BEFORE THE NATIONAL GREEN TRIBUNAL, SOUTHERN ZONE, CHENNAI

OA 85 /2015 (SZ)

IN THE MATTER OF:

Dr Lubna Sarwath .. Applicant

versus

State of Telangana .. Respondent(s)

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Report on Hussain Sagar Lake

Encroachments and pollution

Submitted to the Honourable Supreme Court of India
New Delhi

Special Committee appointed by the Supreme Court
Hyderabad
October 2005

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CHAPTER 1 INTRODUCTION

1.1 Background

The Honourable Supreme Court constituted this Committee in its orders dated 25 April 2005. The orders arose on a petition by Dr G Hargopal & others versus South Central Railway & others for special leave to appeal (Civil) No(s) 5595-96/2004 from the orders of the Honourable High Court of Andhra Pradesh at Hyderabad in WPMP No 31584 of 2003 and WPMP No 136 of 2004 in Writ Petition No 25073 of 2003. The appellants had filed a writ petition before the Andhra Pradesh High Court challenging the construction of a railway station on Hussain Sagar Lake of Hyderabad by the South Central Railway. In its orders of 4 February 2004, the High Court dismissed the petition of the appellants and allowed the writ of the Railway authorities by vacating the stay granted on the construction of the Railway station. While so ordering, the High Court took note of the fact that substantial work on the railway station had taken place on the other side of the Necklace Road which had been recognised in the earlier orders in WP 26378 of 2000 of the AP High Court on the petition of the Forum for a Better Hyderabad vs Government of Andhra Pradesh and others. **The Court observed that maybe the petitioners are having good prima facie case ultimately to seek imposing some restriction on further construction activities, if any, on any other area of the lake.**

In the interim orders of the Supreme Court pending disposal of the appeal, **it was directed that no further construction shall be carried out except with leave obtained from the Court in, on or around the lake**. Also, having regard to the nature of the issues involved and particularly in view of the submission of the learned counsel for appellants that the orders of the High Court on the question of the extent of the lake are conflicting, the writ petition was withdrawn from the High Court for disposal by the Supreme Court. The present Committee of three members was appointed by the Court to consider the construction and to submit a report as to suggestions relating to the encroachments, if any, and the pollution if it exists, in respect of the lake. The Committee will also recommend to the Court as to what measures could be taken with regard to the Railway station which has already been constructed (orders at Annexure A).

On receipt of the Supreme Court's orders in early May, the Committee started functioning in accordance with them. It held two inspections of the Hussain Sagar Lake and environs in June and August, met individuals, experts and organizations that had done studies or mapping of the lake or shown interest in it, as also Governmental authorities. It invited suggestions and memoranda and received a number of them (Annexure B). On 30th August 2005, the Committee held a public hearing after due notice in the media. Brief records of all the meetings are also annexed (Annexure C). Based on all these inputs including those from the Government (Annexure D), and technical papers which were referred to and discussions with experts (Annexure E) on the extent and nature of pollution of the lake and the possible measures to tackle the issues and redeem the lake, the Committee gives the present report. Relevant maps and sketches are also enclosed.

The scheme of the report is to look at the past litigation and the broad approach in the rest of this chapter and then deal in the remaining chapters with the following:

Chapter 2: General overview of the lake ecosystems, in particular the lakes and their ecological and environmental role.

Chapter 3: History, geographic description, extent, water budget of the Hussainsagar lake also considered in the context of all the lakes of Hyderabad and the manner in which 'land use' has impacted the water body.

Chapter 4: Encroachments, including interpretation of maps and imagery and a look at the developments in and around the lake and its implications for communities living around the lake.

Chapter 5: Water pollution including the biology and aquatic ecology of the lake as also its social and community uses depending on the water classification and the water storage and ground water recharge.

Chapter 6: Other issues including health risk due to lake pollution, possible air pollution impacts on the lake, dam safety, solid wastes and the fitment of the lake in the overall city planning.

Chapter 7: Conclusions and recommendations

1.2 Brief history of earlier policy and litigation

The policy relating to urban planning and the role of water bodies in it is not clearly adumbrated, except in the revenue records dating back to the period of the Nizam's rule when water bodies were shown as 'shikam' and there were orders not to alienate this and neighbouring Government land variously classified as 'gairan' or 'kharij khata sarkari'. The intention was clearly to conserve the water spread and foreshore. Hussain Sagar Lake itself was primarily in Survey No 9 of Khairatabad village. According to the deposition of the Deputy Director, Survey and Land Records in OS 12 of 1983 (detailed later), the Khairatabad village was surveyed in 1324 Fasli (1914 AD) and Hussain Sagar Lake was assigned Survey No 9 with an extent of 1,379 acres and 35 guntas (roughly 479 ha). There are water bodies of the lake stretching into other S Nos like 20, 21, 22, 23 and 31 of Somajiguda, S Nos 212/1 to 8, and 7 and 8 of Khairatabad, S Nos 194 of Begumpet village and S No 43 of Bholakpur village, some of which were shown as patta, some as kharij khata or taken over inam land and even as shikam. In some of these cases, court cases were pending before land grabbing or other courts. S Nos 7/1, 7/2 and 8 are recorded as shikam talab in pahanies (revenue records) of 1947. The entries are not so clear in the records about S Nos 20/1, 20/4, 21, 22, 23 and 31. But S No 20 is clearly 'sarkari', whereas 20/2 and 20/3 are shown as pattas in 1937 pahani (1338F). In regard S Nos 212/1 to 212/8 of Khairatabad village, where there is a big water body, as confirmed in the maps as well as from the inspection of the Committee, has been shown as patta land in government records. According to revenue authorities, the pattedars of the land constructed a compound wall of the land within the boundary of their land. This water body is clearly a part of the Hussain Sagar system and it is not clear how patta was issued on a water body. **The Committee requested the authorities thrice to provide details on how the patta was granted, but this has not been furnished up to the time of writing this report. This will have to be probed further.**

The judicial pronouncements in some of the cases pertaining to Hussainsagar water body do consistently hold that a water body should be respected. In its orders in OS 12 of 1983 of 20th February 2001 the **Additional Chief Judge City Civil Court, Hyderabad held that the land claimed as mazi S Nos 50, 51 and 64 was part of S No 9, ie, Hussain Sagar Lake bed. It is interesting to note that the Government of Andhra Pradesh, while holding this was so also mentioned in a written statement that they laid a road (Necklace Road) in it to develop it.** In another case where a claim was laid

to mazi S Nos 39, it was held to be part of S No 9, ie, Hussain Sagar tank only by the Special Court under AP Land Grabbing (Prohibition) Act, Hyderabad in LGC 145 of 1994 on 5th December 2001. **In this orders the Special Court made an interesting observation that "Merely because somebody leveled the tank when the water receded or raised some structures or dug some wells does not make it any the less tank".** These orders were also upheld by the A.P High Court in their orders in WP 1218 of 2002 on 21st September 2002, and the Supreme Court in SLP 22546/2002 of 9 December 2002 dismissed the Special leave petition against that. Again in respect of encroachments in S No 9 as well as 8 (the latter being kharij khata) the Special Court in its common judgement of 13 October 2004 on LGC Nos 106/99,107/99 and 109/99 declared the land was shikam Hussain Sagar and directed the encroachments may be vacated. However the Hon'ble Court added, "the respondents are poor people, the Government may consider for regularization of the land in favour of the respondents on their applications within two months from the date of this order". The applications are said to be pending with Government.

The next set of cases in Courts is those that preceded the present one in the Supreme Court. They include the orders of the AP High Court in WP 26378 of 2000 on 15th June 2001, where they held that **no further permanent structures including those involving commercial activities may be allowed to be raised on or near the water spread or catchment area. The word 'catchment' has not been defined.** If the definition were the orthodox one which includes all the area from which water is trapped and flows into the lake, the area covered would indeed be huge. It is mentioned in the judgement that the catchment area is 16,447 acres (6,659 ha) and the intercepted catchment is 42,382 acres (17,159 ha). **Perhaps their Lordships meant by that term the foreshore areas, water bodies and channels or nalas which feed directly into the lake and all the areas up to MWL, where there is fluctuation in water level or is somewhat higher ground from which water gradually flows into the lake.**

In their observations their Lordships mentioned, **"Water bodies play an important role in the matter of maintenance of ecology. They act as a benefactor to the society. Any encroachments on the water bodies may be found to be detrimental to the society" and again,** "Hussain Sagar is also required to be protected for preventing floods and in the event of water logging of the city as the rainwater normally would be stored in the lake only when the rainwater cannot find its way in the water bodies, a flood like

situation may arise. Of course, having regard to the fact that precautionary principle had not been adhered to; a great deal of encroachments had been made. **The water of Hussain Sagar, by reason of immersion of the idols or otherwise, is also being polluted,** although it has become free from industrial effluents coming into it". It is also to be noted that the High Court referred to the counter of the Government showing the present area of the lake as 1,066 acres (431.58 ha) as against water spread of 1,203 acres (487.04 ha) thus showing that within a short span of time 140 acres (56.68 ha) have been encroached. In the same orders the Court referred to a notification dated 4-5-200 by the Hyderabad Urban Development Authority (HUDA) also showing the water spread at MWL as 1,739.6 acres (704.29 ha) and at FTL as 1,423.3 acres (576.23 ha). It also referred to the stand of the Government that this notification by HUDA was not statutory but merely an appeal to the inhabitants of the respective corporations.

There are discrepancies also in the area of the lake reported in other documents and cases, which seems to have prompted the appellants to mention it to the Supreme Court in this case. The AP High Court also directed that construction of amusement park etc, might be allowed subject to examination and certification by the AP Pollution Control Board (APPCB) that creation of such parks, etc, would result only in sustainable development and would not create any ecological imbalance. **The APPCB laid down that there can be no net addition of small vehicular traffic attributable to the development proposed on all roads surrounding the lake and there can be no discharge of trade effluents or sewage from the new projects into the lake and there can be no littering or solid waste disposal in and around the lake.**

In WP 13656 of 2003 and WP 7848 of 2003, judgments were delivered on 16-10-2003 and 20-7-2004, respectively **that the authorities should protect the water spread area both from private persons and the governmental authorities as required under the law** and that APPCB shall ensure strictly monitor adherence to conditions during the construction and thereafter and if any violation is found the Board could take necessary action in accordance with the law. These directions were repeated in WP 7426 in the judgement dated 13-9-2004.

In the WP 24937 of 2004 relating to the cremation and erection of a memorial in honour of the Late Shri P V Narasimha Rao, former Prime Minister of India by filling the lake, the judgement is to be delivered.

In WP 10113 of 1995 and 21495 and 22303 of 1998, on idol immersion in Hussain Sagar Lake, the Division Bench of AP High Court in their judgement on 15.6.2001, observed that the "lakes in and around the twin cities, and Hussain Sagar in particular, are being polluted by reason of immersion of idols. **It is unfortunate that official agencies, which have a statutory duty to maintain the standard and purity of the lake, had failed or neglected to perform their duty. It is also unfortunate that the state had failed to act even in terms of the recommendations of the various committees set up for various purposes.** Immersion of idols should be divided in several tanks so as to minimize pollution. We may notice that guidelines in almost a similar situation had been issued by the West Bengal Pollution Control Board with regard to maintenance and cleanliness of the water of river Ganga, after the immersion of idols on different festive occasions. The authorities must follow the said guidelines on the same lines and/ or other stricter measures having regard to the fact that in twin cities of Hyderabad and Secunderabad, idols are immersed in lakes and not rivers like Ganga."

There are a couple of other cases relating to water bodies in Hyderabad that have a bearing on the status and management of Hussain Sagar Lake. In civil appeal 368-373 of 1998-99, in their judgement dt 1.12.2000, relating to Himayat Sagar, the Supreme Court confirmed the orders of APPCB, not to grant consent to M/s Surana Oil Derivates (India) Ltd, not to grant consent to establish its industry within 10 km of Himayat Sagar. In its observations, the Supreme Court not only mentioned the duty of the state under article 21 of the Constitution of India to provide clean drinking water to its citizens, but also highlighted the significance "of Precautionary Principle" as the new rule of "burden of proof" in the matter of environmental pollution, and emphasized the need for scientific inputs before adjudicating complicated issues of pollution to environment. The Court added that on the basis of scientific material obtained from three highly reputed sources, that on the **facts of this case, the Pollution Control Board could <u>not</u> be directed to suggest safeguards, and that there is every likelihood that safeguards could fail due to accident or human error.**

In WP 36929 of 1998, relating to Durgam Cheruvu Lake, the Division Bench of AP High Court directed on 20.7.2001:

a) AP Pollution Control Board is directed not to allow 20 highly polluting industries notified by Government of India, as falling within the purview of industrial licensing, to come up within the vicinity or catchment area of Durgam Cheruvu.
b) Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB) is directed to provide collection of sewage and treatment systems for the existing colonies in the vicinity of the upstream of Durgam Cheruvu in order to prevent the flow of domestic and other forms of effluents into the lake.
c) The Commissioner, Serilingampally Municipality is directed not to permit any more residential colonies in the vicinity or catchment area of the Durgam Cheruvu to come up and take immediate and necessary measures to prevent the discharge of sewage from nearby colonies into the lake, so as to protect the quality of water of the lake (the word "catchment" is used signifying a very large already heavily built up area).

In a subsequent case in the AP High Court in WP 21793 of 2001 decided on 23 January 2002, the Court took note of the fact that in GO 4 dated 2-2-1996, the Government of Andhra Pradesh decided to declare 55 acres of Buddha Purnima Project as NTR Gardens and as held in S R Ramanujam v Chief Secretary to AP Government, the park cannot be used for any other purposes. In this writ petition 25835 of 1996 and 35 of 1997, the observations of their Lordships were as follows, **"Military and State honours could be provided and all honours which the departed deserve could be extended without there being any interference with the parks in the city, if there was a will and desire to respect the fundamental rights of citizens of Hyderabad and Secunderabad. In sum, the respondents have acted out of jurisdiction as well as with malice in law in permitting disposal of the dead bodies of late Shri N T Rama Rao and late Dr Channa Reddy in the public parks and have violated the rights of the petitioners and others similarly situated under Articles 14 and 21 of the Constitution of India."** These observations pertaining to conversion of parks should apply with even greater force to the conversion of a water body or its foreshore.

The IMax theatre construction of which was originally allowed in the NTR gardens and was challenged before the Court was held to be in area other than the NTR Gardens in view of the correction issued by the Government on 22-10-2001 that the land was located in commercial zone abutting NTR Park. There are other cases too like the case in which the AP High Court directed no cremation should take place in the lake area.

As regards the policy of the Government in dealing with water bodies, it is to be noted that the AP Government has been deriving authority from the AP Urban Areas (Development) Act, 1975 (Act I of 1975). Under section 59 of this act, the HUDA notified Zoning Regulations of Bhagyanagar (Hyderabad) Development Area. Among the land use zones was the recreational use zone and in it were included waterfronts. It may be noted that 'water body' as such has not figured in the uses. The master plan is also notified under the Act. It is open to the Government to make any modifications in the master plan under Sec 12 (2) and Sec 13A of the Act by notification in the official Gazette inviting objections and suggestions, giving fifteen days time for conversion to non-industrial use and seven days for industrial use. In the WP 21793 of 2000, the High Court has assumed that the Master Plan was amended in 1997 to make part of the lake area as commercial and another as recreational. **But the Court recorded dissatisfaction over the way in which this was done as citizens had to be informed about the developments.**

Among the notifications made under the above Act were GO 75 MA dated 3-3-97 **converting 26 hectares from part water body and part public and private use into recreation park (park use zone) and in GO 363 MA of 23-8-1995 land of 4 hectares earmarked in the zonal development plan was changed to commercial use zone for the construction of world trade centre. This area has since been given to the IMax theatre.**

An indication of the policy thrust is seen from the constituting of the Buddha Purnima Development Authority (BDPA) through GO 1947 MA, dated 8-91981. The objectives of the scheme were:

- To save the lake from encroachments by stopping reclamation.
- To provide recreational, public and semi-public outlets commercial and communication.
- Preservation of aesthetics of the lake by proper landscape treatment.
- To make conservation of the lake a commercially available proposal
- To develop the lake as a centre of activity for water sports.

Further indications of the policy thrusts are in the entrustment of studies and plans by eminent architects like Shri Charles Correa for beautification of the lake and that the city

had grown rapidly not matched by public places and the lake and its environs have the potential and the size to fit the role of a public plaza for the city's place. **Thus the water body was treated like any other land on which a plaza can come up.**

In regard to pollution of the lake some initiatives had been taken like diverting the industrial effluents from Balanagar, Jeedimetla and Fatehnagar area as also from Kukatpally nala, Picket nala, Yousufguda nala, Banjara nala and Balkapur channel by pipe (duplicate K&S Main and Duplicate A Main sewers) downstream of the Hussain Sagar Lake, creation of a sewage treatment plant in the tank bed near the Khairatabad flyover to treat the sewage from Banjara side, and plans for up gradation of this plant and having another near the Picket nala. The Kirloskar report in the wake of the 2000 floods for improvement of nalas upstream and downstream is under consideration.

In 1995-97 and in 2004, 527,000 cubic meter of material was dredged from the lake to fill in the area between railway track and Necklace Road, but further work was stopped on orders of the High Court as the lands were under litigation. HUDA has constructed compound wall near the railway station, Khairatabad flyover (which the Committee found had been breached in two places). A proposal to dredge sediment from the lake is also under consideration based on a report of the Environment Protection Training and Research Institute (EPTRI) given in November 2004. To consider taking up of many of these works, a new Project proposal has been made to the Japan Bank for International Cooperation for Rs 311 crores, and as a first step it has been decided to conduct a Special Assistance for Project Formulation. The Committee has also come across proposals for an underwater world at Sanjeevaiah Park (which juts into the lake) and a rail link between the Sanjeevaiah Park and Lumbini Park across the lake. An architect Shri Nitish Roy has also made suggestions for development of Entrance Plaza, Theme Park, Water Park, and Mono Rail etc in the Sanjeevaiah Park.

1.3 Approach in the Report

The Committee would be totally guided by the directions of the Supreme Court. The Committee also had for guidance the observations of the Supreme Court in M C Mehta vs Union of India (1996) 8 SCC 462 (Badhkal and Surajkund Lakes), and again in M C Mehta and Union of India (1997) 3 SCC 715. In these cases the Court held that large scale construction activity in the close vicinity of the 2 lakes is bound to cause adverse impact on the local ecology, disturbing the rain water drains, which in turn may badly

affect the water level and well as the water quality of these water bodies. It may also cause disturbance to the aquifers, which are the source of ground water. The hydrology of the lake may also be disturbed. The Court favoured a green belt of 1 km radius all around the lakes.

The Committee is analyzing in detail the environmental and ecological, socio-economic and other factors related to the Hussain Sagar Lake and its surrounding environs in the ensuing chapters, both in the context of total urban planning and in the background of how urban water bodies have to be looked at, especially when located in a semi-arid plateau region as the Hyderabad city is with deficiencies in water supply for most of the year and flood proneness in some years.

The Committee is conscious of the directions of the Supreme Court, which cover encroachments, and pollution of the lake. In this exercise, therefore, the Committee decided not to accept any step already taken either to encroach or pollute as a fait accompli but go deep into reasons behind and not to hesitate to point out how many of the measures both in the public and private domain infringed the doctrine of PUBLIC TRUST in respect of a common property resource and has been continuously been justified and even judicial sanction sought. On the basis of such an examination, the Committee would be making recommendations, which may be of value in tackling the issues relating to the Hussain Sagar Lake, especially of the restoration of the ecological value of the lake, and submit them for the consideration of the Honourable Supreme Court. **The Committee has to make special mention of these considerations, having observed that even after the interim directions of the Supreme Court that there should be no construction either in, on or around the lake until further orders and the Committee also pointing out to this in the inspections, the activity has continued in some places. This shows either a spirit of defiance or a continuance of the tendency to take the water body for granted and as a piece of land, which can be put to any use.**

The Committee has made recommendations specifically on the Hussain Sagar Lake. But the problems of encroachment and pollution afflict many (nee most) urban lakes in India. The Committee hopes that the recommendations made in this report will be also viewed in the larger context of all urban lakes in India, most of which need conservation and upkeep in the larger public interests and for inter-generational equity; which demands

that we do not diminish our natural resources, so that our children and grandchildren also continue to have and enjoy them.

