

# Deciphering Natural Lake with the Lens of Urban Wetland Management: Case Ramgarh Lake, Gorakhpur

Ar. Safa Seraj

Assistant Professor, Faculty of Architecture & Planning, Integral University, Lucknow, India

**ABSTRACT:** The city of Gorakhpur sits on a the rich land of North – East region of Uttar Pradesh close to Terai region . Ramgarh lake is a natural lake that lies within the flood plains of River Rapti . It is located within the city with rich vegetation along one edge . Ministry of Environment & Forests ( MOEF ) in 2010 , had identified it as one of the major lake of Uttar Pradesh that needed to be conserved under National Lake Conservation Program . Since the city’s population has increased at rate of 1.1% every year therefore rapid urbanization is causing negative impact on the quality of lake and its environs . Nature and natural resources are destroyed as human population grows . The lake is surrounded by forest , wetlands and agriculture land . People are always drawn to water , they play with it , they feel it and wants to be around it , therefore their interaction with water is major reason for encouraging this project - lakefront development . They are emotionally and spiritually attach to water therefore it is very important to provide an opportunity to the people to approach the lakefront as well as provide a framework for natural resource conservative and appreciation of nature . This thesis hopes to bridge the gap between the people and the natural resources by developing a passive recreational spaces that act as a socio – cultural interactive spaces with appreciation of nature as its core value .

**KEYWORDS:** Preservation, Natural assets, Urban lakefront, Wetland Management, Passive recreation

## I. INTRODUCTION

Ramgarh Taal is a large natural lake situated southeast of Gorakhpur in eastern Uttar Pradesh. . It was identified as one of the major wetland of Uttar Pradesh that needed to be conserved under National Lake Conservation Program by Ministry of Environment & Forests [1] , The role of wetlands has emerged as a key element in the delivery of inland freshwater and coastal ecosystem conservation through the Convention on Biological Diversity. The importance of our wetlands goes beyond their status as the habitat of many endangered plant and animal species. They are a vital element of national and global ecosystems and economies.[2].It lies within the floodplain of River Rapti and outflows into it through a drain called GurrahNalla. The lake had a maximum water spread of about 723 ha in 1970s but has now shrunk to 678 ha. Its maximum water depth has also declined from 4.5 m in 1990s to less than 3.5 m at present. The lake has a catchment area of more than 11500 ha most of which is urbanised and densely populated. The lake and its catchment are under the control of the Gorakhpur Development Authority (GDA). The lake receives storm water runoff and wastewater through several drains such as the Kuda Ghat Nalla, Gordhaiya Nalla, Mohaddipur Power House Nalla, Golf Ground Nalla and Padley Ganj Nalla.

The lake supports a significant fishery and numerous people depend upon it for their livelihood. Fishing rights are leased out by the GDA. The lake water is also used for irrigation and recreation. During later 1980s, a large tourist complex which included a Buddha museum, a Planetarium, a park and the facilities for water sports, was developed close to the lake. However, the lake has deteriorated rapidly because it receives huge amounts of domestic wastewater and solid wastes from the urban catchment, besides large amount of sediments carried with the storm runoff. Large scale fish kills have been reported frequently in recent years. The lake also supports a large diversity of macrophytes but their excessive growth, and particularly that of water hyacinth, has created serious problems of water quality as well as for its use.

## II. METHODOLOGY

The methodology followed was to analyze the natural factor (topography , vegetation , drainage , ecology and hydrology, river course change , climate and contour ) and socio-cultural factors (approach , landuse , demographic ,

density , religion , literacy , illiteracy , existing recreational opportunities within the urban fabric , road network and landmark through mapping) . Through primary survey the aspiration of the people was framed . With the comparative analysis of site feasibility and people’s aspiration the design brief program was developed that was nature sensitive . An activity pattern for the usage of the site throughout the year was prepared .The nature based site analysis lead to framing of the potentials and constraint for the area surrounding the lake .

