

Conservation of Hussain Sagar Lake Hyderabad (Andhra Pradesh, India)

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ABSTRACT

Hussain Sagar Lake was built in 1562 A.D. during the reign of Quli Qutub Shah (1550-1580) the fourth ruler of Qutub Shahi dynasty. The lake water was utilized for irrigation and drinking water needs upto 1930. The lake joins the twin cities of Hyderabad and Secunderabad and adds historical aesthetic dimension to the twin cities. Gradually the lake became receptacle of sewage and industrial effluents from the catchment areas. Due to eutrophication, algal bloom, growth of water weeds and bad odour the water body became redundant for recreation & pisci-culture. Hyderabad Urban Development Authority (HUDA) is making efforts to restore Hussainsagar Lake to its past glory in all respects including ecological, economical and cultural aspects by appropriate technological interventions. The project titled "Hussainsagar Lake and Catchment Area Improvement Project" is funded by Japan Bank for International Cooperation (JBIC) under ODA assistance with objectives, To improve the lake water quality by preventing pollutants entering into the lake both point source & non-point sources of pollution, besides removal of nutrient rich sediments. Interception & Diversion of dry weather flows, improvement of Nalas in catchment area.

The following components of work is undertaken to improve the lake water quality and to maintain the hydrology of the lake. Construction of New Sewerage Treatment Plant at Picket Nalla, Upgradation of Existing Hussain Sagar Sewerage Treatment Plant, Construction of Trunk Sewers, Construction of Small Sewerage Treatment Plants, Construction of Ring Sewers around the Hussain Sagar Lake, Capacity Enhancement of Interception and Diversion Works, Recycled Water Supply Facilities, Lake and Nalla Environment Improvement, Desilting/Dredging and Disposal of Sediments, Construction of Alternative Idol Immersion Places, Repair of Surplus Weir, Installation of Aeration Equipment, Shoreline Improvement, Nalla Improvement, Slum Improvement, Public Awareness and Community Participation



INTRODUCTION

Hyderabad City, the capital of the state of Andhra Pradesh had undergone phenomenal growth in the recent times as a high-tech city and is well known globally for its State-of-the-art infrastructure

facilities on information technology and software companies. Many industries, educational institutions, defense establishments and important research and training centres are established in the city.

Hussain Sagar, a historical lake was constructed in 1562 AD to meet the irrigation needs of old

Hyderabad city during the reign of Quli Qutub Shah (1550-1580) the fourth ruler of Qutub Shahi dynasty. The lake joins the twin cities of Hyderabad and Secunderabad and adds historical aesthetic dimension to the twin cities. The lake water was utilized for drinking water source from 1884 to 1930. The total Catchment area of the lake is 240 Sq.Kms with free Catchment area of 67 Sq.Kms. Recent past many recreational facilities around the lake are created to attract the tourists. The places of tourist attraction centered around the lake such as Lumbini Park, NTR Garden, Jala Vihar, Water front, Sanjeevaiah Park and more talked Necklace Road are the special attractions for the thousands of tourists and visitors from all over India. The 18 mtrs height 350 tonne monolithic statue of Buddha carved in white granite erected on the rock of Gibraltar rock and 33 statues of Andhra Pradesh luminaries from various fields on the Tank Bund are major attractions of the lake vicinity. The regular boating and roving facilities in the lake waters of Hussain Sagar entertains the tourists in the field of water sports and creates a pass time.

Photo-1 Hussain Sagar Lake view



ENVIRONMENTAL STATUS

Owing to the fast rate of urbanization and industrialisation, the Hussain Sagar Lake which was unpolluted and was being used as drinking water source for the city until 1930s gradually became receptacle of sewage and industrial effluents discharged in to the feeder nalla from its watershed area. There are four inflow nallas bringing water into the lake from the catchment area i.e. Picket Nalla, Kukatpally Nalla, Banjara Nalla and Balkapur Nalla. The quantum of sewage flowing in the above feeder nallas of the lake is measured approximately 150 Mld from the residential and industrial establishments of the lake catchment area. The picket nalla enters the Lake from the northeastern side. This nalla discharges mostly domestic sewage in to the Lake from residential areas throughout the year. The Kukatpally Nalla enters the lake at northern side and brings the mixed domestic and industrial effluents. The Banjara nalla and Balkapur nalla enters from the northwest and western side

respectively and carries domestic sewage into the lake.

Photo-2: Entry of pollutants – Picket Nalla



Status of Influent Quality through Nalas

S No.	Parameter	Values
1	pH	7.62
2	Colour	Grey
3	Turbidity NTU	118.87
4	Suspended solids mg/l	345
5	Total Nitrogen mg/l	40
6	Total Phosphorus mg/l	7
7	Dissolved Oxygen mg/l	BDL
8	COD mg/l	549.5
9	BOD mg/l	219.5
10	Total Coliforms MPN/100ml	>1600

The discharge of municipal sewage and industrial effluents in to the Lake for several years and the storm water discharge containing diluted sewage and other impurities on the land surface from over 240 square kilometres area of watershed have resulted in dumping in to the Lake high amounts of organic matter, nitrogen and phosphorous in to the Lake water. The suspended organic matter rich in nutrients had been deposited on the Lake bed for several years and had formed an internal store house of nutrients in the Lake. The high amount of nutrients present in the Lake had given rise to high rate of eutrophication resulting in Algal blooms and growth of water hyacinth. The dead algae and water hyacinth sunk to the lake bed had added to the nutrient content. To plan pollution control measures

it is necessary to assess the pollutant load from different sources from outside the Lake and from within the Lake.

