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**Urban Water Scarcity: A Case Study of Ramgarh Lake Gorakhpur, U.P., India****Neha Kumari Sonkar****Research Assistant****Department of Botany****D.D.U Gorakhpur University****Gorakhpur**

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**Abstract**

Water is life for all the living organisms which is present on earth. Water is needed to ensure food security, feed livestock, and take up industrial production and to conserve the environment. Water scarcity involves water stress, water shortage or deficits, and water crisis. India is home to 18 percent of the global population but has only 4% of the global water resources and is one of the largest water users per unit of gross domestic product. This suggests that the way in which India manages its scarce water resources accounts for much of its water woes. Growth in urban population leads to additional water demand of 12,420 MLD in urban areas and is expected to grow at a rate of 4.2% per year till 2025. There is a vast gap between the demand and supply of water in urban areas of India. According to a study by the Centre for Science and Environment, 48% of urban water supply in India comes from ground water. Ground water exploitation for commercial and domestic use in most cities is leading to reduction in ground water level. The Asian Development Bank has forecast that by 2030, India will have a water deficit of 50%. Integrated holistic approach towards managing urban water supply is needed in India, which aligns with the UN's Sustainable Development Goals to be achieved by 2030 regarding availability and sustainable management of water and sanitation for all. Much of the water crisis in India is caused not by natural disasters, but rather because of severe mismanagement of water resources, poor governance, anthropogenic wastes and apathy about the magnitude of the crisis. The increased value of solid wastes and other hazardous waste in water systems such as rivers, ponds, lakes and canals also heavily pollute the water quality. This paper elucidates various measures for sustainable urban water management especially in Uttar Pradesh. Recycling and treating sewage water can also help us meet out the water scarcities in urban areas. Protection and conservation of Water bodies/ Ponds, recharging the ground water and the aquifers hold the key importance. The need of the hour is conservation of shrinking water bodies, wetlands and dying lakes. The

case study of Ramgarh lake of Gorakhpur area has been mentioned in this paper which is the affected lungs of the city.

**Key words: Urbanization, Integrated Water Resource Management, Ramgarh Lake**

### **Introduction**

Water is a vital component of an ecosystem. It sustains life on earth. A community depends on water for its domestic, agriculture and industrial needs<sup>1</sup>. Availability of water has been the main reason for the development of varied civilizations near lakes and rivers. Both human population and water resources are distributed unevenly across the world. Around one- third of the world's population lives under physical water scarcity for the last couple of decades; it has become evident that due to a steadily increasing demand, freshwater scarcity is becoming a threat to sustainable development of human society. The Globe Economic Forum in its annual risk report lists; water crises the largest global risk in terms of its potential impact. The demand for water is growing thrice faster than the expansion of population and it is estimated that by 2025, the water scarcity will increase from 450 million to about 3,000 million people in the world<sup>2</sup>. The status of provision of water and sanitation has improved, albeit slowly, inadequate and poor quality of potable has not only resulted in additional sickness and death, but has increased health costs<sup>3</sup>. International Conference on Sustainable Development by the UN in 2015 has put Sustainable management of water in the coreframework of Millennium Development Goals (MDGs) and by 2030, it is goal to access the potable water for all. Water is important for socio-economic development and for sustaining the different ecosystems. The WHO/UNICEF Joint Monitoring Programme (JMP) is affiliated to UN-Water and was established in 1990 and has provided regular estimates of progress towards the MDG targets, tracking changes over the 25 years to 2015. In 1990, global coverage of the utilization of improved water sources and sanitation facilities stood at 76 % and 54%, with respective MDG targets of 88 % and 77 % by 2017<sup>4</sup>. By 2025, 1.8 billion people are going to be living in regions or countries with absolute water scarcity. Given the transboundary nature of water (Fig.1), this will have grim implications for world peace and also equitable socio-economic development. With 263 trans-boundary river basins within the world, the potential for cooperation or conflict is tremendous<sup>5</sup>. 148 countries have territory within one

or more transboundary river basins. Almost 450 agreements on international waters were signed between 1820-2007<sup>6</sup>.



