

I shut my eyes, there it was, it's clear waters rippling around my ankles, as I idled away on the fisherman's oblong boat. But alas, my twitching nose, detecting the veritable stink of decayed vegetation, broke my reverie and landed me on a muddy bank. Where was the water, I gasped, as I stared at the remnant limbs of one of the most beautiful lakes, Damdamma, upon the shores of whom, many years ago, I had found true love. Alarmed, upset and indignant I began my search – to prove this drastic decline with data, and shake everybody up to stop this unwarranted disappearing act.

A ridge spans the land between two sprawling megalopolis' in the making – Gurgaon and Faridabad. Dotted with lakes, ponds and little water bodies, these Aravalli outcrops are an interesting exploration format, fit to mesmerise all. But for builders and land developers the ancient rocks are just encumbrances that need a good blasting to make way



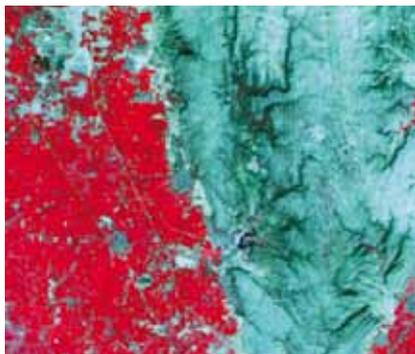
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Disappearing Lakes

LAKE DAMDAMMA

Looking through the satellite Perhaps the most interesting and specific evidence used in determining the declining levels of water here, was remote sensing data. Kianoush Suzanchi, a PhD scholar, spared some of his valuable time to ascertain, from time series satellite data, the shrinkage of the two lakes. The details of the method and interpretation is given below.

In order to find the periodic changes in the area of Damdamma lake satellite images of three periods were used - LandSat imagery of March 1977, IRS 1D of March 2001 and IRS P6 of February 2006. The imageries were registered and resampled to make them uniform and enable comparison. Then through visual interpretation the boundary of the lakes were drawn over different periods. The visual interpretation has resulted in the approximation of the lake areas. The lake boundaries of different period were overlaid to determine the changing lake surface area over

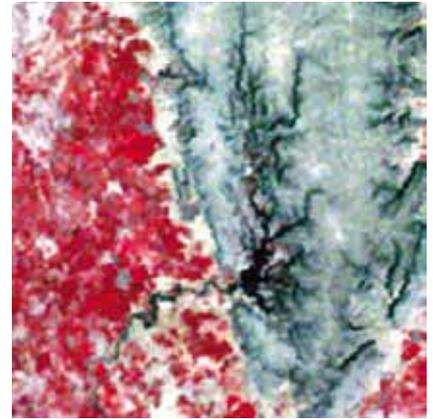


IRS P6 of February 2006

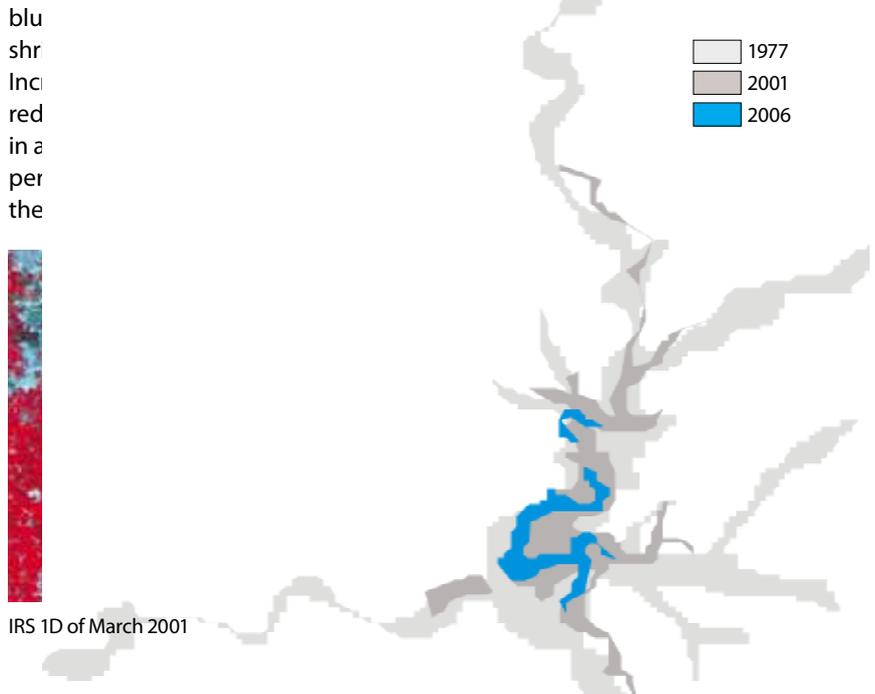
these periods. Since false colour composites were placed in the imageries for visual interpretation, the lake has been depicted in black, the agricultural area have been depicted by red and ridge outcrops and settlement by blue shrubs. Increased in area per the



