

India's Pond Rejuvenation Programme

Learnings from the Mission Amrit Sarovar
Implementation in India



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Their dedicated efforts were instrumental in identifying and assessing diverse pond rejuvenation interventions across various regions of India. We express our hope that the insights provided in this compendium will serve to strengthen the models for pond rejuvenation embraced by policymakers and non-governmental agencies throughout India.



Sheep herd grazing around Bhartasar Talab, Jodhpur, Rajasthan

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Executive Summary

Water is an indispensable resource, essential for life and the sustenance of ecosystems. In India, where water scarcity and degradation of water bodies have become pressing concerns, the rejuvenation of ponds emerges as a vital solution to address these challenges. Ponds, historically embedded in the cultural and ecological fabric of the nation, play a pivotal role in recharging groundwater, supporting biodiversity, and catering to various human needs.

In this report, we present assessment of 12 pond rejuvenation interventions encompassing both Amrit Sarovars and non-Amrit Sarovars—across various climatic zones in India. We examine the implementation status, impact on triple bottom line, and opportunities for improvement. Further, we provide actionable recommendations to improve governance and implementation in the next phase of Mission Amrit Sarovar.



Chandeli Talab, Niwari District, Madhya Pradesh

This report comprises two sections. The first section delves into a policy brief, critically examining 12 pond rejuvenation interventions—encompassing both Amrit Sarovars and non-Amrit Sarovars—across various climatic zones in India. This comprehensive assessment consolidates insights into pond utility, the imperative for rejuvenation, triple bottom line impacts (economic-social-environmental), and sustainability. The aim is to strengthen Mission Amrit Sarovar's implementation by advocating for a long-term approach, enhancing local community and institutional capabilities, notably Gram Panchayats, and fostering more impactful community engagement.

The second section focuses on a compendium of pond rejuvenation interventions, presenting a comprehensive exploration of interventions undertaken across diverse climatic zones. . The compendium is a product of collaboration with grassroots agencies such as SRIJAN, GuruJal, Gramin Vikas Vigyan Samiti (GRAVIS), Tarun Bharat Sangh (TBS), Development Research Communication & Services Centre (DRCSC), Samaj Pragati Sahyog (SPS), and Vasundhara Sanjeevani Mandal (VSM), whose unwavering dedication has been instrumental in capturing these real-world case studies. Additionally, the generous support of the Indian Collaborative for Applied Sustainability Solutions (ICAS) has contributed to the development of this compendium.

These case studies not only offer inspiring success stories but also emphasize the necessity of tailoring strategies to the unique attributes of each location. Recognizing that there's no one-size-fits-all solution in pond rejuvenation, they underscore the influence of context-specific factors on approaches and outcomes. By delving into these studies, we uncover the challenges faced by communities in managing their water resources and the innovative and adaptive solutions they have employed. Drawing from these experiences, our aim is to foster a deeper understanding of effective pond rejuvenation strategies, thereby enriching the resources available to policymakers, practitioners, researchers, and concerned citizens.

In essence, this report seeks to equip policymakers, NGOs, academics, and the public with tangible insights gleaned from evidence-based policy assessments, enhancing the understanding of effective pond rejuvenation interventions.



Abbreviation

BDO	: Block Development Office
DRCSC	: Development Research Communication & Services Centre
FPO	: Farmer Producer Organisation
GIS	: Geographic Information System
GRAVIS	: Gramin Vikas Vigyan Samiti
IEC	: Information, Education and Communication
IFS	: Integrated Farming System
ICAS	: Indian Collaborative for Applied Sustainability Solutions
JE	: Junior Engineer
KVK	: Krishi Vigyan Kendra
MGNREGA	: Mahatma Gandhi National Rural Employment Guarantee Act
MSL	: Mean Sea Level
NGO	: Non- Government Organisation
OBC	: Other Backward Caste
PRI	: Panchyati Raj Institute
SJVN	: Satluj Jal Vidyat Nigam
SHGs	: Self Help Groups
SPS	: Samaj Pragati Sahyog
SRIJAN	: Self- Reliant Initiatives Through Joint Action
SDO	: Sub Divisional Officer
TBS	: Tarun Bharat Sangh
TDS	: Total Dissolved Oxygen
TMC	: Tank Management Committee
VSM	: Vasundhara Sanjeevani Mandal
VDC	: Village Development Committee



Glimpse of a pond in Sunderbans

SECTION I

POLICY BRIEF

HARNESSING THE POTENTIAL OF PONDS IN INDIA WITH AN ECOSYSTEM-BASED REJUVENATION APPROACH

PRAXIS TO POLICY LESSONS FOR MISSION AMRIT SAROVAR

INTRODUCTION

Ponds are critical enablers for environmental sustainability, social well-being, and economic prosperity, especially in an agrarian economy like India. Traditionally used for storing rainwater to meet the community's drinking, cleaning and irrigation needs, these structures support biodiversity, regulate the micro-climate and facilitate groundwater recharge and drought-proofing. Local village ponds relieve women from the time-consuming chore of fetching water from afar, emancipating them from drudgery. These ponds also enable the diversification of livelihoods for the local communities through fishery, duckery, water chestnut cultivation and other allied activities. However, ponds in India are threatened by degradation due to anthropogenic pressures. As of 2023, about 14,42,993 ponds have been identified in India, with 96 percent located in rural areas. Of these ponds, about 82 percent are currently in use, while the rest have dried up, destroyed beyond repair, or affected due to siltation, industrial effluent, salinity and other reasons.

India's water policies, programmes and schemes provide an impetus for water conservation through Integrated Water Management, including comprehensive improvement of water bodies, including pond rejuvenation. Launched in April 2022, Mission Amrit Sarovar, as part of the Azadi ka Amrit Mahotsav, exclusively focuses on rejuvenating 75 Amrit Sarovars (ponds) in every district of the country to conserve water for the future. It expects to create 50,000 water bodies with a pondage area of a minimum of 1 acre (0.4 hectare) and a water holding capacity of 10,000 cubic meters and more. Such policies offer an opportunity for mainstreaming a 'whole of ecosystem' approach for pond rejuvenation that goes beyond the conventional

form of mechanical excavation of a new or desilting of an existing water body and then inundating it with externally sourced water, to addressing the potential of various benefits/co-benefits of ecosystem-based approaches for rejuvenation including social, economic and ecological elements in the design, implementation, and monitoring of the water bodies.

This policy brief is based on the investigation of 12 pond rejuvenation models, including both Amrit Sarovars and non-Amrit Sarovars, across different climatic zones in India. This assessment synthesizes the knowledge on the uses of the pond and the need for rejuvenation, triple bottom line impact (economic-social-environmental) and sustainability. The findings from this study intend to provide insights to further strengthen the implementation of Mission Amrit Sarovar, and suggest adopting a long-term focus for the Mission, building capacities of the local community and institutions, including the Gram Panchayats, and more effective community engagement. The policy brief proposes developing a framework for classifications of ponds based on climatic zones for efficient administration and monitoring, while considering traditional knowledge and practices on water conservation to establish a case for an ecosystem-based approach to pond rejuvenation and promote sharing of knowledge under Mission Amrit Sarovar.

PONDS AS CRITICAL NATURE-BASED SOLUTIONS

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, in an ecosystem-based approach, the benefits of these waterbodies extend well beyond this primary role.

Ecological Benefits of Pond Ecosystem

A healthy pond ecosystem is important for tackling climate change and preventing biodiversity loss. A small pond doesn't only recharge groundwater but is also estimated to sequester 79-247 g of organic carbon per square meter annually, a rate that is 20-30 times higher than woodlands, grasslands and other habitat types. 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.

Social Benefits of Pond Ecosystem

Women have traditionally played the role of fetching water for their households, especially in rural areas. Ponds emancipate them from drudgery by enabling access to water near their homes. It also corrects the under-representation of women in natural resource decision-making and leadership through engagements in user groups, pond committees and enterprises.

Economic Benefits of Pond Ecosystem

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

To this extent, ponds hold a significant value as a Nature-based Solution, driving 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

The first Census of Water Bodies (2022-23) has registered 24,24,540 water bodies in the country, of which 14,42,993 (~60 percent) are ponds. The states with the highest concentration of ponds are West Bengal, Uttar Pradesh, Assam, Odisha and Jharkhand. About 96 percent (13,85,882) of these ponds are in rural areas. Out of the total number of ponds in India, ~82 percent (11,81,077) are currently in use. The dominant uses are pisciculture (58 percent), irrigation (16 percent), domestic/drinking (10 percent) and groundwater recharge (9 percent). About 23 percent of the ponds not in use have dried up, while the others have been destroyed beyond repair or are in bad shape due to siltation, industrial effluents, salinity and other reasons. Additionally, over two-thirds of all encroached water bodies in India are ponds, with most of them located in rural areas.

Threats to Ponds in India

The rate at which ponds are drying or are being rendered unfit for use in India is alarming. Some of the factors raising risks for these water bodies are listed below:

- **Over-extraction of water:** Excessive groundwater or surface water withdrawal for various purposes reduces water levels and negatively 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 run-off lead to eutrophication in the ponds. This causes excessive growth of algae and aquatic plants, depleting oxygen levels and harming aquatic organisms.
- **Invasive species:** Introducing invasive plant and animal species disturbs the ecological balance of the pond ecosystem, with invasives often outcompeting the native species.

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

India’s landscape of water policies and programmes recognise the significance of and need to conserve, protect and rejuvenate these critical ecosystems. Mission Amrit Sarovar is a recent initiative towards that end.

MISSION AMRIT SAROVAR

Mission Amrit Sarovar 2022 was launched as a part of the *Azadi ka Amrit Mahotsav* with the objective of developing and rejuvenating 75 Amrit Sarovars (ponds) in every district of the country to conserve water for the future. This Mission intends to create 50,000 water bodies, each with a pondage area of a minimum of 1 acre (0.4 hectare) and a water holding capacity of 10,000 cubic meters and more. The economic value of the pond is recognised under the Mission through pond-based livelihood activities. The focus on biodiversity is restricted to commemorative plantation of trees. On an institutional level, the Mission emphasises *Jan Bhagidari*, or people’s participation at all levels through the formation of user groups.

The Mission is designed to run with a “Whole of Government” approach in all its aspects, including funding. There is no separate financial allocation made for the Mission, and it leverages funding from the ongoing schemes, including the Mahatma Gandhi National Rural Employment Guarantee Scheme, 15th Finance Commission Grants and Pradhan Mantri Krishi Sinchayee Yojna (PMKSY) sub-schemes; and similar schemes from the State/ Central Government, 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 various benefits/ co-benefits of the pond ecosystem and incorporate that at the designing, implementation, and monitoring stage.

ECOSYSTEM APPROACH TO POND REJUVENATION

An 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.” The operational guidance for an ecosystem approach is 5-fold: -

1. Focus on the functional relationships and processes within ecosystems.
2. Benefits derived from ecosystem functions to be maintained or restored – requiring capacity-building, especially at the level of local communities managing 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 the local stakeholders.
5. Formation of inter-ministerial bodies within the government or the creation of networks for sharing information and experiences of ecosystem management.

THE STUDY

In this context, this policy brief assesses 12 pond rejuvenation models in India, distributed across five climatic zones - Humid, Moist Sub-Humid, Dry Sub-Humid, Semi-Arid and Arid – to identify best practices from the field.

Map 1 indicates 12 sample ponds selected for assessment:

Map 1: Sampled Ponds across Four Evapotranspiration Zones (Dry Sub-Humid, Moist Sub-Humid, Semi-Arid and Arid).

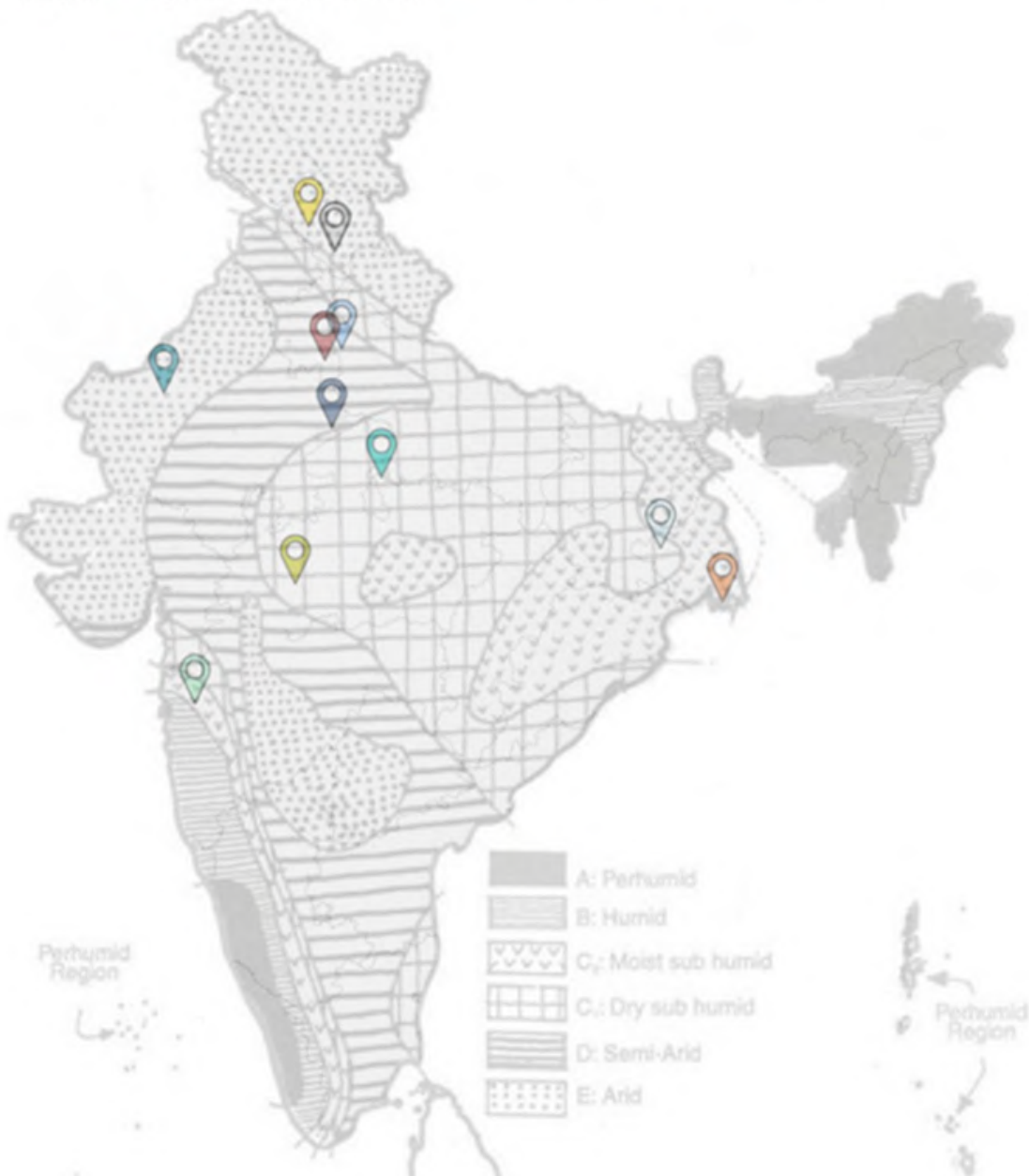
Source: Development Alternatives

Note: The sampled ponds in Himachal Pradesh are clubbed together in the map due to their proximity. Their color code in the legend is, thereby, white.

The classification is based on Thornthwaite's rational classification system. Perhumid and humid zones were excluded from the study due to the limited scope of the assessment.

