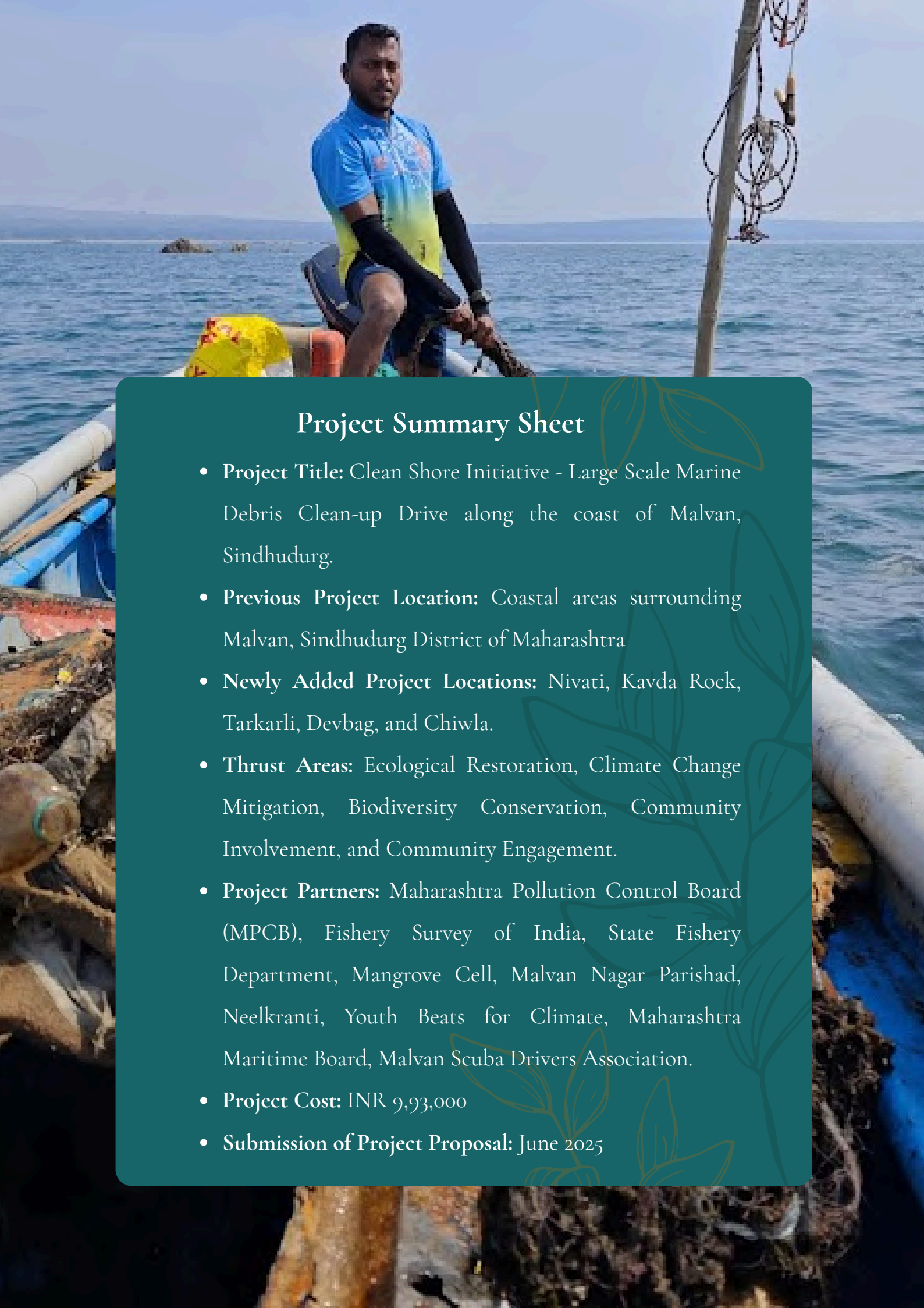
CLEAN-SHORE INITIATIVE – LARGE SCALE MARINE DEBRIS CLEAN-UP DRIVE AROUND THE COAST OF MALVAN, SINDHUDURG



