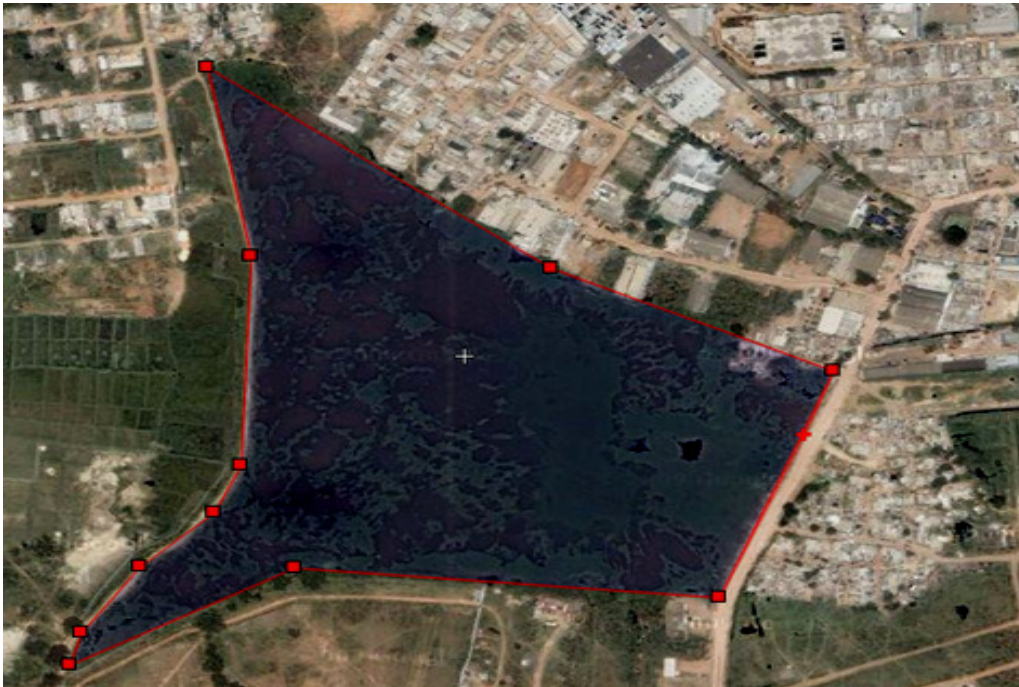
**Figure 12: Gopashetty Koppa, Shimoga**

- Chikka Begur Lake, Bangalore:** Most of the lakes or "tanks" in the Bangalore region were constructed in the Sixteenth century by damming the natural valley systems by constructing bunds. The lakes in the city have been largely encroached for urban infrastructure and as result; in the heart of the city only 17 good lakes exist as against 51 healthy lakes in 1985. Many lakes in Bangalore needs conservation and Chikka Begur lake is one of them.

The details of the lake are as given below.

**Table 5: Chikka Begur Lake, Bangalore**

SNo.	Item	Details
1	Name of the Lake	Chikka Begur Kere
2	Location	Bangalore
3	Area	29.74 acres
4	Irrigation source	
5	Source of drinking Water	
6	Tourism Potential	
7	Qualification under NLCP	



**Figure 13: Chikka Begur Lake, Bangalore**

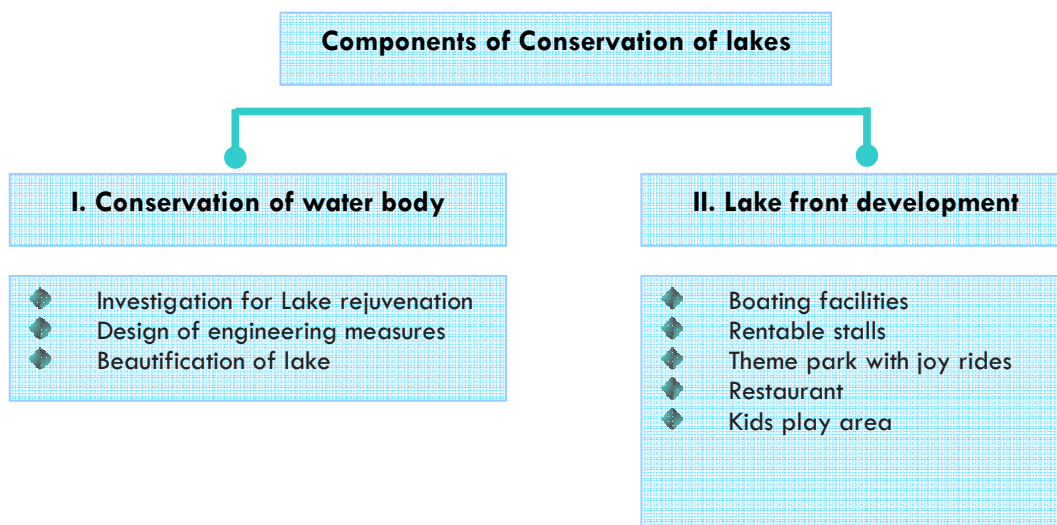
### **Phase II: Steps involved in individual lake conservation**

Under the PPP policy, the private partners can be involved in the conservation of lakes and allowed to operate recreational facilities in return for conserving and maintaining the lake. For the purpose of conservation, the private partner shall be responsible for desilting, dredging, landscaping, foreshore and island development, creation of tree parks, rock gardens, walkways, jogging paths, cycling tracks, fountains, children park area, electrification for illumination etc. Apart from this the private partner can be allowed to construct boat jetty, sports fishing, bird watching, Butterfly Park, boating, eco friendly water sports, eco friendly restaurants etc to generate revenues to make the



project financially viable. Two such examples are Kankaria Lake (Ahmedabad) and Ranchi Lake. The details of the same are provided in Annexure-8.

Once the lake is prioritized, the structure under which the lake has to be taken up under the PPP framework needs to be finalized. The lake conservation shall have two important components which shall influence the project cost, the revenue model and viability of the project to be taken up under a PPP model.



**Figure 14: Components of lake conservation**

Component I of lake conservation involves cleaning and maintaining of the water body with minor beautification works like jogging track, seating, development of park etc. Component I creates a public facility which might not generate enough revenue to make the project financially viable for a private partner to invest.

Component II consists of revenue generating activities which if combined with Component I might make the project lucrative for a private partner to invest.

The viability of the project will depend on:

- ◆ The project structure (component I i.e lake development or a combination of component I and II i.e. lake development along with lake from development). It is important to ascertain the project cost, the funding pattern and the revenues expected from the project.
- ◆ Availability of grant since the initial development cost as well as maintenance cost is high in lake conservation projects)

Base on these factors the project can be taken up in the following manner:

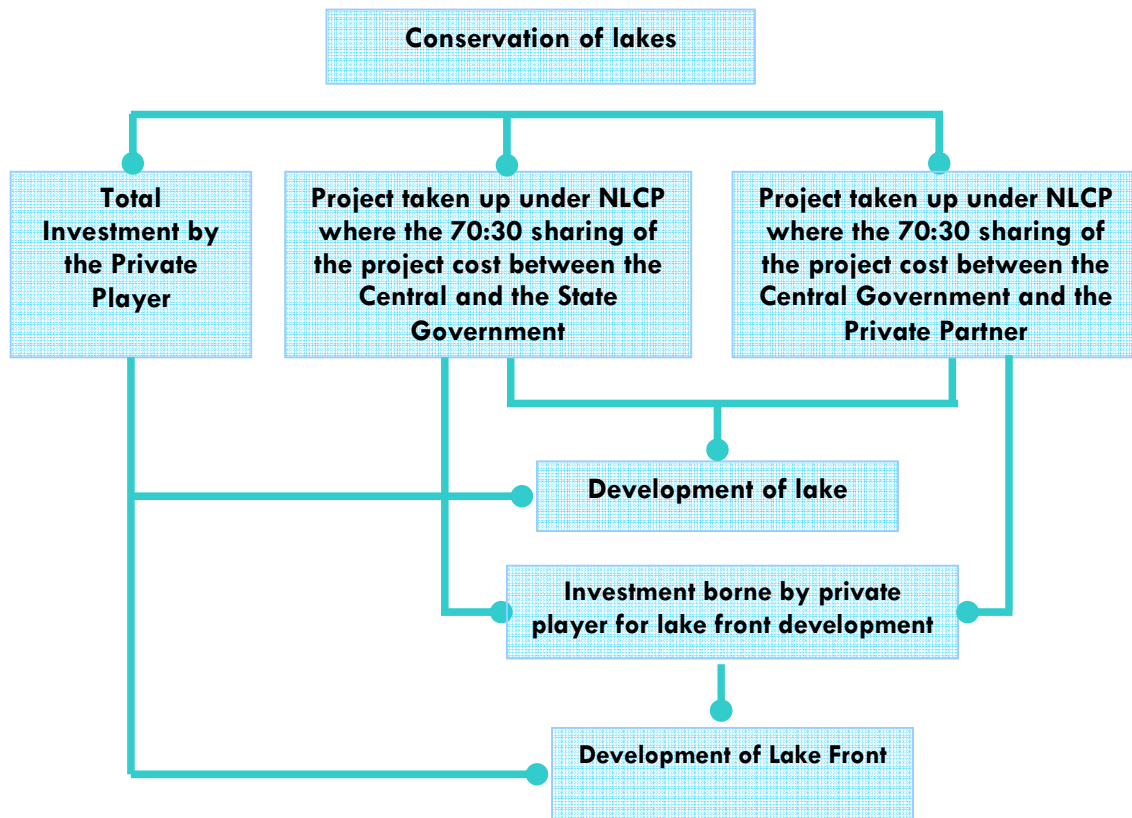


Figure 15: Possible development options for lake

For developing this project, we may get 70% of the total project cost from central government as a grant. This grant is given if the project is qualified under the NLCP guidelines. So, the project can be considered in the following six scenarios.

- ◆ Scenario 1 (Lake development without grant): In this scenario, it is assumed that the private partner may not get any grant from the State Government or the Central Government and the total investment for the lake conservation (Component I) has to be borne by the private partner.
- ◆ Scenario 2 (Lake and lake front development without grant): In this scenario, it is assumed that the private partner may not get any grant from the State Government or the Central Government and the total investment for the lake conservation as well as the lake front development (Component I as well as II) has to be borne by the private partner.
- ◆ Scenario 3 (Lake Development with grant under NLCP): In this scenario, it is assumed that the private partner may get grant under the National Lake Conservation Programme (NLCP) which shall be about 70% of the cost involved for lake development (Component I) from the Central Government and 30% from the Government of Karnataka.
- ◆ Scenario 4 (Lake Development with grant under NLCP and lake front development by Private Player): In this scenario, it is assumed that the private partner may get grant under the National Lake Conservation Programme (NLCP) which shall be about 70% of the cost involved for lake development (Component I) from the Central Government and 30% from

the Government of Karnataka and the total investment for the lake front development (Component II) has to be borne by the private partner.

- ◆ Scenario 5 (Lake development with partial grant under NLCP (70% from the Central Government) and 30% from the Private Player): In this scenario, it is assumed that the private partner may get grant under the National Lake Conservation Programme (NLCP) which shall be about 70% of the cost involved for lake development (Component I) from the Central Government and the balance 30% of the State Government share has to be borne by the private player.
- ◆ Scenario 6 (Lake development with partial grant under NLCP (70% from the Central Government) and 30% from the Private player as well as Lake Front Development by the Private Player): In this scenario, it is assumed that the private partner may get grant under the National Lake Conservation Programme (NLCP) which shall be about 70% of the cost involved for lake development (Component I) from the Central Government and the balance 30% of the State Government share has to be borne by the private player. Also the total investment for the lake front development (Component II) has to be borne by the private partner.

Subsequent to the finalization of project structure, it is required to get Detailed Project Reports for implementation. The details for Component II are variable and design based. The details for Component I shall be based on the surveys including water quality and biodiversity of the lake. For the purpose of Component I, the detailed project report shall include the following five broad heads as furnished in the figure below. The detailed description of each step is given in Annexure 3.