Status of lake Water Quality

S No.	Parameter	Value
1	pH	7.4
2	Colour (Hazen units)	50
3	Turbidity NTU	41
4	Suspended solids mg/l	52
5	Total Nitrogen mg/l	14
6	Total Phosphorus mg/l	2
7	Dissolved Oxygen mg/l	2.3
8	COD mg/l	90
9	BOD mg/l	30
10	Total Coliforms MPN/100ml	>1600

Photo-3: Ganesh Idol Immersion



The Hyderabad city over the years experienced the idol immersion of Ganesh and Durga during the Vinayaka Chaturthi and Dasara season. The idols ranging from 1 mtr to 15 mtr are installed at the junctions of colonies and prominent places to worship for 10 days. After the worship period these idols are taken on procession with large gatherings of public for immersion into Hussain Sagar Lake. These idols along with flowers, leaves and other pooja material are immersed into the Hussain Sagar Lake waters. Around 20 to 30 thousand idols along with decorative material are unloaded into lake water to cause increase in pollution of water levels.

The State Government of Andhra Pradesh has taken initiatives to divert the sewage and industrial effluents flowing into the lake to the down stream

area by laying 'A' Main and 'K&S' Main from the nalla inflows. A smaller I&D structures are developed in these nallas to intercept and divert the excess flows of sewage into diversion pipelines. A secondary level treatment plant with 20 Mld capacity is constructed to treat the sewage water drawn from the 'A' main at confluence point of Balkapur Nalla meeting the Hussain Sagar Lake. The total treated water is released into the lake for maintenance of hydrology. Over the years the lake has become a major central attraction for local and foreign tourists in water sports, gardens around the Hussain Sagar Lake. Government of Andhra Pradesh has created a separate management authority named Budda Poornima Project Authority (BPPA) to control and maintain the lake and its surrounding areas. A project named "*Hussain Sagar Lake and Catchment Area Improvement Project*" with ODA loan assistance from Japan Bank for International Cooperation (JBIC) with following objectives

PROJECT OBJECTIVES

- To improve the lake water quality by preventing pollutants entering into the lake both point source & non-point sources of pollution, besides removal of the nutrient rich sediments.
- Interception & Diversion of dry weather flows, improvement of Nalas in Catchment area to check the entry of polluted waters into lake.
- To improve the overall lake environment and its surroundings for enriched biodiversity.
- Increasing the potentiality of eco-tourism and economic status of local people
- Improving sanitary conditions of people living in the catchment area and vicinity of the Lake.

PROJECT INITIATIVES

To restore and conserve the Hussain Sagar Lake various components of work is proposed around the lake and its catchment area.

Treatment Plants:

To maintain the hydrology of the lake due to evaporation and percolation losses it is calculated the need of 32 Mld water regularly during the lean season. To maintain the water levels of the lake and to improve the some of the catchment area lakes water quality the five Sewerage Treatment Plants (STP) are in progress of construction.

- Construction of 30 Mld Treatment Plant with BNR Process.

- Up gradation of existing 20 Mld Treatment Plant with MBR Process to tertiary level at Maktha.
- Establishment of 3 STPs in Hashmathpet, Rangadamini and Thammidi Kunta Lakes.

Sewerage Network:

To avoid the entry of untreated sewage into the lake through nallas it is essential to establish perfect interception and diversion works at the inflow nallas. To take the load of excess sewage flowing into the lake the trunk sewer connectivity to the capacity of flows is in progress.

- Development of sewerage system in Hussainsagar Catchment area as per Sewerage Master Plan by HMWS&SB.
- Laying of ring sewer along the Hussainsagar Lake.
- Capacity enhancement of I&D works.

Proposed Water Quality in the Lake

S No.	Parameter	Proposed Value
1	pH	6.5 – 8.5
2	Colour (Hazen units)	20
3	Turbidity NTU	10
4	Suspended solids mg/l	20-30
5	Total Nitrogen mg/l	<10
6	Total Phosphorus mg/l	<1.0
7	Dissolved Oxygen mg/l	> 5
8	COD mg/l	<50
9	BOD mg/l	<6
10	Total Coliforms MPN/100ml	<500

Water Body Improvement

Over the years lot of nutrient rich pollutants have entered into the lake through inflow nallas and settled in the lake bottom at the mouths of nallas. The idol immersion is also causing annual pollution load to the lake waters. It is proposed to remove the nutrient rich lake sediment at mouths of the nallas by way of dredging. To reduce the idol immersion pollution load in Hussain Sagar Lake 10 different urban lakes are identified to create alternate idol immersion ponds.

- Dredging of lake sediment.
- Development of decentralized idol immersion ponds.
- Repairs and improvement of surplus weirs.

Photo-4: Improved Lake Shore Area



Shoreline Improvement

The Hussain Sagar Lake shore area has become larger tourist attraction for the local and foreign tourists. Already some initiatives are taken up to create attractive shore area pockets for the people to spend time with the nature in sprawling lawns and tree grooves.

- Development of greenery and attractive pathways along the lake shore area.
- Development of eco-tourism activity.

RESULTS

- Improvement in the Lake water quality from Hyper-eutrophic condition to Mesotrophic condition
- Increase the Biodiversity of the Lake
- Increase in pisci-culture activities, leading to recreational fishing.
- Employment generation by Eco-tourism activity
- Increase in recreational facilities
- Improvement in the groundwater quality
- Improvement in human health of lake surround
- Improved aesthetics
- Enhancement of property values in the lake surroundings

CONCLUSION

The Hussainsagar Lake and Catchment Area Improvement Project (2006-2012) funded by Japan Bank for International Cooperation (JBIC) under ODA loan assistance will restore and conserve one of the larger urban lakes. This creates an environmental upgradation in the heart of the city and provide aesthetic values to the tourists / visitors and economic upliftment to the local residents.