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Harnessing the potential of ponds in India through ecosystem approach

INTRODUCTION

Moving beyond the traditional use of ponds for storing rainwater to meet the community's drinking, household, and irrigation needs, ponds are critical enablers for environmental sustainability, social well-being, and economic prosperity, especially in an agrarian society like India. However, many of India's ponds are threatened by degradation due to anthropogenic pressures.

India's water policy framework (policies, programmes, and schemes) recognises the significance of freshwater ecosystems, and the need to conserve, protect, and rejuvenate them. It provides an impetus for water conservation through integrated water management, including comprehensive improvement of water bodies, including pond rejuvenation. Such policies offer an opportunity for mainstreaming the ecosystem approach for pond rejuvenation that goes beyond the conventional form of mechanical excavation of a new water body or desilting of an

existing one, and then inundating it with externally sourced water. This approach considers ponds as ecosystems with potential for various ecological, economic, and social benefits, and accordingly, the rejuvenation plan incorporates elements related to these in its design, implementation, and monitoring.



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A community-owned pond in Madjuli in Siddhi district of Madhya Pradesh.

ECOLOGICAL, ECONOMIC, AND SOCIAL ROLE OF POND ECOSYSTEMS

Ponds are small and relatively shallow surface waterbodies whose source is either run-off from rainwater or are connected to streams, canals, channels, and natural springs. Known by different names such as *naadi* or *talaabs* in different regions of India, ponds in the form of infiltration basins have been a standard solution for storing rainwater to fulfil water needs throughout India's rich history. However, when viewed through the lens of the ecosystem approach, the benefits of these structures extend well beyond this primary role.

1. Ecological benefits of pond ecosystem

A healthy pond ecosystem is important for tackling climate change and preventing biodiversity loss. A small pond does not only recharge groundwater but is also estimated to sequester 79-247g of organic carbon per square metre annually, a rate that is 20-30 times higher than woodlands, grasslands, and other habitat types². Acting as a refuge, these ecosystems host more species than lakes or rivers at a landscape level and support the growth of flora and fauna around them.

2. Social benefits of pond ecosystem

With women traditionally playing the role of water-fetcher of their households, especially in rural areas, ponds help emancipate them from drudgery by enabling access to water near their homes. This also corrects the under-representation of women in natural resource decision-making and leadership through their engagement in water user groups, pond committees, and enterprises.

3. Economic benefits of pond ecosystem

Ponds are conventional sources of water for irrigation in agriculture. They support integrated farming methods involving fisheries, duckery, and the cultivation of water chestnuts. In urban areas, pond-related tourism and recreational activities are being increasingly studied and replicated as a means of supplementing income.

Pond rejuvenation, therefore, has significant potential as a nature-based solution³, contributing towards many of the Sustainable Development Goals (SDGs) – including but not limited to SDG 1 (No Poverty), SDG 5 (Gender Equality), SDG 6 (Clean Water & Sanitation), SDG 8 (Decent Work), SDG 13 (Climate Action), and SDG 15 (Life on Land).

CURRENT STATUS OF PONDS IN INDIA

India's first Census of Water Bodies (2022-23) registered 24,24,540 water bodies in the country, of which 14,42,993 (~60%) are ponds. The states with the highest concentration of ponds are West Bengal, Uttar Pradesh, Assam, Odisha, and Jharkhand. About 96% (13,85,882) of these ponds are in rural areas. Approximately 82% (11,81,077) of the ponds are currently in use, dominantly for pisciculture (58%), irrigation (16%), domestic/drinking (10%), and groundwater recharge (9%). About 23% of the unused ponds have dried up, while the others have been damaged beyond repair, or are unusable and unproductive due to siltation, industrial effluents inflow, salinity, and other reasons. Additionally, over two-thirds of all encroached¹ water bodies in India are ponds, with most located in rural areas.



