IndusInd Bank

WATERBODIES RESTORATION PROJECT

Impact Assessment Report

FOREWORD

Waterbodies, whether they be lakes, ponds, or rivers, are an essential part of our ecosystem. They support a diverse range of aquatic life, play a crucial role in maintaining the water cycle, and provide an invaluable source of freshwater for our communities. Unfortunately, due to human activities, many of these waterbodies have been neglected and have fallen into a state of disrepair.

The impact of decaying waterbodies is not only limited to the aquatic life that resides within them, but it also affects the surrounding environment and the communities that depend on them. Neglected waterbodies become breeding grounds for disease-carrying insects, reduce the water-holding capacity of the land, and affect the quality of air that we breathe. Moreover, they are also a threat to public safety, especially during monsoons, when water levels rise and often cause flooding in nearby areas.

Therefore, it is essential that we take steps to restore these waterbodies and improve their health. The restoration of waterbodies has a significant impact on the ecology, aquatic life, and the community. It helps in maintaining the water cycle, improves air quality, and provides a habitat for diverse aquatic life. Additionally, it enhances the aesthetic value of the area, which in turn, attracts tourism and generates economic opportunities for the local community.

Not only that but restoring waterbodies can help to mitigate the impact of climate change by reducing the risk of flooding and erosion, increasing the storage capacity of water, and promoting the growth of vegetation. The restoration is a critical step in ensuring the sustainability and resilience of our environment.

The waterbodies restoration project discussed in this report is a significant step towards this goal. The project aims to restore the health of several waterbodies by removing silt, invasive weeds, and garbage, constructing strong bunds, and planting diverse plant species. Through these efforts, the project has not only improved the ecological health of the waterbodies but also created a positive impact on the surrounding communities.

The objective of the restoration is to clean, purify, and restore waterbodies, adopting a holistic approach that addresses all elements of an ecosystem such as soil, hydrology, flora, and fauna.

Restoring waterbodies is a daunting task that requires a concerted effort from all stakeholders. Our project is an excellent example of how collaborative efforts can achieve meaningful results. However, the journey has not been without its challenges. The restoration of waterbodies requires a long-term commitment and the adoption of sustainable practices. It requires the participation of the community and the government, and the active involvement of all stakeholders.

Importance of waterbodies restoration

- ✓ Serves as a sink for carbon storage
- ✓ Reduces the risk of floods
- ✓ Reduces the levels of phosphorous and nitrogen in waterbodies
- ✓ Controls excessive growth of microphytes
- ✓ Prevents encroachment
- ✓ Prevents pollution and spread of diseases
- ✓ Preserves lakes to its original glory

EXECUTIVE SUMMARY

The waterbodies restoration project, in collaboration with Environmentalist Foundation of India (EFI), aimed to address the deteriorating conditions of several lakes and ponds across India. The project's objectives were to remove silt, invasive weeds, and garbage, strengthen bunds, construct inlets and outlets, and plant saplings and diverse species of flora to support the ecology of the waterbodies.

The project has been successful in achieving its objectives, resulting in increased water capacity, improved water quality, and biodiversity, providing nesting sites for several birds that flock in and around the ponds. The project has also had a significant impact on the surrounding communities, replenishing the groundwater table, and positively impacting the lives of thousands of residents.

The restoration project aimed to address several Sustainable Development Goals, including 11, 14, 15, 6, 8 and 3.

By restoring the waterbodies, the project helped strengthened the bunds and constructed fences to prevent encroachment and preserve the ecosystem, contributing to SDG 11 (Sustainable Cities and Communities), and helping promote sustainable urbanisation. Furthermore, the project promoted biodiversity by planting hundreds of different species of trees and plants, contributing to SDG 14 (Life Below Water) and SDG 15 (Life On Land).

The restoration of multiple lakes and ponds also contributed to SDG 6 (Clean Water and Sanitation) by removing silt, garbage, and invasive weeds, and increasing the storage capacity of the waterbodies and also created employment opportunities, contributing to SDG 8 (Decent Work and Economic Growth).