List of Assessed Ponds

- Amrit Sarovar Niatti Pond / Hamirpur, HP
- Bhartasar Talab / Baap, RJ
- Chandeli Talab / Bundelkhand, MP
- Gendasagar Pond / Dewas, MP
- Hariahera Pond / Gurugram, HR
- Individual Family Farm Pond / South 24 Parganas, Sundarbans, WB
- Kachre Ka Taal / Karauli, RJ
- Mahavad Pond / Gautam Buddha Nagar, UP
- Manyachi Wadi Pond / Thane, MH
- Patur Bandh / Purulia, WB
- Sarog Amrit Sarovar / Theog, HP
- Sipur Amrit Sarovar / Shimla, HP



Sampled ponds across four evapotranspiration zones (Thornthwaite's Climate Classification Map)

Methodology of Assessment

A mixed methodology of desk research and field investigation was adopted for this study. A review of published and grey literature, including reports by national agencies like NITI Aayog, international agencies like Swedish International Development Cooperation Agency (SIDA), and private actors operating at different levels, was undertaken for the purpose of identifying 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 through a pre-designed questionnaire based on these indicators through semi-structured interviews with the implementation/executing agencies, focus group discussions and key-informant interviews with individuals from the local community.

Key Observations under the Study

This limited study of the 12 rejuvenated ponds across the climatic zones, including Amrit Sarovars, provides rich insights into the implementation strategy of the Mission. These are: -

- Since the Mission was launched only in 2022, in many locations, the work for pond rejuvenation is either ongoing/incomplete, or if completed, the pond has no water. One such case was of the Amrit Sarovar at Patharam Village in Bundelkhand.
- The pondage area of Sarovars is below 1 acre in some cases, especially in the hilly areas due to the terrain. The Sarog Amrit Sarovar, for instance, had an area of ~0.26 acre. Similar variation was observed in the other Amrit Sarovar studied in Himachal Pradesh and was validated during semi-structured interviews with the Panchayati Raj Institutions.
- There is a scope for knowledge exchange on adaptive practices within Amrit Sarovars in a similar topography. The Sipur Amrit Sarovar, for instance, adopted a 'Catch the Rain' model to arrest surface water runoff and offers a scope of replication in other Amrit Sarovars of the State.
- Developed Amrit Sarovars are, in most cases, handed over to the Village Panchayat for maintenance. Interactions with the Panchayat

have revealed inadequacy of funds and the need to generate financing through community contribution, business models and other means.

- On the monitoring end, the Master Report of Mission Amrit Sarovar had information unavailable for many ponds counted under the total work completed.

Some good practices observed during the field investigations are: -

Case 1: SHGs as Agents of Governance of the Pond

In the case of 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 Maa Lakshmi Mahila Dal Self Help Group (SHG). The agreement authorises the owners and the SHG to share the income in 1:2 ratio (1/3rd to owners and 2/3rd to the SHG), while all community members in the village are entitled to collect water from the pond for domestic use.

Case 2: Tank Management Committee for Local Decision-Making

In the Niwari District of Madhya Pradesh, Self-Reliant Initiatives through Joint Action (popularly known as SRIJAN) rejuvenated the Chandeli Talab with more than 60 percentage of the total investment driven by the community contribution. The implementing agency, SRIJAN formed a Tank Management Committee, comprising the women from the village that now convenes regularly to discuss the maintenance requirement of the pond, monitor water distribution among villagers and undertake other critical decisions regarding the use of pond water.

Case 3: Pond as a Part of a Larger Landscape

The Gendasagar Pond at Dewas, Madhya Pradesh was rejuvenated by Samaj Pragati Sahyog by adopting a ridge-to-valley approach. This consisted of afforestation efforts in the ridge areas, alongside the construction of contour trenches to capture water flow and enhance moisture retention in the soil. Downstream, various structures such as check dams and gabions were built to reduce water flow and prevent soil erosion, enabling the underground seepage of rainwater.

PRAXIS TO POLICY RECOMMENDATIONS

The above-given observations, driven by scheme review, key informant interviews and focus group discussions, lead to the following recommendations to further strengthen the implementation of Mission Amrit Sarovar.

1. **Coherence in pond classification:** Water being a state subject, States (except a few) 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, considering the micro-climatic variances. Yet, there is, probably, a need for coherence in the classifications adopted by the States in similar climatic zones for administrative and monitoring purposes. 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 focus:** As a new programme, the Mission has the potential to learn from the Sarovars developed in the first year, evolve and strengthen its mechanisms. The impact of the Mission should be envisioned in acknowledgement of it, giving sufficient time and space for identifying the best methods of rejuvenating a pond from the field. The sustained financial flow under the Mission and timely dispersal of funds will be crucial for the groundwork, and for supporting livelihoods.
3. **Reinforcing focus on capacity building of Panchayati Raj Institutions (PRIs):** The impact of the Mission can be amplified by reinforcing the need for capacity building of the PRIs on both technical (models of rejuvenation) and non-technical (community mobilisation) aspects. Cross-learning among Amrit Sarovars in the same climatic zones is critical.
4. **Innovation and knowledge sharing,** especially of the traditional knowledge and practices of water conservation, will be of immense value, along with monitoring, to ensure that the learnings from the various ponds 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. Community members, especially women, youth and other disadvantaged groups, can be mobilized at various levels to support the rejuvenation through:
 - a) Revitalizing local committees to resume the responsibility of the pond, including checking the committee governance for efficacy.
 - b) Organizing public meetings or town hall sessions to create awareness and sensitise the community regarding the importance of pond rejuvenation.
 - c) 'Citizen Science' for monitoring, through capacity building of community members on collecting regular impact data of the Sarovars.
 - d) Development of business models that empower the community to leverage the economic value of the pond for income generation and contribute their part towards the pond maintenance.

CONCLUSION

The socio-economic and ecological value of ponds, as compared to lakes and rivers, is often under-estimated. Mission Amrit Sarovar, building upon the momentum of the previous water policies such as the Water (Prevention and Control of Pollution) Act 1974, the Repair, National Water Policy (1987, revised 2012) and the Renovation and Restoration of Water Bodies (RRR) of 2009, brings greater focus on the ponds, through convergence at various levels including, policy, institutions and finance. The success of the Mission will depend on how efficiently it adopts scientific practices (sometimes combined with traditional knowledge), engages with the community and builds the capacity of various stakeholders, and ensures a smooth funds flow. Some of the early lessons from the present study can pave the way for a holistic and integrated approach to pond rejuvenation, which can potentially contribute to the attainment of several environmental goals, build resilience of the community to tackle water stress and conserve the pond ecosystem.



Bhartasar Talab, Jodhpur

SECTION II

**COMPENDIUM OF
POND REJUVENATION
INTERVENTIONS**

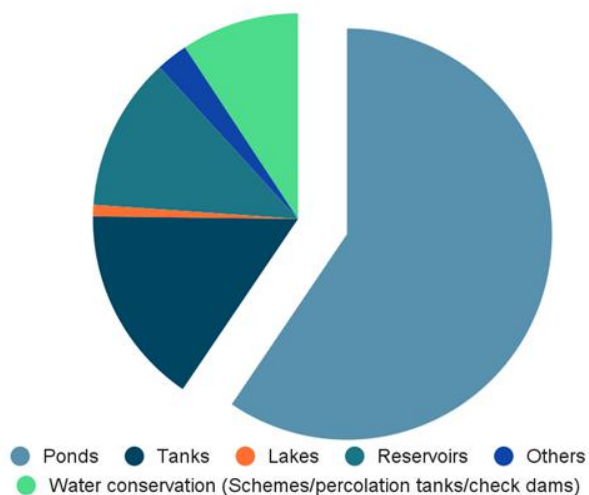
INTRODUCTION

In a nation as diverse and populous as India, the interplay between water resources, population, and environmental sustainability forms a complex scenario that demands urgent attention. Amidst this complex scenario, the stark reality of water scarcity stands out prominently. India, home to 18 percent of the global population, grapples with the harsh reality of possessing only 4 percent of the world's freshwater resources (The World Bank, 2023). This precarious balance between population and water availability has earned India the unfortunate distinction of being the 13th most water-stressed nation (Pandey, 2019).

A detailed survey has revealed the existence of an impressive 2,424,540 water bodies throughout the country (Ministry of Jal Shakti, 2023). Surprisingly, 97.1 percent of these aquatic treasures, totaling 23,55,055, are nestled within rural landscapes, serving as lifelines for the sustenance of rural livelihoods (Marie Duraisami, 2018). In contrast, a mere 2.9 percent (69,485) of these water bodies find their place within urban areas (Ministry of Jal Shakti, 2023).

The variety in these water bodies showcases their diversity and contribution to the nation's well-being. The key findings of this study indicate that ponds constitute a majority, comprising 59.5 percent of all water bodies in

% Distribution of Water Bodies by type



The distressing statistics continue as we delve deeper. Per capita water availability has plummeted by a staggering 75 percent, diminishing from 6042 to 1486 cubic meters (Mohan V., 2023). This decline is further compounded by escalating pollution and unchecked groundwater extraction, pushing the nation's water crisis to alarming levels. Excessive consumption of groundwater, accounting for a quarter of the world's supply, has led to 17 percent over-exploitation, with 5 percent reaching critically depleted levels, and an additional 14 percent categorized as semi-critical (Mohan V., 2021).

Amidst this daunting backdrop, a ray of hope emerges from an often-overlooked source: India's water bodies.

India. The accompanying pie chart provides a detailed breakdown of these statistics¹.

This comprehensive enumeration underscores the undeniable presence of these water bodies across the nation, showcasing their critical roles in rural economies, agriculture, and environmental sustainability.

Beyond their utilitarian functions, ponds emerge as pivotal elements in the pursuit of sustainable water management. Functioning as infiltration basins, they contribute to preserving surface water and augmenting groundwater. However, their significance transcends these roles, encompassing flood control, nutrient retention, carbon sequestration, and fostering thriving

ecosystems that support biodiversity. This rich ecosystem extends its benefits to women emancipation, alleviating rural labor burdens, strengthening communities, and generating livelihoods through activities like agricultural irrigation, duck farming, and water chestnut cultivation. Even in urban and peri-urban contexts, the potential of ponds for recreation and tourism gains recognition.

This compendium of case studies is designed as a thoughtful response to India's diverse climatic variations and geographical nuances. Six climatic zones — Per-humid, Humid, Moist Sub humid, Dry Sub humid, Semi-Arid, and Arid provide the sample's distribution framework based on the Thornthwaite's Climate Classification. For practicality, the study's focus will extend to five climatic zones, excluding the intricate specifics of the Per-humid.

The process of selecting ponds within these climatic zones draws inspiration from the objectives of Mission

Amrit Sarovar. While the Mission dictates specific criteria, such as minimum size and water-holding capacity, this study further refines these standards to accommodate the contextual realities of each climatic zone. This report aims to document best case practices that reflect diverse intervention types, timeframes, geographical locations (rural, peri-urban/urban), and the agencies responsible for rejuvenation. Each case study features an index color coding system that illustrates the ecosystem services provided by a specific pond. This is achieved by highlighting these services with a distinctive green color, making it visually clear.

As we traverse through the narratives of these case studies, we unravel the intricacies of India's pond rejuvenation landscape, unearthing insights that stand to shape a more sustainable and resilient future for water security.

1 <https://cdnbbsr.s3waas.gov.in/s3a70dc40477bc2adceef4d2c90f47eb82/uploads/2023/04/2023040672.pdf>

Climatic Zone: Semi-Arid Hariahera Pond: Gurugram, Haryana



Nature of Pond	Man-made
Place of Implementation	Hariahera village, Sohna block, Gurugram district, Haryana
Year of Rejuvenation	2023
Total Investment in Rejuvenation	INR 85,12,000
Implementation Agency	GuruJal
Funding Agency	Hyundai
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

Hariahera Pond is situated in Hariahera village, Sohna block, Gurugram District, Haryana, spanning over an area of 0.5 hectares. The district experiences a mean temperature of 40 degrees Celsius and receives an average annual rainfall of around 596 millimeters. The Sahibi River, though now partially existent, is part of the drainage network in the area.

The geological formation in the region primarily consists of alluvium, with sand and gravel being the major water-bearing formations. The net groundwater availability in the district is reported as 240.48 million cubic meters, while the groundwater draft for all users is 544.18 million cubic meters.

To meet the water demand of Gurugram's population and its floating residents, significant new infrastructure (pond, water tanks, etc.) has been developed, providing economic opportunities and revenue generation. However, this development has come at the cost of a drastic reduction in the district's green cover, ridges, and water bodies. Gurugram relies entirely on groundwater and the Yamuna Canal for its fresh water supply, as there is no fresh water source available in the region.



Flower beds around the pond enhancing the aesthetic value



ABOUT THE INTERVENTION

Objective

The Hariahera Pond is a natural pond that was until 2013 used by villagers for supporting fisheries and fulfilling water needs of animals. It was also used to source water for irrigation purposes, though restrictively. Later, the condition of the pond deteriorated due to two main factors: -

- The **dumping of sewage and solid waste** has become a significant issue at Hariahera pond. Situated on the outskirts of the village, untreated wastewater from local households flows into the pond, contributing to water pollution. Additionally, the pond has become a dumping site for solid waste, further degrading its environmental condition.
- The **presence of water hyacinth and algae** has become noticeable, adversely impacting the flora and fauna in and around the water body. This growth of aquatic plants and algae can lead to imbalances in the ecosystem, causing harm to the natural habitat and biodiversity of the pond.

In this specific context, GuruJal, an initiative by Abhipsa Foundation headquartered in New Delhi, has undertaken the crucial task of rejuvenating Hariahera pond, aiming to halt uncontrolled wastewater discharge and solid waste dumping. The initiative also strives for the conservation of flora and fauna while fostering the development of the surrounding areas to enhance the social life of villagers.

In the pond rejuvenation project, GuruJal implemented a significant intervention through wastewater treatment, establishing a 200 kilo liters per day wastewater treatment plant at the pond site. Root zone technology²

2 Root zone technology is an eco-friendly wastewater treatment method that leverages plants and their root systems to naturally purify water. In this system, selected plants play a vital role in breaking down organic matter and absorbing nutrients. The roots facilitate the filtration and treatment of wastewater, leading to an overall enhancement of water quality. This approach not only contributes to effective wastewater treatment but also reduces the reliance on extensive human intervention and minimizes the associated costs of maintenance procedures.

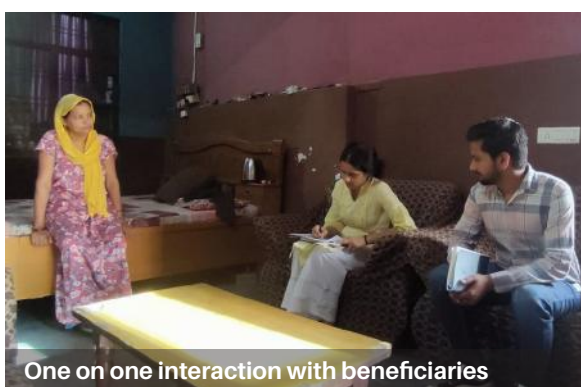
was employed for wastewater treatment, utilizing plants and their root systems to enhance natural purification and reduce operational and maintenance costs. Prior to releasing treated wastewater into the pond, desilting and dewatering processes were executed to remove untreated wastewater and enhance water holding capacity. The final step involved landscaping to create a biodiversity zone around the pond. This comprehensive intervention, funded by Hyundai as part of their CSR initiative, incurred a total cost of INR 85.12 lakhs.

Result

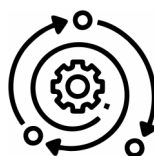
The intervention has brought about a significant transformation in the pond's characteristics, positively impacting water availability and sustainability. Initially, with a depth of 3.2 meters, the pond had limited volume. However, following the intervention, the depth has successfully increased to 4.5 meters, resulting in a volume of 16,943 cubic meters. This increase in depth has profound implications for the pond's functionality. The expanded volume now guarantees a consistent and reliable water source throughout the year, even during the most arid periods, marking a substantial improvement in its water retention capacity.



Focus group discussion with community members



One on one interaction with beneficiaries



IMPACT ANALYSIS

Economic and Social Impact

As indicated by the respondent, the economic and social benefits of the intervention remain unclear to the villagers. Presently, agricultural lands are still relying on rainwater or alternative water channels for irrigation, while the rejuvenated pond water remains unused for agricultural, livestock, or fisheries purposes. Addressing this challenge requires additional efforts to effectively communicate and integrate the advantages of the pond rejuvenation project within the local community. This entails fostering awareness and promoting diversified uses of the enhanced water resource to unlock broader economic and social benefits for the community.

