intense CITY

Alarm bells for Bellandur

Ignoring the pollution and encroachment of the city's biggest lake, Bellandur, could be disastrous, as dramatically brought out by the toxic foam in downstream Varthur lake recently. Can a revival project monitored by the High Court make a change?

The toxic foam that dramatically overflowed from Varthur lake last week definitely triggered alarm bells. It symbolized everything that has gone horribly wrong with the city's once-cherished water bodies. But Varthur happened because of a far bigger lake upstream, polluted to the core, encroached by realtors and vandalized by effluents of every hue: Bellandur.

Vast, scenic and dominating, Bellandur lake occupies an area of 891 acres, large enough to qualify as Bengaluru's biggest. Sadly, it is also the city's most polluted. Seriously under threat by real estate sharks, the lake now relies on a recent Karnataka High Court directive, seeking a comprehensive, coordinated effort to rejuvenate it along with the Agara lake upstream.

The court's urgency is justified. Check what the Lake Development Authority (LDA) says in its report submitted to the High Court on April 13: Bellandur and Agara lakes have drastically shrunk over the last 15 years, and the sewage inflow could kill what is left of the water bodies.

In the absence of ready survey maps, LDA relied on satellite images to show the extent of the shrinkage. Between 2002 and 2014, the area of Agara lake, for instance, reduced from 149.24 acre to 97.32 acre.

Encroachments, private and public

But the blame is not only on the private property developers. A part of the lake area was gobbled up even by Bangalore Development Authority for the HSR Layout formation. The layout's 14th main road, the Outer Ring Road stretch and flyovers were all in the Agara lake area before.

The immediate threat to both the lakes come from the construction activities taken up by two private developers on the Agara lake bed. The Koramangala 1st Block Residents' Welfare Association had petitioned the High Court, contending that the two firms had rapidly encroached upon the stormwater drains running through the land, thus blocking the natural flow of water to Bellandur lake.

The petitioners' contention: The respondents, Mantri Techzone Pvt Ltd and Core Mind Software and Services Pvt Ltd, have proposed a Rs 2,300-crore project to set up a park, hospitality and residential units. Also planned is a mall spread over 80 acre and abutting the Agara lake.

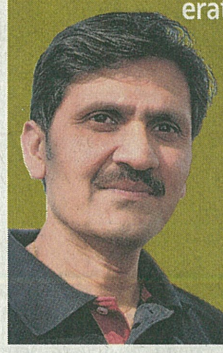
There are two issues here: Obstruction of natural flow of excess water from one lake to another, and the unbridled inflow of sewage. The Court has directed the Karnataka Industrial Areas Development Board (KIADB) to make sure that spillover water from Agara lake enters Bellandur lake through water channels. It is apparent that this will not be easy without clearing the encroachments first.

NITIN SESHADRI, B'lore Forum for Sustainable Development

We are trying to stop the projects from coming up on the lake's catchment area. It would be disastrous for the lake and citizens, raising risks of flooding and groundwater depletion.

SUBRAMANYA SANKARAN, resident, Bellandur

Bellandur lake is the most visible eyesore, symbolic of Bengaluru's complete degeneration. Reviving it calls for a concerted effort involving local communities and the civic agencies.



MUKUND KUMAR, lake activist, Bellandur

You have to mark the boundary of the Bellandur lake through a proper survey. It is not rocket science. Builders construct their projects on lake beds because the boundaries are hazy.

STPs: Costly to build, maintain

To arrest the inflow of sewage, the standard solution offered is the Sewage Treatment Plant (STP). But, as Koramangala resident and activist Nithin Seshadri points out, STPs are quick, money-making and ineffective options. They are expensive to make and maintain. "Where are the STPs working? BWSSB is now suggesting a Rs 7 crore-STP for the 18-acre Ibblur lake. Such decisions are made only for the real estate lobby."

The 248-MLD capacity Koramangala and Challaghatta Valley STP lets out its treated water into the Bellandur lake. But untreated, raw sewage enters the lake through several other inlets, negating the benefits of the STP treatment. One alternative that has been talked about is building ring-based diversion canals for sewage. But this has remained on paper.

However, M N Thippeswamy, former BWSSB chief engineer contends that the ring gutters cannot be a permanent solution. "Such gutters only help the sewage bypass one lake and get into the next lake downstream. They will gradually erode due to rains and other factors."

Divert sewage

In Bellandur lake's case, Thippeswamy's suggestion is to divert sewage entering from the different inlets to the Koramangala and Challaghatta Valley STP for treatment. The treated water could then be let into the lake. This could be achieved through pipelines, and the sewage could flow either by gravity or could be pumped, he adds.

An even better option would be to direct all the sewage emanating from villages surrounding Bellandur to the STP. "Earlier, the urban local bodies had no sewer lines. BWSSB is now in the processing of laying Underground drainage (UGD) lines under the Karnataka Municipal Reforms Project (KMRP). The number of inlets into the lake has come down.

