NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Noakhali - 3814, Bangladesh.

SDG PROGRESS REPORT 2024

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Comprehensive Report: SDG 14 - Life Below Water

Noakhali Science and Technology University

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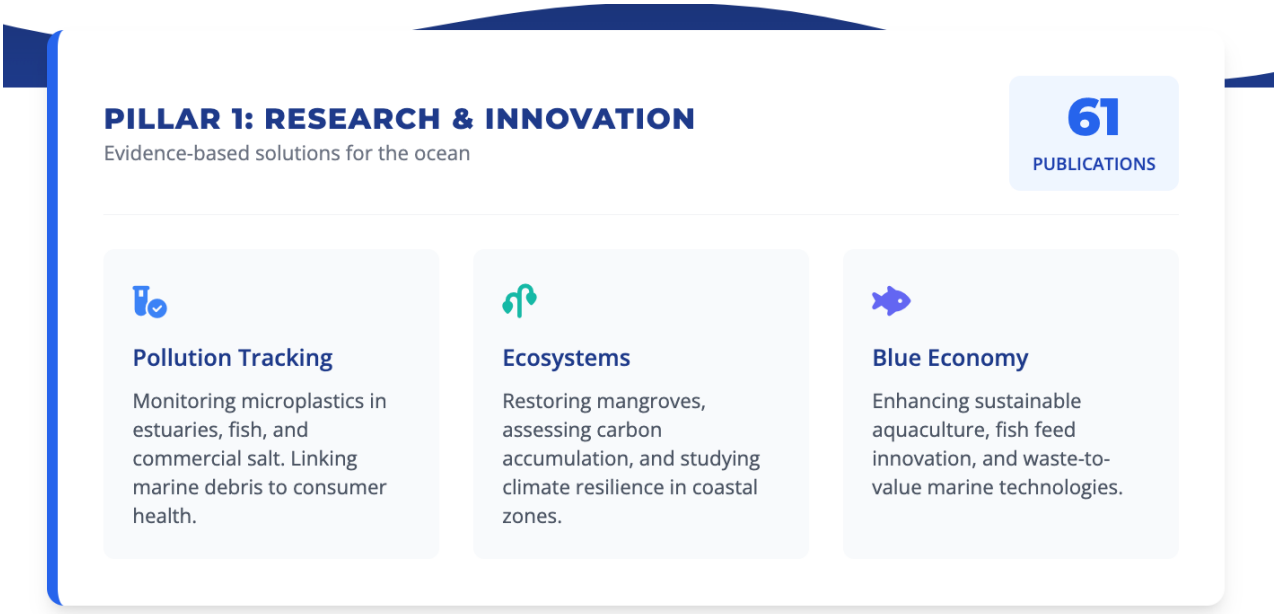
Introduction

Noakhali Science and Technology University (NSTU) is deeply committed to Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development. We recognize the critical importance of marine and coastal ecosystems to global health, climate regulation, and economic prosperity.

Our 2024 contributions demonstrate a profound engagement with this goal, organized around two key pillars:

- **Research and Innovation:** Tackling challenges from molecular-level pollution (microplastics) to large-scale ecosystem management and sustainable fisheries.
- **Operations and Community Engagement:** Implementing rigorous campus pollution controls, protecting local biodiversity sanctuaries, and empowering coastal communities through education.

This report details our key 2024 accomplishments supporting the targets of SDG 14.



Pillar 1: Progress through Research and Innovation

Our 2024 research portfolio, featuring 61 high-impact publications, provides the evidence base to understand and improve marine sustainability.

Section 1.1: Combating Marine Pollution (Target 14.1)

A massive component of our research is dedicated to preventing and reducing marine pollution, with a major focus on microplastics (MP).

- **Microplastics Monitoring:** The study by Banik et al. leads our tracking efforts by quantifying MPs in estuaries, while Fardullah et al. and Rabari et al. have assessed water, sediments, and the epipelagic layer. Crucially, our researchers are tracking MPs moving up the food chain, from copepods (Khan et al.) to farmed tilapia (Siddique et al.) and commercial fish species (Sultana et al.; Belal Hossain et al.).
- **Impact on Consumers:** Linking pollution to human consumption, Siddique et al. and Md Saad et al. identified significant MP contamination in sea salt, while Paray et al. investigated drinking water. De-la-Torre et al. analyzed the release of MPs from face masks, directly connecting public health measures to marine outcomes.
- **Chemical and Litter Analysis:** Beyond plastics, Lipi et al. assessed heavy metal contamination from shipbreaking, and Rakib et al. tracked metals in fish feed. Howlader et al. provided critical assessments of anthropogenic litter on ecologically critical beaches.

