

Re-Establishing Link between Water Bodies and Human Life-An Attempt for Rejuvenation of Water Bodies

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Abstract:- In ancient times water bodies played key role in establishment of different settlements. Most of the Indian cities have a great heritage of a number of natural as well as manmade water bodies. Human life was closely linked with these water bodies for day-to-day activities. Now days, due to rapid urbanization and change in technology this link is weakened and most of the water bodies are in neglected condition. There is significant shrinkage in their size and number. Even though most of the water bodies in urban areas are not serving the basic purpose of water supply, they play vital role in maintaining ground water table, lowering the temperature in surrounding areas, providing large open space in dense urban fabric or even adding to the beauty of urban fabric. Hence, conservation of this unbuilt heritage is very important. Government has formulated different policies for protection and restoration of water bodies in urban areas. In spite of these policies, there is no significant improvement in the condition of water bodies. This study was started with the hypothesis that re-establishing link between water bodies and human life will help in the rejuvenation of water bodies. This paper is an attempt to find out the contribution of micro level factors in bridging the gap between water bodies and human life. The scope of study is limited to the lakes in urban areas. It involves study of different physical aspects related to the lakes, physical and visual connectivity, surrounding development, land uses and ownerships of adjacent land, human activities and the provisions in government policies and Acts. Research methods used are qualitative and quantitative analytical method. Under these methods; tools used are case study, secondary data and observations. The area chosen for the case study is city of Kalyan gifted with a number of natural and manmade lakes, located in Thane district, Maharashtra.

Keywords:- Land ownerships; land uses; physical connectivity; policies; visual connectivity.

I. INTRODUCTION

A. Background

India has a wide range of geographical and climatic conditions. Areas under hot and arid climate are facing droughts while some coastal areas are flood prone areas. To overcome the problem of water scarcity in urban areas, different innovative techniques of water conservation and management were developed. Some of the cities are well known for natural as well as manmade water bodies. Bangalore, Bhopal, Udaipur, Hyderabad are some of the

examples which were famous for their series of lakes. While some of the coastal cities like Navi Mumbai have their coastal area lined with artificial lakes which act as holding ponds at the time of floods. Based on their scale and function, there is a wide range of different forms of man-made water bodies in different parts of India. Bandharas of Maharashtra step wells of Gujarat, kere of Karnataka, kundas of Thar Desert are some of the examples. Apart from fulfilling the basic need of irrigation and domestic water supply, water bodies were advantageously used for different purposes. Udaipur is an example where water bodies are advantageously used for governing the microclimate. Also the tourism activity that was flourished due to lakes is the backbone of the city's economy. Nal Durga fort in Marathwada is another example where water bodies were used for the purpose of water supply, defence and aesthetics. Water bodies are inseparable elements of Mughal gardens in which water was used for aesthetics. In Hindu religion different rituals are closely related to water bodies. As a result most of the temples have different forms of water bodies associated with them. Also there is a great tradition of different festivals related to water bodies in different parts of India eg. Kumbh Mela in Maharashtra, Uttarkhand and Madhya Pradesh, Boat festivals in Kerala, Tula Sankramana in Karnataka. Thus, human life was closely connected with water bodies and hence they were properly maintained.

But now due to rapid urbanisation, water bodies in urban areas are shrinking and are subjected to pollution. As they are not serving the basic function of water supply, human life is not directly connected with these water bodies and are in neglected condition. There is a continuous decline in their number and area. For example at the beginning of 1960s Bangalore had 262 lake, now only 10 hold water. Similarly, in 2001, 137 lakes were listed in Ahmadabad city, and over 65 were reported being already built over (Centre for Science and Environment, 2012). Another example exhibiting this increasing loss of urban waterbodies is Hyderabad, within last two decades, Hyderabad has lost approximately 3200 ha. area of its water in the form of lakes and ponds. As a result of this, urban areas are now facing different environmental issues like water scarcity, ground water depletion, increase in temperature, water logging during monsoon season and loss of biodiversity.

B. Literature Review

At national and international level different policies and programmes have been formulated for conservation and restoration of water bodies in urban areas. World Lake Vision has been developed by International Lake Environment Committee (ILEC), Japan in collaboration

with UNEP. World Lake Vision has formulated the seven Principles for sustainable lake management (CPHEEO, 2013). One of the principle is about developing harmonious relation between humans and nature. In Advisory on Conservation and Restoration of Water Bodies in Urban areas by CPHEEO, 2013, there is a chapter on Suggested Steps in Lake Conservation for State Government and ULBs. It mentions the first important step towards the conservation of lakes as the identification of lakes in urban areas and the proper documentation of their details. It mentions about the inclusion of other forms of water bodies like step wells, trenches around old forts and also other manmade water bodies at religious places. It also includes a step about a separate land use classification for urban water bodies.

