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Urban Lake Scenario and Development Possibilities- A case of Surat.

Escenario de lago urbano y posibilidades de desarrollo: un caso de Surat.

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ABSTRACT

Urban water bodies are an inherent part of Indian culture. They store rainwater and ensure supply for domestic use and for agriculture. They help in recharging groundwater. They serve as flood cushions. They also act as city level open space and recreational area for the city. They help in maintaining the micro-climate of the area. Due to extensive urbanization and industrialization, urban land use changed in many cities and resulted in lost water bodies. Cities are expanding and population is becoming urbanised with a greater rate. It's challenging the natural eco system of cities as a result pockets in the form of green parks, lakes etc. are disappearing. Same is the case of Surat city, Gujarat. Despite of having a series of natural urban lakes, these blue marks are gradually disappearing from the map of Surat. The city consisted total of 352 lakes which is now limited to only 62 lakes. This number may decrease further if enough actions and interventions are not taken by the authorities, stakeholders and Surat city people. This paper discusses about the current condition of urban lakes in Surat city and concerns regarding urban lakes disappearance and dire need of water body presence, its importance in the urban fabric. The case of Surat gives us insights about how multiple components like government initiatives, institutional arrangements, stakeholder participation, lakefront design can foster and improve the face of urban lake, while providing city the breathing space it needs. This paper also looks upon the dynamics of collaboration of public, private and non-governmental resources concerning urban lake development. The restoration and lake development are done through designing, improving and managing these urban lakes. This study will foster understanding of varied benefits these spaces generate that carve out the pathways/alternative for governance and management of urban lakes.

Keywords: Urban lakes, public private partnership, lake management, lake development.

RESUMEN

Los cuerpos de agua urbanos son una parte inherente de la cultura india. Almacenan agua de lluvia y aseguran el abastecimiento para uso doméstico y para la agricultura. Ayudan a recargar las aguas subterráneas. Sirven como amortiguadores de inundaciones. También actúan como espacio abierto a nivel de ciudad y área

recreativa para la ciudad. Ayudan a mantener el microclima de la zona. Debido a la urbanización e industrialización extensivas, el uso del suelo urbano cambió en muchas ciudades y resultó en la pérdida de cuerpos de agua. Las ciudades se están expandiendo y la población se está urbanizando a un ritmo mayor. Está desafiando el ecosistema natural de las ciudades, como resultado están desapareciendo espacios en forma de parques verdes, lagos, etc. Igual es el caso de la ciudad de Surat, Gujarat. A pesar de contar con una serie de lagos urbanos naturales, estas marcas azules poco a poco van desapareciendo del mapa de Surat. La ciudad constaba de un total de 352 lagos, que ahora se limita a solo 62 lagos. Este número puede disminuir aún más si las autoridades, las partes interesadas y la gente de la ciudad de Surat no toman suficientes acciones e intervenciones. Este documento analiza la condición actual de los lagos urbanos en la ciudad de Surat y las preocupaciones sobre la desaparición de los lagos urbanos y la necesidad extrema de la presencia de cuerpos de agua, su importancia en el tejido urbano. El caso de Surat nos brinda información sobre cómo los múltiples componentes, como las iniciativas gubernamentales, los arreglos institucionales, la participación de las partes interesadas y el diseño de la orilla del lago, pueden fomentar y mejorar la cara del lago urbano, al tiempo que brindan a la ciudad el respiro que necesita. Este documento también analiza la dinámica de colaboración de recursos públicos, privados y no gubernamentales en relación con el desarrollo de lagos urbanos. La restauración y desarrollo de los lagos se realiza a través del diseño, mejora y gestión de estos lagos urbanos. Este estudio fomentará la comprensión de los variados beneficios que generan estos espacios que forjan los caminos/alternativas para la gobernanza y la gestión de los lagos urbanos.

Palabras clave: lagos urbanos, asociación público privada, gestión de lagos, desarrollo de lagos.