Environmental Impact

Even after its rejuvenation, the villagers are not using water from the pond due to the presence of algae and other organic waste like animal excreta. This is because of the stagnation of the pond water, which hampers aeration and has led to the emergence of algal bloom within the pond. Various interventions, such as the introduction of ducks and fishes to enhance biological aeration or the implementation of mechanical methods like fountains have not been implemented due to insufficiency of funds. Source: (GuruJal - Detailed Project Report, Hariahera pond)

Institutional Impact

Institutionally, the pond has recently been transferred to the village panchayat. The sarpanch asserts that the unavailability of funds poses a significant barrier to the sustainability of this intervention. The village faces challenges in attracting grants for such initiatives, particularly due to the recent implementation of the state government's e-tendering system. Notably, there is a lack of any committee formation to institutionalize the activities related to pond rejuvenation and maintenance. Addressing these institutional gaps is crucial for ensuring the long-term success and viability of the pond rejuvenation project.



WAY FORWARD

- GuruJal has been planning to attract funding for the operation and maintenance of the pond from CSR and/or District plan. Being a rural area site, the operation and maintenance of the pond is very difficult due to budget constraints.
- The process of community mobilization plays a pivotal role in ensuring the long-term sustainability of any intervention. Deployment of the Information, Education, and Communication (IEC) tools for sensitization of the communities on the benefits of the rejuvenated pond as well as for institutionalization is critical. These committees can then take charge of essential activities like pond operation and maintenance while also exploring avenues for livelihood enhancement, such as pisciculture and aquatic farming (e.g., water chestnut cultivation).
- Solid waste management could be deployed at community level to avoid flow of waste into the pond and ensure proper running of the wastewater treatment plant.



Piezometer installed near the pond to monitor the ground water level

Climatic Zone: Dry Sub Humid Chandeli Talab: Niwari, Madhya Pradesh



Nature of Pond	Man-made
Place of Implementation	Mudara Village, Niwari Block, Niwari District, Madhya Pradesh, Bundelkhand
Year of Rejuvenation	2019
Total Investment in Rejuvenation	INR 4,37,539
Implementation Agency	Self-Reliant Initiatives through Joint Action (SRIJAN)
Funding Agency	Hindustan Unilever Foundation
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

Chandeli Talab is situated in Mudara village, Niwari block, Niwari District, Madhya Pradesh, within the Bundelkhand region. Encompassing an area of 5 hectares, the pond is located in a complex and diverse environment. Bundelkhand, characterized as a rain-fed, and vulnerable to climate change region, is socio-economically heterogeneous and culturally unique. The area faces challenges such as limited groundwater resources, inadequate infrastructure, and a lack of access to improved technologies. Bundelkhand comprises fourteen districts, including seven in Uttar Pradesh (Jhansi, Jalaun, Chitrakoot, Lalitpur, Banda, Mahoba, and Hamirpur) and seven in Madhya Pradesh (Datia, Niwari, Tikamgarh, Chattarpur, Damoh, Sagar, and Panna). The region grapples with varying temperature conditions, impacting crop productivity across all seasons. Agriculture faces significant challenges in maintaining and enhancing productivity due to soil fertility loss and escalating production costs, primarily attributed to the predominantly rain-fed nature of agriculture in the state.



Focus group discussion with the tank management committee



ABOUT THE INTERVENTION

Objective

In Niwari District of Madhya Pradesh, SRIJAN has led rejuvenation of the Chandeli Talab at Neem Khera to increase irrigation area and transfer the benefits of enhanced well recharge to farmers, as well as transfer silt from the ponds to farm fields to increase agricultural productivity. As an NGO, SRIJAN works towards promoting self-reliance and dignified livelihoods for the communities and works largely in central India. Soil and water management is an important segment of their work.

This rejuvenation was funded by the Hindustan Unilever Foundation and partially with the contribution of the community. The total investment was INR 1,41,61,183, of which the community contributed INR 90,71,111. The size of the pond is 4.99 hectares. The rejuvenation works at the Chandeli Talab consisted of earthworks (except in areas of hard rocks that required blasting) and transportation of soil.

Result

The intervention successfully increased the pond's depth from 3 meters to 4.5 meters, leading to a volume rise from 468,810 cubic meters to 703,215 cubic meters. This heightened depth guarantees year-round water availability. Additionally, a Tank Management Committee (TMC), predominantly comprising women from the village community, was established. The committee holds regular meetings to address concerns such as water quality, encroachment, monitoring water distribution activities among farmers, and opposing irregular activities by anti-social elements to ensure the security of the pond. This community-led initiative reflects a comprehensive and inclusive approach to the sustainable management and utilization of the enhanced water resource.



IMPACT ANALYSIS

Economic Impact

The community has significantly benefited from the increased availability of water resulting from the substantial rise in the water-carrying capacity of the ponds post-desilting. This improvement has guaranteed that the pond will not run dry even during the driest months of the year, leading to considerable savings by reducing the reliance on purchasing water tankers, which was the alternative in times of water scarcity. Before the pond rejuvenation, the community solely practiced kharif cropping, and now, with the augmented water supply, they engage in two-season cropping, including both rabi and kharif cultivation. Additionally, the enhanced water availability has facilitated livestock rearing, contributing to a more diversified and sustainable livelihood for the community.

Social Impact

Beyond their practical utility, these ponds hold cultural significance for the community. During Kartik Poonima, the community comes together around the pond to perform rituals, fostering a deep sense of belongingness and cultural connection. The pond serves as more than just a water reservoir; it has become a central element in the cultural fabric of the community, reinforcing traditions and communal ties during significant events.

Ecological Impact

The rejuvenated pond now boasts a thriving population of fishes, including largemouth bass, bluegill, and channel catfish, with some reaching lengths of up to 0.34 meters. The aquatic environment also supports a diverse array of amphibians such as common frogs and marbled toads, alongside various insects like mayflies, stoneflies, dragonflies, caddisflies, beetles, bugs, and butterflies. This rich biodiversity extends its benefits further, attracting migratory and water birds that feed on the abundant fish population. Notable bird species include

the Indian pond heron, common sandpiper, great egret, oriental white ibis, and others, establishing the pond as a vital ecosystem for a variety of wildlife.

Institutional Impact

In order to ensure the feasibility and sustainability of the rejuvenation effort, SRIJAN has taken a proactive approach by forming a TMC with women, from the village community, as its members. The committee meets regularly to address crucial issues, including water quality, encroachment concerns, monitoring water distribution activities among farmers, and opposing irregular activities by anti-social elements that may threaten the security of the pond. The involvement of the local community, especially women, in the management and decision-making processes underscores a participatory and inclusive strategy for the long-term success of the project.



Chandeli talab, Neemkhera village



WAY FORWARD

The impact of the intervention has been notably positive. The villagers express a clear and immediate demand for the timely de-silting and maintenance of the community pond to sustain the benefits derived from recreational use, irrigation, and groundwater recharge. However, the community faces challenges with unsolicited soil mining activities around the ponds. Compounding the issue, the extracted soil is loaded onto tractors and transported to other villages. This situation is particularly concerning, as making silt available for agricultural lands was one of the primary objectives of the pond rejuvenation work. Addressing and mitigating these challenges are essential to ensure the continued success and effectiveness of the pond rejuvenation initiative.



Kund ki Talaiyya, Mudara village



Well recharged by the pond- Mudara village

Climatic Zone: Dry Sub Humid

Gendasagar Pond: Dewas, Madhya Pradesh



Nature of Pond	Man-made
Place of Implementation	Neemkheda Village, Bagli Block, Dewas District, Madhya Pradesh
Year of Rejuvenation	2007
Total Investment in Rejuvenation	INR 44,00,000
Implementation Agency	Samaj Pragati Sahyog (SPS)
Funding Agency	MGNREGA & Community Contribution
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

Gendasagar Pond is located in Neemkheda village, Bagli block, Dewas District in Madhya Pradesh. The pond spans over an area of 5.61 hectares. The climate of the region is semi-tropical, characterised by hot summer and well-distributed rainfall during the southwest monsoon season. Temperature remains around 40-45 degrees Celcius with mean annual precipitation around 1083 millimeter. Dewas district is characterised by different types of soils based on its geographical features. Approximately three-fourths of the district's area is covered by black cotton soils associated with Deccan Basalts. These soils are known for their high clay content and are suitable for agriculture. In Dewas district, the geology primarily consists of hard rock formations with limited capacity to hold and transmit water. These formations are not favourable for the development of productive aquifers. On the other hand, alluvial formations, which are unconsolidated and typically provide better aquifers, have a limited extent in the district. Even the Narmada river, which flows through the district, does not contribute significantly to the formation of alluvial deposits in the area.

Due to the challenging geology, groundwater availability and accessibility may be limited in Dewas district. The hard rock terrain restricts the natural recharge of groundwater, making it essential to rely on other sources such as precipitation and surface water bodies.

The district's economy relies equally on both the agricultural and industrial sectors, with chief agricultural products including wheat, sorghum, rice, cotton, among others. However, due to the unavailability of water, villagers were forced to rely on rainfed agriculture and seek employment in the Malwa plateau as manual laborers. This challenging situation made them vulnerable to exploitation by wealthy landowners who took advantage of the uncertainty in wages. The inability to generate a stable income further exacerbates poverty and contributes to an increased migration rate within the community. Addressing water scarcity is crucial for promoting sustainable agriculture, economic stability, and reducing vulnerability among the local population.



ABOUT THE INTERVENTION

Objective

In 1996, SPS recognised the potential of implementing Integrated Watershed Management in the region using the ridge-to-valley approach. The initiative commenced with afforestation efforts in the ridge area, accompanied by the construction of contour trenches to capture water flow and enhance moisture retention in the soil. Downstream, various structures such as check dams and gabions were built to reduce water flow and prevent soil erosion, enabling the underground seepage of rainwater. Furthermore, a thorough scientific analysis of the geological composition of Neemkheda led to the construction of Gendasagar in the valley. This reservoir facilitated the downstream flow of groundwater, thereby recharging the wells situated in the lower-lying areas of the slope.

The initiative witnessed exemplary public participation in terms of voluntary rehabilitation, financial contribution and utilisation of funds from MGNREGA, and some extra work hours that the community members did not charge for. Finally, after ten years of social and scientific planning, Gendasagar was constructed in Neemkheda village with a vision to improve the socio-economic conditions of the village by enhancing agricultural productivity and reducing migration distress. The intervention incurred a cost of INR 44 lakhs.

Through individual interactions and focus group discussions with beneficiaries, it was revealed that the region faced widespread water stress attributed to unfavorable hydrogeological formations (lack of groundwater availability) and the absence of rainwater harvesting practices. The consequential water scarcity had significant repercussions on the socio-economic development of the village, adversely affecting agricultural productivity and contributing to increased migration rates. Addressing these water-related challenges became crucial for sustainable development and the overall well-being of the community.



Pond rejuvenated for wild animals and livestock, Dewas

The village primarily depended on farming to meet its food consumption as well as livelihood needs. However, the huge dependency on rainwater limited farmers to practice farming in both rabi and kharif seasons leading to migration in the absence of a sustainable source of income from agriculture.

The consequences of water scarcity included a shift in responsibilities, placing women at the forefront of managing both household and farming activities, with a primary focus on meeting water needs for both. This added burden on women highlights the gendered impact of water scarcity. Furthermore, the vulnerability of migrants increased as they became susceptible to exploitation by large landowners due to uncertainties in wages and employment opportunities.

Result

The pond's depth of 8 meters, securing a volume of 435,880 cubic meters, now guarantees year-round

water availability, meeting the community's essential needs. The watershed committee, consisting of 11 members, has played a pivotal role in the management of this invaluable resource. Committed to inclusivity, the committee includes one-third women and half PRI (Panchayati Raj Institution) members, ensuring diverse representation and perspectives. Through vigilant monitoring, the committee has successfully maintained water quality, promptly addressing contamination concerns. Proactively preventing encroachments, they have preserved the pond's integrity, safeguarding its essential functions. Their efforts in monitoring water distribution among farmers have led to fair allocation and a reduction in conflicts, contributing to the sustainable and equitable utilization of the water resource.

Furthermore, this approach has fostered a sense of ownership and unity among members. Their dedication extends beyond the pond itself, advocating for sustainable practices that benefit the environment.

In essence, the watershed committee's efforts have led to reliable water access, improved quality, and harmonious community collaboration. Their holistic approach set a commendable example for responsible resource management, inspiring similar initiatives elsewhere. It is evident that the committee's work has yielded far-reaching positive outcomes for both the pond and the community it serves.



Interaction with the pond management committee members



IMPACT ANALYSIS

Economic Impact

- The pond has resulted in enhanced agricultural income of approximately 150 households in Neemkheda village as stated by participants during individual interviews and focus group discussions. It has done so by recharging the wells lying downstream. The number of wells in the village has increased by almost 50 percent and now the duration of water availability in ponds has increased till the peak summer months. Earlier, the water in wells would dry out as early as April, leaving farmers without a water source for their irrigation needs until the onset of the monsoon season. The farmers have now started cultivating crops other than the rainfed crops like maize, onion, and wheat. They have also started cultivating some horticultural crops and vegetables like amla, guava, eggplant, okra etc., that meets their household requirements and are also being sent to the local market.
- The downstream proximity of the pond supports a livelihood school where various types of trees are cultivated, including Baheda, Arjun, Moringa, Shalu, Dhavadar, Amla, Mango, Guava, Ber, and Sajad. This initiative contributes not only to environmental conservation but also provides a sustainable source of livelihood through the cultivation of diverse tree species. The cultivation of these trees can have multiple benefits, ranging from ecological restoration to the production of fruits and other useful products, enhancing the overall well-being of the community.
- The pond also enables pisciculture in a small outlet pond constructed downstream of the pond.



Focused group discussion with beneficiaries

The training for fisheries has been provided by Krishi Vigyan Kendra (KVK) to the farmers. It has led the farmers to practice layered pisciculture by determining the characteristics of sub-surface zones and the viability of fish species in the respective zones. The profit earned from fisheries goes to the PRI.

Social Impact

- The construction of the pond has provided a sustained source of water supply for irrigation which has resulted in practicing more than one crop in a year by farmers and has reduced their dependency on rainfed farming. It has also enabled them to grow horticultural and vegetable crops generating an additional source of income.
- Lack of water availability had forced the village community to migrate to the upper Malwa region in search of labour work. The labour rates were non-uniform and hence exposed the farmers to exploitation by the employers. The enhanced water availability resulting from pond construction has created local livelihood opportunities in agriculture, horticulture, pisciculture, and animal husbandry. This has played a crucial role in preventing the outflow of people, thereby strengthening the village's local economy, social structure, and familial cohesion.

3 *Gliricidia sepium*, a fast-growing nitrogen-fixing tree, is used in agroforestry and sustainable land management, providing organic matter and green manure in agriculture.

Ecological Impact

- The construction of the pond followed the ridge-to-valley approach of integrated watershed management, starting from the upstream of the Neemkheda watershed. The implementation agency initiated the process by planting native tree species with specific physiological attributes for soil binding and water percolation below their root zones. This strategic afforestation has resulted in an improved forest cover in the area. Additionally, the implementation agency has supported farmers in land use planning, encouraging plantation of trees such as Amla, Mango, Guava, Ber, and Moringa. *Gliricidia*³ is cultivated to serve as organic manure, enriching the soil's nitrogen content. Downstream of the pond, the livelihood school hosts a variety of medicinal and fruit-bearing plants, including Baheda, Dhavadar, Shalu, Sajad, Arjun, etc., fostering biodiversity and sustainable land use practices.
- The implementation agency's geological study revealed a natural transmissivity gradient at the pond site, where Basalt and Katkut sandstone intersect. The Basalt facilitates water seepage into the porous sandstone layer downstream, enhancing groundwater availability through downstream aquifer recharge.
- The watershed management approach constituting the construction of contour trenches, bunds, gabions, and check dams from the ridge to the valley has slowed down the rainwater velocity. It has allowed sufficient time for rainwater to percolate in the soil. This has enhanced the soil moisture of the Neemkheda watershed.



