e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:12/December-2024 Impact Factor- 8.187 www.irjmets.com

RESEARCH PAPER BIODIVERSITY ASSESSMENT OF AQUATIC ANGIOSPERMS IN LEHRI SAGAR LAKE: A KEY TO ECOLOGICAL HEALTH IN GUJARAT

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ABSTRACT

This study presents a comprehensive survey of wetland angiosperms conducted in the aquatic habitats of Lehri Sagar Lake, Son Vadiya, Jamjodhpur, Jamnagar district, Gujarat, India. A total of 51 species belonging to 47 genera and 32 families were identified, including 26 herbs, 6 trees, 5 shrubs, 5 climbers, 3 grasses, 2 sedges, and 2 succulent shrubs. The findings highlight the ecological richness and biodiversity of this man-made wetland, underscoring the importance of such habitats for local flora and fauna. The study also addresses the presence of invasive species and their potential impacts on native biodiversity. These insights aim to inform conservation efforts and enhance the sustainability of wetland ecosystems in the region.

Keywords: Wetland, Biodiversity, Aquatic Angiosperm, Gujarat.

I. INTRODUCTION

With the introduction of U.S. Fish and Wildlife Service (FWS) circular 39, the word "wetland" was first used formally in a government report in 1956. The United States' wetland is the subject of this historic report (Charan et al., 2019). Zones where the earth cycles between dry and wet conditions are called wetlands. Water is either just below the surface of the earth or is present in a thin layer on the ground (Mitsch and Gosselink, 1986). There are a variety of plant and animal species that depend on water levels in wetlands since they are situated between terrestrial and aquatic ecosystems (Šijačić-Nikolić and Milovanović, 2012). Gujarat has an arid climate yet an abundance of wetlands. Gujarat boasts the largest expanse of land classified as wetlands in the nation, at over 34.74 lakh hectares. The state's entire estimated wetland area is 3474950 ha, or roughly 17.56 percent of its total land area. This is the most remarkable feature of Gujarat (National Wetland Atlas, 2010).

II. STUDY AREA

In the Jamnagar district of the state of Gujarat, the Lahari Sagar Lake is situated in the Son Vadiya Village in Jamjodhpur Taluka. It is situated 64 kilometers south of Jamnagar, the district headquarters.This research focuses on a region of a lake with abundant biodiversity and human populations. Prior to the 1980s, this wetland was created on the river for the storage of drinking water and for agricultural use. It was a man-made wetland. In order to store a lot of water in the marsh and river, the river includes eighteen tiny check-dams. This lake is included of the Narmada Avataran irrigation yojana (Saurashtra-Narmada) program, which provides water to Saurashtra for drinking and agriculture. The farmers and villages would get great benefit from this initiative. Aquatic vegetation and great biodiversity may be found in wetlands.

III. FLORISTIC SURVEY

An essential component of the research is the field survey. Lehri sagar Lake was visited in 2024. Different plant species were gathered and recorded throughout the field survey. A few blooming sections were gathered, and several plants were photographed. A field notebook was used to record their names, habitat, habits, and features, including their family and species identification. The accessible flora helped in the taxonomy identification of the gathered specimens (Charan et al., 2019).