IRS 1D of March 2001



LandSat imagery of March 1977,



CHANGING BOUNDARIES OF LAKE DAMDAMMA

for high rises and malls. The glittering sapphires and emeralds have now disappeared, to be replaced by dull sandy banks with little pools within, dank and dark, waiting in hushed silence for its imminent death.

Background

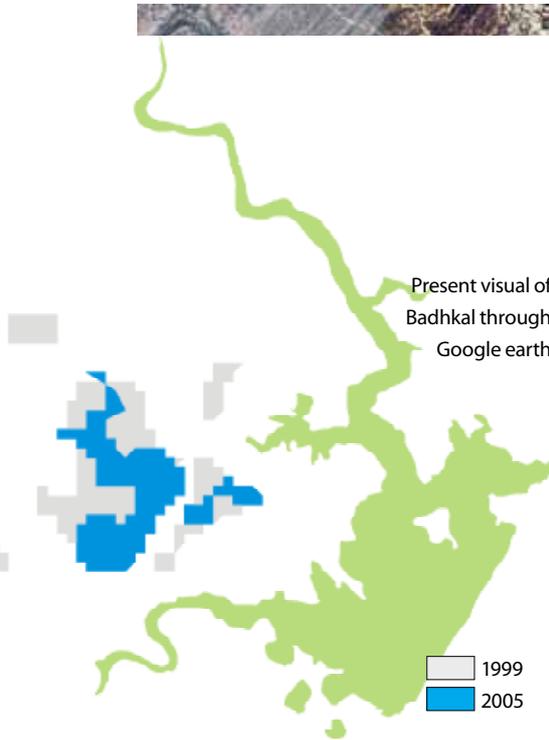
Damdamma and Badhkal are two prominent lakes that flank the north and south corner of the craggy outcrops of the Aravalli. The Badhkal is a dammed lake built by embanking the down slope of the catchment area, while Damdamma is a

natural lake, recharged each year by the monsoons. These picturesque lakes are fringed by the low lying Aravallis which forms a splendid backdrop against the waters. The water levels of this lake are not uniform varies with the vagaries of the monsoons. According to the Haryana State tourism site the water levels used to reach 50 to 60 feet in these lakes during monsoons, but in recent times the levels hardly reach 7 to 10 feet. In summers the levels that fell to about 10 feet - today dries up to about half a feet. With uncontrolled human activities not

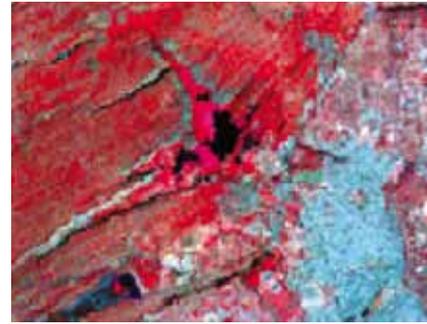
only the depth but the area of these two lakes has also shrunk. The many minor streams and limbs that keep changing course, served as a splendid location for migratory birds and myriad habitats. Now the entire ecosystem lies under threat.

