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Study the Wetland Plant Diversity Of Wainganga Riverine Area of Bhandara District, Maharashtra

Arvind Dhargawe [1], Dr. Mrunal kale [2]

[1]*Student in Centre for higher learning and research and specialized studies, Department in Botany, Ananad Niketan College, Warora*

[2]*Professor in Centre for higher learning and research and specialized studies, Department in Botany, Ananad Niketan College, Warora*

Abstract – Diversity of living organisms is most important for survival of any Ecosystem , different Ecosystem show huge diversity of flora and fauna, Wetlands is one of the crucial habitat for carrying plant diversity.The present study based on study of wetland plant diversity of different regional specification, upstream and downstream of Wainganga River in district Bhandara, Maharashtra India. According to state forest department of Maharashtra has identified 507 wetlands for taking up conservation and management, out of that 83 wetland estimate in Bhandara district.

Bhandara Riverine area was selected as wetland site on date 21 Jun 2022. In studied found Wetland is a zone present near the surface of water and it contains huge effective diversity of flora fauna, and it provides ecosystem services. A study was conducted to record the diversity of wetland plant, Total 86 wetland plant species identified belonging to 36 plant families.

***Key Words*:** Wetland, Ecosystem, Conservation, Flora, Pauni, Bhandara, Diversity.

1. INTRODUCTION

Earth has different type of diversity of flora and fauna. All type of organism directly or indirectly depends on each other to complete their life cycle. Biodiversity plays vital role in environment, to provides all the life sources of different organism for survival in nature, it is all diversity depend on that Habitat of any ecosystem. Wetlands are amongst the most productive ecosystems in the world (Ghermandi et al.,2008.) it provides harbor diversity of flora and fauna. They are also important for transformation of nutrient water retention, flood control, Ground water recharge and storm buffering, and maintenance of biodiversity, Wetlands are the transitional areas between terrestrial and aquatic systems where the water table is at or near the surface, or the land is covered by shallow water. (According to Cowardian et al.)

Wetlands include mangroves, peatland and marshes, rivers and lakes, deltas floodplain, and flooded forest, rice fields and even coral reefs. They provide numerous environmental, economic, cultural, recreational, aesthetic, and ecological benefits to society. The diversity of plant of any wetland depends upon the water quality, soil composition, area of landscape and the vegetation around the wetland for the survival of the species (Buckton, 2007). Vegetation controls soil erosion by eliminating flowing forces of waves at the shoreline unlike seas and ocean; which facilitates sedimentation (Chaves and Lakshmanan, 2008). Present study Carrie out the study of plant diversity area of Wainganga River Bhandara.

Study site: Selection of site is the most important task for any developing and monitoring program (Kentula et al. 1993). Some important criteria were use for site selection like determination of the ecological and socioecological factors. the study site located in Wainganga River in Bhandara district, it covers an area of about 368.7 km in Maharashtra state and lies between 20°.38’ and 21°.36’ North latitudes and 79°27’ to 80°.06’ East longitudes. it is known as most popular reservoir of Maharashtra, all zones of Wainganga’s River have well drainage system in the form of ponds and streams towards the water reservoir. The annual average rainfall of the area is 900 mm.

Material and Method: The study area was selected based on preliminary survey and ecological variables viz. altitude, rainfall gradient, vegetation type, land use, polluted / unpolluted, dams, etc. with regular field visit in specific interval of time in the year of 2022 -2023. Study conducted three different seasons; winter (November to February), summer (March to May) and monsoon (June to September) to observe and collect plant species and were identified with the help of respected regional flora. And classified into - Submerged, Free Floating, Floating.

2. LITERATURE SURVEY

Wetlands are vital ecosystems that provide numerous ecological services, including water filtration, flood control, and habitat for diverse flora and fauna. The Wainganga River, flowing through the Bhandara district in Maharashtra, hosts a variety of wetland habitats that are critical for maintaining regional biodiversity. This literature review focuses on the plant diversity in these wetlands, examining existing research, identifying gaps, and suggesting directions for future studies.