Pilgrims and locals maintain this pond near Vindhyawasini Mata Temple at

1 Nature-based Solutions or NbS are actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

Threats to ponds in India

The rate at which ponds in India are drying or are being rendered unfit for use is alarming. Some of the risk factors for this water body are listed below:

- ◆ **Over-extraction of water:** Excessive groundwater or surface water withdrawal for various purposes reduces water levels and adversely impacts pond ecosystems.
- ◆ **Sedimentation:** Erosion, deforestation, and growth of infrastructure in the catchment areas lead to sediment run-off into the ponds, causing siltation. Excessive sedimentation reduces the depth of the ponds, impacts water quality, and disrupts aquatic habitats.
- ◆ **Nutrient loading:** Excessive nutrients from fertilisers, sewage, and agricultural runoff lead to the eutrophication of ponds (increased production of algae and certain aquatic plants), depletion of oxygen levels and destruction of the aquatic ecosystem.
- ◆ **Invasive species:** Introducing invasive plant and animal species disturbs the ecological balance of the pond ecosystem, with invasives often outcompeting the native species.



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Salkanpur that helps aquatic and other biodiversity to flourish.

- ◆ **Pollution:** Industrial discharge, untreated sewage, agricultural and other run-offs adversely affect pond water quality, risking the survival of aquatic life.
- ◆ **Encroachment:** Encroachment of the pond due to a change in land use for agriculture, housing, or other uses by a private entity affects the accessibility of the pond as a common property resource.

MISSION AMRIT SAROVAR

Launched in April 2022 – as part of the *Azadi Ka Amrit Mahotsav* – Mission Amrit Sarovar exclusively focuses on rejuvenating 75 *Amrit Sarovars* (ponds) in every district of the country to conserve water for the future². This Mission intends to create 50,000 water bodies, each with a minimum area of one acre (0.4 hectare) and minimum water-holding capacity of 10,000 cubic metres. The economic value of the ponds is recognised under the Mission through pond-based livelihood activities. On the social side, the Mission emphasises *jan bhagidari*, or people's participation at all levels through the formation of user groups. However, the recognition of ecological value is limited and restricted to the commemorative plantation of trees.

The Mission is designed to run with a 'whole of government' approach in all respects, including funding. It leverages funding from the ongoing schemes, including the Mahatma Gandhi National Rural Employment Guarantee Scheme, 15th Finance Commission grant, *Pradhan Mantri Krishi Sicchayi Yojana* sub-schemes, and other similar schemes from the State/Central governments (either individually or in combination). There is also a provision for public contributions through crowdfunding and corporate social responsibility support.

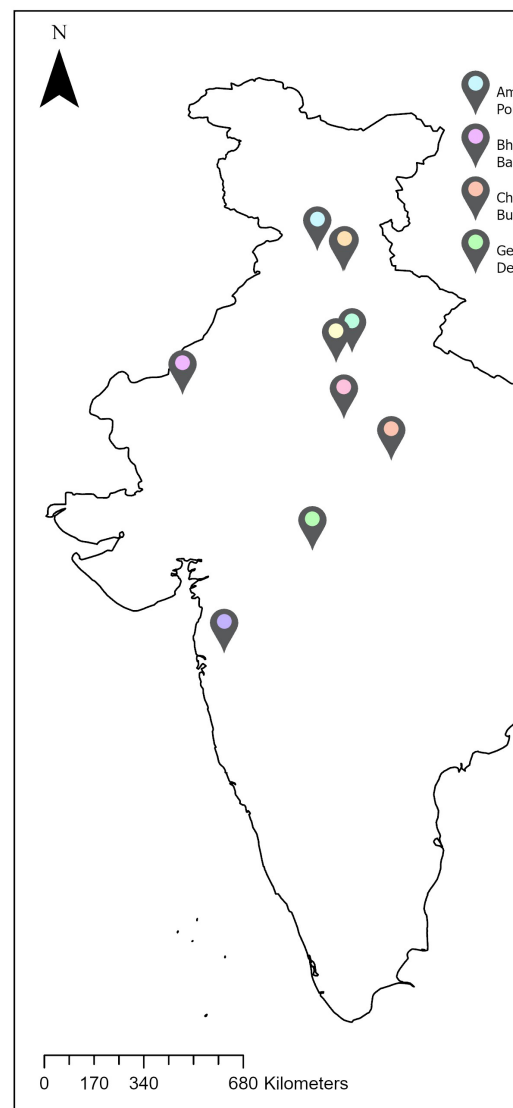
Mission Amrit Sarovar, alongside similar schemes, serves as an opportune ground for moving beyond the conventional approach to recognise the benefits of pond ecosystems and incorporate that at the designing, implementation, and monitoring stages.