Project Summary Sheet

- **Project Title:** Clean Shore Initiative - Large Scale Marine Debris Clean-up Drive along the coast of Malvan, Sindhudurg.
- **Previous Project Location:** Coastal areas surrounding Malvan, Sindhudurg District of Maharashtra
- **Newly Added Project Locations:** Nivati, Kavda Rock, Tarkarli, Devbag, and Chiwla.
- **Thrust Areas:** Ecological Restoration, Climate Change Mitigation, Biodiversity Conservation, Community Involvement, and Community Engagement.
- **Project Partners:** Maharashtra Pollution Control Board (MPCB), Fishery Survey of India, State Fishery Department, Mangrove Cell, Malvan Nagar Parishad, Neelkranti, Youth Beats for Climate, Maharashtra Maritime Board, Malvan Scuba Drivers Association.
- **Project Cost:** INR 9,93,000
- **Submission of Project Proposal:** June 2025

Clean Shore Initiative - Large Scale Marine Debris Clean-up Drive along the coast of Malvan, Sindhudurg.

Aim:

The aim of Phase 2 of the Marine Debris Clean-up Drive is to build upon the success of the initial cleanup efforts by intensifying the removal of non-biodegradable and hazardous waste from ecologically sensitive coastal and marine zones, while fostering greater community participation, awareness, and long-term stewardship. This phase seeks to address persistent marine pollution through collaborative action, targeted interventions at high-impact sites, and the establishment of sustainable waste management practices to protect marine biodiversity, support local livelihoods, and mitigate the environmental and socio-economic impacts of marine debris along the Konkan coastline.

Introduction

Marine debris, particularly plastic waste, represents one of the most pressing and complex environmental threats of the 21st century. The world's oceans are inundated with an estimated 8 to 12 million metric tons of plastic waste annually (Jambeck et al., 2015; UNEP, 2021), with projections indicating this could triple by 2040 without substantial intervention. Marine litter originates from both land-based sources, such as poorly managed urban waste, stormwater runoff, tourism, and industrial effluents, and ocean-based sources, including abandoned fishing gear, maritime transport, and offshore oil and gas activities.

This growing crisis directly undermines global efforts toward sustainable development, particularly:

- SDG 14 – Life Below Water: To conserve and sustainably use the oceans, seas, and marine resources.
- SDG 13 – Climate Action: Marine ecosystems, particularly mangroves and seagrasses, play a crucial role as carbon sinks.
- SDG 12 – Responsible Consumption and Production: By promoting the reduction and recycling of marine-bound waste.
- SDG 3 – Good Health and Well-being: Through the mitigation of human exposure to microplastics and associated toxins.

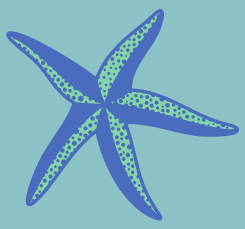
The Malvan coastal region in Maharashtra, situated within a designated Marine Protected Area (MPA), is globally recognized for its rich biodiversity, including coral reefs, seagrass beds, and endangered marine fauna such as olive ridley sea turtles, finless porpoises, dolphins, and other marine species. Despite its ecological significance, the area is increasingly affected by marine litter, particularly ghost nets (ALDFG—Abandoned, Lost, or otherwise Discarded Fishing Gear), polyethylene terephthalate (PET) bottles, multi-layered packaging waste, and microplastics.

Recent assessments conducted during Phase 1 of this initiative revealed the accumulation of over 2750 kg of non-biodegradable waste, with fishing nets comprising approximately 60% of the collected debris. Studies in comparable coastal ecosystems indicate that ghost gear can account for up to 70% of large plastic waste in marine habitats and continues to trap marine species unintentionally for years—a phenomenon known as "ghost fishing."

Scientific and Environmental Impacts of Marine Debris:

