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Refilling Of 'Hussain Sagar' With Fresh Water – Engineering & Social Implications

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Abstract:

"Hussain Sagar" for drinking and agriculture needs was constructed during the year 1560 by Ibrahim Quli Qutub Shah, which is now in the heart of Hyderabad. The works of Hussain sagar were started in the year 1560 and completed in 1562. The designer of Hussain Sagar was Hussain Shahvali, the son-in-law of Ibrahim Quli Qutub Shah, who was a Civil Engineer. The tank was named as Hussain sagar, after Hussain Shahvali The filling of water into the tank was in the year 1566 through a canal from Musi River and the tank was made fully impounded by the year 1567. The technology for filling the tank was by formation of a chain of 600 to 700 small kuntas which after filling with water entered into the sagar. Subsequently due to urbanization these small kuntas were faded away.

The sagar was completely dried during 1922 (92 years back) due to continuous droughts in its life history. The Government of Telangana now contemplates complete purification of Hussain sagar to make it as a drinking water source to Hyderabad by emptying of water body during the summer and refilling with clean water. It is estimated that at least 6 months are required for the removal of entire water from the tank and after this it is expected to take 6 months more for the removal of silt/ debris. In the present study, various engineering & social implications are discussed which are to be addressed by all the stake holders for successful completion of this project.

Key words:

Solid waste, debris, sewage treatment plants, Inter section diversions, , silt removal, eco friendly material, sky scrapers, catchment, hazardous

Introduction:

Hussain Sagar for drinking and agriculture needs was constructed, during the year 1560 by Ibrahim Quli Qutub Shah and for the formation of this 450 year old tank, an amount of 2.54 lakhs was spent. At that time no machinery was employed and only 3000 mazdoors participated. The remuneration given at that time was 2 copper coins to man mazdoor and 1 copper coin to woman mazdoor (one copper coin is equal to 1/100th rupee). The history says during the invading period of Aurangajab in the year 1687, the people around Hyderabad used the waters of Hussain sagar for drinking for 8 months without ny difficulty.


Ibrahim Quli Qutb Shah

The salient features of Hussain Sagar Lake are given below.

Catchment area of the lake	240 sq. km.
Full tank level	+513.430 m.
Maximum water level	+514.930 m.
Top of formed tank bund level	+518.160 m.
Actual water spread area of lake at MWL	5.70 sq. km
Water spread area of tank at present FTL	4.81 sq. km.
Circumference of the tank	14 km.
Submerged area at maximum flood	2500Ha (approximate)
Normal rain fall in the catchment	770 mm
Average runoff in to the lake	28 to 33 M. cum

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Outlets for over flow: 2nos (across tank bund and near to Mariate hotel), in addition to 400 mm diameter pipes near Osmania University, Birla mandir & public garden for outflow of excess water. Areas under surplus nala of lake: Kawadiguda, DBR Mills, Arundhati nagar, Ambedkar nagar, Ratna nagar, Sivaram nagar, Datta nagar, Domalguda & Himayat nagar

Pollution of sagar:

This lake was used for drinking and fishing up to 1930. Due to industrialization and urban growth, huge quantities of Industrial

and domestic waste waters continuously entered the lake & polluted the sagar, due to which the lake was unfit for drinking (or) fish growth, for the past 85 years. There are four major Nalas joining the lake called Kukatpally, picket, Banjara & Balkapur which carries lot of industrial & domestic waste waters and they contaminated the Hussain Sagar. Over a period of time the entire water has become impure.

Large quantity of solid waste also joins the lake including the debris due to immersion of idols and tourists who happen to spend time around the Hussain Sagar used to throw the used food material which finally made the lake contaminated. During the year 1993, Hyderabad Metropolitan Water Works & Sewerage Board (HMWW&SB) initiated a project to improve the water quality of Hussain sagar , comprising diversion of dry weather flows of nalas away from the lake and providing adequate treatment to part of domestic water before discharging in to the lake. The project also include establishing of Sewage Treatment Plants (STPs) under quality management of water. Nine Inter section diversions (ISDs) across the four nalas joining the Hussain sagar were also constructed by the Government for diversion of polluted waters.

During the year 2010, further purification works of the tank at an estimated cost of 370 crores were started by awarding the work to M/s Jaika company of Japan which has taken up the silt removal process in the nalas including construction of Sewage treatment plants (STPs). Out of 500 to 600 million liters of impure water daily expected to come into the sagar, only 450 million liters is being diverted into the STPs and the remaining 150 million liters still joining the sagar. Government also decentralized the Ganesh idol immersion by identifying different water bodies around Hyderabad to facilitate minimizing the tolerance limits of Hussain sagar waters. Using social media for propagating the idea of making idols by eco friendly material for environmental protection also made an impact on quality of sagar water.