There are many international protocols that have been outlined for the large lakes. However, smaller recreational lakes smattered around peri-urban areas are lost in the need to develop land for housing and industries. In this report we have encapsulated the plight of two such

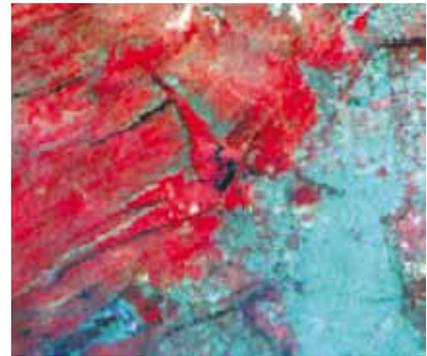
In order to find the periodic changes in the area of Badhkal Lake, satellite images of LandSat of October 1999 and IRS P6 of October 2005, based on the availability, were used. The methodology mentioned earlier resulted in the figure alongside. Since false colour composites were placed in the imageries for visual interpretation, black colour denotes the lake and water, while the increasing extent of electric blue characterise the spreading built up area of Faridabad. The predominantly red colour denotes rocky outcrop with vegetation cover.



CHANGING BOUNDARIES OF LAKE BADHKAL



LandSat of October 1999



IRS P6 of October 2005

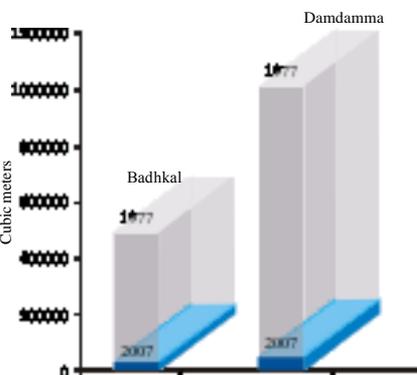
Interpreting the changes

Interpolation of Kianoush Suzanchi maps clearly pointed towards an unprecedented decline in the extent of the lakes. The maps of both Damdamma and Badhkal have been placed above. From 1977 to present almost 80 percent of the lake is gone. Although Suzanchi warned that mapping over time periods will not be adequate as rainfall regimes and

usage differ from year to year, yet we can safely say that we are losing our two beautiful lakes – rapidly. Rainfall regimes over a thirty year period (500 mm to 600 mm for Delhi and its adjoining areas, averaged over a 22 year period) have not changed so drastically as to reduce the lakes by nearly 80 percent. If rainfall isn't playing truant then we can safely allude to human pressure that

has affected the natural health of these lakes. Built up area and agricultural activities, evident from the satellite images, has increased manifold. Drawing conclusions about catchment area destruction would need further exploration but to the apparent understanding of our young researchers, destruction of catchment area seems a lesser evil than usage in the built up and agriculturally intensive area.

Present water levels



small lakes that not only serve as a tourist attraction, but form an important part of the local mosaic of living and loving. Thus a quick look, short term study of about two months was undertaken to highlight the need to address our hinterland lakes.

Getting to know the lakes

Health of the Lakes

Most of today's research focusses on larger lakes, pushing the smaller lakes away from its ambit. Land records around Delhi and its adjoining regions pertain to

the national capital region and its built up areas. Some base data is available on the water levels about 20 years ago but it does not suffice as area and catchment specific data is not available. However, field studies were conducted by measuring the present depth of water and calculating the area. The field survey was undertaken in the post monsoon period (August to September) when water levels are substantially high.

