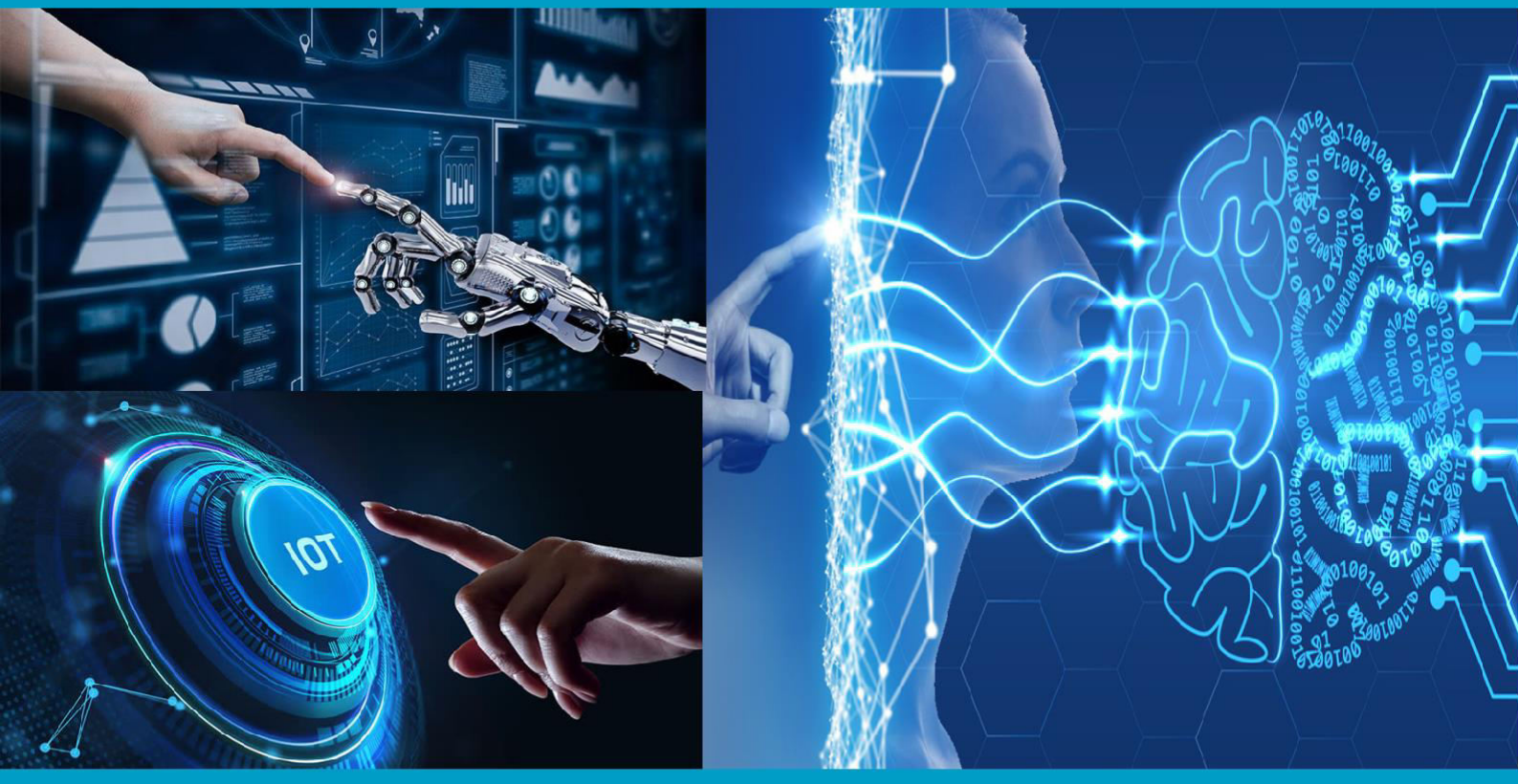
IJMRSETM

e-ISSN: 2395 - 7639



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

Volume 10, Issue 7, July 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.580

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International Journal of Multidisciplinary Research in Science, Engineering, Technology & Management (IJMRSETM)