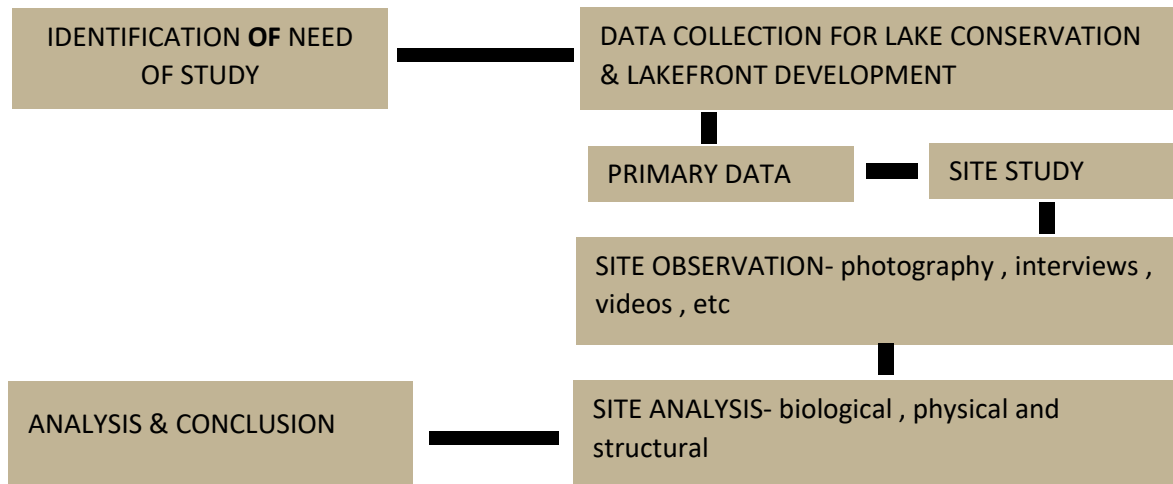


Fig. 1The methodological approach of the site analysis.

### III. CITY BACKGROUND

According to Gorakhpur Development Authority, Gorakhpur in Purvanchal of Uttar Pradesh contains many archaeological, spiritual, cultural and natural heritage known as Baba Gorakhnath .The ancient Gorakhpur, in addition to modern, comprised the districts of Basti, Deoria, Azamgarh and parts of Nepal tarai. These region, which may be called as Gorakhpur Janpad, had been an important centre of Aryan culture and civilization. Gorakhpur was a part of the famous kingdom of Koshal, one of sixteen mahajanpadas in 6th Century B.C. Nestled along the bank of river Rapti in Eastern Uttar Pradesh , Gorakhpur is considered to be gateway to Hinduism and Buddhism . Located near the border of Nepal , this city stands as a solid reminder of cultures and religions that have co – existed through out history . Named after the saint and tantric , Baba Gorakhsanath , this city contributed immensely to Indian cultures and religious values. Gorakhpur has and still continues to be the gateway to many cultures.

### IV. SITE LOCATION

The site is located in the south- east direction of the city. The site is located in the core of city . A large water body in the center of the city which is 678 ha spread over in a large area . The lake is 4m deep and are in flat tub shape . The site is near the Gorakhpur Development Authority office and the lake is 2.5km wide and 3.5 km long.