The project directly and indirectly impacted over 200,000 people, contributing to SDG 3 (Good Health and Well-Being) by replenishing the groundwater table, improving the water quality, and providing a healthier ecosystem for local flora and fauna.

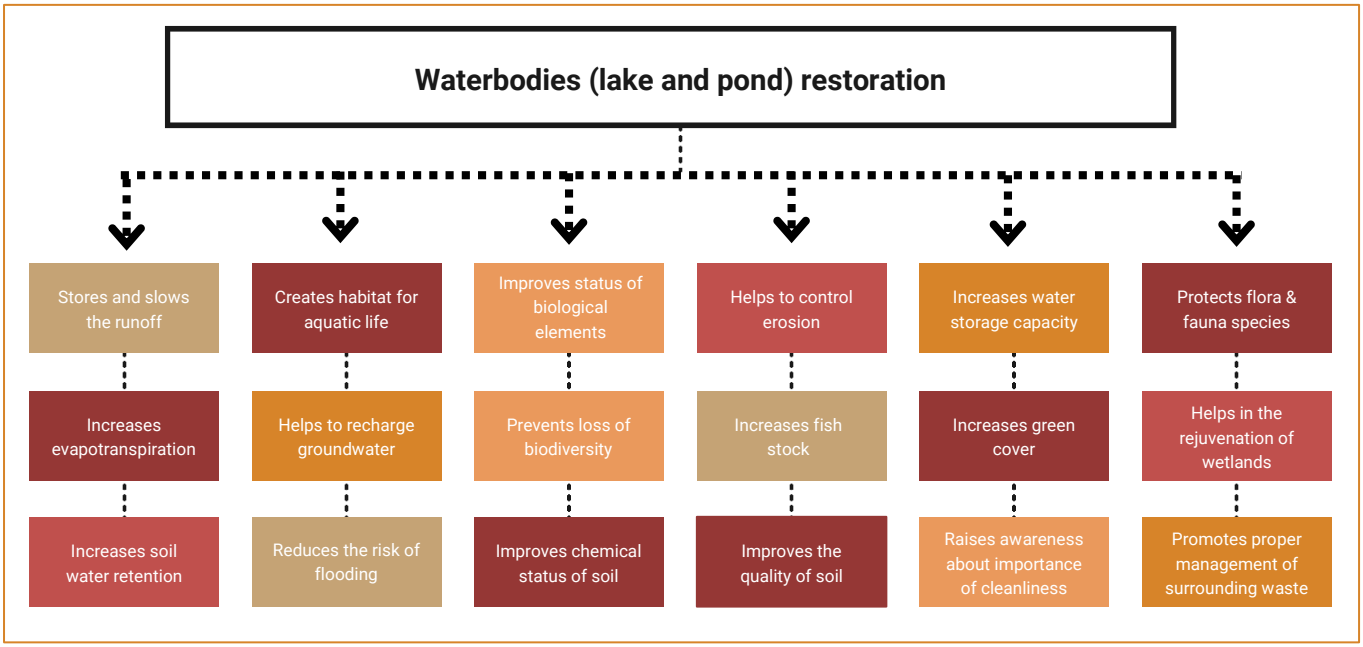
Overall, the project successfully addressed multiple Sustainable Development Goals, contributing to a sustainable future for the local community and environment.

We hope that this project serves as an inspiration for others to take up similar initiatives and join hands in restoring our planet's natural resources.

Key Findings and Recommendations

- ✓ Effective management of inlet and outlet points is crucial for monitoring and disposing of solid waste and garbage in waterbodies.
- ✓ Regular monitoring of the project's impact and activities is important for its continued success.
- ✓ It is recommended to involve both urban and rural government officials, as well as local communities, in the monitoring and maintenance of the project.

Key Impact



RESEARCH METHODOLOGY AND DESIGN

The results were analysed following the OECD DAC Network on Development Evaluation criteria, which looked at the performance and impact of the programme based on six evaluation criteria: relevance, coherence, efficiency, effectiveness, impact, and sustainability for each of the indicators.