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.580| A Monthly Double-Blind Peer Reviewed Journal |

| Volume 10, Issue 7, July 2023 |

Aquatic and Marshy Plants of Uttar Pradesh India and their Ecological Importance

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ABSTRACT: As producers, aquatic and marshy angiospermic plants are most important component in aquatic and wetland ecosystems. It is therefore necessary to record and to assess the diversity and potentiality of these aquatic plant communities. In the present study on aquatic and marshy angiosperms of Uttar Pradesh, 201 species belonging to 115 genera of 50 families were identified. Out of total 201 species, 107 were dicot species belonging to 65 genera of 33 families while 94 species were monocot belonging to 50 genera of 17 families. During the survey of studied area Ceratophyllum submersum L. was first time reported from Gangetic plain. Two species were found to be new record for Uttar Pradesh viz. Alternanthera philoxeroides (Mart.) Griseb. and Synedrella vialis (Less.) A. Gray while Ranunculus cantoniensis DC. was found to be extending its distribution in Uttar Pradesh.

KEYWORDS: plants, Uttar Pradesh, ecological importance, India, Gangetic plain, communities, wetland ecosystems, species and genera

I.INTRODUCTION

Habitat improvement and conservation is a key factor for conservation and management of wildlife and biodiversity. This is being done through Integrated Development of Wildlife Habitats in all wildlife and bird sanctuaries. Specific projects include Project Tiger in Dudhwa and Pilibhit Tiger Reserves, Project Elephant in Shivalik, Bijnore and Najibabad forest divisions, Lion Safari Park and BabbarSher Fertility Centre in District Etawah, Shaheed Chandra Shekhar Azad Bird Sanctuary Nawabganj (Unnao), Sandi Bird Sanctuary (Hardoi) and Lakh Bahosi Bird Sanctuary (Kannauj). Plant species IndopiptadeniaOudhensis, which is on the verge of extinction has been declared as prohibited species, and Ghariyal Rehabilitation Centre, Lucknowhas been notified as a Biological Heritage Site under the Biodiversity Act, 2002.[1,2]

Public participation for wildlife and biodiversity conservation is essential if it is to be broad-based and sustainable. The UP State Biodiversity Board has constituted all the Biodiversity Management Committees (BMCs) at the Gram Sabha level under Biodiversity Act, 2002 in 9 agro-climatic zones of the state. People's Biodiversity Registers (PBR) are being prepared at the Gram Sabha level to inventorise biological resources in different agro- climatic zones, in consultation and collaboration with Biodiversity Management Committees (BMC). Tiger and Saras Conservation Societies have been formed for conservation and constant monitoring of the tiger and saras population in the state.

Sustainable use of bio-resources is being promoted through promotion of eco-tourism in protected areas, for which the Eco-tourism Policy was formulated in 2014. This includes strengthening of forest rest homes and internal routes in Dudhwa National Park and other protected areas.

The state's wetland management approach rests on conservation of existing wetlands, pollution control and improved water use efficiency.[3,4]

The National Plan for conservation of aquatic ecosystems is being implemented in 13 specified wetlands. In addition, Department of Agriculture is promoting khettalabs and renovation of ponds and other water bodies for storing rain water and recharging groundwater.

The National Ganga River Basin Authority (NGRBA) has been constituted with the mandate that by 2020 no untreated municipal sewage or industrial effluents will be discharged into River Ganga. The Ganga Action Plan Phase-II, under the National River Conservation Programme of Government of India, covers river pollution control works in 23 towns situated on the banks of rivers Ganga, Yamuna and Gomti. For treatment of domestic effluent the state has 44 sewage treatment plants (STPs) that are achieving the prescribed norms, 20 STPs that are operational but not achieving the norms, 6 STPs that are installed but not operational, whereas 3 STPs have started operation on trial basis. 15 new STPs are proposed in the state. Industrial pollution control measures include implementation of Zero Liquid Discharge norms for distilleries and agro-based pulp and paper units, minimum water consumption norms in sugar industries and chemical recovery systems for black liquor from paper and pulp industry and chrome recovery for tanning industry. Water quality monitoring is being done by the UP Pollution Control Board at various water resources like rivers, ponds, lakes and ground water in a total of 91 locations (53 for surface water and 38 for groundwater) under National Water

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Quality Monitoring Programme (NWMP) as per the Central Pollution Control Board (CPCB) guidelines. Simultaneously bio- monitoring is being conducted in River Ganga at 4 locations and in River Gomti at 13 locations.

