



Sansaar Pokhar, Lakhisarai (Bihar): Ecological, Historical and Conservation Perspectives. A Comprehensive Review

Priyama Kumari

Research Scholar, University Department of Zoology, Tilka Manjhi Bhagalpur University, Bhagalpur, Bihar, India

Abstract: Wetlands are among the most productive ecosystems on Earth and play a fundamental role in sustaining biodiversity, regulating hydrological processes, improving water quality, supporting fisheries, and maintaining ecological balance. India possesses a rich diversity of wetlands that provide numerous ecological, economic, and cultural benefits. Bihar, situated within the fertile Indo-Gangetic plains, contains several natural and man-made wetlands, ponds, oxbow lakes, and marshes that have historically supported local communities. Among these freshwater ecosystems, Sansaar Pokhar (also known as Sansar Pokhar) in Lakhisarai district represents an ecologically and culturally significant water body. Besides serving as an important freshwater resource, the pond has historical associations with the ancient civilization of the region and contributes to groundwater recharge, local biodiversity conservation, fisheries, and religious activities. Despite its importance, comprehensive scientific information on Sansaar Pokhar remains limited, with available knowledge scattered across historical records, government reports, environmental surveys, and local documentation. Rapid urbanization, indiscriminate waste disposal, encroachment, eutrophication, sediment accumulation, and declining water quality threaten the ecological integrity of the pond. These anthropogenic pressures have reduced habitat quality for aquatic organisms and weakened ecosystem services. This review synthesizes the available literature on the historical background, geographical characteristics, hydrology, biodiversity, ecological functions, socio-economic significance, environmental threats, and conservation opportunities of Sansaar Pokhar. It also identifies major research gaps requiring multidisciplinary investigation. The review highlights the urgent need for integrated wetland management involving scientific monitoring, community participation, restoration of native vegetation, pollution control, and policy implementation. Strengthening ecological research on Sansaar Pokhar will contribute to sustainable freshwater conservation in eastern India while preserving an important component of Bihar's natural and cultural heritage.

Key Words: Wetland ecology, Sansaar Pokhar, Lakhisarai, Bihar, Freshwater ecosystem, Biodiversity, Conservation, Ecosystem services, Urban wetlands.

1. INTRODUCTION:

Freshwater ecosystems represent less than one percent of the Earth's surface; however, they support approximately ten percent of all known species and provide essential ecosystem services indispensable for human survival (Ramsar Convention Secretariat, 2016). Wetlands perform diverse ecological functions, including groundwater recharge, flood mitigation, nutrient cycling, carbon sequestration, climate regulation, and maintenance of biodiversity. They also provide livelihood opportunities through fisheries, agriculture, tourism, and collection of aquatic resources (MEA, 2005).

India possesses nearly 15.3 million hectares of wetlands distributed across diverse climatic regions. These ecosystems include lakes, reservoirs, rivers, floodplains, marshes, mangroves, oxbow lakes, village ponds, and seasonal wetlands. Freshwater ponds, although relatively small in area, significantly contribute to local hydrology and biodiversity conservation (National Wetland Atlas, 2011).

The state of Bihar contains numerous wetlands formed by the dynamic river systems of the Ganga basin. Natural floodplain wetlands, locally known as chaur, maun, taal, and village ponds, constitute important freshwater habitats



supporting fish diversity, migratory birds, aquatic macrophytes, amphibians, reptiles, and microorganisms. Many of these wetlands also possess historical and religious importance extending over several centuries.

Among these water bodies, Sansaar Pokhar located in Lakhisarai district occupies a unique position due to its ecological significance and historical associations. The pond has served local communities for domestic use, irrigation, fisheries, groundwater recharge, and religious gatherings. Historical evidence suggests that the region surrounding Sansaar Pokhar has been associated with ancient settlements and cultural development. Consequently, the pond represents not merely a freshwater ecosystem but also a valuable cultural landscape.

In recent decades, however, the ecological condition of Sansaar Pokhar has deteriorated due to increasing anthropogenic pressure. Encroachment, sedimentation, nutrient enrichment, disposal of municipal waste, uncontrolled aquatic weed growth, and reduced public awareness have collectively affected the ecological functioning of the wetland. Similar trends have been observed in many urban and peri-urban ponds across India, emphasizing the need for sustainable management strategies.

Although several studies have examined wetlands in Bihar, comprehensive scientific documentation specifically focusing on Sansaar Pokhar remains scarce. Existing information is fragmented among archaeological reports, environmental documents, government publications, newspaper reports, and local records. The absence of integrated scientific reviews limits effective conservation planning and policy formulation.