Local residents say the natural gradient system has been bypassed for an UGD line commissioned from Agara towards Bellandur. "BWSSB chose to have a pumped line. There is the Ibblur lake on the way, how will sewage from there get into the UGD? Dedicated UGDs which other lakes cannot tap into, cannot be the option," feels Mukund Kumar, a key campaigner for reviving Bellandur lake.

Digitised survey maps

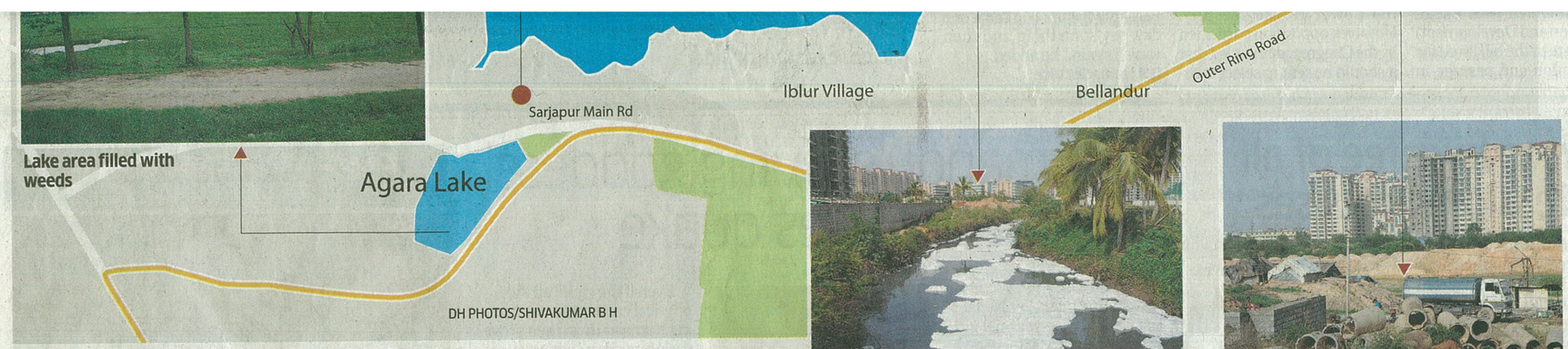
Rejuvenation plans should be based on professional survey maps that are preferably digitised. Mukund explains, "You have to mark the lake boundary through proper surveys. It is not rocket science. The builders come up with grand projects on lake beds because the boundaries are hazy."

The High Court has also directed KIADB to conduct a resurvey Bellandur lake and fix the boundaries. But both Mukund and Nithin are skeptical whether a comprehensive survey can be completed by June 10. Relying on satellite maps that are only about 13 years old could not be an option either.

Bellandur resident Subramanya Sankaran prefers a multi-pronged approach, actively involving local communities. The successful revival of the 48-acre Kaikondanahalli lake could be a model. Agrees Mukund, "Bellandur's hope lies in more and more residents understanding the seriousness of the situation, and exploring solutions."

The first step could be in blocking the flow of untreated sewage from apartments into the lake. Although the Kar-

Area earmarked for private project



Toxic foam in drain leading to Bellandur lake.

Bellandur wetlands, a dumping ground now.

Ecological regime change hurting Bellandur lake

Unplanned, rapid urbanisation post-2000 witnessed large-scale conversion of watershed area of the Bellandur lake into residential and commercial layouts and this has altered the hydrological regime and enhanced the silt movement in the catchment.

This is what Prof Dr T V Ramachandra and scholars Bharath Aithal, Vinay S and Aamir Amin Lone from the Indian Institute of Science (IISc) conclude in their study, "Conservation of Bellandur Wetlands: Obligation of decision-makers to ensure inter-generational equity." The authors are part of IISc Wetlands Group under the Centre for Ecological Sciences.

The declining vegetation cover, says the study, has lowered water yield in the catchment, affecting the groundwater recharge. Alterations in ecological integrity is evident from reduced water yield, flash floods, contaminated water, obnoxious odour, copious growth of invasive floating macrophytes, disappearance of native fish species, rising mosquito menace and other disease vectors, etc.

A major portion of untreated city sewage (500+ million liters per day) is let into the lake, beyond its neutralizing ability and this has hampered its ecological functioning.

The study makes it clear that land use change such as conversion of watershed area, especially valley regions of the lake to paved surfaces, would alter the hydrological regime. Removal of drain (Rajakaluve) and reducing the width of the drain would flood the surrounding residential (areas) as the inter-connectivities among lakes are lost.

There are no mechanisms for the excess stormwater to drain. Thus, the water stagnates, triggering floods in the surroundings.

Dr Ramachandra points out that the lake cannot also be revived if there is alteration in landscape topography since it alters the integrity of the region affecting the lake catchment. This would also have serious implications on the stormwater flow in the catchment. Dumping of construction waste along the lakebed leads to alteration in the lake natural topography, thus rendering the stormwater runoff to take a new course. Eventually the water would get into the existing residential areas.

Besides, alteration of topography would not be geologically stable. It leads to soil erosion and siltation in the lake, the study notes.

