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RESEARCH ARTICLE

Community engagement and conservation outlook: insights from Dhanauri and Surajpur wetlands, India

Neeti Tomar[1], Monika Koul[2] and A.K. Pandey[1]*

[1]Department of Botany, Mansarovar Global University, Bilkisganj, Sehore, Madhya Pradesh, India.

[2]Department of Botany, Hansraj College, University of Delhi, Delhi, India.

*Corresponding author email: arunpandey79@gmail.com
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Abstract

Present study examines the extent of use, perceptions, and attitudes of local populations towards two wetlands, Dhanauri and Surajpur, Noida, Uttar Pradesh through a cross-sectional survey of one hundred residents from each location. The survey revealed that Dhanauri had a higher frequency of visitors compared to Surajpur. Most respondents in Dhanauri perceived the wetland as heavily degraded, expressing concerns about its future, while Surajpur respondents were more optimistic, with many viewing the wetland as either pristine or moderately affected. Awareness of conservation efforts was generally low in both locations, though support for protective regulations was high. These findings underscore the vital role that wetlands play in local livelihoods and highlight the need for targeted conservation efforts. Enhancing community involvement and addressing specific perceptions could improve the long-term sustainability and protection of these wetlands.

Keywords: Dhanauri and Surajpur Wetlands, Community perceptions, Livelihoods, Conservation,

1. Introduction

Wetlands, which comprise a range of water bodies like marshes, fens, and peatlands, are incredibly valuable ecosystems (Abdulmajeed et al., 2023; Kundu et al., 2024). They have a high species richness and make a substantial contribution to the sustenance of life on Earth. Considering their tiny size on Earth, wetlands offer a disproportionately high number of ecosystem services. Some examples of these services include the provision of resources like fish, timber, and medicinal plants, support for agriculture (Altieri et al., 2022), carbon sequestration, control over air and water quality (Mahato et al., 2023), management of climate change, stabilization of shorelines, reduction of flooding, upkeep of habitats, waste treatment, and use for cultural and recreational purposes (Carmen et al., 2022).

A wetland is a type of complex ecosystem that is characterized by floods or saturated soil (Madgwick, 2018). As a result, low oxygen environments are favourable to a certain mix of microorganisms, vegetation, and creatures that have evolved to survive extended periods of still or slowly flowing water. Wetlands are generally categorized using terms like bogs, marshes, swamps, and other such environments that describe their vegetation and soil type (U.S. Environmental Protection Agency, 2022). Wetlands and the subdiscipline of wetland ecology are relatively recent additions to the field of ecology, mostly because of laws and other regulations that were implemented in the 1970s. Formal use of the term "wetland" dates back to 1953 in a U.S. a report from the US Fish and Wildlife Service (USFWS) that provided the basis for a later article regarding duck habitat in the US. The Ramsar Convention, an intergovernmental agreement signed in Ramsar, Iran, in 1971, offers a description that acts as a guide for both domestic and international wetland conservation efforts, as there isn't a single official definition (Ramsar Convention Secretariat, 2016).

The detrimental effects of ecological challenges, such as climate change and ecosystem degradation, have had a significant influence on the lives of populations that depend on ecosystems (Bennett et al., 2023). Among these implications include lower agricultural output, fewer opportunities for a livelihood, higher rates of poverty, and a diminished ability to take advantage of opportunities at different scales (Huq et al., 2020; Birkmann et al., 2022). Even though diversifying livelihoods is commonly suggested as a strategy to overcome these challenges and unpredictability, it is crucial to analyse livelihood vulnerability within the larger framework of sustainable livelihood planning and ecosystem-based adaptation. Understanding the qualitative and quantitative linkages between the ecosystem and the livelihood system in a given social-ecological context is crucial for developing livelihoods based on ecosystems (Adams et al., 2020).