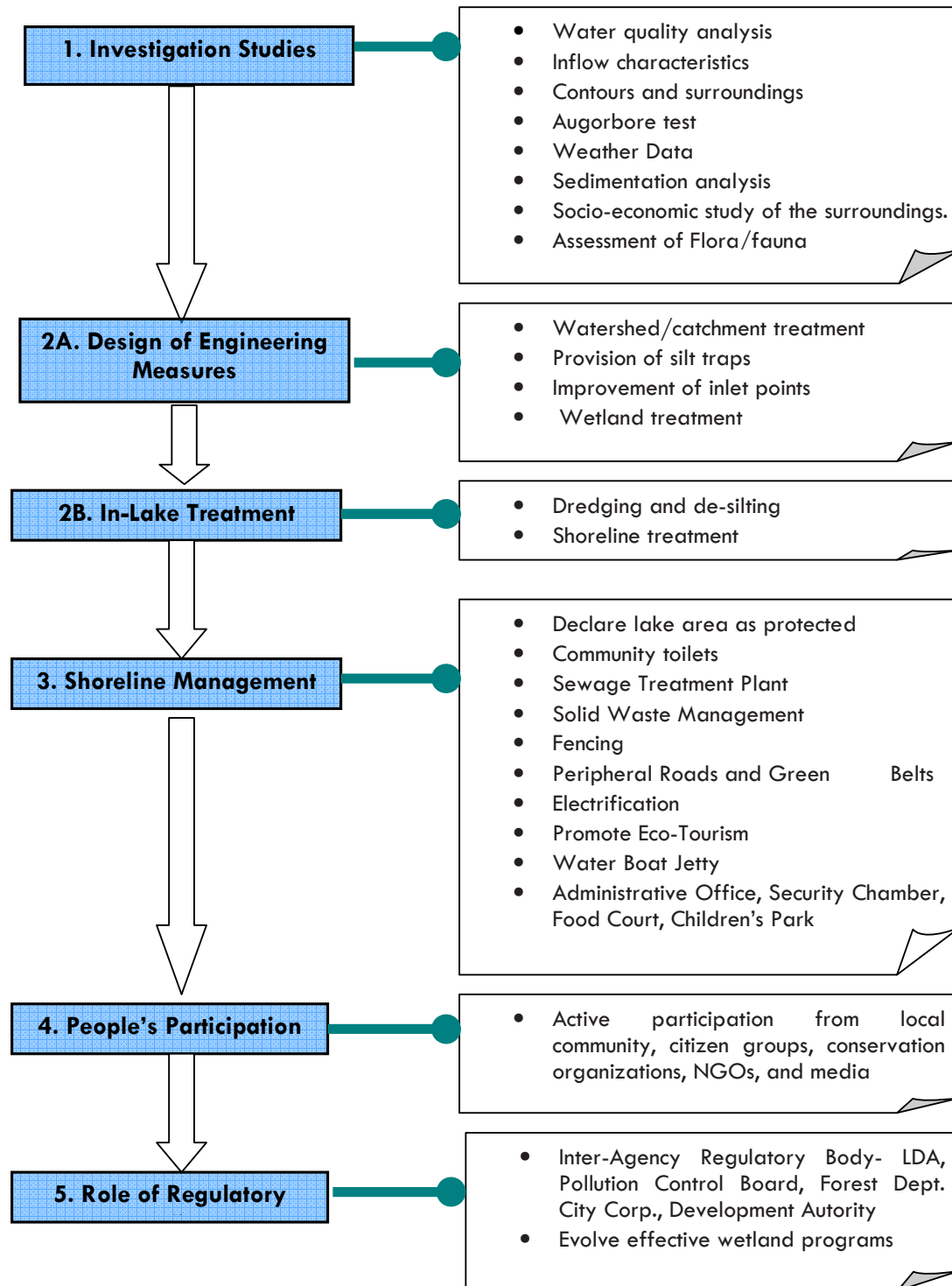


Figure 16: Steps involved in individual lake conservation

## Market Assessment

### 4. Industry outlook

The stakeholders involved in the process of lake conservation look capital investment, long term operation and maintenance and risk sharing mechanism with the private player. A private player is expected to design, engineer, finance, construct, operate, maintain and transfer the developed lake after a specified period. The major stakeholders involved in the process of lake conservation are:

**Table 6: Agencies involved in lake conservation**

Agencies	Description
Lake Development Authority	This is a society created by the Karnataka Govt. in 2002 for the conservation of lakes in Karnataka. They keep an inventory of the inland wetlands of Karnataka.
BBMP (Bruhat Bengaluru Mahanagara Palike)	The BBMP has developed 2 lakes and is currently developing another 7 lakes in Bangalore.
Forest Department, MoEF	This department is in charge of 114 lakes in Bangalore.
BDA (Bangalore Development Authority)	The BDA has restored 2 lakes and is in the process of restoring 12 more lakes in Bangalore.
State Government	As lakes belong to the community at large, state governments have a large role in this field.
Central Government	The central government launched the NLCP in 2001.
City Municipal Councils	The municipal councils of different cities across Karnataka are also responsible for maintaining lakes.
Citizens	The public in general, is the user of the water for irrigation, consumption or entertainment.
Environmental Groups	Environmental groups are a representative of the surrounding flora and fauna, which is important to maintain the ecological balance.

Similarly private players expect the project to be commercially viable for them to built, operate and maintain over a period of time. The PPP in lake conservation leads to positive output if used along with awareness and legal enforcement. The market players who can be involved in the process are:

- ◆ **Developers:** Private partner can bring in activities such as boating facilities, jogging track, children's park, theme park, water parks, and nature walks etc. around the lake which would attract people from not only the nearby areas but also tourists from other distant places. This would help in accruing revenue all the year round.
- ◆ **Corporate Offices:** By rejuvenating a lake, a private company could acquire the goodwill of the people in the surrounding areas. Rejuvenating a lake is one of the corporate social responsibilities that a private company can undertake.

- ◆ **Hoteliers:** Some lakes without too large a socio-economic influence on the people nearby can be given for development of resorts or hotels around the area. This would help in producing revenue for the private partner as well as ensure the maintenance of the lake. Private partner can introduce the concept of floating hotels or boat tourism in lakes bigger in scale (200 hac and above).
- ◆ **Welfare Associations:** Annual lake festival, sound and light show and other public gatherings can be conducted. A lake an ideal location for holding environmental conferences and other environment or nature related symposiums.

These market players can be involved in the conservation of lake within a defined legal framework and restricted activities.

#### 4.1 SWOT Analysis

The SWOT analysis for taking up lake conservation under a PPP framework is as follows:

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> <li>• Private Partners are involved for the conservation of lakes where operations and maintenance capital investment and commercial Risk can be shared or transferred entirely on to the private partner.</li> <li>• Can help in promoting new concepts, designs and efficiencies in lake conservation.</li> <li>• Can maximize service to citizens at an affordable price with optimal use of government Funds.</li> </ul>	<ul style="list-style-type: none"> <li>• Involvement of Private Partners leads to commercialization of public / natural assets.</li> <li>• The concern of amusement with construction of theme parks, entertainment venues and shopping malls tend to have a negative impact on urban biodiversity and exclude the under privileged.</li> <li>• Fencing of common public property like tanks will adversely affect access of poor urban and peri-urban populations who depend on these commons for washing, bathing themselves and their cattle; to extract fodder; fishing; irrigation, recreation, etc.</li> </ul>

## OPPORTUNITIES

- Private partner can bring in activities such as boating facilities, jogging track, children's park, theme park, water parks, and nature walks etc. around the lake which would help in accruing revenue all the year round.
- A developed lake is an ideal location for holding environmental conferences and probably even other environment or nature related symposiums.
- By rejuvenating a lake, a private company could acquire the goodwill of the people in the surrounding areas.
- Rejuvenating a lake is one of the corporate social responsibilities that a private company can undertake.
- Developing small bird parks, butterfly parks, a variety of flower beds not only maintains the flora and fauna of the area but would also add to the scenic beauty of the lake and would further enhance the attractiveness of the lake.
- Some lakes without too large a socio-economic influence on the people nearby can be given for development of resorts or hotels around the area. This would help in producing revenue for the private partner as well as ensure the maintenance of the lake.
- Annual lake festival, sound and light show and other public gatherings can be conducted.
- Private partner can introduce the concept of floating hotels or boat tourism in lakes bigger in scale (200 hac and above).

## THREATS

- The creation of a hotel and commercial complex in an area that is exclusively meant to be retained as an ecological habitat and public commons leads to land use violation.
- The act of handing over the lake development under a PPP model encroaches and rejects a variety of customary rights of local communities and fishing communities in terms of their free access and utilization of the water body.
- Concept is susceptible to legal violation as, as per the directives of the Hon'ble Supreme Court of India which held in a recent judgment directly relating to management of tanks (in Intellectuals Forum, Tirupathi vs. State of A.P. & Ors, Appeal (civil) 1251 of 2006) that tanks and lakes are community property and cannot be traded away at all.
- The manner in which these ancient tanks are being 'rehabilitated and developed' kills the biodiversity, reduces the biological productivity and water holding capacity of these tanks.

## Statutory and Legal framework

### 5. Legal Framework

India has Policies, Acts, Rules and Laws in the Water Resources, Environment, Forest, Agriculture, Fisheries and Social sectors, directly or indirectly related to lake management. The Indian Constitution provides, in clear and unambiguous terms, for the State's commitment to protect the environment. Article 48-A of the directive principles states, "The State shall endeavor to protect and improve environment and to safeguard the forests and wild life of the country". Under Article 51-A (g), it is the fundamental 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 Constitution empowers Panchayats and Urban local bodies with functions and responsibilities, as relevant to Lakes Environment.

#### 5.1 Initiatives by the Central Government

Several acts and notifications issued by the Ministry of Environment and Forests (MOEF) provide the legal framework for protection of lakes and reservoirs (wetlands). These deal with environmental protection, pollution control, specific natural resources protection acts, hazardous waste management and the National Environment Tribunal.

##### ◆ Constitutional Provision and applicable legislations

Protection of environment and improvement were explicitly incorporated into the Constitution by the Constitution (Forty-Second Amendment) Act of 1976. Article 48A of the directive principles of state policy declares: "the State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country". 'Fundamental Duties' as envisaged in Article 51A (g), imposes a similar responsibility on every citizen 'to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

##### ◆ The Water (Prevention and Control of Pollution) Act, 1974

The above Act, 1974 suggest that only State Governments can enact water pollution legislation. Article 252 empowers Parliament to enact laws on state subjects for two or more states, where the State Legislatures have consented to such legislation. Under this Act, the State Boards were vested with the regulatory authority and were empowered to establish and enforce effluent standards for factories discharging pollutants into bodies of water. A Central Board performs the same functions for union territories and coordinates activities among the states.

The PCBs established under the Water Act, control sewage and industrial effluent discharges in the water bodies by approving, rejecting or conditioning applications for consent to discharge.

##### ◆ The Water (Prevention and Control of Pollution) Cess Act of 1977

The main object of this Act is to meet the expenses of the Central and State water boards. Economic incentives are provided for control of pollution by differential levy of tax structure. The local authorities and certain designated industries are required to

pay a cess for water consumption. The revenues accruing thus are in turn used for implementation of the Water (Prevention and Control of Pollution) Act, 1977. The Central Government, after making deductions for collection expenses, pays the Central board and the States such sums as it deems necessary to enforce the provisions of The Water (Prevention and Control of Pollution) Act, 1974. On the installation of effluent treatment equipment and meeting the applicable norms the polluter is entitled to get a rebate of 25% on applicable cess.

#### ◆ **The Indian Forest Act of 1927**

This Act is a consolidation of Indian Forest Act of 1878 and its amendments, with minor changes it has been enacted in pre-independent India. This Act mainly deals with four categories of forests, viz., reserved forests, village forests, protected forests and non-government (private) forests. The said Act applies to the lakes which come under any of the above mentioned four categories of forest.

#### ◆ **The Forest (Conservation) Act Of 1980**

The Central Government has enacted the Forest (Conservation) Act, 1980 to prevent rapid deforestation and environmental degradation. According to this Act, before a State Government “de-reserves” a reserved forest, uses forest land for non-forest purposes, assigns forest land to a private person or corporation, or clears forest land for the purpose of reforestation, it has to take the approval of the Central Government. The Central Government is assisted by an advisory committee constituted under this Act. The said Act applies to the lake which comes under the reserve forest.

#### ◆ **National Lake Conservation Plan**

Ministry of Environment and Forests has been implementing the National Lake Conservation Plan (NLCP) since 2001 for conservation and management of polluted and degraded lakes in urban and semi-urban areas. The major objectives of NLCP include encouraging and assisting State Governments for sustainable management and conservation of lakes. Lakes being major sources of accessible fresh water require well planned, sustainable and scientific efforts to prevent their degradation and ultimate death. The main objectives of the National Lake Conservation Plan are:

- Prevention of pollution from point and non-point sources.
- Treatment of Catchment area.
- Desilting and weed control.
- Research & Development studies on floral and faunal activities and related ecological aspects.
- Other activities depending on the lake specific conditions such as integrated development approach, including interface with human populations.

The funding pattern under National Lake Conservation Plan was revised to 70:30 costs sharing between Central and the State Government with effect from January, 2002. In view of a large number of proposals being received from various States, the scope of NLCP has been enlarged during the Tenth Plan Period by including the rural lakes in the programme along with urban lakes. The funding pattern is same for the year 2007- 2008.

### ◆ **The Environment (Protection) Act, 1986 (EPA)**

According to EPA, "Environment" includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property;

Section 3 of the EPA states, that Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

### ◆ **National Environment Policy, 2004**

The National Environment Policy (NEP, 2004) is a response to the national commitment to a clean environment, mandated in the Constitution in Articles 48A and 51 A (g), strengthened by judicial interpretation of Article 21. The Objective of NEP 2004 is:

- Conservation of Critical Environmental Resources:
- Intra-generational Equity: Livelihood Security for the Poor:

## **5.2 Initiative of the State Government**

Appreciating the urgency and enormity of the task for the integrated development of lakes, the Department of Environment and Ecology proposed the constitution of the lake Development Authority. The Lake Development Authority was created vide Government Order No. FEE/12/ENG/02, Bangalore, Dated. 10th July 2002. It is a registered society under the Karnataka Societies Registration Act, 1959 and a non-profit organization working solely for the regeneration and conservation of lakes within BMRDA jurisdiction.