Chapter 2 Lakes

2.1 Eco-Systems Services That Lakes Perform

A lake is defined in the Concise Oxford Dictionary as ‘a large body of water entirely surrounded by land’. It is also described as ‘an aggregation of water bodies’.

It is a special ecosystem like the rivers, mountains, forests etc., which confers immense benefits to all living beings. It can be natural formed in natural depressions as in Kolleru Lake, Chilika Lake, Manasarovar Lake or smaller lakes in Hyderabad like Durgamcheruvu. Human beings, taking advantage of the natural terrain, can also build lakes.

Lakes perform several ecosystem services. Some of them are well described in various documents: Eg, the Hyderabad Urban Development Authority (HUDA) notification (No 3195/PR/H/2000 dt 4/5/2000) makes the point that: “Protection of lakes and water bodies has assumed great importance in recent years for the following reasons: * Recharging of ground water, * Recycling of valuable sources of water for various urban uses, * Development of foreshore areas as recreational and picnic spots, * Serving as essential lung spaces for the large urban populations, * For maintaining ecological balance as a long term objective.

In a pamphlet brought out by the Lake Development Authority at Bangalore, which says a lake “can: *Harvest water, *Recharge the groundwater table, *Mitigate floods, *Act as a city lung-space, providing air and area for public gardens, *Can be a nesting place for birds and also be a rich piscine habit, *Offer several recreational options like boating, swimming, jogging, *Help promote eco-tourism, *Serve as an emergency reservoir during fires, drought etc, *Function as a cattle watering hole”.

Some of these functions continue to be performed by lakes in an urban setting, where a **lake also has a moderating influence on the microclimate, especially in semi-arid zones like the Deccan plateau,** where they can serve as sources of irrigation as well as drinking water supply.

Most lakes are self-renewing and cleaning in nature, taking advantage of the fresh water that enters with every rain and the surplus mechanism. But there are limits to this when the area is very arid, or there is excessive washing or bathing with the use of soaps and detergents, or when pollutants, (eg, chemicals and sewage) enter the lake, causing eutrophication, overgrowths of weeds like water hyacinth and odour. In rural lakes, frequent desilting and periodic maintenance, following practices like *kudimaramath* in South India ensure the lake quality is in good repair.

But there are problems in urban lakes where the polluters and pollutants are many. In such lakes, inflows of untreated sewage and sullage carry tremendous amount of plastics. Many lakes like Hussain Sagar are used for washing cattle and clothes, attract wrong type of tourism accompanied by litter, oil spills, etc; and even for immersion of large idols made of plaster of paris, toxic paints and iron scaffoldings. Such practices pollute lakes very quickly, as also diminish groundwater quality, and form impervious lower layers that affect aquatic life that has its own cleaning role. Encroachments, laying of roads and having structures that impede water flow diminish the lake, making it even more difficult to clean itself due to the reduction in water storage and flows.

2.2 Lakes in India

India has been blessed with several lakes, both natural and manmade. In view of the ecosystems services lakes give, most villages have either a lake or at least a pond, which helps store water and also recharges the village wells. There are lakes in dry areas like Rajasthan, which are invaluable stores of water—a precious commodity in a desert system eg, Rajsamund. Every temple had a tank attached where water was used not only for religious purposes but also served the needs of the village and townspeople for bathing, groundwater recharge, etc.

In states like West Bengal and Tamil Nadu, most villages have a village pond or lake, which gives sustenance to the villagers in different forms. In all the lakes there are resident birds and fish and many of them attract migrant avian species too which enrich the lakes with their droppings, cull the fish and make periodic forays into neighbouring fields to harvest pests and worms many of which are harmful to farmers. Many manmade reservoirs like Bhakra Nangal, Srisailam and lakes like Vaitarna near Mumbai

are storehouses of water for irrigation and power, are also sources of drinking water, and perform other ecosystem services.

Most forests have lakes inside them, which are of value to the life inside, including wildlife. Hills too have lakes, eg, Nainital and Kodaikanal, which also perform several eco-system services. In the northern part of the country every place has a jheel or sarovar and in the South a kulam, kere or cheruvu. No wonder that many of these are not only conserved by the local citizens for the value they add to the local lives and livelihood security but are also considered sacred, eg, Hemkund Lake, Amritsar Saras, like the rivers, waterfalls, springs and groves. The spirit of conservation in these cases is almost the same as what applies to ecological systems.

2.3 Urban Lakes

Then there are the urban lakes like Dal Lake in Srinagar, Bada and Chota Talabs in Bhopal, in Jaipur, Bangalore. Kolkata, Pune, and in almost all other towns and cities. These lakes perform most of the ecosystem services listed above, apart from adding to the scenic splendour of the otherwise dreary urban landscape dotted with disharmonious structures and hoardings, rarely punctuated by beautiful trees or rocks. Almost all of them are conducive to moderation of the microclimate and bird life, which attract the citizens and nature lovers among them too. They are cushions against floods in the rainy season. Many of them are valuable sources for both surface and groundwater supply.

In Hyderabad, as noted earlier, Hussain Sagar played an important role for four centuries, until 1930's, as an urban drinking water supply source—a low cost one, like the way Himayat Sagar and Osman Sagar (which were later creations) still are, in spite of being threatened by unsustainable developments like industrialization and wrong kind of urbanization, which have attracted the critical remarks of the Honourable Supreme Court in Civil Appeal 368-373 of 1.12.2000 (quoted in Para 1.2).

2.4 Management Of Urban Lakes in India

The effect of urbanization on the lake eco-systems has already been discussed above. Even though the lakes have either disappeared or are heavily encroached and polluted, the ecosystem services they could have performed, and continue to perform, cannot be substituted by any other mechanism. The urban populations in cities like Hyderabad

experiencing water shortages can ignore lakes only at their own peril. So, measures have to be taken to restore them and their water quality as argued well in one of the papers given to the Committee by the Centre for Resource Education (paper of August 2004 on Approach Methodology—Annexure E).

It follows that the management practices and institutional mechanisms tailored to them have to be mindful of the need for corrective and firm action. The gaps identified in the management of urban lakes are:

- Urban lakes are grossly neglected water resources
- Water shed management has to receive attention
- Urban lakes are unique and their water quality reflects cumulative effects of land use of corresponding water shed areas
- As no two urban lakes are similar, locale specific water shed management is required

The institutional mechanism for many such complex tasks, including avoidance of pollution of lakes in urban areas, is fragmented. There is a multiplicity of agencies handling lakes in most cities. It is a case of too many cooks spoiling the broth. As will be seen later in Section 3.3, **the Hussain Sagar Lake is subject to the management of at least nine government formations, apart from the private sector that influences management, if not actually involved with management.**

In rural areas, three agencies control the management of lakes—revenue, panchayat and irrigation. The proximity of the lakes to the small village populations, to whose needs the lakes cater, acts as a fairly effective lever for their management.

In urban lakes, there are competing demands of stakeholders. These include poor communities, eg, cattle owners, fishermen and also government agencies like railways and road authorities, urban planners, for whom a water body is like land, tourism agencies who consider lakes to be picnic spots and religious groups. **Added to these interests are those of real estate and commerce (including land grabbers), who wish to profit by the central location of urban lakes. Other stakeholders like walkers, joggers, cyclists, water sport lovers and nature lovers, most of whom enjoy plain communion with nature, have been marginalized. All these interests compete and**

most of them, except the marginalized, reduce the lake in size and quality, and take away slowly from the valuable eco-system services that they can perform.

It is a recognition of the problems of lakes that made the Government of Karnataka constitute the Lake Development Authority (details in Annexure D). There is some kind of unified command in the management of lakes in Bangalore. The attempt is to manage them such that citizens can enjoy fresh air, good health and good microclimate, and also encourage water sports of the sustainable variety. Another model can be seen in the Bhoj Lake of Bhopal city (Annexure E). A recent newspaper report suggests that in regard to Udaipur Lake, conservation measures have been called for, and reference also made to the orders of the Supreme Court that "Talab petas cannot be built upon".

The central theme of management has to be to treat the lake as a water body that requires conservation; both in its own right and as a valuable ally of all urban residents, and also for visitors. If this were done, there would be enhanced beauty, utility and sustainability for generations of city dwellers. In this process, the heritage, cultural and artistic value of lakes should also be recognized, as argued by some before the Committee.

Thus, suggestions have come to declare Hussain Sagar as a monument "Under the Ancient Monuments Act" or as a "Heritage precinct" under HUDA. Multiplicity of controlling agencies, lack of coordination or consultation among stakeholders, and finally, non-implementation of rules and regulations, which have been agreed upon, should not vitiate management of lakes. **Bad lake management practices, such as mentioned above, tend to benefit the few (generally the privileged or better-off), while taking away pleasure and livelihood security from many, which is a violation of the doctrine of <u>PUBLIC TRUST</u> and respect for common property resources.** Based on a study of good practices elsewhere and in Hyderabad, the Committee will endeavor to recommend good management practices for Hussain Sagar Lake, which can hopefully influence management of other urban water bodies in the state and elsewhere.

Chapter 3 Hussain Sagar Lake

3.1 Brief History of Hussain Sagar Lake

Hussain Sagar is the oldest of the five big freshwater lakes in the city of Hyderabad. It is situated between the twin cities of Hyderabad and Secunderabad. The lake, in fact, is older than Hyderabad city, having been constructed by Sultan Ibrahim Quli Qutub Shah during his reign as King of Golconda. Its date of construction in the 16th century is put around 1561. The lake came about with the construction of an earthen bund, about 2.5 km long along in a North-north-east to South-south-west direction, connecting two highrise areas and storing water over a large area, depressed and marked by rocks and foreshore of grasslands and vegetation until about 50 years back.

For nearly 375 years, i.e., till the 1930's, it served as a source of drinking water and irrigation. The first piped water supply to the city was started in the year 1864 through the Narayanguda slow sand filter beds. The water supply from the Hussain Sagar Lake to the British residency and surrounding localities was continued until 1930-31, when the water supply from Osman Sagar Lake was started. Raw water of Hussain Sagar was being supplied to Fateh Maidan, Public Garden, Women's college, Dhobi Ghat, Osmania University, Electricity Department, Narayanguda Distillery, Industrial area and Railways totaling 20,25,000 gallons (as quoted in the judgment in WP 26378 0f 2000.0f 15th June 2001). Some of these uses like the supply to the Distillery may have ceased now.

The geographic location of the lake is 17^{o}25'N and 78^{o}28'E. It is elevated about 540 meters above sea level. The catchment area is 16,447 acres (6,659 ha) with an intercepted catchment of 42,382 acres (17,159 ha). It is fed by the Bholakpur (Balkapur) channel and three other nalas, viz., Banjara, Kukatpally (including Jeedimetla and Yousufguda) and Picket. Two other small streams also join the lake at Bridge 3 near Hussain Sagar Railway junction and near KIMS Hospital on Ministers Road.

There can be no better description of the lake as it then was, than from two books, "The Glimpses of Nizam's Dominion" by A Claude Campbell and "Confessions of a Thug" by Capt Meadows Taylor who served as the Assistant Resident of the British. In the first

work we come across this piece describing the Hussain Sagar Lake, “This fine sheet of water is about 11 miles in circumference and is the largest body of water near Hyderabad. The lake and the tanks in the vicinity are considered to have decidedly beneficial effect on the climate of both Hyderabad and the Cantonment of Secunderabad. The scenery around this charming expanse of water appeals strongly to all lovers of the picturesque in nature, for the eye meets the verdant slopes of velvet softness in the Northwest, a scraggy weather worn eminence of bare rocks to the South-west, wooded sloping pastures to the East, and a valley, skirted afar off by picturesque rose-tinted hills, and a great outburst of granite to the South. A direct highway runs along the bund or huge dam, for about two miles and unites the Cantonment of Secunderabad with Hyderabad. It is mostly along this pleasant and well-metalled drive or promenade that residents, both European and Native, seek relaxation after the day’s work, either driving, riding, bicycling or walking in the cool of the evening and enjoying the refreshing breeze that floats so appreciably across the lake.”

In the second book we read, “We passed the village of Ulwal… and pursuing our way, we saw on passing a ridge of rocks, the camp of the army at the far-famed Hussain Sagar… We had heard much of this lake from many persons on our journey and as we passed it, a strong breeze had arisen, and the surface was curled into a thousand waves whose white crests as they broke sparkled like diamonds and threw their spray into our faces as they dashed against the stone walk of the embankment. We stood a long time gazing upon the beautiful prospect, so new to us all, and wondering whether the sea of which we had heard so much, could be anything like what was before us”.

The lyricism apart, these extracts bring out the vastness of this lake in those days and its moderating effect on the climate. The vastness of the lake can be gauged not only from earlier maps, but also from accounts by old residents of Hyderabad. Thus it has been stated that “the original spread of the waters of Hussain Sagar was up to the present Begumpet Police Lines.” Sir Ronald Ross had his laboratory within walking distance from the lake (today, it is not). He discovered the malaria parasite on the banks of this lake (article by Shri Sarvottam Rao, IFS (Retd) in the 2000-2001, anniversary number of the Forum for a better Hyderabad). In his discussions with the Committee, the Khairatabad corporator referred to his childhood when the lake water was present in the

area now occupied by Prasads IMax theatre, and buffaloes grazed here when the waters receded.

Based on the lake perimeter of 11 miles referred to earlier, some interesting calculations have been attempted of the lake area. Had the lake been circular, the area would be 6,160 ac (2,494 ha), if pentagonal with equal sides, it would be 5,329 ac (2,157 ha), if rectangular, 4480 ac (1,814 ha), if square, it would be 5,120 ac (2,073 ha). Even the lowest of these estimates is larger by a factor of four compared to the present notified size of about 1,373 ac (555.9 ha HUDA notification dated 4-5-2000) and the area of 1,066 ac (431.6 ha) mentioned by the Government itself in the counter affidavit filed in WP 21793 of 2001.

The sad incontrovertible fact is that in the last two decades of the last century and in this century too, the lake has been reduced to less than *one-fourth* its original size, and still continues to shrink because of encroachments. This, coupled with the entry of untreated sewerage and industrial effluents, especially from the late 1960's, has affected the ecological role of the lake. Till then it had a reasonable water quality (outdoor bathing standard), and attracted migratory birds. Groundwater levels below the lake were steady till then, but started declining thereafter.

In regard to bird life in Hussain Sagar Lake, the Bird Watchers Society of Andhra Pradesh has referred to 35 bird species being recorded. Of this, the population of winter migrants likes shovellers and pintails have declined in the last few years due to the manifold disturbance in the area. There have been no sightings of Ruddyshel Ducks after 1983, Comb Duck, Red Crested Pochard, Common Pochard and Black Headed Ibis after 1996. The Blue Rock Thrush has not been seen after 1997. Three more species—Cotton Teal, Brahmani Kite and River Tern have not been sighted after 1998.

All these developments have been further compounded now by the further decline in the water spread due to laying of roads, parks and tourism developments. The aesthetics of the area are also now overwhelmed by excessive building activity all around the lake and the erection of huge hoardings that take away from the view and beauty of the lake.

3.2 Lakes around Hyderabad

Hyderabad was a city of beautiful (and useful) lakes, parks, gardens and small tanks until the mid-twentieth century. The earlier residents seem to have been very conscious of the need to conserve water, both surface and under ground, due to long periods of dry and arid weather.

In May 2000, HUDA notified that there were 169 lakes of more than 25 acres in extent. The State of Environment (SoE) report of the Environment Protection Training & Research Institute (EPTRI) in 1996 stated that there were 125 lakes in and around Hyderabad and 23 of them were perennial. It added that "many lakes in Hyderabad have either disappeared under residential and industrial areas or their areas have decreased due to encroachment of both foreshore and even bed and bunds by housing, parks, tourism and agriculture. The water quality has also witnessed considerable deterioration due to the increased inflow of untreated domestic and industrial effluents".

Striking examples of water bodies which have vanished under housing or parks are Masab Tank and Anumula Kunta tank, which was on Road 1 Banjara Hills, which is now a park (Jalagam Vengal Rao park). The vanishing lakes were in the company of gardens like Kundanbagh or Kanchanbagh or Imliban or Bagh Lingampally that are now but names. Water sources like wells, eg, Putli Bowli, Gachi Bowli have also vanished giving their names to the suburbs. The Musi River is now been reduced to a sewer and thereby to the stage of being considered for some kind of real estate and commercial development, instead of having a sustainable plan to develop it into a waterway, enhancing the quality of the surroundings. The disappearing lakes took many of the picturesque rocks that dotted the city landscape softening the dreariness of an urban setting.

The National Remote Sensing Agency (NRSA) had found 932 tanks in and around Hyderabad in 1973, which came down to 834 in 1996 (page 19 of the 2000-2001 Annual of the Forum for Better Hyderabad, Ibid). Between 1927 and 1996, 18 tanks above 10 ha and 80 tanks below 10 ha have disappeared according to an EPTRI-NRSA study (Ramchandriah, C, Pollution and loss of water bodies, Annual Number 2004-05, Forum for Better Hyderabad).

The exact areas of the lakes, their FTL and MWL are not demarcated on ground, thus helping the cause of land grabbers and unsustainable development activities, including tourism, roads, commercial zones etc. All this has happened while the population increased and the water supply sources decreased. Even with water being brought from distant rivers, most areas in the city are given piped water supply only once in two days for short periods and many depend on water tankers which bring water burning fossil fuels which aggravate water pollution. Had all lakes that had existed even up to 1930 been conserved, they would have supplied a substantial portion of Hyderabad's current demand for water. They would also have had a beneficial effect on the microclimate of the city by keeping heat waves away.

There is good reason to reverse this trend in the interest of all citizens, and there is no reason why this cannot be done.

3.3 Location and importance of Hussain Sagar Lake

The Hussain Sagar Lake is a bridge between the twin cities of Hyderabad and Secunderabad. It is close to the State secretariat and many other Government offices like the office of the Municipal Corporation of Hyderabad (MCH) and is also not too far from the present airport and the railway stations of Nampally, Begumpet and Secunderabad. The original Central Business District (CBD) of Hyderabad and Secunderabad cities has grown around the Hussain Sagar Lake. Since the lake is at the centre of the CBD, there has been a strong temptation to make the lake a part of the CBD. However, other CBDs like HiTech City and the International Airport are rapidly being developed. Hence, there is no reason at all to try to make the lake an integral part of the original CBD.

In the last two decades the buildings in and around the lake as well as the recreational and commercial activities in it and its environs have reached a stage where the older structures like the Raj Bhavan and Lake View Guest House located on the road up to which the waters of Hussain Sagar lake used to reach until the 1960's no longer enjoy the view of the lake that they used to earlier. Roads like the Ministers Road, NTR Marg, and off late, the Necklace Road have come up at different stages in the lakebed and apparently heightened the importance of the lake from the traffic, commercial and real

estate point of view. In this sense, the location of the lake has become even more important and attracted several activities, which diminish the ecological role and apparently enhance its economic role.

Yet the ecological role of the Hussain Sagar Lake continues to be important for the residents of Hyderabad and Secunderabad, especially the colonies in the foreshore area as well as in the downstream area below its bund. For these colonies, the lake offers not only a unique water body ideal because of its moderating effect on temperature and humidity for simple sports like walking, bicycling, jogging, rowing and sailing but also a source of groundwater recharge and a buffer against floods when the margin between FTL and MWL is conserved as all foreshores should be. Economic development around the lake, encroachments on the lake and pollution of the lake have threatening the ecological importance of the lake.

These developments have also impacted traditional livelihoods that people could eke from the lake. For example, the lake foreshore was earlier used for farming, which has now disappeared. The lake foreshore was used by washer men. This activity has been shifted to other areas.

The effect of reduction of water spread of the lake between 1987-2005 on ground water levels in the hydraulic gradient on the downstream side was analyzed. The data related to dug well at Gowshala on Lower Tank Bund Road is relevant in this context. There has been a secular increase of depth to water from 1.75 m to 7.15 m in the month of April. In the month of November for the same period, it increased from 0.45 m in 1988 to 6.54 m in 2004.