One on one interaction with beneficiaries

Institutional Impact

The pond serves as a notable example of community engagement through monetary, physical, and land contributions. Financial support involved collecting INR 1000 from users within 500 meters proximity to the pond and INR 500 from those residing beyond 500 meters, totaling around INR 35,000. Additionally, people contributed to pond excavation by providing 20 percent extra labor under MGNREGA. Four families at the construction site were relocated to the nearby village Ratatalai, receiving an equivalent amount of land and groundwater sources (wells) in return.

The implementation agency has effectively integrated watershed work with MGNREGA, assisting communities in obtaining job cards. The watershed committee, consisting of 11 members with one-third women and half PRI members, oversees pond management. Ownership is vested in PRI, conducting regular meetings. Community capacity building encompasses training on watershed structure construction, committee formation, maintenance, FPO establishment, and natural farming practices.

Stakeholders receive regular sensitization through exposure visits, water quality testing (*Neerakh Parakh*), wall paintings, and community gatherings (*Jan Sunvai*). The implementing agency maintains a strong liaison with PRI and district government to ensure effective operation and maintenance of the pond.



WAY FORWARD

Due to the availability of groundwater, because of pond rejuvenation, some of the farmers have started cultivating water guzzling crops like onions. This can be controlled by making regulatory norms on groundwater usage.



Group discussion with pond management committee

Climatic Zone: Dry Sub Humid Kachre Ka Taal: Karauli, Rajasthan



Nature of Pond	Man-made
Place of Implementation	Bhood Khera village, Sapotra block, Karauli District, Rajasthan
Year of Rejuvenation	2022
Total Investment in Rejuvenation	INR 25,00,000
Implementation Agency	Tarun Bharat Sangh (TBS)
Funding Agency	Life Insurance Corporation (LIC)
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The Kachre Ka Taal pond is located in Bhood Khera village in Karauli district covering an area of 7 hectares. The topography of the Karauli district is characterized by undulated rocky terrain, inadequate rainfall, water scarcity, and a depleting groundwater table. The district experiences very hot summers reaching 48 degree Celsius in summer months and very cold winters. It receives 559 millimeter of rainfall on average. Geologically, the district is associated with a thick mantle of solid, blown land and alluvium. The Karauli district was chosen as the Aspirational District in the Niti Ayog 2018 report on the Transformation of Aspirational Districts Programme owing to its vulnerable characteristics. It falls under a very low economic development zone where the population is involved in agriculture and has a very low literacy rate. Considering all demographic, social, and economic development categories, Karauli falls under the medium development zone.



Glimpse of River Sherni



ABOUT THE INTERVENTION

Objective

Bhood Khera village was reeling under drought for the last five decades before 2016, having water in only one well despite having 17 wells. To address the challenge, the Kachre Ka Taal pond construction was done to support the village community as a source of livelihood by increasing the irrigation area for agricultural land, feeding water for livestock, drinking water for the community as well as for playing a catalytic role in recharging Sherni or Sairni river.

The implementing agency, TBS, began its discussion with trust and confidence building with the community members of the Bhoodkheda village. They undertook the implementation of pond construction right from inception to completion stage covering the aspects of design structure, community capacity building, and pond handover to the community. The total expenditure of the pond stood at INR 25 lakhs from LIC in 2018, with the latest maintenance activity getting completed in 2022. TBS contributed two-thirds of the expenditure of INR 9,00,000, whereas each household of the village contributed INR 8000, a total corpus of INR 8,40,000. After the completion of work, the pond has been handed over to the village community which looks after the maintenance of the pond.

The Ripple Effect

Tarun Bharat Sangh has rejuvenated 150+ pond structures in the Karauli. The recharged groundwater has contributed to the flow of the Sherni river and its rejuvenation. Looking at the success story of Bhood Khera village, many surrounding villages have also made talaabs, pokhars and anicuts.

Result

This new pond, constructed by TBS, covers an area of 7 hectares with a depth of 7 meters and a total water storage capacity of 840230 cubic meters. The pond has a catchment area of 92 hectares.



IMPACT ANALYSIS

Economic Impact

The average agricultural land owned by respondents is approximately 0.4 hectares (1 acre), predominantly cultivated with crops like wheat, millet, mustard, corn, and vegetables. Before the construction of the village pond, the community relied solely on rainfed Pearl Millet (Bajra) during the rainfall season. Livestock income was also limited due to water scarcity. Post-pond construction, the irrigated agricultural area increased by 75 percent, leading to a significant improvement in natural resources. Livestock now contributes an average of INR 52,000 annually, with INR 20,000 allocated for feeding and maintenance. Respondents reported an annual savings of INR 92,000 from agriculture and livestock. The total agricultural yield for the village last year was valued at INR 100 lakhs, resulting in visible changes such as increase in house constructions.

Social Impact

Prior to the pond's construction, water scarcity affected various aspects of life, from drinking and household chores to agriculture and livestock. Despite having multiple wells, handpumps, and borewells, only one well had water. The 10.66-meter deep pond significantly increased groundwater recharge, addressing water shortages. Women, traditionally responsible for fetching water, now find it more accessible. The enhanced income from agriculture and livestock has reduced migration. The absence of caste bias ensures equal water access. The entire community participated in pond construction, demonstrating ownership. One-third of the construction work was donated by the community to showcase commitment to managing the pond ecosystem.

Ecological Impact

The pond played a vital role in rejuvenating the Sherni river and forests, with respondents noting an increase in the groundwater table. Although specific depth information is lacking, interviews suggested a depth of



Focused group discussion with the community

3.04 meters pre-monsoon. All 17 open wells in the village are now filled with water. Tree plantation, particularly fruit-bearing trees like jackfruit, jamun, lemon, and guava, has flourished. Various tree species, including gum arabic trees, neem, sacred fig, berberis, Indian rosewood, banyan, pomegranate, and mango, contribute to groundwater recharge. Animal density around the pond has increased, benefiting species like jackal, neelgai, pig, cow, buffalo, bluebuck, goats, and leopards.

Institutional Impact

The land for the pond was voluntarily contributed by 10 families, forming the basis for the village committee overseeing pond maintenance. This committee, comprising 7 male members, ensures sustainability through water planning for irrigation and practicing pisciculture. A drawback observed is the limited involvement of women in decision-making, possibly influenced by low literacy and sex ratios.



WAY FORWARD

- **Installing low-cost water filter solutions and monitoring of water quality of the pond:** Community members were concerned of the poor water quality of the pond. Additionally, tap water which is drawn from borewell also results in

water borne diseases. Thus, regular water quality monitoring and installation of low-cost water filters is essential to safeguard the needs and health of the community.

- **Need for active engagement of women in decision-making:** After the consultations with the community, it was evident that men are the front runners when it came to the decision-making for the pond. There is a dire need to empower women to take a leading role in such matters.



Pond rejuvenation intervention by TBS

Climatic Zone: Dry Sub Humid

Mahavad Pond: Gautam Buddha Nagar, Uttar Pradesh



Nature of Pond	Man-made
Place of Implementation	Mahavad village, Gautam Buddha Nagar, Uttar Pradesh
Year of Rejuvenation	2022
Total Investment in Rejuvenation	INR 5,44,432
Implementation Agency	Development Alternatives
Funding Agency	HCL Foundation
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The Mahavad Pond is one of the three man-made ponds in the peri-urban village of the same name in Dadri Tehsil of Gautam Buddha Nagar district, Uttar Pradesh. The pond lies in a low-rainfall zone⁴ with an annual mean temperature of 30 degree Celsius, about 4.4 percent higher than the national average. The soil is clay loam in nature. The village is spread over 390 acres, housing a population of 4,278 with an average of 9-10 members in each household. The literacy rate is 81.78 percent, with more men (92.70 percent) than women (69.72 percent) being literate. The village economy is dependent upon the self-owned businesses and employment of the men of the households in companies/factories outside the village. Women of the households occupy themselves in household chores, work on the family land, rear livestock or, in the case of poor households, work as daily wage labour. Though villagers in Mahavad still occupy farmland, dependence on agriculture as the primary income source has fast declined in the last decade.



Group discussion with beneficiaries

Powered by

4 As per India Meteorological Department



ABOUT THE INTERVENTION

Objective

All ponds in Mahavad date back to the settlement of the village about 150 to 200 years ago. These initially acted as lifelines by enabling storage and access to water for household and agricultural purposes. Over time, the significance of these ponds as a water source for both purposes declined. Today, almost all houses in Mahavad have water pumps to source water for their daily needs. With a decline in the dependence on agriculture as a primary income source, not only has the criticality of water for irrigation reduced, but that is today sourced through irrigation canals instead of the pond. This reduced dependence on the pond has also led to the deterioration of societal ownership and connection with the pond.

The Mahavad Pond-2, one of the three ponds and the focus of this study, came into existence as a separate water body about 20 years back when a larger pond of about 1.6 hectares was divided by a stretch of lane to connect to the main road for travel and transportation purposes. The pond is in a lowland area, with the upland constituting residential houses and paddy fields. Before the rejuvenation, the pond was an active ground for waste dumping by nearby households – the sewage drains of which would open near the Mahavad Pond-2. Because there was no bund or lining around, the villagers would worry about the children and animals falling into the pond as well as of it serving as a ground for suicides. Breeding mosquitos and the spread of diseases was another concern of the villagers regarding Mahavad Pond-2.

In the context given above, Development Alternatives undertook the rejuvenation of the Mahavad Pond-2 in support of the HCL Foundation with the aim of putting an end to solid waste dumping at the pond. A total of INR 5,44,432 was spent in two phases: -

Phase 1: Preparatory & Awareness Generation This constituted a village-level assessment of the dependence on the pond as well as the villagers' perspective on the pond's rejuvenation. Low awareness and interest of the villagers in water conservation was identified as a prime risk factor, to address which awareness sessions in schools, wall paintings and monthly community meetings were organised.

Phase 2: Physical Intervention Major activities undertaken as a part of the rejuvenation included desilting, dewatering, de-weeding, setting up/clearing of inlet and outlet channels, bund set-up and plantation.

Result

Post-intervention records of the pond characterise it to be spanning over 0.45 hectares with a catchment area of 0.16 square kilometer. The original depth of the pond was recorded to be 2m, which increased to a maximum depth of 3.75 meter at a full water level and a mean depth of 3.62 meter due to the rejuvenation activity. Bunds were constructed around the pond giving it a defined boundary. On 11th August 2022, the pond was recognised as one of the Amrit Sarovar Ponds in India, and fencing was installed. The local government owns the pond, and any maintenance or other intervention is undertaken in coordination with the Block Development Officer or BDO.



Latitude and longitude of Mahavad pond



IMPACT ANALYSIS

In the peri-urban village of Mahavad, the Mahavad Pond-2 holds purely aesthetic and ecological value for the village community. The community doesn't depend upon it to fulfill its water needs, nor is the pond linked to any livelihood activity – limiting the economic impact of the intervention².

Ecological Impact

Peepal, Neem, Water hyacinth, Water Spinach, Sheesam, Arjun, and Papri are common in sight in and near Mahavad Pond-2 after its rejuvenation. The pond today also serves as a ground for black crown night heron, kingfisher, jalmurgi, red-naped Ibis, water-crow, black-winged stilt (Himantopus) 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. It is, however, essential to note that the rejuvenation has affected the area of Mahavad Pond-2 alone. The pond on the other side of the narrow lane is still used as a dumping ground; hence, the intervention has had limited impact at an ecosystem level.

Social Impact

The rejuvenated Mahavad Pond-2 facilitates village gatherings during and outside events, including festivals. The awareness sessions and community meetings conducted as a part of the project's preparatory phase have nudged the villagers' perspective positively towards the need for the conservation of the water bodies³.

Institutional Impact

As an Amrit Sarovar Pond, the Mahavad Pond-2 comes under the local government's jurisdiction. While the community is more vocal about the maintenance of the pond, there is yet to be setting up of a village community to anchor the processes, which today are primarily led by institutions like Development Alternatives, together with local leaders and Block District Officers (BDO).



WAY FORWARD

The preparatory phase of the rejuvenation of Mahavad Pond-2 offers high replicability for similar interventions in the peri-urban area. At an intervention level, however, the Mahavad Pond-2 provides evidence for **the scope of deeper involvement of the local community and the adoption of an ecosystem approach.**

- **Formation of Interest Groups** to enable the village community to anchor decision-making and coordination with local government authorities for the post-rejuvenation maintenance of the pond.
- **Planning pond rejuvenation in a cluster while considering the ecosystem as a whole for impact** in cases where two or more ponds are located within a 500-meter radius.



Group discussion with beneficiaries

Climatic Zone: Arid

Bhartasar Talab: Jodhpur, Rajasthan



Nature of Pond	Man-made
Place of Implementation	Bhartasar Talab, Baap Block, Jodhpur Distict, Rajasthan
Year of Rejuvenation	2005
Total Investment in Rejuvenation	INR 300000
Implementation Agency	Gramin Vikas Vigyan Samiti (GRAVIS)
Funding Agency	CSR, MGNEGA
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

Bhartasar talab, located in the Baap block of Jodhpur district, Rajasthan, lies near the Great Indian Thar desert in an arid climatic zone with significant diurnal and seasonal temperature variations and low rainfall. Jodhpur receives an average precipitation of 314 millimeters, with the main rainfall months being July and August. The predominant red desertic soil in the central, eastern, and southern parts of the district has low water retention capacity. Both ground and surface water availability are shallow, increasing the community's dependency on water bodies for drinking water.

Agriculture serves as the primary source of employment for villagers, but arid soil, lacking in moisture and nutrients, coupled with increased degradation due to overgrazing, overpopulation, and climate change, poses challenges (Gravis, 2014).

Animal husbandry, a secondary occupation, involves keeping cattle, sheep, and goats for income generation. However, water and resource scarcity make daily grazing challenging, leading to migration for fodder. Men often undertake this, leaving women to manage the farm, care for children, cook, and fetch water, amplifying the household responsibilities (Gravis, 2014).



ABOUT THE INTERVENTION

Objective

Bhartasar Talab, constructed 300 years ago to address water scarcity, suffered from neglect and a lack of community understanding, leading to siltation and complete drying. Women were burdened with spending 10-12 hours fetching drinking water. Recognizing these challenges, GRAVIS took the initiative to desilt the ancient pond. The goal is to alleviate the labor burdens and ensure a reliable, guaranteed water supply, aligning with the commitment to holistic development and empowering communities to address their challenges.

Result

The intervention has resulted in a pond depth of 2 meters, yielding a volume of 72,710 cubic meters, ensuring a consistent year-round water supply. The Village Development Committee (VDC), comprising 10-15 members with representation from each household, convenes regularly. Their dedicated efforts have improved water quality, prevented encroachment, and effectively monitored water distribution among farmers. Additionally, the VDC's firm stance against anti-social elements has enhanced the pond's security.



Tankas are underground tanks that are used to store water in the semi-arid and arid areas of Rajasthan



IMPACT ANALYSIS

Economic Impact

According to discussions with the community, the pond has saved 4-5 hours for each household member, allowing them to seek paid work elsewhere, such as agricultural labor or in salt mines. Previously, the community primarily engaged in salt washing in salt mines. Moreover, the pond has contributed to groundwater recharging in its proximity (around 300 meters), enabling farmers to dig borewells and cultivate crops beyond rainfed ones. Additionally, interactions with community members revealed that the removed pond silt is utilized by local potters to create pots, generating livelihoods at a micro-scale level. While the exact data on the number of potters and the amount of silt used was not known to the community, this practice showcases a positive impact on local economies.

Social Impact

The community holds a sacred attachment to the pond, considering it a convenient source of drinking water. During the pond's desilting, the villagers regarded manual silt extraction as a sacred task (punya ka kam). In the past, when the pond couldn't be used for fetching drinking water, women had to travel at night to obtain water from nearby sources, posing significant risks to their safety. Now, with access to the pond, they can secure drinking water conveniently at home, ensuring both safety and convenience for the community.



