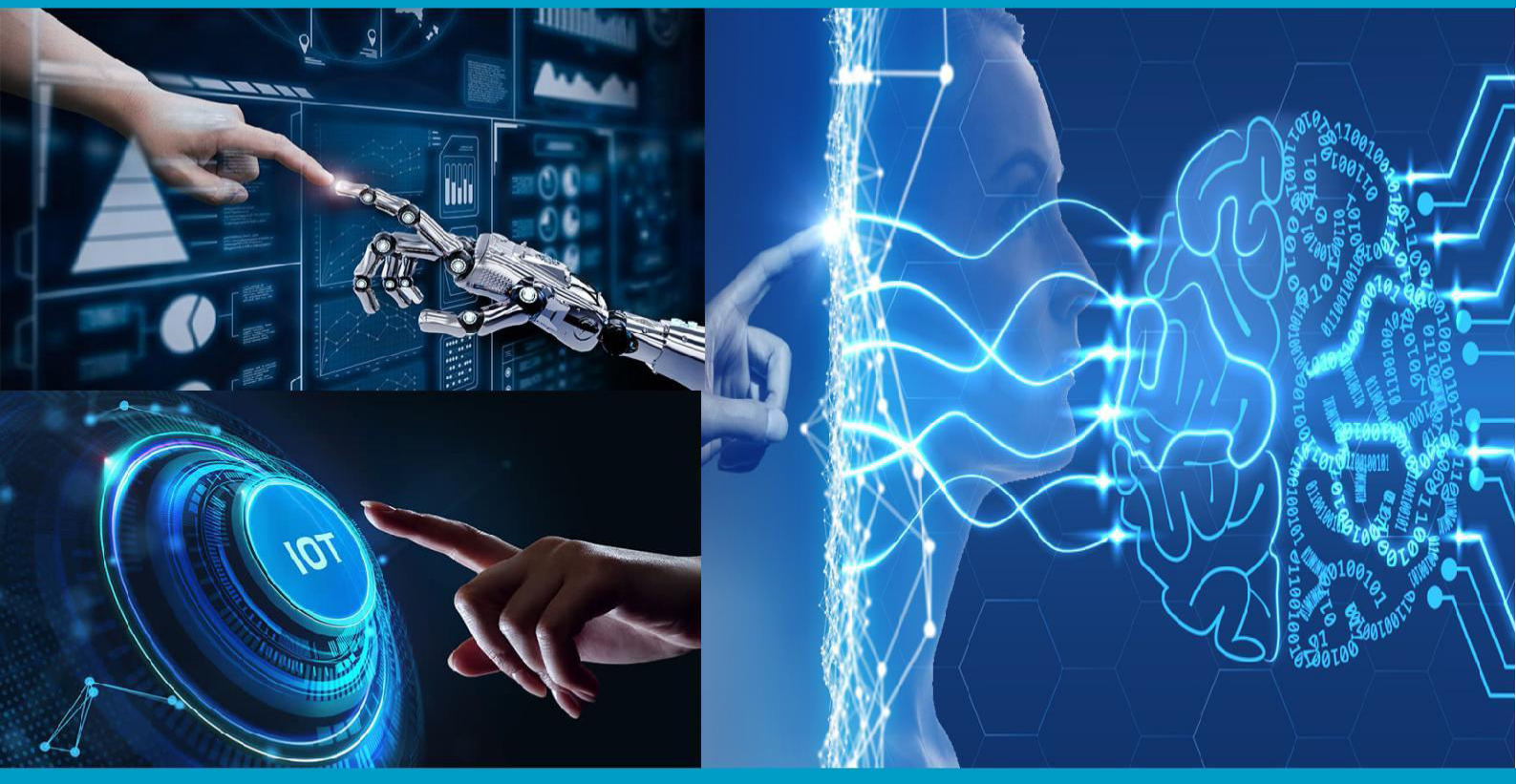
IJMRSETM

e-ISSN: 2395 - 7639



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

Volume 9, Issue 3, March 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.580

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

| Volume 9, Issue 3, March 2022 |

Phytoremedies for Restoring Wetland and Biodiversity Conservation in the Study Site along the Kali Nadi

Dr. Suresh Kumar

Assistant Professor, Dept. of Botany, Govt. PG College, Fatehabad, Agra, Uttar Pradesh, India

ABSTRACT:

• Healthy rivers are important for people and nature, but much historic damage has caused serious problems that now need to be addressed as a matter of urgency.

• Kali Nadi restoration is important for achieving biodiversity conservation and sustainable development.

• Working with nature allows us to achieve many otherwise conflicting objectives.

• Kali Nadi restoration, working with natural processes and natural flood management, is a cost-effective response to changing climate.