Human activities such as urban expansion, industrial pollution, agricultural encroachment, and changes in land use have significantly degraded many wetlands, reducing their capacity to deliver these services (Agostoni et al., 2023). This degradation has far-reaching consequences, not only for biodiversity but also for local communities that depend on wetlands for their livelihoods and well-being (Bennett et al., 2023). Understanding how local populations use these wetlands, perceive their current state, and respond to conservation efforts is critical for devising strategies that can balance ecological preservation with the socioeconomic needs of the people (Adams et al., 2020). The objectives of the present work were to provide a comprehensive account of the community usage of Dhanauri and Surajpur wetlands located in NOIDA, Uttar Pradesh and suggest conservation measures.

2. Methodology

The methodology for studying the extent of use and local people's perceptions and attitudes towards wetland in Dhanauri and Surajpur was structured around a cross-sectional survey. The study targeted 100 residents from the wetland area each location, selected using a combination of stratified random sampling and convenience sampling techniques to ensure diverse representation. A structured questionnaire was developed, consisting of questions. The survey explored local awareness of conservation issues, attitudes towards wetland degradation, and perceived benefits and threats related to the wetlands. Ethical considerations were observed by obtaining informed consent, ensuring confidentiality, and emphasizing voluntary participation throughout the process. Finally, the results were analysed and presented to highlight differences between Dhanauri and Surajpur, with a focus on local perceptions of wetland conservation and usage patterns.

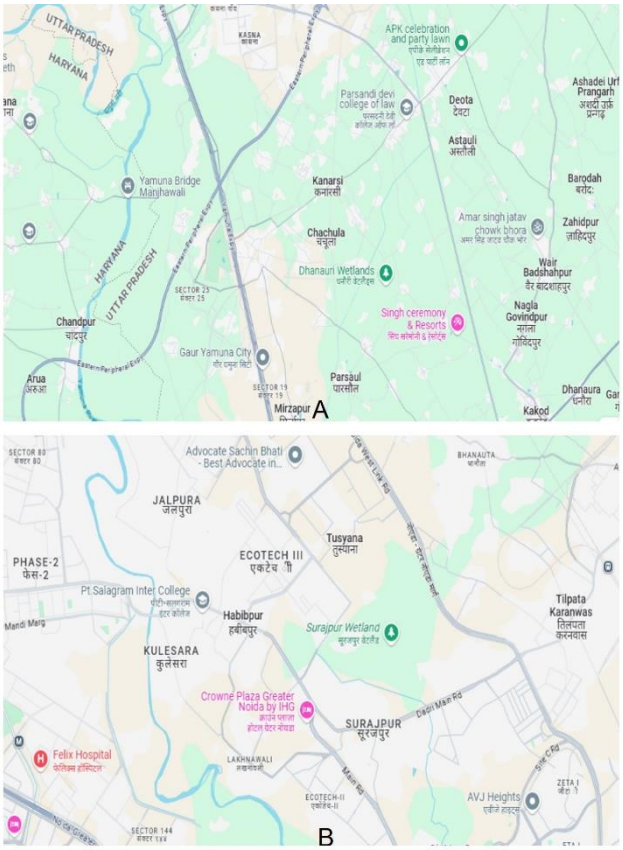

Figure 1 A. Map showing Dhanauri Wetlands; B. Map showing Surajpur Wetlands.

3. Results

3.1. Data analysis for Dhanauri

The analysis of survey data of Dhanauri provides a comprehensive understanding of public perceptions, usage patterns, and concerns regarding wetlands (Table 1). In terms of frequency, the majority of respondents visit wetlands rarely (49 individuals) or monthly (31), with fewer visiting weekly (11) or daily (10). The reasons for visiting varied, with recreation or tourism being the most common (28), followed by agricultural activities (22), fishing or harvesting resources (8), and a notable 31 respondents who reported not visiting wetlands at all.

Perceptions of wetland conditions highlighted significant concerns, as 67 respondents believed wetlands were heavily degraded, and 30 considered them moderately affected. Similarly, a majority (77 individuals) perceived a major impact on wetlands due to anthropogenic activities, while only 20 viewed the impact as minor. The importance of wetlands was acknowledged, with 61 respondents rating them as extremely important, 34 as somewhat important, and only a few (3 individuals) perceiving them as not important or only slightly important.