In a report on Protection and management of Urban Lakes in India (Centre for Science and Environment, 2012) explains about different lacunas and challenges in Lake Management Approaches in India. As per that, one of the obstacles in effective protection of urban lakes is lack of a clear definition of a 'Lake'. Most of the water bodies in urban areas doesn't fit into the definition provided by NLCP as a result of which most of them remain unidentified and neglected. Another shortcoming mentioned is lack of Acknowledgement of a Water body as a Land Use Category. Due to this water bodies are easily converted for other purposes. In the Executive summary of Inventorisation of Open Spaces & Water Bodies in Greater Mumbai MMR-EIS Adarkar Associates (2012) it is mentioned that all water bodies must be marked and reserved only as Water Bodies on the DP, with their areas and ownership mentioned. This will help in prevention of indiscriminate filling up of lakes and using the land for development. Further it is recommended that the Water Bodies existing in the city today should be available and accessible to all sections of society, for recreation and relaxation.

C. Purpose of study

Thus this study indicates that in spite of different policies and programmes at national as well as international levels, the condition of water bodies in urban areas is deteriorating day by day and this is alarming situation. This shows that there is a gap between formulation and implementation of policies. Same set of strategies for restoration of water bodies may not prove suitable to all the water bodies. Hence it is necessary to study different micro level aspects related to urban water bodies and identify the probable factors that are responsible for failure of implementation of strategies. This study is an attempt to find out the role of different physical aspects like land uses and land ownerships adjacent to water bodies, accessibility, proposed land uses in development plan etc. in the rejuvenation of water bodies.

D. Scope and Limitations

The scope of study is limited to lakes and small water bodies in urban areas. The study of water bodies is based only on a visual assessment. The findings regarding activities are based on observations and local inquiry. The data regarding area of water bodies is taken from secondary data and satellite images. As whole periphery of all the lakes is not accessible, there was limitation in taking photographic images.

II. METHODOLOGY

This study was started with the hypothesis that re-establishing link between water bodies and human life will help in the rejuvenation of water bodies. To check the validity of this statement, case study approach was used. City of Kalyan situated in thane district of Maharashtra having a number of manmade and natural lakes was selected as study area. It was necessary to study the rate of depletion in their number. For this Records found in old village maps were compared with the existing lakes and development plan provisions. Different government policies were studied and were critically analysed to understand the gap between their formulation and implementation. To understand the current status of lakes different physical aspects like their size, location, physical and visual accessibility, land uses of adjacent land, activities were studied. Out of total nine existing lakes three lakes were studied in detail which are representative of the whole area. To study the awareness of local residents regarding existing water bodies, an online survey was conducted. The tools and techniques used for data collection are case study, secondary data and field observations. For analysis of data collected, qualitative and quantitative analytical methods were used. It was an attempt to find out different micro level factors that may contribute in re-establishing link between lakes and human life.

III. RESULTS AND DISCUSSION

A. Introduction to study area

The selected study area lies within Kalyan Dombivli Municipal Corporation (KDMC) limits. It includes ward no. 1 and 3 (Figure 1). The selected area covers the old Kalyan village, Umbarde, Wadeghar, Chikanghar, Kolivli and Sapad village. Almost 75% of the total selected area is developed and remaining is in process. The city of Kalyan is a rapidly growing city gifted with a number of manmade and natural lakes which find their roots long back in history. Due to rapid urbanization city has experienced depletion in their number. Some of the lakes are in neglected condition. Majority of the lakes are located in well-populated area. There are total nine lakes existing in selected study area. Out of nine lakes, three lakes are selected for detailed study which are the representatives of the area. The lakes selected are- Shenale Lake commonly known as Kala Talao, Rahatale Lake /Wadeghar Lake and Pokharan Lake.