I. INTRODUCTION

The exploitation of Kali Nadi by humans has led to widespread degradation of their natural character, resulting in a loss of characteristic habitat, biodiversity and the benefits we rely on. The extent of alteration justifies the need for river restoration alongside measures that conserve them to prevent further damage. Kali Nadi restoration should aim to reinstate characteristic river habitat and biodiversity. It can be defined as: the re-establishment of natural physical processes (e.g. variation of flow and sediment movement), features (e.g. sediment sizes and river shape) and physical habitats of a river system (including submerged, bank and floodplain areas). Restoring water quality and removing invasive species are equally important for the recovery of kali-nadi habitat and biodiversity but these issues are not the focus of this report. River restoration has become a prominent strand of river management; to date many projects have been undertaken. Instead of using a catchment-scale approach, most projects have been carried out at the reach scale, in lowland areas and focused on local issues. Well-planned river restoration may benefit physical habitat and biodiversity in the short term, but realising the full benefits takes longer particularly at large (catchment) scales.[1,2,3]

Restoration techniques that encourage natural processes and help kali-nadi to recover are recommended because:

It result in conditions naturally more in keeping with a given part of a river and therefore characteristic habitat that supports the expected range of plants and animals. It, result in dynamics and habitat conditions that are more resilient and sustainable than engineered channels or habitats, particularly in the face of climate change. Construction and maintenance costs are reduced as natural processes do the work of restoration and maintain the restored channel. It,is capable of restoring whole river–floodplain ecosystems rather than individual habitat elements or species. It,support the restoration of ecosystem services such as flood management.

There are four key river processes that underpin natural river habitat and biodiversity that restoration techniques should aim to restore: • Free sideways movement of river channels by erosion and deposition. • Free connections of water, sediment, organic material and biota between kali-nadi and their floodplains. • Free connections of water, sediment, organic material and biota downstream and upstream. • Natural riparian vegetation communities and the free interaction with adjacent rivers of kali-nadi.[5,7,8]

II. DISCUSSION

Create policies that support restoration

1. Ensure long-term (i.e. >5 years) provision of government-funded resources to facilitate planning, implementation and evaluation of kali-nadi restoration projects. 2. Streamline regulations and permission processes to aid implementation of small-scale, low-risk restoration projects. 3. Consider innovative

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

| Volume 9, Issue 3, March 2022 |

approaches to compensating landowners, such as land purchase, land swapping, conservation covenants and easements, and payments for alternative land use.

Provide funding for restoration

4. Encourage greater uptake of voluntary (self-funded or in-kind) work by showing the long-term benefits of river restoration, such as reduced maintenance costs and flood risk. 5. Make use of long-term funding from a range of sources that already exist including agrienvironmental schemes and grant funding. 6. Consider alternative funding sources for restoration planning and actions. These include payment for ecosystem services, developer contribution schemes and persuading food producers to invest in restoration of kali-nadi[9,10]

Devise effective plans for restoration

7. Assess processes and causes of degradation at the catchment scale to inform the implementation of the right restoration measures in the right places and at the right scale that tackle the root causes of degradation of physical habitat. 8. Adopt existing frameworks such as the REFORM protocol (4) and the designated kali-nadi restoration strategies (5) to aid decision support for planning at large scales.9.Encourage a long-term commitment to planning and implementing restoration. 10. Balance 'top-down' strategies with 'bottom-up' initiatives to use and increase existing interest and enthusiasm for carrying out restoration. 11. Assess the level of risk associated with project actions for individual cases to ensure that it is commensurate with the cost of each project(4). 12. Involve all stakeholders (landowners, river trusts, NGOs, voluntary groups and communities) at the earliest opportunity, including those that may not already be engaged in restoration, to gain support and maximise use of local knowledge. 13. Set clear and measureable project goals, while taking into account social and economic constraints.

Gather evidence and evaluate projects

Improve the evidence for the effectiveness of river

14. restoration by investing in long-term monitoring (i.e. >5 years) at selected sites. These should encompass a large geographical range and use robust scientific approaches to evaluate projects that focus on process-based approaches. Monitoring should be undertaken before restoration and afterwards for a sufficient timescale to detect both rapid and longerterm changes. Promote and implement simple and cost-effective 15. monitoring methods that can be applied across all sites (e.g. fixed point photography). Consistency in these monitoring methods is vital to ensure comparability between projects. 16. Use citizen science to provide useful information and connect people with their river environments. 17. Use monitoring evidence to evaluate projects objectively and help inform the future design and implementation of actions elsewhere. Understand how different projects are carried out so 18. that opportunities and barriers can be identified to help refine future practice[2,3]