Focus group discussion with community members

Ecological Impact

The agency has promoted the planting of native tree species around the pond, including Desi Babool, Khejri, Jal, and Kumath. Additionally, many goats and sheep visit the pond to drink water. The pond attracts various bird species, including ducks, swans, and sparrows, contributing to the overall biodiversity and ecological health of the area.

Institutional

The implementing agency established a VDC with equal representation from each household, comprising of 10-15 members. The villagers have constructed taka at their homes, which are concrete structures with a depth of 2.5-3 meters. These structures are utilized to store water received from the pond through tankers, providing a sustainable and decentralized water storage solution for individual households.



Tank filling water from Pong to fill the household tankas



WAY FORWARD

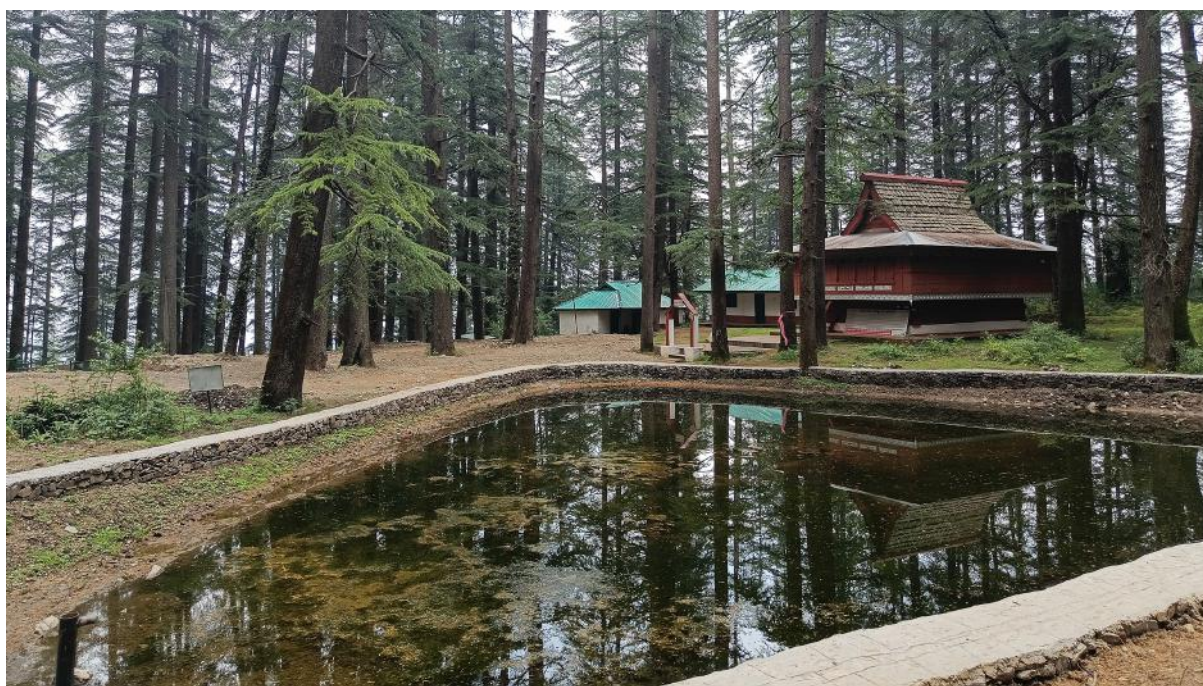
- Fetching of water using tankers might lead to creation of informal water markets and social conflicts, appropriate regulatory mechanisms should be put in place to ensure equitable water access
- Installing In situ water treatment facility
- Regular water quality monitoring of pond should be done to ensure the water is meeting the drinking water quality standards



Native tree species around the pond: Khejri tree

Climatic Zone: Arid

Sipur Amrit Sarovar Pond: Shimla, Himachal Pradesh



Nature of Pond	Natural
Place of Implementation	Sipur village, Mashobra block, Shimla
Year of Rejuvenation	2023
Total Investment in Rejuvenation	INR 2,26,019
Implementation Agency	Gram Panchayat, Mashobra
Funding Agency	15th Finance Commission, MGNREGA
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The Sipur Amrit Sarovar pond is located in Sipur village covering an area of 0.2 hectares. The Sipur village, in Mashobra Block, Shimla District, Himachal Pradesh lies in the Arid climatic zone in the South-Western Himalayan range. The climate in Shimla is predominantly cool during winters and moderately warm during summer. The annual rainfall in Shimla is 1415 millimeter. The Sipur village is reachable by NH5 and lies at a distance of 16 kilometers from the state capital, Shimla. The closest river, the Sutlej, is about 21 kilometers away. As per the 2001 census, Shimla had a population of 722,502 of which males were 380,996 and remaining 341,506 were females. The district has a density of 141 people per square kilometer. Brown podzolic soil, which is generally characterized by darker colors containing high organic matter, is found in the Shimla district. Water scarcity becomes an acute issue in the summer months in the city of Shimla as it is densely populated and is the only urban center in Himachal Pradesh. In addition, it also supports a significant floating tourist population that further adds to the water stress in the region.



Deodar forest surrounding the Sipur Amrit Sarovar Pond



ABOUT THE INTERVENTION

Objective

The purpose of rejuvenating the pond near the Shiva temple is primarily beautification, groundwater recharge, and to increase tourism, which will in turn help the village economy of Sipur by creating opportunities for livelihood.

The name of the village 'Sipur' comes from the local deity 'Sip' or Shiva. The village houses the temple of lord Shiva which is about 300 years old and has an old, natural pond adjacent to it. The village also has the temple of Bhagwati Tripura.

The small village of Sipur is surrounded by high mountains, pristine streams of water, and a lush Deodar Forest. The famous Sipur fair takes place annually in the month of May when close to twelve thousand people gather to seek the blessings of Lord Shiva. Cultural programmes, sports activities and exhibitions of various line departments are the key attractions of this fair. Year-round tourism activities are considerable in the Sipur village owing to the Shiva temple, the adjacent pond, and the scenic beauty.

An Amrit Sarovar called Amrit Sarovar Sipur was rejuvenated in the year 2022-23 by the local Panchayati Raj Institution. This Amrit Sarovar is 0.025 acres in size and has a depth of roughly 1.2 meter. The expenditure incurred was INR 2,26,019. Another Amrit Sarovar Pond, about 50m away from the Amrit Sarovar Sipur has been constructed by the Gram Panchayat, Mashobra. This sarovar is 0.2 hectares in size and the cost of its construction was INR 99,304. Unlike the Amrit Sarovar Sipur, this pond under the Amrit Sarovar has been dug up and is not a naturally occurring pond. Despite being located in close proximity to each other, both of these ponds under the Amrit Sarovar mission have separate catchment areas.

The ponds have been rejuvenated/constructed by the application of the 'Catch the Rain' concept, as in

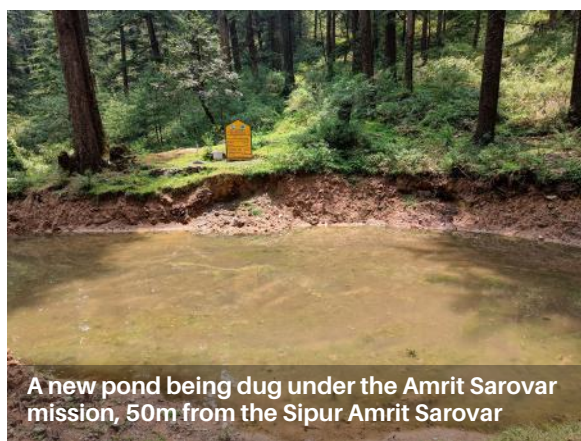
the mountain regions, due to the presence of gradient, water flows downstream and rarely collects at one place. Hence, in mountainous regions, it becomes important to arrest the surface water runoff. The purpose of rejuvenating the pond near the Shiva temple is primarily beautification, groundwater recharge, and to increase tourism, which will in turn help the village economy of Sipur by creating opportunities for livelihood.

The pond was rejuvenated by employing funds from the 15th Finance Commission, MGNREGA, and the decentralized funds available with the District Commissioner's office. As the pond holds immense religious value to the villagers, bare minimum foreign materials were used in the rejuvenation work. The villagers objected to the use of foreign building materials in the repair of the temple pond.

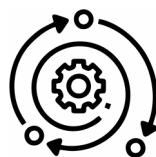
Small, natural water streams from higher ground called 'nallas' feed into the Amrit Sarovar. The Block Development Officer, Mashobra commented that the natural terrain, streams, and springs shouldn't be tampered with as unmoderated interventions can alter paths of the water streams which may result in overflow or even in some cases, complete disappearance.

Results

As a result of the intervention, the region's community and the ecology both have benefited. During the Sipur fair, which is held annually in the month of May, droves of visitors from nearby villages and towns travel to Sipur to offer their prayers at the old Shiv temple. With the pond rejuvenation work of the Amrit Sarovar Sipur being carried out, the scenic beauty of the spot has increased, one of the main attractions being the Amrit Sarovar Sipur next to the temple.



A new pond being dug under the Amrit Sarovar mission, 50m from the Sipur Amrit Sarovar



IMPACT ANALYSIS

Economic Impact

Sipur, a small hamlet comprising roughly 15 households and a population of 150 people, features dispersed housing typical of mountain settlements. Despite its proximity, the Sipur Amrit Sarovar, located 200 meters away, does not directly benefit the villagers due to the abundant natural water streams in Mashobra Tehsil. These streams naturally irrigate agricultural fields, supplemented by ample rainfall. Moreover, piped water supply ensures consistent access to water for all households in Himachal Pradesh, minimizing the need for water tankers in the village. The religious significance of the pond precludes the introduction of pisciculture, limiting direct economic benefits from its rejuvenation.

Social Impact

The rejuvenated pond adjacent to the temple has significantly enhanced tourism activity and the scenic beauty of Sipur village. It has become a focal point for devotees and tourists, especially during the annual Sipur fair in May. A newly constructed walking path around the pond serves both aesthetic and communal purposes, providing space for leisure and social interaction. The fair features exhibitions showcasing local food, handicrafts, and products, engaging Self Help Groups (SHGs) and Farmer Producer Organisations (FPOs). This initiative promotes alternative livelihoods and celebrates local art and culture, enriching the community and fostering economic opportunities.

Ecological Impact

The Sipur Amrit Sarovar is nestled amidst a sprawling Deodar Forest, enhancing its natural allure. With the augmented water-carrying capacity of the pond, the surrounding vegetation, comprising lush grass, moss, and a variety of shrubs and trees including Deodar and pine, flourishes abundantly.

During the scorching summer months when water scarcity prevails, the pond serves as a vital reserve for irrigation and drinking purposes, offering a lifeline to the local community. Additionally, it attracts a diverse array of avian species such as the Asian Paradise Flycatcher, Black-Throated Tit, Cattle Egrets, and Great Barbet, enriching the ecosystem with their presence.

Moreover, the pond serves as a watering hole for various wild animals including boars, leopards, and deer, further highlighting its significance as a crucial source of sustenance and habitat amidst the verdant wilderness.

Institutional Impact

The construction and rejuvenation of both Amrit Sarovars in Sipur village were undertaken by the Gram Panchayat, Mashobra, under the technical guidance and instructions provided by the Block Development Office, Mashobra. The Gram Panchayat, Mashobra, is entrusted with the responsibility of maintaining and ensuring the sustainability of these interventions.

From mobilizing funds to organizing equipment such as JCBs for pond deepening, as well as overseeing stone pitching and beautification efforts, the Gram Panchayat plays a central role in decision-making processes. At its helm is a female *Pradhan*, supported by three female *panch* and two male *panch*, ensuring gender-inclusive leadership within the Gram Panchayat.



Panchayat Samiti, Mashobra, Shimla



WAY FORWARD

- Improve coordination among government departments to streamline resource allocation and minimize delays in project execution.
- Address delays in fund disbursement from the government to prevent setbacks in implementation work.
- Address understaffing at government offices at the Gram Panchayat and block levels to enhance efficiency in project management.
- Encourage senior government officials to focus on both quantitative and qualitative aspects of scheme implementation during progress reviews.
- Explore strategies to promote the utilization of the MGNREGA scheme in Himachal Pradesh despite the region's higher per capita income and widespread government employment.
- Enhance the reliability and functionality of digital apps used for project management to prevent disruptions for field workers, especially in remote areas.
- Adapt expectations regarding the size of Amrit Sarovars in Himachal Pradesh to accommodate the mountainous terrain, acknowledging limitations in construction feasibility.
- Provide technical training and capacity building for officers and technical assistants at the village and block levels to ensure effective implementation of government policies.

Climatic Zone: Arid

Sarog Amrit Sarovar Pond: Shimla, Himachal Pradesh



Nature of Pond	Natural
Place of Implementation	Sarog village, Theog block, Shimla
Year of Rejuvenation	2022
Total Investment in Rejuvenation	INR 7,00,000
Implementation Agency	Gram Panchayat, Theog
Funding Agency	Gram Panchayat, Theog & SJVN
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The Sarog Amrit Sarovar pond is located in Sarog village, covering an area of 0.1 hectares. The Sarog Village, in Theog Block, Shimla District, Himachal Pradesh lies in the Arid climatic zone in the South-Western Himalayan range. The climate in Shimla is predominantly cool during winters and moderately warm during summer. The annual rainfall in Shimla is 1415 millimeter. The Sarog village is reachable by NH5 and lies 27 kilometers from the state capital, Shimla. Theog is located at 31.12 degrees N 77.35 degrees E. It has an average elevation of 1965 meters or 6446 feet and is situated on National Highway NH22 (on the Hindustan-Tibet Road). As per the 2011 census, Shimla has a population of 722,502 of which males were 380,996 and remaining 341,506 were females. The district has a density of 141 people per square kilometer. Brown podzolic soil, which is generally characterized by darker colors containing high organic matter, is found in the Shimla district. Water scarcity becomes an acute issue in the summer months in the city of Shimla as it is densely populated and is the only urban center in Himachal Pradesh. In addition, it also supports a significant floating tourist population that further adds to the water stress in the region.



Development Alternatives team conducting a Focused Group Discussion with the Gram Panchayat, Theog - The Implementing Agency



ABOUT THE INTERVENTION

Objective

The pond at Sarog village had become silted and dirty as residents put fish feed into the pond and a lot of fish had started to die due to overcrowding. Therefore, to increase the water carrying capacity of the pond, improve the water quality, and boost tourism in the village, the rejuvenation process of the pond at Sarog village was carried out.

The pond in the Sarog village, Theog block, Shimla district, Himachal Pradesh is a naturally occurring pond and is called '*Kufar*' in the native language. It has a catchment area of about 5.4 square kilometers. About 70 years ago, the local deity's temple was constructed next to it. Since then, it has come to acquire religious significance. Upon discussions with the residents of Sarog village, it was learnt that till about 30 years ago, drinking water for the Sarog village and other nearby villages was extracted from this pond. But soon, fish started to breed in the temple pond and exponentially grew in population. The residents of the village too would feed them grains like wheat, maize etc. due to which the pond started to get filthy. Soon, a lot of fish started to die because the water had become dirty and there was significant overcrowding. The residents of Sarog started to complain of foul smell near the pond and the dead fish created a conducive environment for outbreak of deadly diseases.

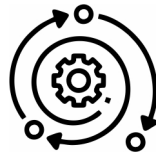
This is when the residents decided to clean out the pond and try and convert it into a tourist spot. An attempt was made in the year 2006-07 however, the JCBs that were deployed at the site to carry out desilting got stuck in the quagmire. Recently, in the year 2020, renewed attempts were made to rejuvenate the pond at Sarog village. However, it so happened that as progress was being made on rejuvenating the pond, the central government announced the commencement of the Amrit Sarovar Mission. This is when the Block Development Office, Sarog and the Gram Panchayat, Sarog decided to bring this community pond under the Amrit Sarovar Mission.