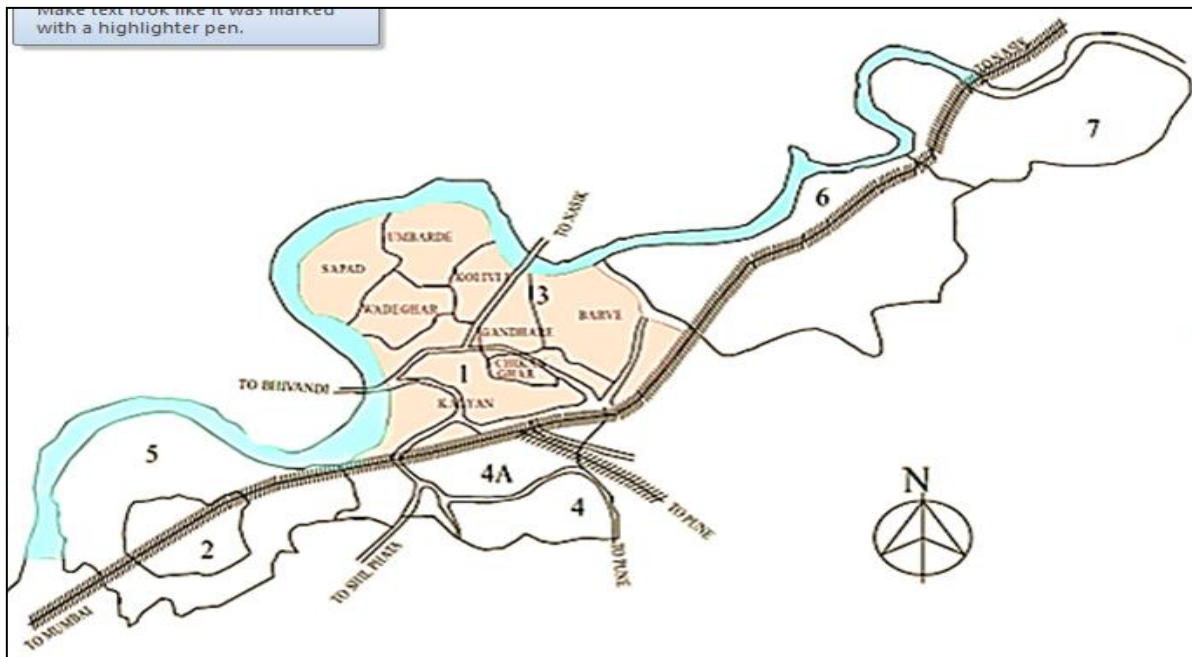


Fig. 1: Map showing KDMC limits with study area (Ward no. 1 and 3) highlighted
 Source: City Development Plan for Kalyan Dombivli Municipal Corporation Study area highlighted by author

B. Observations of Survey conducted-

An online survey was conducted amongst the residents of Kalyan to check their awareness about the existing water bodies in Kalyan city. More than 100 samples were collected. Out of that 88% of the respondents are residing in Kalyan for more than 10 years which is sufficient period to know about any small size city. They were asked to select the names of lakes they know or heard about it. Remaining questions were regarding their visit to these lakes, for which activity and their perception about the condition of lakes. Out of total nine lakes (Fig.) only four lakes viz. Kala Talao (Shenale lake), Gauripada lake, Pokharan lake and Dahisar

lake were known to more than 50 % of the respondents. Out of these four only two lakes viz. Kala Talao and Gauripada lake were visited by more than 50% of respondents. Below that Pokharan lake and Dahisar lake/ Adharwadi lake was visited by more than 40% of the respondents. Kala talao and Gauripada lake was mainly visited for leisure activities like jogging while Adharwadi lake and Pokharan lake was visited mainly for idol immersion or other activities. Regarding condition of lakes only Kala Talao and Gauripada lake are in good/fair condition as per their perception.