INTRODUCTION OF SURAT LAKES AND AIM

The small and big lakes of Suryapur (Surat) served several needs of rural life over a long period in earlier times to the time of undivided Bombay presidency (Gazetteer of Bombay Presidency: Gujarat, Surat and Broach. Vol II). Impounding surplus rain water, recharging ground water reservoirs and feeding wells, providing protective irrigation, drinking water for cattle, places for bathing and washing, soaking pools for buffaloes, space for cultivation of some highly water demanding, nutritive produce of the margins and a number of other functions were served through these lakes. Often they are connected with channels, so that when Lake overflowed the surplus water could flow into the next and so on. Through the ages village societies evolved autonomous management practices and mechanisms for keeping the catchments areas clean and free encroachments, for de-silting the tanks periodically for maintenance and repair of bunds and livings. Lake and lake catchment area can be protected from pollution and encroachments through different management practices and alternatives which are divided into three major categories: Administrative; Non-structural and Structural alternatives.

Aim of the study is to understand the different mechanism prevalent for accelerating the Lake development projects in context to Gujarat state and what procedures/frameworks can be taken up for the better execution and monitoring.

Major aim of the study will be on- Reforming institutions for better governance and Regulatory bodies and enforcement agencies for better lake development projects in the city.

Present Scenario of the Urban Lakes

With the increasing development activity, these autonomous management practices were forgotten and lost, the catchments areas were gradually encroached upon. Maintenance was abdicated to a remote district Administration, - leading to neglect, silting pollution and dilapidation. As the city pushed outward in its growth, they engulfed peri-urban villages and consumed agricultural and pastoral land. Urban occupation and life style radically changed the land-use of the village and the surroundings rendering the traditional function of the Lakes increasingly irrelevant. Today they are looked upon as oversize cesspools constituting an environmental nuisance. As places where mosquito breed, around which slum dweller defecate; where buffalos come to water, where many of the new housing complexes let out their untreated sewage. However, because such views were commonly held, they tend to condone the reclamation of these lakes for the requirement of urban development. The building boom which the outskirts of Surat have witness over the past decades has steadily diminished open spaces, depriving the port city of Surat of which these lakes are an important aspect.

As per the Gujarat Government Notification, following water bodies were notified in the Surat Municipal Corporation Area.

Sr no.	Name of water Body	Description Of Land		Area in Sq.Mt
		Moje	R.S No/Bloc	
1	Government Pond, Adajan	Adajan	642	31560
2	Bhimatlao,Adajan	Adajan	59	2219
3	Government Lake. Vania Talao, Ugat	Jahangirab ad	167	85710
4	Surat Municipal Corporation Lake, Subhash Sarovar, Mora Bhagol	Rander	111,115	18877
5	SMC Lake, Kansangar Lake, Katargam	Katargam	304/A,1/A/1	27200
6	Government Lake, Dabholi	Dabholi	100	19655
7	Gamtalao,Singapore	Singapore	23	2385
8	Suraat Muncipal Corporation Lake	MajuraKhatodra	T.P.S 6 (MajuraKhatodra)F.P.161	9841
9	SMC Lake	Bhestan	15	13861
10	Dindoli Gam Panchayat Lake	Dindoli	352	9105
11	Surat Municipal Corporation Lake, Lake View, Piplod	Piplod	T.P.S.6(Piplod) F.P 99	14007
12	Gam Talao, Althan	Althan	T.P.S 37 (Althan) F.P.2	34564

Source: SMC, CDP

Urgent need to develop Surat lakes: It is essential to start searching for some new planning and development strategies in respect to urban lakes of Surat city. The old traditional conservation concept may not adequately lend itself to such thinking. Rather the open space concept may be more appropriate since these are the only and most potential open space left in the urban fabric of Surat. Hence, it is intended to seek and identify urban parameters for not only protecting and conserving, but actually developing these lakes. These water bodies can serve the city in several capacities - as storm water sinks, as sources of aquifer recharge, as open space in the public realm for the recreation, as microclimatic regulators, as environmental assets in the form of natural areas harboring important aquatic ecosystem and as havens for migratory birds. Also there is a need to find appropriate mechanism to undertake the same.