Previous Studies on Wetland Plant Diversity in India

General Overview: Various studies have been conducted on the wetlands of India, highlighting the rich biodiversity and the ecological significance of these ecosystems. For instance, Gopal and Chauhan (2006) provide an extensive overview of the biodiversity and conservation status of Indian wetlands.

Regional Studies: Studies specific to Maharashtra, such as those by Kulkarni et al. (2004) and Deshmukh and Sharma (2007), have documented the plant diversity in different

wetlands across the state. These studies emphasize the need for conservation due to the threats posed by human activities and climate change.

Methodological Approaches: Research methodologies vary from floristic surveys, remote sensing, and GIS applications to molecular techniques for understanding genetic diversity. Prasad et al. (2002) utilized remote sensing and GIS to map and analyze wetland vegetation in Maharashtra.

Wetland Plant Diversity in Wainganga Riverine, Bhandara District

Floristic Composition: Studies like Mishra et al. (2012) have documented the floristic composition of wetlands along the Wainganga River, identifying key species and their ecological roles. The presence of aquatic and semi-aquatic plants such as Typha angustifolia, Nymphaea nouchali, and Eichhornia crassipes has been reported.

Ecological Significance: The wetland plants in the Wainganga Riverine area play a significant role in supporting local fisheries, providing fodder, and maintaining water quality. Raut et al. (2015) highlighted the importance of these plants in local livelihoods and their potential in phytoremediation.

Threats and Conservation: The wetlands in the Bhandara district face threats from agricultural runoff, pollution, and encroachment. Jadhav and Wagh (2018) discussed the impact of these threats on wetland biodiversity and suggested conservation strategies such as community involvement and sustainable management practices.

Gaps in Existing Research

While there is a considerable amount of research on wetland plant diversity in Maharashtra, specific studies focusing on the Wainganga Riverine wetlands are limited. There is a need for comprehensive studies that:

- Conduct detailed floristic surveys to document plant species diversity and abundance.
- Assess the impact of anthropogenic activities on wetland health.
- Explore the role of wetland plants in ecosystem services and their potential in bioremediation.
- Involve local communities in conservation efforts and sustainable management practices.

3. RESULT

Regular interval of field visit of Wainganga River of Bhandara from different zone throughout the year of different season and observation, collection and identification of plant specimen done with respect regional flora. The statistical analysis of the floristic components also carried out. studied found diversity of wetland plant, Total 86 wetland plant species identified belonging to 36 plant families. During studied found some of the most predominant wetland plant diversities are, Pistia, Azolla, Hydrilla, Utricularia, Azolla, Ipomea, Lemna, Trapa, Eichhornia, Nelumbo, Parthenium heterophorias, Alternanthera, Alternanthera so there are many dominant species observed in different habitat like Wet patches, Open water, Marshy places, Mud patches, Margin Lake, on that basis plant classified into floating free floating and submerged.
According to ecological classification, most of the plant species observed in submerged habitat like hydrilla , Vallisneria, Oryza rufipogan, some are free floating e.g. pistia azolla, nelumbo, lotus .all of this given in table.

Table no.1- Floristic diversity of wetland belonging to different morpho-ecological Plant Family and habitat .