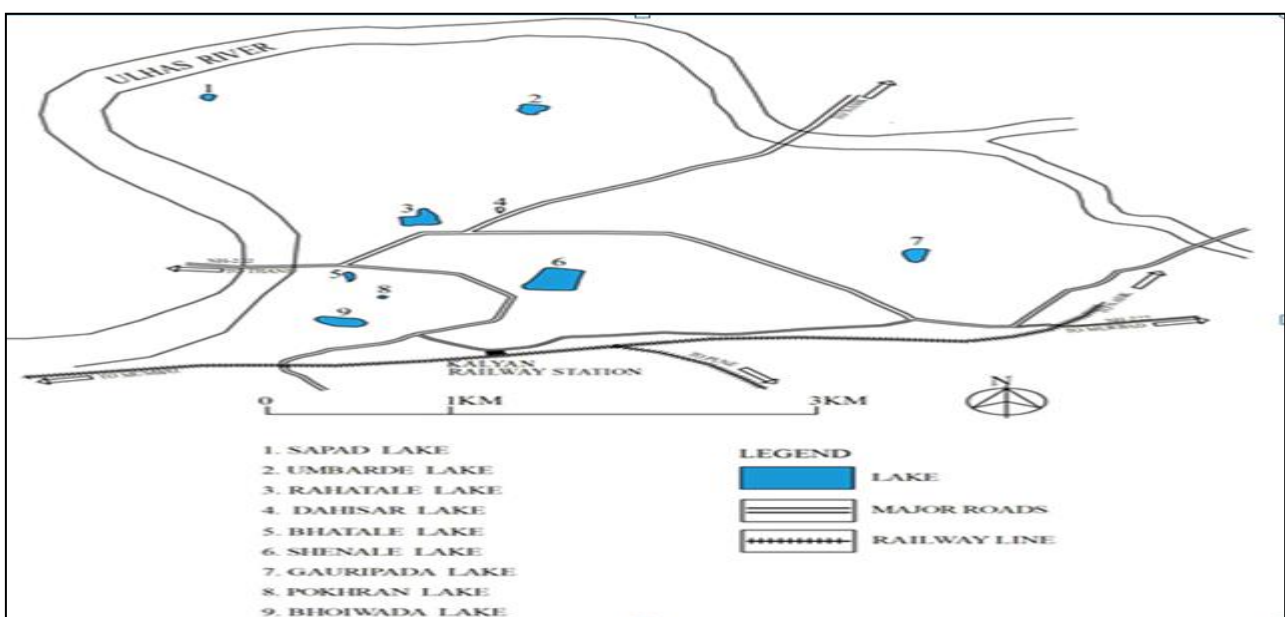


Fig. 2: Map showing lakes/water bodies in selected study area
 Source: Author

C. Comparison of Village map, Map showing Existing water bodies and Development Plan

Village map of old Kalyan(Figure 3) was compared with figure 2 showing position and names of existing water bodies in selected study area. It is observed that three lakes

in old kalyan village map are not in existence and not even found in Development plan. It is also observed that for some of the existing water bodies, land use shown in Development Plan is not shown as water bodies and is shown as Recreational Ground or Garden.