Section 1.2: Protecting and Restoring Marine & Coastal Ecosystems (Targets 14.2, 14.3)

We are actively researching the health, management, and resilience of vital coastal ecosystems.

- **Ecosystem Management:** Supporting Target 14.2, Md Monzer Hossain et al. quantified the ecosystem services of the Sundarbans, while Ahmed et al. measured carbon accumulation in mangroves. Jannah et al. assessed the impact of tidal barriers on benthic communities, providing data for sustainable infrastructure.
- **Climate Change Resilience:** Addressing Target 14.3, Bhuiyan et al. investigated ocean oxygen declination, and Rahman et al. studied the effect of elevated temperatures on fish health. Mahmud et al. and Al Mamun et al. are developing adaptation strategies, such as mitigating salt stress in seedlings and promoting climate-adaptive agriculture for coastal communities.
- **Restoration Strategies:** Tanjin et al. demonstrated the use of aquatic plants for phytoremediation of heavy metals, and Haque et al. showed how artificially induced habitat complexity can successfully restore macroinvertebrate diversity.

Section 1.3: Promoting Sustainable Fisheries, Aquaculture, and Blue Economy (Targets 14.4, 14.7, 14.a)

Our R&D ensures the long-term viability of marine resources for food and economic benefit.

- Sustainable Fisheries: Supporting Target 14.4, Dipty et al. and Al Nahid et al. provided essential biodiversity assessments and larval fish assemblage data. Palash et al. and Sarker et al. conducted detailed fishery biology studies of key commercial species to inform stock management.
- **Sustainable Aquaculture:** Paul et al. and Yasmin et al. advanced induced breeding techniques to reduce pressure on wild stocks. Akter et al. developed sustainable plant-based fish feed, while Shazada et al. focused on genetic resource conservation via sperm storage.
- **Blue Economy:** Hossain et al. provided a high-level analysis of the sustainable blue economy. Dey et al. analyzed consumer willingness to pay for safer fish, and Kawsar et al. pioneered waste-to-value pathways by synthesizing nano-plaster from waste marine shells, contributing to a marine circular economy.

Pillar 2: Progress through University Operations and Community Engagement

NSTU's operational strategy focuses on stewardship, direct conservation, and community empowerment. We have translated our research findings into tangible on-the-ground actions that engage our students, faculty, and the broader coastal community.

Section 2.1: Empowering Communities and Sustainable Livelihoods

We serve as a vital hub for knowledge transfer, actively extending our expertise to help local populations manage aquatic resources sustainably.

- **Aquaculture Training and Livelihood Support:** The Department of Fisheries has taken direct action to support coastal farmers. A notable initiative involved a specialized training programme in Cox's Bazar, where 60 farmers were trained on using crab supplement feed. By transferring this technical knowledge, we are not only boosting local production but also securing livelihoods and promoting sustainable aquaculture practices that reduce pressure on wild stocks.
- **Water Conservation Outreach:** Recognizing the scarcity of fresh water, NSTU offers free educational programmes for the community. This includes hands-on workshops on rainwater harvesting, where community participants are taught practical methods to conserve water. These efforts demonstrate our active role in promoting sustainable water management beyond the university campus.
- **Combating Overfishing:** Our faculty members are on the front lines of national conservation efforts. Experts from the Department of Fisheries and Marine Science have served as key advisors in the government's "Gravid Hilsa Conservation Programme." By educating local fishing communities on the critical importance of protecting threatened fish populations during breeding seasons, we actively contribute to the fight against illegal, unreported, and unregulated (IUU) fishing (image attached below, left side).

Section 2.2: Sustainable Campus Operations

NSTU recognizes that ocean conservation begins on land. We have implemented robust, adaptive policies to minimize our ecological footprint and prevent land-based pollution from reaching marine environments.

- **Water Quality Standards:** The university has formally adopted a *Water Management and Sustainability Policy*, with full activation scheduled for 2026. We are currently in a trial phase to test and refine our procedures. During this period, we are piloting protocols for the pre-treatment of laboratory wastewater, establishing water quality testing routines, and developing guidelines for the safe disposal of hazardous chemicals. We are also evaluating drainage system maintenance needs to better prevent pollution of nearby wetlands. This adaptive phase (2024–2026) ensures that we can identify and resolve operational challenges before the policy becomes fully mandatory.
- **Action Against Plastic Pollution:** To combat the global crisis of marine debris, NSTU has launched a campus-wide action plan to reduce plastic waste. This initiative includes restrictions on single-use plastics, the promotion of reusable alternatives, and active collaboration with campus canteens to minimize packaging waste. These operational measures are supported by student-led awareness campaigns, ensuring a culture of sustainability that prevents plastic from entering local waterways.