Present attempt:

The Government of Telangana now contemplates complete purification of Hussain sagar to make it as a drinking water source to Hyderabad by emptying of water body during the summer and refilling with clean water. It is also proposed to beautify the surroundings of the lake by constructing 'sky scrapers' in the open spaces for which vacant lands to be identified. it is estimated that about 35 properties including parks are available around Hussain sagar lake, including Sanjeevaiah park (90 acres),

N.T.R garden (34 acres), Lake view (17.5 acres), Rock garden (12.5 acres) and Lumbini park (5 acres). This project is proposed to be completed in one year and the only problem will be how to transport and where to dump the silt removed from the sagar. During the process adequate measures have to be taken for obstructing the unwanted flows entering the sagar through nalas.

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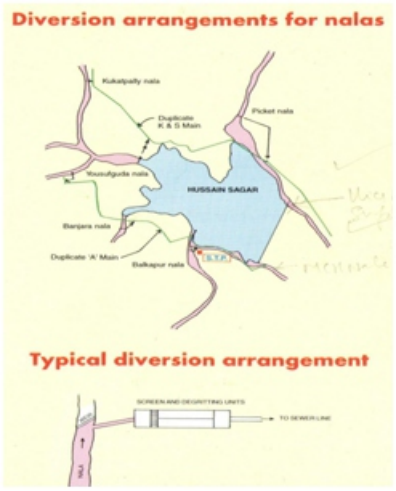

The major problem would be how the water from the lake spread over 500 hectares at full tank level could be drained within a specified time. For emptying the existing two outlets near Marriot hotel & Buddha purnima project can be partly used to route the flows and the balance need to be drained using other carrying systems which is quite difficult in urban areas like Hyderabad. Diversion of 150 million liters per day of water joining the lake during the time of emptying is quite difficult and needs adequate diversion net work. In addition to physical emptying of tank the ground water recharge need to be tackled which was also contaminated during the earlier periods.

Issues of Concern:

Water level in the lake is subjected to change due to un expected rains in the catchment during the process of emptying and this may pose problems in complete emptying of sagar. Removal of silt and dumping at a suitable location which is not hazardous and not affect the tolerance limits during the transport from the heart of the city to the dumping yard.

This creates adverse reactions among residents. Enormous funding is required to take up the sagar purification work which is difficult and unless a motivated effort is initiated by the Government, with the cooperation of people it is highly difficult to complete the project . The major concerns include

» How the water released in large quantities through densely populated localities before joining river Musi protects properties/residents of low level areas along surplus course.

» How the sentiments of people adjusted to a custom are protected and convincing all sections might be a difficult task without the involvement of social organizations.

» If the source is finally made fit for drinking, in the urban area it is very difficult to protect the lake as a perennial drinking water source .

» The Forum for better Hyderabad, a social organization already appealed to the Government to analyze the entire process of cleaning by experts and not take hasty political decisions for any gain.

The sediment accumulated in the sagar was tested positive in the quality control laboratories of NG Ranga Agricultural University and found fit for vegetable and other agricultural operations. However the soil from kukatpally nala is toxic in nature. The Government desires to empty the sagar in ensuing summer and it is now proposed to remove the water from December so that the entire emptying will be achieved by March/ April, 2015. This is essential since the rainy season likely begins in 2nd week of June.However the process is yet to be started. In order to obstruct flows from nalas, it is proposed to divert the kukatpally nala flows with a pipe line to join the surplus course at Marriat hotel which finally enters Musi river. An amount of Rs. 100 crores was already released by the Government. Tenders for this work are being called for. By identifying the vacant lands around sagar, it is proposed to construct 'sky scrapers' to make the surroundings beautiful to attract tourists and make the Hussain sagar as one among world's heritage model To protect the religious sentiments of Hyderabad, a lake called 'vinayaka sagar' is proposed to be constructed in Indira Park and fill it with the emptied water of Hussain sagar for idol immersion.

Conclusion:

Theoretically emptying of a tank is possible provided it is at an isolated location and away from the urban areas. Practical issues are multifold if the tank is located in a dense area like Hyderabad. The process of emptying & refilling with clean water can be completed only with cooperation and participation of the people. Cleaning of sagar after completion will be an engineering marvel remembered by future generations.