Improved water use efficiency is being promoted through implementation of norms for ferti-irrigation of treated industrial effluents, recycling of treated sewage, promotion of crops whose water requirement is low for water scarce areas, such as oilseed and pulses in Bundelkhand and millets in central UP, laser land 2502aximiza, 2502aximization of water use efficiency by using sprinkler and drip irrigation system and promotion of non-governmental groups to encourage water conservation and improved water management systems.

II.DISCUSSION

The state has been conservative in setting targets for all areas of terrestrial ecosystem conservation and restoration. If more ambitious targets are to be embraced, resources in the form of finances, trained human resource, land availability, effective monitoring mechanisms, etc. will be required. The state thus envisages the following strategies:

Target 1.1

By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services. In particular, forests, wetlands, mountains and dry lands, in line with obligations under international agreements.

The state will adopt the National Wetland Strategy that has been formulated as part of the Capacity 21 project. The state is in process to constitute a Pond Development Authority for conservation, development and protection of water bodies. The objectives of the strategy are:

Conservation and management, prevention of loss and restoration and sustainable use of wetlands.
Planning, managing and monitoring of wetlands.
Use of wetlands in community land without changing the wetland status and ecosystem.
Participation of stakeholders.
Amending legislation, inter-ministerial responsibilities and cross sectoral coordination.
Capacity building in government and other institutions.
Public and corporate awareness and international cooperation.
Researching the dynamics of wetland ecosystems for preparing management strategies for mitigation of problems like uncontrolled growth of weeds and pollution and also in the restoration of wetlands. Research to also cover study of economic value and benefits of wetlands.
Pursuant to the Ramsar Convention on Wetlands 1981, the Bijnor to Narora belt of River Ganga is being adopted for conservation of ecological character.
Sharing the interstate water by interlinking rivers and water bodies.
To reduce fertiliser run-off and consequent pollution of surface water bodies, creating awareness on more efficient irrigation systems as opposed to flooding.
Construction and operationalisation of sewage treatment plants to cover all municipality areas.
Establish online effluent quality monitoring network covering all industrial units requiring environmental clearance.
Intensive and continuous campaigns for awareness on all water related aspects – the real worth of water, health and economic losses due to polluted water, wastages and shortages.

Target 1.2

By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally[5,6]

Promotion of agroforestry by targeting planting of 1 crore saplings every year across the state under the National Agriculture Mission.
To maximise participatory forest management in reserve forest and protected forest areas by increasing participation in Joint Forest Management and Eco-Development Committees. Funds to be sourced from external funding agencies, Government of India and state government.
Undertakingmeasurestoimproveproductivity of forests by ensuring that certified seeds and high quality planting material are used.
Use of improved nursery management techniques in all nurseries (about 700) and plantations (about 6,000) of Department of Forest.
Support LPG distribution and biogas promotion schemes to reduce pressure on fuelwood use by poors.
Develop a Forest Management Information System for better management of forest resources.
Digitisation of data on forest boundaries.

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Target 1.3
By 2020, combat desertification, restore degraded land and soil including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world

Mapping of degraded community lands.
Extension of land reclamation/soil improvement activities to all degraded land areas in 25 selected districts.
Increasing agricultural production and productivity by improving efficiency and soil health.
Reduce cost of cultivation by way of better crop management, use of cost effective locally available inputs and adoption of new technologies.
Promoting agriculture based industries in order to make landless labour self-dependent and decrease dependency on agriculture.

Target 1.4
By 2030, ensure the conservation of mountain ecosystems, including their biodiversity in order to enhance their capacity to provide benefits that are essential for sustainable development.

Target 1.5
Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and by 2020, protect and prevent the extinction of threatened species.

Effective implementation of Biological Diversity Act 2002, Biodiversity Rules 2004 and Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations 2014 at Gram Sabha level/grassroots level.[7,8]
Bring commercial utilisation of bio-resources within the ambit of Biological Diversity Act 2002, BiodiversityRules 2004 and Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations 2014 so that there is harmony between sustainable growth, availability of bio-resources and their commercial utilisation.
Notification of Biodiversity Heritage Sites for in-situ conservation of flora and fauna.
Mapping of wildlife and biodiversity and digitisation of baseline data of flora and fauna (People's Biodiversity Register) of the 9 agro- climatic zones of the state.