Bhimrad Lake

Magdalla Lake

Pal lake

Budiya Lake

Source: Field Visit

Lakes Under Development

In the Surat city, twelve lakes were notified and selected in the year 2004 by the Surat Municipal Corporation for the lake front development and their restoration (refer table-1). However, even after a long process and period a single lake (Gopi lake) was opted for development which is located in the center of the city (Gaamtal) and consist of a historic importance. The development of the Gopi lake (including owing and construction) was fully fetched by the SMC and its resources though after the completion of the project it was transferred to the local private partner for its further operation and maintenance and making the project functional and viable. This transfer of the operation and maintenance was done due to limited capacity, time and resources of the ULB to run the property and less experience in the particular field. In Surat, Lake development has not received serious attention and funding until the development of Gopi Talav in 2012. After the success of the project as a viable one and a prominent famous recreational space in the city ULB decided to take up three more lake development projects and identified the lakes for it according to the favorable conditions and characters of the vicinity (Pal, Dindoli and Dummas) and for making the projects financially viable with improved recreational facilities and introduced Public Private Partnership approach for the same. But the approach has got some shortfalls and some issues in the whole process which is important to identify and address to formulate an overall pilot proposal that perhaps can be implemented for most of the lakes in city.

Table 1: Zone wise lakes of Surat city

Sr. No.	Zone	No. of lakes	Area of lakes (in sq. m)
1	East	4	12205
2	West	11	138790
3	North	9	22350
4	South	21	212238
5	Central	3	13450
6	South - west	9	134501
7	South - east	5	124560

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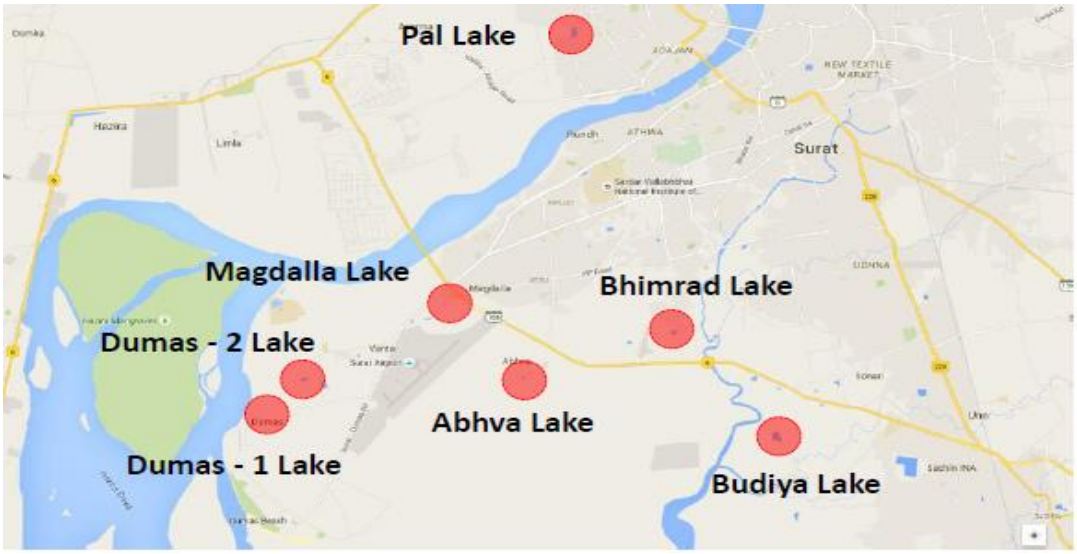

Fig 1 showing selected lakes location for development

Sr. No	Name of Lake	Development Area (Sq.M)	Water Body Area (Sq.M)	Survey Area (Sq.M)
1	Magdalla	33995.10	37709.51	71704.62
2	Dummas 2	26794.64	28702.23	55496.87
3	Pal	15456.31	17916.42	33372.73
4	Dummas 1	29081.69	28193.16	57274.85
5	Bhimrad	32499.74	21357.32	53857.06
6	Budiya	20606.43	30948.68	51555.10
7	Abhava	12884.67	11154.02	24038.70

Working participation of agencies

3-tier Institutional Mechanism is been proposed by the NRCD/GOI.

(a) Lake Development Authority (LDA) or Lake Conservation Authority (LCA)

(b) If already existing at State level, shall be the nodal dept. / agency. Or State Govt. must identify a nodal department in the state

(c) Project Implementation Unit (PIU) oversees the Project Implementation ensuring no time & cost overruns.

(d) Agency owning the lake (Municipal Council/Corporation/local body) may undertake the O&M of the lake and be equipped with dedicated human resources. In case of multiple agency structure, the concerned District Collector/Commissioner is authorized to take the O&M responsibility.