2 This term is used in the context of anthropogenic activities (such as construction, farming) that imply an illegal entry into the water body boundaries.

ECOSYSTEM APPROACH TO POND REJUVENATION

The Ecosystem Approach is “a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way”³. The operational guidance for an ecosystem approach is five-fold:

1. Focus on the functional relationships and processes within ecosystems.
2. Ecosystem benefits to be maintained or restored, necessitating capacity building of local communities who are the custodians these ecosystems.
3. Use of adaptive management practices and flexibility in the implementation plan to incorporate it.
4. Effective decentralisation of management decisions through the empowerment of local stakeholders.
5. Formation of inter-ministerial bodies within the government or creation of networks for information and experience sharing.



Locations of sample ponds studied.

THE STUDY

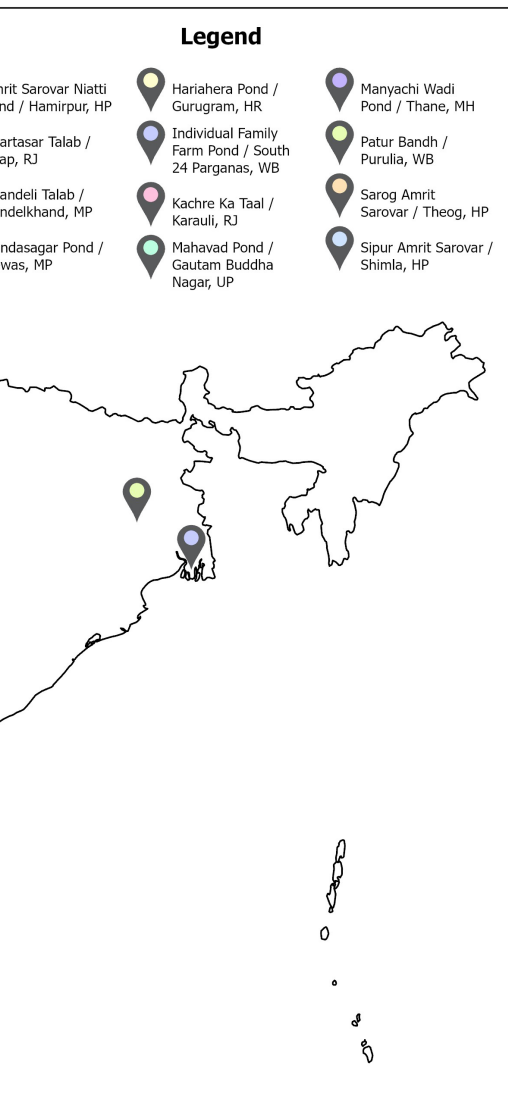
The Nature Conservancy (TNC), collaborated with Development Alternatives, to assess pond rejuvenation models, including both Amrit Sarovars and other ponds, across different climatic zones in India (see map). The study covered 12 ponds distributed across four climatic zones – moist sub-humid, dry sub-humid, semi-arid, and arid – to identify best practices from the field.

Assessment Methodology

A mixed methodology of desk research and field investigation was adopted. A review of published and grey literature, including reports by national

agencies like NITI Aayog, international agencies like Swedish International Development Cooperation Agency, and private actors operating at different levels, was undertaken to identify indicators for capturing the triple bottom line impact of pond rejuvenation. These indicators included changes in income and well-being, community participation and involvement, support for biodiversity, etc. Data was collected using a pre-designed questionnaire (based on these indicators), semi-structured interviews with the implementation/executing agencies, focus group discussions, and individual key-informant interviews with the local community.