However, from 30.04.2003 the Lake Development Authority's jurisdiction has been extended over the lakes in city municipal corporations in the State as well as lakes in the city Municipalities which are the main sources for drinking water. The Lake Development Authority is responsible for:

- Restoring lakes and facilitating restoration of depleting ground water table.
- Diverting/treating sewage to generate alternative; sources of raw water and prevent contamination of underground aquifers from wastewater.
- Environment impact Assessment studies.
- Environmental Planning and GIS Mapping of lakes and surrounding areas.
- Improving and creating habitat for water birds and wild plants.
- Reducing sillage and non-point water impacts.
- Improving urban sanitation and health conditions especially for the weaker sections living close to the lakes.
- Impounding run-off water to ensure recharge of ground water aquifers and revival of borewells.
- Monitoring and management of water quality and lake ecology.
- Utilizing the lakes for the purpose of education and tourism.
- Community participation and public awareness programmes for lakes conservation.

It also has the governing council which has the powers to:

- Frame regulations, byelaws
- Enter into agreements with public or private bodies to further objectives
- Accept endowments grants etc
- Establish and spell out membership of committees, task forces
- Appoint advisory board and other such special committees
- To invite experts to meetings of governing council

Apart from this, the Memorandum of Association of LDA also provides for the creation of an Empowered Committee of the Lake Development Authority. The functions and powers of the Empowered Committee are:

- Seeking funds for the regeneration/development/maintenance of lakes
- Grant Approval for the Detailed Project Reports to be submitted to Ministry of Environment and Forests under the Lake Conservation Plan
- Grant approvals for the works to be taken up by following due process under the Karnataka Transparency in Public Procurements Act, 1999
- Powers to constitute any sub-committee/s for the above purposes.

Since its inception the Authority has drawn up the plans for the conservation of various lakes in the State includes Bangalore city. This has resulted in obtaining Government of India grant for, Nagawara Lake (Rs.5.19 crores). Vengaihnakere (Rs.2.55 crores), Bellandur lake (Rs.5.5.crores), Kottegere Lake, Belgaum (Rs.5.640 crores), Lalbagh (Rs. 1.66 crores) and Bhisma lake, Gagag (Rs.2.50 crores). The proposals sent to Government of India for the 10th Five-year plan is for about Rs.252 crores. The Authority has also taken up preparation of database of lakes in and around Bangalore after physical verification of lakes and update about the lakes, including the water quality monitoring and encroachment thereon.

### **5.3 Conclusion**

Conservation of lakes under a Public Private Partnership is not envisaged directly under any of the enactments and policies, however few lakes were undertaken under private participation and it was alleged by the public that it is commercialization of the lakes which would serve the interest of the private parties and not the public at large. Thus conservation of lakes under a PPP framework has not received the desired response and public acceptance in Karnataka mainly because of its commercial nature. The process was adopted by Lake Development Authority which received a lot of opposition for the public. A number of civic organizations, environmental organizations, naturalists and birdwatchers, were alarmed and perturbed at the manner in which the numerous tanks and wetlands, essentially a common property, were being handed over for commercial and developments activities to private parties by the Government. A copy of letter submitted by an environmental organization (ESG) to the Chief Minister regarding their concern on the privatization of lakes is provided in Annexure. Conservation of lakes under private participation could be undertaken by framing a suitable guidelines and policies for private participation which is not purely commercial in nature and the guidelines should provide for environmental protection, ecological sensitivity issues, abatement of pollution and more so ever conservation of lakes for the public purpose by the private parties.



## Environmental & Social impact of lake restoration

### 6. Environment Impacts

Effective, long-term lake conservation plan is a complex undertaking that must deal with sociology as well as biology. The decision to restore or protect a particular lake has to be based on a thorough study of the lake, its watershed, and the commitment of time and money necessary for long-term management. Each lake is unique, and each management process is as complex as the concerns it addresses. But the ecological, social, and economic benefits of a well-managed lake can span generations. For these reasons, the actual value of a lake conservation project can't be calculated.

A lake and its adjacent wetlands provide habitat for fishes and other wildlife.

#### 6.1 Economic Impact of lake conservation

The economic impact of lake conservation is:

- ◆ The visual quality of the communities built around the lake is highly dependent on the condition of the water body and the lakeshore. The natural beauty of the lake is part of the quality of life for lakeshore property owners and the entire community. The quality of a lake directly affects community property values and, therefore, the local tax base.
- ◆ A properly managed lake provides recreational opportunities for the citizens and mode of revenue for the Government for maintaining the lake.

#### 6.2 Social Impact of lake conservation

Lakes have been part of the historical as well as social landscape of Bangalore for many centuries now. Villages have clustered around many of these water bodies and depended on them for meeting all water related needs, from household uses to livelihood uses. Though this aspect of lakes has changed due to urbanization, there still exist many people as well as communities residing around these lakes, who depend on them. Lakes continue to exist as Common Property Resources<sup>1</sup>.

The social impacts of lake conservation are:

- ◆ **Climate:** Lakes are cooling agents and are essential to the urban microclimate. The cool air if allowed to flow unrestricted into the surrounding urban development creates a stress free soothing environment for the citizens in the adjacent localities.

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<sup>1</sup> Common Property Resources are broadly defined as those (non - exclusive) resources in which a group of people have co - equal user rights. Membership in the group of co-owners is typically conferred by membership in some other group, generally a group whose central purpose is not the use or administration of the resources (per se), such as a village, a tribe etc. CPRs perform several functions. They contribute to people's employment, income generation and asset accumulation (directly or through complementing the private resource based activities). Contributions of CPRs can be through physical products, income/employment gains, and larger social, ecological gain.



Figure 17: Lake Conservation brings in aesthetic value for the city

- ◆ **Recreational facilities:** Entertainment activities along the urban lakefronts if promoted, can serve as a revenue generating measure. The lakes can form a part of urban aesthetics and visual links can be established by avoiding barriers like walls and high bunds along the lake.
- ◆ **Encroachments:** Some areas of the lakefront are inaccessible and get inhabited by slums and other unauthorized usage. Such activities can be avoided by giving free access to the public with well-landscaped terraced spaces along the lakefront.
- ◆ **Rainwater harvesting and bio diversity:** lakes assist in Rainwater harvesting and protection of biological resource, enhancement of water quality and watershed management.

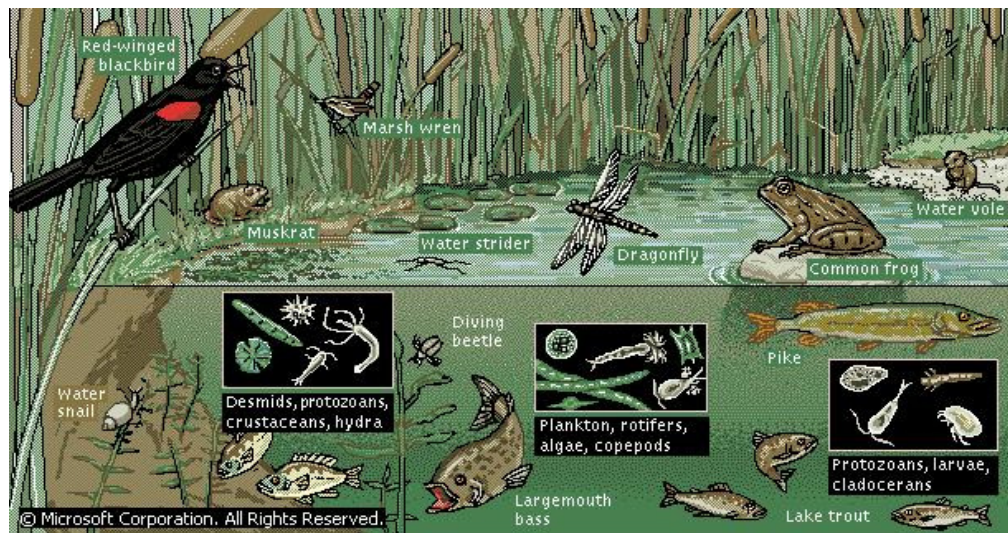


Figure 18: Lakes are home to many aquatic animals and plants

## Project Financials

### 7. Project cost components

This chapter includes estimation of project cost, revenues and operational expenses for the various scenarios explained in chapter 3. It also includes project feasibility analysis under different financing scenarios.

#### 7.1 Overview of Project Financials

The major cost centers and revenue centers for the project are identified and shown in the chart below.

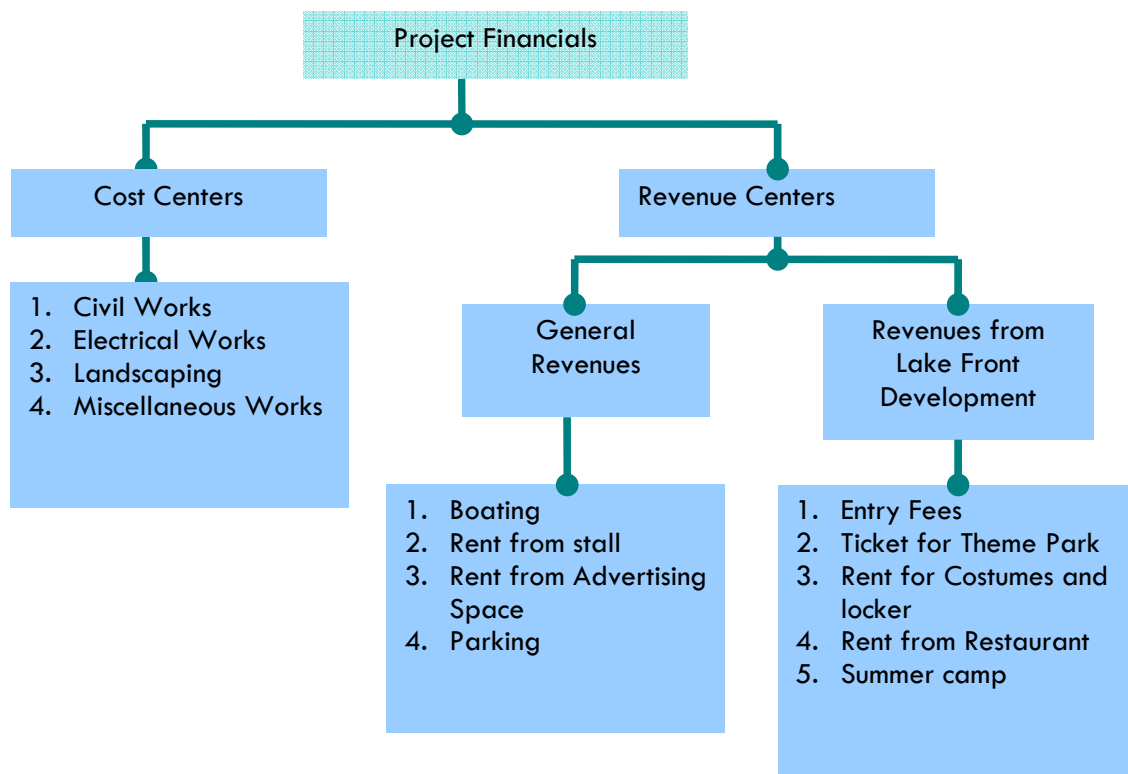


Figure 19: Project Financials

#### 7.2 Assumptions for calculating project cost

The extent of lakes in Karnataka varies between 10 acres to 500 acres and above. A general financial model is prepared for lake spread to an extent of 30 acres. For preparing financial model of any other lake which has different spread from this, the values of costs and revenues in the model have to be adjusted accordingly.

The micro and macro assumptions used to prepare financial model are listed below.

**Table 7: Financial Assumptions**

<b>Spread of lake</b>	30 Acres
Construction period	1 Year
Contingency cost	2% of hard cost
Financing charges	0.5% of hard cost
Operating expenses	10% of Initial cost
Lease period	30 years

### 7.3 Cost Estimation

The scope of work to be done in any lake conservation project has been mentioned in annexure 1. The project cost components, derived from the scope of work, are mentioned below. The total project cost is estimated to be Rs 527 Lakhs.