Evaluation Criteria	How the project supports it
Relevance Is it doing the right thing?	Lake restoration brings new life to the marine life as well as in the surrounding areas.
Coherence How well does the intervention fit?	It interlinks the 6 SDGs which result in decent economic growth, clean water, sustainable cities and life betterment if carried out and maintained properly.
Effectiveness Is the intervention achieving it's objective?	More than 4-5 lakh people benefited directly, including improvement of soil and biodiversity.
Efficiency How well are resources being used?	The intervention is carried out to fulfill all the requirements, implementation of the methods correctly have a long-lasting positive impact.
Impact What difference does the intervention make?	The intervention creates many impacts such as improved water quality, developing green space, spreading awareness, more oxygen, etc.
Sustainability How long and will the benefit of the intervention last?	It is one time investment but lack of public support and not maintaining cleanliness long term affects the lifecycle of the intervention.

BACKGROUND: UNDERSTANDING THE CHALLENGES

The project assessed the conditions of five water bodies across the country, namely Makarba lake in Gujarat's Ahmedabad; Mettuvavi Oorani lake in Tamil Nadu's Coimbatore; Karimadom pond in Kerala's Trivandrum; Rayanal lake in Karnataka's Hubli; and Senguttai pond in Tamil Nadu's Kattampati, and mapped the problem areas.

Mettuvavi Oorani lake	Makarba lake
• Irregular maintenance	• Growth of algae
• Cover of overgrown dry shrubs	• Sewage dump
• Loss of water	• Reduced storage capacity
• Nearby agricultural land impacted negatively	• Ecological threat
• Loss of biodiversity	• Clogged water supply
• Too much silt.	• Anthropogenic stress
Karimadom Colony pond	**Rayanal lake**
• Biodiversity loss	• Increased urbanization
• Eutrophication	• Reduced water holding capacity
• Encroachment	• Excessive silt
• Dumpsite for solid waste	• Lost catchment area
• Health issues reported from nearby areas	• High nitrogen content
• Damaged food chain	• Frothing
• Pollution	• Garbage dump.
Senguttai pond	
• Growth of water incentive crops	
• Depletion of groundwater	
• Biodiversity loss	
• Loss of water.	

KEY INTERVENTIONS

Several measures were taken for the restoration of the waterbodies.

Mettuvavi Oorani lake	Rayanal lake
• Removal of invasive weed	• Removal of invasive weed
• Inlet and outlet regulation	• Inlet and outlet regulation
• De-silting	• De-silting
• Creation of bund and recharge pit	• Creation of bund and recharge pit
• Fencing and plantation of native trees	• Fencing and plantation of native trees
• Creation and maintenance water holding bund	• Creation and maintenance water holding bund
Makarba lake	**Karimadom Colony pond**
• De-silting	• Removal of 180 tonnes of invasive species
• Dredging (42 tonnes)	• Construction of embankment
• Construction of bunds	• Dewatering
• Nesting islands (36)	• 263m of fencing
• Trenches (2ft)	• Waste removal
• Fencing (984 m)	• Dredging
• Plantation (3350)	• Jute pitching of 130m
	• Voluntary clean-up and plantation of 409 saplings
	• Setting up of an eco-park
Senguttai pond	
• Removal of invasive species	
• Inlet and outlet regulation	
• Removal of sediment along the periphery	
• Creation of 400m bund, and a recharge pit	
• Fencing around the pond	
• Plantation of native species	

IMPACT OF THE PROGRAMME

The restoration project has had direct impact on the waterbodies, the flora, fauna and the surrounding ecology.