BOTANICAL NAME	FAMILY	HABITAT
Cynodon dactylon	Poaceae	Wet patches
Phalaris arundinaceae	Poaceae	Wet areas
Oryza rufipogan	Poaceae	Open water
Paspalidium flavidum	Poaceae	Wet Patches
Pennisetum pedicellatum	Poaceae	Mud patches
Paspalidium geminatum	Poaceae	Wet patches
Setaria verticillata	Poaceae	Wet patches
Themeda triandra	Poaceae	Wet patches
Eragrostis gangetica	Poaceae	Wet patches
Setaria intermedia	Poaceae	Wet land
Phragmites australis	Poaceae	Wet patches
Phalaris arundinaceae	Poaceae	Wet areas
Polypogon monspeliensis	Poaceae	Wet patches
Justicia simplex	Acanthaceae	Wet Patches
Justicia quinquangularis	Acanthaceae	Margin of lake
Justicia procumbens	Acanthaceae	Margin of lake
Hygrophyla schulli	Acanthaceae	Marshy places
Hygrophila auriculata	Acanthaceae	Mud patches
Rungia pectinata	Acanthaceae	Mud patches
Asteracantha longifolia	Acanthaceae	Marshy places
Rungia pectinata	Acanthaceae	Mud patches
Asteracantha longifolia	Acanthaceae	Marshy places
Blumea lacera	Asteraceae	Margin of lake
Caesulia axillaris	Asteraceae	Mud patches
Blumeaeri antha	Asteraceae	River bank
Wedelia trilobata	Asteraceae	Wet patches
Xanthium strumarium	Asteraceae	Riverbank
Blumea lacera	Asteraceae	Margin of lake
Cyperus iria L	Cyperaceae	Open wet places
Fuirena glomerata	Cyperaceae	Marshy area

Kyllinga nemoralis	Cyperaceae	Wet Patches
FImbristylis ferruginea	Cyperaceae	Wet patches
Fimbristylis aphylla	Cyperaceae	Wet patches
Striga densiflora	Scrophulariaceae	Wet patches
Sopubia delphiniifolia	Scrophulariaceae	Wet patches
Limnophila heterophylla	Scrophulariaceae	Wet soil
Buchnera hispida	Scrophulariaceae	Wet patches
Bacopa monnieri	Scrophulariaceae	Pond
Verbascum chinense	Scrophulariaceae	Margin of lake
Hydrilla verticillata	Hydrocharitaceae	Submerged
Ottelia alismoides	Hydrocharitaceae	Shallow water
Vallisneria spiralis	Hydrocharitaceae	River stream
Hydrilla verticillate	Hydrocharitaceae	Pond, lake
Vallisneria spiralis	Hydrocharitaceae	Freshwater, lakes
Egeria densa	Hydrocharitaceae	Submerged
Ipomoea fistulosa	Convolvulaceae	Wet patches
Ipomoea carnea	Convolvulaceae	Wet areas
Evolvulus alsinoides	Convovulaceae	Pantropical
Ipomoea aquatica	Convolvulaceae	Wet patches
Amaranthus viridis	Amaranthaceae	Margin of lake
Celosia argentea	Amaranthaceae	Wet area
Alternanthera sessilis	Amaranthaceae	Mud patches
Achyranthes aspera	Amaranthaceae	Moist, shades areas
Nechamandra alternifolia	Polygalaceae	Under water plant
Polygonum glabrum	Polygalaceae	Marshy land
Polygala arvensis	Polygalaceae	Wet patches
Nymphaea pubescens	Nymphaeaceae	Wet patches
Nymphae nouchali	Nymphaeaceae	Open Wetland
Nymphae pubescence	Nymphaeaceae	Open Wetland
Nymphea odorata	Nymphaeaceae	Open wetland
Nymphea alba	Nymphaeaceae	Open wetland
Solanum surrattense	Solanaceae	Well drained sandy loam
Physalis minima	Solanaceae	River bank
Solanum xanthocarpum	Solanaceae	Margin of river or lake
Cyanotis cristata	Commelinaceae	Moist soil
Commelina benghalensis	Commelinaceae	Wetpatches
Azolla pinnata	Salvinaceae	Pond, Lake, Riverline
Azolla carolianna	Salvinaceae	Pond, Lake
Potamogeton nodosus Poir	Potamogetonaceae	Wet patches
Marsilea dromomdii	Marsilaceae	Wet patches
Pistia stratiotes	Araceae	Pond, lake
Eichhornia crassipe0s	Pontederiaceae	Wet patches
Oldenlandia corymbosa	Rubiaceae	Lake
Trapa natans	Trapaceae	Ponds, canal, stream
Sagittaria trifolia	Alismataceae	Wet areas
Heliotropium supinum	Boraginacea	Winter flooded soil
Phoenix sylvestris	Arecaceae	Pond, lake
Ceratophyllum demersum	Ceratophyllaceae	Pond, Lake, Ditches
Terminalia arjuna	Combretaceae	Tropical moist region
Calatropis gigantea	Apocynaceae	Wet patches
Aponogeton natans	Aponogetonaceae	Wetland and Rice field
Populus deltoitds	Salicaceae	Wet patches
Najas minor	Najadaceae	Open water
Didymosphenia geminata	Gomphonemataceae	Open water
Acorus calamus	Acoraceae	Marshes, Pond
Myriophyllum spicatum	Holoragaceae	Lakes, Pond