**Table 8: Estimated project cost for conservation of lake (50 acres approximately)**

S.No.	Components	Cost (Rs. Lakhs)
A	<b>Civil Works</b>	
	Desilting	139.6
	Compound Wall	1.3
	Chain Link Fencing	49.2
	Culverts and Waste Weir	14.5
	Jogging Track	2.9
B	<b>Electrical works</b>	11.9
C	<b>Landscaping</b>	24.6
D	<b>Miscellaneous works</b>	
	Water Boat Jetty	1.4
	Parking	2.3
	Gazebo/Shelter (10 of 375 sqm each)	10.6
	Fountain	6.2
	food kiosks (10 of 10 sqm each)	1.5
D	<b>Pre-operative/Other Expenses</b>	
	(5% of hard cost)	13.3
	<b>Total Hard Cost</b>	<b>279.1</b>
	Contingency Cost (2% of the hard cost)	5.6
	Financing Charges (0.5% of the hard cost)	1.4
	IDC	14.7
	<b>Total Project Cost</b>	<b>300.8</b>

The lake conservation project can be taken with or without developing Lake Front. The feasibility of the Lake Front Development is dependent on the availability of land around the lake. It is assumed that a parcel of 2 acres is available next to the lake for the development of various facilities like jogging track, park, water-world etc. The cost of Lake Front Development will be as follows:

**Table 9: Estimated project cost for Lake Front Development (2 acres approximately)**

No	Particulars	Rs. (Lakh)
1	Cost of Developing Lake Front <sup>2</sup>	200
2	O&M expenses (at 10% of initial cost)	20

The cost of Developing Lake Front is arrived from construction cost of similar Lake Front Development work in India.

#### 7.4 Estimation of Footfalls

The footfalls in weekdays and weekends will vary a lot. Average number of people visiting the lake front is arrived at as shown below.

**Table 10: Average Footfalls for Lake front development**

Key assumptions in calculating footfalls	
No of persons visiting per day in weekdays	100
Total weekdays in a year	261
No of persons visiting per day in weekends	1000
Total weekends in a year	104
Average persons visiting per day	357.1
Footfalls rounded off to	350

#### 7.5 Revenue Model

Various case studies and surveys indicate that people are willing to pay, if facilities such as green relaxation areas, garden, jogging track, walkways, boating are provided.

As shown in the Project Financials, The revenue streams are assumed for two scenarios:

- ◆ **Revenues from lake rejuvenation:** These revenues will be coming irrespective of the lake front development.
- ◆ **Revenues from lake front development:** These revenues will be specific to the lake front development. If lake front is not developed, we will not get these revenues

<sup>2</sup> The cost estimation of Lake Front Development is derived from quotation received from a private player and the same is attached as annexure 12.

The revenues from each component are shown below with all relevant assumptions. It is clear from below table that major part of the revenues comes from lake front development.

**Table 11: Revenue streams in the first year for the developer**

<b>A</b>		<b>Revenues from lake rejuvenation</b>			
<b>Sr. No.</b>	<b>Revenue Source</b>	<b>Amount (Rs.)</b>	<b>Unit</b>	<b>Assumption</b>	<b>Total (Rs. Lakh)</b>
1	Boating	20	Per Person	Average 350 persons visit lake per day, 20 % of them go for boating	5.11
2	Space Rent for food stalls and entertainment kiosks	20	per sqft per month	10 stalls for 500 sqft each	12.00
3	Advertising Space Rent	15	Per sqft per month	700 sqft space available for advertisement	1.30
4	Parking	Car – Rs.5 two-wheeler- Rs. 2	per vehicle	40 cars (per day) 100 2-wheelers (per day)	1.50
<b>Total Revenues without lake front development</b>					<b>19.91</b>
<b>B</b>		<b>Revenues from lake front development</b>			
1	Entry fees	20	Per person	Assuming 350 persons visit park per day	25.55
2	Fees to go to theme park and rides	150	Per person	Assuming 50 % of persons visiting for park go for this	95.8
3	Costumes+ Locker Fees	30	Per person	Assuming 50% of the persons coming for rides go for it	7.66
4	Restaurant rent	35	Per sqft per month	Restaurant space is 800 sqft	3.36
5	Summer Camp Program for swimming	1500	Per person for 15 days	For 60 days, 4 no of batch per day	6.00
<b>Total Revenues</b>					<b>158.2</b>

## **7.6 Viability Assessment**

To cover the operational and maintenance costs from project revenues is one of the prime reasons for giving this project under PPP model.

The operations and maintenance cost would depend on the facilities built, the required level of O&M activities, and also the demands of the users as to the level of services. However, at the feasibility stage, based on the analysis carried out, the O&M cost components shall be estimated as follows.

**Table 12: Operations and Maintenance expenses**

S No.	Component	Cost (in Rs. Lakhs)
1	Desilting	7.0
2	Culverts and Waste Weir	1.4
3	Jogging Track	0.3
4	Electrical works	1.2
5	Landscaping	2.5
	<b>Total O&amp;M expenses without lake front development</b>	<b>12.4</b>
	<b>Escalation in O&amp;M Expenses</b>	3%
	<b>O&amp;M expenses of Lake front Development</b>	20.0
	<b>Total O&amp;M expenses with Lake Front Development</b>	<b>32.4</b>

## 7.7 Scenario Analysis

The results under all above scenarios are listed in the below table.

**Table 13: Scenario Analysis**

Scenario Analysis					
Without any grant  (Total investment made by Private player)		With grant under NLCP  (70% of lake development cost by Central Government, 30% by State Government and cost of Lake front development by Private Player)		With partial NLCP grant & partial private partner's investment  (70% of lake development cost by Central Government and 30% by Private Player. Cost of Lake front development by Private Player)	
1	2	3	4	5	6
<b>Only Lake Development</b>	<b>Lake + Lake front Development</b>	<b>Only Lake Development</b>	<b>Lake + Lake front Development</b>	<b>Only Lake Development</b>	<b>Lake + Lake front Development</b>
Negative IRR.	IRR =15 %	Negative IRR.	IRR=15 %	Negative IRR.	IRR=15 %
Revenues are not sufficient to cover O&M expenses	<b>Project is financially viable</b> for the Private Player to invest	Revenues are not sufficient to cover O&M expenses	<b>Project is financially viable</b> for the Private Player to invest	O&M expenses are higher than revenues	<b>Project is financially viable</b> for the Private Player to invest



<b>Operational grant of Rs. 65 lakh</b> required annually to get target IRR of 15%	Private Player can pay to the Government <b>Negative grant of Rs. 20 lakh</b> annually	<b>Operational grant of Rs. 37 lakh</b> required annually to get target IRR of 15%	Private Player can pay to the Government <b>Negative grant of Rs. 50 lakh</b> annually	<b>Operational grant of Rs. 45 lakh</b> required annually to get target IRR of 15%	Private Player can pay to the Government <b>Negative grant of Rs. 40 lakh</b> annually
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The advantage of taking up the development of lake under a PPP framework as per scenario 2, 4 and 6 can be advantageous in the long term since Government will not have to pay for O&M expenses. The O&M expenses (which are substantial in lake development) shall be borne by the Private Player. These expenses are around Rs. 12.4 lakh a year.

## 7.8 Recommendations

- ◆ As per the revenue projections, major part of revenues comes from facilities created under Lake Front Development. If Lake Front is not developed along with Lake Conservation, the project revenues will be very low.
- ◆ Projections made for operational expenses for the project show that revenues generated from the lake rejuvenation may not be sufficient to cover the operational cost of the lake. The development of Lake Front is critical to make the project financially viable for the private player. In the absence of lake front development, the operational grant might have to be provided by the Government to make project financially viable.
- ◆ If Lake Front is developed, there will be no need for any initial or operational grant.



## Operating framework

### 8. Institutional Framework (Organization & Operational Strategy)

The framework on O&M shall also depend on the mode of implementation and the decision on involvement of the private player into the project either at the implementation level or at the long term O&M level. Irrespective of the selected project structure, the developed and rejuvenated lake needs continuous O&M immediately post completion of the development. The overall framework shall be as follows:

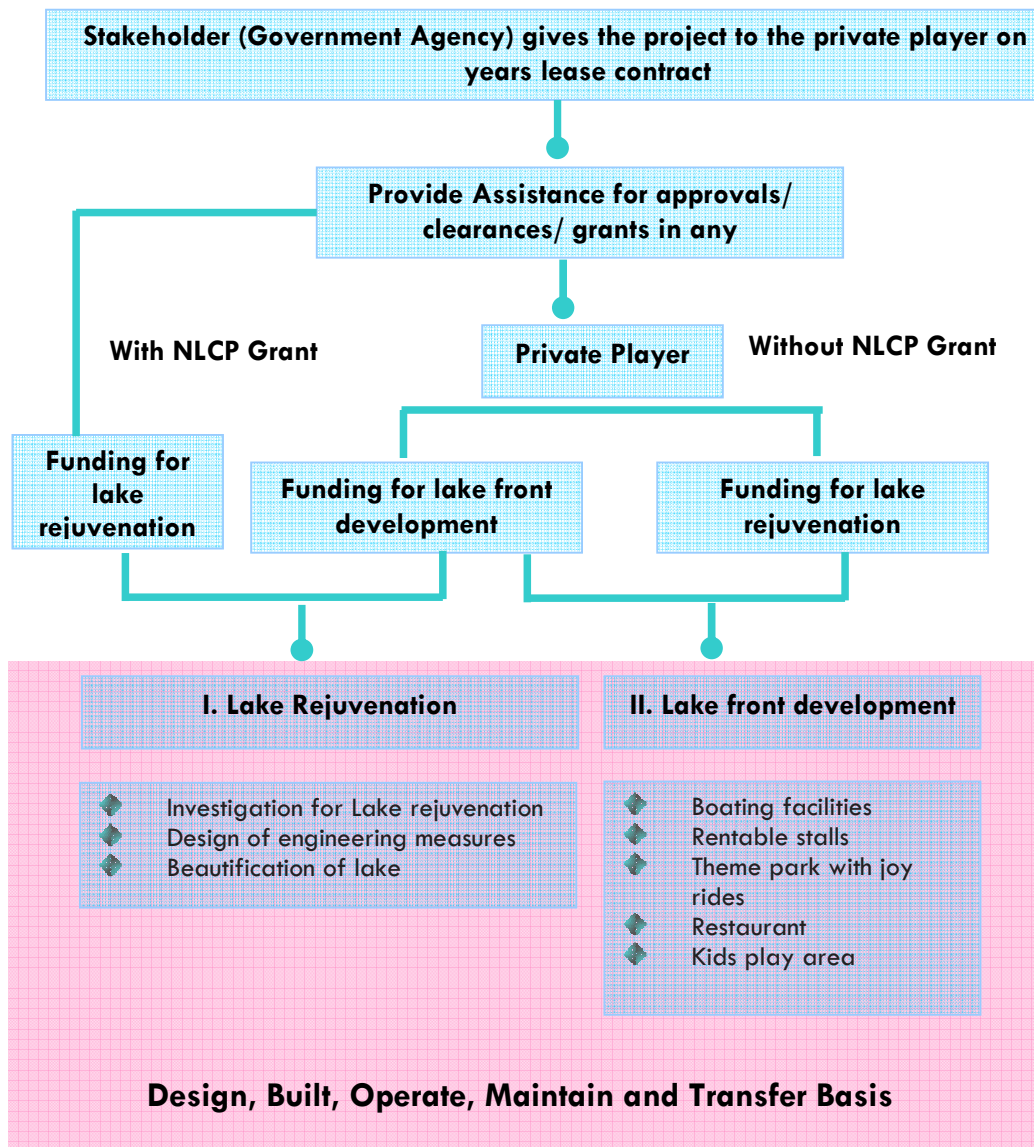


Figure 20: Institutional Framework

Lake rejuvenation essentially requires an integrated approach for operation and maintenance, not only in the spread of water sheet but also in the catchments, the key feeder channels, comprehensive solid waste management, underground drainage and road maintenance etc.

The Private Contractor would need to enter into a lease contract for a period of 30 years and take up the activities involved in lake rejuvenation within one year of signing of the contract. The private player shall continue its obligation to carry out the O&M works which shall include de-silting every 2-3 years, annual de-weeding and other maintenance works. The options for going ahead with this contract (the Contractor could be given the first right of refusal for this contract) would need to be studied and finalized at the Bid stage.

Based on this factor, the bid parameter would need to be finalized and specified in the RFP document.

The private Contractor would be given the freedom of choosing the technology appropriate for undertaking the Project.

The Government agency would monitor the works of the Private player or would engage the services of an Independent Technical Auditor (ITA) for supervision and monitoring of works. Some of the key O&M activities include:

- Clearing solid waste and garbage (including rags, papers etc.) reaching the tank through the channels or from the visitors or illegal dumping.
- Regular monitoring of the water coming through the feeder channels, catchment and tank water.
- Maintenance of plants and garden area including putting the water system into work.
- Regular disinfection of the lake and surroundings including spraying of fungicides for bio remedial measures.
- Daily sweeping and cleaning.
- Regular maintenance of the play equipment, lighting etc.
- Surveillance and security from vandalism and other illegal activity.

## 8.1 Risks involved and mitigation measures

The possible risks perceived if taking up the project under PPP and mitigation measures for the same is given below:

**Table 14: Likely risks and mitigation measures in lake conservation under PPP**

Type of Risk	Description	Mitigation Measures
Financing Capex	The capital expenditure would be incurred by the Contractor during the construction phase, while revenues would accrue only during the O&M phase of the project.	The Government could consider giving the Contractor payments under a NLCP or viability gap funding.
Opex	The revenues that would accrue by way of entry fee/ tariffs/ user charges may be insufficient	The tariffs that are being currently charged may need to be reviewed and rationalized.

