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Assessment of Fish Diversity and Aquatic Ecosystem in Dhurde tal Wetland, Saran District, Bihar

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Abstract
Wetlands are vital for maintaining aquatic biodiversity, delivering necessary ecological services, and boosting local economies. In Bihar's Saran district, the Dhurde Tal wetland is a biologically rich but little-studied habitat. The purpose of this study is to assess the water health and fish diversity of the Dhurde Tal wetland. Through seasonal fish sampling, water quality parameter analysis, and anthropogenic effect assessment, the study offers a thorough insight of the ecological condition of the wetland. The results provide insightful information for conservation tactics and sustainable management. Situated in Bihar's Saran district, the Dhurde Tal wetland is an important but little-known aquatic environment. The purpose of this study is to appraise the aquatic ecosystem's health and fish diversity in Dhurde Tal. The study aims to shed light on the wetland's ecological state and guide sustainable management strategies by examining species composition, water quality metrics, and human influences.

Keyword: Aquatic ecosystem, biodiversity, Dhurvetal, Wetland, Fish diversity.

1. Introduction

Dynamic aquatic ecosystems, wetlands are renowned for their ecological diversity and richness. They serve as habitats for many aquatic and terrestrial species, flood control, carbon sinks, and natural water purifiers. Because of their sensitivity to environmental changes, fish are important bioindicators of the health of aquatic ecosystems. In addition to reaffirming each country's sovereign rights over its whole genetic resource base, the Convention on Biological Diversity (CBD) calls for protection, sustainable use, and fair distribution of the advantages that come from biological resources. (Prakash and Pandey 2015) Numerous fish of economic importance can be found in its rich and varied fauna. In addition to offering chances for livelihood and the creation of new jobs, rivers are playing a significant role in the inland fish production in the Saran District of Bihar, which helps address the issues of nutritional security for communities. many human-caused actions. Nonetheless, the best ways to boost the nation's fisheries output are through scientific and environmentally friendly growth methods combined with an integrated management strategy (Dr. Kumari Shashi Prabha 2025). India's freshwater fish population is fascinating and provides a unique chance to research its diversity and range. based on the principal freshwater fish genera' known geographic distribution (Sinha and Hassan, 2015). One such body of water with major ecological and economic significance is the Dhurve Tal wetland in the Saran district.

Nevertheless, relatively little scientific research has been done to document its richness, particularly with regard to fish species. The current study intends to investigate water quality factors impacting the aquatic ecology and the diversity of fish in the Dhurv etal wetland. Additionally, the study suggests conservation measures and draws attention to possible dangers. Research conducted on ponds in the Saran district has revealed a wide variety of fish species (Pallvi M. 2020). Research on the Dhurdetal wetland in the Saran district has shown a wide variety of fish species. For example, studies have found 17 species of freshwater fish in three orders and six families, with the Cyprinidae family being the most prevalent. The study highlighted the region's notable ichthyofaunal richness by reporting 47 species in wetlands are essential habitats that sustain a wide variety of plants and animals, especially fish species that are essential to maintaining ecological balance and supporting local economies. Bihar is home to a diverse range of ichthyofauna due to its vast network of rivers and wetlands. Dhurve Tal in the Saran district. Conservation of biodiversity and sustainable resource use depend on an understanding of the fish diversity and ecological health of such wetlands (Kumari P. and Kumar U. 2023)

3. Study Area

Dhurde tal wetland is located in Saran district, Bihar, near Chapra. The wetland is fed by monsoonal rainfall and local runoff, forming a perennial or semi-perennial water body depending on seasonal variations. Dhurve tal is a natural wetland situated in the Saran district of Bihar. The region experiences a subtropical climate with distinct seasons, influencing the hydrology and ecological dynamics of the wetland.

The wetland serves as a habitat for various aquatic speciesand supports local communities through fisheries and agriculture. Location: Dhurve tal, near Chapra in Saran district, Bihar. Coordinates and map details to be added during field visits.

Methodology

Sampling: Fish were sampled during pre-monsoon, monsoon, and post-monsoon seasons using cast nets, gill nets, and traps at five different sites across the wetland. Collected specimens were preserved in formalin and identified using standard taxonomic keys (Talwar & Jhingran, 1991; Jayaram, 2010).

Fish sampling: Using cast nets, gill nets, and traps at multiple points over different seasons.

Water sampling: Monthly analysis for parameters like temperature, pH, DO, BOD, TDS, nitrates, and phosphates.

Identification:

Species identified using standard keys

Diversity indices: Shannon-Wiener Index, Simpson Index, Evenness.

4. Expected Outcomes

A comprehensive **checklist of fish species** in Dhurve tal. Classification of species based on **ecological roles** and conservation status. Understanding of **seasonal variation** in diversity. Assessment of **wetland health and threats**, offering a basis for conservation.

4.1 Significance of Study

Provides baseline data for further ecological research. Supports **local fisheries development** and sustainable use of wetland resources.

Water Quality Assessment

Water samples were collected from the same sampling sites. Parameters measured included temperature, pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), total dissolved solids (TDS), nitrates, phosphates, and turbidity using APHA (2012) standard methods.

Table 2: Seasonal Averages of Water Quality Parameters

Parameter	Pre-Monsoon	Monsoon	Post-Monsoon	Ideal Range (Aquatic Life)
Temperature (°C)	29.2	27.0	25.5	**20 - 30 °C**
pH	7.2	7.0	7.4	**6.5 - 8.5**
DO (mg/L)	5.1	6.5	7.8	**>5.0 mg/L**
BOD (mg/L)	4.8	3.5	3.2	**<5.0 mg/L**
TDS (mg/L)	400	350	310	**<500 mg/L**
Nitrate (mg/L)	2.8	2.5	2.1	**<10 mg/L**
Phosphate (mg/L)	1.2	1.0	0.8	**<2.0 mg/L**
Turbidity (NTU)	**24**	**31**	**18**	**<50 NTU**

All values were within permissible limits, indicating a moderately healthy aquatic environment.