III. RESULTS

A key concept in biodiversity conservation is identifying and safeguarding characteristic biodiversity. This means promoting the integrity of biological communities and associated habitat that would be expected for a given environment that is not adversely affected by human pressures. This is important for influencing how kali-nadi biodiversity is valued for planning river conservation and restoration actions. For example, in a physically degraded kali-nadi, whole-community diversity may be modified or even similar to that expected under unaltered conditions but would not be composed of the characteristic range of species of that particular environment. Such a system would be worthy of physical restoration to allow biodiversity to recover to its characteristic state

The following 15 key statements emerged and received strong support

• There is evidence of widespread damage to kali-nadi thus emphasising the need for a strategic approach to river restoration. • An ecosystem services approach is needed to complement biodiversity conservation in river restoration but should not replace it. • Better regulations and incentives are needed for river restoration. • 'Iconic' species can be useful vehicles for promoting river restoration concepts and projects. • kali-nadi restoration projects require long-term funding. • Businesses should be encouraged to explore options for river restoration that can reduce their costs while aiding natural processes. • We need to communicate which river restoration techniques are effective for achieving different goals. • We need to learn from and share our failures in kali-nadi restoration. • To influence politicians, landowners, and the wider public we need to demonstrate and communicate that river restoration outcomes are

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

| Volume 9, Issue 3, March 2022 |

beneficial. • kali-nadi restoration should always be discussed in the context of the whole catchment because this brings multiple benefits. • There is a need for clear, simple and targeted monitoring before and after kali-nadi restoration projects. • Lateral connectivity, including floodplain and riparian zones, should be considered more explicitly in kali-nadi restoration. • Both physical and biological processes should be considered in kali-nadi restoration. • Restoration should be seen not just as a means of replacing lost environments but as a means of protecting key resources against future change. • Synergies between different sectors need to be identified to maximise the success of kali-nadi restoration.

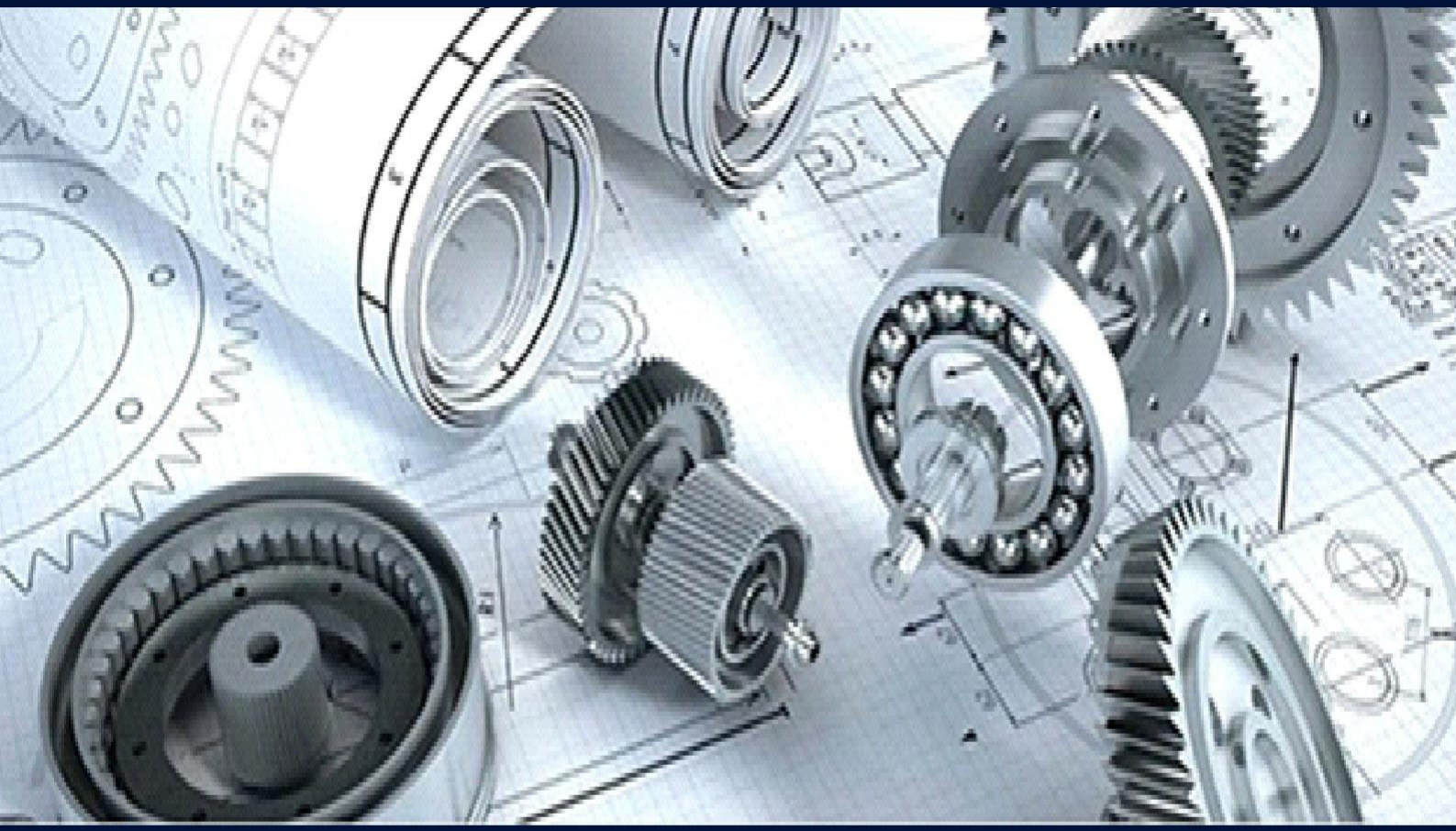
The kali-nadi, has suffered from long-standing pollution because of lack of management. Restoration was commenced to reduce pollutants and improve water quality. Four ecological areas and ten surface carriers should be constructed for the culture of plants (mainly water hyacinth (*Eichhornia crassipes*) and ryegrass (*Lolium perenne* L.)) for phytoremediation. Chemical oxygen demand (COD), total suspended solids (TSS), total phosphorus, total nitrogen (TN), ammonia-nitrogen (NH(3)-N), water transparency, and variations in phytoplankton population need to get investigated to evaluate the effects of restoration. Transparency increased should be noticed. Improvements in water quality significantly enhance the diversity of phytoplankton, which were harmed by pollution stress. Water hyacinth and ryegrass cultured in the ecological areas and the surface carriers can be used to restore kali-nadi.[5,7]