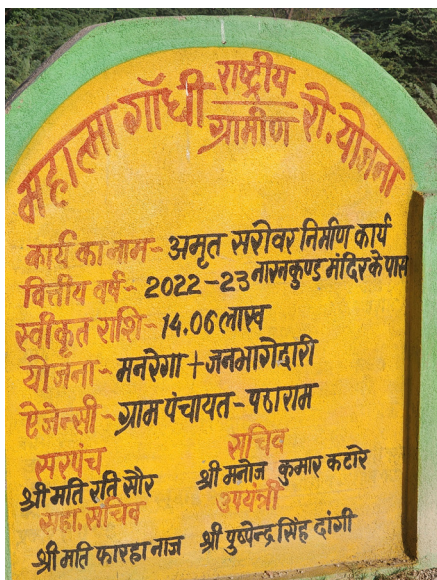
³ COP 5 Decision V/6. Accessed at <https://www.cbd.int/decision/cop/?id=7148>



Key Observations from the Study

This study of 12 rejuvenated ponds provided rich insights into the implementation strategy of the Mission Amrit Sarovar, as follows:

- ◆ Since the launch of this Mission in 2022, pond rejuvenation in many locations was either ongoing, or if completed, the pond was yet to receive water. For example, Amrit Sarovar at *Patharam* village in Bundelkhand.
- ◆ The pond area was found to be less than one acre in case of some *sarovars*, especially due to the terrain for those situated in hilly areas. For example, the Sarog Amrit Sarovar, in Theog, Himachal Pradesh (HP), had an area of only about a quarter of an acre. Similar variation was observed in other Amrit Sarovars studied in HP and was validated during semi-structured interviews with the local/state Panchayati Raj Institutions (PRIs).
- ◆ There is scope for knowledge exchange on adaptive practices within Amrit Sarovars in similar topographies. For example, the Sipur Amrit Sarovar in HP adopted a ‘catch the rain’ model to arrest surface water runoff and offers scope for replication in other Amrit Sarovars of the state.



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An Amrit Sarovar at Patharam village in Bundelkhand where physical works had been completed but the pond was yet to be filled with water at the time of the study.

CASE STUDY 1

SELF HELP GROUPS AS AGENTS OF POND GOVERNANCE

For the *Patur Band* at Purulia in West Bengal, the Development Research Communication and Services Centre (DRCSC) facilitated a 20-year lease agreement between 10 owners of the pond and the self-help group (SHG) *Maa Lakshmi Mahila Dal*. The agreement authorises the owners and the SHG to share the income in the ratio 1:2, while all community



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Patur Band rejuvenated by the DRCSC at Purulia in West Bengal.

members in the village are entitled to collect water from the pond for domestic use.

CASE STUDY 2

TANK MANAGEMENT COMMITTEE FOR LOCAL DECISION-MAKING

In Niwari district of Madhya Pradesh, the NGO Self-Reliant Initiatives through Joint Action (SRIJAN) rejuvenated the *Chandela talab* wherein more than 60% of the total investment was driven by community contribution. The agency formed a Tank Management Committee (comprising of women from the village) that now convenes regularly to discuss maintenance needs of the pond, monitors



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A convening of the Tank Management Committee of the Chandela talab in Bundelkhand.

water distribution among villagers, and takes other critical decisions regarding the use of pond water.

CASE STUDY 3

POND AS A PART OF A LARGER LANDSCAPE

The *Gendasagar* pond in Dewas district of Madhya Pradesh was rejuvenated by the NGO Samaj Pragati Sahyog by adopting a 'ridge-to-valley' approach. This consisted of afforestation efforts in the ridge areas along with the construction of contour trenches to capture water flow and enhance moisture retention in the soil. Downstream, various structures such



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The Gendasagar pond, rejuvenated by Samaj Pragati Sahyog, in the Dewas district of Madhya Pradesh.

as check dams and gabions were built to reduce water flow and prevent soil erosion, enabling the underground seepage of rainwater.

CASE STUDY 4

POND REJUVENATION FOR ECOLOGICAL AND SOCIAL BENEFITS

Mahavad pond located in Gautam Buddha Nagar, Uttar Pradesh, is an example of successful pond rejuvenation in a peri-urban area under the Mission Amrit Sarovar. Today, the rejuvenated pond serves as a habitat for many birds such as black-crowned night heron, kingfisher, common moorhen, red-naped ibis, water crow, black-winged stilt, and myna, apart from fishes, snakes, and frogs. Most of these species were not seen earlier when the pond served as a dumping ground for domestic and other waste. The rejuvenated pond is also used as a public space for village gatherings, events, and festivals.