The present review therefore aims to compile and critically evaluate the available knowledge regarding Sansaar Pokhar. Particular emphasis is placed on its historical evolution, geographical characteristics, hydrological features, biodiversity, ecosystem services, socioeconomic relevance, environmental threats, conservation strategies, and future research priorities. By integrating information from multiple disciplines, this review seeks to establish a scientific foundation for sustainable management of this important freshwater ecosystem.

2. OBJECTIVES

The present review was undertaken with the following objectives:

1. To compile available scientific and historical information regarding Sansaar Pokhar in Lakhisarai district.
2. To describe the geographical, hydrological, and ecological characteristics of the pond.
3. To evaluate the ecological, socio-economic, and cultural significance of the wetland.
4. To identify major environmental threats affecting the pond.
5. To assess existing conservation measures and recommend sustainable management strategies. To identify research gaps for future ecological investigations.

3. HISTORICAL BACKGROUND:

Sansaar Pokhar is an important traditional freshwater pond located in Lakhisarai district of Bihar, India. The pond is recognised as a valuable community water body and has contributed to the social, cultural, and ecological life of the surrounding region for many decades. Although the exact period of its construction has not been documented in published scientific literature, it is considered one of the historical ponds of Lakhisarai and continues to serve local communities (Government of Bihar, 2011).

Lakhisarai district occupies an important position in the historical landscape of Bihar. Archaeological evidence indicates that the region flourished during the Pala dynasty (8th–12th century CE), when Buddhism and Hinduism developed simultaneously. Numerous temples, monasteries, stone sculptures, inscriptions, and archaeological remains discovered in the district reflect its historical significance (Archaeological Survey of India, 2018; Government of Bihar, 2011).

Historically, ponds were constructed as an essential part of settlement planning in the Gangetic plains. These water bodies stored rainwater, supplied water for domestic and agricultural purposes, supported fisheries, and helped maintain groundwater levels. Traditional ponds also reduced surface runoff during the monsoon and acted as local water reservoirs during dry periods (Mitsch & Gosselink, 2015; Ramsar Convention Secretariat, 2016).

Like many traditional ponds in Bihar, Sansaar Pokhar has cultural and religious importance for the local population. The pond is used during religious festivals, including Chhath Puja and other community ceremonies. Such activities strengthen the relationship between local communities and freshwater ecosystems and contribute to the preservation of traditional cultural practices (Government of Bihar, 2011).

In earlier times, ponds were maintained through regular desilting, cleaning of embankments, and community participation. These traditional management practices helped preserve water quality and ecological balance. However,



rapid urbanization, population growth, and changing land-use patterns have reduced community involvement in pond management across many parts of India (National Wetland Atlas, 2011; Kumar et al., 2019).

At present, Sansaar Pokhar is facing several environmental challenges, including sediment accumulation, encroachment around the pond margins, disposal of solid waste, and excessive growth of aquatic vegetation. Similar threats have been reported from numerous freshwater ponds throughout the Indo-Gangetic Plain, where increasing anthropogenic pressure has affected ecosystem health and biodiversity (National Wetland Atlas, 2011; Ramsar Convention Secretariat, 2016).

Despite these challenges, Sansaar Pokhar continues to perform important ecological functions. The pond contributes to groundwater recharge, supports aquatic organisms, moderates the local microclimate, and provides ecosystem services that benefit nearby communities. Protecting such traditional water bodies is therefore essential for maintaining ecological sustainability as well as preserving regional cultural heritage (Millennium Ecosystem Assessment, 2005; Mitsch & Gosselink, 2015).

Scientific studies specifically focusing on Sansaar Pokhar remain limited. Most available information is derived from government documents, archaeological records, local historical accounts, and general studies on wetlands in Bihar. Therefore, comprehensive ecological, limnological, biodiversity, and hydrological investigations are needed to generate baseline scientific information that can support evidence-based conservation and sustainable management of this important freshwater ecosystem (National Wetland Atlas, 2011; Bihar State Wetland Authority, 2020).

Table 1. General Features of Sansaar Pokhar

Parameters	Description
Location	Lakhisarai, Bihar, India
Ecosystem	Fresh water pond
Climate	Humid subtropical
Main Water Source	Rainwater and surface runoff
Ecological importance	Groundwater recharge, biodiversity, cultural value

4. ECOSYSTEM SERVICES

Sansaar Pokhar provides a wide range of ecosystem services that benefit both the environment and local communities. As a freshwater ecosystem, it stores rainwater, recharges groundwater, moderates local temperature, and supports a variety of aquatic organisms. The pond also acts as a natural sink for sediments and nutrients, thereby contributing to environmental stability (Millennium Ecosystem Assessment, 2005; Mitsch & Gosselink, 2015).