METHOD TAKEN UP FOR LAKE FRONT STUDY

In order to understand the current scenario and conditions of lake systems in the Surat city which was the first objective of the study. This was done by studying and evaluating the existing available data such as available on net (SMC website), Surat zonal office, on site surveys of couple of lake, and understanding was built by conducting few personal interviews of concerning staff and officials. And the study was further strengthened by few focused group discussions around the site with beneficiaries and stakeholders. The factors influencing the performance of private service provider are external (contracts and regulation) and not internal (private sector capacity) to the private organization. This paper discusses only external factors of regulation related to legal policy and institutional framework. The capacity need and assessment of design of lake systems and technical resources in ULB is also not the scope of the study.

Research study involves the use of both the qualitative and quantitative data collection using a survey method. Sources of the data are they key informant interviews, questionnaire survey and secondary data.

1. Secondary data:

Secondary data regarding the contractual agreement and private sector participation, initiatives by the ULB of Surat and contractual agreements of PPP For development projects were collected form ULBs.

2. Key ULB informant interviews:

Questioner was made and oral interview were done with ULB Garden cell executive engineer and chief engineer for understanding the process of PPP involvement and their views on the contracts and problems arising out during the process.

3. Survey of Private developer:

Private sector participant were surveyed for understanding the regulatory and contractual issues they face from government and ULB side which are barrier to enabling environment and market for them.

Overall chronological procedure and understanding of few elements is needed as listed below:

I. development proposals for Surat city lakes

II. strategic business model for lake development and developers/investors perspective with formation of LDA

III. Surat Municipal corporation institutional framework

IV. Financing mechanism

V. Civil society intervening probability.

Different lake front Indian Models studied.

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KANKARIA LAKE- AHMEDABAD

Kankaria is the biggest lake of the city of Ahmedabad, Gujarat. With an approximate circumference of 1.4 miles (2.3 km), it represents the regale history of Ahmedabad. Kankaria Lake has approximate circumference of 1.4 miles (2.3 km). it was developed in 2006-07 by Government of Gujarat at an approximate cost of Rs. 36 Crore. The lake conservation project was not restricted to only cleaning, de-silting and other lake related activities, but it also included lake front development activities. In this project facilities like Toy Train, Indoor Stadium, Laser show etc are also developed. The lake front includes Jogging Track, Aquarium, Zoo, Park called Nagina wadi, Amusement Park called Balwatika. The new stadium will hold two basketball courts, a skating rink, a planetarium, elibrary, multipurpose hall, a gymnasium, aerobics hall, store-rooms, a stage and different rooms for table tennis, snooker and other indoor games.

The lighting and special effects on the walkway and sumptuous food of the restaurants in the

Central garden make the lake a worthwhile place to visit or spend an evening. The Lake and Lake Front are totally covered and the Ahmedabad Municipal Corporation has decided to charge Rs.10 for entry ticket.

The project was completed in 2008 at the cost of Rs 360 million. The lake was transformed into a Complete Entertainment Centre. Ahmedabad Municipal Corporation resolved to charge the entry to cover the maintenance expenses at the premises. The response from the citizens has been overwhelming. During last one year more than 1.18 crore visitors have enjoyed the ambience of the transformed Kankaria Lake Front (70 lacs visitors during weekdays since start of its operations & 48 lakh people participated during the Kankaria Carnivals of 2008 and 2009). Moreover 12.5 lacs visitors and children took joyride of mini train – 'Atal Express'. Festivals, small gatherings, educational tours, jogging, informal meetings, picnics etc. have become new face of Kankaria to attract younger generation in a meaningful way. Further, the Lake is emerging as a platform for creative expressions of different communities of artists. Programmes like ultra-fast laser show with sound, fireworks and musical nights are attracting tourists from other cities and states.

The pristine water body, Pushkar Sarovar is unique and attraction of tourists and pilgrims is subjected to pollution stress and need to be conserved. The distinction between a small but legendary historic Pushkar Sarovar with the other urban water bodies is people and pilgrims are worshiping holy water of the Sarovar. Among the numerous pilgrimage places of Hindus in India, Pushkar is one of the most sacred and oldest pilgrimages where pilgrims take bath in the sacred water of Pushkar Sarovar. It attracts large number of domestic as well as international tourists daily, besides huge gatherings on auspicious occasions.