The maximum and minimum temperatures in Hyderabad never crossed 40^{o}C and 26.5^{o}C, respectively, prior to 1971. Since then, they have crossed these temperatures in seven out of 15 years. In fact in three of those years, the minimum temperature crossed 28^{o}C. The mean maximum temperature rose by 4^{o}C between the 1960s and the 1990s. Reduction in the water-spread area, along with population growth, indiscriminate construction, lack of green spaces, phenomenal growth of vehicles, encroachment of open spaces, are responsible for the rise in the city's average temperature.

A point to be noted in the context of this lake is that it is subject to the management of several institutions like the Collectorates of Hyderabad and Ranga Reddy, HUDA, Buddha Purnima Development Authority (BPDA), AP Tourism Development Corporation (APTDC), Hyderabad Metro Water Supply & Sewage Board (HMWSSB), the Government in the Municipal Administration and Urban Department (MAUD), the Municipal Corporation of Hyderabad (MCH) and the Irrigation Department. Many of them manage parts of it in the geographic sense and parts of it in the regulatory or functional sense. This multiple management structure has its own effect on the importance and management of the lake and it is not always that this has been conducive to the importance or continuance of the ecological role of the Lake.

Such disparate authority has resulted in the following:

- Lake is the centre of the city with the CBD developing right around it, hence the attraction to commercialize the lake
- No master plan, hence land use can be altered at will, therefore encroachment
- Ground water levels going down in hydraulic gradient

3.4 Water budget

The total inflow into Hussain Sagar Lake in 2002 was 115 MLD and is expected to increase to 144.3 MLD in 2005 (see table below). These flows, except for 20 MLD coming through the STP, are supposed to have been diverted away from the lake in order not to contaminate the lake with wastewaters.

Incoming nala	**1992 DWF** (MLD)	**2002 DWF** (MLD)	**2005 DWF expected** (MLD)
Kukatpally, including Jeedimetla & Yousafguda	70.0	67.8	85.2
Picket	5.7	14.6	18.2
Banjara	7.0	14.2	17.9
Balkapur	13.3	18.4	23.0
Total	95.0	115.0	144.3

Source: Government of Andhra Pradesh, Report on Hussain Sagar Lake, July 2005, submitted to Supreme Court Committee

A water budget for the lake is given in the table below:

	Water quantity (MCM)
Inflows	
Storm water runoff including precipitation over lake	33
Wastewaters including through STP	10.14
Outflows	
Evaporation losses	12.5
Percolation losses	3.0
Consumptive use	3.4
Surplus through spillways	NA

Source: NEERI, Environmental Monitoring of Hussain Sagar Lake Water & Sediment, June 2000

The table does not balance as figures for surplus water through spillways was not available.

3.5 Brief historical account of land use changes around the lake

Some idea of the land use changes made by policy and private developments has been given in Chapter 1. It is necessary to look at the changes over the history of the lake, partly with the help of some historical accounts, partly from cartographic evidence and revenue records, partly by derived information from the uses to which the lake was put to over the years, partly in the context of demographic and developmental thrusts that have impacted on both quantity and quality of the waters and water spread as well as its ecological functions.

Historical accounts, mainly from late nineteenth century (quoted earlier from sources like Campbell and Meadows Taylor), show there was no interference with the lake in any manner until 1930's when it ceased to be a drinking water source. Thereafter, its spread diminished but slowly until 1960's. The lake spread up to Begumpet, Somajiguda and Khairatabad, and its related water bodies like the nalas, was not very much diminished up to 1960's, except by the encroachments on the Ministers Road side and on the Raj Bhavan and east of Hussain Sagar. The Hyderabad-Secunderabad railway line, a good length of which was built on the western side of the lake, began to be seen as the lake's border. Encroachments that inched towards the railway line were significant enough to bring down the lake area to two thirds its size in the 1930s and 1940s.

Developments after the lake ceased to be drinking water source seemed to have speeded its diminution, especially after 1950-60. This is also reflected in the relationship between increase in urban sprawl, population and decrease in the agricultural and water body areas from 1927 to 1996. Sharp decreases in water bodies are noticed between 1973 and 1996 when Hyderabad city lost 22 tanks above 10 hectares and 80 below ten hectares (EPTRI –NRSA study, 1996, quoted on p 23 of the SoE report, 1996). Though there may be differences due to the statistical base, the figure of 233 lakes for 1996 quoted therein had become 169 in the notification issued by HUDA on 4-5-2000. Similar trends are seen in the remote sensing imagery of Hussain Sagar Lake from 1996 to 2002.

How much of this decrease in Hussain Sagar took place due to change of land use? It may be noted that we are forced to use the term 'land use' even in relation to a water body as that has been the Governmental practice so far. Of course there was some recognition of the water body in the revenue records, eg, Survey No 9 of Khairatabad village, is sown as 'shikam talaab'. But the inalienable nature of such an entity was given the go-by in terms of regularization of private occupation in the foreshore as well as even in the lake over the years. The state of the revenue records does not permit piecing together all the encroachments and regularizations that took place over several years prior to 1323-24 Fasli (corresponding to 1914 AD).

After 1950's, as briefly indicated in Chapter 1, in regard to court cases pending in respect of Survey Nos rightly falling in Hussain Sagar lake area there have been steady incursions into the lake, some of which got regularized even though the survey maps show the existence of water body (for details, the notes given by the HUDA in July August 2005 may be referred to in Annexure D). The modus operandi to convert the lake into real estate seems to have been outright encroachment or filling up first with debris and thereafter occupying the land. Often this has been allowed on the ground that the occupiers were poor, but no follow up has been done to determine whether this was only a cover for richer people, as many of the areas that are even now encroachments have even multi-storeyed houses!

Another important reason for the lake being encroached upon is the lack of a notified city master plan that regulates land use around the lake. A city "Development plan for the area comprising the municipal corporation of Hyderabad" was prepared by the Health,

Housing and Municipal Administration Department (Municipal Administration) and notified in 1975 (GO Ms No 414, Municipal Administration, 27 Sept 1975) under Rule 13 of the Municipal Corporation of Hyderabad (Development Plan) Rules, 1967. In 1980, HUDA prepared a master plan for metropolitan areas under the Andhra Pradesh Urban Areas (Development) Act, 1975, and this plan was notified under vide GO Ms No 391MA dt 23 June 1980. In 1994 a master plan was prepared for a target population of 2011, but was never notified. Another master plan was prepared in 2003 and the draft was circulated for comments. This plan is yet to be notified.

Without an effective master plan, there is easy scope for making changes in the city's land use, particularly if the areas where changes are made are small. This appears to be one of the principal reasons for the encroachment of the lake and the rapid land use changes happening around it.

These developments of land grabbing which could not be controlled and the promulgation of the Andhra Pradesh Urban Areas (Development) Act seem to have prompted moves by the Government to join the encroachers in the name of development and beautification. The non-notification of a master plan and zonal development plans, and subsequent issue of government orders changing land use from water body to construction of roads, parks etc, without overtly saying so and without proper public notice or public hearing and also parceling out part of the lake environs to a separate authority like the BPDA (and through it APTDC) has brought the lake to its present size.

The trend was set by laying the NTR Marg to connect to the flyover, developing Lumbini Park and the issuing series of Government orders like GO 363 of 23-8-1995 (which openly changed water body zone to commercial use zone in 4 hectares) and again in GO 775 of 3-3-1997, changing further 26 hectares from part water body and part public/ recreational into entirely recreational use. The latter facilitated the creation of NTR Gardens and later giving land to Prasads IMax theatre also. These were areas, which had historically been part of the lake and its foreshore and should have been conserved as such. In fact the AP Government has admitted that the area reclaimed from the lake for developmental activities like Necklace Road, STP, Parking lots, Peoples' Plaza, Lumbini Park including the laser show, NTR Gardens and NTR Marg is 63.07 acres (25.5 ha). In addition 0.6 ha was handed over to South Central Railway in September 2001 for

construction of MMTS railway station on Necklace Road. This was done by filling up the area between necklace Road and that point of the railway line.

Another device used for changing land use, even in a water body, was the use of the powers of Municipal Corporation of Hyderabad (MCH) under section 568 of the Hyderabad Municipal Corporation Act, read with sections 566 and 567 for allowing the lake area for cremation of a former Chief Minister and former Prime Minister, ie, by notifying a part of the lake area as a cremation ground. This violated the spirit of the orders of AP High Court in WP 25835 of 1996 and 35 of 1997 and got around it by such notification. Thus the intrinsic powers to change land use without much ado vests in the government as of now, and there is no adherence even to the guideline of public notice, leave aside public hearing in dealing with such a valuable common property resource. It appears the Government has joined those who consider the lake can be encroached if it is projected as a public cause, even when other avenues or places could support such activities which erode the beauty, ecology and functional natural use of the people of Hyderabad for activities like walking, cycling, sailing and giving all of them a commercial gloss which diminishes nature.

Chapter 4 Encroachments

4.1 Lake levels

The levels of a lake are dealt with in irrigation jargon as those between Full Tank Level (FTL) and Maximum Water Level (MWL). The lake has a certain capacity (FTL) in the non- rainy season that is more or less stable. The quantity of water in the tank may vary though, depending on the rise in bed level, operation of the gates or sluices if any, evaporation etc. Water stored in the lake above the FTL can go up to MWL, which is the level at which the bund is still considered to be secure. MWL can also vary depending on the quantity of inflows, especially in the rains. The area between FTL and MWL may not have water in the non-rainy season but should be treated as part of the lake system. Usually this area has some kind of permanent greenery like trees, which are water tolerant like *acacia nilotica* (babul) or sometimes pastures.

In villages this area is generally guarded zealously knowing its potential for water conservation, but unfortunately in towns and cities this is encroached upon in the belief that the floods will be temporary and the constructions come up. Over a period, the encroachments become permanent forcing the authorities to change the water regime itself including FTL and MWL. Encroachments like roads etc, inside the lake also fall into a similar category. Unless the FTL and MWL are respected and the greenery in the foreshore and its perimeter protected, there is not much hope of the lake surviving, leave aside performing its ecological functions.

In the case of Hussain Sagar, sadly, the FTL and MWL were not demarcated over the years in the water-spread area and this has facilitated shrinkage of the lake. If this continues and the lakebed level rises, the Hussain Sagar, the oldest lake with such beauty, may have to be written off like some of the other lakes of Hyderabad.

4.2 Lake area

As already mentioned, petitioners before the Supreme Court had raised the issue before their Lordships of the area of the lake about which varying accounts were given even in Courts of law. Thus, in WP 26378 of 2000 before the AP High Court, the area of water spread of the Hussain Sagar Lake was given as 704.29 hectares at MWL and 576.1

hectares at FTL. In WP 21793 of 2001 in the same Court, the Government gave a figure of 431.58 hectares of water spread. In the earlier case, reference was also made to the May 2000 notification of HUDA where the area given was 549.32 hectares as per topo sheet. In some other cases, some other figures were given. In a note given to the Narendra Luther Commission, HUDA had said that the area of the lake as measured on the 1914-15 map (known as Hyderabad Municipal Survey map) made by the Public Works Department of the Nizam's Government, as measured on the scale 1''=400', was 1,450 acres (587.04 ha). This included the area of the lake within FTL, including the two segments, Kukatpally nala and the Picket nala, separated by the railway line. It may also be noted that as per the revenue records, the *shikam talab* (leaving out appurtenant Government lands in the lake foreshore) is itself 486.59 hectares.

After careful deliberation, the Committee decided that the availability of satellite imagery should facilitate arriving at the figures of water spread and foreshore of the lake, which will be shown as vegetative cover or open land. The area so determined would, in comparison with the figures from earlier surveys, show up the developments, including encroachments of the lake and the area that needs to be conserved as per FTL and the criterion of 30 metres mentioned in the HUDA notification of May 2000.

The topographical sheet of 1974 becomes the basis for these calculations as the earlier maps have infirmities like that of scale, illegible entries etc. The efforts to get the Survey of India maps of an earlier period of the last century did succeed even as this report was nearing completion. Three maps of 1919, 1929 and 1965-66 show encroachments on the Khairatabad side, Raj Bhavan side and Secunderabad side creeping in. In the earlier maps, the railway line on the west is clearly seen as passing through water. Also, there is a clear water body between the powerhouse and Mint Compound (now partly NTR Gardens) and Khairatabad Railway station. There is acceleration of encroachment between 1930 and 1965, as seen in these maps.

The Committee felt 1974 was a comparatively fair cut off point as the speed of encroachments and pollution increased rapidly after the 1960's. Even though satellite imagery of 1967 from a US satellite is available, this being in black and white with haze, it becomes difficult to arrive at the precise water spread figures. In its efforts to correlate

the toposheets to satellite imagery and arrive at the areas, the Committee had the assistance of the Geomatics Centre of the AP Forest Academy.

The 1974 toposheet showed an area of 571.42 hectares; of which 487.75 hectares had water and 83.67 hectares were either foreshore vegetation or open or encroached by structures. The satellite imagery of 1996 (month of November) confirms this total area, but in it the water-spread area is only 470.8 hectares. Vegetative or open foreshore was 69.69 hectares and structures occupied 30.92 hectares. In February 1997, the imagery showed water spread of 451.54 hectares. Part of the reduction may be due to the onset of summer months. The 'others' including vegetative cover and structures was 97.78 hectares, yielding a total of 549.32 hectares, which is the figure given in the May 2000 notification of HUDA.

It is in the two decades of 1980's and 1990's that the authorities had also joined private encroachers to start building and filling the lake area. The continuance of these activities is vouched by the imagery of 2002, which shows water spread of 458.71 hectares. Vegetative foreshore remained at 69 hectares, but this may include the parks or gardens created too. The built up areas had increased to 49 hectares by 2002. Part of the vegetative cover is occupied by gardens like NTR Park which was created on a relatively high contour, but this also extends to the lower lying areas on which structures like IMax theatre have come up. NTR Marg, Necklace Road and debris dumping on both the sides of the road and railway track have also diminished the water spread and foreshore within FTL.

Treating the area where water was seen as the only area of the lake, ignoring the FTL and MWL contours was perhaps the reason for the Government stating in its affidavit in WP 21,793 of 2001 that the lake area of 431.58 hectares. The figure of 549.32 hectares given in the HUDA notification that included the foreshore (not the catchment, which is a much larger area) was nearer the correct area of the lake as it should be.

The Committee had the benefit of the 2004 satellite pictures. However, the resolution of the pictures was found to be unsatisfactory to make an accurate determination of the lake area.

The committee finds the area of the lake has shrunk to *one-fourth* its original size. Many of the areas encroached up to 1960's and subsequently have become part of the urban settlement, which have even been regularized, barring for some areas. The Committee, therefore found it could only report on encroachments that should be dealt with on a priority basis, and arrive at the area that it would be feasible to conserve now to preserve the ecological integrity of the lake.

Taking the areas which are clearly encroached and admitted as such and also water bodies which have been conferred pattas (titles) prior to 1974 or interfered with after that year and correlating these with the FTL contours, the area of the lake that should be conserved now at least is arrived at as follows:

1.Water spread as per 2002 imagery		**458.71 ha**
2. Encroachments after 2000		**19.05 ha**
Rock garden	8.1 ha	
Food court	0.2 ha	
Laser show, car park, etc	1.7 ha	
People's plaza	1.05 ha	
Car park opp Imax and between Necklace Rd & STP MMTS Railway station	1.4 ha	
Area between railway line and Necklace Rd Stn to Bridge 4	~3.0 ha	
Area filled up between Necklace Rd and water body, excluding People's plaza, Food court, Jala Vihar and part of PV Narsimha Rao memorial	~3.0 ha	
3. Encroachments held to be illegal and unauthorized structures		**36.4 ha**
Opp IMax theatre	1.9 ha	
Part of MS Maktha and Raj Nagar	16.2 ha	
Ministers Road	18.3 ha	
4. Encroachments on feeder nalas which have been part of the Lake system (Kukatpally S No 194/8/1)		**13.8 ha**
5. Water bodies given as pattas, especially in the foreshore on the directly draining area of the watershed on the railway line side (S No 213, 214)		**5.67 ha**
6. Water bodies only partly covered in Item 1		**9.86 ha**
Water body near Kharatabad flyover	4.86 ha	
Ministers Road water body foreshore and area with vegetation	~5.0 ha	
7. Total area		**543.49 ha**

NTR Garden, NTR Marg, Necklace Road Railway station (up to the railway line part) and railway line, the STP, Lumbini Park have been left out of the above table as they were pre-2000 encroachments, not having water bodies or were on highrise foreshore or were on existing railway line. When these areas are added, the total area will correspond to the toposheet/ satellite figure of 571 ha that require conservation.

4.3 Land use classification and changes in the lake

In Section 3.5 the land use changes around the lake have been mentioned. Land use classification goes primarily by the revenue records and thereafter by executive orders of the Government. In Hyderabad, the Government orders derive their authority from the statute book. The AP Urban Areas (Development) Act of 1975 has given this authority. The HUDA notification of 169 lakes on 4-5-2000 also draws on Sec 48 of the Telengana Area Irrigation Act 1957F under which even private ownership does not entitle owners to reclaim or destroy the lakes or use them for phasing and other urban uses. If such rights do not exist with private owners, it should follow that such rights do not exist even with public ownership. Therefore, the land classification in and around a water body should remain that of 'water body' (or 'shikam' as mentioned in revenue records) with appurtenant government lands.

Yet the powers under the AP (Urban Areas) Development Act have been used to notify master plan and zonal development plans for residential, commercial, industrial, recreational, conservation and other uses like roads etc. The Act of 1975 nowhere mentions water or water bodies and even 'land' has been defined as including ' benefits to arise out of land, and things attached to the earth or permanently fastened to anything attached to the earth. Neither the Urban Development Authority (Hyderabad) Rules notified on 21-4-1977 under the Act of 1975 or the Bhagyanagar (now known as Hyderabad) Urban Development Authority Zoning Regulations 1981 notified on 3-9-1981 mention water bodies. In the latter 'water course', 'minor water course' and 'major water course' are defined and refer to storm water carrying channels but there is no further reference to them except that in the description of 'Recreational Use Zone' 'water fronts' are also mentioned.

However in the HUDA map, area notified in GO 381 of 23-6-1980, the word 'water bodies' has been used, and the map shows 'Osman Sagar' and 'Himayat Sagar' as water

bodies. In the MCH area 'Hussain Sagar' has been shown. In view of the revenue classification and the provisions of Irrigation Act like the Telengana Irrigation Act, it appears the clear intention was to have a distinct classification of water bodies like lakes which would not be subject to the same rules and regulations as other land uses which can be the subject of changes by Government orders from time to time. The issue of the notification by HUDA in May 2000 seems to be the result of subjecting lakes and water bodies to land use regulations.

Yet the Government in their submission before the AP High Court in WP 26378 of 2000 said the notification was not statutory but only 'an appeal to the inhabitants of the respective corporations'. This was said in spite of the notification stating that violations by constructions in and around the lakes would invite prosecution under The Environment Protection Act of 1986.

While there is overwhelming acceptance both by Government and judicial pronouncements that lakes being specific eco systems, should be conserved, even in urban areas, it is clear that over the years encroachments have been allowed and even regularized, resulting in an unwarranted change in so called 'land use' itself. In view of the doctrines of Public Trust and safeguarding of Environment spelt out by the Supreme Court and also enunciated in the Directive Principles of State Policy and Fundamental Duties of citizens of the Constitution of India, there is enough justification to draw the conclusion that water bodies and lakes cannot be encroached upon or developed in any manner by any person, institution or Government except for its strict conservation. The lakes should be demarcated and exhibited in all master plans and zonal development plans as' Conservation areas-water bodies' and their conversion for other uses like 'commercial' or 'recreational' prohibited.

It is a recognition of these aspects, which has made the Karnataka Government hand over 114 lakes of Bangalore city to the Karnataka Forest Department following the recommendations of the Laxman Rao Committee of 1984.