The rejuvenation process began with the draining out of all pond water with the help of motors. Once the water was drained, a depression pit measuring 3x2 meters right at the center of the pond was discovered. The villagers believed that this portion of the pond never runs dry and the local deity is believed to have originated from this part of the pond. During the pond deepening process, the soil was extracted from the pond bed. This soil was very rich in organic matter as a lot of fish had died in the pond. It was collectively decided by the community to put some of this soil on the nearby forest land and the rest of it was laid on the crop fields of the farmers of Sarog village. Post the pond rejuvenation work, the Sarog Amrit Sarovar has a capacity of 360 cubic meters and a maximum depth of 3.6 meters. The farmers are not allowed to extract water from the pond for irrigation purposes as the Gram Panchayat wishes to develop this pond as a tourist attraction and plans to provide water for irrigation only if an acute scarcity of water sets in during hot summer months.

The rejuvenated Sarog Amrit Sarovar has 6 steps along its boundary. The pond bed is U-shaped, being deepest in the middle. The rejuvenation work was aided by the Satluj Jal Vidyut Nigam (SJVN), which is an Indian public sector undertaking involved in hydroelectric power generation and transmission. It was incorporated in 1988 as Nathpa Jhakri Power Corporation, a joint venture between the Government of India and the Government of Himachal Pradesh. SJVN provided technical assistance and funds and the decentralized funds from the District Commissioners' office too were mobilized to carry out the rejuvenation of the community pond at Sarog village.

Result

The process of pond rejuvenation has benefited the community and the ecology. With the rejuvenation of the pond, aquifer recharge has taken place, tourism activity has increased, and the water in the pond now acts as a reserve, which may be used as and when needed. As a result of the intervention, the average depth of the pond increased from 1.82 meters to 3.6 meters which resulted in the total storage capacity of the pond to increase from 182 cubic meters to 360 cubic meters. The scenic beauty and tourism around the pond received a major boost as well.



IMPACT ANALYSIS

Economic Impact

As the pond was very recently rejuvenated in 2022, impacts are yet to appear distinctively. However, the villagers believe that the pond will help attract tourists to Sarog village. They also plan to start boating in the pond which will in future accrue monetary benefits.

Social Impact

The pond has become a place for social congregation. On early mornings, thrice a week, yoga sessions are held in the leveled and tiled pond boundary. Benches have been built around the pond for people to gather and spend leisurely time. Streetlights also line the boundary of the pond which makes taking a walk in the nighttime easy.

Ecological Impact

Planting of trees such as pine, deodar, birch, sal, cedar has been carried out on the boundaries of the pond. The pond also exerts a cooling effect on the nearby areas and helps maintain humidity. Birds like parakeets, barbets, sparrows, common doves, and Himalayan bulbul visit the pond regularly to drink from it. Though the pond does not have any fish in it, it has a thriving ecosystem of insects like dragonflies, water strider, mayflies and water plants like water thyme, duckweed, common waterweed etc. The six steps that have been constructed along the boundary of the pond are helpful in two ways - firstly, it slows down the rate of surface water evaporation and secondly, it helps distribute the weight and pressure exerted by water on the boundary walls of the pond. The pond has also been thoughtfully constructed to be U-shaped, being deepest in the middle. This helps with cutting down on the rate of surface water evaporation too. Also, before the pond rejuvenation, small water streams from higher ground flowed into the pond which expedited the siltation process. During the pond rejuvenation process, these small streams were

diverted elsewhere, and it was ensured that the water inflow into the pond was curbed. No waste dumping or encroachment is observed near the pond however, no in-situ water treatment plant is employed. Earlier, when the pond was not fenced, dogs, cattle, boars, deer would visit the pond for drinking water. But now with the fencing being put up, animals are unable to drink water from the pond.

Institutional Impact

The pond rejuvenation of the Sarog Amrit Sarovar was taken up by the Gram Panchayat, Sarog with assistance from SJVN. The panchayat is headed by a female *sarpanch* and assisted by two female and three male *panch*. Since the investment in the rejuvenation process was substantial, around INR 38 Lakh, it was noted that the rejuvenation process drew attention of senior government officials like the Sub Divisional Officer (SDO), Junior Engineers (JE), Technical Assistants, etc.



WAY FORWARD

- In-situ water treatment facilities can be employed at the Sarog Amrit Sarovar to ensure quality maintenance of the pond water.
- The diversion of small water streams to curb the issue of siltation of the pond may not be sustainable in the long run as it alters the natural course of the water flow.
- Given its modest size of 0.1 hectares, initiating boating as a recreational activity in the pond might pose practical challenges.



Before pond rejuvenation



After pond rejuvenation



Development Alternatives team along with the residents of Sarog village at Sarog Amrit Sarovar

Climatic Zone: Moist Sub Humid Patur Bandh: Purulia, West Bengal



Nature of Pond	Man-made
Place of Implementation	Pabrapahari village, Kashipur block, Purulia district, West Bengal
Year of Rejuvenation	2017
Total Investment in Rejuvenation	INR 2,00,000
Implementation Agency	Development Research Communication and Services Centre (DRCSC)
Funding Agency	Adaptation Fund Network
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

Patur Bandh pond is located in Purulia district covering an area of 0.4 hectares. This district is a drought prone region characterized by undulating topography with rugged hilly terrains in the western and southern parts. The district has a sub-tropical climate and is characterized by high evaporation and low precipitation. Average annual rainfall varies across community development blocks ranging between 1100 and 1500 millimeter. Its temperature is characterized by dry tropical climate with scorching heat reaching 40 degree Celsius in summers and moderately cold reaching 10 degree Celsius in winters. The district generally has residual type soil wherein the uplands have Lateritic soil and in valleys reddish clay loam or white to reddish clay are common. The district has been classified as 'low' in terms of level of educational deprivation index whereas in terms of socio-economic development deprivation index it is classified as 'high'. A total number of approximately 40 lakhs households are considered for deprivation.



ABOUT THE INTERVENTION

Objective

Step well pond of Pabrapahari village was a small knee-deep wetland which turned into a futile pond. Women in groups used to walk miles to bathe at the pond and collect drinking water for livestock and domestic purposes. It was only in the rainy season that farmers could cultivate only one crop, paddy which usually succumbed owing to adverse weather conditions. These conditions resulted in malnutrition amongst the tribal community of the village. To address these challenges, pond rejuvenation intervention took place to revive the pond for the overall wellbeing of the community.

DRCS implemented the pond rejuvenation intervention in Pabrapahari village in 2017 seeking expert advice from Jadavpur University in Kolkata to scientifically design the intervention process which involved water table mapping to identify accurate pond



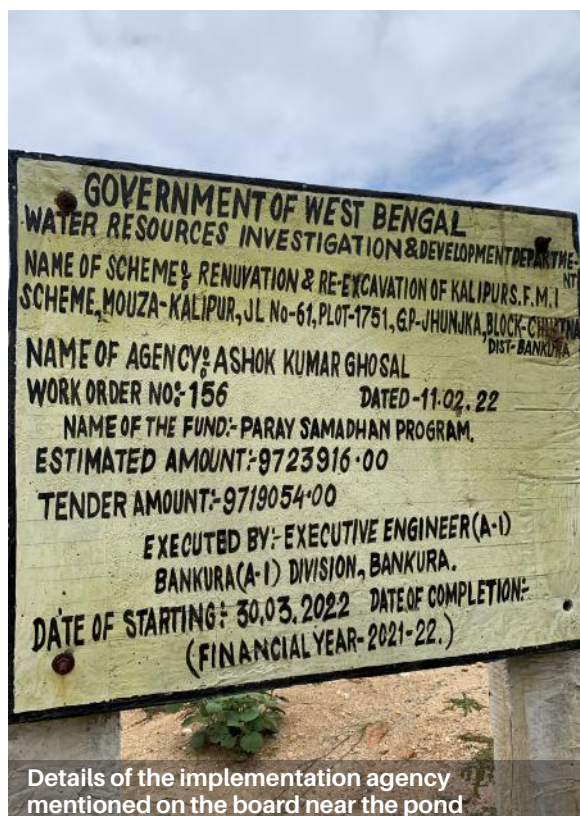
Solar panels installed near the Patur Bandh pond

location. During the initial transect walk and community consultations, DRCSC gathered insights around this erstwhile pond from elder community members. The insight around identification of location to renovate the pond was scientifically validated using GIS technology. After having mutual consensus with the community on the location, DRCSC facilitated a 20-year lease agreement between 10 owners of the pond and the Maa Lakshmi Mahila Dal SHG. The agreement mentions the owners and the group will share the income 1/3rd and 2/3rd respectively, while all community members in the village are entitled to collect water from the pond for domestic use.

Result

Once a small knee-deep wetland is now a 4.26 meters perennial community pond mobilizing 130 community members.

Post rejuvenation, the average depth of the pond has increased from 0.91 meters to 4 meters resulting in a total water storage capacity of 1764 cubic meters. The pond, which used to be a small knee-deep wetland, now covers an area of 0.4 hectares of land.



Details of the implementation agency mentioned on the board near the pond



IMPACT ANALYSIS

Economic Impact

The pond water has helped in irrigation to 6 hectares of land. The village community highlighted that they are now able to grow paddy in the fields surrounding the pond. The community earlier used to rely only on Kharif season cropping, however after the pond rejuvenation, they have been able to take up Rabi season as well.

DRCSC introduced the concept of a nutrition garden in which they now grow multiple varieties of crops. This was not the case before as the community was only dependent on paddy cultivation before the pond rejuvenation intervention. However, now they grow multiple varieties of vegetables like coriander, tomato, potato, brinjal, etc.

Pond rejuvenation has helped in diversifying their livelihood portfolio. Earlier the community used pond water only for drinking and household chores. After the rejuvenation the community sells about 100 kilograms of fish at INR 100 - 150 per kilogram, meaning they now earn a steady income from fish cultivation.

In our on-site evaluation, the village women displayed evident happiness and proudly showcased gold earrings recently acquired by one of the villagers symbolizing an improved livelihood attributed to the rejuvenation of the pond.

Social Impact

Pond rejuvenation has had a significant social impact by reducing drudgery of women. Prior to the pond's rejuvenation, women had to travel 2 kilometers to fetch water for livestock, household needs, and bathing. Now, the pond water serves for all these purposes.

Ecological Impact

The community members highlighted a noticeable increase in groundwater recharge, evident in the two open wells and multiple tube wells in the village. While the installation of water supply connections for

households is still in progress, the community currently relies entirely on open wells and tube wells for drinking water.

Furthermore, the region previously lacked flourishing flora and fauna. However, there has been a positive transformation, with community members now observing a diverse array of bird species around the pond, including kingfishers, Asian open-billed storks (shamukh kohl), white-breasted waterhens (dauk), parrots, and more.

Institutional Impact

Women of the community are front leaders in the management and decision making of the pond ecosystem. The pond has been handed over to Maa Lakshmi Mahila Dal SHG comprising 10 members. The community has received multiple training from DRCSC on group capacity building, nutrition garden training, pond handholding, etc. Maintenance of the pond is being done by the SHG. The intervention has helped in empowering the women in the decision making process for pond maintenance. This was evident in our field visits where we observed that it was only the women of the village who were welcoming and happy while talking about their village pond rejuvenation work which had been crucial in safeguarding their well-being. Additionally, all the community members took active participation during the implementation phase of the pond. They contributed 25 percent of the total investment towards the intervention. They also took part in physical labor required for the work.

Once a small knee-deep wetland is now a 4.26 meters perennial community pond mobilizing 130 community members.



"I can now engage in farming throughout three seasons each year, even in areas with limited water resources, in contrast to the previous practice of only one season (Kharif). Additionally, I have observed an increase of over 1.5 times in paddy cultivation productivity."

- Bishikha Singh Parmar, Pabrapahari village



WAY FORWARD

- **Water pollutants:** There is a need to address water pollution evident at the pond site. Throwing solid waste, bathing at the pond, cattle wading is common which are some of the major reasons for water pollutants.
- **Regular desilting required:** Since its rejuvenation, the pond has never been desilted. This is needed for ponds as during the physical visit to the pond one could see organic matter and accumulation of leaf litter inside the pond.



Interaction with SHG women group managing the Pond rejuvenation

Climatic Zone: Moist Sub Humid

Niatti & Chathiyar Village Pond: Nadaun, Himachal Pradesh

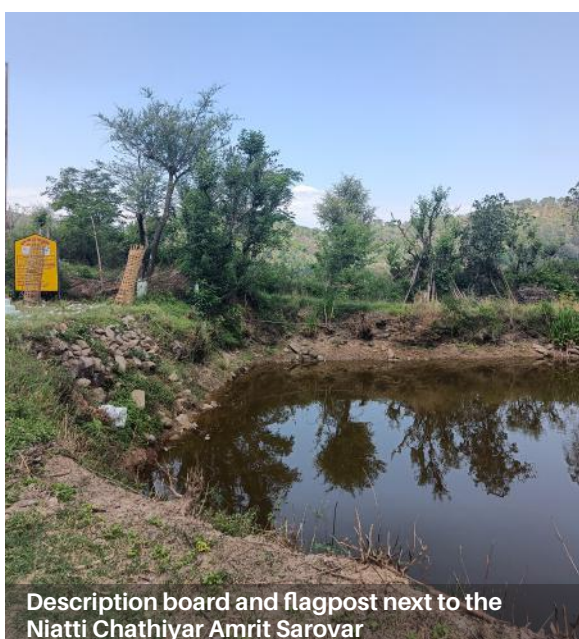


Nature of Pond	Man-made
Place of Implementation	Niatti & Chathiyar village, Nadaun, Hamirpur, Himachal Pradesh
Year of Rejuvenation	2022
Total Investment in Rejuvenation	INR 3,00,000
Implementation Agency	Gram Panchayat, Balduhak
Funding Agency	MGNREGA
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The villages of Niatti & Chathiyar in the *Balduhak* Panchayat of Hamirpur district in Himachal Pradesh fall in the Moist Sub Humid climatic zone. The minimum recorded temperature is 4 degree Celsius and the maximum recorded temperature is 38 degree Celsius. The average annual rainfall in the region is 1600 mm. The terrain of the Hamirpur district is undulating and hilly. The surface elevation ranges from 400 meter to 600 meter above Mean Sea Level (MSL). The soil here is loamy, skeletal, and calcareous, and crops such as wheat, maize, paddy, gram, mustard, potato, sugarcane, etc. are suited to be grown in this region. Nadaun is one of the five subdivisions of Hamirpur district in Himachal Pradesh and has a total area of 1118 square kilometers. As per Census 2011, the total population of Nadaun is 4,54,768 out of which males are 2,17,070 and females are 2,37,698. The population density is 407 people per square kilometer. 1,09,256 people belong to the scheduled castes and 3,044 belong to scheduled tribes. Though the Beas and Sutlej River systems adequately drain the district, water discharge in springs and *nallas* thins out during the summer months, creating an acute shortage of supplied water.



Description board and flagpost next to the Niatti Chathiyar Amrit Sarovar



ABOUT THE INTERVENTION

Objective

The pond is located in a depression with high hills surrounding it. Due to this, the sewage and gray water from households located on higher ground flowed directly into the pond. Also, soil runoff from surrounding higher ground accumulated at the bottom of the pond, causing it to lose its depth, and in turn its water carrying capacity. So, the objective of carrying out the intervention was to increase the pondage and improve the water quality of the pond.

The pond of the Niatti & Chathiyar village in the *Balduhak* Panchayat is situated in the Shivalik Hills or The Lesser Himalayas at an altitude of 458 meters above Mean Sea Level (MSL). The pond is located at an approximate distance of 15 kilometers from the district headquarters at Hamirpur in Himachal Pradesh and is located at around 12 kilometers from the Beas River. The size of the pond is 23 meters x 20 meters and spans over an area of 0.046 hectares, with a varying depth of 1.5 to 2.5 meter. The pond was rejuvenated in the year 2022 by the Gram Panchayat of *Balduhak* by employing funds from MGNREGA.