Perception of stakeholders

A questionnaire based open ended



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interviews were also conducted to understand effect on the lake by local users. These structured interviews for lake usage and recall period were conducted for seventy five users distributed unequally between the two lakes. Rural in character, the users are well to do farmers or pastoralists well above the poverty line. The selection of respondents was on the basis of years of stay in the region, (minimum criteria

of 25 years were taken as base mark) and proximity to the lakes. Women respondents in this survey were higher with more than forty two belonging to this category. The interviews were conducted over the week in Hindi and Haryanvi. It is worth mentioning that unlike most regions the respondents here opened up and highlighted environmental concerns adequately. They counter questioned and asked whether positive interventions in reviving the area would be made by the State and Central governments.

Our Diagnosis

We knew the answers, yet we asked questions, hoping to find solutions from the results. The lakes are dying that is for sure – local knowledge and data just helps us ascertain how fast and how soon. The findings are just a way to encapsulate and quantify the inevitable.

Changing lakes

The area of Lake Damdamma was about 3,37,500 sq meter in 1977 which stands at 87,000 sq meter today, while the Badhkal in 1977 covered about 2,33,600 sq meter and was only 64,000 sq meter in 2006. It is not only about area occupied, but also the depth of water. The Damdamma lake is currently deepest in small pockets, which is about 2 odd meters, but in most areas it is not more than 0.15 meter. It now resembles a marshy tract rather than a lake. The Badhkal on the other hand is shallower at about 1 meter at certain deeper locations. The water held in the



Bano collecting fuelwood at Badhkal

two lakes has dropped by 80 percent in the last 20 to 25 years and at this rate the remaining 20 percent will disappear in another 2 to 5 years. The faunal diversity in the lake areas (as the natural history records highlight) was indeed rich about 15 years ago with Cranes, Cormorants, Terns, Egrets and Kingfishers being regular visitors of these lakes. Today the bird population is low with Egrets dominating the show. The lake had several species of fresh water fish which is today predominated by catfish, as it can survive in the wet mud as the water levels fall further in summer. The vegetation at the bottom of the lake, which was once dense with oxygenating water plants are now muddy and dark. Pollution however, is a lesser evil in both the lakes, as sewage from the built up area does not lead into the lake - not just yet. The water is clear in Badhkal as compared to Damdamma, but with reducing levels, its brackishness is on the rise.

Recommendations

- So what are the remedies that can revive our two disappearing lakes.
- A strict zonation for built up area may be put in place, so that encroachment and landfill activities are kept at bay.
- The sites may be actively promoted as a tourist attraction with family packages as the locals admit that they rather have no tourists than face embarrassing situations which are against the social and cultural fabric of the country. Unfortunately these destinations have turned into sleazy night out spots indulged by nefarious antisocial elements of urban India.
- Holding conferences in and about these

Local children splashing mid lake - note the water is only ankle deep





Azhar the goat herder in Badhkal

Changing lives

The pastoralists use the raised ground around the lake for fodder and use the foliage around the lake freely. Azhar, a goat herder at Badhkal, fattens his goats at the grassy outcrops around the exposed lake bed. His goats fetch a good price, and are sought after he claims. Goats, buffaloes, cows and pigs are all reared around the lakes. They are allowed to graze on the soft grass on the banks and wallow in the muddy pools left behind as the lake recedes. Although livelihood options around the lake was lively before the century turned and real estate became a viable option, now no entrepreneur is willing to set up trade near the lake. The tourist strength is down to a trickle with the lake drying up. Badhkal has discontinued its boating service for three years now and Damdamma has a lone warrior striving to upkeep a fleet of decaying boats.

Farmers around the Badhkal are



Damdamma's lone warrior striving to upkeep a fleet of decaying boats

poorer than Damdamma with smaller holdings. The habitations around are Muslim dominated, with very little farm land, the Faridabad region being now a built up area with tall buildings and snazzy shopping arcades. The ground water they claim is adequate, though available only by boring a deep well, to provide two crops in a year, one of wheat and the other of jowar or bajra, besides vegetables that they sell in the Faridabad markets. However, farming is not a favoured occupation in this region

and drinking water is available through municipal supply route. The Badhkal lake region has a higher goat population than Damdamma and is more urban in character with an emphasis of service based livelihoods conjoined with the adjoining area.