- Entanglement and Ingestion: Species such as sea turtles, dolphins, seabirds, and pelagic fish ingest or become entangled in debris, leading to injuries, reduced fitness, starvation, or death. For instance, 52% of sea turtles globally have been reported to ingest plastic (Schuyler et al., 2014).
- Habitat Disruption: Coral reefs are particularly vulnerable to physical damage from entangled nets and plastic entrapment, which reduce light availability, promote algal overgrowth, and increase disease susceptibility.
- Bioaccumulation and Toxicity: Plastics act as vectors for Persistent Organic Pollutants (POPs) like PCBs and DDT, and heavy metals that bioaccumulate up the marine food web. Microplastics have been detected in over 100 marine species and have been found in human stool, lung tissue, and placenta, posing as-yet-unclear long-term health risks.
- Carbon Sink Degradation: Plastic pollution affects blue carbon ecosystems—such as mangroves, salt marshes, and seagrasses—that sequester up to 70% more carbon per unit area than terrestrial forests. Degradation of these habitats compromises global climate goals.
- Economic Losses: Marine debris contributes to reduced fish catch, damaged fishing equipment, a decline in tourist appeal, and increased clean-up costs. A World Bank report (2019) estimates that marine litter costs the Asia-Pacific region up to $1.3 billion annually.

Purpose of the Marine Debris Cleanup Drive



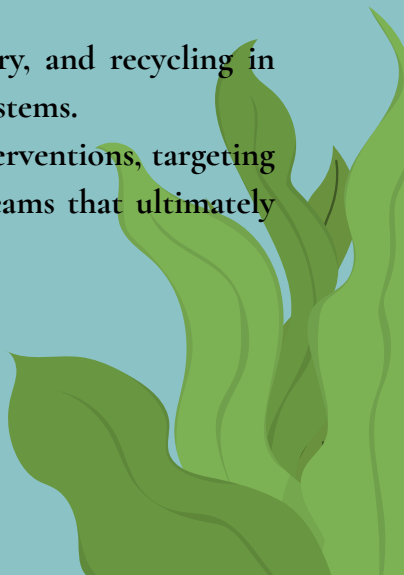
- Initiated as a multi-stakeholder, community-based intervention, the Marine Debris Clean-up Drive is designed to be a replicable and scalable model that:
- Removes accumulated marine litter, with a focus on ghost nets and plastics from critical habitats.
- Restores coastal and marine ecosystems to enhance biodiversity, fishery productivity, and ecological resilience.
- Builds capacity among local fishing communities through training on sustainable fishing practices, ghost gear retrieval, and waste segregation.
- Promotes behavioural change through public awareness campaigns, school outreach programs, and volunteer engagement.
- Supports environmental policy development by providing ground-level data for marine litter monitoring and integrated coastal zone management.

Phase 2 aims to expand upon the foundational work of the initial clean-up, with intensified efforts focused on high-impact sites identified through GIS mapping, marine litter transect surveys, and stakeholder consultations. Collaboration with government agencies, academic institutions, coastal communities, and NGOs will remain central to the drive, ensuring a science-driven, people-centric, and ecosystem-based approach to combating marine pollution

Phase 2 of the Marine Debris Cleanup Drive seeks to build upon foundational efforts by implementing a targeted, science-informed approach to mitigate marine pollution, protect biodiversity, and foster long-term ecological stewardship. The program is designed with the following objectives:

1. Strategic Removal of Marine Debris and Source-Level Waste Mitigation

- Execute planned clean-up operations across high-impact coastal and nearshore zones, with a focus on retrieving abandoned fishing gear (ghost nets), microplastics, and hazardous anthropogenic debris.
- Deploy systematic protocols for waste segregation, material recovery, and recycling in partnership with authorized recyclers and local waste management systems.
- Address upstream pollution drivers by initiating catchment-level interventions, targeting illegal dumping, urban runoff, and poorly managed solid waste streams that ultimately discharge into marine ecosystems.



2. Protection and Rehabilitation of Critical Marine Ecosystems

- Reduce anthropogenic pressures on marine species by minimizing debris-induced entanglement, ingestion, and habitat fragmentation.
- Facilitate habitat restoration projects in collaboration with marine ecologists, focusing on coral reef regeneration, seagrass protection, and mangrove buffer strengthening.
- Promote low-impact fisheries and tourism practices through local stakeholder training, reducing ecological footprints in vulnerable zones.

3. Community Engagement and Behavioural Change Initiatives

- Implement sustained awareness campaigns tailored for schools, coastal villages, fishery cooperatives, and tourists, emphasizing the ecological and socio-economic impacts of marine litter.
- Foster community-led action through educational workshops, eco-clubs, and citizen science projects to democratize ocean stewardship.
- Encourage the adoption of locally relevant waste reduction practices, including the use of reusable items and proper disposal methods.