4.4 Development plans around the Lake

It would be useful at this stage to look at the development plans in and around Hussain Sagar Lake and their role in resulting in private and public encroachment of the lake as also altering its ecological role. The first stage of the public plans seems to have been the

laying of roads. In his note of 3 February 1930 on City improvement schemes for Hyderabad, Sir M.Visweswarayya, the well-known engineering expert suggested the completion of the circuit of roads around Hussain Sagar by constructing a loop road along the water edge at the south end of the tank. The loop road intended by Sir Visweswarayya is not the one that finally came up. The lake was then a drinking water source and extended in the south up to the Mint Compound and the water edge beyond the area now occupied by the NTR Marg, NTR Gardens etc. The Ministers road, as mentioned earlier, was also an encroachment as there was water body beyond it also. Then came the Necklace road to the west side when the lake had the Khairatabad flyover and the Raj Bhavan Road which flanked it until the encroachments came in as described earlier on that side also. All the newer roads have been laid in such a manner as to draw the inference that the encroachments on the southern side and western side more or less got regularized.

The next stage of development was to go beyond the provision of walking path, railings and benches on all side of the lake and of natural greenery and pastures on the foreshore up to MWL by developing parks, parking spaces and so on. The assumption seems to have been that the citizenry of Hyderabad would enjoy more the artificial attractions of a park rather than the gaze at the lake, the birds and the rocks, enjoying the breeze and the microclimate. The Sanjeevaiah Park and Lumbini Park cane into being along with the Buddha statue near it, inside the lake. Boat rides up to the statue by powerboats were introduced and now big boats ply, which offer other attractions as for picnickers. The tank bund also got extended to install statues of great people of the State facing the lake on the other side of the road.

Then came the Necklace Road in the lake to the east and south of the railway line by filling up and joining up the filled area up to the railway line. Except for the existing bridges on the Railway line no vents were provided under the Necklace road to facilitate flow of water. The water ways leading to the lake on the other side of the railway line were already getting choked by encroachments, some of which had been regularized. The Necklace Road on an embankment became an encroachment, which facilitated the subsequent opening of the Necklace Road railway station figuring in the current writ petition and reclamation for car park, open grounds for public performances, eating-places. Even the Rock Garden, which had been described as, an ‘Island of Peace’ by a former Chief Secretary was not spared and is now becoming a pleasure resort called Jala

Vihar. In parallel came the NTR Gardens after the funeral of late Chief Minister Shri N T Rama Rao was held there. It has now become a kind of recreational cum entertainment spot. Beyond this, the area near Khairatabad station which was heavily encroached upon was joined by the filling up of the foreshore and notifying it for commercial purposes and now the IMax theatre has been housed in it. The sewage treatment plant has also come up in the foreshore near the Khairatabad flyover. The water bodies adjacent to this and the railway track up to Hussain Sagar Junction are also fast vanishing under debris dumped by various persons and by those claiming ownership of the land.

The creation of the Necklace Road with an embankment structure made the report of M/s Charles Correa and Associates, a firm of architects, give to the BPDA to whom a part of the lake was handed over, a plan for beautification of the lake. Their 'in depth' study, as it was described, took the lake to be the centre of an artistic concept to be developed in an orderly fashion and the available sites developed to their full potential. The land between the Necklace Road and the lake was treated as Zone 1 the land between the Necklace Road and the railway line as Zone 2. The architects proposed Zone 1 for outdoor public facilities such as entertainment, food, recreation and culture. Zone 2 was for convention centre, museum, amusement park etc, to serve educational and recreational needs. The consultants felt that the lake and its environs have the potential and size to fit the role of a public plaza and serve as a symbol of the city. The implicit assumption seems to have been that the lake itself was not necessarily a symbol for the city.

A master plan was drawn up and an environment impact study entrusted to the JNTU Centre for Environment. The study mentioned *inter alia*, that while the impact will be nil in the construction phase, it would be slightly negative in the operational phase. The report does not seem to have considered the possibility of further filling up of the lake as a result of these developments and may have assumed this would not happen. The report was not fully accepted by the Technical Committee of the AP Pollution Control Board (APPCB) to whom matters went on the directions of the AP High Court in W.P 26378 of 2000. The court directed no further permanent structures including those involving commercial activities may be allowed to be raised on or near the water spread or catchment area (presumably foreshore area within 30 meters from FTL or MWL). However the court allowed the other activities like construction of an amusement park subject to the APPCB going into all aspects and certify that such activities for the purpose of encouraging tourism would result in only sustainable development, which

would not create any ecological imbalance. The APPCB Technical Committee wanted full picture of the impacts to conclude that the developments are sustainable. Over a period the APPCB itself laid some conditions and the reports indicate there have been infractions, which have not been acted upon.

Thus the stipulation that entrances to the NTR Garden and IMax theatre should not be from NTR Marg has not been adhered to. Studies on the ambient increase in air pollution as a result of all the projects have not been completed and in the meanwhile the projects have come up. Treatment of sewage and dredging suggested are yet to be acted upon. The APPCB has not given a clear chit to the Food Court (Eat Street) and Jala Vihar on the Necklace road where stipulations have not been complied with and as noticed by the Committee itself there has been further encroachment into the lake by dumping, creating cantilever hangings etc, and permanent structures created.

The statements of the project proponents routed through the Tourism Development Corporation have been accepted, eg, when the APPCB found evidence of tree felling in Jala Vihar the project proponent claimed they had only removed shrubs and no enquiry was made into this, especially when the bird lovers and others have noticed felling of trees earlier used by birds. Even near the BPDA office and laser show area, further encroachments have been made to create car parks etc. The latest development was the cremation of the late Shri P V Narasimha Rao, former Prime Minster of India on the Necklace Road and building a Memorial on the lakeside. Several amusement ideas have been floated by an architect in the Sanjeevaiah Park, and press reports have also appeared about an underwater park and railway to Buddha statue and Lumbini Park etc. All these are not even on the waterfront, but in the water.

It is clear that development plans treating the Hussain Sagar almost like any piece of land have been on the increase since 1981-82. These are listed below as given by the BPDA/ HUDA authorities.

	Project	**Year**
	Already implemented	
1.	Formation of NTR Marg by MCH	981-82
2.	Widening of tank Bund and installation of statues(R&B)	1988
3.	Construction of Khairatabad flyover by MCH	1990

4.	Development of Lumbini Park	1994
5.	20 MLD Sewage Treatment Plant by HMWSSB	1995
6.	Formation of Necklace Road and green belt (dredged material)	1996
7.	NTR Memorial	1999
8.	NTR Gardens	2002
9.	Parking spaces near STP, Police post and between railway track and Necklace road	2003
10.	Imax theatre	2003
11.	Food courts in the green belt area of Necklace road	2004
12.	MMTS Railway station (Necklace Road) & Sanjeevaiah Park	2005
13.	Gallery and pools for Laser show and Musical Fountain near Lumbini Park	In progress
14.	P V Narasimha Rao memorial	In progress

Planned

		Acres
1.	Amusement park (NTR Garden)	2
2.	Office complex (South of Khairatabad flyover)	10
3.	Proposed landscaping/ open to new ideas (wetlands)	1
4.	Multilevel parking & shops (Misl pockets)	6
5.	Promenade & food courts (land between Necklace Road and lake)	
6.	Landscaping/ Sunken court/ Open air theatre (Sanjeeviah Park)	20
7.	State museum/ open to new ideas	3
8.	Promenade/ open to new ideas (land between Necklace Road and lake)	
9.	India International Centre (land adjacent to Sailing Club)	2
10.	Landscaping/ Open to new ideas (Rotary Park)	2
11.	Landscaping/ Open to new ideas (Sagar Park)	1
12.	Tourist center/ open to new ideas (Fisheries Site)	5
13.	Beautification (Statue of Buddha)	
14.	Rail bus (Railway line)	Along Necklace Road
15.	International convention centre/ new ideas (opp Deccan Continental/KIMS Hospital)	20-30
16.	Food courts/ Landscaping/ Dinasaur park/ Open to new ideas (Indira Park)	

Some developments not mentioned include filling up area near Minister's road, attempted embankments on this side and near Khairatabad flyover and extension of construction activity into this pond near the flyover as also filling up to create car park in front of IMax theatre etc. Debris dumping on Kukatpally nala area and on the sides of the railway stations and railway line, and between Necklace Road and Hussain Sagar Lake are also noticed and it is not clear which of the activity is authorized.

A view on all of these developments in terms of their encroaching and polluting status will have to be taken if a clear message on sustainable development has to be sent across, especially as these have come up after the enactment of all environmental laws in the

country and far-reaching judicial pronouncements on conservation of ecology and environment. The view so taken to tackle these encroachments and pollution should be treated as a positive one as it involves replacing wrong developmental practices by sustainable ones without taking away the citizens' right to fresh air, water and good climate.

Chapter 5 Pollution

5.1 Lake pollution

5.1.1 Water quality

The lake waters were used for drinking from 1894 till about the 1930s. This indicates that the water quality was potable till then. The water quality started deteriorating since about 1950 due to rapid urbanization of Hyderabad city. During the decade of the 1960s, Hyderabad saw rapid industrialization occurring in its outskirts. The effluents from many of these industries flowed into the lake.

The nature of the pollutants flowing into the lake is a mix of untreated sewage and industrial effluents. The main pollutants in the lake today are: biological oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), heavy metals (carcinogenic—hexavalent chromium, cadmium, nickel, arsenic; non-carcinogenic but highly toxic—mercury, lead, manganese), coliforms and pesticides (DDT, lindane, monocrotophos, endosulfan, chlopyriphos, chlorophos). Poly-aromatic hydrocarbons and trace organic compounds, including aliphatic and aromatic compounds have been found to be present in the lake. The lake's water quality, monitored over time, is given in the table below.

Hussain Sagar Lake water quality

Sl. No	Parameter	1985 APPCB	1988 OU	Nov 97-Oct 98 NEERI	Feb 2000 NEERI	July 2005 APPCB
1	pH	8.0-8.1	7.5-8.7	7.8-9.1	8.6-8.7	8.08
2	Suspended Solids (mg/l)	10-20	20-120	14-47	34-40	--
3	Phosphates (mg/l)	0.5-0.8	1.1-3.3	1.7-3.9	0.9-1.1	1.3-1.6
4	TKN (mg/l)	0.9-1.8	--	5.6-54	30.2-31.3	--
5	COD (mg/l)	56-160	88-410	76-203	66-68	--
6	BOD (mg/l)	21-56	16-120	20-48	16-20	12-18

Despite the lake being shallow, anaerobic conditions prevail at the lake bottom, indicating an absence or near-absence of dissolved oxygen (DO), and consequently the presence of hydrogen sulfide (H_2S) accompanied with bad odour. The table indicates

that recent measures have improved the water quality of the lake, **but it is yet to meet the Central Pollution Control Board's (CPCB) most relaxed water quality standard, ie, for propagation of wildlife and recreational use.**

5.1.2 Studies on Hussain Sagar Lake

Several studies have been initiated since 1956 on different aspects of the Hussain Sagar Lake, resulting in taking measures to improve water quality and aesthetics of the lake. In 1978, an AP Government recommended several measures to mitigate the pollution in the lake, in addition to other works such as laying ring roads along the periphery of the lake, development of a museum, park and boat clubs.

In 1981, another committee constituted in 1981, presented a report to the Rajya Sabha stressing the need to prevent pollution of the lake, and recommending several mitigation measures included laying the duplicate "K" main (sewer) to tackle the pollution problem in the lake and also dredging of the lake.

AP Pollution Control Board (in December 1985) and the Zoological Survey of India (in 1986-87) monitored the lake water quality and sediment. Osmania University and AIC-Watson also analyzed water samples from the inlet nalas at the entry points of the HS Lake. Various agencies organized extensive studies during 1986-1993 aimed at rehabilitation and strengthening of existing sewerage system.

All these studies have established that the **HS Lake is highly polluted due to the discharge of untreated domestic wastewaters through Picket, Banjara and Balkapur nalas and wastewaters from a number of industries located at Jeedimetla, Balanagar and Sanathnagar through the Kukatpally nala.** A considerable volume of domestic wastewater was discharged directly into the lake from the surrounding residential areas on the foreshore of the lake. Further, washing of clothes, vehicles, animals and immersion of Ganesh idols (chemicals used to paint the idols contain toxic chemicals) every year in the lake has added to the pollution loads. The lake experiences anaerobic conditions. With the continuous discharge of industrial wastewaters and sewage into the lake, there has been an accumulation of toxic heavy metals such as nickel, lead, cadmium, etc. in the lake sediments. Past studies have also indicated

bioaccumulation of toxic heavy metals in the body tissues of fish, particularly in the brain. In the light of these findings, fishing in the lake was banned.

In 1992, M/s AIC, in their study for HMWSSB titled "Conceptual Design Report on HS Lake Protection" identified various activities responsible for the pollution of the lake, and suggested following improvements for rejuvenation of the lake: a) Diversion of industrial wastewaters away from the lake, b) Diversion of domestic wastewaters presently entering the lake through the various nalas, c) Provision of adequate treatment to a part of domestic wastewater, which is to be discharged into the lake to maintain the hydrology of the lake. The consultants recommended lake rejuvenation in two phases: Phase-I: Diversion of dry weather flows from the four nalas and treatment of a part of the domestic wastewater and returning it to the lake to maintain the hydrology of the lake so as to eliminate smell nuisance and minimize mosquito breeding, Phase-II: The pollutants get washed out in each monsoon, improving the water quality and lake aesthetics. A complete cleanup of the lake is expected to take about five monsoon seasons after the dry weather flow is diverted from the lake and the upstream sewerage system is remodeled.

A 20 MLD sewage treatment plant (STP) has been installed for treating part of the sewage now reaching the lake through the Balkapur and Banjara inlet nalas, and then discharging the treated waters in to the lake to maintain its hydrology.

5.1.3 Lake rejuvenation measures

Between 1995 and 1998, HMWSSB implemented the following measures to rejuvenate the lake:

- Diversion of municipal and industrial discharges from the lake.
- Diversion of 35 mld of municipal wastewater, and 15 mld of industrial effluents from the industrial areas of Jeedimetla, Balanagar and Fatehnagar through the Kukatpally nala to the duplicate K&S main behind the airport. The diversion works have been completed and are operational from May 1995.
- Diversion of 20 mld of municipal wastewater from Sanathnagar, Balkampet and S R Nagar through Kukatpally nala to the duplicate 'K&S' main at Prakash Nagar. The diversion works have been completed and commissioned in February 1997.

- Diversion of 6 mld of domestic sewage from the cantonment area through Picket nala to the duplicate 'K&S' main at Minister's road by pumping. The diversion was completed in June 1997 and pumping commenced from December 1997.

- Diversion of dry weather flows in the Yousufguda nala to the duplicate 'A' main at Divyasakthi apartments. The diversion has been completed.

- Diversion of the Banjara nala flows (6 mld) from Banjara hills; Panjagutta and Somajiguda to the 20 mld sewage treatment plant via the duplicate 'A' main. The effluents will be diverted to the 'A' main sewer.

- Diversion of the Balkapur channel flows (13.3 mld) from Khairatabad and Chintalbasthi to the duplicate 'A' has been completed in May 1998. The construction of 20 mld sewage treatment plant has been completed and the Balkapur channel flows through the 'A' main were diverted into the STP from May 1998. The STP is in operation since May 1998.

In one of the meetings that the Committee had with AP Government officials, the APPCB representative admitted that **it is possible that industrial effluents and domestic sewage still flow into the lake.**

At the request of HMWSSB, NEERI carried out a study, “Environmental Monitoring of Hussain Sagar Lake water and sediments” during November 1997-December 1998 to assess the impact of the implemental rejuvenation measures on the ecology of the lake. The significant conclusions were:

The pH of the lake waters were in acceptable range at all the locations and was around 9.0 during summer due to increased algal activity. The BOD in the lake water varied between 20-48 mg/l, and COD varied between 76-203 mg/l. Nutrient levels were very high. The range of observed values of total phosphorous chlorophyll-a and secchi depth indicated that the **Hussain Sagar Lake is in an advanced state of eutrophication.** Polynuclear aromatic hydrocarbons were detected in the lake water along with trace organic compounds including aliphatic and aromatic hydrocarbons and their derivatives. Despite the shallow depth of water, **anaerobic conditions prevailed in the bottom layers of the lake** as indicated by low DO/ absence of DO and the presence of H_2S in some locations with bad odour**. The characterization of sediments at the various locations in the lake confirms significant accumulation of heavy metals, nutrients and pesticides.**

Analysis of water samples collected from the lake during February 2000 shows that there is an improvement in the water quality compared to October 1998 in terms of BOD, COD and Phosphorous level. The 20 mld STP is working satisfactorily in terms of suspended solids, BOD and COD removal. However it observed that the total nitrogen and phosphorous level in the treated wastewater that enters into lake is high which encourage algal growth and cause eutrophication.

5.1.4 Lake sediment

Over time the lake sediment has become a repository of various pollutants, including heavy metals, nutrients and pesticides. These toxins are transported back and forth between the lake waters and sediment.

5.1.5 Solid wastes

The lake receives two types of solid wastes. The first type is packing of consumer articles—plastic containers and packings, glass bottles, tetra-packs, tins and other garbage.

The second type is Ganesh idols that are immersed every year after Ganesh Pooja. It is reported that this year the number of idols immersed in the lake was about 13,000 of more than 2.5 m height, and the total was about 25,000. The maximum idol size exceeded 14 meters height in this year. The average size and number of idols going into the lake have been increasing every year. About 10-15 jumbo cranes were used to lower the idols on the eastern and southern side of the lake this year.

Large idols have steel frames. The paints used on the idols have many toxins in them, including heavy metals. The idols pollute the lake waters and sediment with plaster of paris, steel frames and heavy metals, including carcinogens like arsenic, cadmium and nickel. From the data provided by APPCB on heavy metal concentrations in the lake waters and sediment before and after Ganesh immersion, it is evident that this activity adds to lake pollution.

5.2 Pollution sources

Based on available information and site inspections conducted by the Committee, along with officials of various AP Government Departments, it has been confirmed that a

considerable quantity of domestic and industrial wastewater enters the lake through various inlet nalas.

Domestic wastewaters are from unsewered colonies along the nalas as well as from low-income group colonies located along the foreshore of the lake. Other activities, eg, clothes washing, garbage dumping, cattle and human bathing (done particularly on the northern shore of the lake), also pollute the lake. The Picket, Balkapur and Banjara nalas discharge only domestic sewage. Industrial effluents usually come into the lake through the Kukatpally nala from industries located in industrial areas upstream of this nala. The industrial wastewaters that come through nala are usually at low pH and have high TDS. They mix with some amount of domestic sewage before entering the lake.

Theoretically, these wastewaters are supposed to have been diverted away from these nalas. In reality, some quantities still flow through these nalas. Sediments from the lake bottom are also a major cause for keeping the lake polluted. The lake is shallow and the sediments are in constant circulation, thus causing pollution of the lake waters. This phenomenon makes restoration of the lake waters more difficult and time consuming.

5.3 Impact of pollution on the lake

The lake is an advanced state of eutrophication as evidenced by substantial algal blooms. Dissolved oxygen (DO) is depleted in sub-surface waters, and this is associated with odour problems and large fish kills. These conditions continued unabated, and gave rise to a monoculture of water hyacinths, which covered a good part of the lake till a few years back. A clean up operation was taken up by spraying 2,4-D (dichlorophenoxy acetic acid), a phenoxy herbicide and defoliant, initially in a small-enclosed area in the northeastern bay of the lake to test its efficiency, and then over the entire area of the lake. After the plant mortality, the water hyacinth was removed manually. Following the removal of water hyacinth, excessive algal growth has been noticed in the lake due to nutrient enrichment from domestic wastewater resulting in green-blue colour and odour.

The aquatic ecology of the Hussain Sagar has not been properly studied. A recent study of the aquatic ecology of the lake done by a research scholar made her conclude that the presence of the species ***Arthrospirs, Oscillatoria*** **and** ***Nitzschia*** **in the lake in "large numbers indicated the polluted nature of the lake."** These species survive well in

eutrophic and organically polluted habitats. Hence, they are considered to be indicator species.

5.4 Lake dredging

In 1995-97, about 5 lakh cubic meter material has been dredged out from Hussain Sagar Lake to form a Green belt portion of Necklace Road, and in 2004, another 27 thousand cubic meter material has been dredged out and filled in between railway track and Necklace Road from Bridge 5 to APSEB sub-station, a distance of about 250 m. The work was stopped on the orders of the AP High Court as the lands identified for filling the dredged material were under litigation.