Type of Risk	Description	Mitigation Measures
Operation & Maintenance	to meet operating expenses. O&M cost escalation	The Contractor is expected to factor in cost escalations arising out of operation & maintenance activities over the tenure of the contract, while submitting his financial bid or a price escalation clause could be included in the contract.
Force Majeure	Natural disaster Manmade disaster Declared war Riots Terrorism attack Labour strike	These risks would need to be shared appropriately by Staeholders and the private Contractor.
Legal	Breach of Contract by Government  Premature termination by Government	Appropriate termination payments would need to be worked out.  The SPV would need to make payments to the Contractor in this case.

## Annexure 1

### List of Major Lakes in Karnataka

1	Agara tank (Yelandur cluster)	42	Karigala kere
2	Amanakatte	43	Kenchana kere
3	Amani Hirikere, Hole Narsipura	44	Kesthur lake (Yelandur cluster)
4	Arakere	45	Kolar Ammanikere
5	Attivery Bird Sanctuary	46	Konanhalli Lake, Mandya
6	Badane kere	47	Koppa
7	Bannur Heggere	48	Kothagere kere
8	Belikere	49	Krishnarajasagar dam
9	Bellandur	50	Kukkarahalli tank
10	Bethamangala tank	51	Kunigal Chikkakere
11	Byramangala reservoir	52	Kunigal doddakere
12	Chikka Hoskote	53	Kunthur lake (Yelandur cluster)
13	Chikkaballi	54	Lingambudhi tank
14	Chikkajala tank	55	Maddur kere (Deshalli)
15	Chikka Begur Lake, Bangalore	56	Maddur tank (Yelandur cluster)
16	Dalavay tank	57	Magadi tank
17	Daroji tank	58	Malagi Dharma dam
18	Doddajala tank	59	Mansalapura tank
19	Duggatti tank (Yelandur cluster)	60	Maralur Ammanikere
20	Gende Hosalli	61	Marehallikere
21	Gopashetty Koppa, Shimoga	62	Mullur tank (Yelandur cluster)
22	Gudavi Bird Sanctuary	63	Nagavalli tank
23	Hebbur Ammanikere	64	Narasambudi tank
24	Heche tank	65	Neregal tank
25	Heggari (Haveri) tank	66	Rampura tank
26	Hennagara tank	67	Ravanduru kere
27	Hirekere tank (Yelandur cluster)	68	Salagaon tank
28	Hoskote lake	69	Samunder talab
29	Irsawadi tank (Yelandur cluster)	70	Shanti Sagara, Davengere
30	Isloor village tank	71	Shidlaghatta Ammanikere
31	Jigni tank	72	Shimsha river stretch
32	Kabini river	73	Siddapura Tank, Chitradurga
33	Kaggaladu Chikkakere	74	Sulekere
34	Kaggalipura kere	75	Tailur tank
35	Kaggalladu Dodda kere	76	Tumkur Ammanikere
36	Kalambellan tank	77	Uranganahalli tank
37	Kalkere tank	78	Vartur tank
38	Kallur lake (Yelandur cluster)	79	Yelandur tank (Yelandur cluster)
39	Kamalapura Lake, Kamalapura, Bellary	80	Yelibechali tank
40	Kamasamudram kere	81	Yellamallappa
41	Karanji tank	82	Yeriyru tank (Yelandur cluster)



## **Annexure 2**

### **Details of prioritized lakes**

1. Kolar Ammani Kere, Kolar
2. Kamalapura Lake, Kamalapura, Bellary District
3. Shanti Sagara, Davengere
4. Konanhalli Lake, Mandya
5. Siddapura Tank, Chitradurga
6. Hoskote Lake, Hoskote
7. Amani Hirikere, Hole Narsipura, Chamarajnar District
8. Gopashetty Koppa, Shimoga
9. Chikka Begur Lake, Bangalore

## Annexure 3

### Details of steps required in lake conservation

#### ◆ Step 1: Investigations for Lake Rejuvenation

i. **Water quality analysis**

Before starting with the framing of strategies for rejuvenation, the first step is to analyze the present situation of water quality at the following locations in the lake:

- Inlets of lake
- Body or center of lake
- Outlet of lake
- Effluent/sewage entry points

Based on this information, steps are taken for sewage diversion/pollutants, design/size of wetland, requirement of aerators etc.

ii. **Inflow characteristics**

The inflow characteristics of water into the lake is required for calculating the depth of de-silting, height of the bund, full tank level, waste weir level etc. the inflow of lake is measured through:

- Storm water drains
- Catchment area of lake
- Type of drainage
- Type of catchment.
- Maximum flood discharge

iii. **Contours and surroundings**

Investigation for actual contours and its surroundings by total station survey is important for the following information:

- Area of the lake
- Present levels
- Characteristics of bund

iv. **Augorbore test**

This is necessary to estimate the quantity of silt to be removed and also to analyze silt.

v. **Weather Data**

Information like rainfall, maximum and minimum temperature, humidity etc is important to gauge the inflow into the lake.

vi. **Sedimentation analysis**

This is necessary to calculate the percolation of lake, to design silt trap and also to quantify the silt.

vii. **Socio-economic study of the surroundings.**

This is done to analyze the impact of industries, slums and other misuse which can affect lake. It is also necessary for the provision of facilities like toilets, jogging tracks, Immersion tanks, boat jetties etc.

viii. **Assessment of Flora/fauna**

It is necessary to investigate the status of aquaculture, species of fishes, aquatic life, birds etc.

◆ **Step 2A: Design of engineering measures**

i. **Watershed/catchment treatment**

This may involve the following steps:

- Widening of storm water drains
- Trimming of slope
- Trimming of storm water drains
- Rectifying slopes
- Cleaning up of drains

ii. **Provision of silt traps**

This may involve the following steps:

- Design of various types of silt traps
- Sizes of silt traps
- Estimate Screen Barrier their type, height and width.

iii. **Improvement of inlet points**

This may involve diversion of sewage/ effluents or diversion of dry weather flow.

iv. **Wetland treatment**

This may involve:

- Bund design for wetland
- Screen Barriers over bund
- Aerators (mechanical)
- Plantations in the area.

◆ **Step 2B: In lake treatment**

This has involved several palliative measures to remove eutrophication and improve quality of lake water; the components of which are:

i. **Dredging and de-silting**

This is widely adopted and considered essential in all lakes and tanks. The steps may involve:



- Improvement to bund: widening, strengthening, and pitching to bund up to full tank level or above 0.5m level.
- Turfing above full tank level.
- Murrum casing on bund to avoid slipping of soil



## ii. Shoreline treatment

Treatment may involve:

- Increase in height of the shores
- Pitching
- Turfing
- Sluice improvement
- Design of overflow sections
- Design of waste water wier based on maximum flood discharge
- De-weeding/hyacinth control or removal (biological, chemical, mechanical and manual measures, bio- composting)
- Bio-remediation (Clean up with bio-products - natural bacteria breakdown, and aerators to churn the lakes.
- Introduction of composite fish culture/larvivorous fish species to control mosquitoes

## ◆ Step 3: Shoreline management

Shoreline management can be achieved in urban lakes by:

- Banning construction activity to specific heights above the periphery of the lake.
- Declaring the lake periphery as protected areas or wild life sanctuaries
- Providing community toilets around periphery to prevent pollution from human wastes.
- Provision of sewage treatment plant either secondary or tertiary.
- Introducing Solid waste management measures.
- Demarcating lake boundaries with fencing around the lake periphery, in many lakes.
- Creating Peripheral roads and green belts.
- Provision of electricity and lighting around the lake.
- Undertaking Eco tourism facilities which can convert lakes into great tourist centres.

- By imposing restrictions and guidelines on Idol immersions and designing immersion ponds.
- Provision of Boat Jetties
- Provision of security guard chamber, administrative office, ticket counters, food courts, aquariums, pebble banks, children park area etc.

#### ◆ **Step 4: Peoples' participation**

Lake management, restoration or conservation requires an integrated, broad based inter-agency \ partnership all working towards a common goal involving the educational institutions, forest department, Development Authorities, City Corporations, Irrigation department, Public Works Department (PWD) and Pollution Control Board. The active participation of local community, conservation organizations, NGOs, and citizens groups with active support from the media at all levels of planning, executing and monitoring is required for implementation of measures to meet the set goals. This is an effective management method in which the Non-Governmental organizations have acted as great catalysts. The initiative of the government to form Adopt a Lake policy is a major step for the involvement of public and private sector in the revival and management of lakes. Several organizations, both Government, Non-Government and at Community levels, can be participants in lake restoration.

#### ◆ **Step5: Role of Regulatory Bodies**

An interagency regulatory body comprising personnel from departments involved in urban planning (Development Authorities, City Corporations, etc.), resource management (Forest department, Fisheries, Horticulture, Agriculture, etc.),and regulatory bodies such as Pollution Control Board (PCB), Lake development Authority (LDA),local citizen groups, research organizations and NGOs would help in evolving effective wetland programs covering significant components of the watershed, that need coordinated effort from all agencies and organizations involved in programs affecting the health of wetland ecosystems directly or indirectly.

**Annexure 4**  
**District wise number of lakes and tanks in Karnataka**

No of Lakes in each district		
1	Bidar	86
2	Gulbarga	507
3	Bijapur	125
4	Bagalkot	73
5	Belgaum	811
6	Raichur	450
7	Dharwad	
8	Gadag	3080
9	Koppal	213
10	Uttar K'taka	3270
11	Haveri	1438
12	Bellary	233
13	Shimoga	4890
14	Chitradurga	371
15	Davengere	
16	Udupi	247
17	Chikmaglur	2866
18	Tumkur	1998
19	Kolar	4263
20	Hassan	5599
21	Dakshin K'taka	432
22	Kodagu	1146
23	Mandya	965
24	Bangalore	2076
25	Mysore	
26	Chamrajanagar	1369
	TOTAL	36508

## Annexure 5

### Scope of Work for Conservation of Lake (30 Acres)

SNo.	Components	Remarks
1	De-silting	Removing of silt upto maximum water level
2	Compound Wall	Construction of Compound wall around the lake to prevent encroachment
3	Chain Link Fencing	Fencing of the lake to define its perimeter
4	Water Boat Jetty	<ul style="list-style-type: none"> <li>• Building of boating facilities</li> <li>• Construction of dock pier</li> </ul>
5	Electrical works	<ul style="list-style-type: none"> <li>• Cabling</li> <li>• Electrification</li> <li>• Lighting</li> </ul>
6	Landscaping	<ul style="list-style-type: none"> <li>• Pathways</li> <li>• Grass turfing</li> <li>• Planting of various trees, shrubs, flowering plants etc.</li> </ul>
7	Toilet Construction	2 toilet blocks (each being a twin unit for ladies and gents)
8	Jogging Track	Jogging Track of width 3m all around the lake
9	Gazebo/Shelter	10 Gazebos for shelter
10	Fountain	4 fountains
11	Culverts and Waste Weir	For regulating water flow and storage during rains

## Annexure 6

### NLCP Guidelines for selection of lake for conservation

The selection criteria for lakes for conservation according to the National Lake Conservation Plan (NLCP) guidelines are as follows:

- ◆ **Hydrological Criteria:** The lake water body is perennial i.e. it holds a certain volume of water at all times, even in the lean season of the year. Physical parameters of the lake are:-
  - i. Lake size > 10 Ha (Exception: lakes larger than 3 Ha having socio cultural or religious importance)
  - ii. Lake depth (maximum depth) > 3 m
  
- ◆ **Scientific Criteria:** The lake is either justifiably prioritized by the State Government or if the water body is highly degraded and cannot be put to its traditional use primarily because of the reasons as indicated below:
  - i. Discharge of domestic and industrial waste water into the lake such as:
    - Dumping of municipal solid waste
    - Other non point sources of pollution
    - Flow of heavy silt loads from the lake catchment.
  - ii. Incorrect land use leading to heavy soil erosion and sediment transport into the lake resulting in nutrient enrichment of lake (Nitrate & Phosphate) signifying eutrophication.
  - iii. The lake water body is degraded and not meeting the desired standards. In the absence of specific water quality criteria developed in respect of lakes, for the present Designated Best Use criteria for surface waters for bathing quality as given by Central Pollution Control Board (CPCB) shall be the target for lake water quality table below.