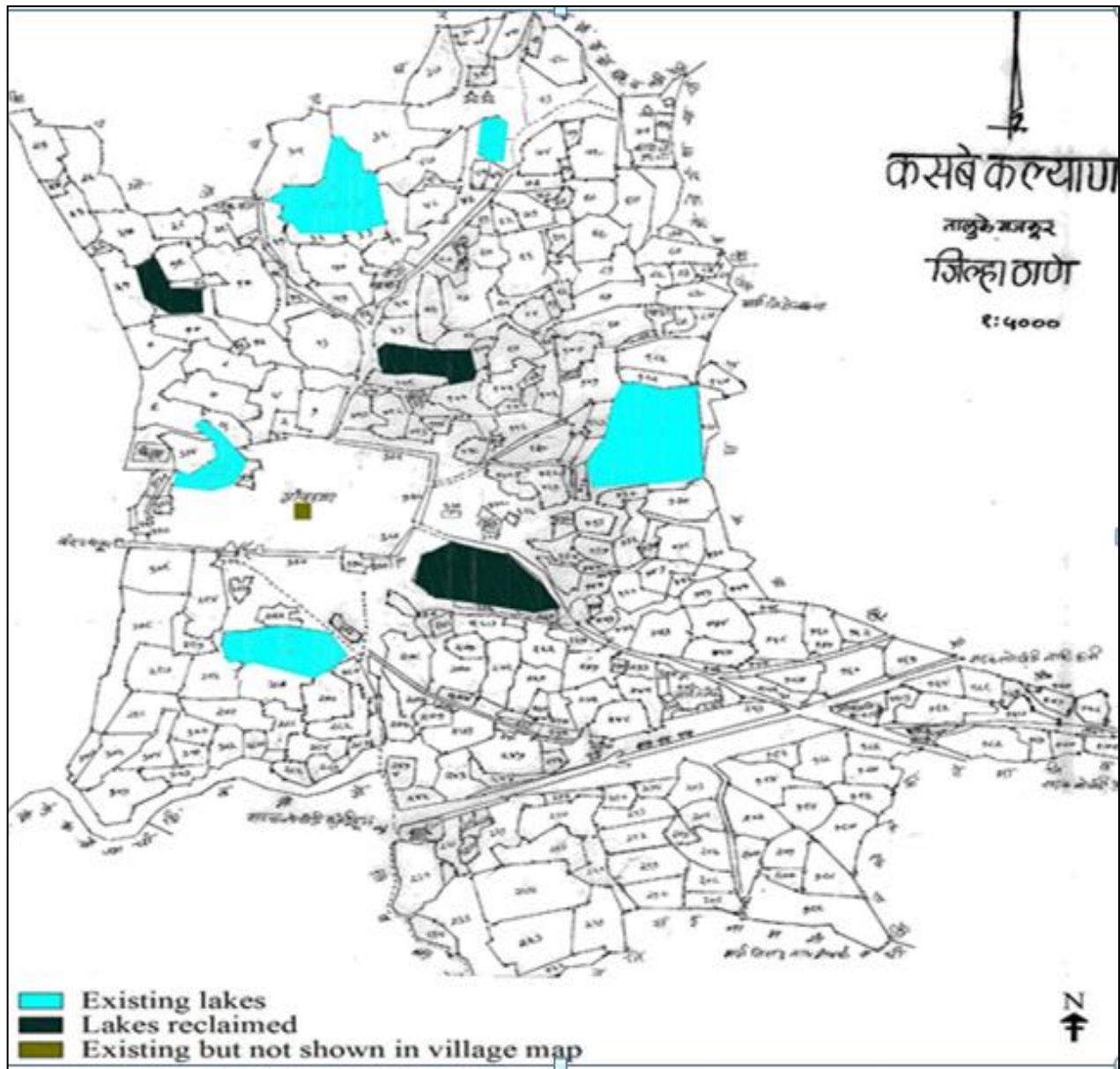


Fig. 3: Village map of old Kalyan village showing lakes

D. Current Status of all existing lakes

To understand the existing condition of all the lakes and find out the relation between their condition and the development on adjacent land different aspects like area, location, physical and visual accessibility, activities related etc. are studied. The findings noted are based on the field observations in tabular format **Table 1**. Also by comparing the results of online survey of awareness of residents with

the results of current status of water bodies, some inferences are drawn that will help in re-establishing link between water bodies and human life.

Table 1: Study of Existing water bodies in study area

| name of lake | Area sq.m. | Location | Land uses in adjacent land proposed/ existing | Part of Periphery of lake touching the road | Accessibility Visual /physical | Activities related to the lake (at present) | Land use shown in D.P. |
|---------------------------------|------------|--|--|---|--------------------------------|---|------------------------|
| <i>Kala Talao/ Shenale Lake</i> | 9 6757 | Developed area , well populated | Residential, Recreational Public Purpose (Religious) | Yes | Yes | Recreational, fishing | Water body |
| <i>Bhoiwada lake</i> | 28230 | Old area in the city | Recreational road | No | No | Nil | Water body |
| <i>Rahatale lake</i> | 37545 | Newly developed Moderately populated | Residential, Recreational shopping Centre (proposed) | No | No | Fishing, idol immersion | Water body |
| <i>Gauripada lake</i> | 22915 | Developing area | Residential, Recreational Transportation(road) | Yes | Yes | Recreational, fishing | Water body |
| <i>Bhatale lake</i> | 9325 | Old area in the city, at the foot of historic Durgadi Fort | Residential, Transportation road (proposed) | No | No | Nil | Garden |
| <i>Dahisar lake</i> | 10165 | Developing area, near jail | Public/semi Public (jail) | Yes | Yes | Idol immersion | Water body |
| <i>Pokharan lake</i> | 8030 | Historical core of the city | Residential, Public Purpose (Religious) | No | No | Nil | Water body |
| <i>Umbarde lake</i> | 29915 | Developing area, less populated | Recreational (proposed), Public utility | Yes | Yes | Idol immersion, Recreational | Water body |
| <i>Sapad lake</i> | 12415 | Developing area, less populated | Garden (proposed), public utility | No | Yes | Fishing | Water body |

E. Detailed study of three selected lakes

Out of total nine lakes, three lakes viz. Pokharan lake, Bhatale lake and Wadeghar lake, which are in deteriorated condition are selected for detailed study. In spite of being located at the foot of famous Durgadi fort, Bhatale lake is known to only 12% of the respondents. Pokharan lake

situated in historical core is known to and visited by around 50% respondents is in very poor and neglected condition. While rahatale lake located in new developing area, inspite of being largest lake is known to and visited by very few no. of residents and is also in neglected condition. Hence these three were selected for detailed study.