IV. CONCLUSIONS

The phytoremediation performance based on pollution removal efficiency of the highly polluted kali-nadi. The maps generated can be used to identify the highly polluted region for phytoremediation applicability assessment. Four free-floating plants can be tested in treating water samples from the highly polluted region under three different conditions, namely controlled, aerated and normal treatments. The selected free-floating plants were water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), rose water lettuce (*Pistia* sp.) and pennywort (*Centella asiatica*). The results showed that kali-nadi gets more polluted during dry season compared to raining season based on the water quality analysis. During dry season, four parameters were marked as polluted namely dissolve oxygen (DO), 4.72 mg/L (class III); ammoniacal nitrogen (NH_3-N), 0.85 mg/L (class IV); total suspended solid (TSS), 402 mg/L (class V) and biological oxygen demand (BOD), 3.89 mg/L (class III), whereas, two parameters were classed as polluted during raining season, namely total suspended solid (TSS), 571 mg/L (class V) and biological oxygen demand (BOD), 4.01 mg/L (class III). The thematic maps generated from spatial distribution analysis using Kriging gridding method showed that the highly polluted region was recorded . Hence, water samples were taken from this station of kali-nadi for pollution removal analysis. All the free-floating plants are able to reduce TSS and COD in less than 14 days. However, water hyacinth showed the least detrimental effect from the phytoremediation process compared to other free-floating plants, thus made it a suitable free-floating plants to be used for on-site treatment.[10]

REFERENCES

1. Khan, Zahoor Ali (1987). "Kali Nadi: The History of a River". Proceedings of the Indian History Congress. 48: 741–749. ISSN 2249-1937. JSTOR 44141794.
2. ^ Growse, Frederic S. (1884). "1. Bulandshahr". Bulandshahr: Or, Sketches of an Indian District: Social, Historical and Architectural. Benares: Medical Hall Press. pp. 1–2.
3. ^ Hydrology and water resources of India By Sharad K. Jain, Pushpendra K. Agarwal, Vijay P. Singh,p. 349 Springer, The Netherlands. ISBN 1-4020-5179-4.
4. ^ Pathak, Sugandha (August 2011). "No helping hand for Kali". Civil Society Online. Archived from the original on 19 April 2013.
5. ^ Jain, Sharad K.; Pushpendra K. Agarwal; Vijay P. Singh (2007). "8. Ganga basin". Hydrology and water resources of India- Volume 57 of Water science and technology library - Tributaries of Yamuna river. Springer. pp. 349–350. ISBN 978-1-4020-5179-1.
6. ^ "National Ganga River Basin Project, Design Review and Advisory Services Inception Report – Final" (PDF). Archived from the original (PDF) on 19 April 2013.
7. "Organizational history of the Ministry of Water Resources, River Development and Ganga Rejuvenation". Government of India. Archived from the original on 18 April 2015. Retrieved 19 May 2015.
8. ^ NGRBA Archived 7 October 2011 at the Wayback Machine Ministry of Environment, GoI.
9. ^ http://cpcb.nic.in/ngrba/about.html p.1.
10. ^ p.2. Composition of the Authority Archived 10 July 2012 at archive.today Ministry of Ganga Rejuvenation



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

+91 99405 72462 +91 63819 07438 ijmrsetm@gmail.com