IEM
श्रद्धावान लभते ज्ञानम्
INSTITUTE OF ENGINEERING & MANAGEMENT
Good Education, Good Jobs

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Sustainability Development Report

2024-25

SDG 14

Life Below Water

Executive summary

The report from Institute of Engineering Management (IEM), Kolkata presents achievements and future plans aligned with Sustainable Development Goal 14: Life Below Water for 2024-25. IEM Kolkata is committed to conserving oceans and marine resources through impactful research, community engagement, and education. Key efforts include innovative pollution control technologies, extensive awareness campaigns, interdisciplinary curriculum development, and collaborations with research institutions. The report highlights metrics such as student research contributions, marine ecosystem awareness, and advancements in pollution monitoring. Challenges and opportunities in technology, funding, and curriculum integration shape ongoing efforts to advance sustainable marine ecosystem management and conservation.

Contents

Preamble

IEM Kolkata recognizes the vital importance of conserving and sustainably using the oceans, seas, and marine resources, aligning with Sustainable Development Goal 14 (SDG 14). The institute is committed to raising awareness, conducting impactful research, and engaging in practices that enhance marine ecosystem health, reduce pollution, and promote sustainable management of aquatic resources.

Vision, and Mission

- **Vision:** To contribute to the protection and sustainable use of marine environments through education, research, and community engagement.
- **Mission:** To create interdisciplinary knowledge and solutions addressing marine pollution, biodiversity conservation, and sustainable aquatic resource management.

Key Achievements

- ✓ Initiated innovative research projects including the development of underwater solar-powered fish for aquatic pollution control. Collaborations with research institutions like SN Bose Centre enhance sustainability innovations.
- ✓ Launched extensive educational sessions and awareness campaigns focusing on marine ecosystem conservation, involving students and local communities to reduce plastic usage, conduct beach clean-ups, and preserve water quality.
- ✓ Organized workshops, webinars, and interdisciplinary academic programs on marine ecology, pollution control, and sustainable aquaculture to engage students and faculty in marine conservation and the global ocean sustainability agenda.
- ✓ Developed and revised interdisciplinary courses integrated with Sustainable Development Goals (SDGs) that address marine biodiversity, ecosystem protection, pollution mitigation, and sustainable resource management, fostering holistic understanding among students.
- ✓ Established partnerships and collaborative initiatives with environmental organizations for joint efforts in aquatic biodiversity preservation, wastewater treatment technologies, and monitoring of aquatic pollutants, advancing impact through shared expertise and resources.

Research and Innovation

- Active research projects focus on advanced filtration methods and nanotechnology aimed at the efficient removal of microplastics and chemical contaminants from wastewater prior to discharge, contributing to cleaner aquatic environments.

- Studies are being conducted on capturing and mitigating the impact of heavy metals and persistent organic pollutants to prevent contamination and degradation of marine ecosystems.
- Student theses and doctoral research extensively contribute to understanding the ecological impacts of water pollution as well as assessing the efficacy of treatment solutions, enriching scientific knowledge and practical applications.
- Indoor and outdoor experimental work on bioremediation techniques is advancing sustainable approaches to detoxify polluted water bodies and support ecosystem restoration.
- Innovative models of sustainable aquaculture are being developed and tested, integrating ecological balance with economic viability to promote responsible marine resource management.

Community Engagement and Outreach

- Facilitated active participation in international Ocean Day and World Water Day events, highlighting local marine conservation efforts and raising awareness about sustainable water management practices.
- Supported student clubs and societies in organizing beach cleanup drives, plastic waste reduction campaigns, and awareness programs on sustainable seafood consumption, fostering youth-led environmental action.
- Conducted educational outreach programs for local schools and communities, emphasizing the importance of marine biodiversity and promoting practical pollution reduction strategies.
- Established partnerships with coastal authorities and non-governmental organizations (NGOs) to support ecosystem restoration projects and implement pollution monitoring activities, enhancing collaborative impact.
- Integrated community-based research and innovation, encouraging local stakeholders to contribute to marine conservation and pollution control initiatives, thereby strengthening the link between research and real-world application.

Data and Metrics

Category and Metric/Indicator	**Value/Number**
Marine Ecosystem Conservation Awareness	Conducted multiple educational sessions and initiatives increasing awareness of marine ecosystem health among students and community.
Underwater Drone Project for Marine Litter Monitoring	Successfully developed and implemented underwater drones to monitor marine litter, supported by grant funding to aid marine life protection.

Research Collaborations and Publications	Collaborated with institutions like SN Bose Centre; published 20 research publication advancing marine sustainability; participated in THE Impact Rankings 2024.
PhD Student Engagement and Research Output	124 PhD students registered contributing to research on aquatic pollution and ecosystem conservation, enhancing knowledge and innovation.
Progress Reporting and SDG Ranking	Publicly reported measurable progress toward SDG14; University ranked in Times Higher Education Impact Rankings for SDG contributions.

Challenges and Opportunities

Challenges

- Balancing rapid technological advancements with the need for sustainable marine ecosystem protection remains complex, requiring continuous innovation and effective monitoring systems such as underwater drones.
- Securing consistent external funding for research and sustainability initiatives is difficult, impacting the scale and continuity of marine conservation projects.
- Keeping educational curricula and research aligned with fast-changing industry and environmental demands poses academic and operational challenges.
- Managing interdisciplinary collaboration across departments and external partners requires effective governance and resource allocation
- Increasing awareness and community engagement on marine conservation among diverse local and student populations requires sustained outreach efforts.

Opportunities

- Leveraging innovative technologies and grant-funded projects to enhance marine litter detection and pollution control efforts.
- Implementation of internal grant-in-aid schemes encouraging faculty and student research, fostering a culture of innovation and scholarly output.
- Agile curriculum updates based on real-time industry feedback and collaboration with global institutions improve relevance and student employability.
- Establishment of multiple Centers of Excellence and Innovation Development Centers to foster cross-disciplinary research and entrepreneurial initiatives.
- Expanding educational programs, awareness campaigns, and partnerships with NGOs and government agencies to promote marine biodiversity and pollution reduction effectively.

Annual Goals (2025-26)

- Expand research and development in innovative technologies such as underwater drones and advanced filtration for microplastic and pollutant removal to bolster marine ecosystem conservation.
- Strengthen collaborations and partnerships with national and international research institutions, industry, and environmental organizations to amplify impact and resource mobilization for SDG 14-related projects.
- Enhance interdisciplinary curriculum offerings incorporating sustainability, marine ecology, pollution control, and aquaculture to equip students with cutting-edge knowledge and practical skills.
- Increase student and community engagement through awareness campaigns, workshops, and participation in global events like World Ocean Day, aiming to build a strong conservation culture.
- Develop and implement scalable models for sustainable aquaculture and bioremediation techniques, integrating them into continuous field trials and pilot projects to promote sustainable livelihoods and ecosystem restoration.