5.5 Handling of sediments

Handling of sediments is a major problem considering the volume of sediments and method of their disposal. Assuming the depth of sediments to be removed as 1 m, and area of water spread as 500 hectares, the total volume of sediments to be removed will be 5 million cubic meters. The disposal of these highly contaminated sediments will pose serious health risks and will also be very expensive. There are two options for handling the sediments:

1. Dredging & disposal
2. Allow sediments to remain at the lake bottom

Dredging of sediments and proper disposal will result in the restoration of lake water quality in shorter time. However, considering the cost of the massive volume of sediments to be dredged and safely disposed, and the health risk involved in disposal, this option is not viable.

By allowing the sediments to remain at the lake bottom, restoration of the lake water quality will take longer due to constant recirculation of solids in the shallow lake waters. However, the process of self-purification will clean the lake, though over a longer time than if the sediments were dredged out. This process is contingent on no further pollutants entering the lake. Even though this process will take a longer time, it is the only practical available option. It is therefore recommended that:

1. Immediately take all the steps to stop the dry weather flow consist of domestic wastewater and industrial wastewater that enters in to the lake.

2. Prevent non-point source pollutants from entering the lake.

3. Provide tertiary treatment facilities for the removal of phosphorous and nitrogen at 20 mld STP.

4. Maintain inlet nalas in pollution free conditions and provide the mesh at the inlet points of the lake to prevent debris enter into the lake.

5. Provide artificial aeration at the inlet points to avoid anaerobic conditions.

5.6 Implication for pollution as a consequence of societal conditions

5.6.1 Socio-economic conditions of low income colonies around the lake

An idea of the impact on pollution of the lake due to lower income group colonies around it not having proper facilities comes out in the findings of EPTRI. As a part of the EIA for the proposed dredging of sediment from Hussain Sagar Lake, done for HUDA in November 2004, EPTRI did a socio-economic survey of 16 lower income group colonies around the Hussain Sagar Lake. The findings of the study are provided in the annex and summarized below:

Demography: Most of the colonies were about 25-30 years old. Some were much older. Most of them had populations ranging between 500-2,000. A few had larger populations.

Education and occupation: Most of people living in these colonies were working as labour, maids, etc. Some were petty vendors, auto/ car drivers, blue-collar workers, etc. Education levels in most colonies were neither low nor high. A few colonies, particularly towards the southeast and west of the lake had higher educational and income levels.

Infrastructure: All colonies had semi-pucca housing, drinking water and power. Most colonies had open drains, though a few had closed ones. Drains in many colonies were not in good repair. The colonies to the east of the lake had better infrastructure facilities than those on the west.

Hygiene and sanitation: Most colonies had some individual and some public toilets. One colony had 100% of its houses with individual toilets and another colony had no toilets—individual or public—at all. Public toilets were inadequate, and where they existed, were inadequately maintained. Sanitation was generally not good. This forced people to defecate in and around the lake and the nalas leading to the lake. In some colonies drinking water gets mixed with drainage water.

Solid waste disposal: While many colonies (particularly the ones to the east of the lake) had some kind of solid waste collection system, many others did not. Solid wastes are often dumped on vacant land or into the lake or nalas leading to the lake.

Health: Incidence and prevalence of malaria is high in almost all colonies. The cause for this was ascribed to mosquito swarms being present around the lake. One colony on Lower Tank Bund Road reported a high incidence of water-borne diseases.

Action plan desired by colony residents: The colony dwellers stated that they wanted the following: 1. Toilets and proper maintenance for them, 2. Clean the nalas, 3. A good system for collecting solid wastes, 4. Good drains and proper maintenance for them, 5. Construction of walls along the nalas so that storm water does not enter the colonies.

Conclusions: 1. Malaria incidence is high because small stagnant pools of water bodies have been created on parts of the lake bed that are in the process of being encroached, 2. Improving sanitation and solid waste collection in the colonies around the lake can easily eliminate non-point source pollutants around the lake, 3. Ensuring that colony residents get potable water that is not mix with water from drains can eliminate water-borne diseases.

5.6.2 Other societal conditions impacting the lake

The Committee noticed during various inspections certain other problems that have a bearing not only on the pollution of the lake, but also the health and welfare of the lower income groups living around the lake. The committing of nuisance on the railway line and the lake foreshore was noticed. Littering of the lake waters unobtrusively such that blame could not be put on anyone. As pointed out by Courts, the immersion of idols

creates its own problems. Apart from impact on water quality, the immersion of idols only in Hussain Sagar Lake obstructs normal vehicular traffic, increases noise considerably at night during the 10 day Ganesh Pooja period. All this disturbs the rhythm of lake users—regular and casual.

Another problem noticed in respect of encroachments, primarily by the lower income groups, is the subsequent alienation of plots to those who are much better off, and the construction of multi-storied buildings. This adds to the waste being led into the lake, apart from spoiling its scenic splendour. In fact those who alienate these plots create further encroachments and create new slums. This has been aggravated by municipal laws and building regulations.

Annex: Socio-economic survey of lower income group colonies around Hussain Sagar Lake

Colony name & location	Age	Population	Education & occupation	Infrastructure	Hygiene & sanitation	Solid waste disposal	Incidence of diseases	Requirements as stated by colony residents
Brahmanwadi, Begumpet	30	680	• Edu—Med • Occ—Labour	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• Public toilets nil • Some individual toilets • Open defecation around lake & nalas leading to lake	• Earlier, disposed into adjacent nala • Now, collected by tricycle	• Malaria low	• Public toilets • Approach road
Ambedkar Nagar, Hussain Sagar Lake	60	1,500	• Edu—Low • Occ—Labour	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• Public toilets available but not cleaned regularly • Some individual toilets • Defecation in open areas, around lake & nalas leading to lake	• Earlier, disposed into adjacent nala • Now, collected by tricycle • Dustbins available	• Malaria high	• Public toilets • Individual toilets • Approach road • Regular collection of solid waste
Alamthota Bhavi, Mayur Nagar (near Kukatpally nala)	20	2,840	• Edu—Low • Occ—Labour	• Semi-pucca hsg • Drinking water available • Power available • Drainage not good	• Most houses have individual toilets • Drainage water mixing with drinking water	• Collected by tricycle	• Malaria high	• Good drinking water • Offensive smell from Kukatpally nala requires control by filter beds • Regular collection of solid waste
Vengal Rao Nagar, Minister Rd.	40	800	• Edu—Med • Occ—Dhobis (earlier they were dependent on the lake, now have dhobi ghat), labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• Public toilets only • Drainage water mixing with drinking water	• Dumped into nearby vacant land & into nala	• Malaria high	• Individual toilets • Filter beds to clean nala • Good drinking water • Regular collection of solid waste
Old Custom Basti, Begumpet Nagar (near Kukatpally nala)	60	1,800	• Edu—High • Occ—Labour, Blue-collar workers, drivers,	• Semi-pucca hsg • Drinking water available • Power available • Closed drains	• Some individual & public toilets available • Sulabh sauchalaya • Open defecation in open areas, around lake & nalas leading to lake	• Collected by tricycle	• Malaria high	• Public toilets • Retaining wall along nala to be constructed to prevent water coming into colony • Municipal water mixes with drainage water • Regular collection of solid waste
Mathaji Nagar, Begumpet (near Kukatpally nala)	30	1,400	• Edu—Mod • Occ—Labour, Blue-collar workers	• Semi-pucca hsg • Drinking water available • Power available • Drains exist	• Some individual & public toilets available • During monsoon, Kukatpally nala water enters the colony • Municipal water mixes with drainage water	• Dumped on vacant land	• Malaria high	• Individual & public toilets • Regular collection of solid waste • Retaining wall along nala to be constructed to prevent water coming into colony

					• Defecation in open areas, around lake & nalas leading to lake			
Prakasam Nagar, Begumpet (near Kukatpally nala)	32	1,125	• Edu—Low • Occ—Labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Drains exist	• No individual & public toilets • During monsoon, Kukatpally nala water enters the colony • Municipal water mixes with drainage water • Defecation in open areas, around lake & nalas leading to lake	• Dumped on vacant land and into nala adjacent to colony	• Malaria high	• Individual & public toilets • Regular collection of solid waste • Municipal water mixes with drainage water • Retaining wall along nala to be constructed to prevent water coming into colony • Proper drainage system
Bapu Jagjeevan Ram Nagar, Khairatabad	90	2,000	• Edu—Mod • Occ—Labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Closed drains	• A few individual & public toilets • During monsoon, Kukatpally nala water enters the colony • Defecation in open areas, around lake & nalas leading to lake	• People use provided dustbins		• Nalas should be cleaned by using filter beds • Proper drainage facilities should be provided • Regular collection of solid waste
M S Makhta, Khairatabad (near lake)	70	30,000	• Edu—High • Occ—Labour, Service, petty businesses, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Closed drains	• Individual toilets	• Dumped on vacant land	• Malaria high	• Nalas should be cleaned by using filter beds • Proper drainage facilities should be provided • Regular collection of solid waste
Subhash Chandra Bose Nagar	35	500	• Edu—Mod • Occ—Labour	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• No toilets • Defecation in open areas around lake and adjacent nalas	• Dumped into adjacent nala		• Individual & public toilets required • Nalas should be cleaned • Proper drainage facilities should be provided
Dr Ambedkar Nagar, Lower Tank Bund Rd	30	800	• Edu—Mod • Occ—Labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• Few individual toilets • No public toilets • Defecation in open areas around lake and adjacent nalas	• Dustbins being used	• Malaria moderate	• Individual & public toilets required • Nalas should be cleaned • Proper drainage facilities should be provided
Goondala Basthi, Lower Tank Bund Rd	30	500	• Edu—Mod • Occ—Labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Open drains	• Some individual toilets • No public toilets • Defecation in open areas around lake and adjacent nalas	• Dumped into adjacent nala	• Malaria moderate • Water-borne diseases, eg, amoebiosis, dysentery high	• Retaining wall along nala • Nalas should be cleaned by using filter beds
Elchiguda, Lower Tank Bund Rd	100	1,500	• Edu—Low • Occ—Labour,	• Semi-pucca hsg • Drinking water	• Individual toilets in all houses & public toilets	• Dumped into dustbins provided		• Regular collection of solid waste

			petty vendors	available • Power available • Open drains	also available	by MCH		
Rose Colony, Domalguda	75	625	• Edu—High • Occ—Labour, blue-collar work, drivers	• Semi-pucca hsg • Drinking water available • Power available • Closed drains	• Individual & public toilets available	• Dumped into dustbins provided by MCH	• Malaria high	• Regular collection of solid waste • Nalas should be cleaned by using filter beds • Public toilets should be cleaned regularly
Sabarmathi Nagar, Gandhinagar	35	900	• Edu—High • Occ—Labour	• Pucca hsg • Drinking water available • Power available • Closed drains	• Individual toilets	• Dumped into dustbins provided by MCH	• Malaria high	• Nalas should be cleaned by using filter beds • Public toilets should be provided
Arundhati Nagar, Gandhinagar	30	1,750	• Edu—High • Occ—Labour, petty vendors	• Semi-pucca hsg • Drinking water available • Power available • Closed drains	• Individual toilets	• Dumped into dustbins provided by MCH • Collected by tricycle	• Malaria high	• Nalas should be cleaned by using filter beds • Public toilets should be provided

[1] Source: Chapter 5, EIA for the proposed dredging of sediment from Hussain Sagar Lake, done for HUDA, EPTRI, November 2004

Chapter 6 Other issues

6.1 Risks posed by heavy metals and pesticides

6.1.1 Heavy metals and pesticides

The lake waters and sediment contain concentrations of heavy metals and pesticide residues that are highly toxic to humans, cattle and aquatic life. Some of these chemicals are carcinogenic—hexavalent chromium, cadmium, arsenic, nickel, DDT, lindane. Others are highly toxic, particularly through certain routes—mercury (ingestion of contaminated fish), manganese (ingestion of contaminated water), etc. To understand the risk they posed to human health, the Special Committee on Hussain Sagar Lake did risk analysis.

The average concentrations of heavy metals and pesticides in the lake waters and sediment at Kukatpally nala inlet and Sanjeeviah Park, sediment opposite NTR Garden and ground water at Lower Tank Bund Road, are given in Table 6.1.1 (see Fig 6.1.1). Lake waters at Kukatpally nala and Sanjeeviah Park were chosen for doing risk analysis as the maximum concentrations of heavy metals were found to be at the Kukatpally nalla inlet, and the maximum exposure to lake water by humans and cattle was at Sanjeeviah Park, as people and cattle from a nearby slum swim and bathe daily in the lake at this point. Heavy metal concentrations at other monitoring stations lie between those at Kukatpally nala and Sanjeeviah Park. Hence, risk caused by heavy metals at these two stations defines the upper and lower ends of toxic risk the lake pollutants pose to human health. Variation in pesticide residue concentrations was less marked than that of heavy metals, so station selection for them was less critical.

6.1.2 Risk analysis

Using the concentration data in Table 6.1.1, exposure and risk assessments were done for several pathways. Though risk is generally treated as being chemical and exposure route specific, in some situations such as the current problem, eg, when many chemicals produce the same toxic effects regardless of route, combined risks may be computed for understanding the problem better. Uncertainty analysis provides the band within which

risk may lie. Tables in this report have provided combined risks across routes and chemical exposures to give the reader an idea of what may be the magnitude of the combined risk, without necessarily considering the synergistic nature of the risks.

Risk due to exposure to lake waters and sediment

A hierarchy of risks magnitudes by exposure pathway and principal chemicals contributing to the risk at Kukatpally nala are summarized below (see Tables 6.1.2 and 6.1.3 for details):

Risk magnitude & pathway \ **Risk type**	**Cancer**	**Non-cancer**
Extremely high for ***sediment*** as medium		
Eat lake fish	DDT, Lindane	DDT, Lindane, Endosulfan
Significant for ***lake water*** as medium		
Eat lake fish	DDT, Lindane	Hg, Chloropyriphos, As, DDT, Cd
Drink lake water		Mn, As, Hg, Cr
Elevated for ***lake water*** as medium		
Swim in lake	DDT	Mn, DDT, Chloropyriphos
Eat lake water irrigated fruit/ vegetables	DDT	
Bathe with lake water	DDT	DDT
Borderline for ***lake water*** as medium		
Exposed to lake water in confined spaces	DDT	

Lifetime cancer risk (the probability of that a person would develop cancer in an exposure period of 30 years) for a particular exposure is considered to be *not low* in many north nations if it $>1x10^{-6}$ (one in a million). Using this yardstick, lifetime cancer risk for eating lake fish is extremely high ($7x10^{4}$—$1.2x10^{6}$ in a million) due to organo-chlorine pesticide residues being present in the lake sediment.

A hazard quotient (HQ), the sum of the individual hazard indices (HI—the ratio of the potential exposure to the agent to an exposure that is assumed not to be associated with toxic effects), is considered to be *not low* if it is >1. Using this yardstick, non-cancer toxic risk due to eating lake fish is extremely high (6500—55000) due to the presence of mercury, chloropyriphos, arsenic, DDT and cadmium in water, and significant for drinking lake water (9—15) due to the presence of manganese, arsenic, mercury and chloropyriphos in lake waters.

Swimming in the lake (cancer risk ≤$35x10^{-6}$, non-cancer risk ≤1.67), bathing with lake water (cancer risk 3—$24x10^{-6}$, non-cancer risk ≤1.41) and eating fruit or vegetable irrigated with lake waters (cancer risk 1—$34x10^{-6}$) have an elevated risks associated with them due to presence of DDT, manganese and chloropyriphos concentrations in the water. Exposure to lake water for continuous and prolonged periods in confined spaces causes a borderline risk (1—$5x10^{-6}$), as DDT is present in water.

The profile of cancer and non-cancer risks due to polluted lake waters and sediment at Sanjeeviah Park and due to contaminated sediment in the lake opposite to NTR Garden is almost the same as that of Kukatpally nala inlet (see Tables 6.1.4 through 6.1.6). It can then be said that the risk profile prevalent at Kukatpally nala for exposures through various pathways generally holds for entire lake.

Risk due to ground water at Lower Tank Bund Road

Manganese is responsible for an elevated non-cancer toxic risk in the ground water at Lower Tank Bund (see Table 6.1.7).

6.1.3 Conclusions

The lake water poses cancer and non-cancer risks varying from extremely high to borderline for various pathways. DDT and lindane are the primary cancer causing agents, whereas mercury and manganese caused the primary non-cancer toxic risks. Cancer and non-cancer risk hierarchy for various exposure pathways, and the agents primarily responsible for these risks is given in Table 6.1.8, and summarized below.

Extremely high cancer and non-cancer risks: Cancer and non-cancer risk was found to be very high if lake fish were eaten. This is due to the presence of DDT and lindane residues in the lake sediment.

Significant non-cancer toxic risk: Non-cancer toxic risk was found to be significant if lake water is drunk as it contains manganese, arsenic, mercury and chromium.

Elevated cancer and non-cancer risks: Swimming in the lake and bathing with lake water caused elevated cancer and non-cancer risks. The primary agents for causing elevated cancer risk were DDT, and the primary agents for elevated non-cancer toxic

risks were manganese, DDT and chloropyriphos. DDT also caused an elevated cancer risk if fruit or vegetable irrigated with lake water were consumed.

Manganese caused an elevated non-carcinogenic risk if the ground water at Tank Bund Road was ingested.

Borderline cancer risk: DDT in the lake water caused a borderline carcinogenic risk to persons exposed to lake water continuously and for prolonged periods in confined spaces.

Downstream groundwater contaminated by lake: Elevated concentrations of manganese are present in the ground water just downstream of the lake at Lower Tank Bund Road but not upstream of the lake. This suggests that **heavy metals may have migrated from the lake,** where they are present in lake water and sediment. Manganese is responsible for an elevated non-cancer toxic risk in the ground water at Lower Tank Bund.

6.1.4 Inferences

The lake waters are currently not considered as potable. Lake fish are however still sold, and the lake is used on the northern side for swimming and bathing. On this side, cattle are allowed to enter the lake, and their milk is sold commercially. The lake water is used for gardening at various places—Tank Bund, the South Central Railways, etc. It is therefore possible that humans consume fruit and vegetables grown with lake-irrigated water. Lastly, **the lake may cause a borderline cancer risk (not considered low) even if its waters run in a confined space and people are present in such confined spaces.**

6.2 Risk to dam structure and downstream populations

6.2.1 Dam safety

Constructing a 2.5 km long earthen bund on the eastern side formed the Hussain Sagar Lake. In the mid 1980s, Government of Andhra Pradesh built a retaining wall at the back of the bund, and the gap between the bund and the wall was filled with earth to provide a little additional space on top of the bund to erect statues.

A former Chief Engineer of Public Health had **objected to the retaining wall on grounds that it would obstruct water seepage (normal to earthen bunds) by building up pressure inside, which in turn can destabilize the bund.** The former Director, AP Engineering Research, as well as two irrigation engineers who were asked by AP Government to examine this issue upheld his objections.

About a year back a flyover was built from the Secretariat to Lower Tank Bund Road. On the Lower Tank Bund side, the flyover hugs the retaining wall at the back of the bund. There was an objection to the flyover on grounds that vibrations caused by vehicular traffic on it are may weaken the retaining wall. If the wall collapses, the accumulated water and slush inside the bund may gush out and breach the bund. **A dam burst would put lakhs of people living between Hussain Sagar Lake and the Musi River to enormous risk.**

From anecdotal information the Committee has learnt that a dam breach may have occurred at least once in the past, probably in 1887. Reference to this has apparently been made in an Urudu manuscript titled “Bostana e Asafia Vol 2” by Manak Rao Vithal Rao Jagirdhar. The breach is supposed to have damaged downstream structures. In 1903, there was an apprehension of a breach and a nala was dug at Sapurwadi to carry excess water. This information requires verification.

It is pertinent to draw attention to Secn 50(1)a of the Andhra Pradesh (Telangana Area) Irrigation Act, 1357 Fasli, which states that “Whoever without the permission of the competent officer: (a) …..endanger the stability of any irrigation work; …. Shall on conviction before a Collector be punished with a fine ….”