	DESIGNATED BEST USE	CLASS OF CRITERIA	CRITERIA
1	Drinking Water Source without conventional treatment but after disinfection	A	1. Total Coliforms Organism MPN/100ml shall be 50 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20 degree C 2mg/l or less
2	Outdoor bathing (Organised)	B	1. Fecal Coliforms Organism MPN/100ml shall be 2500 (max permissible), or 1000 (desirable) 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20 C 3mg/l or less
3	Drinking water source after conventional treatment and	C	1. Total Coliforms Organism MPN/ 100ml shall be 5000 or less 2. pH between 6 to 9

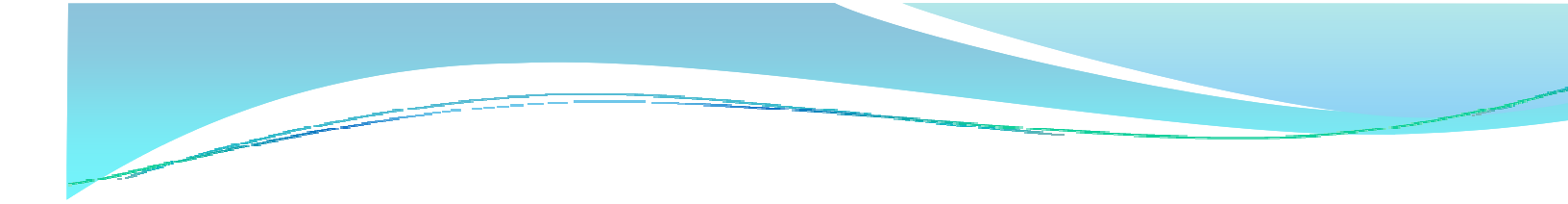
	disinfection		3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
4	Propagation of Wild life and Fisheries	D	1. pH between 6.5 to 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 1.2 mg/l or less
5	Irrigation, Industrial Cooling, Controlled Waste disposal	E	1. pH between 6.0 to 8.5 2. Electrical Conductivity at 25 C micro mhos/cm Max.2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/l

◆ **Administrative Criteria:** The lake if getting degraded/eutrophied, is an important source of drinking water supply, domestic use, recreational use, provide other goods & services, may be proposed under NLCP, when:

- i. There is a high degree of demand from public forum/local stakeholders for its conservation and if the forum/stakeholders give their commitment to bear 10% out of State share in the project cost.
- ii. Lake is categorised as a 'unique fresh water ecosystems.'

◆ **Other Conditions:** Following are some of the other relevant conditions considered to be a pre-requisite, based on site specific requirements, for preparation of the proposal:

- i. While outlining the lake water use, the details regarding stakeholders involved and impact of lake degradation on each of these are to be provided. The lake rejuvenation proposal may consider the stakeholder demands through a public hearing at site and their involvement in operation & maintenance.
- ii. Increasing the lake depth through de-siltation does have an impact on its flora and fauna and may lead to destruction of habitat for migratory birds. De-siltation component in the proposals must be supported by bathymetry of the lake as per the standard methodology and its planning and execution to be carried out scientifically under expert guidance.
- iii. The cost towards 'Lake Front Development' activities under the proposal may be restricted to 25% of the project cost.
- iv. Engineering works in respect of bund may be minimized with naturalization of bund as a preferred option. The cost towards shaping/strengthening including slope revetment, provision for construction of retaining wall, if any etc. should not exceed 10-15% of the total project cost. Stone revetment along the inner slope of the earthen bund, to be resorted to in cases where strengthening of burnt required. As far as possible naturalisation of slops by providing suitable vegetation with proper selection of species, be resorted to.
- v. The lake shores to be naturalized as far as possible by planting macrophytes on the lake slope rather than providing hard stone pitching.
- vi. The water quality monitoring plan should include sampling and analysis of lake water as per standard methods (refer para 9.0) by appointing an independent agency having a laboratory accredited by Ministry of



Environment & Forests or National Accreditation Board for Testing and Calibration of Laboratories (NABL) with Lake Development Authority of the State as the nodal agency. In case, there is known source of industrial pollution to the lake or agricultural run-off from the lake catchment, heavy metals and total Pesticides monitoring may also be included. The conservation plan should ensure that the water quality after implementation of the project is restored to the criteria for Designated Best Use classification for B Class waters.

- vii. All lake conservation measures lead to incidental ground water recharge depending upon the soil strata. However, the objective should not be charging the bore wells.
- viii. The State Governments may prepare comprehensive plan for environmental awareness and public participation which would suite site specific requirements and also depicting the values and functions of the water bodies.
- ix. While planning the project and deciding the restoration measures, the states may consider for recycle and reuse of sewage and also the introduction of eco-friendly activities to minimize degradative impacts on the water body.



## Annexure 7 List of Stakeholders Contacted

S.No.	Agency Visited		No. of Visits	Contact Person
1	Lake Development Authority	LDA	4	Mr. Vedanth, CEO Mr. Singh, Chief Conservator
2	City Manager's Association of Karnataka	CMAK	1	B S Gopala Rao, Research Associate
3	Forest Department, Aranya Bhavan		1	Mr. Srivastav, DFO
4	Karnataka State Remote Sensing Applications Center	KRSRAC	1	Director
5	Jala Samavardhane Yojana Sangha	JSYS	1	Mr. Manjunath, MIS Department
6	Karnataka Urban Infrastructure Development & Finance Corporation	KUIDFC	1	Dr. J.V.Nandana Kumar, DGM
7	Shimoga Urban Development Authority	SUDA	1	Mr. Ghatke, AEE

## Annexure 8

### Current initiatives in lake conservation by the stakeholders

# Suddenly, a flood of hope for lakes

## Over Rs 100 Crore Earmarked For Three-Stage Package To Rejuvenate Drying Water Bodies

TIMES NEWS NETWORK

Bangalore: A flood of funds and packages have come to the rescue of the few lakes that remain in Namma Bengaluru — both drying and dying.

"What could have once been completed in Rs 25 crore has now become a project worth more than Rs 100 crore! If only previous governments had thought about it," said chief minister B S Yeddyurappa while laying the foundation stone for a rejuvenation project on Uljal Lake premises on Tuesday.

Twelve lakes will be rejuvenated at Rs 104 crore by the BDA. Five lakes are in Yeshwantpur constituency, and the package may be complete in a year. "Next year, I'll return here to inaugurate a rejuvenated lake," Yeddyurappa added.

The package is part of a project to rejuvenate 100 lakes in three stages. The first stage will cover 33 lakes across BBMP areas. Apart from 12 lakes taken up by the BDA, the remaining will be handed over to the BBMP. Work on these is expected to start soon.

The other two stages of the project will look at development of lakes in core city areas. "Not only lakes, but many areas in Bangalore will see developmental work soon," Yeddyurappa said. "An additional Rs 8-10 crore for newly-identified areas of BBMP and an agenda for slum development are just a few," he explained.

to:bir.reporter@timesgroup.com

### IN THE BDA'S DOZEN

Lake	Cost of work*
● Jakkur & Sampigehalli Lake	21.91
● Rachenahalli Lake	19
● Venkateshpura Lake	47 lakh
● Uljal Lake	4.49
● Mallathahally Lake	22.95
● Kormaghatta Lake	6.44
● Thalaghattapura Lake	2.4
● Konasandra Lake	6.1
● Sompura Lake	3.85
● Ramasandra Lake	13.40
● Kothanur Lake	3.6
<b>Total cost</b>	<b>104.61</b>

\* (In Rs crore unless otherwise specified)

### FINALLY, SOME ACTION

It's been a dream project for three decades. The project will save lakes from being stagnant and turning into dumping grounds

— R ASHOK,  
TRANSPORT MINISTER

Rejuvenating lakes and their proper maintenance will save them from being encroached upon or polluted by sewage

— KATTA SUBRAMANYA  
NAIDU, SWISS MINISTER

We can't create more lakes but will attempt to save drying and dying ones

— SHOBHA KARANDLAJE  
RURAL DEVELOPMENT AND  
PANCHAYAT RAJ MINISTER

### STUDENTS' SCHOLARSHIPS

- 36,000 SC/ST students in the state who secured 75% and above in SSLC this year will be given Rs 10,000 each
- Poor students who secured a first class in SSLC will get Rs 5,000 each

### ENHANCED HEALTHCARE

- 2,000 patients with heart ailments will be operated free at Jayadeva Hospital within a year
- Four new hospitals, each with 250 beds, will be set up in the city. One may come up on Magadi Road

## 'Homeless, not beggars'

TIMES NEWS NETWORK

Bangalore: "Call them destitutes, homeless or anything else, but not beggars anymore. It's time we change what we call them," Yeddyurappa said on Tuesday after a surprise visit to the Beggar's Colony.

He said the government is serious about relocating it from Sumanahalli to the outskirts and use the land to set up a mini Lalbagh and hospital. "It's a plan to make use of huge lung space in the city centre. The exact plan for relocation is still under discussion," he told reporters.

Meanwhile, the centre will continue to function at the current location until the new campus is ready. The authorities have been given a strict one-month ultimatum to improve conditions.

"We are yet to take a close look at problems the individuals face. But their plight is the same as on the streets, or even worse. A lot needs to be done. I will follow it up after a month," the CM said.

Most of the funds came from the beggary cess. However, there isn't much transparency, he added.

### SOME HOME TRUTHS

- There are 922 inmates at Beggar's Colony: 725 men and 197 women
- A majority (354) are from Tamil Nadu
- 402 old inmates, 131 are mentally ill
- Remaining 124 are diseased, 45 are physically handicapped
- Many able youngsters have joined Colony — 220 at present
- Centre set up in 1944 to rehabilitate beggars from streets, for 1-3 years
- No shortage of funds, staff is big worry, say authorities.

## Annexure 9

### Lake Front Development Case Studies

#### Case Study on Lake Development in India

##### Kankaria Lake:

**Kankaria** is the biggest lake of the city of Ahmedabad, Gujarat. With an approximate circumference of 1.4 miles (2.3 km), it represents the regale history of Ahmedabad.

Kankaria Lake has approximate circumference of 1.4 miles (2.3 km). it was developed in 2006-07 by Government of Gujarat at an approximate cost of Rs. 36 Crore.



The lake conservation project was not restricted to only cleaning, de-silting and other lake related activities, but it also included lake front development activities. In this project facilities like Toy Train, Indoor Stadium, Laser show etc are also developed. The lake front includes Jogging Track, Aquarium, Zoo, Park called Nagina wadi, Amusement Park called Balwatika. The new stadium will hold two basket ball courts, a skating rink, a planetarium, e-library, multipurpose hall, a gymnasium, aerobics hall, store-rooms, a stage and different rooms for table tennis, snooker and other indoor games.





The lighting and special effects on the walkway and sumptuous food of the restaurants in the central garden make the lake a worthwhile place to visit or spend an evening.



The Lake and Lake Front are totally covered and the Ahmedabad Municipal Corporation has decided to charge Rs. 10 for entry ticket.

The major revenues sources and other financials are listed in the table below.

<b>Particulars</b>	<b>Rs. Lakh</b>
Project cost	3600
O&M expenses	73
<b>Revenues</b>	
Entry ticket	156.4
Train	39.1
Bal Vatika	140.8
Zoo	58.7
Aquarium	35.2
Naginavadi	27.4
Boating	11.7
Rent from shops and others	73.0
Auditorium	18.0
Parking	25.6
<b>Total revenues</b>	<b>585.84</b>
O&M expenses (% of revenues)	10%
Operating profit (% of revenues)	90%
Annual escalation in revenues	5%
<b>IRR of the project</b>	<b>11%</b>

The development is made in such manner that there are many facilities created which serve as revenue centre and the project cost can be covered over a period of time.

## Case Study on Lake Development Abroad

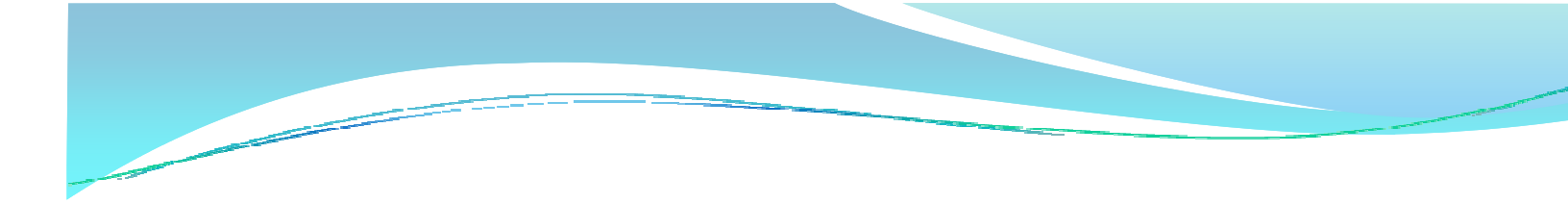
### Jurong lake, Singapore

Jurong Lake is a freshwater lake and reservoir located in the western region of Singapore. The lake serves as a reservoir contributing to the water supply of the country. The lake is surrounded by parkland, which serves as a recreational ground for nearby residents in Jurong East and Jurong West New Towns. A landscaped sanctuary called Jurong Lake Park exists around the perimeter of the lake. 2.8 kilometer water promenade along Jurong Lake Park allows residents to participate in water sports.



The Urban Redevelopment Authority has prepared a master plan in 2008 to transform the area around Jurong Lake to a unique lakeside destination for business and leisure. A new district will be created, named, Jurong Lake District which consists of two precincts, Jurong Gateway and Lakeside.





The main features of this plan are as below.

- Some 750,000 square metres of land will be set aside at Jurong Gateway for offices, hotels, food and beverage, and entertainment uses.
- 1,000 new private apartments will also be built at Jurong Gateway.
- The new district will be served by three MRT stations and two major expressways.
- The sense of greenery will be heightened with new landscaped open spaces and park connectors at the street-level and skyrise greenery in buildings.
- New Science Centre will be built next to Chinese Garden MRT Station
- A Lakeside village will be developed
- Chinese Garden and Japanese Garden will be enhanced.
- An integrated network of pedestrian walkways between buildings and public facilities will be created.