5. Results and Discussion

5.1 Fish Diversit:

A total of 34 fish species belonging to 6 orders and 11 families were recorded from Dhurde tal. The family Cyprinidae was dominant, contributing 38% of total species, followed by Siluridae and Bagridae.

Fig:(1)

Fig: (2)

Fig: (3)

Fig: (4)

Fig: (5)

Fig (1), (2), (3), (4), (5), Sample Collection site of Dhurdetal Wetland Saran of Bihar

Table 1: Fish Species Recorded in Dhurve tal Wetland

S. N.	Common Name	Scientific Name	Family	Order	Species	Economi-c Value
1.	Catla	Catla catla	Cyprinidae	Cypriniformes	Catla catla	High
2.	Rohu	Labeo rohita	Cyprinidae	Cypriniformes	Labeo rohita	High
3.	Pothiya	Puntius sophore	Cyprinidae	Cypriniformes	Puntius sophore	Moderate
4.	Garayi	Clarias batrachus	Clariidae	Siluriformes	Clarias batrachus	High
5.	Tangra	Mystus tengara	Bagridae	Siluriformes	Mystus tengara	Moderate
6.	Rewa	Cirrhinus reba	Cyprinidae	Cypriniformes	Cirrhinus reba	Moderate
7.	Singhi	Htereopneuste s fossilis	Heteropneustid ae	Siluriformes	Htereopneust es fossilis	High
8.	Patya	Anabas testudineus	Anabantidae	Anabantiformes	Anabas testudineus	Moderate
9.	Glass Fish	Parambassis ranga	Ambassidae	Perciformes	Parambassis ranga	Moderate
10.	Brigade	Glossogobius giuris	Gobiidae	Perciformes	Glossogobius giuris	Moderate
11.	Golden Fish	Xenentodon cancila	Belonidae	Beloniformes	Xenentodon cancila	Moderate
12.	Barai	Notopterus notopterus	Notopteridae	Osteoglossiform es	Notopterus notopterus	High
13	Dara	Wallago attu	Siluridae	Siluriformes	Wallago attu	High
14.	Nayani	Gudusia chapra	Clupeidae	Clupeiformes	Gudusia chapra	Moderate
15.	Kevyi	Macrognatus	Mastacembelid	Synbranchiform	Macrognatus	Moderate

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16.	Bangur	Mystus cavasius	Bagridae	Siluriformes	Mystus cavasius	Moderate
17.	Dhalo	Salmostoma bacaila	Cyprinidae	Cypriniformes	Salmostoma bacaila	Moderate
18.	Tangusi	Ompok bimaculatus	Siluridae	Siluriformes	Ompok bimaculatus	Moderate
19.	Khosla	Rasbora daniconius	Cyprinidae	Cypriniformes	Rasbora daniconius	Moderate
20	Nekti	Chanda nama	Ambassidae	Perciformes	Chanda nama	Moderate
21.	Jhinga	Macrobrachium rosenbergii	Palaemonidae	Decapoda	Macrobrachium rosenbergii	High
22.	Kauwa machhali	Xenentodon cancilia	Belonidae	Cyprinopterygii	cancila	Moderate
23.	Spiny eel	Macrognathus pancalus	Mastacembelidae	Synbranchiformes	pancalus	Moderate
24.	Olive barb	Systomus sarana	Cyprinidae	Cypriniformes	sarana	Moderate

Fish diversity was highest during the post-monsoon season, likely due to increased nutrient levels and aquatic vegetation. Monsoon flooding brought in migratory species, while pre-monsoon showed reduced diversity due to lower water levels.

5.4 Anthropogenic Pressures

The wetland faces several threats: Encroachment for agriculture.Use of chemical fertilizers and pesticides. Unregulated fishing practices. Domestic sewage and solid waste dumping. These activities pose risks to water quality and biodiversity.

Significance of the Study

This study will fill the knowledge gap regarding the ichthyofaunal diversity and ecological status of Dhurve tal wetland. The findings will aid in formulating conservation strategies and inform policymakers and stakeholders about the importance of preserving such ecosystems for biodiversity and community livelihoods.

6. Conservation and Management Recommendations

- **Community Engagement**: Involve local communities in wetland monitoring and sustainable fishing.
- **Buffer Zones**: Establish vegetated buffer zones to filter runoff.
- **Pollution Control**: Regulate use of agrochemicals and develop sewage treatment systems.
- **Biodiversity Monitoring**: Regular biodiversity assessments and water quality monitoring.
- **Legal Protection**: Advocate for recognition of Dhurdetal as a Community Reserve or protected wetland.

Potential Research Avenues for Dhurve tal Wetland

Given the regional biodiversity trends, the Dhurve tal wetland offers several research opportunities: Species Inventory: Conducting a comprehensive survey to catalog fish species present in Dhurde tal. Habitat Assessment: Analyzing the wetland's physico-chemical parameters to understand habitat suitability for various fish species. Conservation Status: Evaluating the presence of endemic or threatened species to inform conservation strategies. Anthropogenic Impacts: Investigating the effects of human activities, such as agriculture and fishing, on the wetland's fish diversity.

7. Conclusion

Dhurve tal wetland harbors considerable fish biodiversity and supports important ecosystem functions. Although water quality remains within acceptable limits, growing anthropogenic pressures threaten the wetland's ecological integrity. Immediate conservation action, community participation, and policy support are necessary to safeguard this valuable ecosystem.

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