6.2.2 Risk to bystander populations

The lake and its inlet and outlet watercourses have been encroached upon. This has decreased their capacity to handle floodwaters, consequently has increased the risk of flooding after heavy rains. Hyderabad experienced this situation in the year 2000. Excess water from the lake filled the Gandhinagar waste weir to the brim, flooded the surrounding areas, damaged its banks and washed away automobile garages and other structures on them. Several poor families were affected. After heavy rains in July 2005, there was an apprehension that a similar situation may occur.

6.3 Violations of the Irrigation Act

The following are **violations of the Andhra Pradesh (Telangana Area) Irrigation Act,** 1357 Fasli:

1. Closure of the waste weir at the southern end of the bund, across the MCH Office. This violates Secn 38 that deals with interference with canal works.

2. Retaining wall built by Hotel Viceroy in the water way (surplus course) below the main weir at the northern end of the bund. This violates Secn 50(1)c(ii)) that deals with creating obstructions to the free flow of water.

3. On the question of encroachment, permitting encroachment of the lake (dealt with in earlier chapters), and polluting and allowing the lake to become polluted, it is pertinent to note that Secn 49(a) of the Act states that "(1) Whosoever wilfully and without the permission of the competent officer, commits or attempts to commit the following acts: (a) interferes with, or increases or diminishes the supply of water, or the flow through, over or under any irrigation work or does some other act that reduces the utility for the purpose for which it was constructed; (b) corrupts or fouls the water of any irrigation work by which the utility is reduced for the purpose it was ordinarily used; (f) notwithstanding any prohibition, passes or causes animals or vehicles to pass, in or across any irrigation work, its banks, or channels contrary to rules made under Secn 67; (g) Wilfully causes or permits cattle to graze upon any irrigation work, or flood embankment.

These violations have not always been acted upon.

6.4 Air pollution impacts on the lake

Data provided by APPCB for seven monitoring stations in the Hussain Sagar Lake indicates that the pH of the lake has dropped in all stations from the range 7.5—8.5 to 7.0—7.5 between 1999 and 2004. APPCB states that this may have been caused by an increase in phosphates and nitrates ions in the lake and release of carbon dioxide due to eutrophication of the lake.

For a five-year period the drop in pH is quite sharp and may not be fully explained by APPCB's statement. The eutrophication of the lake has been retarded in recent years; hence the production of carbon dioxide in 2004 should be less than what it may have been in 1999.

Hyderabad is one of the fastest growing cities in India. Hyderabad's current vehicle population is 16 times greater than its population in 1980-81, when it was one lakh, ie, the growth was 12.78% per annum (see Table 6.4.1). The Hussain Sagar Lake is at the centre of the city with the central business district (CBD) having developed right around it. As with CBDs all over the world, the maximum trip density is to and from a CBD. Traffic on roads around the lake has multiplied manifold over the years. **The acidic gases (NO_2 and SO_2) that vehicles release may have played a significant role in decreasing the lake water pH.** Decrease in lake water pH due to acidic gases has been observed in many parts of the world.

Table 6.1.1 Average concentrations of chemicals in the Hussain Sagar Lake waters/ sediment and ground water in hydraulic gradient from lake

	Lake water		**Ground water**	**Sediment**	
	Kukatpally nala (µg/L)	**Sanjeeviah Park** (µg/L)	**Lower Tank Bund Rd** (µg/L)	**NTR Park** (mg/Kg)	**Sanjeeviah Park** (mg/Kg)
Copper	70.0	15.8		56.7	
Zinc	660.0	15.2	146.4	333.3	
Lead	280.0	55.0	35.0	77.7	
Manganese	2,280.0	137.0	651.0	467.7	
Mercury	9.3	6.0		467.7	
Nickel	11.0	20.0		67.7	
Cadmium	11.0	2.0		7.3	
Arsenic	25.0	31.0			
Chromium	35.0	20.0	12.0	50.0	
DDT	0.16	0.15		2754.1	3514.5
BHC (Lindane)	0.36	0.29		343.6	457.2
Endosulfan	0.11	0.10		327.8	609.8
Monocrotophos	2.03	5.30		5.3	1.3
Chloropyriphos	6.83	1.25		1.1	0.8
Chlorophos	BDL	8.33		BDL	BDL

Notes: *APPCB provided data for Cu, Zn, Mn, Hg, Ni, Cd in lake water and sediment. Average monthly concentrations of chemicals in water are for 28 months Jan 2003—Jun 2005. Average concentrations of heavy metals in sediment samples were taken a day before and a day after Ganesh immersion during the years 2002-04.*

Data for As, Cr, and pesticides in lake waters and sediment were taken from their report "Environmental Monitoring of Hussain Sagar Lake Water and sediment", June 2000 prepared by NEERI for HMWSSB. Data is an average of 12 monthly samples for the period Nov 1997—Oct 1998.

Ground water quality data is from Environmental Protection Training & Research Institute's report "EIA for proposed dredging of sediment from Hussain Sagar Lake", Nov 2004.

Table 6.1.2 Lifetime cancer risk* due to potential chemical exposures in lake waters and sediment at Kukatpally nala

Exposure pathway	**Drink lake water** ($x10^{-6}$)	**Eat lake fish** ($x10^{-6}$)		**Swim in lake** ($x10^{-6}$)	**Eat lake water irrigated fruit/veg** ($x10^{-6}$)	**Bathe with lake water** ($x10^{-6}$)	**Exposed to lake water in confined spaces** ($x10^{-6}$)	**Cancer risk by chemical** ($x10^{-6}$)
Medium	***Water***	***Water***	***Sediment***	***Water***	***Water***	***Water***	***Water***	***All***
DDT	<0.1 – 1	10 – 400	10^4 – $3x10^5$	<0.1 – 30	1 – 30	3 – 20	1 – 5	**10^4 – $3x10^5$**
Lindane	1 – 7	16 – 600	$6x10^4$ – $9x10^5$	<0.1 – 5	<0.1 – 4	<0.1 – 3		**$6x10^4$ –$9x10^5$**
Cancer risk by pathway	**1 – 8**	**26 – 1000**	**$7x10^4$ – $1.2x10^6$**	**<0.1 – 35**	**1 – 34**	**3 – 23**	**1 – 5**	**$7x10^4$ – $1.2x10^6$**

Notes: ** Lifetime cancer risk—is expressed as the probability that a person would develop cancer in an exposure period of 30 years. For example, the probability of developing cancer due to eating lake fish is between 16 and 600 in a million due to exposure to Lindane being present in the lake waters. This is in addition to getting cancer from other causes. However, in view of the uncertainties associated with such risk estimates, they should always be interpreted as general indicators, rather than precise estimates. Lifetime cancer risk for a particular exposure is considered to be* ***not low*** *in many north nations if it >$1x10^{-6}$ (one in a million).*

Table 6.1.3 Non-cancer toxic risk due to potential chemical exposures in lake waters and sediment at Kukatpally Nala**

Exposure pathway	**Drink lake water** (HI**)	**Eat lake fish** (HI)		**Swim in lake** (HI)	**Eat lake water irrigated fruit/ veg** (HI)	**Bathe with lake water** (HI)	**Global Hazard Index by chemical**
Medium	***Water***	***Water***	***Sediment***	***Water***	***Water***	***Water***	***All***
Zinc	0.03 – 0.07	0.01 – 0.08		<0.01 – 0.04			**0.04 – 0.19**
Manganese	7.0 – 10.0			0.02 – 0.7			**7.02 – 10.7**
Mercury	0.4 – 1.0	10.0 – 100.0		<0.01 – 0.05			**10.4 – 101.05**
Nickel	0.01 – 0.02	<0.01 – 0.02					**0.01 – 0.04**
Cadmium	0.3 – 0.6	0.1 – 1.0		<0.01 – 0.04			**0.4 – 1.64**
Arsenic	1.0 – 3.0	0.3 – 3.0		0.03 – 0.1			**1.33 – 6.1**
Chromium	0.1 – 0.2	0.01 – 0.1		<0.01 – 0.01			**0.11 – 0.31**
DDT	<0.01 – 0.01	0.6 – 5.0	500 – 5000	0.1 – 0.4	0.06 – 0.4	0.1 – 0.2	500 – 5000
Lindane	0.02 – 0.04	0.1 – 1.0	1000 – 10000	<0.01 – 0.03	<0.01 – 0.02	0.01 – 1.01	1000 - 10000
Endosulfan	0.01 – 0.1		5000 - 40000				5000 - 40000
Chlopyriphos	0.03 – 0.07	0.7 – 6.0	0.2 – 2.0	0.01 – 0.3	0.07 – 0.5	0.1 – 0.2	**0.91 – 7.07**
Global HI by pathway	**8.9 – 15.11**	**11.82 – 116.2**	**6500 — 55000**	**0.16 – 1.67**	**0.13 – 0.92**	**0.21 – 1.41**	**6500 - 55000**

Notes: *** A Hazard index (HI) is the ratio of the potential exposure to the agent to an exposure that is assumed not to be associated with toxic effects (the exposure at which no toxic effects have been known to occur). A Hazard quotient (HQ), the sum of the individual HIs for exposure scenarios for each chemical, is considered to be* ***not low*** *if it is >1.*

Table 6.1.4 Lifetime cancer risk due to potential exposures to lake waters and sediment at Sanjeeviah Park

Exposure pathway	**Drink lake water** ($x10^{-6}$)	**Eat lake fish** ($x10^{-6}$)		**Swim in lake** ($x10^{-6}$)	**Eat lake water irrigated fruit/veg** ($x10^{-6}$)	**Bathe with lake water** ($x10^{-6}$)	**Exposed to lake water in confined spaces** ($x10^{-6}$)	**Cancer risk by chemical** ($x10^{-6}$)
Medium	***Water***	***Water***	***Sediment***	***Water***	***Water***	***Water***	***Water***	***All***
DDT	<0.1 – 1	10 – 400	10^4 – $4x10^5$	<0.1 – 30	1 – 10	1 – 20	1 – 4	**10^4 – $4x10^5$**
Lindane	1 – 8	5 – 200	$9x10^4$ – 10^6	<0.1 – 4	<0.1 – 2	<0.1 – 4		**$9x10^4$ –10^6**
Cancer risk by pathway	**1 – 9**	**15 – 600**	**10^5 – 10^6**	**<0.1 – 34**	**1 – 12**	**1 – 24**	**1 – 4**	**10^5 – 10^6**

Table 6.1.5 Non-cancer toxic risk due to potential chemical exposures in lake waters and sediment at Sanjeeviah Park

Exposure pathway	**Drink lake water** (HI**)	**Eat lake fish** (HI)		**Swim in lake** (HI)	**Eat lake water irrigated fruit/ veg** (HI)	**Bathe with lake water** (HI)	**Global Hazard Index by chemical**
Medium	***Water***	***Water***	***Sediment***	***Water***	***Water***	***Water***	***All***
Zinc	<0.01 – 0.01	<0.01 - 0.01					**<0.01 – 0.02**
Manganese	0.4 – 1.0						**0.4 – 1.0**
Mercury	0.3 – 0.6	8.0 – 70.0					**8.3 – 70.6**
Nickel	0.01 – 0.03	0.01 – 0.04		0.02 – 0.07			**0.04 – 0.14**
Cadmium	0.06 – 0.1	0.03 – 0.3					**0.09 – 0.4**
Arsenic	1.0 – 3.0	0.4 – 4.0		<0.01 – 0.2			**1.4 – 7.2**
Chromium	0.06 – 0.1	<0.01 – 0.05					**0.06 – 0.15**
DDT	<0.01 – 0.01	0.1 – 0.2	700 – 6000	0.01 – 0.3	0.03 – 0.2	0.1 – 0.2	**700 – 6000**
Lindane	0.01 – 0.03	0.1 – 1.0	2000 – 20000	<0.01 – 0.02	<0.01 – 0.1	<0.01 – 0.01	**2000 – 20000**
Endosulfan	0.01 – 0.02		6000 – 60000				**6000 – 60000**
Chlopyriphos	<0.01 – 0.01	0.1 – 1.0	0.2 – 2.0	<0.01 – 0.05	<0.01 – 0.05	0.02 – 0.03	**0.22 – 3.14**
Global HI by pathway	**1.85 – 4.91**	**8.74 – 76.6**	**15000 - 86000**	**0.03 – 0.64**	**0.03 – 0.35**	**0.12 – 0.24**	**15000 – 86000**

Table 6.1.6 Lifetime cancer risk and non-cancer toxic risk due to potential exposures to organo-chlorine pesticide residues in lake sediment near NTR Park

Exposure pathway	**Eat lake fish** (HI)	
Risk type	***Lifetime cancer risk***	***Non-cancer toxic risk***
Medium	Sediment	Sediment
DDT	$10^4 – 10^6$	500 – 5000
Lindane	$7x10^4 – 9x10^5$	1000 – 10000
Endosulfan		3000 – 30000
Chloropyriphos		0.3 – 3.0
Hazard quotient	**$8x10^4 - 10^6$**	**4500 - 45000**

Table 6.1.7 Non-cancer toxic risk due to potential chemical exposures in ground water at Lower Tank Bund Road

Exposure pathway	**Drink lake water** (HI)
Medium	***Water***
Zinc	0.01 – 0.02
Manganese	2.0 – 4.0
$Chromium^{+6}$	0.03 – 0.08
Hazard Quotient	**2.04 – 4.1**

Table 6.1.8 Cancer and non-cancer risk ranking by exposure pathways, mediums and chemicals contributing to risk

Location	**Kukatpally nala** (Lake water and sediment)		**Sanjeeviah Park** (Lake water and sediment)		**NTR Garden** (lake sediment)	**L T Bund Rd** (ground water)
Risk type / Risk severity & pathway	Cancer	Non-cancer	Cancer	Non-cancer	Cancer	Non-cancer
Extremely high for ***lake sediment*** as medium						
Eat lake fish	DDT, Lindane	DDT, Lindane, Endosulfan	DDT, Lindane	DDT, Lindane, Endosulfan	DDT, Lindane	
Significant for ***lake water*** as medium						
Eat lake fish	DDT, Lindane	Hg, Chloro-pyriphos, As, DDT, Cd	DDT, Lindane	Hg, As		
Drink lake water		Mn, As, Hg, Cr				
Elevated *for lake water* and ***ground water*** in hydraulic gradient away from lake as media						
Swim in lake	DDT	Mn, DDT, Chloropyri-phos	DDT			
Eat lake water irrigated fruit/ vegetables	DDT					
Bathe with lake water	DDT	DDT	DDT			
Drink lake water				As, Mn, Hg, Cd, Cr		Mn
Borderline for ***lake water*** as medium						
Eat lake water irrigated fruit/ vegetables			DDT			
Drink lake water	Lindane		Lindane			
Exposed to lake water in confined spaces	DDT		DDT			

Table 6.4.1 Vehicle population in Hyderabad

	1980-81	**1985-86**	**1990-91**	**1995-96**	**2000-01**	**2004-05**
Transport	17,692	29,081	44,727	64,788	108,049	138,498
Non-transport (4-wheelers)	10,754	27,773	49,142	78,030	135,247	295,357
2-Wheelers	60,669	177,205	357,855	610,738	856,397	116,5796
Total	**89,115**	**234,059**	**451,724**	**753,556**	**1,099,693**	**1,599,651**

Source: APPCB

Chapter 7 Conclusions and recommendations

7.1 Introduction

In this report the Committee has strictly followed the directions of the Supreme Court and also the principles of conservation and sustainable development of our natural resources enunciated in various judgments of Courts of law and in the provisions of the Constitution of India in the sections on Directive principles of State Policy and Fundamental duties of all Indian citizens regarding preservation of our environment. It also had for guidance the principles of Public Trust, Precautionary Principle and Equity in relation to the common property resources of our lakes that have an aesthetic and ecological role to play. In Chapter 1 and later, these principles, their interpretation by Courts of law and the benefits they confer especially in urban lakes have been brought out. In doing so, the Committee had in mind the following findings and directions of law and policy and basic principles of ecology of lakes brought out in them:

- Lakes perform several ecological services.
- Lakes, even in urban areas, have values in terms of natural beauty, moisture conservation, microclimate moderation, flood control etc. They have heritage, cultural, social and aesthetic values.
- Most lakes are self renewing and cleaning in nature provide they are not polluted or encroached upon, thus diminishing water storage and flows.
- Pollution of the lakes can arise from discharge of untreated industrial effluents and sewage into the lakes and by dumping waste like plastics and immersing idols.
- Treating the lake area as one where cremations or memorials for leaders can take place was inappropriate.
- Construction activity in or around the lakes impacts adversely on the local ecology, rainwater drains, water level and water quality and also affect ground water recharge and hydrology of the lakes.
- A green belt all round the lakes up to 1 km is advisable.
- A lake being a water body needs to be treated differently from a piece of land on which industrial or commercial development can take place.

- The conservation of urban lakes confers benefits on not only local communities but also all citizens who are either nature lovers or need sustenance for their good health with clean water and air.

- Management of urban lakes in India needs focus, avoiding multiplicity of controls and stressing conservation and sustainable development.

The various directions of Courts of law and Governmental policy in regard to Hussain Sagar Lake itself as well as lakes of Hyderabad urban area have also been brought out in earlier chapters. Along with them, the Committee has also arrived at findings on the encroachments, pollution and related social, environmental and management of the Hussain Sagar Lake based on the field visits, representations, study of technical papers and the representations received. The conclusions are set out in the following sections.

7.2 Encroachments

It is quite clear that the location of Necklace Road station was once a part of the Hussain Sagar Lake. This is stated in the Narendra Luthar report as well.

The Hussain Sagar Lake, which is older than the city of Hyderabad itself, was once a very large lake with scenic beauty, utility as a source of even drinking water and conducive to recreation like walking by the citizens. But its size has been steadily diminished by encroachments over the years, particularly after 1930's and sharply after the 1960's. It is now less than one-fourth the original size. The toposheets of 1974 showed a lake size of 571.48 hectares of which 487.75 hectares was having water spread and the balance of 83.67 hectares had lower water spread and foreshore vegetation. The satellite imagery of 1996 showed a water spread of 470.80 hectares, vegetation of 69.69 hectares and built up area of 30.92 hectares, totaling 571.42 hectares. As against this the HUDA notified in the year 2000 an area of 549.32 hectares and the satellite imagery of 2002 showed water body of 458.71 hectares, 69.5 hectares of vegetation and 43.21 hectares of built up area, totaling to 571.42 hectares. The tabulated picture is as follows:

Nature of data	Year	Water spread (ha)	Vegetation & open spaces (ha)	Built up area (ha)	Total (ha)
Toposheets	1974	487.75	83.67 (includes built up)		571.42
Satellite	1996	470.8	69.69	30.92	571.42
HUDA	2000				549.32
Satellite	2002	458.71	69.5	43.21	571.42

Thus, in the years since India adopted environmental laws (ie, 1974) the lake has lost over 29 hectares of water spread of which a major portion was in the built up area, including roads and structures for parks etc. If we go by the HUDA notification of 2000, the area of the lake would be less by another 22 hectares, and surprisingly, the government presented an even lower figure in the AP High Court, saying that the HUDA notification was not statutory.

The attempt to ignore the foreshore of the lake within FTL and the actions of the government and its agencies, which should have set an example instead of encroaching on the lake area on various grounds, most of which were unsustainable, are the major reasons for this, and the Committee concludes that the area of the lake, which should include not only the water spread up to and to the west and north of the railway line and the appurtenant water bodies in the inlet channels as also the areas like Sanjeevaiah Park, Lumbini Park and NTR Garden and Imax theatre, the Necklace Road and Railway station, is to be conserved to the extent of 549 hectares as mentioned in the HUDA notification adding 30 meters beyond FTL on the north, west and south. This will correspond to the figure of 571.42 hectares from the satellite imagery.

The three parks—Sanjeeviah, Lumbini, NTR Garden—which are on comparatively high ground could be retained as parks within the conservation area. The STP may remain for the reason that it performs a service for the lake. The Necklace Road railway station, being on an old railway line, would be within the conservation area, but within certain limits.

Obviously, the encroachments in this area have to be removed and substituted by a green belt of trees only with proper demarcation and recreational areas without structures. Where there should be water or its courses as in the inlet nalas to the west and north of

the railway line, the encroachments and debris dumped should be cleared and patta lands revoked in the case of clear water bodies or drain courses, or the foreshore of the lake on the western side of the railway line up to 50 meters width to yield the limit of 30 meters as per HUDA notification and 20 meters for peripheral recreation like walking or jogging.