- Graph show the number of plant family and plant species

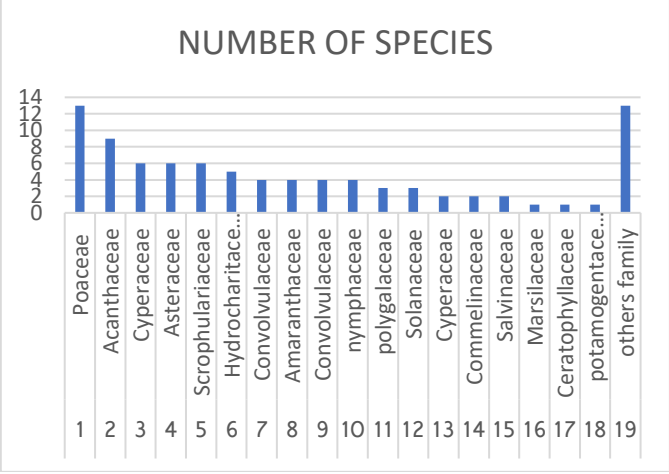

Fig -1: Number of Plant Family & Plant Species

- Graph-show Classification of plant species into Submerged, Free Floating, Floating.

Habitat	Submerged	Free Floating	Floating

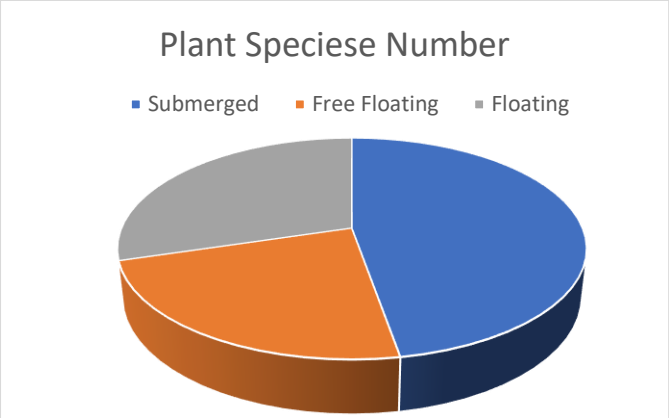

Fig -2: Classification of Plant Species

4. CONCLUSION

The wetlands of the Wainganga Riverine in Bhandara district are rich in plant diversity and play a crucial role in the regional ecology and local livelihoods. However, these ecosystems are under threat from various human activities. There is a pressing need for detailed and focused research to understand the plant diversity of these wetlands better, assess the impacts of threats, and develop effective conservation strategies. Future studies should employ a combination of traditional and modern scientific techniques and actively involve local communities in conservation efforts.

Ecosystem identified of their special identity like diversity of flora and fauna, same wetland area of Bhandara Wainganga river observed more different plant species belonging to different plant families. during studied found that wetland plant diversity depends in their composition of water and soil, it creates most special type of habitat, and this is required for plant to complete their life cycle. Every plant required special habitat for survival, some of the plant found in zone of wetland like submerged, floating, and free floating.

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