4. Integration of Sustainable Waste Management at the Grassroots Level

- Promote waste minimization through reuse, recycling, and substitution of single-use plastics, in alignment with national mandates under the Plastic Waste Management Rules, 2016.
- Work with local governments and businesses to implement source segregation, decentralized composting, and the transition to eco-friendly alternatives (e.g., jute, areca leaf, and starch-based packaging).
- Encourage market-based solutions and social entrepreneurship in circular economy models.

5. Policy Advocacy and Institutional Collaboration

- Facilitate dialogue with municipal authorities, pollution control boards, and the Ministry of Environment, Forest and Climate Change (MoEFCC) to enhance the enforcement of marine litter regulations, EPR frameworks, and coastal zone protections.
- Support the development of policy briefs, white papers, and recommendations to guide decision-makers on effective marine debris governance.
- Encourage corporate responsibility and producer accountability in waste generation and post-consumer collection mechanisms.

6. Strengthening Volunteerism and Citizen Participation

- Establish structured volunteer engagement programs involving students, coastal youth, corporates, and local residents, empowering them to contribute regularly to conservation activities.
- Conduct capacity-building sessions on marine ecology, sustainable practices, and safety protocols during clean up operations.
- Promote environmental leadership by recognizing and supporting grassroots champions and eco-warriors.

7. Contribution to Global and National Environmental Commitments

- Align project activities with the United Nations Sustainable Development Goals (especially SDG 14: Life Below Water, SDG 13: Climate Action, and SDG 12: Responsible Consumption and Production).
- Support India's commitments under the UNEP Clean Seas Campaign, the Global Partnership on Marine Litter, and the National Action Plan on Marine Plastic Waste.
- Collaborate with international, national, and local organizations to facilitate knowledge exchange, co-financing, and capacity enhancement.

Interdisciplinary Relevance of The Project:

- Environmental Science and Marine Biology
- Ecology
- Public Health
- Geography and Oceanography
- Engineering and Technology
- Sociology and Community Development
- Economics
- Education and Communication
- Policy and Law

The interdisciplinary nature of this project fosters collaboration across various domains, enabling a holistic approach to conserving marine biodiversity. It not only addresses ecological and cultural challenges but also contributes to sustainable development, community empowerment, and global environmental goals.

Review of Research and Development:

Marine debris, particularly plastic pollution, has emerged as a critical global environmental issue. Numerous studies have documented the adverse impacts of marine litter on marine biodiversity, human health, and coastal economies.

1. Marine Debris and Biodiversity:

According to Derraik (2002), plastic debris accounts for the majority of marine litter and poses significant threats to marine fauna through ingestion, entanglement, and habitat destruction. Gregory (2009) further emphasized how plastics degrade slowly, leading to long-term impacts on marine ecosystems.

2. Sources and Movement of Marine Debris:

Ryan et al., (2009) categorized marine litter sources into land-based (80%) and ocean-based (20%) origins. Land-based sources include tourism, stormwater runoff, and mismanaged waste, while ocean-based sources involve fishing, shipping, and aquaculture activities. Ocean currents also play a role in transporting debris across regions (Lebreton et al., 2012).

3. Impact on Human Health and Economy:

Rochman et al., (2013) highlighted the bioaccumulation of toxic chemicals from plastics in marine organisms, which can enter the human food chain. Furthermore, McIlgorm et al. (2011) estimated that marine litter causes billions in economic losses annually due to its impact on fisheries, tourism, and marine transport.

4. Clean up Strategies and Technological Interventions:

Several cleanup strategies have been proposed and implemented, ranging from manual beach cleanups to advanced technologies like autonomous drones and ocean-cleaning booms (The Ocean Cleanup Project, 2018). Hardesty et al. (2016) advocated for a combination of removal, policy enforcement, and prevention to effectively manage marine litter.

5. Community Engagement and Education:

Studies by Hartley et al., (2018) and Schuyler et al., (2020) show that community-based initiatives and environmental education significantly increase public awareness and behavioral change towards litter reduction and proper waste disposal.

The literature collectively supports a multi-dimensional approach to marine debris management involving environmental science, community engagement, policy regulation, and technological innovation. Continued interdisciplinary research and collaboration are essential to achieve long-term solutions to marine litter. The literature collectively supports a multi-dimensional approach to marine debris management involving environmental science, community engagement, policy regulation, and technological innovation. Continued interdisciplinary research and collaboration are essential to achieve long-term solutions to marine litter.