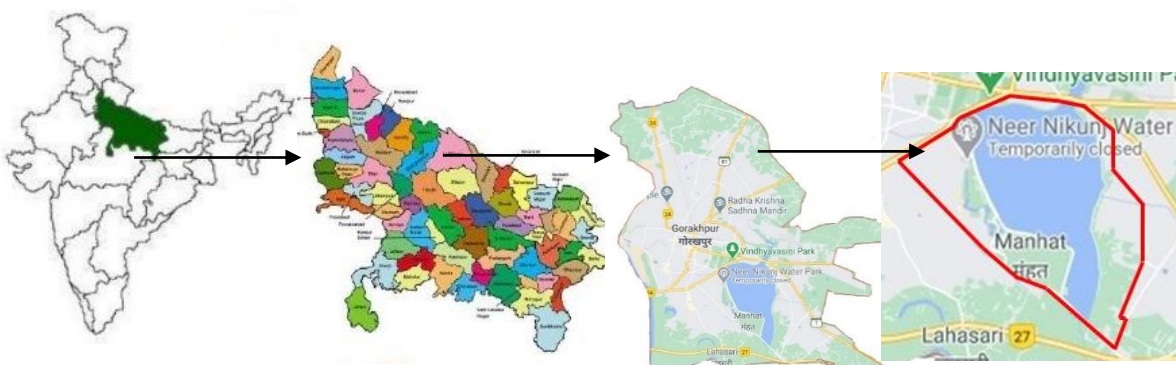


Fig. 2 Site Location (image source: <https://www.google.co.in/maps>)

## V. SITE ANALYSIS

Site analysis is the process of surveying or studying the existing environment and how it will influence the project on site . For this project it is very important to under the feasibility of the site . So to understand it studies of various pattern is conducted such as – site sections , road map vegetation , ownership map , landuse map , drainage map and infrastructure map .

### (a) BASEMAP

The site is 12456319.7 sq . m. and lake is surrounded by buildings that are random in heights there is no norms are followed . The building typology are mix around the lake one can find residence of two storey and three storey and at some place there is high rise tower of height Ground plus fifteen .

### (b)ROAD NETWORK

The site is accessible from all the three sides . An arterial road is connecting my site that is 12 m wide and sub – arterial roads are running along the lake from two sides named – Buddha Vihar Road and Ramgarh Taal road that are 9 m wide .

### (c)VEGETATION

Typology of vegetation present on the site are – wetlands , woodlands , islands , lake , shrubland and water channels . ,The types of trees found here are – neem , babool , gulmohar , amaltas , peepal , etc. The wetland area consist of specific types of shrubs and plant , the site becomes shelter area for migratory bird from November till late January . Migratory bird such as - Amur Falcon , Great White Pelican , Black crowned night heron , Siberian crane , common crane and saras crane are usually seen in winter season. These bird they migrate from china , middle east and Siberia (Russia ) .

### (d) ECOLOGICAL SENSITIVITY

The shrinking of the lake and the pollution has severely affected its flora and fauna. Till the 1980s, there was considerable diversity in the flora and fauna of the lake. The fish was in great demand in Gorakhpur town. Human interference since then has affected both the fish, the fish trade and those dependent on fishing for a living. Only a few fish are saleable. Before 1980, there were 40 species of fish in the lake. In 1990, 28 species were reported but by 2006 just 18 were extant. Commercially only three indigenous species, rohu (Labeorohita), catla (Gibelioncatla) and magur (Clariusbatrachus) and three other hybrid varieties are found. Eight species have disappeared and 14 are on the verge of doing so. The removal of sand from the lake bed and the reduction of dissolved oxygen has led to this. [3]The lake edge condition are in vulnerable condition . The building line are very much close to the lake edge . Due to urbanization the soil are getting eroded and surface runoff is increase . The lake water quality are getting bad . Highly sensible areas are lake edge and wetland because it consist of specific type of vegetation and lake edge due to its vulnerability . Then the lake and forest area are medium sensitive areas and the lowest sensitive areas are agriculture land .

### (e)DRAINAGE

Its western side bordered with embankment and Sewage Treatment Plant ( Padleyganj), Buddha Vihar, Tourist Residential House, Government Circuit House, Tara Mondal, NaukaVihar etc. whereas in the eastern side a Sewage Treatment Plant ( Jharkhandi) is existed. The municipal solid wastes largely degrading the quality of lake water. Liquid wastes from the entire N.E. Railway establishments like, loco shed, loco workshop, railway hospital and a large number of residential quarters are drained into Gurdhuanala and finally flows into the lake. Enhancement in nutrients and algal growth in lakes due to household wastes and also growth in exotic flora are major problems for lakes. The most severe problem is the disposal of non-decomposable material because it can never participate in the recycling process. [4]. The lake receives storm water runoff and wastewater through several drains such as the KudaGhatNalla, GordhaiyaNalla, Mohaddipur Power House Nalla, Golf Ground Nalla and Padley Ganj Nalla . The drain are natural also and man – made also . There is one outlet from where the lake water gets drained out to river Rapti for irrigation purpose .