The pond at the Niatti & Chathiyar village was constructed about 60 years ago on government land by the earlier generations of the residents of the village for the purpose of irrigating the nearby farms and providing water for drinking and bathing for the livestock. Lately, the condition of the pond deteriorated due to the above-mentioned factors. Hence, the task of rejuvenation of the pond at the Niatti & Chathiyar village was undertaken with the purpose of stopping uncontrolled discharge of wastewater, conservation of flora and fauna, increasing water carrying capacity, and development of surrounding areas for the pond for the social life of villagers. Towards this end, desilting for increasing pondage, weed removal, improvement of water quality by in situ treatment, and catchment area treatment were undertaken by the Gram Panchayat of *Balduhak* for the rejuvenation of the pond.

The issue of influx of sewage waste resulted in the need for pond rejuvenation in the year 2022 in the first place. The enterprise of raising and harvesting fish is being practiced in the pond. But the villagers are not able to use water from the pond due to the presence of fish. This causes internal conflict of interest amongst the residents of the village practicing different livelihoods. The enterprise of fisheries had started in 2022 when close to a thousand fingerlings were put in the pond by one family residing in the village. Now, a single fish weighs close to 3-5 kilograms. However, the fish have not been sold once, so the enterprise has not yet yielded any income.

Result

As a result of the intervention, the average depth of the pond increased from 1.2 meters to 2.4 meters which resulted in the total storage capacity of the pond to increase from 182 cubic meters to 960 cubic meters. The scenic beauty and tourism around the pond received a major boost as well.



Details of the rejuvenated pond



IMPACT ANALYSIS

Economic Impact

Pisciculture was practiced in the pond even before the intervention. However, post-intervention, the practice of pisciculture has received a further boost.

Social Impact

Since the rejuvenation of the pond in Niatti & Chathiyar village, it has become a focal point for residents from neighboring villages, attracting visitors with its serene beauty and the abundance of fish within its waters. Particularly during religious festivals, the temple adjacent to the pond draws crowds of worshippers who also enjoy the opportunity for socializing and community gatherings by the water's edge. This transformation has greatly enhanced the village's picturesque charm.

Ecological Impact

In the wake of the pond's rejuvenation, a thriving home garden has been meticulously cultivated around its periphery. Fruit-bearing trees such as mango, papaya, oranges, kinnow, guava, and pomegranate, along with a variety of plants including chilies, lemon, and ornamental shrubs, now adorn the landscape. The pond, acting as a magnet for water and migratory birds such as geese, teal, China ducks, and vibrant red and black-headed species, has become a vibrant ecosystem.

Before the rejuvenation efforts, the pond attracted not only wild animals like leopards, wild boars, and deer but also domesticated ones like cattle and dogs seeking water. However, post-rejuvenation, though the pond was expanded and deepened, the absence of a slope on either side dissuaded the once-frequent visits of wild animals seeking hydration.

Remarkably, the pond's positive impact extends to the surrounding wells, significantly increasing water availability by recharging groundwater. Despite this boon, the presence of fish renders the pond water unsuitable for drinking or irrigating nearby agricultural fields. Fortunately, the households in the region benefit

from a reliable water supply through the Irrigation & Public Health (IPH) scheme of Himachal Pradesh, administered by the Irrigation and Public Health Department, making the extraction of water from the pond unnecessary for household consumption.

Institutional Impact

Pond rejuvenation in Niatti & Chathiyar, carried out under the Amrit Sarovar Mission by the Gram Panchayat of Balduhak, stands as a testament to effective governance. The funds for this initiative were sourced from the MGNREGA scheme, highlighting the Panchayati Raj Institutions' capability to mobilize resources and implement central or state policies.

The responsibility for overseeing and making decisions regarding the pond's maintenance falls under the jurisdiction of Balduhak's Gram Panchayat. Comprising a female sarpanch and five panchs, three of whom are female and two male, the Gram Panchayat exemplifies gender-inclusive leadership.

The successful rejuvenation of Niatti & Chathiyar Pond not only showcases the Gram Panchayat's proactive role but also underscores how Panchayati Raj Institutions across the country can effectively utilize funds, execute policies and schemes, and ensure the long-term sustainability of interventions. This, in turn, yields multifaceted benefits for society—spanning social, economic, and ecological realms.



WAY FORWARD

- Address the absence of a slope on the pond's sides to facilitate easy access to water for cattle, hare, wild boar, jackal, kakar, sambhar, and monkeys.
- Install fencing around the pond to ensure the safety of residents, particularly small children who may be at risk of falling into the deep water containing large fish.
- Establish a water treatment facility for the pond, considering the inflow of gray water from nearby households. Relying solely on fish for cleanliness is insufficient.
- Explore solutions to allow water extraction for irrigation purposes, given the current limitations posed by the presence of fish and the pond's small size (0.046 hectares).
- Implement measures to control mosquito breeding during the summer months to mitigate the risk of malaria outbreaks in the village and its surroundings.



Focus group discussion with beneficiaries

Insights from the Local Government Authority of Hamirpur District in Himachal Pradesh

During documenting pond rejuvenation case studies in Nadaun, Himachal Pradesh, a visit to the office of the Block Development Officer (BDO), Nadaun was arranged to discuss the implementation work and feasibility of the scheme in the mountainous state of Himachal Pradesh in the South-Western Himalayan range. The BDO is the official in-charge of the block who monitors the implementation of all central and state programs related to planning and development of the blocks. The following pertinent points came out from the discussion:

- The BDO, Nadaun noted that water retention in mountainous areas differs from that of the plains due to slopes with varying gradients. Additionally, open areas are few in the mountains where water can collect and form a pond. Even if a pond is formed, it may not be very large in size. Instead of constructing new ponds or rejuvenating the few that are already existing, it would be beneficial to carry out catchment area development or build check dams on small water streams.
- The Central Government's foresight is reflected in the way that it has mandated that the tricolor will be unfurled by government dignitaries every year on Independence Day, which is 15th August, across all Amrit Sarovar's in the country. This way, the maintenance of the ponds will be ensured as annually the dignitaries will visit the pond on Independence Day to unfurl the tricolor.
- The BDO, Nadaun also noted that the Amrit Sarovar Mission is a very important scheme considering the looming water crisis and the onslaught of climate change that India is facing. However, it was pointed out that clear region/topography specific guidelines, technical training, and capacity building exercises to the officers and PRI could be extended. This would ensure better implementation of the Amrit Sarovar Mission.

Amrit Sarovar pond in the Lower Himalayan Region

ABOUT THE POND REJUVENATION WORK

The pond in Nial village in the Nadaun block of Hamirpur district in Shimla is a natural pond situated amidst the village settlement. For many years, the pond has provided water to the village community and fed livestock. However due to its location in between the village settlement led to deterioration of water quality and flowing of sewage and gray water from households. To address the challenge, the Block Development Office selected the pond for rejuvenation as part of Amrit Sarovar scheme. The intervention was implemented by the PRI of the village and the fund came through the MGNREGA scheme.

OBSERVATIONS FROM ASSESSMENT OF THE POND REJUVENATION MODEL

Our field visit to Nial village talab was coordinated by Block Development Office Nadaun and village panchayat. During our field assessment, we conducted a physical visit to the pond, interviewed the implementing agency, and conducted a focus group discussion with the village community.

During our visit, we found out that the pond was completely dry. The village community seemed unsatisfied with the intervention as the pond rejuvenation intervention did not serve any purpose. They stated that before the intervention, the water used to stay in the pond structure during the summer season as well. However, on our visit in the month of June, the peak summer month, there was no water stored. The stone pitching carried out on one side of the pond was faulty, due to the water flowing out. They also complained that the depth of the pond needed to be increased to ensure adequate water storing capacity. Before the intervention they mentioned that pond water was used to feed livestock but now there is no water and cemented structure around the pond restricts the animals from drinking water during monsoon season.

Considering these issues, the community mentioned that they are in talks with CSR organisations working in the region to take up pond rejuvenation projects in an appropriate integrated manner. To conclude, the pond of Nial village demands a holistic approach towards pond rejuvenation intervention which suits the community needs and ecology of the area.



A dry Amrit Sarovar Pond in the Lower Himalayan Region in Hamirpur district of Himachal Pradesh

Climatic Zone: Moist Sub Humid

Family Farm Pond: South 24- Parganas, West Bengal



Nature of Pond	Natural
Place of Implementation	Ramganga village, South 24- Parganas district, Sundarbans region, West Bengal
Year of Rejuvenation	2018
Total Investment in Rejuvenation	INR 21,000
Implementation Agency	Development Research Communication and Services Centre (DRCSC)
Funding Agency	BMZ
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The family pond is located in Ramganga village in South 24-Parganas district, covering an area of 0.1 hectares. South 24-Parganas district is located in Sundarban region of West Bengal designated as a UNESCO World Heritage Site, having rich flora and fauna and largest mangrove forest on Earth. The region boasts endangered species, including tigers, aquatic mammals, birds, and reptiles. The district receives 1800 millimeters of rainfall. It is characterized by hot and humid climate wherein the summer temperature reaches 40 degree Celsius and in winter temperatures dips to 10 degree Celsius. The soil usually consists of clays, silts, and sands deposited during floods. Overall, the district has 3 types of soils these are: (i) Entisols, (ii) Alfisols; and (iii) Aridisols



ABOUT THE INTERVENTION

Objective

The people of Ramganga village and Sundarbans, in general, are constantly fighting against the adverse effects of climate change for survival. Due to low-income opportunities, people migrate to different parts of the country for livelihood. Agriculture is the prime source of livelihood in the region. However, the per-capita land holding is less than 0.4 hectares (1 acre). The agricultural land's salinity is very high due to the inundation after saline water floods. This leads to mono-cropping, which is only cultivable during the rainy season. On the other hand, the high input cost of the cultivation results in crop failure due to erratic climatic conditions. Thus, an Integrated Farming System (IFS) was introduced in the



Glimpse of a typical farm pond of Sunderban region

village of Ramganga. IFS is a combined approach which aims at efficient, sustainable resource management for increasing productivity in the cropping system. It involves different components like trees, crops, and livestock arranged spatially and temporarily over the same unit of land for the best utilization of available resources. Various types of plants, livestock, mushroom, aquaculture, and other aquatic flora and fauna are managed for maximum productivity in such a way that they complement one another. The waste generated from one component is recycled and used as a resource for the other.

In 2017, DRCSC started with the capacity building training programmes and provided hand-holding support on climate adaptive agriculture. In 2018, the IFS approach in the family farm pond of the Sundarbans region was piloted with a corpus of INR 21,000 of which 1/3rd was contributed by the family and the remaining portion was contributed by the DRCSC through BMZ fund.

Result

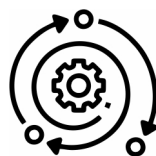
The farm ponds of Sundarban region have a landholding size of less than an acre (0.4 hectares). This small piece of land was underutilized due to lack of appropriate planning and optimal utilization of limited land. The pond now holds a total water storage capacity of 50 cubic meters.



Group Interaction with beneficiaries



Green bands between family ponds



IMPACT ANALYSIS

Economic Impact

Diversification of livelihood options through paddy cultivation, livestock, fish cultivation, and vegetable production: The total landholding size of the farmer is 0.24 ha of land. The land ecosystem is divided into three types, namely, Upland (0.04 ha), Low Land (0.13 ha), and Pond (0.07 ha). The intervention helped them in the holistic planning of the limited land space, which further supported them to increase their land productivity.

The Upland is used for growing vegetables and rearing livestock. Through the IFS model, the integration of vegetables and animals was made in such a way that excreta of the animal is used as a plant nutrient, and vegetable wastage was used for animal feeding. The excreta of animals is also being used as fish feed, and vegetable waste is transformed into compost and used during lowland cultivation.

Lowland is mainly used for paddy cultivation during the rainy season, which also helps in duck rearing and fish cultivation. On the one hand, fishes wandering inside the paddy field consume zooplankton and photo-plankton of fields, whereas ducks consume small insects from the fields.

The Pond water is used for fish cultivation and duck rearing, feeding insects, snails, etc. The pond water is also used for irrigating crops cultivated in the upland and lowlands.

Before the intervention, the farmer was only cultivating 5-6 varieties of crops. However, after the intervention, they learned that maximum varieties of crops should be cultivated to reduce climate risk. At present, they cultivate vegetable varieties such as Brinjal, Okra, Amarnath, Snake Gourd, Cucumber, Pumpkin, Bottle Guard, Chilli, Coriander, Maize, Radish, etc., to name a few.

Post-intervention, they were able to produce 1.5 quintals of vegetables in 2022 from the embankments and upland, from which they earned a profit of INR 15,000 and

INR 13,000 from livestock rearing. They also produced 160 kilograms of fish and 112 kilograms of paddy, from which they earned a profit of INR 17,600 and INR 10,000, respectively.

Social Impact

Improved adaptive capacity from the disasters:

The farmer highlighted that the last 2 cycles in 2019 and 2020 had the least impact on their lives and property as compared to when the IFS system was not introduced to them by DRCSC. They mentioned that it was the first time that their farm pond did not get submerged in water due to cyclones and flash floods.

Ecological Impact

Post-intervention, the farmer observed the growth of some natural plant species like Water Spinach, Centinela, Helencha (Marsh Herb), Kulekhera (Long-Leaved Barleria), etc.

Institutional Impact

To ensure family ownership, the implementing agency contributes 75 percent of the total funds, while families contribute 25 percent towards the development of the farm pond and an additional 25 percent to the Village Revolving Fund (VRF). DRCSC has introduced the VRF concept to facilitate financial support for multiple families. Each village where the organization operates establishes a village committee comprising 12-15 household members. For instance, in Gobindpur village, 15 households are part of the committee. Beneficiary farmers who receive financial assistance from the organization contribute 25 percent to the fund. This contribution aids other group members in accessing loans for implementing climate-smart models introduced by the organization in the region. This approach is necessitated by limited fund availability, which cannot fully support every household financially. However, this institutional mechanism serves to foster stronger relationships within the broader community.



WAY FORWARD

Need for more comprehensive plan from a vertical land perspective:

Due to the limited size of land which is less than an acre (0.4 hectares) leaves farmers with limited production capacity. They demanded more planning which helps them increase their land productivity through vertical planning thinking.



Green bands between family ponds

Climatic Zone: Sub Humid

Manyachi Wadi Pond: Thane, Maharashtra



Nature of Pond	Man-made
Place of Implementation	Manyachi Wadi Village, Murbad Block, Thane District, Maharashtra
Year of Rejuvenation	2022
Total Investment in Rejuvenation	INR 10,00,000
Implementation Agency	Vasundhara Sanjeevani Mandal (VSM)
Funding Agency	Finance Commission Funds
Ecosystem Services	
Provisional	Regulating
Supporting	Cultural



CONTEXT

The Manyachi Wadi pond, located within the Murbad block of Thane district, Maharashtra, resides in a sub humid climatic zone within the tropical monsoon region, as classified by the Central Ground Water Board in 2013. The landscape predominantly comprises Deccan basalt (80 percent) and coastal alluvium (20 percent). The district experiences a mean maximum temperature of 32 degree Celsius, with an average annual precipitation of 3000 mm. Groundwater development stands at 11.28 percent, and nearly 98 percent of irrigation relies on groundwater. The soil composition consists of brown and sandy soil, with reddish soil near the coastal region, making it suitable for paddy cultivation, horticulture, and orchards. However, the area contends with water-related challenges like irregular subsurface layers, perennial rivers, and ineffective rainwater utilization, leading to summer water scarcity. Additionally, the impact of industrialization is evident in the deteriorated water quality, with groundwater pH rising from 7.71 to 8.18 and Total Dissolved Solids (TDS) increasing from 760 to 975 mg/l.

Thane district, situated between the Sahyadri ranges and the Arabian Sea coast, has a 113 kilometers long coastline. Drained by the Vaitarna and Ulhas rivers, it features Deccan basalt (80 percent) and coastal alluvium (20 percent). The district experiences a mean maximum temperature of 32 degree Celsius, annual precipitation of 3000 mm, and faces groundwater challenges with 11.28 percent development. Over 98 percent of irrigation relies on groundwater, hinting at a need for sustainable management to prevent seawater ingress. Industrialization has driven the district's development, covering 5,942 square kilometers with a population density of 1,008 per square kilometer, mainly urban.