**Figure 8. Gorakhpur City, U.P, ISRO**

### **Gorakhpur City**

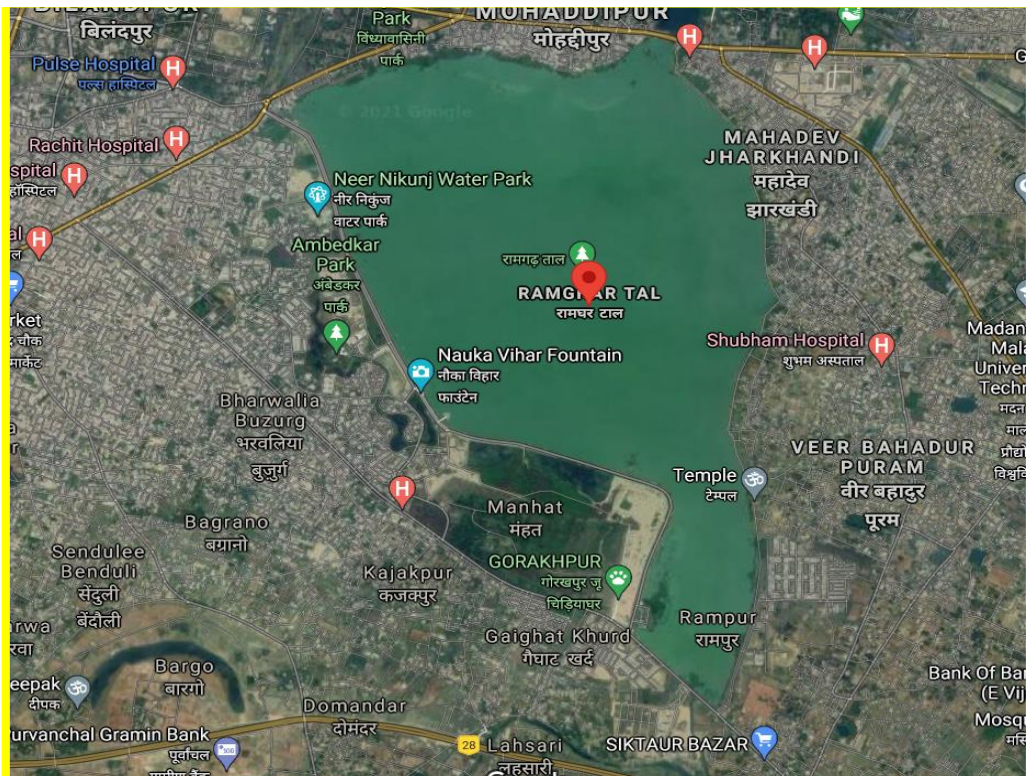
Gorakhpur City, the headquarters of Gorakhpur District, is the second most vital town in Eastern Uttar Pradesh, after Varanasi. Meet a vicinity of 147 sq kms, it lies within the basin of the Rapti and Rohini rivers and the land is like of a bowl. It has rural villages and pre-urban habitats around it where agriculture is practiced<sup>49</sup>. Gorakhpur district is situated within the Terai region of the Nepal Himalayas. The district has numerous annual and perennial freshwater ponds and lakes of different dimensions<sup>50</sup>. Over time, due to human interferences, like dumping solid wastes, sewage water, rapid encroachment many of those have disappeared or are on the verge of doing so (Fig. 8). The famous Ramgarh Lake is now spotlight to the study of receding water body due to several aspects.

### **Ramgarh Lake**

Ramgarh Lake (260 42' 30" N to 260 45' N and 830 24' 20" E to 830 25' 20" E) - an example of deteriorating lake because of several urban impacts an oversized, perennial, eutrophic lake, exists within the south-east a part of Gorakhpur city having luxuriant aquatic plants and animals (Fig. 9). Several macrophytes, planktons, aquatic fauna, aquatic fauna like Eichhornia, Vallisnaria, Ceratophyllum, Pottamogeton etc. are surface and

submerged weeds. Among fishes, Wallagoattu, Murrel, Mystusseenghala etc. are common while variety of insects like, Nepa, Ranatra, Cybister, etc. are present within the lake. Disposal of municipal solid wastes is deteriorating the water quality of lake and enriching eutrophication and siltation, that resulting contraction of the lake basin area. This encroachment was very huge due to the enormous greed of human being with shameful manner (Fig. 10).

Ramgarh lake project is being developed by the Gorakhpur Development Authority acquiring 486 ha area of the older lake between western dam along the lake and Padaleganj, Indra Nagar, Deoria bypass road. The project includes a Buddhist Complex, Research Center, Library, Deer Park, Five Star Hotel, Tourist Bungalow, Circuit House, Health Center, Water Sports Club, Planetarium, Aquarium, Children's Park, Shopping Center, Japanese Garden, etc. Thus, the beautification of the lake has continued to develop as a source of income through tourism<sup>5</sup>. Commercial use of Ramgarh Lake and the anthropogenic disturbances are mainly responsible for its eutrophication (Table-3.)