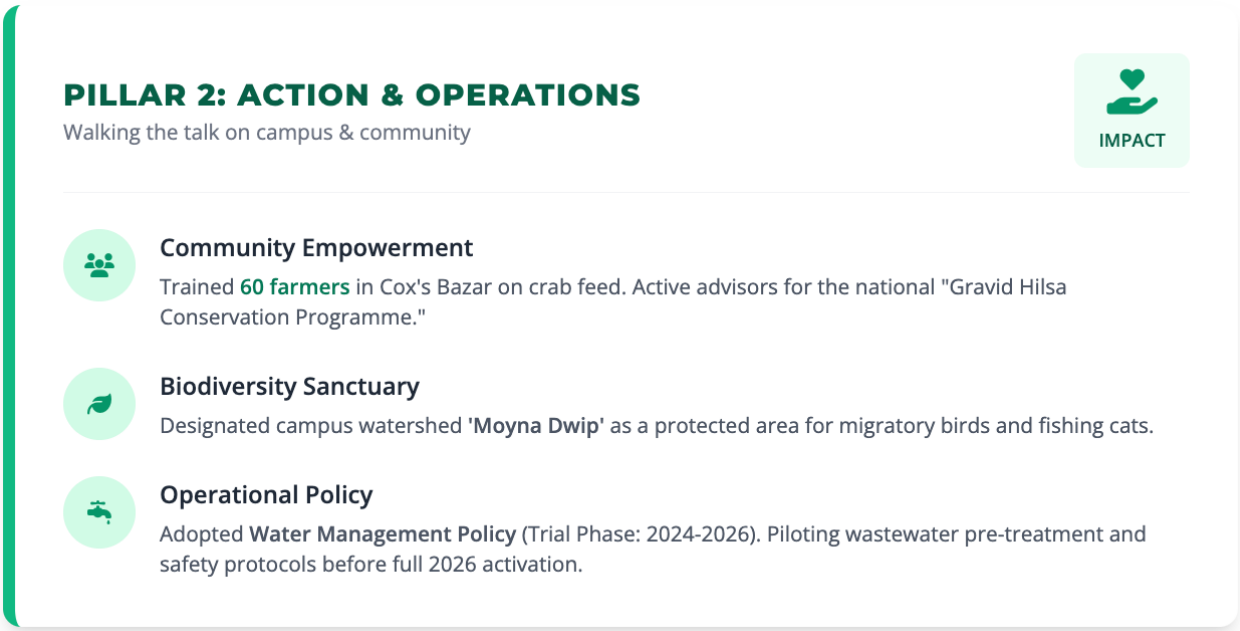
Section 2.3: Ecosystem Conservation and Biodiversity

We are actively engaged in the direct conservation of ecosystems, transforming our campus into a model for biodiversity protection.

- **Campus Sanctuary ('Moyna Dwip'):** We have officially designated our campus watershed area, known locally as 'Moyna Dwip', as a protected biodiversity sanctuary. A dedicated committee oversees the management of this area to ensure it remains a safe habitat for diverse species, including migratory birds during winter and fishing cats year-round. This initiative is part of a broader watershed management strategy based on location-specific aquatic diversity (see the attached image on the right side of the previous page).
- **World Ocean Day Advocacy:** Led by the Department of Oceanography, the university observes World Ocean Day annually with extensive public awareness programmes. These student-led initiatives are crucial for educating the broader public on the importance of protecting seas and marine resources, fostering a new generation of ocean stewards.

Section 2.4: Policy on Sustainable Food and Strategic Partnerships

- **Sustainable Procurement Policy:** NSTU has integrated sustainability into its supply chain through a formal commitment within its *Sustainable Procurement Policy*. This ensures that all food served on campus that originates from aquatic ecosystems is sustainably and legally harvested, reinforcing our stance against destructive fishing practices.
- **Strategic Partnerships for Resilience:** To scale our impact, we have signed a Memorandum of Understanding (MoU) with the *Centre for People and Environ (CPE)*. This partnership supports the Department of Environmental Science and Disaster Management in developing planetary health resilience planning. Through this collaboration, we work with local and regional stakeholders to strengthen environmental stewardship and protect shared aquatic ecosystems.



Conclusion

Our 2024 contribution to SDG 14 is comprehensive and actionable. Our 61 research publications provide the scientific foundation for combating pollution and restoring ecosystems. Operationally, we walk the talk by maintaining our campus as a biodiversity sanctuary, enforcing strict pollution controls, and directly training local farmers in sustainable aquaculture. Together, these pillars represent a holistic commitment to the "Blue Economy" and the preservation of life below water.

Appendix: SDG 14 Targeting 2024 Publications Referenced

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