IMPACT							
Implementing Partner	**Project Location**	**Beneficiaries**	**Indicators**	**Units**	**Before**	**After**	**Remarks**
Environmentalist Foundation of India	1. Makarba lake, Ahmedabad, Gujarat 2. Mettuvavi Oorani lake, Coimbatore, Tamil Nadu 3. Karimadom pond, Trivandrum, Kerela 4. Rayanal lake, Hubli, Karnataka 5. Senguttai pond, Kattampati, Tamil Nadu	5,00,000	a. Total solid waste removed	tonnes	0	512	As part of the lake restoration project, primary debris from the lakes is removed using mechanical methods. This process increases the capacity of the project and allows for the removal of other debris and impurities, ultimately leading to improved water quality and sustainability.
			b. Total weeds removed	tonnes	0	475	After the removal of waste, non-native weeds are targeted for removal to promote a healthier ecosystem within the lakes. By removing these non-native species, the lakes are better able to support local flora and fauna, leading to a more sustainable and natural environment.
			c. Total area of encroachment recovered	sq. mtr	0	12057	During the debris removal process, illegal encroachments are identified and removed in order to restore the lake to its original shape and size. This ensures that the project is consistent with environmental regulations and that the lakes are better able to support aquatic life and natural habitats.
			d. Average increase in storage capacity of the lakes	%	10	37.7	With the removal of debris and non-native species, the lakes are better able to support natural habitats and aquatic life, resulting in an increased capacity to store water. This increase in water storage capacity can help mitigate the effects of drought and other water-related challenges.
			e. Total quantum of silt excavated	cub. mt	0	53500	Mechanical methods are employed to remove debris, silts, excess gravels, and impurities in order to maintain the natural slopes and structure of the lakes. This helps to improve water quality and restore the ecological balance of the lake ecosystem.
			f. Increase in soil water retention	Mtr. Ton	3	9	Due to the removal of debris and weeds through various mechanical and civil methods, there is now additional space in the lakes which can be utilised for water storage. This has resulted in an increase in the water storage capacity of the lakes.
			g. Aquatic habitat created	Acres	140	355	With the improved water storage and water quality resulting from the removal of debris and weeds, there has been an increase in the area of aquatic habitats in acres, with the observation of additional habitats.

1. On Makarba lake

The Makarba lake had weak bunds and was full of silt, prompting the project to remove the silt, construct stronger bunds, and plant vegetation around them. The project successfully achieved its objective, resulting in an increase in the lake's water capacity and the establishment of sturdy bunds around it.

- Increase in storage capacity
- Mitigation of floods
- Erosion prevented
- Increase in groundwater recharge
- Reduction in soil degradation
- Increase in percolation of water
- Inflow to Sarkhej Roza
- Cleaner surrounding

Impact on flora and fauna

As a result of the restoration project, the impact on flora and fauna has been significant. In an effort to increase green cover and provide ecological services, 3350 native tree saplings such as the Neem, Gulmohar, and Gooseberry were planted. These trees not only provide habitat and breeding areas for fish, birds, and other organisms but also contribute to improving the overall ecosystem.

Impact on community

The restoration project had a direct impact on approximately 45,000-50,000 individuals through the removal of waste and the planting of trees, which resulted in a cleaner and greener environment. Additionally, the nesting island provided

a habitat for various organisms. The project also had an indirect impact on a 4km radius covering nearly 350,000 residents, as the lake is upstream to the historic Sarkhej tank.

2. On Mettuvavi Oorani lake

The Mettuvavi Oorani lake was heavily impacted by silt accumulation and invasive weeds, with no proper inlet and outlet. The project aimed to remove the silt and invasive weeds, and construct an inlet and outlet for better management of water flow. The objective was successfully achieved, resulting in an increase in the water capacity of the lake.

- Increases water holding capacity
- Regular flow of water
- Increased percolation
- Farmers benefited from lake
- Ecological restoration
- Increase in flora and fauna

Impact on flora and fauna

Close to 400 saplings were planted as they help in improving the biodiversity of the water body and serve as nesting sites for several birds that flock in and around the pond.

Impact on community

Replenishing the groundwater table of the region and planting saplings directly impacted approximately 8,000 people.