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IV. RESULT AND DISCUSSION

Table 1: List Of Aquatic And Wetland Angiosperms Of Lehri Sagar Lake

Sr No.	Botanical Name	Local Name	Family	Habit
1	*Acalypha indica* L	Vaichikato, Dadaro	Euphorbiaceae	Herb
2	*Alysicarpus vaginalis* (L.) DC.		Fabaceae (Papilionaceae)	Herb
3	*Amaranthus viridis* L.	Dhimbdo, Green Amaranth	Amaranthaceae	Herb
4	*Andrographis paniculata* (Burm. f.) Nees	Kalmegh	Acanthaceae	Herb
5	*Argemone mexicana* L	Darudi	Papaveraceae	Herb
6	*Azadirachta indica*	Limdo, Neem	Meliaceae	Tree
7	*Boerhavia erecta* L.		Nyctaginaceae	Herb
8	*Bolboschoenus maritimus*	Water chiyo	Cyperaceae	Sedges
9	*Butea monosperma* (Lam.)	Khakhro	Papilionaceae	Tree
10	*Calotropis procera* (Willd.)	Aakdo	Asclepiadaceae	Shrub
11	*Centella asiatica* (L.) Urb.	Brahmi	Apiaceae (Umbelliferae)	Herb
12	*Cleome viscosa* L	Pili Talavani, Talavani	Capparidaceae	Herb
13	*Clitoria ternatea* L.	Butterfly Pea	Papilionaceae	Climbers
14	*Coccinia grandis* (L.)	Tindora, Ivy Gourd	Cucurbitaceae	Climbers
15	*Commelina benghalensis* L.	Motu Shishmudiyu	Commelinaceae	Herb
16	*Cucumis melo* L.	Sakkarteti, Musk Melon	Cucurbitaceae	Herb
17	*Cyanotis fasciculate*	Nilwanti	*Commelinaceae*	Herb
18	*Cyanthillium cinereum* (L.) H.Rob.	Sahadevi	Asteraceae	Herb
19	*Cyperus alternifolius* L.	Umbrella Palm, chiyo	Cyperaceae	Sedges
20	*Digera muricata* (L.) Mart.	Kanejaro	Amaranthaceae	Herb
21	*Eclipta prostrata* (L.)	Bhangaro, False Daisy	Asteraceae (Compositae)	Herb
22	*Enicostema axillare* (Poir. Ex Lam.) A. Raynal	Mamejavo, Indian White Head	Gentianaceae	Herb
23	*Eragrostis amabilis* (L.)	Kalavo.Bug's Egg Grass	Poaceae (Gramineae)	Grasses
24	*Euphorbia caducifolia*	Dindoliyo Thor, Katara Thor	Euphorbiaceae	succulent shrub
25	*Euphorbia hirta* L.	Moti Dudheli, Rati-Dudheli, Asthma	Euphorbiaceae	Herb

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26	*Ficus benghalensis* L.	Vad, Banyan	Moraceae	Tree
27	*Hibiscus lobatus*		Malvaceae	Herb
28	*Indigofera cordifolia* Roth	Heart-Leaf Indigo	Papilionaceae	Herb
29	*Jatropha gossypiifolia*	Ratanjoti	Euphorbiaceae	Shrub
30	*Lantana camara* L.	Abhagini, Indradhanu,	Verbenaceae	Shrub
31	*Ludwigia hyssopifolia water species*		Onagraceae	Aquatic Herb
32	*Marsilea quadrifolia L*		Marsileaceae	Aquatic ferns
33	*Martynia annua L.*	Vinchhi Kanto, Vinchhudo,	Martyniaceae	Herb
34	*Momordica charantia L.*	Karela, Bitter Gourd	Cucurbitaceae	Climbers
35	*Momordica dioica,*	spiny gourd, kantola	Cucurbitaceae	Climbers
36	*Oplismenus hirtellus*	basket grass	Poaceae	Grasses
37	*Opuntia littoralis*	Hathaliyo Thor , Hathala Thor	Cactaceae	succulent shrub
38	*Parthenium hysterophorus L.*	carrot grass, congress grass	Asteraceae (Compositae)	Herb
39	*Pergularia daemia*	Chamar Dudheli	Asclepiadaceae	Climbers
40	*Phoenix sylvestris*	wild date palm	Arecaceae	Tree
41	*Phyllanthus niruri L.*	bhumi ambli, kadvi ambli	Euphorbiaceae	Herb
42	*Senna tora (L.)*	Kuvadio,	Caesalpiniaceae	Herb
43	*Solanum pseudocapsicum*			
44	*Solanum virginianum L.*	Bhoy-Ringani,	Solanaceae	Herb
45	*Sorghum halepense*	Baru,	Poaceae	Grasses
46	*Spermacoce pusilla*	Tiny Buttonweed,	*Rubiaceae*	Herb
47	*Striga densiflora (witchweed)*	Denseflower Witchweed, Agya	*Orobanchaceae*	Herb
48	*Ephrosia purpurea (L.) Pers.*	Sarpunkho, Ghodakan	Papilionaceae	Shrub
49	*Tridax procumbens (L.)*	Pardesi Bhangaro,ghaburi, vandra ni puch	Asteraceae (Compositae)	Herb
50	*Vachellia nilotica*	Ram baval,babul	Fabaceae	Tree
51	*Vachellia tortilis*	Israeli babool,sidho baval,	Fabaceae	Tree