In the case of encroachments covered by Court orders, the cases should be pursued to ensure the lake area is conserved and wherever the encroachments have been regularized, the further construction activity should be so regulated as not to obstruct the view of the lake or add to the heat, air pollution and accumulation of waste in the vicinity. In any case, the encroachments, which took place after 2000, when the Courts also directed that there should be no more structures, should be vacated on priority and all commercial activity in the name of entertainment or otherwise, should cease along with artificial creations in parks. Where any encroachments like roads or railways have to remain for reasons of logistics, the transport by electric buses and diversion of traffic through alternate routes should be effected, and only limited access provided.

The entertainment on the foreshore of the lake should be in the form of encouragement of children's education on science, environment and ecology, bird watching, and encouraging non-motorized sports and exercise for the citizenry like walking, jogging and cycling on the periphery and water sports like sailing, rowing and canoeing on the lake itself. No public plaza or public meetings or entertainment should be in the lake or in its foreshore and vicinity as that only encourages further encroachment and pollution. Hoardings (which are encroachments of land, water or the eyes), which disfigure the scenic environs of the lake, including its approaches, should be removed and not allowed in future.

Encroachments on the inlet nalas and drains both near the lake and in its catchment up to and above the Banjara Lake should be removed, the nalas maintained, the main catchment of Chiran Palace (now KBR National Park) should be totally conserved in terms of the Forest and Wildlife Protection Acts and no more unsustainable activities allowed as laid down in the Durgam Cheruvu case, by the AP High Court.

In any case no more new developmental activities should be taken up in the lake area including the parks, etc, mentioned earlier in the name of tourism or foreign assisted project for the development of the lake. Such assistance, if forthcoming, should be for systematic treatment of the wastes entering the lake or for non-motorized sports in the water and no waterfront or shore based activity should be allowed except walking, cycling and jogging. When the lake waters are cleaned up, sports like angling and swimming can be thought of.

7.3 Pollution

The Hussain Sagar Lake is highly polluted by a mixture of industrial effluents and untreated sewage entering it as pollutants. It also receives two types of solid wastes. The first is in the form of packing for consumer articles eg, plastic and the second is at the time of immersion of Ganesh idols, which have increased not only in size and numbers but also in the steel, plaster of paris, toxins from paints, and heavy metals including carcinogens like chromium, arsenic, cadmium and nickel.

Domestic waste waters from the unsewered colonies (including slums) on the foreshore and catchment area and other activities like washing of cattle, clothes etc, defecation and littering by eating joints and crowds thronging entertainment areas, oil spills by power boats also add to the pollutants in varying degrees.

The cumulative effect of all the pollutants entering the lake has been that it has not only ceased to be a drinking water source but also does not meet the water quality standards for recreation or outdoor bathing or drinking or wildlife propagation.

There was some improvement in parameters like pH, BOD and COD. But the nutrient levels are very high and the lake is in an advanced state of eutrophication. Anaerobic conditions prevail at the bottom of the lake, indication near absence of dissolved oxygen. The consequent presence of hydrogen sulphide with bad odour is noticeable.

More worrisome is the fact that the lake water poses cancer and non-cancer risks varying from extremely high to borderline for various pathways. Eating lake fish poses extremely high cancer and non-cancer toxic risks. Drinking lake waters poses significant cancer

and non-cancer toxic risks. Swimming in the lake or bathing with its waters or consuming lake water, irrigated fruit or vegetables pose an elevated cancer and non-cancer toxic risk. And even exposure to its waters for continuous or long periods poses a borderline cancer risk.

Elevated concentrations of manganese are present in the ground water just downstream of the lake at Lower Tank Bund Road but not upstream of the lake. This suggests that heavy metals may have migrated from the lake, where they are present in lake water and sediment. Manganese is responsible for an elevated non-cancer toxic risk in the ground water at Lower Tank Bund.

The improvement in the quality of effluents entering the lake initiated in respect of one part of the waters through the treatment of the waters of one inlet at the Kahairatabad STP and the diversion of sewage and industrial effluents through pipes to areas below the lake have had some impact but efforts to step up the treatment of wastewaters entering the lake through Kukatpally and Picket nalas and any additional flows through Banjara nala should be made, locating STPs outside the lake area. This will ensure the maintenance of dry weather flows, which, with the floods in monsoons, will help clean the lake and sediments over a period. The dredging of sediments is not only costly but also poses problems of finding places to dump the silt away from the lake area without affecting water and air quality there, and the health of the human population in the vicinity.

7.4 Lake management

One of the major issues in management is conceptual. The water body is being treated like any other piece of land in all the rules, regulations. The Master Plan for the city has never been notified after proper public consultations and this has facilitated the process of issuing Government notifications from time to time changing designated uses and even allowing water bodies to be built upon. If this is not remedied by statute or orders of the Court, the temptations to diminish the lakes will continue unabated.

The second issue in management is the organizational one. Today, in most lakes and definitely in the case of Hussain Sagar, there is a multiplicity of agencies handling the

control or management of the lake and mutual consultation or coordination is weak. This has played the water body into the hands of real estate interests and other developmental interests for whom conservation of the lake is not a priority. There has to be a strong organizational set up with a unified command structure for only Hussain Sagar lake but all the lakes in the city of Hyderabad and hopefully, elsewhere.

This management setup should be able to take steps to conserve the lake in its entirety and do policing and monitoring to prevent encroachments and pollution. Its mandate should extend to any development which will not encroach on the lake or foreshore in any manner and only promote greening by trees in the foreshore and creation of pathways in the periphery of the foreshore for walking, jogging and cycling and also to promote water sports of the un-automated kind.

It should have statutory backing and assured funding. The funding should be partly based on the Polluter Pays principle and the Government should take on this responsibility of assuring the support.

The management should include commissioning of studies from time to time of the status of the lake, its water quality etc. The municipal laws and regulations insofar as they pertain to the lake and its foreshore and catchment, should be implemented only after directions from the new set up and after public hearings. The management setup should have all stakeholders represented along with Government agencies, experts and NGO's with a good track record of work in regard to urban water bodies and urban issues. The representation should be so balanced as not to allow any one interest to dominate but on the clear understanding that the focus on conservation and sustainable development should not be lost.

Monitoring of conditions set in Court judgments if any, or conservation of the lake should not be entrusted only to Government agencies like the APPCB, but to technical groups which can associate Government agencies. In this context, the Government may have to re-look at the structure, composition of the board of management and personnel of APPCB to give it some autonomy.

7.5 Other issues

There are other issues to be tackled in relation to the lake that may have a bearing also on encroachment, pollution and management. These are issues of health and well being particularly of the low-income group communities living around the lake. The measures to see that there is no spread of disease, and there are proper amenities created in these colonies should be taken, ensuring, however that the building and other activity does not get into the hands of vested interests who may, over a period displace the colonists themselves. Public conveniences should be provided to ensure there is no public nuisance committed either by the walkers or other categories of users like the water sports and bird watching enthusiasts. Only non-motorized transport of the sustainable, non polluting kind should be encouraged on the roads on the lake and the eatables brought there should be by the push cart vendors who should use only biodegradable containers and not bring junk or fast food.

Immersion of idols should take place only in the portion of the lake at Minister's road, where the traffic will cause fewer problems. In any case the size of the idols should be restricted to below 1 meter and be made of clay and only biodegradable material, and if paints are to be used at all, they should be non-toxic vegetable dyes/paints. The immersion of idols should be staggered to include other lakes and water bodies.

An environment education campaign should be taken up both with children and adults on the importance of conserving lakes in their own interests and not polluting it in any manner. Steps already taken to make school children avoid plastics and make clay Ganesh idols of very small size and to teach them about improvement of water quality should be taken forward. The National Green Corps and the Children's Science Congress are good platforms for taking up such a campaign.

The most important issue to be addressed is the effective follow up of all the measures recommended. As the Committee found there were infractions of even the interim directions of the Honourable Supreme Court itself, mechanisms should be in place that avoids this and makes it incumbent on the government and authorities to carry out the orders of the Courts and the lake conservation measures. One measure is for the State

Government to guarantee the implementation and follow up through a financial guarantee given to the Supreme Court.

7.6 Recommendations

The recommendations of the Committee that flow from the earlier chapters and its findings above are as follows:

1. Hussain Sagar Lake should be conserved up to FTL and MWL with a green belt of water tolerant trees up to 30 meters beyond the MWL level. The total area to be conserved is 571.42 ha as mentioned in Section 4.2.

2. Hussain Sagar Lake, which is at the center of the city and its central business district (CBD), should not be allowed to become a part of the CBD or used for allowing picnicking, entertainment and commerce in the name of creation of parks. The lake should not be allowed to be converted into any more parks, and in any case no buildings or structures should be allowed in the lake area as a whole. By keeping the lake and its immediate surroundings relatively free from air pollution by not commercializing the immediate areas around it, the city would get some relief from the high asthma and other air pollution-related health effects that most other big Indian cities have been suffering from.

3. The lake should not be allowed to be encroached or be polluted. Restoration of the lake should be done by removing encroachments, as suggested in Section 4.2. **In regard to encroachments prior to 2000,** other than road and railway line, cases in courts of law should be pursued, and wherever the land reverts to the lake, the water body should be enlarged to that extent. Regularization in favour of the poor, who may have squatted in colonies, may not be wise. Instead they should be re-located outside the lake area in such a manner that it does not affect their livelihood and social interactions. The FSI of the colonies that are encroachments into the lake should be frozen at 1:1, and buildings above two storeys (ground + one floor) should not be allowed under any circumstance.

4. Lake conservation should include creation of a green belt of water tolerant trees both in the foreshore between FTL and MWL as well as in a 50-meter periphery. Up to 30 meters in this, there should be again plantations of water tolerant trees not subject to intervention by humans or livestock and in any case no parks with artificial creations including lawns etc, should be allowed.

5. The perimeter of the lake foreshore as well as the bund should be well demarcated with large boundary stones and fenced off or walled. Inside this limit, walkways could be created to a width of 20 meters to enable walking, jogging and cycling only with public conveniences at intervals of about 100 meters. This should be done without affecting the inlet flows into the lake for which ample vents should be provided, apart from bridges where major channels enter. It is desirable to continue water bodies appurtenant to the lake system if they exist beyond this limit.

6. In the roads or tracks already laid around or in the lake itself, there should be free flow of water on both sides. In any case no roads or railway track should be laid in the lake area in future. Where a road has already been laid, only recreational walking and cycling should be allowed and a limited amount of environment friendly vehicles like electric buses, cycle rickshaws and pushcarts should be allowed.

7. **In regard encroachments after 2000,** keeping in mind the directions of the AP High Court, increase in environmental pollution and the reduction of the water body including by the Necklace Road and the Necklace Road Railway Station, it is recommended that:

   a) The area to the east and south of the Necklace Road encroached by food courts, etc, including Eat Street, Jala Vihar, People's Plaza, HUDA food court, should be recovered and restored to the water body, or water tolerant trees should be planted. It follows therefore that Eat Street, Jala Vihar, People's Plaza and HUDA food court should be relocated beyond the lake area.

   b) The car parks opposite the People's Plaza, the Necklace Road railway station and to the north of the STP should be removed and the area greened with trees.

c) The Necklace Road railway station may remain with access on the Raj Bhavan side being as now arranged. But now on the Necklace Road side, the railway station only up to the limits of the area earlier occupied by the railways. On the land allotted to them in 2001, only an access path upto Necklace Road may be allowed. The rest being green areas of trees.

d) NTR Marg and NTR Park are now on relatively high ground and therefore, may be left alone.

e) Prasad's IMax theatre is clearly on land created from a part of the lake. Since it has come up after 2000, and is adding to air, water and noise pollution to the lake (because of the massive vehicular traffic and human population that it attracts to its shopping malls, eateries and theatres), it should be relocated outside the lake area. Restoring the land on which the theatre is to the water body may not be practical. Hence, the building may be used for creating a science and environment museum for children. The approach road to the building from the NTR Marg-Necklace Road junction should be closed permanently and the approach may be from behind, ie, the Mint Road.

f) The car park opposite Prasad's IMax theatre, the various bunds cutting the water body on the left of the flyover at Khairatabad should be restored to the lake, and a walkway created along the edge of the water body as suggested above.

g) The area on both the eastern and southern side of the railway line along the Necklace Road from the NTR Marg-Necklace Road junction up to Bridge No 4 on Necklace Road should have a green belt of trees only.

h) Regarding Necklace Road itself, it should be permanently closed to all prime mover-based motarable traffic. Electric buses to ply between NTR Marg-Necklace Road junction and Sanjeeviah Park may use half the road. The other half may be used for walking, jogging, cycling, rickshaws, and pushcart vends that will not serve junk and fast foods and will use only eco-friendly containers.

i) The area to the west of the railway line, up to Bridge 4, should be converted into water body up to 50 m from the railway property, where necessary by revoking pattas. The existing water body in S No 13-14 should also be restored to the lake system by revoking the patta. A walkway should be created along the newly created water body, to be used by walkers, joggers, and cyclists.

j) Additional vents may be provided under the Necklace Road and the railway line to allow for free flow of water on both sides.

k) The booking office and car park on the eastern side of Necklace Road railway station should be demolished and be made part of the green belt suggested in 4b) above. The main booking office may be shifted to the western side of the station and a small booking station may be established inside the railway platform on the western side. Only a 10 ft (3.3 m) track leading from the railway platform on the eastern side may be constructed up to the pedestrianized Necklace Road.

l) If the government wishes to have another road connecting Hyderabad and Secunderabad, and in view of the recommendation for banning through traffic on part of Necklace Road, we recommend that a road may be laid to connect Raj Bhavan Road from a point close to the Necklace Road Station, running over the railway line (like a road cum railway bridge) up to a point near the Sanjeeviah Park. This will avoid laying a road through water bodies west of the railway line, as understood to be planned by the AP Government.

m) Various bunds cutting the water body between the Ministers Road and the railway line should be demolished, the area cleaned up, encroachments on the water body removed and the land restored to the water body. The walkways as suggested above should be created around the water body and the areas on the periphery of the water body should be greened. The Sai Baba temple along the Ministers Road should preferably be re-located. In any case, the shed at the temple should be removed.

n) The laser show should be relocated outside the lake area, and buildings, except for heritage ones, demolished and the land restored to the lake. The newly created Lake Conservation Authority may use the heritage buildings.

o) Marriages and film shooting should be banned in all three parks around the lake periphery —Sanjeeviah Park, Lumbini Park, NTR Park.

p) Cremations or burials should not take place in the lake area. As two samadhis have already come up for a former Prime Minister and a former Chief Minister, they could remain. The serenity of NTR Garden should be maintained as suggested in our recommendations. In regard to the samadhi of the late Prime Minister Shri P V Narsimha Rao, the area between Necklace Road and the samadhi should be retained as a memorial garden, without any structures. The

q) area to the east of the samadhi may be given back to the water body, planting water-tolerant trees at the edge.

r) The continued construction of lower income group housing (Bambay housing) in the water body adjacent to Khairatabad flyover should be dismantled. Alternate housing may be provided for those who would have benefited by the construction being made on the lakebed in Khairatabad.

8. The pollution in the lake should be avoided by diverting industrial effluents and treating sewage and open drain flows entering the lake in STP's located beyond the periphery. The following additional measures should be taken:

a) There should be total ban on the use of plastics and other forms of solid waste in the environs of the lake.

b) Dumping of garbage into the lake should be prevented.

c) In the lake waters only non-motorized sport like sailing, rowing and canoeing should be allowed. Only small powerboats may be allowed in the lake stretch

between Lumbini Park and the Buddha statue. The plying of large power boats in lake should be discontinued.

d) At a future date, if the water quality permits, limited amount of fishing, swimming and bathing may be allowed.

e) Dry weather flow consisting of domestic and industrial wastewaters should be stopped from entering the lake.

f) The inlet and outlet nalas should be maintained in pollution free condition and meshes should be provided at the inlet points to prevent debris from entering the lake. Artificial aeration should be provided at inlet points to prevent anaerobic conditions. Encroachments should be removed on inlet and outlet nalas as a flood control measure and for ensuring all the channels and drains in the catchment area are not obstructed in any manner. In this context, the recommendations of the Kirloskar Consultants report are relevant.

g) Steps should be taken to ensure that pesticides, heavy metals and other pollutants do not enter the lake.

h) Unsewered areas from where sewage is entering the lake should be sewered and the sewage diverted from the lake or treated before entry into the lake.

i) STPs should also be constructed on the Kukatpally and Picket nalas on land that does is not a part of the lake area. These STPs and the existing one at Khairatabad should be provided with tertiary treatment facilities for the removal of phosphorous and nitrogen.

j) It is best to avoid immersion of religious or other idols in such public water sources, and if unavoidable, it should be confined to a corner of the lake that will not impede traffic flow. Such a space is available in the water body adjacent to Ministers Road. Only idols less than 1 meter in size and made of biodegradable substances and/or clay may be immersed in the lake. Idols beyond that size or

that use steel, plaster of paris and that use chemical or toxic paints should be banned.

k) Regular monitoring of air, water and sediment quality in and around the lake, inlet channels and in the ground water below the lake must be done, and if required, corrective steps taken promptly. Risk analysis for the lake waters and sediments should be conducted once every 2 years.

l) Public must be informed and educated of the risk they face due to the lake waters.

m) The following activities should be banned forthwith and the ban enforced until such time as the lake water quality improves to consider such activities safe: Swimming in the lake, using lake water for bathing and washing clothes, using lake waters for irrigating fields that grow any foodstuffs for human or cattle consumption, allow cattle into the lake.

n) The milk of cattle swimming and drinking lake water should be tested, and if the concentration of pesticides or heavy metals are a cause for concern, the milk of such cattle and diaries/ gow shalas that they belong to, be banned.

o) Prominent boards should be put up around the lake stating, “Continuous and prolonged presence in confined spaces with lake water may be injurious to human health”.

p) The contaminated lake sediments should not be dredged out, but allowed to remain where they are and let nature self purify them in time.

9. A committee of experts should be constituted to examine all issues related to dam safety, and suggest appropriate measures.

10. All violations of the Andhra Pradesh (Telangana Area) Act, 1357 Fasli should be rectified forthwith.

11. To prevent dismemberment of the water bodies through executive fiat or private encroachment, urban development laws relating to land should not apply to the lake area. The lake and its foreshore should be notified under the Forest Act and under Heritage regulations. The scenic splendour of the lake should be preserved. Hoardings or garish structures in the lake vicinity should be banned. The government department dealing with lakes should be the one dealing with environment and forests and not urban development or tourism. This authority should be funded by levies on earlier or current polluters and by the government.

12. A Lake Conservation Authority (LCA) should be set up for managing of lakes and for enforcing the above stated measures that the Hon'ble Supreme Court may deem fit to pass orders. The LCA should include not only government agencies, including HUDA, MCH, HMWSSB, but in equal measure of experts, NGO's and stakeholders who do not wish to convert water bodies into real estates or commercial areas for development or tourism. Once this authority is set up, the Buddha Purnima Development Authority may be disbanded. The LCA should be funded by levies on earlier or current polluters and by government. This authority may start with the management of Hussain Sagar Lake, but in time its jurisdiction may be extended to other lakes in and around Hyderabad and beyond, as has been done with the Lake Development Authority in Bangalore. The system of honorary wardens should be introduced. The wardens should have powers to report offences to the authority, who in turn should report back on the action taken. The powers of the authority to conserve the lake should not extend to changing the geography of the lake.

13. The LCA should monitor the implementation of the Court's orders, specifically of the recommendation made in recommendation 8 k) above. To help them do this, a pollution monitoring committee, consisting of senior scientists from APPCB, NEERI, CPCB and one independent scientist, should be set up.

14. The findings of the socio-economic survey in EPTRI's report, regarding welfare facilities for low-income colonies around the lake should be implemented to improve the health, sanitation and living conditions of their residents.

15. Environmental awareness is the key to preserving the lake. The Lake Conservation Authority must make the imparting of environmental education one of its primary activities, for which it may find appropriate partners. It may also use a part of the resources at its disposal for environmental education.