### (f) LANDUSE

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the total of arrangements, activities, and inputs that people undertake in a certain land cover type. Landuse in this

study area are mixed landuse , the site consist of – residential , institutional ,commercial , recreational , agriculture and forest .

**(g) OWNERSHIP**

Ownership of property may be private, collective, or common, and the property may be of objects, land or real estate, or intellectual property. Determining ownership in law involves determining who has certain rights and duties over the property. These rights and duties, sometimes called a "bundle of rights", can be separated and held by different parties . Ownership of the site are – Gorakhpur Development Authority , Private , Railway and Forest Department .

**(h) INFRASTRUCTURE**

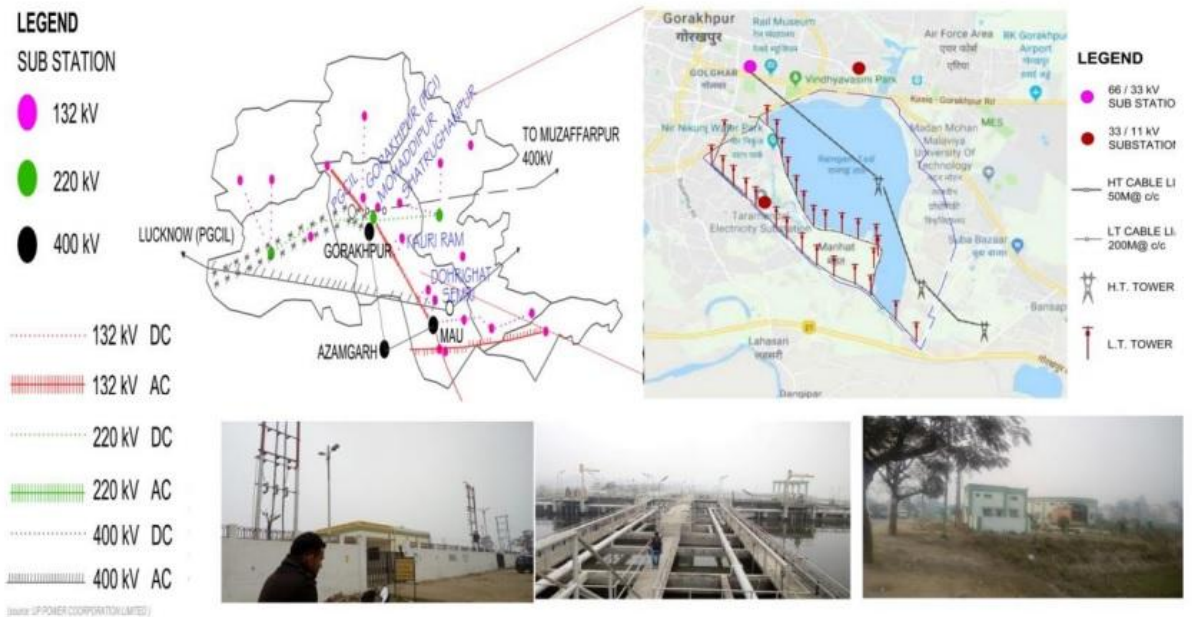


Fig 3 Infrastructure – Power map of East Zone- Gorakhpur (image source: UP Power Corporation Limited)