Usage of the lake also involves bathing and washing, especially in Damdamma, where a flourishing village stands at the edge of the lake. The farmers here own extensive tracts of land where the ground water levels are continually declining

areas can create awareness, much in the lines of *jal jatha* organised by the Department of Science and Technology, Government of India.

- Promoting camping with lake related activities such as recreational fishing and bird sighting treks will ensure the health of the lakes,
- Prohibiting the usage of these lakes for wallowing, washing or bathing of humans and animals.
- Dredging may be undertaken at pockets for deepening and better rainfall retention
- Sustainably replanting the catchment area to green it will ensure water absorption and retention in the lakes
- Prohibiting leveling of land in the catchment area and catchment destruction activities like mining.



A view of the Badhkal Lake



There are many international protocols that have been outlined for the large lakes. However, smaller recreational lakes smattered around peri-urban areas are lost in the need to develop land for housing and industries. In this report we have encaptured the plight of two such small lakes that not only serve as a tourist attraction, but form an important part of the local mosaic of living and loving.

Approximate Measurement of the Lakes

Damdamma	Badkhal
Area	Area
Previous (1977)	Previous (1977)
3,37,500 Sq meters	2,33,600 Sq meters
Now (2007)	Now (2007)
87,000 Sq meters	64,600 Sq meters
Water content	Water content
Previous (1977)	Previous (1977)
10,12,500 Cubic meters	4,67,200 Cubic meters
Now (2007)	Now (2007)
87,000 Cubic meters	32,300 Cubic meters
Data measured using field records and satellite mapping	

from 30 feet about 15 years ago to 250 to 300 feet at present. Farming constitutes the prime occupation of the area with wheat and jowar predominating the land, apart from mustard and radish. The built up area around the lake has increased manifold around the lake in the last 15 years or so. Speaking to the respondents it was clear that although they were alarmed at its shrinkage, they were really not oriented towards its redemption. ‘Life moves on’, Bano asserted, living in the vicinity of Badkhal, when the question of a solution was posed to her. Most felt that with water now available through municipal supply and property prices around the region reaching such a high, they are rich by any standard. If required they would place a deep tube well or seek service in the adjoining regions. For the residents of both these areas, the shrinkage of the two lakes is not a pertinent livelihood issue.

Fuel wood is the most lucrative deal around these lakes, feel our respondents. Usually a job delegated to women, the villagers cut down branches and leave them to dry for a day or two. The collection regime is a group activity, with several women and their young coming together to bring home the stacks.

Shubna, a respondent from Damdamma felt it was a waste to invest in LPG cylinders or other renewable sources like gobar gas, as fuel wood was available freely, albeit it took up considerable time. Asked about the imminent death of these lakes, respondents felt with the lake drying there would be more common property to support such activity. Clearly unaware about the long term prospects of a dying lake, respondents talked about short term gains.

Thinking aloud - Restoring the lakes

A lake - the most beautiful and expressive feature of a landscape, is rapidly losing its identity. My youthful memories of camping around Damdamma and Badkhal, are now just that – memories. The lakes are disappearing. We, the custodians of earth and its resources need to instill instant remedial measures or be guilty of depriving future generations of the beauty, the grandeur and the bountiful benefits of nature.

End Note

Going by the past record of Haryana government and greedy land sharks in Gurgaon and Faridabad, it is unlikely that the State government will be interested in reviving the lakes. However, we look up to the Central government, which is competent in redeeming these lakes from ‘extinction’. The concerns highlighted in the Jaipur Declaration are enough to indicate that positive interventions is on its way. Badkhal and Damdamma may just be the lucky ones to come on under the wing of Ministry of Environment and Forests and rejuvenate. ■