The primary benefits of wetlands were identified as water resources (42), wildlife habitat and biodiversity (35), and flood control and climate regulation (9). Future perceptions were generally pessimistic, with 60 predicting that wetlands would shrink but still exist, 39 fearing their disappearance entirely, and only 6 expressing optimisms about preservation. A significant portion of respondents (55) were unaware of conservation efforts, while 42 were aware but uninvolved, and only 12 were both aware and actively involved. Notably, 7 respondents expressed scepticism about the existence of any conservation efforts.

Table 1. The extent of use of wetlands by the local people and their perception and attitude towards Dhanauri wetland (Noida, UP, India).

Question	Options	Number of Individuals
Q1 (Frequency of visiting wetlands)	Rarely	49
	Monthly	31
	Weekly	11
	Daily	10
Q2 (Reason for visiting wetlands)	I do not visit wetlands	31
	Recreation or tourism	28
	Fishing or harvesting resources	8
	Agricultural activities	22
Q3 (Perception of wetland condition)	Heavily degraded	67
	Moderately affected	30
Q4 (Perceived impact on wetlands)	Major impact	77
	Minor impact	20
Q5 (Importance of wetlands)	Extremely important	61
	Somewhat important	34
	Not very important	2
	Not important at all	1
Q6 (Primary benefit of wetlands)	Wildlife habitat and biodiversity	35
	Water resources	42
	Flood control and climate regulation	9
Q7 (Future of wetlands)	The wetlands will shrink but still exist	60
	The wetlands will disappear entirely	39
	The wetlands will be preserved	6
	I am unsure	1
Q8 (Awareness of efforts)	No, I am not aware	55
	Yes, I am aware but not involved	42
	Yes, I am aware and involved	12
	I do not believe any efforts exist	7
Support for Regulations	Yes, I strongly support	67
	Yes, but with some reservations	15
	No, I do not support	4
	Urban expansion	45
Greatest Threat	Agricultural encroachment	22
	Industrial pollution	8
	Lack of awareness and education	3
State 5 Years Ago	All the above	29
	More abundant biodiversity	26
	Higher water and soil quality	15
	Larger wetland area	12

Table 2. The extent of use of wetlands by the local people and their perception and attitude towards Surajpur wetland (Noida, UP, India).

Category	Option	Number of Individuals
Gender	Male	78
	Female	57
Frequency of Visit	Daily	9
	Weekly	36
	Monthly	45
	Rarely	45
Reason for Visit	Recreation	60
	Agricultural activities	30
	Fishing or harvesting natural resources	15
	I do not visit wetlands	30
Current State of Wetlands	Pristine and well-preserved	63
	Moderately affected by human activities	66
	Heavily degraded due to land use changes	5
Impact of Land Use Change	No significant impact	63
	Minor impact	66
	Major impact	5
Importance to Livelihood	Extremely important	29
	Somewhat important	26
	Not important at all	2
	Not very important	2
Benefits to Community	Water resources (e.g., irrigation, drinking)	25
	Wildlife habitat and biodiversity	22
	Flood control and climate regulation	7
	I am not aware of any benefits	5
Future Perception	The wetlands will be preserved	23
	The wetlands will shrink but still exist	31
	The wetlands will disappear entirely	2
Awareness of Conservation Efforts	Yes, I am aware and involved	22
	Yes, I am aware but not involved	36
	The wetlands will disappear entirely	6
Support for Regulations	Yes, I strongly support	60
	Yes, but with some reservations	7
	No, I do not support	2
Greatest Threat	Agricultural encroachment	21
	Urban expansion	14
	Industrial pollution	12
	Lack of awareness and education	18
State 5 Years Ago	Larger Wetland Area	15
	Higher Water and soil Quality	5
	More Abundant Biodiversity	1
	All the above	38

Support for wetland conservation regulations was strong, with 67 individuals expressing strong support, 15 showing reservations, and only 4 opposing. The greatest threats identified included urban expansion (45), agricultural encroachment (22), industrial pollution (8), and lack of awareness and education (3). Reflecting on the state of wetlands five years ago, 29 respondents noted improvements across biodiversity, water and soil quality, and wetland area, while others specifically recalled more abundant biodiversity (26), higher water and soil quality (15), or larger wetland areas (12). These findings underscore the urgent need for targeted conservation efforts and increased public awareness to mitigate threats and preserve these vital ecosystems.