A December 2022 satellite image of the Mahavad village showing the local ponds.

- ◆ Rejuvenated Amrit Sarovars are, in most cases, handed over to the village *panchayat* for maintenance. Interactions with the *panchayat* revealed the inadequacy of funds and the need to generate financing through community contribution, business models, and other sources.
- ◆ With regards to monitoring, the master report of Mission Amrit Sarovar had limited information

for many ponds counted under the reporting category 'total work completed'⁴.

POLICY RECOMMENDATIONS

1. Coherence in pond classification

Water being a state subject, most states classify the water bodies on parameters such as the total area covered, type of water body, location, etc. This permits a more realistic pond classification that considers the local micro-climatic variances. Yet, there is a need for coherence to the classifications adopted by various states in similar climatic zones for better targeting, implementation, and monitoring of national initiatives such as the Mission Amrit Sarovar. A guiding framework that bundles sarovars based on 'climatic zones' may be developed that allows for comparable monitoring, evaluation, and sharing of experiences.

2. Adopting a long-term vision

As a new initiative, Mission Amrit Sarovar has the potential to learn from field experience and best practices to develop a long-term vision for not just rejuvenating pond ecosystems, but also ensuring their sustainability. There is a need for a long-term monitoring and evaluation plan along with allocation of resources for its implementation. It is important to note that sustained flow of financial resources and other support is critical for not just carrying out initial pond rejuvenation works but also for upkeep and maintenance of these critical ecosystems that offer triple bottom line benefits.

3. Reinforcing focus on capacity building of PRIs

The impact of the Mission can be amplified by building the capacity of PRIs on both aspects – technical (models of rejuvenation) and non-technical (community mobilisation).

4. Innovation and knowledge sharing

Innovative practices and methods as well the traditional knowledge of water conservation, especially on pond rejuvenation, must be captured

4 Master report at <https://amritsarovar.gov.in/Masterreport>



Kachri ka talab in Jodhpur, Rajasthan

and stored in appropriate formats. Cross-learning among Amrit Sarovars in the same climatic zone is critical. At the broader national level, lessons from various sites can be properly documented and shared through the portal and the app proposed under the Mission.

5. Community engagement

Amrit Sarovars or other rejuvenated ponds cannot be managed with the resources (financial and human) available with the *Gram Panchayat*. It requires active participation of the local community including women, youth, and various disadvantaged groups. Such community engagement can be promoted by:

- (i) **revitalising local committees** to resume the responsibility of the pond, including checking the committee governance for efficacy;
- (ii) **organising public meetings** or town hall sessions to create awareness and sensitise the community regarding the importance of pond rejuvenation;
- (iii) **introducing 'citizen science' for monitoring**, through capacity building of the community on collecting regular impact data of the rejuvenated ponds; and
- (iv) **developing business models** that empower the community to leverage the economic value of the pond for income generation and contribute a part of this income towards pond maintenance.



Rejuvenated Sarog Amrit Sarovar in Sarog village of Shimla, Himachal Pradesh.

CONCLUSION

The socioeconomic and ecological value of ponds, as compared to lakes and rivers, is often underestimated. Mission Amrit Sarovar, building upon the momentum of the previous water policies, laws, and initiatives such as the Water (Prevention and Control of Pollution) Act (1974), National Water Policy (1987, revised 2012), and the Guidelines for Repair, Renovation and Restoration of Water Bodies (2009), brings greater focus on the ponds through a convergence of various ongoing initiatives in a mission mode.

The success of the Mission and other similar initiatives depends on how efficiently these initiatives adopt best practices that are based not only on theory but draw lessons from the field. The availability of adequate and timely resources, community engagement, and capacity building are the other key ingredients for success. Considering that there are more than 14 lakh (1.4 million) ponds in India, adoption of the ecosystem approach to pond rejuvenation can have a huge impact in terms of the country's ecological, economic, and social goals.

Our Partner