Conducting baseline survey of flora and fauna in the Vindhyachal and Bundelkhand regions of Uttar Pradesh for biodiversity conservation in mountain ecosystems, with participation of Botanical Survey of India and Zoological Survey of India. The findings of Botanical Survey of India and Zoological Survey of India to be applied for protection, preservation, rehabilitation and introduction of those species which are on the verge of extinction/ endangered.
Strengthening capacity (human and financial resources) of existing four Forest Research Centres (Varanasi, Bareilly, Gorakhpur and Lucknow).

-situ and ex-situ conservation of endangered flora and fauna.
Undertake measures to check ground fire through division level quick response teams; local villagers to be educated through all joint forest management committees for supporting quick response teams.
Protection of forests by checking illicit felling of trees, illicit mining and encroachment, with the help of regular and intensive monitoring and patrolling; participation of villagers to be encouraged through joint forest management committees/eco-development committees.

Participatory forest management through existing 2683 joint forest management/eco- development committees.
Further development of eco-tourism in wilderness areas including national parks, wildlife and bird sanctuaries, creating employment opportunities in hospitality sector for local people.

Promote awareness for forest and wildlife conservation in school children by organising competitions and visits for children to wilderness areas including wildlife parks and sanctuaries.

Creating in-situ biodiversity banks by protecting and controlling access to areas earmarked for live gene banking.
Explore possibility of allocation of part income from royalty/proceeds from forest resources for biodiversity conservation, or from other agencies like National Biodiversity Board.

Prevention of fragmentation of forest areas andprotected areas (wildlife areas) and recreating forests where fragmentation has already taken place& re-establishment of the proper corridor.
Ensure conservation of endemic species.[9,10]

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Target 1.6

Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.

Participatory forest management will be promoted by strengthening local institutions like self-help groups to ensure socio-economic sustenance of people of forest fringe villages. More than 2,800 existing self-help groups will be supplemented by more such groups in future.

Implementation of Biological Diversity Act 2002, Biodiversity Rules 2004 through Biodiversity Management Committees at Gram Panchayat level and at other (urban and rural) local bodies.
Support sectoral departments in forming an integrated mechanism at district level, directorate level and at government level to implement the Guidelines on Access to Biological Resources and Associated Knowledge and Benefits Sharing Regulations 2014. This shall ensure fair and equitable sharing of the benefits arising out of the commercial utilisation of genetic and biological resources.[15,16]

Transfer accrued benefits to bio-resource growers to incentivise protection, preservation, growth and regeneration of bio-resources.

Explore avenues for raising resources through payment for ecosystem services for local populations, thereby incentivising their participation in better management of forest resources.
Launch the multiple/vertical canopy afforestation scheme so that optimum biodiversity may be raised in a scarce available space. This includes grass and herbs at lower canopy level, dwarf trees and shrubs at midcanopy level and tall trees for top canopy level so that optimum utilisation of land takes place and diversity of bio-resources is enhanced.
Development of animal husbandry, dairy, poultry, fish-culture, apiculture, horticulture, aquaculture, sericulture and mushroom cultivation.
Encouraging development of infrastructure at rural level for supply of quality inputs, transportation and marketing of goods to enable equitable sharing of benefits of biological resources.

III.RESULTS

Target 1.7

Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products .

Protection of forest by checking illicit felling of trees, illicit mining and encroachment.
Development of natural habitats for breeding and protection of birds.
Development of forest management information system (MIS) based on geographical information system (GIS).
Establish, activate and strengthen division- level quick response teams to resolve human- animal conflict.
Use of unmanned airborne vehicles (UAV), sensors, satellite based monitoring/tracking protocols.
Undertake fencing of forest tracts in phased manner to reduce incidences of poaching and illegal felling.
Undertaking Forest Certification for sustainable harvesting of forest resources.

Target 1.8
By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

Adopt National Wetland Strategy under Capacity 21 project for researching the dynamics of wetland ecosystems, preparing management strategies for mitigation of problems like uncontrolled growth of weeds and pollution and restoration of wetlands.
Undertake measures for eradication of invasive alien species like lantana, water hyacinth and ipomoea, etc.,for better health of the forest.