➤ Pokharan Lake

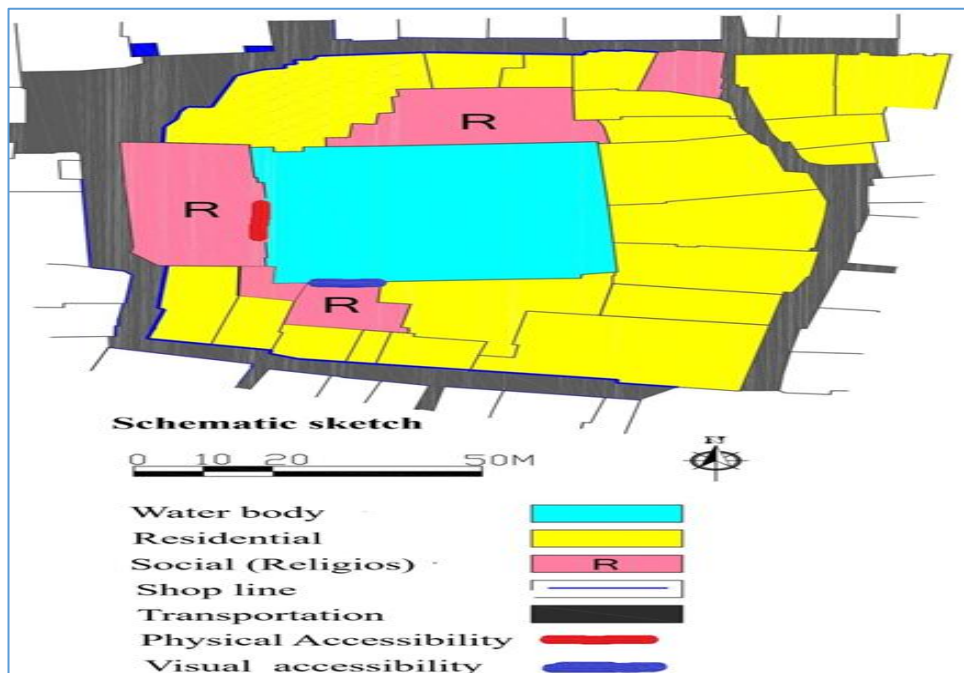


Fig. 4: Schematic plan of Pokharan lake Source: Author



Fig. 5: D.P. Extract of KDMC



Fig. 6: Satellite image of Pokharan lake area

It is square in shape and covers approximately 8030 sq.m area. As per the historical records it had underground connection with Shenale lake and was perennial. But due to various reasons that connection is broken and lake is no more perennial. Almost 70 % of its periphery is surrounded by Religious structures. Land use falls under Public Purpose (Religious) category and remaining portion has Residential

land use with backyards of buildings facing the lake. Thus ownership of land is Private. It does not have direct physical or visual accessibility from road. The only physical accessibility is from a flight of steps from a temple on West side. There are no activities related to the lake. Thus there is no connection between local residents and lake. As a result it is in neglected condition.