PROJECT BACKGROUND AND EXPANSION PLAN:

The Marine Debris Cleaning Program was initiated in the Malvan region in November, 2024 with the goal of addressing the growing concern of marine pollution and its impact on local biodiversity and livelihoods. In its first phase, the program successfully engaged local stakeholders—including fishermen, Government Bodies, NGOs, and tourism operators—in a series of cleanup drives, awareness campaigns, and preliminary data collection efforts. This initial phase laid a strong foundation for community engagement and environmental action in the region.

Building on the success and learnings of the past year, we now propose to expand the scope and impact of the program in the current year. The expansion will focus on increasing the frequency and reach of cleanup activities, involving more coastal villages, introducing improved waste management systems, integrating technological tools for monitoring, and strengthening partnerships with local authorities and educational institutions. The aim is to move from awareness towards long-term behavioral change and sustainable coastal conservation practices.

Marine Debris Clean-up Drive at Malvan

Date: November 27th, 2024, December 28th, 2024, January 9th, 2025, 2nd February, 2025 and 5th, 6th March, 2025, April 9th, 2025 and April 10th, 2025.

Total Number of Drive	08
Total Removal of Waste	2750 kg
Event Implemented by	Vanashakti, Sagarshakti
Project supported by	Maharashtra Pollution Control Board (MPCB).
Collaborating Partners	Fishery Survey of India, State Fishery Department, Mangrove Cell, Malvan Nagar Parishad, Neelkranti, Youth Beats for Climate, Maharashtra Maritime Board, Malvan Scuba Drivers Accociation.
Previous Location	Costal areas around Sindhudurg Fort, Malvan, Maharashtra.
Newly Added Locations	Nivati, Kadva, Tarkarli, Devbag, and Chiwla, etc.