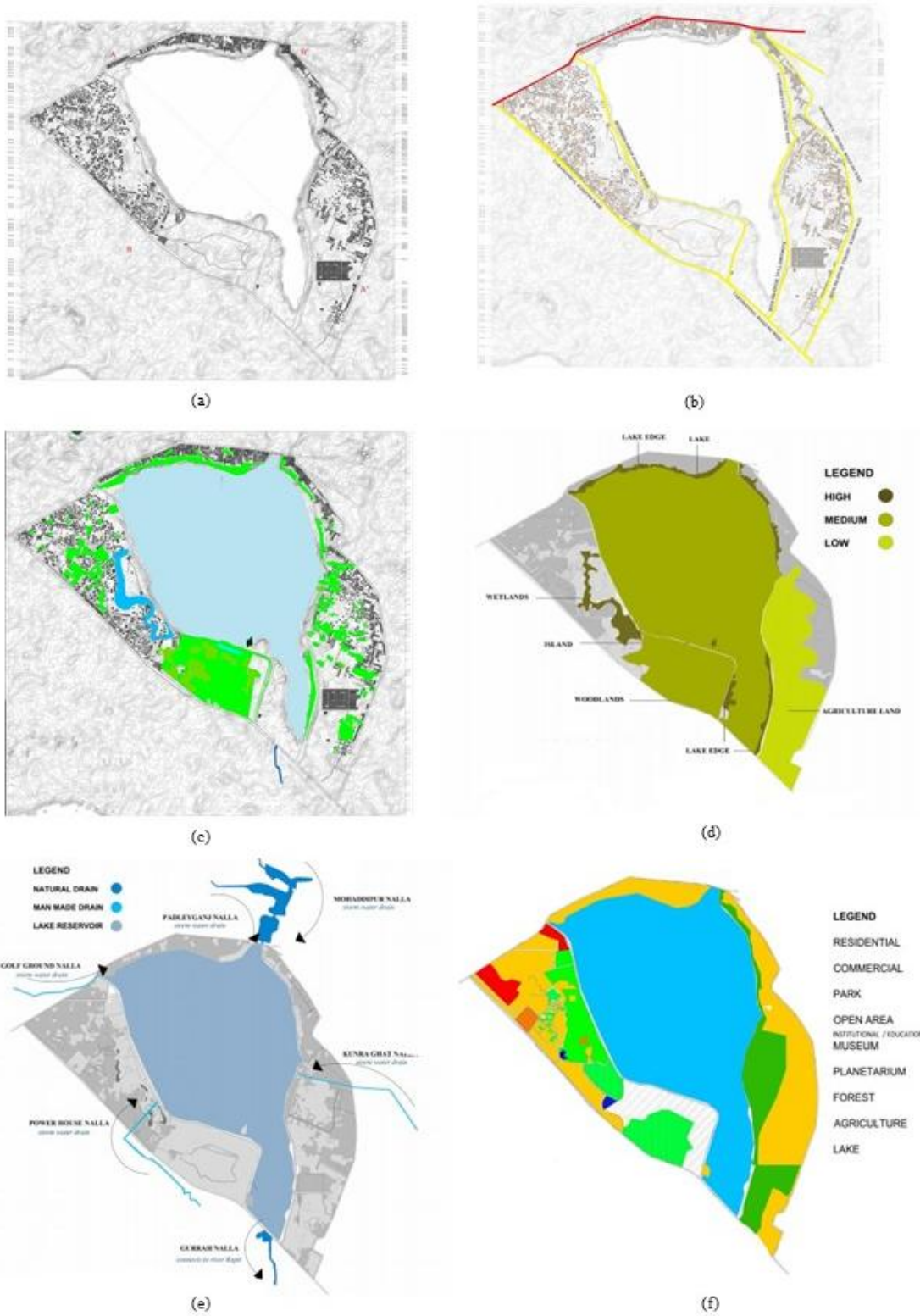


Fig4 Site analysis mapping of (a)Basemap (b) Road Networks (c)Vegetation Typology (d) Ecological Sensitivity (e ) Drainage and (f) Landuse