Table 2: List Of The Total Families, Genus And Species Found In The Habitat Of Lehri Sagar Lake

Sr No	Family	Species	Genus
1	Euphorbiaceae	5	4
2	Fabaceae (Papilionaceae)	1	1

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3	Amaranthaceae	2	2
4	Asteraceae (Compositae)	3	3
5	Acanthaceae	1	1
6	Papaveraceae	1	1
7	Meliaceae	1	1
8	Nyctaginaceae	1	1
9	Cyperaceae	2	2
10	Papilionaceae	4	4
11	Asclepiadaceae	2	2
12	Apiaceae (Umbelliferae)	1	1
13	Capparidaceae	1	1
14	Cucurbitaceae	4	3
15	Commelinaceae	2	2
16	Asteraceae	1	1
17	Gentianaceae	1	1
18	Poaceae (Gramineae)	1	1
19	Moraceae	1	1
20	Malvaceae	1	1
21	Verbenaceae	1	1
22	Onagraceae	1	1
23	Marsileaceae	1	1
24	Martyniaceae	1	1
25	Poaceae	2	2
26	Cactaceae	1	1

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27	Arecaceae	1	1
28	Caesalpiniaceae	1	1
29	Solanaceae	2	1
30	Rubiaceae	1	1
31	Orobanchaceae	1	1
32	Fabaceae	2	1