➤ *Bhatale Lake*

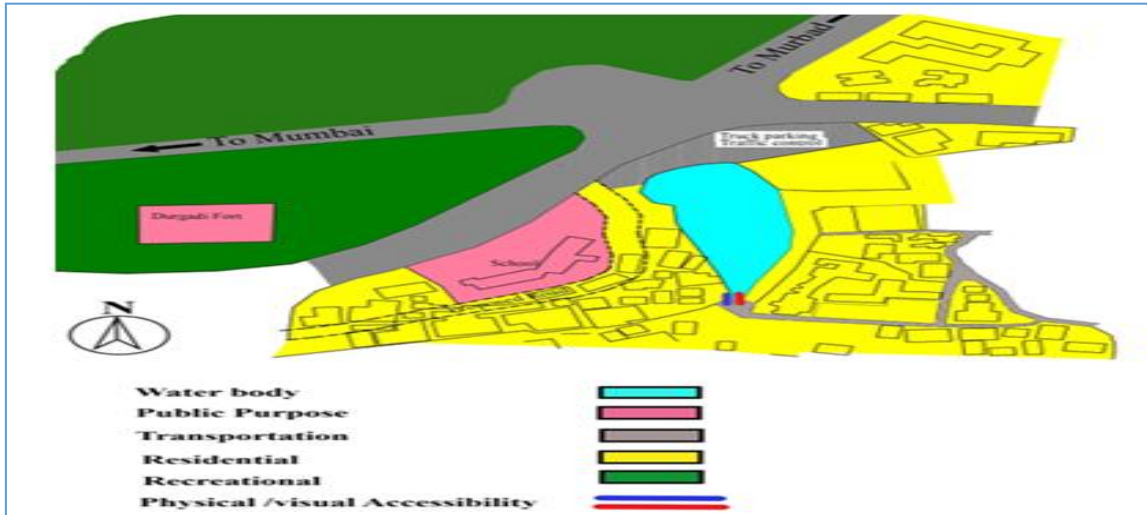


Fig. 7: Schematic plan of Bhatale lake Source: Author



Fig. 8: D.P. Extract Bhatale lake area



Fig. 9: Satellite image Bhatale Lake

Lake is located at the foot of Durgadi fort having historical importance. It is elongated in shape and covers 9325 sq. m. area (Subhash Patil & associates,2006). It is not perennial. In Development plan Land use of this lake is not shown as Water body. It is shown as Garden. East side of lake is lined with Residential land use while on West side proposed road is shown in D.P. But at present haphazard

development is observed in that portion. Land on Northern part of lake which connects the lake with busy traffic node has Transportation land use which is meant for truck parking, traffic control etc. There are two narrow lanes terminating on the eastern side of lake. These are the only access points for this lake. This is the most neglected lake.