The vast catchment of the Sarovar to 21.87sq.km, which drains rainy water received in the catchment, the increasing population, and visitors load and decreasing water table and water recite to the Sarovar make the problem more intense as far as conservation is concerned.

Figure 1: View of Pushkar lake

Pushkar Lake Project has been conceived under NLCP with a share among center government, state government and ULB's. This project is a move to conserve the 63 lakes in the India and Pushkar is one of that. This includes 70% stake of central government, 30% state of state government and ULB's have to under take the O&M for the project.

Conservation and Sustainable Management of Pushkar Sarovar at Ajmer in the state of Rajasthan under the Centrally Sponsored Scheme of National Lake Conservation Plan (NLCP) at an estimated cost of Rs. 4836.70 lakhs, which will be shared on the 70:30 bases between Central Government and State Government respectively. Accordingly share of the Government of India and Government of Rajasthan in the project will be Rs. 3385.69 and Rs. 1451.01 lakhs respectively.

Situation around Gopi-talao

Whole area around *Gopi-talao* decay due to various parameter & having present situation like central open land, slum encroachment, poor linkages, and surrounding graveyards shows in the above figure. Existing situation demanded the renewal of Gopi-talao.

Renewal of Gopi-talao

Surat Municipal Corporation (SMC) decided to renewal the Gopi-talao & initiated a mega demolition to remove 1,400 houses and 140 shops around Gopi-talao. Apart from opposition shown by a few people, the drive remained peaceful as all home owners have been allotted flats for economically weaker section (EWS) at Bhestan. The civic body aims at redeveloping Gopi-talao that once existed at the spot and developed it through inspiration by Kankaria Lake, Ahmedabad. Re-development of 13,934.88 Sq. Mt. of land outside Gopi-talao will give the historic 16th-century lake site a magnificent view. This SMC property is in front of DKM Hospital and stretch is to the front portion of Navsari bazar. (India-Bilkulonline, 2014)

5.3.3. Main four features of Redevelopment:

•Redevelopment of Gopi-talao as a lake

•Restoration of the heritage vav, development of play area & fountains

•Development of a snowpark, IMAX & other allied entertainment activities as a part of Gopi-talao area redevelopment

•Development of newly acquired land parcel on kotsafil road

A. *Gopi-talao Special Development Zone (GTSDZ)*

For practical implementation of the project, it is proposed to divide the entire SDZ into parcels.

Parcel 1: Commercial Development

Parcel 2: Slum Rehabilitation – Site & service scheme

Parcel 3: Graveyard development

SMC carried out the redevelopment in 3 phases:

Phase-1: Work completed in this stage is 3 Nos. of platform, two no. of Ghats, open amphitheatre, viewing jetty with approximately amount of 6 crore.

Phase-2: Work completed in this stage is inner, outer & D. P. Roadside compound wall, C.C road development cost of about 3.40 Crore.

Phase-3: Development of different types of zone (approximately cost of 10 crore).

Gopi lake financial parameters

Heads	cost
Project cost	Rs 20 crore
annual royalty to SMC	Rs 30 lakh (15 per cent in the same for the next 20 years)
9000 sq mt future zone	Rs 10,0000 royalty
O and M cost	Rs 70 lakh per year
Total revenue generation from all streams	1.78 crore (2016 figure)

Government of Gujarat (GoG) through Surat Municipal Corporation (SMC) intend to develop the different Lakes with infrastructure development through private sector participation within the city. These lake developments would be on Design- Built and operated & maintained with pre-determined quality standards, rendering cost effective and efficient services to the users/visitors/tourists.

Surat Municipal Corporation (SMC) hence invited technical and financial proposals from interested bidders for development of lakes Infrastructure development work and to develop water based recreational facilities through PPP mode. The objective of this Concession is to ensure the development of state-of-the-art lake

infrastructures with better facilities for visitors. The Concessionaire also has to maintain the entire lake premises which consist of Lake water body, open spaces, recreational open land given to them for development during the concession period.

The developer is allowed to develop commercial facilities. The developer would also market the commercial facilities and facilitate long term lease agreement between individual unit holders and SMC.

The developer will bear all costs associated with the preparation and submission of its Proposal, and the SMC will in no case be responsible or liable for any costs, regardless of the conduct or outcome of the Proposal process.

The Project consists of two components namely

A) Lake Infrastructure development Facilities

B) Visitors Recreational facilities on Commercial base in the reserved.