## Annexure 10

### Case Study: Privatization of Bangalore Lakes

(Copy of statement of concern on privatization of lakes, ESG enclosed)

The following lakes were leased out to private parties; the Hebbal Lake to E.I.H, the Nagavara Lake to Lumbini Gardens and the Venkanayakere to ParC Ltd out of which the first two were initially allotted. In May 2006, LDA leased out the Hebbal Lake, one of the largest lakes in Bangalore, to East India Hotels (the Oberoi group) for a period of 15 years for an annual lease amount of Rs. 72,10,000 (about US\$ 1.44 million) and an annual escalation of 1.5% in the amount and an Investment of Rs.16,75,00,000 (about US\$0.34 million) with a security deposit of 1.5% (Rs.25,12,500 – about US\$0.50million) under the Public-Private Partnership policy. The Nagavara Lake was leased to Lumbini Gardens Pvt Ltd in April 2005 for a period of 15 years for an annual lease amount of Rs.4023, 000 (about US \$0.80 million) with an annual escalation of 1.5 % of this amount every year for the 15–year lease period and with Investment of Rs.7,01,00,000 (about US\$ 14.02 million) with a security deposit of 2% of this amount (Rs.14,20,000 – about US\$0.284million).

As per the lease agreement, the above referred agencies were to carry out the development and maintenance of the lakes by:

- Setting up water treatment plant
- Deweeding the lake
- Controlling of storm water entry by building check dams
- Do landscaping, build a rose garden and also a rock garden
- Build jogging tracks and erect fountains
- Put up 4.5 m (14.8 ft) high Buddha statue.
- Develop an artificial beach as an amusement activity
- Develop water sport activities such as aqua karting, water scooter rides and paragliding
- Set up food courts, restaurants, including a floating restaurant

#### IMPACT OF PRIVATIZATION

The social damage caused due to privatization, as reported by a researcher, are:

- There is dichotomy in the functions allocated by the vesting of powers with LDA to maintain only the water body and some part of the shore line while the shore and lands adjoining the lakes, which also play an important role in the overall maintenance and health of lakes, are with district bodies. This state of affairs creates a complex situation of not addressing the lake as a continuum with land.

- The lakes are being developed as stand alone water bodies without a linkage to other lakes
- Land use regulations are violated as the private developers of the two lakes have not sought permission for change in land use from the Bangalore Development Authority for converting the Nagavara and Hebbal Lakes for commercial use; a case of non compliance of the law.
- Fauna dependent on the lake, like birds, fish and others are disturbed by the excess and disturbing human activity
- Conversion of the lakes and their surrounding areas into exclusive resorts, with entry fee access to the lake areas. The private developers are in the real estate/hospitality business with profit motive
- Violation of land use regulations by the private organizations while implementing the scheme
- Proposed construction of a 223–room Hotel at the side of Hebbal Lake is indication that private developer has taken the lease purely for commercial and business purposes. Such a development would exclude access to the lake for the general public.
- Lakes are Common Property Resources, in which a group of people have co–user rights. The impact of the privatization scheme would, therefore, need to be addressed legally
- The socio–economic impacts or apprehensions of the people such as fishermen dependent on the lake for livelihood is that there could be restrictions on their fishing rights and washer–men (dhobis) also have similar apprehensions.

#### LDA’S CONTENTION

The Lake Development Authority contends that the organization is not adequately staffed and that they do not have the finances for maintaining lakes on an ongoing basis. Hence, the alternative is leasing out lakes to private parties.

#### PUBLIC INTEREST LITIGATION (PIL)

A Public Interest Litigation (PIL) has been filed in 2008 by an Environmental Support Group (a Trust) and a public spirited individual of Bangalore in the High Court of Karnataka citing 16 respondents with the Lake Development Authority (LDA) as the second main respondent and the favoured respondents (at serial number 14,15 and 16) namely M/s Biota Natural Systems (I) Pvt. Ltd, M/s Lumbini Gardens Ltd., and M/s E. I. H. Limited, in respect of the ongoing privatisation of lakes/tanks in Bangalore. The PIL contends that:

- Actions taken by the respondents are against settled legal norms in respect of Management and conservation of such ecologically sensitive water bodies (also wildlife habitats) and which support a variety of customary and traditional rights

- Water bodies are located in prime areas of the city and beneficiaries of privatization of these are largely hoteliers and builders, as it is not an environmentally progressive purpose but more a manipulation of the policy with profit motive
- The constitution of the Lake Development Authority (Respondent) expressly prohibits privatizing these public water bodies against the wider public interest

PIL has sought redress from the Honorable High Court by way of issue of writ or order in the nature of Mandamus repealing the 'Lease Deeds' executed by Respondent (the LDA) in favour of the beneficiary respondents (to whom the lakes were leased – Respondents 14, 15 and 16) and requested the Court to direct the Government of Karnataka (as first Respondent) to ensure full compliance with the law and policies relating to protection and conservation of lakes/tanks/wetlands.

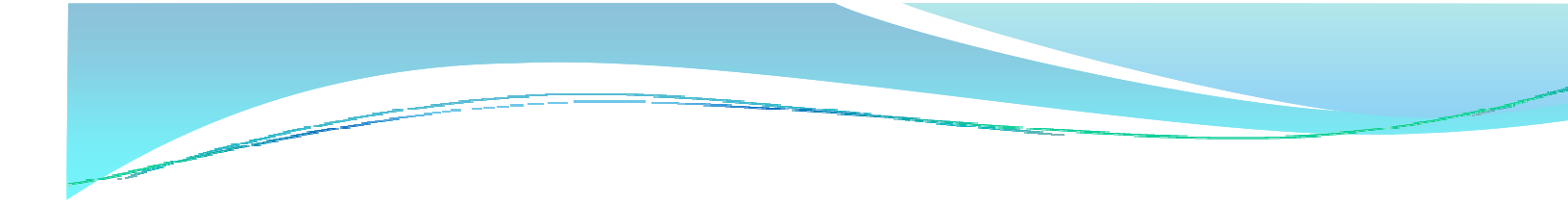
The High Court of Karnataka on Tuesday, 4th November, 2009 directed the Lake Development Authority (LDA) not to enter into fresh agreements enabling private parties to own lakes. A division of the HC bench, comprising Chief Justice PD Dinakaran and Justice VG Sabhapathi, took the State government to task, observing that the government was trying to commercialise lakes by handing them over to the private parties.

The bench also ridiculed government bodies by saying that the LDA is working like an agency and not an authority. From one side it is behaving like an agency for the government and from the other side for the private parties. It also mentioned that the LDA went ahead with the commercialisation ignoring the objections from the Forest Department and the Karnataka State Pollution Control Board. At the same time the government was also criticised for its laid back attitude towards the case.

"If the government was serious enough in performing its duties towards the maintenance of the lakes then there would have been no need to create the LDA and then further make way for privatisation," said the justices. The bench further mentioned that there are many talented officials in the government who possess tremendous knowledge about preserving lakes, but their talent has not been effectively utilised. Hence, such officials are selling their talent to private parties, the bench noted.

The High court bench observed that, "The government is making all efforts to prevent citizens from enjoying natural beauty. The Court cannot be a mute spectator to such a development. There can be no development at the cost of the nature. If allowed to act as per its whims and fancies, the government will soon privatise Cubbon Park and Lal Bagh,"

The High court bench concluded by saying that the government was not serious and undertook all the supposed development as just eyewash to the public. It asked the government to give powers to the tourism department to take up lake development and stop LDA from entering any fresh agreement or commercialisation activities.



From the above case law it could be observed that, there was lack of proper monitoring mechanism and conservation methods, which resulted in unwarranted litigation. **Public private participation could be rendered feasible by placing suitable mechanism for monitoring, maintenance and conservation of lake.**

105, East End B Main Road, Jayanagar 9<sup>th</sup> Block East, Bengaluru 560069.INDIA

Tel: 91-80-22441977/26531339 Fax: 91-80-26534364

Email: [esg@esgindia.org](mailto:esg@esgindia.org) or [esg@bgl.vsnl.net.in](mailto:esg@bgl.vsnl.net.in) Web: [www.esgindia.org](http://www.esgindia.org)

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To,  
Shri. H. D. Kumaraswamy  
Hon'ble Chief Minister of Karnataka  
Vidhana Soudha  
Bengaluru 560001

17<sup>th</sup> September 2007

**Subject: "Statement of Concern" regarding the Illegal Privatisation of lakes in Bengaluru**

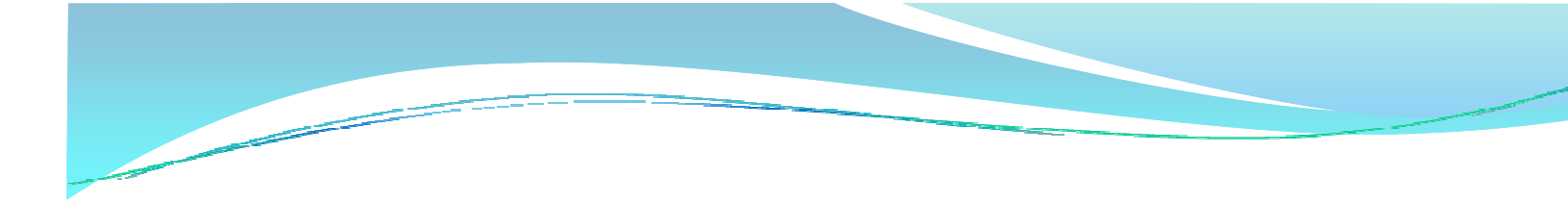
Respected Sir,

In the recent month it has come to the shocking notice of the public that the Lake Development Authority (LDA) of Bengaluru has undertaken a scheme to privatise lakes in Bengaluru under the guise of maintaining them. The LDA in its Memorandum of Association was entrusted with the mandate of ensuring the "protection, conservation, restoration, regeneration and integrated development of lakes". In the case of the Hebbal and the Nagavara lakes we find that the LDA has leased out these lakes to private companies (such as the Oberois and Lumbini, respectively) for a period of fifteen years (extendable by 10 more) allowing them to develop these water bodies into commercial centres.

The Public Trust Doctrine, which is applicable here, recognises that the State and its instrumentalities as trustees have a duty to preserve and protect natural resources such as rivers, lakes and forests, open spaces and other common property resources. This doctrine has been widely recognised and upheld by the Supreme Court in various judgements. The move of LDA to effectively privatise and commercialise lakes, which in Bengaluru have great socio-economic and ecological value, is in direct violation of all such Supreme Court decisions.

Historically the lake system in Bengaluru was created to ensure water supply to its denizens, yet over a period of time these lakes have grown to have greater value by providing livelihood, recreation and supporting a wide variety of flora and fauna. As we have witnessed through the A. T. Ramaswamy Joint House Committee reports extremely thorough enquiry into the encroachment of government lands in Bengaluru, wetlands are already being threatened into non-existence through illegal conversion into residential layouts or commercial centres. We fear that the acceptance of such privatisation of our lakes will result in the large scale commercialisation of open/public spaces in Bengaluru, and eventually in its total loss as viable water bodies. The case for protecting these water bodies from any form of built activity around it cannot be overstated, considering the widespread flooding Bengaluru has been suffering in recent weeks, a situation that has become typical for every monsoon.

We request your kind intervention in the form of an enquiry by the Joint House Committee on Encroachment of Govt. Lands in Bengaluru City/Urban District in this regard to ensure that the land of commons is not further pilfered to meet private gains. We are also attaching a more detailed "Statement of Concern" that has been signed and supported by many from Bengaluru and elsewhere. We do hope you will consider our request as you see fit in



protecting the last of the open spaces within the urban conglomerate of Bengaluru and keep it accessible to the public at large.

Thanking you,

Yours sincerely,

Leo F. Saldanha

(On behalf of the those who have endorsed the Statement of Concern)

Bhargavi S. Rao

## **Annexure 11**

# **Statement of Concern and Protest against Privatization of Lakes/Tanks in Bengaluru**

**23.08.07, Bengaluru**

The undersigned, who represent a variety of civic organisations, environmental organisations, naturalists and birdwatchers, are alarmed and perturbed at the arbitrary and *ad hoc* manner in which the numerous tanks and wetlands, essentially a common property, of Bengaluru, are being handed over for commercial and developments activities to private parties by the Government of Karnataka.

The Hebbal and Nagavara tanks, in particular, have been in the news lately as a vigilant media and citizens' protest have brought to the fore the ill-conceived Private Public Partnership (PPP) policies of, ironically, the Lake Development Authority (LDA). LDA was constituted and entrusted with the task of conservation and preservation of tanks – and not to engage in activities that constitute the commercial development of these critical wetlands and water bodies. Despite widespread protests, several more tanks are slated to be handed over to private parties by the LDA in blatant violation of Supreme Court decisions, against the law of the land and without any concern and consideration to wider public resistance to such privatisation in the management of our common resources.

Hebbal and Nagawara tanks are amongst the most important wetland habitats for resident and migratory waterfowl and have been part of an international effort to monitor waterfowl populations over the past two decades.