16. Hyderabad is not the only city to lay claim to having disappearing and shrinking lakes. The press has recently reported that Udaipur, another famous lake city, has also been experiencing a similar phenomenon, and there may be many more cities like that. The above recommendations may, where appropriate, be used to conserve other urban lakes.

17. Measures to conserve the lake have failed, and the un-sustainable developments have taken place in and around the lake. This is mainly due to fitful implementation of laws and regulations by government and its agencies. As this trend has to be reversed, the Committee recommends that the State Government of Andhra Pradesh should provide a financial guarantee for a sum not less than Rs 500 crores to the Honourable Supreme Court. The guarantee could be revoked in stages depending on the acceptability to the Supreme Court of the periodic monitoring reports on the implementation of the Court's orders.

R Rajamani R C Reddy Sagar Dhara

Hyderabad
8 October 2005

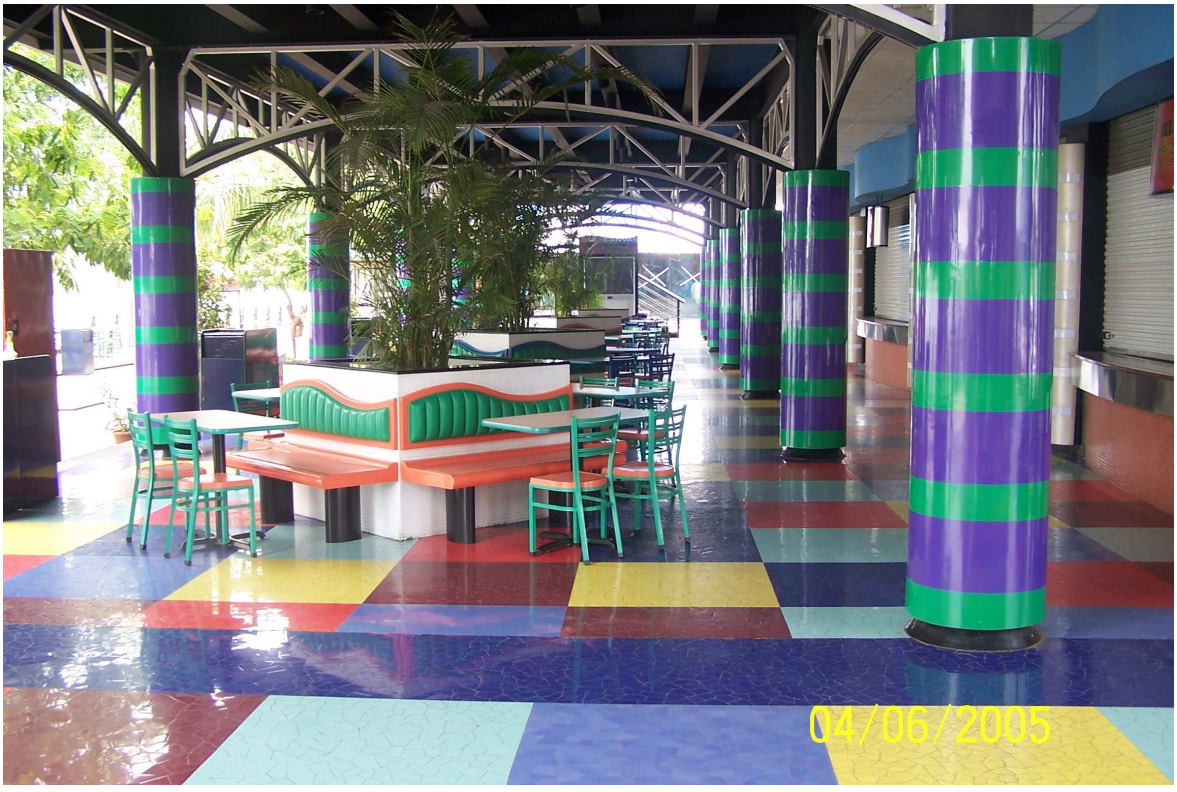
Part of Hussain Sagar Lake water body being encroached to the left of Khairatabad flyover

Encroachments on part of lake to the west of the railway line near Kukatpally nala

Continued filling on part of lake body even after the Supreme Court passed orders

Part of lake, west of the railway line, encroached by plantations with a wall constructed by unknown party

Jala Vihar's "temporary structures"



Food court: Eat street’s temporary structure

Encroachments into Kukkatpally nala

Fillings into water body near Ministers Road

Water body near Ministers Road broken up by fillings

Continued debris dumping into water body near Ministers Road

Encroachments into wastewater carrying inlet nalas into lake

Debris dumping near inlet nala to lake

Prasads IMax theatre located on what was once the lake bed

Bathing in the lake

Old encroachments into water body to the west of railway line

Washing clothes in the lake

Public hearing on 30 August 2005

Lake or land?

Gas bubbles from the bottom of the eutrophicated lake

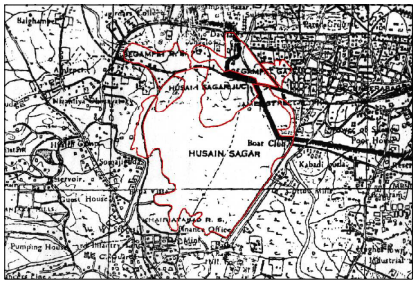
Fresh filling to the west of the Necklace Road railway station

New construction to the west of the Necklace Road railway station

Claim to property west of the Necklace Road railway station

Husain Sagar as per topomap - 1934

Area Ha – 583.78



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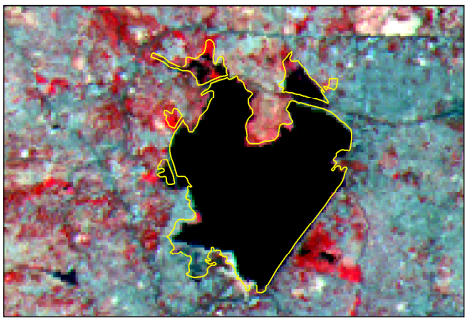
Husain Sagar as per topomap on 1:25K - 1974

Area Ha – 571.28

40

Husain Sagar as IRS 1A/1B LISS II Imagery - 1988



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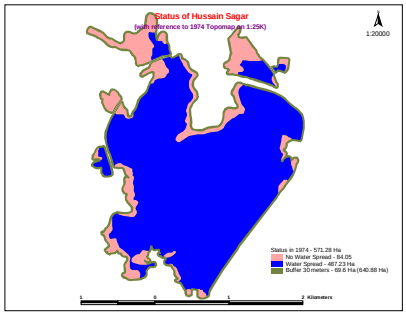

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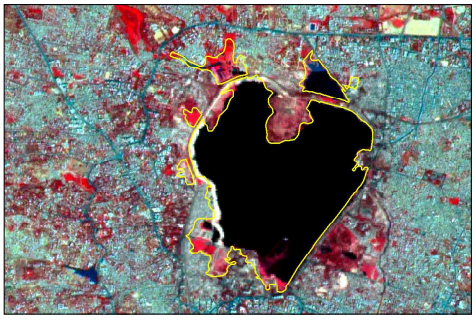
Husain Sagar as IRS 1C LISS III + PAN Imagery - 1996



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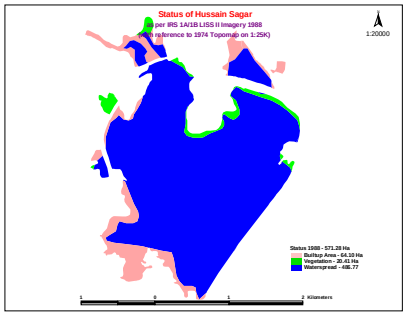

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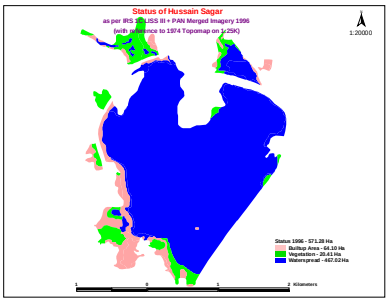

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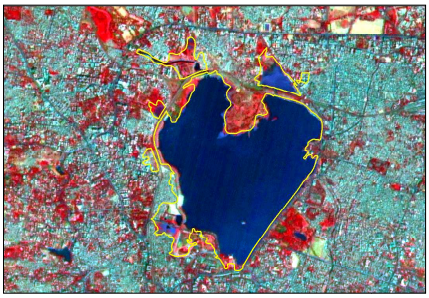
Husain Sagar as IRS 1C LISS III + PAN Imagery - 2002



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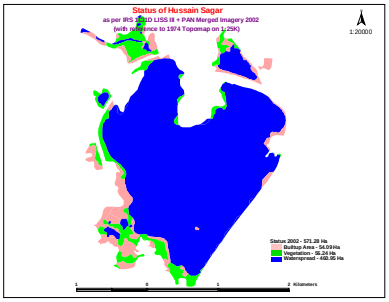
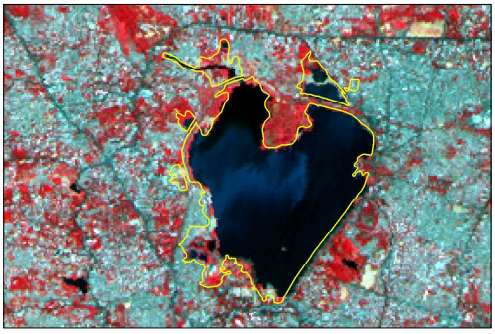


47

Husain Sagar as IRS P6 LISS III Imagery - 2004



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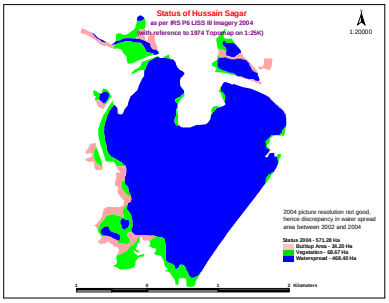

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Present Status

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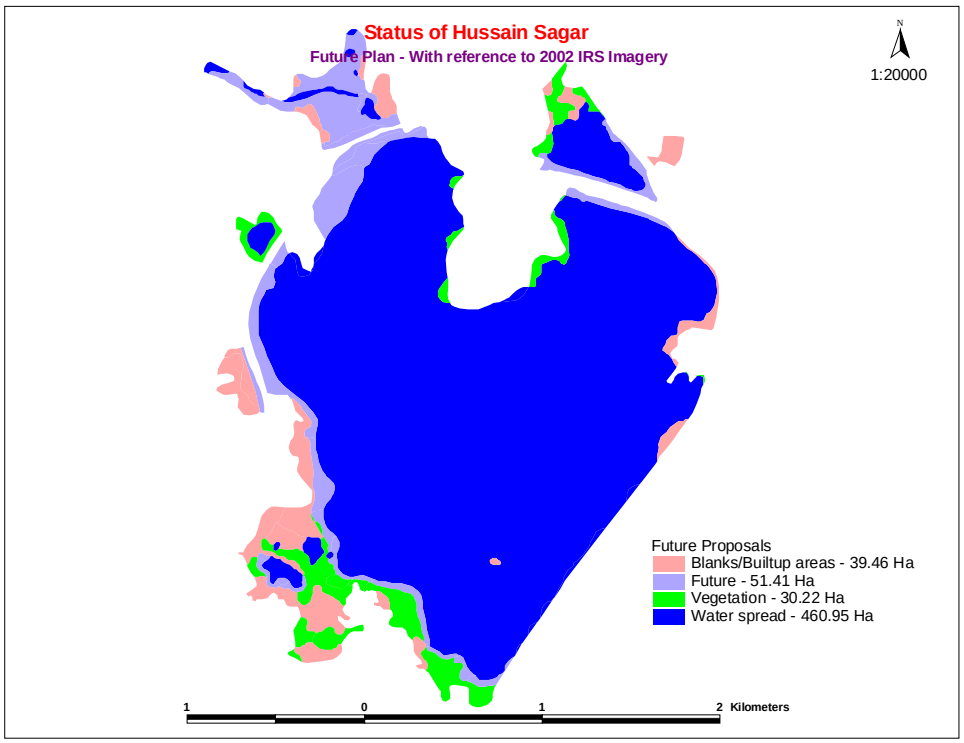
Status of Hussain Sagar
Future Plan - With reference to 2002 IRS Imagery
N
1:20000
Future Proposals
Blanks/Builtup areas - 39.46 Ha
Future - 51.41 Ha
Vegetation - 30.22 Ha
Water spread - 460.95 Ha
1
0
1
2 Kilometers

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IN THE SUPREME COURT OF INDIA
CIVIL APPELLATE JURISDICTION

CIVIL APPEAL NOS. 2905-2906 OF 2005

DR. G. HARAGOPAL & ORS.	.....APPELLANT(S)	
VERSUS		
SOUTH CENTRAL RAILWAY & ORS.	.....RESPONDENT(S)	

O R D E R

These appeals arise out of an interim order passed in WPMP No. 31584 of 2003 and WVMP No. 136 of 2004 in Writ Petition No. 25073 of 2003. Writ Petition No. 25073 of 2003 was filed seeking a declaration that the construction of the Necklace Road Railway Station and also other such developmental activities undertaken by the respondents as unconstitutional, illegal and ab initio void. A direction was also sought for the restoration of the Hussain Sagar Lake to its original purity and spread and also to protect and promote the right to life and shelter of the petitioners and other basti dwellers of M.S. Makta and also consequential relief.

When the interim relief granted by the High Court is challenged before this Court, this Court called for the main writ petition itself for final disposal. While the matter was pending before this Court, the Court constituted two Committees (one headed by Mr. Narender Luther, former Chief Secretary to the State and the other comprising Mr. R. Rajamani, former Secretary, Ministry of Environment and Forests and R. Sagar Dhara, Consultant UNEP as members) to examine the issue relating to the encroachment on the Hussain Sagar Lake and steps to be taken.

Reports were submitted and against which few objections were raised. We, however, notice that the State of Andhra Pradesh has not filed any objection to any of these reports.

So far as the construction of the Railway Station is concerned, this Court has taken the view that since the same has already been constructed, there is no question of restoration of that part. We are informed that few other persons have encroached upon the lake and effected illegal construction.

Mr. P.S. Narasimha, learned senior counsel appearing for the applicants in IA Nos. 33-34 of 2012, brought to our notice that the Andhra Pradesh Building Rules, 2012, Andhra Pradesh Rules for Construction and Regulation of Multiplex Complexes, 2007 and the Zoning and Development Promotion Regulations, 2013 have come into force.

We are of the considered view that there is no purpose in keeping the matter pending here, since due to the interim order passed by this Court, the State machineries, including the Corporation, are not in a position to deal with various applications that are filed as well as the complaints of encroachment of the lake and other places.

That being the factual position, we direct that Writ Petition No. 25073 of 2003 be remitted back to the High Court for its disposal, in accordance with law. The High Court can look into all the reports filed by the Expert Committee, objections filed and various laws that came into force in the meanwhile. Since the writ petition is of the year 2003, we request the High Court to dispose of the same within a period of four months from the date of receipt/ production of a certified copy of this order.

The interim order dated April 25, 2005 shall remain in operation till the matter is finally disposed of by the High Court.

The civil appeals are disposed of.

.....J.
(K.S. RADHAKRISHNAN)

.....J.
(VIKRAMAJIT SEN)

NEW DELHI,
JANUARY 16, 2014.

REVISED

ITEM NO.101 COURT NO.7 SECTION XIIA

S U P R E M E C O U R T O F I N D I A

RECORD OF PROCEEDINGS

CIVIL APPEAL NO(s). 2905-2906 OF 2005

DR. G. HARAGOPAL & ORS Appellant (s)

VERSUS

SOUTH CENTRAL RAILWAY & ORS. Respondent(s)

(With appln(s) for permission, impleadment, permission to file addl. documents and office report)

Date: 16/01/2014 These Appeals were called on for hearing today.

CORAM :
HON'BLE MR. JUSTICE K.S. RADHAKRISHNAN
HON'BLE MR. JUSTICE VIKRAMAJIT SEN

For Appellant(s)
Mr. Colin Gonsalves, Sr. Adv.
Mr. Juno Rahman, Adv.
Ms. Jyoti Mendiratta, Adv. (NP)

For Respondent(s)
Mr. R. Venkataramani, Sr. Adv.
Mr. G.N. Reddy, Adv.
Mr. Bala Shivudu M., Adv.
Mr. Sodhan Babu, Adv.
Ms. Neelam Singh, Adv.

Mr. P.S. Narasimha, Sr. Adv.
Mr. Ananga Bhattacharya, Adv.

Mr. G. Ramakrishna Prasad, Adv.
Mr. B. Suyodhan, Adv.
Mr. Bharat J. Joshi, Adv.
Ms. Filza Moonis, Adv.

Mr. Nikhil Nayyar, Adv.
Ms. Akanksha, Adv.

UPON hearing counsel the Court made the following

O R D E R

The civil appeals are disposed of in terms of the signed order.

|(N.S.K. Kamesh) | |(Renuka Sadana) |
|Court Master | |Court Master |

(signed order is placed on the file)

ANNEXURE -P/2

ITEM NO.60 COURT NO.4 SECTION XIIA

SUPREME COURT OF INDIA

RECORD OF PROCEEDINGS

Petition(s) for Special Leave to Appeal (Civil) No(s). 5595-96/2004

(From the judgment and order dated 04/02/2004 in WVMP No. 136/2004 & WP No. 25073/2003 & WPMP No. 31584/2003 of The HIGH COURT OF A.P AT HYDERABAD)

DR. G. HARAGOPAL & ORS ....Petitioner(s)

VERSUS

SOUTH CENTRAL RAILWAY & ORS. ...Respondent(s)

(With prayer for interim relief and office report)

(For final disposal)

Date: 25/04/2005 This Petitions was called on for hearing today.

CORAM :

HON'BLE MRS. JUSTICE RUMA PAL
HON'BLE MR. JUSTICE C.K. THAKKER

For Petitioner(s) Mr. Colin Gonsalves, Sr. Adv.
Ms. Aparna Bhat, Adv.
Mr. P. Ramesh Kumar, adv.
Mr. Jai Singh, Adv.

For Respondent(s) Mr. B. Dutta, ASG,
Ms. Kiran Bhardwaj, Adv.
Mr. Nikhil Nayyar, Ad.

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Mrs. D. Bharathi Reddy, Adv.
Mr. B. Sridhar, Ad.
Mr. Shreekant N. Terdal, Adv.

UPON hearing counsel the Court made the following

ORDER

Leave granted.

The appellants filed a writ petition challenging the construction of a Railway Station on Hussain Sagar lake by the respondent authorities. An interim order was passed by the High Court permitting the construction to go on. Against the interim order, the appellants preferred this appeal by way of special leave.

On the basis of the proceedings before this Court, a large amount of material has been submitted,, including a report of the Commissioner Mr. Narender Luthar who submitted a report on the construction made.

In the meanwhile the construction of the Railway Station has been completed. According to the appellants not only is this likely to cause pollution, the respondent authorities are going forward with further construction on what originally was the lake and which is essential for maintaining the water body.

Having regard to the nature of the issue involved and particularly in view of the submissions of learned counsel for the appellants that the orders of the High Court on the question of the extent of the lake are conflicting, we withdraw the writ petition from the High Court for disposal by this Court.

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The matter is admitted for hearing on a regular basis. By way of an interim order and pending disposal of the appeal, no further construction shall be carried out except with leave obtained from this Court in, on or around the lake.

The Committee comprising of Shri R. Rajamani, former Secretary, Ministry of Environment & Forests, SWIC, R.C. Reddi, Head, NEERI, Hyderabad and Shri R. Sagar Dhara, Cerena Foundation, Consultant UNEP are appointed to consider the construction already made and to submit a report as to suggestions relating to the encroachments, if any, and the pollution if it exists in respect of the lake. The Committee will also recommend to this Court as to what measures could be taken with regard to the Railway Station which has already been constructed. In the event any member of the Special Committee so appointed is unavailable for whatever reason, liberty granted to the parties to mention. The report shall be submitted to this Court within six months from today.

Sd/-
(SUMAN WADHWA)
Court Master

Sd/-
(MADHU SAXENA)
(Court Master)

(TRUE COPY)