During the interviews and focus group discussion with the villagers, it became evident that water scarcity

had been a significant challenge in their lives, directly impacting their livelihoods. Water scarcity affected their agricultural activities and had broader implications to the community's socio-economic condition.

Agriculture is the main occupation in the village, and water availability is crucial for their crops. The villagers only relied on rain-fed crops, particularly paddy. This limited their agricultural productivity and profitability. The lack of water prevented them from cultivating high-yielding or cash crops that could have provided better incomes. The intermittent agricultural income increased economic instability in the village.

Livestock farming also contributed significantly towards the livelihood of the participants. However, they had to sell their cattle due to water scarcity, as they couldn't provide enough water and fodder for their animals. This resulted in the loss of an essential source of income and weakened their overall economic stability.

The water scarcity issue forced many villagers to migrate to other regions for employment during seasons when agriculture was impossible. A need to find alternative sources of income and livelihood created a migration cycle, disrupting family and community cohesion. It also put an additional strain on the villagers, especially women, by putting them at the forefront of ensuring water availability to the households and fields.

Water scarcity also had social implications for the villagers. Lack of water for daily needs, such as drinking, cooking, and sanitation, posed significant challenges. The villagers had to travel 1.5 to 2 kilometers to fetch water, which was time-consuming and physically demanding.

After understanding the impacts of water scarcity, it became clear that addressing it was essential for the villagers' livelihoods, economic stability, and overall quality of life. The rejuvenation efforts made by the implementation agency aimed to alleviate these challenges by providing a sustainable water source for agricultural activities, livestock farming, and domestic use, ultimately improving the socio-economic conditions in the village.



ABOUT THE INTERVENTION

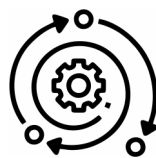
Objective

The accumulation of silt over time caused the pond to reach the same level as the surrounding land, thereby reducing its capacity. This situation led to a lack of water availability, ultimately worsening the situation of migration from the area. Water scarcity affected the villagers' agricultural productivity, limiting them to rain-fed crops like paddy. The villagers had to migrate to other regions for employment during different seasons. Furthermore, they were forced to sell their cattle due to the water scarcity.

Realising the importance of addressing these challenges, VSM took the initiative to desilt the pond. The primary objective was to provide water for livestock and enhance agricultural productivity by recharging the nearby wells. This resulted in the cultivation of both rabi and kharif crops, along with some horticultural crops by farmers. The desilting process involved the community's active participation in transportation as people brought their tractors to assist the contractor in removing the desilted soil. The initiative received funds from gram panchayat funds allocated by the 15th finance commission, indicating financial support from the local governing body. This effort alleviated the water scarcity issues, enabled diversification of crops, and provided more stable livelihood options for the villagers, reducing the need for seasonal migration and the sale of cattle.



Interaction with community members



IMPACT ANALYSIS

Economic Impact

- With the rejuvenation of the pond, the duration of water availability in their wells has increased and their dependency on rainfall for irrigation has reduced. The increased water availability in Manyachi Wadi village in Murbad taluka enabled farmers to plant more crops than just paddy, such as vegetables (lady finger, eggplant, tomato, etc.) and fruits (Jamun, mango, and papaya). They now cultivate high-yielding crops and practice multiple cropping, which generates a source of income for them rather than just meeting the family's consumption needs. This has ultimately led to enhanced agricultural productivity, higher crop yields, and improved farmers' income.
- Water availability for livestock farming is essential. The rejuvenated pond now provides a reliable water source for the villagers' livestock, allowing them to resume and expand their livestock activities. This revival of livestock farming can now further increase the breeding and sale of animals, providing additional income streams for the villagers.
- The rejuvenated pond also provides pisciculture as a livelihood activity. The Gram Panchayat provides a contract to the villagers for doing fisheries in the rejuvenated pond. A contract specifies the duration (5 years), conditions, and guidelines, such as how much tax is to be paid by the farmer on fishing profits. Pisciculture has enabled the villagers to produce and harvest fish directly. This can serve as an additional source of livelihood and income for the community members involved. By actively managing the fishery, they can benefit from the sale of fish, generating revenue and improving their economic well-being.

Social Impact

- The rejuvenated pond provides a reliable and accessible water source to the villagers. Approximately, 11 bawdi get recharged from the pond, of which, 3 are used for drinking water purposes. This has directly improved their situation by providing a sustainable source of drinking water. Villagers no longer have to travel 1.5-2 kilometers to fetch water for their basic needs, such as drinking, cooking, and sanitation. Improved water availability contributes to enhanced hygiene, health, and overall well-being within the community.
- Pond rejuvenation has created new livelihood opportunities for the villagers, improved water supply and expanded agricultural activities beyond rain-fed crops. This has resulted in increased agricultural productivity and income generation, contributing to poverty reduction and economic empowerment within the community.
- Water scarcity often compelled villagers to migrate for employment, but the rejuvenation of the pond and subsequent improvement in water availability for agriculture and livestock have decreased the need for seasonal migration. This reduction positively impacts the community's social fabric by promoting family stability, preserving cultural traditions, and fostering a stronger sense of community cohesion.
- Pond rejuvenation project involves active community participation, with villagers contributing

their labor or resources during the desilting process and participating in decision-making through community meetings. This engagement fostered a sense of ownership, empowerment, and pride among the villagers. They feel invested in the project's success and develop greater responsibility for the pond and its sustainable management.

- Pond rejuvenation has catalysed social interactions and community gatherings. The revitalised pond serves as a hub for cultural events, festivals, and recreational activities, fostering stronger social cohesion. The village celebrates Ganesh Chaturthi as their main festival, with processions and festivities taking place around the pond, contributing to the cultural revival and strengthening community ties.

Ecological Impact

The improved water quality, habitat structure, and resource availability has contributed to increased pond biodiversity. The villagers claimed that the tiger, the wild cats, wild boars, and the nilgai have been drinking water from the pond.

Institutional Impact

The pond has been recently handed over to the village panchayat. The village has a population of approximately 500 members. No committee has been formed to institutionalise the pond rejuvenation and sustenance.



Interaction with implementation agency



WAY FORWARD

- **Vegetation and Buffer Zones:** Establish a vegetative buffer zone around the pond to act as a natural filter. Plant native aquatic plants and vegetation that can absorb excess nutrients and help prevent runoff from entering the pond. These plants also provide habitat for beneficial organisms and improve water quality.
- **Proper Waste Disposal:** Plastic bags and cans have been observed in the pond. There is a need to encourage responsible waste disposal practices near the pond. Discourage littering, and provide clearly marked trash and recycling bins. Educate the community about the importance of proper waste management to prevent pollutants from entering the pond.
- **Minimize Chemical Usage:** Villagers have been observed washing their clothes with detergent in the same pond where the fisheries happen. The Implementation agency needs to sensitise the community to avoid or minimise the use of chemicals in and around the pond. Chemical pollutants can disrupt the pond ecosystem and harm aquatic life. And the community can take out the water from the pond and do their household work separately.
- **Water Testing and Monitoring:** Establish a water testing and monitoring program to assess the water quality parameters of the pond regularly. This will help identify any emerging pollution issues and enable timely corrective actions.



Beneficiaries using the pond for household chores



The rejuvenated pond provides a reliable water source for the villagers' livestock

LEARNING & RECOMMENDATIONS

Analysis of the pond rejuvenation models in the aforesaid geographies reveal gaps. Building upon these, the following recommendations become apparent for rejuvenation under the Mission Amrit Sarovar.

- 1. Pond rejuvenation intervention must foster community participation.** Starting from the purpose setting for the pond rejuvenation exercise, to the rejuvenation work itself and post rejuvenation maintenance, participation of the community is imperative to ensure sustainability of the intervention. Some methods by which this can be ensured are:-
 - **Establishing a Community Committee:** Form a committee comprising local residents, community leaders, and relevant stakeholders. This committee will serve as a platform for discussion, decision-making, and implementation of rejuvenation initiatives.
 - **Conducting Public Meetings:** Organise public meetings or town hall sessions to educate the community about the importance of pond rejuvenation. Present information on the current state of the pond, the ecological benefits of restoration, and the potential recreational and aesthetic enhancements.
 - **People based Monitoring & Evaluation:** Involve community members in the ongoing maintenance and monitoring of the pond. Encourage them to report any issues, participate in clean-up drives, and contribute to the sustainable management of the ecosystem.
- 2. Pond rejuvenation demands maintenance, funding mechanisms must be thought through.** A rejuvenated pond may require regular repair and maintenance. While this investment may not have been covered in the original budget by the implementation agency, or the Government in case of the Mission Amrit Sarovar, funding mechanisms must be considered well in advance to fund these activities. Crowdfunding by the community from enhanced livelihood (in case of linkages to fisheries or aquatic farming) or earnings from eco-tourism may help cover for these costs. This requires converting the pond into an income generating source.
- 3. Pond rejuvenation under the Mission Amrit Sarovar Pond needs focus on training and capacity building** especially in the case where PRIs are solely responsible for work. In the case where CSOs are involved who have the capacity and skills on 'how to carry out pond rejuvenation', there is not much to worry about; however, PRIs lack skills to take up activities that have an enormous amount of technicalities involved.
- 4. Climatic and topographical variation should be accounted for while designing pond rejuvenation under the Mission Amrit Sarovar.** India is blessed with different types of terrain ranging from cold mountain, hot humid, arid and coastal to name a few (refer to Map 1 for India's climatic zone). Thus, one stop solution cannot be an answer for Indian geography. The pond rejuvenation guidelines must acknowledge and address the solution for different climatic conditions and challenges of India.

WHAT FACTORS TO KEEP IN MIND FOR IMPLEMENTING AN ECOSYSTEM-BASED POND REJUVENATION?

1. **Assess the Pond Ecosystem:** Begin by conducting a comprehensive assessment of the pond ecosystem. Evaluate water quality, nutrient levels, vegetation, and wildlife populations. This assessment will help identify specific issues and inform the rejuvenation plan.
2. **Improve Water Quality:** Enhance water quality by reducing or eliminating pollution sources such as runoff from nearby agricultural or urban areas. Implement measures like constructed wetlands or biofiltration systems to naturally filter and cleanse the water.
3. **Enhance Vegetation:** Introduce native aquatic plants in and around the pond. These plants serve multiple purposes, such as oxygenation, nutrient uptake, and providing habitat and food sources for various organisms. Choose plants that are adapted to the local climate and maintain a diverse mix of species.
4. **Control Invasive Species:** Identify and remove invasive plant species that can outcompete native vegetation and disrupt the ecosystem. Implement management strategies such as manual removal, targeted herbicide application, or biological controls to maintain a healthy balance.
5. **Create Habitat Diversity:** Design the pond and its surroundings to include a variety of habitats. Incorporate shallow areas, submerged plants, floating islands, and woody debris to provide breeding grounds, shelter, and feeding opportunities for different species.
6. **Minimize Chemical Usage:** Avoid or minimize the use of chemicals, such as pesticides and fertilizers, in and around the pond. These chemicals can harm aquatic life and disrupt the balance of the ecosystem. Explore natural and organic alternatives whenever possible.
7. **Promote Wildlife Conservation:** Encourage the presence and diversity of wildlife by providing appropriate habitat features. Install nesting boxes, bird perches, and floating platforms to support various bird species. Create basking areas for reptiles and amphibians, and consider introducing fish species that are native to the region.
8. **Educate and Engage the Community:** Promote public awareness about the importance of maintaining a healthy pond ecosystem. Conduct workshops, training sessions, and educational programs to inform the community about sustainable pond management practices and the ecological benefits of a rejuvenated pond.

Challenges & Limitations

At the very least, pond rejuvenation models under Mission Amrit Sarovar can be categorized into two broad types:- the ones facilitated by the Government end to end, and the ones facilitated by the local Civil Society Organizations or Non-Governmental Organizations but accredited by the Government as a good case model under the Mission. Unfortunately, due to the Mission having launched only in 2022, most Government-led pond rejuvenation interventions under the Mission, as identified by Development Alternatives, were underway and couldn't be studied for impact evaluation as extensively.

CONCLUSION

There has been increased emphasis on rejuvenating ponds as could be seen in government policies and action plans at various tiers to mitigate the water crisis the nation is facing specifically because of mismanagement of its resources. Through Mission Amrit Sarovar the government has tried escalating the revival of surface water bodies (ponds) to its maximum potential. This compendium with a mission to document the pond rejuvenation interventions aims to gather ample evidence to enrich any such policy initiatives in India by providing successful evidence from ground. To learn from and implement such practices in a contextualized manner the collection attempts to study interventions based on the climatic zones in the country. This compendium envisions a dynamic journey towards a more comprehensive understanding of pond rejuvenation's transformative potential. Like ripples expanding across water's surface, it calls upon practitioners, academics, communities, and development partners to contribute their experiences, thereby enriching the reservoir of knowledge.

The aim is also to make a template for documenting such interventions based on the holistic approach of four pillars such interventions caters to- social, ecological, economical, and institutional. With a purpose to document more such cases to feed into the policy making loop for water resources in India, this

compendium is expected to be more data intensive and is expected to inculcate micro-climatic zones of the country to formulate national but contextualized cases for pond rejuvenation. There has been development in understanding towards the interconnectedness of human and nonhuman interactions. Thus, doing interventions of such sort would require multidirectional flow of knowledge to learn from and replicate best case practices to fit into the hydrological ecosystem. Ponds exemplify the flow of water, life, and livelihoods between these interconnected spaces. These embody a spectrum of ecosystem services- from ensuring water security of the region to providing microclimatic regulation- mirroring the circular movement across the Human-nature continuum.

The rejuvenation of ponds beckons participatory approaches and integration of diverse stakeholders. This compendium highlights the necessity of collaborative governance, where traditional wisdom harmonizes with contemporary innovation to bridge policy gaps and address data needs. The vision for pond rejuvenation is one where these water bodies become vibrant hubs of ecological, social, and economic interplay. The journey has just begun, and through collaborative efforts, we can forge a more sustainable and secure water future, where ponds serve as enduring symbols of harmony between humanity and nature.



Interaction with members of pond committee, Gendasagar talab, Dewas, Indore



[Development Alternatives](#) (DA) is a premier social enterprise with a global presence in the fields of green economic development, social empowerment, and environmental management. It is credited with numerous innovations in clean technology and delivery systems that help create sustainable livelihoods in the developing world. DA focuses on empowering communities through strengthening people's institutions and facilitating their access to basic needs; enabling economic opportunities through skill development for green jobs and enterprise creation; and promoting low carbon pathways for development through natural resource management models and clean technology solutions. DA works in addressing three global challenges namely-

Resource Efficiency and Circular Economy-Accelerating the transition to inclusive and circular modes of production and consumption by reducing carbon and material footprints across the lifecycle of economic activity while promoting local value and wealth creation.

Climate Resilience and Ecosystem Restoration-Regenerating lost biodiversity and degraded ecosystems and building resilience to climate change and extreme events in a manner that also generates prosperity.

Livelihood Security and Inclusive Entrepreneurship-Innovative business models and institutional ecosystems to empower local entrepreneurs for creating businesses that generate jobs and deliver basic needs.

Our solutions in addressing these issues are focused in nine sectors- namely Waste Management, Human settlements, Decent work, Climate Response, Sustainable Enterprise, Empowering Communities, Water Solutions, Sustainable Agriculture, and Green Energy.

Since 1982, Development Alternatives has impacted approximately 20 million lives.



[The Nature Conservancy](#) is a global environmental nonprofit working to create a world where people and nature can thrive. Founded in the U.S. through grassroots action in 1951, The Nature Conservancy (TNC) has grown to become one of the most effective and wide-reaching environmental organisations in the world. It has more than a million members and a dedicated, diverse staff of over 400 scientists and impacts conservation in 79 countries and territories: 37 by direct conservation impact and 42 through partners.