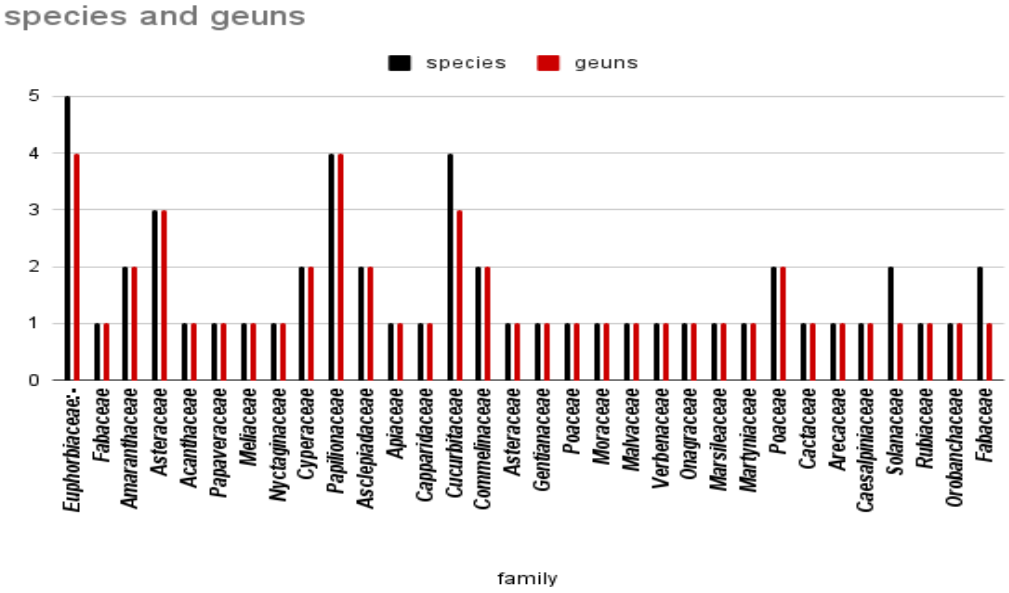

Fig 1: Graphical representation of the plants families Vs Genus and Species

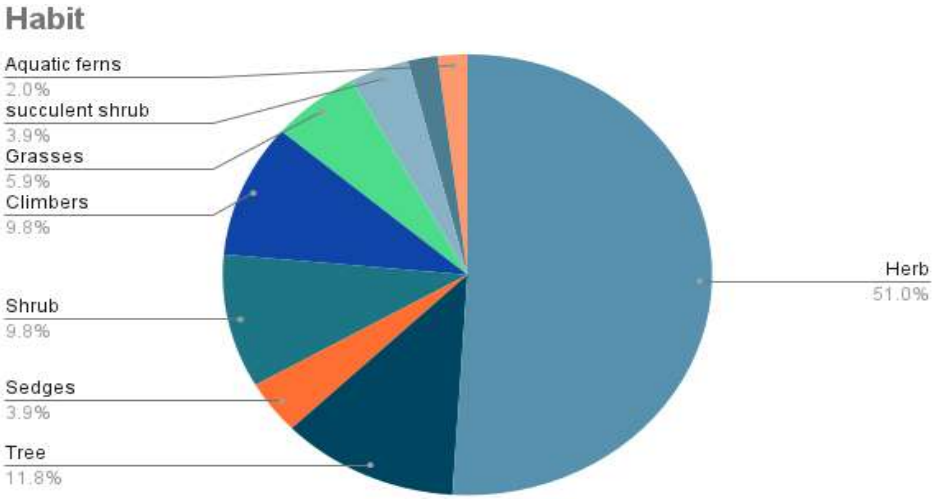

Fig 2: Graphical representation of the plant habit

V. DISCUSSION

This survey of aquatic and wetland angiosperms in Son Vadiya Village reveals a remarkable diversity of 51 species, demonstrating the ecological richness of this habitat. This diversity spans various families and growth forms, including herbs, climbers, shrubs, and trees, each contributing to the ecosystem's overall health and

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functionality.

Diversity and Distribution

Among the documented species, the *Euphorbiaceae* and *Papilionaceae* families are particularly prominent, showcasing their adaptability to wetland conditions as shown in Fig.1. Notable species like ***Acalypha indica*** and ***Alysicarpus vaginalis*** highlight the area's rich herbaceous layer, which provides critical habitat for numerous fauna. The presence of ***Bolboschoenus maritimus*** and ***Cyperus alternifolius*** emphasizes the importance of sedges in stabilizing soil and supporting biodiversity in aquatic ecosystems. As shown in Fig. 2 herbaceous species are dominating in the habitat with 51% while second highest is trees with 11.8% and climbers as well as shrubs are thirld largest group of the species with 9.8% found in the area.

Ecological Significance

The variety of growth forms, including the tree species ***Azadirachta indica*** and ***Ficus benghalensis***, plays a crucial role in nutrient cycling and habitat provision. These trees not only offer shade and shelter but also support various wildlife, contributing to a balanced ecosystem. Furthermore, the inclusion of climbers such as ***Clitoria ternatea*** and ***Momordica charantia*** adds structural complexity, enhancing the habitat's diversity and resilience.

Invasive Species Concerns

It is essential to address the presence of invasive species such as ***Lantana camara*** and ***Parthenium hysterophorus***, which pose threats to local biodiversity. Their ability to outcompete native flora can lead to significant ecological shifts, underscoring the need for ongoing monitoring and management strategies to mitigate their impact.

The documented species in Lehri sagar Lake illustrate the rich biodiversity and ecological significance of its aquatic and wetland ecosystems. Continued research and conservation efforts are paramount to safeguard this natural heritage and enhance its resilience in the face of environmental challenges.

VI. CONCLUSION

In summary, the floristic survey of Lehri Sagar Lake reveals a vibrant assemblage of 51 angiosperm species, illustrating the ecological significance of this wetland habitat. The dominance of diverse herbaceous plants alongside trees and climbers contributes to a complex ecosystem that supports various forms of wildlife. However, the encroachment of invasive species poses a serious threat, necessitating immediate conservation strategies. Continued research and community engagement are crucial for preserving this vital resource and ensuring the ecological integrity of Gujarat's wetlands for future generations. This study serves as a foundational reference for ongoing biodiversity assessments and conservation planning in similar aquatic environments.

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