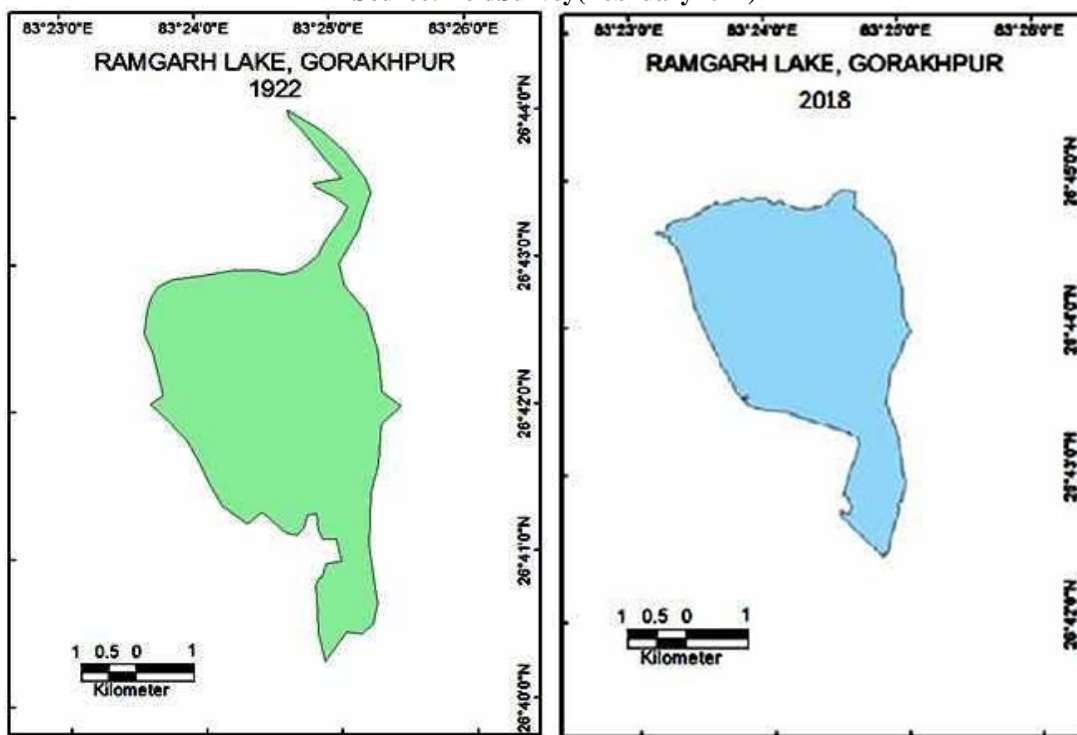


**Figure 9. Map of Ramgarh Tal (Gorakhpur), Google Maps 2021**

**Table3:Change in Utilization Status of Ramgarh Lake<sup>52</sup>**

Activities	Current Status
Fishing	IncessantlyContinue
Irrigation	IncessantlyContinue
VegetableCropping	Upto2005
Washing	Upto1998
RecreationalActivities	IncessantlyContinue
ReligiousActivities	IncessantlyContinue
DumpingSites	IncessantlyContinue
CattleBathing	Upto2011
DrinkingPurpose	Upto1980
TraditionalBoating	Upto2004

Source:FieldSurvey(February2017)



**Figure 10.Reduction in area of RamgarhLake(1922to2018)**

Source:TopsheetNG44-8(1922)and Google earthimages(2018)

### **Status of The Lake And The Need For Conservation**

Traditionally, the lake was of immense value to the citizens of Gorakhpur. Over the time, all biological objects are affected with the slow death of lake. The watershed year seems to be 1980, after which the depletion of the lake really began. The population of villages like Ramgarh, Rampur, Singadia, Kuraghat, Bindutolia and Lakshmipur has increased because of urbanization. Many of those villages have encroached much portion on the lake. Different

kind of pollution has also affected the potability of water<sup>49</sup>. In 80<sup>th</sup> decades, the low-lying marshlands were about 1635 acres but today there are hardly any such lands left. Flora and Fauna have shown steep decline. Human interference has affected the aquatic flora too. 79 percent of the floral species found in the lake in 1969 have disappeared. The density of another 4 percent has reduced. Water hyacinth is a big headache covering a large water surface area of Ramgarh Lake which is not a good for lake health. Submerged plants like *Hydrilla*, *Ceratophyllum*, *Najas* have disappeared totally. Floating plants like *Pistia* and *Salvinia* have gone too. In 1998, there were about 28 varieties of fishes in Ramgarh lake which reduced to 18 in 2006 and 6 to 10 species were remained up to June 2018<sup>52</sup>.

A substantial amount of the effluents is discharged into the Ramgarh lake. Excess nutrients have led to eutrophication and prevent the penetration of sunlight into the waters. Many of those impacts are linked with the development of general infrastructure like roads, airports and tourism facilities, including resorts, hotels, restaurants, shops and golf courses.

Negative impacts from tourism occur when the demands of the extent of people visiting the area is bigger than the environment's ability to address it, within the appropriate limits of change. The Uttar Pradesh Jal Nigam is working on a proposal given to the state government for extension of the sewerage system in the city. The Lake Conservation Department of Government of India is also implementing a project for cleaning and beautification of the lake. Ramgarh Lake is lifeline for Gorakhpur city as a source of ecological social, economical benefits. Urgent measures are required to stop the decline in catchment area and for restoring the water quality in the lake for conservation of the lungs of this growing suburban area.

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