The risk allocation was also reviewed and it was found that it is more on developer sides. The risk like environmental compliance and clearance from government which could be easily managed by the ULB were also allocated to the developer.

DISCUSSION AND RESULTS

The development of the Gopi lake (including owing and construction) was fully fetched by the SMC and its resources though after the completion of the project it was transferred to the local private partner for its further operation and maintenance and making the project functional and viable. This transfer of the operation and maintenance was done due to limited capacity, time and resources of the ULB to run the property and less experience in the particular field.

When an estimation of the required funds to implement and run the ambitious Gopi lake project was undertaken, it showed a gap in capital resources. This large gap hence led in the adoption of Public private partnership mode inviting the private partner for the further operation and maintenance. The contractual deal between the private developer (Rajhans group) and ULB (Surat municipal corporation) for running the project is based on the annual royalty of INR thirty lakhs to be paid to SMC and five percent escalation to be put annually. However the contract is successful as far for now as the revenue streams identified and build proved to be lucrative and helping the private partner getting a handsome amount surpassing the operation and maintenance cost along with the annual royalty of approximately 1.78 crore of revenue generation (year 2016 figure).

It is difficult to get project financing based on the cash flows of the project alone due to lack of knowledge of the financing institutions about the business model in this sector. Hence with the growth of PPP projects in different streams, there is a need to change contracts and include lenders‟ concerns. PPP allows and opens the market for different kind of parties to chip in. Tri-partite agreements are also introduced with parties being the ULB (or government agency), private player and bank or the third party. In this type of contract, a part of the payments which the ULB would make to the private player should be paid to the private player‟s bank directly. This kind of

arrangement would increase the trust of the bank in financing the projects and the cost of funds to the private player or ULB would reduce.

The following things are needed to be done by the authority and ULB of Surat for an effective implementation of the projects and conserving the lakes of the city on a public realm.

Delineating the lakes:

Survey and inventory of all the lakes of Surat city along with the categorization (based on utility, problem and zone) needs to done and make them a part of development plan and land use so that the boundary of the water body is known and hence chances of encroachment are reduced. Also this will enable the authority to evolve suitable development and restoration work approach for each lake rather than going for a generic one for all.

Creating a positive market for developers:

No developer is going to risk his assets for such a long concession period of thirty five years without having a big gain in the project apart from the revenue generation streams. So it is important to enable a market perspective and some incentives on the revenue generation streams to encourage active developers to participate and making the projects financially viable. Promoting private sector partners and investors is essential for the projects to take up in short time.

Creating ULB level implementation and monitoring capacity:

Project implementation process and responsibilities such as thorough project preparation, financial commitment to support PPPS, stakeholder and citizen involvement, a transparent bidding process and capacity building are important components of a successful project. Although external help of consultant is required on some stage but there are specific areas where ULB (be it SMC or SUDA) should intervene and act as a facilitator and integrate different initiative for lake conservation and restoration apart from only lake front development.

Organized structure of lake development department in ULB

To manage the lakes of the city wards are divided in zones. Each zone must having a zonal officer. Zonal inspector should look over the functioning of lake and do monitoring for their respective zones. The whole system should be managed by Executive engineer of garden cell department of SMC. The chief Municipal officer is responsible for overall management of the lakes. Proper allocation of responsibilities and needed data has to be done at different levels of the and designation of the ULB avoiding the clashes and ignorance in the lake development and conservation.

Stakeholder involvement:

It is important to involve stakeholders and citizens to whom the lake property matter or influence day to day life in any way. To involve all the stakeholders and making those equally responsible for decision making and implementation process of the project would definitely help the ULB and the developer to easily execute the project without any opposition.

Issues and problem identification

1. Degrading lakes in city:

Out of over two hundred of small and big lakes mentioned in Gujarat gazetteer only sixty two lakes can be seen on the ground and delineated on the map in the boundary of Surat which is again quite a less number compared to the former one. Also the authority is having total of twelve notified lakes which may or may not get develop or conserve in the future. Further, out of these twelve notified lakes only a single Gopi lake is developed recently present in the center of the city and three lakes selected for the further process of development without any progress in the condition of the lakes (Fig. 1).