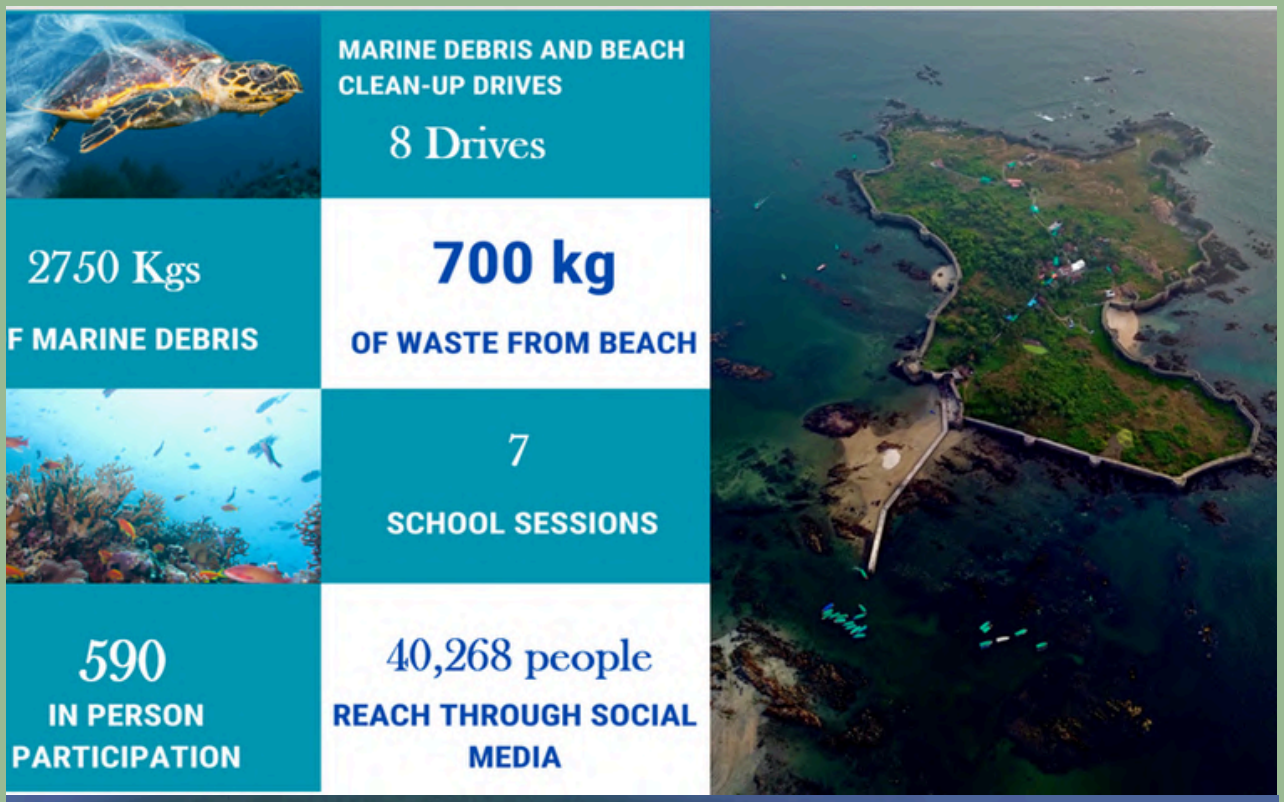
Debris Removal

Skilled divers played crucial role in the removal of marine debris from the ecologically rich zones surrounding the Sindhudurg Fort. These underwater experts meticulously worked to extract ghost nets, plastic and other non- biodegradable waste that had accumulated over time, threatening the marine biodiversity. The extraction process involved precision and care to avoid further damage to the delicate coral reefs and other marine ecosystems. The divers bundled and removed the debris, overcoming underwater challenges such as strong currents and limited visibility. This operation not only contributed to restoring the pristine condition of the ocean floor but also emphasized the need for sustainable marine practices to preserve biodiversity in the region.

Sr. No	Drive	Date	Marine Debris
01	Drive - 1	27th November, 2024	300 kg
02	Drive - 2	28th December, 2024	400 kg
03	Drive - 3	9th January, 2025	400 kg
04	Drive - 4	2nd February, 2025	360 kg
05	Drive - 5	5th March, 2025	450 kg
06	Drive - 6	6th March, 2025	250 kg
07	Drive - 7	9th April, 2025	360 kg
08	Drive - 8	10th April, 2025	230 kg
Total Removal Waste			2750 kg

Outcomes and Impact of Phase I

- Over 2750 kg (300 kg during the first drive, 400 kg during second drive, 400 kg during third drive, 360 kg during fourth drive and 450 kg during fifth, and 250 during sixth drive, 360 kg during seventh drive and 230 kg during eighth drive) of marine debris and 700 kg (from beach) of non- biodegradable waste including ghost nets, plastic bags, wrappers and bottles was removed.
- Strengthen community participation in marine conservation efforts.
- Educated local fishermen and youth on sustainable practices to prevent future debris accumulation.



Implementation Plan

1.Baseline Survey & Assessment:

- oIdentify debris hotspots (beaches, underwater zones).
- oInvolve local divers and fishermen for data collection.

2. Stakeholder Collaboration:

- Engage local authorities, NGOs, schools, tourism operators.
- Define roles and form a coordination committee.

3.Awareness & Education:

- Conduct beach workshops, school programs, and social media drives.
- Promote plastic alternatives and responsible tourism.

4. Cleanup Drives:

- Organize regular beach cleanups with volunteers.
- Schedule underwater clean-ups in coral-rich areas like Malvan Fort, Tarkarli, Kavda, Devbag, Chiwala, and Nivati,

5. Waste Management:

- Install waste bins with segregation signage.
- Ensure proper disposal/recycling with municipal support.

6.Monitoring & Reporting:

- Record type and volume of waste collected
- Use data to improve planning and measure impact.

7.Policy Advocacy & Sustainable Practices:

- Advocate for plastic ban and eco-friendly tourism policies.
- Promote reusable and biodegradable alternatives.

8.Policy Advocacy & Sustainable Practices:

- Scale the model to nearby coastal villages and towns.
- Create a district-wide marine conservation network.