This is indeed a cause for serious concern.

We protest such a takeover of our common resources by the private corporate sector for commercial gain and we demand the immediate cancellation of these agreements. We also request the Joint Legislature Committee on Encroachments in Bengaluru Urban District headed by Shri. A. T. Ramaswamy, MLA, to initiate an enquiry into this matter with due dispatch.

### **Legal violations**

Firstly, LDAs actions go against the directives of the Hon'ble Supreme Court of India which held in a recent judgment directly relating to management of tanks (in *Intellectuals Forum, Tirupathi vs. State of A.P. & Ors*, Appeal (civil) 1251 of 2006) that tanks and lakes are community property and cannot be traded away at all. A relevant extract from the judgment is reproduced at some length to highlight the emphasis laid down by the Hon'ble Court in ensuring tanks remained within the public commons:

**“[our legal system] includes the public trust doctrine as part of its jurisprudence. The state is the trustee of all natural resources which are by nature meant for public use and enjoyment. The state as a trustee is under the legal duty to protect the natural resources. [Para 22]**

The Supreme Court of California, in the case of *National Audubon Society v. Superior Court of Alpine Country*, 33 Cal.419 also known as the *Mono Lake* case summed up the substance of the doctrine. The Court said: Thus the public trust is more than an affirmation of state power to



use public property for public purposes. It is an affirmation of the duty of the State to protect the people's common heritage of streams, lakes, marshlands and tidelands., surrendering the right only in those rare cases when the abandonment of the right is consistent with the purposes of the trust. This is an articulation of the doctrine from the angle of the affirmative duties of the State with regard to public trust. Formulated from a negatory angle, the doctrine does not exactly prohibit the alienation of the property held as a public trust. However, **when the state holds a resource that is freely available for the use of the public, it provides for a high degree of judicial scrutiny upon any action of the Government, no matter how consistent with the existing legislations, that attempts to restrict such free use.”** (emphasis supplied)

In handing over the tank to the East India Hotels, LDA is in direct contravention with the letter and spirit of this judgment. In addition it violates a variety of local laws and customary rights, especially those relating to the absolute role of the State in control and management of minor irrigation tanks. The LDA's agreement with the Oberois (East India Hotels – EIH Ltd) and Lumbini also contravenes the recommendations of the Lakshman Rao Committee Report on the management of tanks – accepted by an order of the Government of Karnataka.

#### **Land Use Violations:**

The Hebbal Tank PPP agreement between LDA and EIH Ltd fundamentally violates the land use planning norms per the Comprehensive Development Plan of the Bengaluru Development Authority. This is because the custodian of Karnataka's lakes has allowed for the creation of a hotel and commercial complex in an area that is exclusively meant to be retained as an ecological habitat and public commons.

It is obvious that the LDA is contravening its own mandate of protection and conservation of urban wetlands and different agencies within the government are working at cross purposes at the cost of the cities ecological and water security.

The PPP in its present form as conceived by the LDA is also highly questionable on counts of social justice, ecological effectiveness or economical cost-benefit analysis.

#### **Social unjust and morally untenable**

This LDAs act of handing over Hebbal Tank, and earlier Nagawara Tank, also seriously encroaches and rejects a variety of customary rights of local communities and fishing communities in terms of their free access and utilisation of the water body.

The PPP pays scant regard for the survival and livelihood needs of the urban poor and is exclusivist in its approach. Fencing of common public property like tanks for the well heeled of society will adversely affect access of poor urban and peri-urban populations who depend on these commons for washing, bathing themselves and their cattle; to extract fodder; fishing; irrigation, recreation, etc.

#### **Anxiety of amusement**

In a city already bursting at its seams with ever increasing number of theme parks, entertainment venues and shopping malls, the serene and natural open spaces in and around these water bodies are being 'developed' by making them into a veritable amusement parks. The anxiety of amusement is proving to be a death knell for urban biodiversity and excludes the under privileged.

### **Ecological Suicide**

The manner in which these ancient tanks are being 'rehabilitated and developed' shows a complete lack of understanding of the ecological structure of these man-made tanks. All the good work done by the Karnataka Forest Department on tank protection is being undone by the civil engineers hired as technical consultants to these projects by the private hospitality industry/investors. Efforts are underway by the Oberois in the case of Hebbal Tank to convert a seasonal dynamic and productive ecosystem into a permanent manicured round-the-year 'sterile' concrete pond. Such ham-handed 'beautification' drives by private developers or in some cases by government agencies are killing the biodiversity, reducing the biological productivity and water holding capacity of these tanks. This amounts to a virtual eco-suicide for a city already under severe pressure from rampant urbanization.

### **Doubtful cost-benefit analysis**

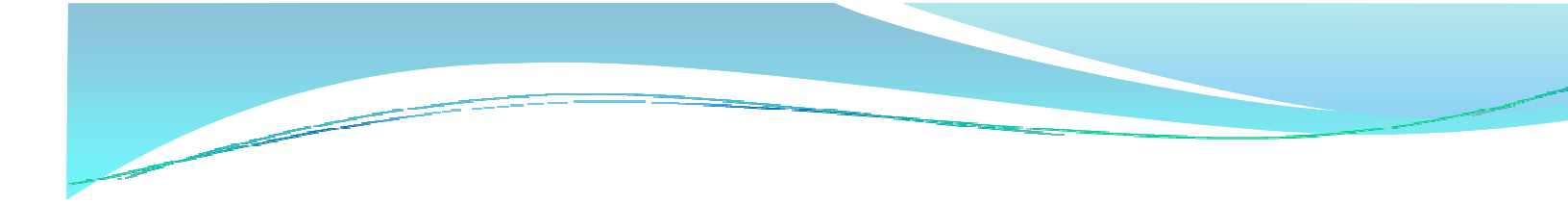
The government has often cited lack of monetary resources as the reason behind seeking private investment in the management of public resources. At the same time the LDA (as reported in some newspapers) contradicts this by stating that there is no lack of funding, only that private parties are better capable of stopping encroachments and 'keeping away slum dwellers'. Shockingly such statements amount to statutory agencies abandoning their due role in protecting public resources and are a reason, by itself, to question the credentials of the officials who have made such statements and initiate action against them in accordance with law.

Equally shocking is the fact that LDA has not at all explained why the Indo-Norwegian Environment Program (INEP) tank conservation effort of Rs. 2.7 crores at Hebbal and Nagvara were considered inadequate and ineffective. Especially given that the INEP programme was chaired by no less an authority than the Development Commissioner of Karnataka, and the funding secured for rehabilitation on the basis of a bilateral agreement between the Governments of India, Norway and Karnataka. The Karnataka Dept. of Ecology and Environment and INEP claim the project of rehabilitating these lands was successful – marked even by a visit to Hebbal in 2004 by the Norwegian Envoy to India – while LDA which works under the very same department makes the claim that the INEP project was a failure. We believe this is a fit case for the Accountant General of Karnataka to investigate into the claims and counter-claims made by these related departments.

### **Oberois's claims:**

Media scrutiny and citizen protests against the privatisation of Hebbal Tank has been reason enough for the Oberoi group to roll back the proposal of a floating restaurant - ostensibly for social and environmental reasons! What is not revealed by the Oberois, however, is that entire water spread and shoreline of Hebbal Tank will be transformed into a commercially developed area. How did the LDA even approve of such a project in the very first place? Obviously short term commercial gains for a few are being traded for the long term ecological and water security of the larger public. It only goes to show how vulnerable these urban wetlands are in the context of the present policies of management.

***Issues like water and environmental security are far too important to be held hostage to ill-informed public official or be at the mercy of largesse and kindness of a benevolent CEO of a private firm.***



What lessons has LDA learnt from this episode and what do they intend to do as a larger policy on tank management? How does the Government of Karnataka plan to integrate tank management into the larger water and ecological security policy for the city of Bengaluru. Obviously the PPP if not put under the public scanner and thoroughly critiqued is capable of doing more damage than good.

### **Appeal**

We appeal to the Government of Karnataka to put an immediate end to the PPP model of privatising public commons. We urge the Government to order a thorough review of the existing projects under the scheme and to take serious note of this flawed policy on urban wetland management.

As concerned residents of Bengaluru we cannot allow the government to abdicate its duties of protecting, conserving and managing our common property resources for larger public good by handing over complete control and ownership to private and corporate groups for the benefit of an exclusive few.

A thorough review and audit of agencies mandated to protect tanks like the LDA, Bruhat Bengaluru Mahanagara Palike, Karnataka Forest Department, Bengaluru Development Authority and others should be done to protect the interests of the wide public and the ecological and water security of everyone – rich or poor.

We demand a more socially just, ecologically sensible and economically viable management plans for the precious few surviving tanks of Bengaluru.

## Annexure 12

### Quotation from Arpan Associates Mumbai for equipments for setting up a theme park

-----Original Message-----

From: Mr. Anil Mehta [mailto:contact@playgroundequipments.com]  
Sent: Tuesday, April 14, 2009 6:39 PM  
To: GURLEEN KAUR  
Subject: Re: Arpan Associates Business Enquiry Through IndiaMART.com

Dear Ms. Gurleen Kaur,

Thank you for your inquiry.

The total budgetary cost of water activity amusement park ( only equipments ) over 2 acres of land should cost around 1.5 crores. The civil construction and landscaping & other infrastructure amenities cost extra in your scope of supply at free of cost to us.

It will include following.

1. Boating non -powered like padel boats, rowing boats, sail etc
2. Powered boating like water scooter, jetski, tourist powerd boat, aqua racing boat etc.
3. wave pool with our latest power saving technology.
4. Water slides of different types.
5. A small children play area. with a minitrain.etc.

Please let us know more details about your project. we have very innovative products to offer. Please visit our website [www.playgroundequipments.com](http://www.playgroundequipments.com)

Regards.

Anil Mehta  
Arpan Associates - Mumbai.  
Ph. 022-26710905.

----- Original Message -----

From: "Gurleen Kaur" <gurleen@idfc.com>  
To: <contact@playgroundequipments.com>  
Sent: Tuesday, April 14, 2009 12:37 PM  
Subject: Arpan Associates Business Enquiry Through IndiaMART.com

>  
> -----  
> Arpan Associates Business Enquiry Through IndiaMART.com  
> -----  
> From:-  
> Gurleen Kaur (IDeCK)  
> 39, infra house 8th main 5th cross rmv extension Sadashiv nagar  
> Bangalore- 560080, India.  
> Phone: +00-080-41505431  
> Fax: +080-23613016  
> E-Mail : gurleen@idfc.com  
> -----

## **Annexure 13**

### **Earlier Lake Conservation projects on PPP in Bangalore**

The following Paragraphs are taken from the report “IMPACT OF PRIVATISATION OF LAKES IN BANGALORE” compiled by Mr.Rohan S D'Souza and published on the website of “Centre for Education and Documentation”.

List of lakes ear marked to be developed under this scheme has been changed from time to time. The initial list consisted of 7 lakes, which later was modified to 11, and then to 36 and now the latest figure that is being portrayed is 60 lakes 31. Given the above TOR for the DOT scheme, three lakes have already been leased out to private parties. The Nagavara Lake has been leased out to Lumbini Gardens, Hebbal Lake to E.I.H and the Venkanayakere to ParC Ltd. The researcher has in his possession, the agreements entered into for two of these three lakes, Nagavara and Hebbal. The highlights of these are as follows:

#### **Nagavara Lake: (Area around 150 acres)**

Leased to Lumbini Gardens Pvt Ltd w.e.f 29th April 2005 for a period of 15 years for an annual lease amount of Rs.40, 23,000/- with an annual escalation of 1.5 % of this amount every year for the 15-year lese period. Investment of Rs.7,01,00,000 with a security deposit of 2% of this amount, i.e., Rs.14,20,000/-

As part of the development and maintenance of the lake, the agency, will set up water treatment plant, de weed the lake, control entry of storm water by building check dams. As part of the beautification/decoration activities, the agency will do landscaping, build a rose garden as well as a rock garden, build jogging tracks, erect fountains, put up a 4.5 meter high Buddha statue.

As part of the amusement activities, an artificial beach will be developed, various water sport activities like aqua karting, water scooter rides, paragliding etc will be allowed. Food courts, restaurants, including a floating restaurant will be set up.

#### **Hebbal Lake: (Area around 85 acres)**

Leased to E.I.H Ltd w.e.f 19th May 2006 for a period of 15 years for an annual lease amount of Rs.72,10,000/- with an annual escalation of 1.5 % this amount every year for the 15-year lese period. Investment of Rs.16,75,00,000/- with a security deposit of 1.5% of this amount i.e., Rs.25,12,500/-

As part of the development and maintenance of the lake, the agency, will set up a sewage treatment plant, de silt and de weed the lake, control entry of storm water by building check dams, catchment area improvement will be done.

As part of the beautification/decoration activities, the agency will build an eco friendly children's park.

Parking bay, Rescue watchtowers, Arch bridges, View points will be created.

As part of the amusement/recreation activities, various water sport activities like aqua scooter, bumper boat, electric boat rides etc will be allowed.

An open-air restaurant, floating restaurant and a curio shop will be set up.