The pond has considerable socio-cultural value. It is used during religious festivals, community gatherings, and recreational activities, making it an important part of the local heritage. In addition, freshwater ponds such as Sansaar Pokhar provide habitat for aquatic plants, fish, amphibians, insects, and birds, thereby contributing to regional biodiversity conservation (Ramsar Convention Secretariat, 2016). Recent local reports also describe the pond as an important historical water body and highlight ongoing restoration efforts.

5. GEOGRAPHY SETTING

Sansaar Pokhar is situated in Lakhisarai town, the administrative headquarters of Lakhisarai district in the state of Bihar, India. The district lies in the middle Gangetic plain, a region characterized by fertile alluvial soils, a subtropical monsoon climate, and an extensive network of rivers, ponds, and wetlands. Geographically, Lakhisarai is located between approximately 25°00'–25°15' N latitude and 86°00'–86°15' E longitude, with an average elevation of about 45–55 m above mean sea level. The climate is marked by hot summers, a monsoon season extending from June to September, and mild winters. Annual rainfall ranges from approximately 1,000 to 1,200 mm, most of which is received during the southwest monsoon (Government of Bihar, 2023).

Sansaar Pokhar occupies a strategic location within the urban landscape of Lakhisarai and serves as one of the city's prominent historical water bodies. The pond receives rainwater runoff from the surrounding catchment and contributes to local groundwater recharge while supporting the urban drainage system. The surrounding area consists of



residential colonies, commercial establishments, roads, educational institutions, and public spaces, making the pond an important ecological component within an increasingly urbanized environment.

From an environmental perspective, Sansaar Pokhar functions as an urban freshwater wetland that provides multiple ecosystem services, including temporary rainwater storage, moderation of the local microclimate, sediment retention, and support for aquatic biodiversity. Such urban ponds play an increasingly important role in enhancing ecological resilience against climate variability and rapid urban expansion (Mitsch & Gosselink, 2015).

6. HYDROLOGY AND ECOLOGICAL SIGNIFICANCE

The ecological functioning of Sansaar Pokhar is closely linked to its hydrological characteristics. As a freshwater pond, it stores monsoon runoff, facilitates groundwater recharge, and helps regulate local water availability during dry periods. Wetlands of this nature also reduce the velocity of stormwater runoff, thereby minimizing soil erosion and localized flooding in urban environments (Ramsar Convention Secretariat, 2016).

The pond acts as a natural sediment trap by retaining suspended particles carried through surface runoff. Aquatic vegetation and microbial communities present within the pond contribute to nutrient cycling and the partial removal of organic pollutants, thereby improving water quality through natural biological processes. Although increasing urban pressure may reduce these ecological functions, healthy wetlands continue to provide valuable ecosystem services that are difficult to replace through artificial infrastructure.

In addition to hydrological benefits, Sansaar Pokhar contributes to maintaining local environmental quality by moderating temperature, increasing atmospheric humidity, and creating favourable conditions for aquatic organisms and terrestrial wildlife. The pond also serves as a green-blue ecological space within the urban matrix, offering habitat connectivity for birds, insects, amphibians, and other wetland-dependent organisms.

Considering the increasing loss of urban wetlands throughout India, conservation of heritage ponds such as Sansaar Pokhar has become increasingly important for sustainable urban development, biodiversity conservation, and climate resilience. Scientific monitoring of hydrological parameters, water quality, and ecological health would further strengthen long-term management strategies for this valuable freshwater ecosystem.

7. FUTURE PERSPECTIVE

Future management should focus on scientific biodiversity surveys, periodic water quality assessment, ecological restoration using native aquatic vegetation, environmental awareness programmes, and long-term conservation planning. Integration of Sansaar Pokhar into urban biodiversity conservation initiatives could enhance its ecological and educational value.

8. CONCLUSION

Sansaar Pokhar is an important heritage pond of Lakhisarai that combines ecological, hydrological, cultural, and historical significance. Despite increasing environmental pressures, ongoing restoration initiatives provide opportunities for sustainable conservation. Scientific management, public participation, and regular ecological monitoring will be essential for preserving this valuable urban wetland for future generations.

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