3.2. Data analysis of Surajpur

The study revealed significant insights into wetland usage, perceptions, and challenges as assessed by the respondents (Table 2). Of the 135 individuals surveyed, 78 were male, and 57 were female. The frequency of visits varied, with the majority visiting monthly (45 individuals) or rarely (45 individuals), while fewer visited weekly (36) or daily (9). Recreation was the primary reason for visiting wetlands (60 individuals), followed by agricultural activities (30), and fishing or harvesting natural resources (15). Notably, 30 individuals reported not visiting wetlands at all.

Regarding the current state of wetlands, opinions were split between those who believed the wetlands were pristine and well-preserved (63) and those who viewed them as moderately affected by human activities (66). A small proportion (5 individuals) regarded them as heavily degraded. Similarly, the impact of land use changes was perceived as minor (66) or insignificant (63) by most, with only 5 respondents considering it major. Wetlands were deemed important to livelihoods by 29 respondents, somewhat important by 26, and not very important or unimportant by 4 individuals combined.

When asked about the benefits wetlands provide, the respondents highlighted water resources (25), wildlife habitat and biodiversity (22), and flood control and climate regulation (7). However, 5 individuals admitted unawareness of these benefits. Future perceptions varied, with 31 predicting wetlands would shrink but still exist, 23 believing they would be preserved, and 2 fearing they would disappear entirely. Awareness of conservation efforts was moderate, as 22 were aware and involved, 36 aware but uninvolved, and 6 unaware.

Support for wetland conservation regulations was high, with 60 individuals strongly supporting them, 7 showing reservations, and only 2 opposing. Agricultural encroachment (21), lack of awareness and education (18), urban expansion (14), and industrial pollution (12) were identified as the greatest threats. Reflecting on the past, 38 respondents noted larger wetland areas, better water and soil quality, and more biodiversity five years ago, underscoring the ongoing challenges in wetland preservation.

Dhanauri has fewer individuals visiting frequently (weekly or daily), while Surajpur has a higher percentage of weekly and monthly visitors. This suggests that Surajpur wetlands may serve more immediate needs for recreation, agriculture, or other purposes. The majority in both wetlands visit rarely or monthly, indicating that wetlands are not part of the daily routine for most local people.

4. CONCLUSION

The survey results reveal distinct patterns in the use and perceptions of the wetlands in Dhanauri and Surajpur in Noida, UP, India. Dhanauri has fewer frequent visitors, with most people visiting the wetlands rarely or monthly, suggesting that these wetlands are not integral to daily activities for the majority of the local population. In contrast, Surajpur had a higher percentage of weekly and monthly visitors, indicating that it may serve more immediate needs for recreation. In terms of perceptions, most respondents from Dhanauri believed the wetland was heavily degraded and expressed concerns about its future, with many

fearing that it might shrink or disappear entirely. Conversely, respondents from Surajpur had a more positive outlook, with a significant number viewing the wetlands as pristine or only moderately affected. Awareness of conservation efforts was relatively low in both locations, but there was strong support for protective regulations across both sites.

Overall, both wetlands play an important role in the lives of local people, particularly in terms of providing water resources, wildlife habitat, and other ecosystem services. However, the differences in frequency of use and perceptions between Dhanauri and Surajpur suggest that each wetland may face unique challenges and opportunities for conservation. Addressing these perceptions and increasing community involvement in conservation efforts could be crucial for the long-term preservation of both wetlands.

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Authors contributions

Collection of data was done by NT. All the authors finalised the manuscript.

Conflict of interest

Authors have no conflict of interest.

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