Loss of shoreline is another factor that may make revival of the lake difficult. It was apparent from the field investigations for the study that illogical land filling and dumping in the Bellandur lake bed had gobbled up the shoreline. This loss results in destruction of habitat for most of the shoreline birds that wade in this region.

The study warns that shoreline wading birds such as stilts and sandpipers will be devoid of their habitat forcing them to move out.

As far back as 2005, it was known that local people were dependent on the lakes for wetlands for fodder, fish etc. The study estimates that this activity provided goods and services worth Rs 10,500 per hectare per day 10 years ago. Now the earning would be higher.

The Bellandur lake terrain is relatively flat and sloping towards south of the city. This water body has been a lifeline sustaining the livelihood of settlements in the catchment and command areas. Agriculture (rice and vegetables) practised since long in the downstream continues even today.

Three main streams join the tank, which form the entire watershed. Three chains of lakes in the upstream join Bellandur lake with a catchment area of about 148 square kilometres (14,979 hectares) and overflow of this lake gets into Varthur lake, from where it flows down the plateau and joins the Pinakini river basin.

Dr Ramachandra describes wetlands as lands that are transitional between terrestrial and aquatic eco-systems. Here, the water table is usually at or near the surface or the land is covered by shallow water. Wetlands are the most productive and biologically diverse but very fragile ecosystems. They function as the kidneys of landscape due to remediation of contaminants (which include nutrients, heavy metals, etc). These fragile ecosystems are vulnerable to even small changes in their biotic and abiotic factors. In recent years, there has been concern over the continuous degradation of wetlands due to unplanned developmental activities.

Prashanth G N

Proposed steps to revive lake

- Ensure adequate vegetation cover around lake and if possible enhance the same
- Protect ecological integrity of lake by ensuring normal water flow in it
- Do not allow untreated city sewage into the lake
- Don't allow change in land use and hydrological regime of the lake
- Dont remove and reduce stormwater drain in lake vicinity to ensure easy water flow
- Take measures to avoid lake siltation and soil erosion

PAST

A water source for farming, fishing, drinking

- Bellandur lake served Bengaluru's water needs right upto the 1970s. The water was used for drinking, household purposes, agriculture and fishing
- Its waters were also used for irrigation. A variety of crops, including rice and ragi besides vegetables were grown. So were pulses and spices
- Fishing was significant in the lake. An estimated 100 families depended on fishing and lived in communities near the lake's northern shore
- Industrial growth from the 1970s, coinciding with supply of Cauvery water triggered neglect and abuse of Bellandur lake. Untreated sewage from South Bengaluru began to be pumped into the lake during this decade
- During the 1980s, chain of tanks/lakes leading to Bellandur were encroached upon to form housing layouts

891

Bellandur lake was much bigger than its current size of 891 acres

PRESENT

Rampant pollution, encroachment, SEZ plans

- Besides rampant pollution due to entry of untreated sewage, Bellandur lake faces the threat of a proposed SEZ. Petition pending before National Green Tribunal
- A Lake Development Authority report submitted to High Court says the land acquired by KIADB for the SEZ is one of the catchment areas of Bellandur lake
- This area between Agara lake and Bellandur lake had been classified as a sensitive zone in the draft CDP Master Plan 2015. However, the final master plan had the classification changed to mixed residential category
- High Court has directed LDA to call a joint meeting of all stakeholders to formulate methodologies to revive both Agara and Bellandur lakes
- HC has directed KIADB to ensure water channels for flow of excess water from Agara to Bellandur lake. BDA is to resurvey Bellandur lake and fix boundaries

97

Agara lake has reduced in size from 149.24 acres to about 97 acres

FUTURE

Remove encroachers: Dr T V Ramachandra

- To stop the change in Bellandur lake ecology, "eliminate encroachers on all sides of the lakes and their encroachments. Once the stone, sand, metal and other waste is removed, the original size and shape of the lake can be restored." Locals can approach pro-active courts to initiate action against violators.
- To eliminate sewage from the lake, "identify points where the sewage has been let in, physically remove them. Identify spread of the sewage and eliminate accordingly."
- To eliminate metals from lakes, evolve a large project. "Vegetables we eat are metal-laden and poisonous. Their chemical content should be eliminated."
- Take steps to prevent dumping of construction waste along the lakebed as this would alter the lake's natural topography, thus rendering the stormwater runoff to take a new course.

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Seventy per cent of the city's sewage goes untreated into lakes

flow of untreated sewage from apartments into the lake. Although the Karnataka State Pollution Control Board (KSPCB) mandates that every apartment with over 50 units should have its own STP, less than 25 per cent follow the rule. Thippeswamy adds that the priority should be to remove Nitrogen and Phosphorus contents, both of which heavily contribute to eutrophication of lakes leading to thick weed growth.

Stormwater drains designed to take only rain water to the lakes are notorious for their sewage content. Communities and private builders across the city are guilty of encroaching into the stormwater drains – also known as Rajakaluves – and directly dumping sewage into these open canals.

Rasheed Kappan