3. On Rayanal lake

The Rayanal lake had a significant amount of silt and garbage accumulation, which reduced its storage capacity and weakened the bunds. The project aimed to remove the silt and garbage, strengthen the bunds, and increase the water storage capacity. The project successfully achieved its objectives, resulting in a significant increase in the water capacity of the lake and the presence of stronger bunds.

- Less garbage dumping
- Flood resilience
- Water percolation
- Increased green cover
- Reduction in surrounding temperature
- Protection of biodiversity

Impact on flora and fauna

Approximately 1,600 plant species, including neem, amla, and banyan trees, were planted to balance the local atmospheric conditions of the region. The lake, which was previously full of garbage, substantial quantities of silt, and shallow bunds, has now been transformed into a fully refurbished eco-system. The eco-system has been clearly demarcated and protected, and there has been a significant increase in the water holding capacity.

Impact on community

The project has a direct impact on 50,000 to 60,000 people, benefiting them through the restoration and protection of the lake ecosystem. Additionally, an estimated 90,000 people may also benefit indirectly from the project's outcomes.

Image: Present Status of the Lake(non-existent bunds)

Image: Garbage Dumps Near the Lake

4. On Senguttai pond

The Senguttai lake faced issues with weak bunds and invasive weeds. The project aimed to remove the silt and invasive weeds, strengthen the bunds, and construct fences. The project was successful in achieving its objectives, resulting in an increase in the water storage capacity of the ponds, along with stronger bunds and fences.

- Increase in water storage capacity
- Increase in soil water retention
- Increase in biodiversity
- Benefits to local farmers

Impact on flora and Fauna

Approximately 220 different plant species including Mangifera indica,(Mango), Azhadirachta indica (Neem Tree), Pongamia pinnata (Pongame oiltree), and Syzygium cumin (plum) were planted to support the ecology of the pond and maintain the eco-park. This initiative provided life to the surrounding area.

Impact on community

The restoration of the pond has directly impacted 5,000-7,000 residents in the neighbourhood and indirectly impacted nearly 20,000 residents in the surrounding area.

5. On Karimadon Colony pond

The Karimadon Colony Pond was full with invasive species and garbage. The Project objective was to remove the invasive species, garbage and construct fences. The project was able to achieve the objective. There is an increase in the water holding capacity of the pond.

- Decrease in soil erosion
- Increase in surrounding water quality
- Natural filtration
- Safe environment
- Recharge groundwater level
- Wall painting activities increase awareness
- Maintain the local species