2. Lack of Institutional focus:

Unlike the other urban infrastructure mainstream serviced like water, sanitation, waste, sewerage, solid waste management etc, and focus on it by the ULB of Surat, Sector Participation in Lake development and its

management has established legal and policy framework. But there is lack of institutional framework for implementation and strengthening the engagement.

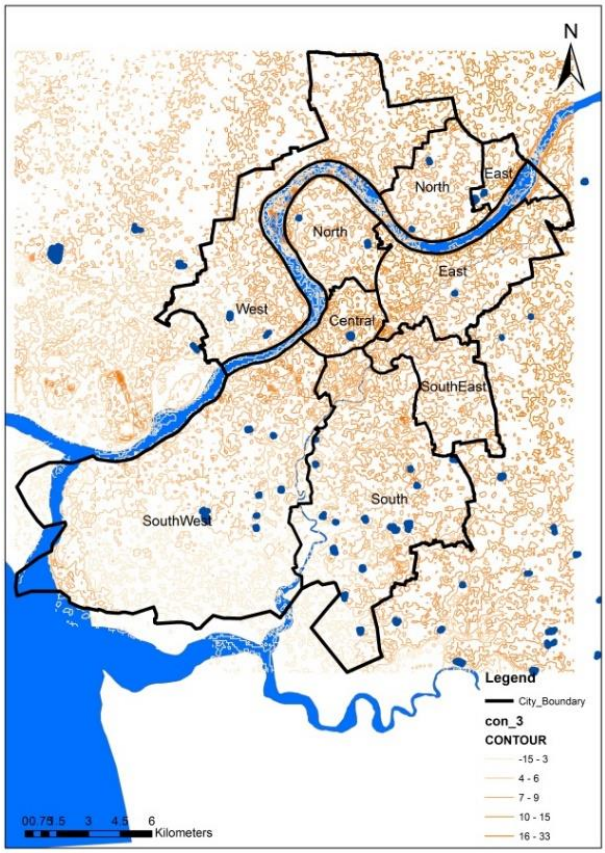

Fig 2: Lakes in SMC boundary

3. Dominating nature of ULBs in contractual agreement:

SMC seemed to be dominating in the contractual agreement with more obligations on side of private developer to be fulfilled. Also, the risk sharing in contract seemed to be unfavorable as in the developers are expected to bear most of the risks- including change in law, compliance to various regulations, etc. The risks which could be better managed by the ULB are also allocated to the developer.

4. Limited stakeholders and public consultation:

PPP policy of Surat Municipal Corporation lack public consultation process. Moreover, there is a lack in internal consultation of departments which is for some reasons not been undertaken. This sometimes creates internal opposition for PPP approach. Even the involvement of citizen during the project preparation at ULB level is

null. Creating awareness among public related to project is weak and is considered as obligation rather than opportunity for a project to be taken up. However, there should be continuous effort for dialogue to opponents for sustainability of the lake development project.

5. ULB level implementation and monitoring capacity:

City-level responsibilities such as thorough project preparation, financial commitment to support PPPs, stakeholder involvement, a transparent bidding process, and capacity building are important factors to be undertaken. Though external help is possible, it can only supplement city-level commitment.

6. Regulatory environment:

If the city wants to attract the highest quality development, it should be the easiest part of the city to do business. The process and policies would need to be more streamlined. Removing regulatory hurdles for the project is itself a big incentive for the private body to step in. There needs to be a strict monitoring framework and policy guidelines for development activities along the waterfront. The guidelines would need to take into consideration the master plan / city development plan and must integrate into the overall development strategies and utility investments (sewer, water, physical infrastructure) of the city.

CONCLUSION

Conservation and management strategies for urban lakes should consider different impacts due to the development and concentrate on recreational development including overall framework. Development strategies should have multi-disciplinary inclusive approach. Central and State government organizations, Educational and Research institutes, Community, Citizens and NGOs should participate in conservation and management of lake and go hand in hand with private partners as well to have an overall aesthetic development of the space around lake.

A Single apex authority may be formed for lakes as decision maker and should coordinate with all the stakeholders. Proper implementation and achievement of conservation activities should be with community involvement. They should be made aware about the ecological, hydrological, environmental and socio-cultural importance of the lake. This can be done through various outreach programs and publications. The active participation of the students and community in planning, design, execution, cleaning, measuring water quality, planting trees, bird watching, drawing competition and self-help program for lake rejuvenation give the opportunity for practical environmental education.

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