Target 1.9

By 2020, integrate ecosystems and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

Implement Rashtriya Gram SwarajAbhiyan (RGSA) to facilitate Panchayati Raj Institutions to develop governance capabilities to deliver on the Sustainable Development Goals. Towards this, the state will invest in the capacity building of elected representatives and government functionaries at Gram Panchayat level on Gram Panchayat Development Plan exercise so that planning for afforestation and biodiversity conservation are included in the GPDP.

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Undertake regionalisation of agricultural research, and support research and development (R&D) on frontier areas of science like biotechnology, gene engineering, remote sensing technologies and pre- and post-harvest technologies.
Support development of technologies to improve understanding of water resources and their management and to get the most value out of the water cycle.
Incorporate green accounting in budgeting and evaluation of all government programmes.
Participatory approach to urban plantations by coordinating with urban local bodies and residents.[11,12]
Organising annual workshops and bi-annual trainings at division level for state departments and civil society organisations with the support of experts.
Involve educational institutions of repute for evaluating ecosystems and biodiversity values in monetary terms. This will help in development of one uniform financial parameter for incorporation into national and local planning, development processes, poverty reduction strategies and accounts.
To ensure that the knowledge, the science base and technologies of biodiversity and its values, functioning, states and trends and the consequences of its loss, are widely shared, transferred and applied among all stakeholders.
Allocating and developing mechanisms for channelising 2% of the ecosystems and biodiversity economic values in monetary terms for sustainable development of bio- resources.

Target 1.a
Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.

All activities and projects listed above require financial support. Funding is currently being provided by the Government of India, NABARD, Government of Uttar Pradesh and International Donor Agencies like JICA. Efforts will be made to increase the funding from national, state and international sources.
Resources will be mobilised from the public for agro-forestry (for plantation of about 16 crore seedlings, i.e., 1 crore yearly). Ultimately this will help to increase the income of farmers.
Raise additional finances through enhanced royalty from sale of timber harvested from certified forest areas and other value additions.
Explore raising funds for forest management through REDD/REDD+ and CDM mechanisms.
Tap corporate social responsibility (CSR) funding for urban and rural forestry activities.
Explore raising a corpus of funds through the polluter-pays principle. The funds may be deployed for compensatory afforestation.[13,14]

IV.CONCLUSIONS

Benefit of marsh ecosystem to environment is just because its home-shelter for plenty of species and plants. It usually found at edge of lakes, River basin and wet areas. Marsh land is to save environment and Ground Water. A marsh is a wetland that is dominated byherbaceous rather than woody plant species.

Here we find some interesting facts about Marshland Ecosystem.

Wetland species:

1. Marshes provide habitats for many kinds of invertebrates, fish, amphibians, waterfowl and aquatic mammals.

2. wetland plant species formed by grasses, rushes or reeds.

3. Marshes provide a habitat for many species of plants, animals, and insects that have adapted to living in flooded conditions and the plants which survive in wet mud with low oxygen levels.

4. Aquatic animals, fish to salamanders, are generally able to live with a low amount of oxygen in the water.

5. Some can obtain oxygen from the air instead, while others can live indefinitely in conditions of low oxygen.

Types of wetlands:

6. The three main types of marsh are salt marshes, freshwater tidal marshes, and freshwater marshes.

7. These three can be found worldwide and each contains a different set of organisms.

8. Marshes also improve water quality by acting as a sink to filter pollutantsand sediment from the water that flows through them.

9. Marshes and other wetlands are able to absorb water during periods of heavy rainfall and slowly release it into waterways and therefore reduce the magnitude of flooding.

10. The pH in marshes tends to be neutral.

11. Wetlands are areas of land where the water level remains near or above the surface of the ground for most of the year.

12. Wetlands cover about 8% of the earth's land surface.

13. Marshland are several kinds of wetlands such as marshes, swamps, lagoons, bogs, fens and mangroves.

14. Marshland is home to some of the richest, most diverse and fragile of natural resources.

15. Marshland support plenty of plants and animals life, biologically they are one of the most productive ecosystems.[17,18]

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Impact Factor: 7.580

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