**VI. FINDINGS : SITE POTENTIAL**

S.No	Site	Potential	Constraint
1	Site-1	<ul style="list-style-type: none"> <li>• Area 2.8 acres</li> <li>• The pocket can be used as a community park.</li> </ul>	<ul style="list-style-type: none"> <li>• There is no possibility to this site because ownership is under Railway.</li> </ul>
2	Site-2	<ul style="list-style-type: none"> <li>• The site consist of wetland and open spaces that can be use as a recreational space such as – landscape, raised pathways, trails, pedestrian promenade, pedestrian bridge that can connect the site with lake, food, stalls, children parks and water activity.</li> <li>• The site is well connected with sub-arterial road.</li> <li>• No physical boundary in between the built area and the site.</li> <li>• Abutting forest land</li> <li>• Possibility for bio diversity park.</li> </ul>	
3	Site-3	<ul style="list-style-type: none"> <li>• Area 121 acres</li> <li>• The site is proposed for Zoo project.</li> <li>• It can easily be club with the wetland area.</li> <li>• Biodiversity park with zoo area.</li> </ul>	<ul style="list-style-type: none"> <li>• Since the site is enriched in flora and fauna therefore the intervention should not harm the nature.</li> </ul>
4	Site-4	<ul style="list-style-type: none"> <li>• Area 111 acres</li> <li>• Lake edge can be develop as a seating area, web of food stall, jogging track along with promenade.</li> <li>• Since the site is abutting a zoo area therefore it can be connected with pedestrian overhead bridge.</li> </ul>	<ul style="list-style-type: none"> <li>• Many birds and animal are inhabitant.</li> <li>• Rare species of plant and grew here.</li> </ul>
5	Site-5	<ul style="list-style-type: none"> <li>• Area 10.6 acres</li> <li>• Since the edge do not have abutting road therefore there is potential to develop the edge as a mini marine drive where people where people can directly access to edge.</li> <li>• Building lines are very close to the lake and the site is lower in comparison to built up areas therefore increase in surface runoff erode the soil.</li> </ul>	<ul style="list-style-type: none"> <li>• The lake edge is under private ownership therefore it can be preserve to extend its useful life .</li> </ul>
6	Site-6	<ul style="list-style-type: none"> <li>• Area 12.3 acres</li> <li>• This particular stretch or land can be use as community park or amusement park or garden in pockets that can serve people living in near by areas.</li> <li>• Easily accessible</li> </ul>	<ul style="list-style-type: none"> <li>• The site comes under private ownership, therefore there is less possibility to execute the potential.</li> </ul>
7	Site-7	<ul style="list-style-type: none"> <li>• Area 17.9 acres</li> <li>• Since the site is lake edge therefore it can be use for fair purpose where ferry go wheel, other kind of amusement tools cab be set up.</li> <li>• Promenade</li> <li>• Installation of traffic signals on the vehicular road for safety factor.</li> </ul>	<ul style="list-style-type: none"> <li>• The site is along the bund therefore safety measure is very important.</li> </ul>

Fig. 5 Table consists of Potential and Constraint of the site.



#### REFERENCES

- [1] Ministry of Environment and Forest, Conservation and Management of lakes- An Indian Perspective, pp.81, MoEF Government of India, New Delhi, 2010.
- [2] Ramsar Convention Secretariat, National Wetland Policies: Developing and implementing National Wetland Policies. Ramsar handbooks for the wise use of wetlands, 4th edition, vol. 2. Ramsar Convention Secretariat, Gland, Switzerland, 2010.
- [3] Gorakhpur Environmental Action Group, “Sectoral Study -Saving a Dying Lake: The case of Ramgarh Tal in Gorakhpur”, Uttar Pradesh, pp. 14, GEAP, Gorakhpur, 2009.
- [4] S.Alka and Sharma. V.N.”A Stewardship Of Ramgarh Lake In Gorakhpur District: Uses, Problems And Management” ,Trans.Inst.Indian Geographers ISSN 0970-9851,pp.39,Vol. 40, No. 1, 2018