➤ *Rahatale/Wadeghar Lake*

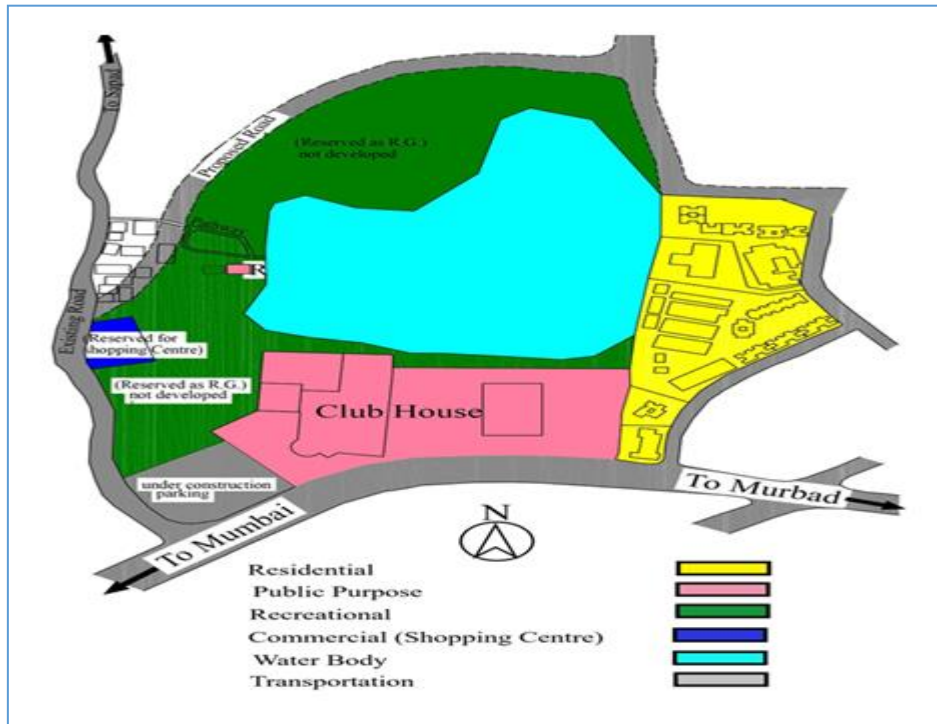


Fig. 10: Schematic Sketch of Rahatale Lake
Source: Author

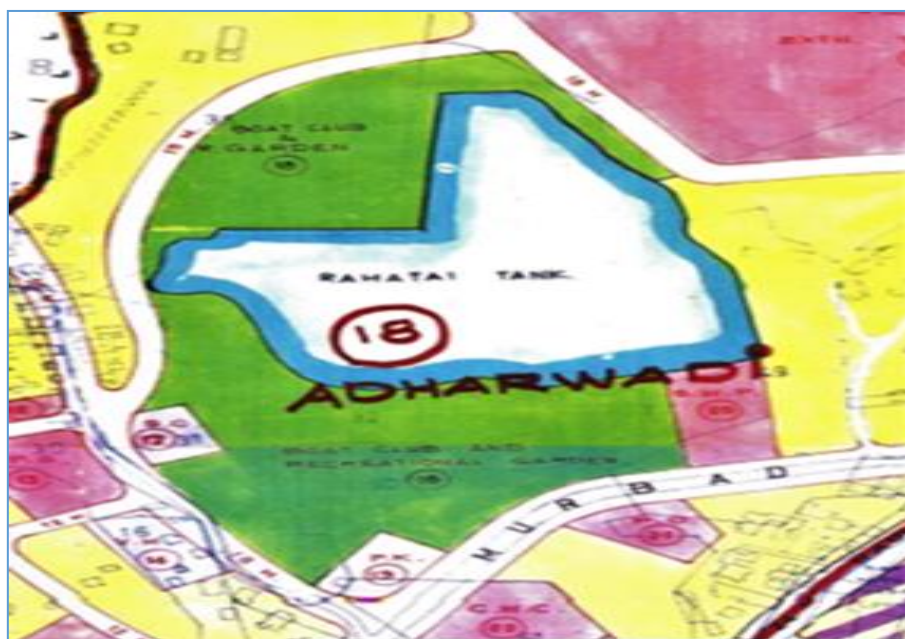


Fig. 11: D. P. Extract of Rahatale Lake



Fig. 12: Satellite image of Rahatale Lake

This lake is located in developing area and covers approximately 37000 sq. m. area. On east side of lake there is residential development with their backyards facing the lake. On the south side of lake land is owned by government (Kalyan Dombivli Municipal Corporation) and Club house is constructed over there. But here also club is not having any activities facing lake or even any visual or physical link with the lake. The land on north and west is reserved for R. G. But not yet developed. There is not a single road touching the lake. On west side there is existing road which is at a far distance from lake. Hence it is not visually connected with the public and is in neglected condition.

➤ *Comparison of three lakes*

In case of Shenale lake and Gauripada lake, around twenty years back they were also in deteriorated condition. But even before restoration, they had some percentage of periphery touching roads making them visually accessible because of which they were known to the people. Shenale lake has religious precincts touching its boundary. These act as points of physical and visual access. Both the lakes are now restored and made accessible for public for recreational purpose. These two lakes are very actively used by local residents.

World Lake Vision (CPHEEO, 2013) was developed by International Lake Environment Committee (ILEC) in collaboration with UNEP with an objective to guide the path for managing lakes for their sustainable use and ensure integration of their survival and economic development. It has stated seven principles for Sustainable Lake Management. One of the Principle is that 'Citizens and other stakeholders should be encouraged to participate meaningfully in identifying and resolving critical lake problems.' For this it is first necessary to make the citizens aware of the existing water bodies in their area. In the report (CPHEEO, 2013) the steps in lake conservation are suggested. These steps cover the different aspects like identification and documentation of all types of waterbodies of different scales, development of land around the lakes, maintaining the quality of water, designation of urban water bodies as separate land use and formulating different mechanisms through State level authorities and ULBs. It

also states that surrounding areas around urban lakes can be used for future business opportunities with some limitations on use of space which may provide active recreational area for citizens. Thus Land uses and activities proposed on the lands adjacent to water bodies will play crucial role in rejuvenation of water bodies. Also it may help in generating funds for maintenance of water bodies. All these policies and Programmes provide umbrella approach restoration and maintenance of water bodies. Their focus is mainly on large scale water bodies. But considering the environmental importance of even small scale water bodies in urban areas, Local Authorities should take steps for their rejuvenation. In this land uses and land ownerships of lands adjacent water bodies will play vital role in re-establishing link between human life and water bodies.

IV. CONCLUSION

From the results of the study it is proved that for rejuvenation of any water body it is important to re-establish their link with human life. The First step in their rejuvenation is their identification and documentation. All the existing water bodies should get reflected in existing land use plan which is a step prior to the formation of Development Plan for any Corporation area. In Development Plan, only provision of recreational land use on the land adjacent to water bodies will not help in their rejuvenation. Other land uses that will help in encouraging the interface between people and water bodies shall be proposed in development Plan. Some guidelines should be formulated for development on that land which will promote visual and physical accessibility to Public. Maximum possible periphery should be made accessible to public. At the same time care should be taken that people are not involved in any activities that will adversely affect the condition of lake. In case of government owned lands adjacent to water bodies, full advantage should be taken to promote the activities that will help in connecting human life with water bodies.

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