Proposed locations for Phase II

Benefit:

1. **Environmental Protection:** Reduces pollution in marine and coastal ecosystems. Preserves marine biodiversity by preventing harm to marine animals through ingestion or entanglement.
2. **Improved Public Health:** Minimizes health risks caused by microplastics and toxins entering the food chain through seafood. Enhances water quality, reducing exposure to hazardous waste for communities.
3. **Economic Advantages:** Supports sustainable tourism by maintaining clean and attractive coastal areas. Protects livelihoods dependent on fisheries and marine industries from the negative impacts of pollution.
4. **Awareness and Education:** Encourages environmental responsibility through community engagement and awareness campaigns. Promotes eco-friendly habits like recycling and waste reduction.
5. **Scientific Research and Data Collection:** Provides valuable data for marine pollution studies and helps monitor the effectiveness of environmental policies. Enhances understanding of debris sources, movement patterns, and impact zones.
6. **Policy and Governance Support:** Strengthens local and national waste management policies. Encourages collaboration between government, NGOs, and citizens for sustainable ocean governance.
7. **Innovation and Technological Development:** Drives the creation of new technologies and sustainable waste management practices. Encourages innovations in cleanup tools, biodegradable materials, and debris tracking systems.

Outcome:

The Marine Debris Cleaning Program in the Malvan region is expected to yield significant environmental, social, and economic outcomes. As a coastal area known for its rich biodiversity, coral reefs, and marine tourism, the cleanup efforts will help preserve the ecological integrity of the Malvan Marine Sanctuary and nearby beaches. The reduction in plastic and other debris will directly benefit marine life, such as turtles, fish, and corals, which are highly sensitive to pollution. Cleaner beaches and coastal waters will enhance the aesthetic appeal of the region, boosting eco-tourism and supporting the livelihoods of local communities dependent on fishing and tourism industries. The program will also strengthen public awareness and community participation in sustainable practices, encouraging local residents, fishermen, students, and tourists to engage in environmental conservation. Educational initiatives and citizen science activities will foster a culture of responsibility and care for marine resources. Furthermore, the data collected from cleanup drives will provide valuable insights into waste sources and help guide better waste management policies at the local level. Ultimately, the project will contribute to the long-term sustainability of Malvan's coastal and marine ecosystems, while building a more environmentally conscious and proactive community.

Financial Summary

SR NO	DISCRIPTION	ESTIMATED COST (INR)
1	Cost of the scuba dive gears and boat for cleaning marine debris. Total Number of Drive: 10 (Duration: 7 Months)	INR 5,00,000
2	Remuneration to Divers and Experts and Accidental insurances	INR 1,70,000
3	Transportation of removed waste for disposal at nearest waste treatment plant	INR 40,000
4	Beach clean-up and Awareness sessions for school and community (7 beach clean-up and 20 sessions and workshops)	INR 1,50,000
5	Conveyance and travel (From Mumbai ⇌ Malvan and local)	INR 50,000
	Total	INR 9,10,000
	Overheads and Admin costs@ 5%	INR 45,500
	Contingency @ 3%	INR 27,300
	Grand Total	INR 9,82,800
IN WORDS	INR Nine lakhs, Eighty two Thousand Eight Hundred only	

Applications and Future Prospects

Applications:

The Marine Debris Cleaning Program can be implemented through a multi-stakeholder approach involving local government bodies, environmental NGOs, schools and colleges, fisherfolk, and tourism operators in the Malvan region. Regular beach cleanups, underwater clean drives, and awareness campaigns can be organized in collaboration with the community. Educational institutions can integrate marine conservation topics into their curriculum to build awareness among youth. In addition, local authorities can install waste collection bins and signage at popular beach spots to encourage responsible behavior. Data from these activities can be recorded and used for research, policy formulation, and monitoring progress.

Future Aspects:

Looking ahead, the program has strong potential for expansion and sustainability. It can evolve into a long-term coastal management plan that includes regular monitoring of marine litter, stricter waste management regulations, and promotion of alternative materials to single-use plastics. Technological tools like GPS mapping of debris hotspots, use of drones for surveillance, and AI-powered waste sorting could be introduced to increase efficiency. On a broader scale, the program can serve as a model for other coastal towns in Maharashtra and across India. By fostering eco-tourism and conservation-based livelihoods, the program also supports sustainable development goals (SDGs) such as Life Below Water (SDG 14) and Responsible Consumption and Production (SDG 12). In the long run, this initiative can play a crucial role in protecting India's coastal heritage and ensuring a healthy, resilient marine environment for future generations.

vanashakti

Contact:

Phone Number:
9967632302/ 7977670832

Website:
vanashakti.org

Location:
Bhandup village- east

Conserve - Nurture - Protect