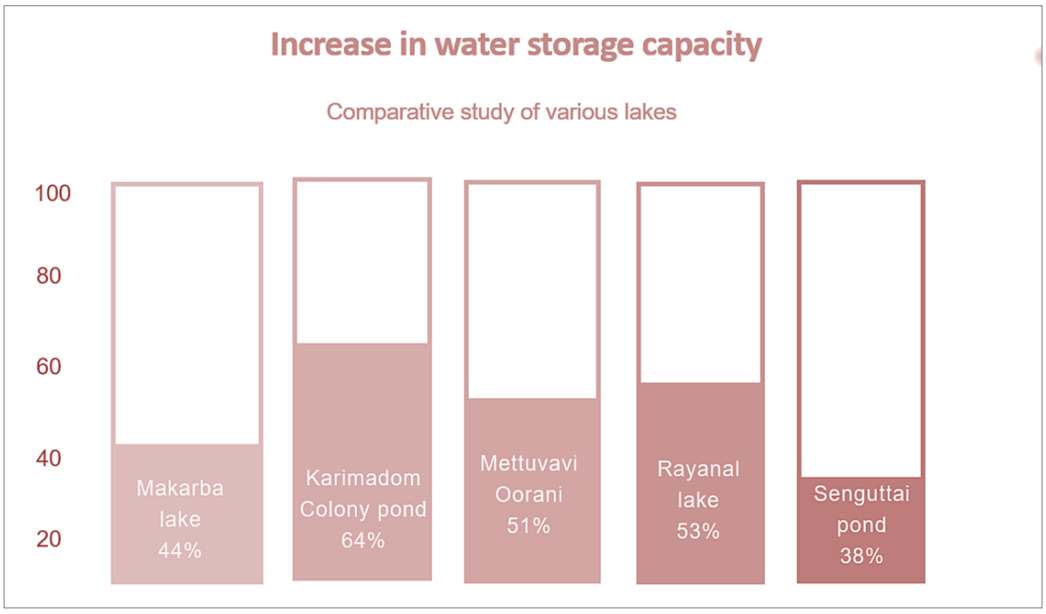
Impact on flora and Fauna

Close to 400 saplings were planted, they help in improving the biodiversity of the water body and serve as nesting sites for several birds that flock in and around the pond.

Impact on community

Directly impacted 10000 people. 180 tonnes of waste and invasive weeds were removed indirectly impacting 20,000 people
64% increase in water storage capacity. Cleaning of waste reduces the spread of diseases

Increase in water storage capacity



ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS

SDG targeted	Indicator addressed	How the projects are addressing it
	6.1, 6.3, 6.4, 6.5 6.6, 6.1 6.b	*Recreation of charged pits and trenches, management of solid entering into waterbody stop eutrophication. Recreation of recharge pits*
	14.1, 14,2, 14.5,	Removal of invasive species and garbage, catchment treatment, Removal of garbage and waste, clean environment for marines species
	15.1, 15.3, 15.5, 15.8, 15.9, 15.b	Plantation of endemic species, plantation of trees, retain native species, removal of invasive weeds, provide clean environment for marine species, creation of nesting island
	8.9	Proper manage lake provides recreational opportunities for citizens and mode of revenue, increases land value, benefits farmers
	3.3, 3.9	Providing clean and green environment, develop eco-park, reduction of nuisance, odor and visual blight, improves aesthetic appearance, increases quality of life,
	11.6, 11.7, 11.a	Prohibition of discharge or disposal of waste or washing activity and action against violators, awareness to people to protect waterbodies and surrounding area, reduces flooding and manages waste efficiently

CONCLUSION AND RECOMMENDATIONS

The project has successfully accomplished its aim of restoring lakes and ponds by enhancing its storage capacity and preventing encroachments. To ensure the success of future waterbody restoration projects, the following recommendations could be considered:

Conduct a thorough assessment of water quality before and after the restoration of the waterbody. Regular monitoring of water quality can help improve and assess the effectiveness of the project.

Collect data on flooding before and after the restoration project in the specific area. This is essential since there is significant investment involved in repairing the inlet and outlet of the waterbody.

GLOSSARY

Evapotranspiration: The combined process of water evaporation from the land surface and transpiration from plants.

Microphytes: Microscopic algae invisible to the naked eye.

Encroachment: The act of intruding upon someone's territory, rights, or property.

Sarkhej Roza: A 15th century historical complex located in Gujarat.

Neem: A tree belonging to the mahogany family.

Gulmohar: A flowering plant.

Desilting: The process of removing silt from a body of water.

Silt: Fine sand, clay, or other material carried by running water and deposited as sediment.

Dredging: The process of clearing the bed of a water body by scooping out mud, weeds, and rubbish with a dredge.

Anthropogenic stress: Environmental stress caused by human activities, particularly pollution.

Eutrophication: A process in which a water body becomes overly enriched with nutrients, leading to abundant growth of simple plant life.

Flora and fauna: Flora refers to all plant life, and fauna refers to all animal life.

Dewatering: The process of removing water from solid materials or soil through wet classification, centrifugation, filtration, or similar solid-liquid separation methods.

OECD: The Organization for Economic Cooperation and Development is an intergovernmental economic organisation with 38 member countries.

SWOT: A strategic planning tool that stands for Strengths, Weaknesses, Opportunities, and Threats.

SDG: The Sustainable Development Goals are a set of 17 global goals established by the United Nations General Assembly in 2015 to be achieved by 2030.