NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Noakhali - 3814, Bangladesh.

SDG PROGRESS REPORT 2024

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Comprehensive Report: SDG 15 - Life on Land

Noakhali Science and Technology University

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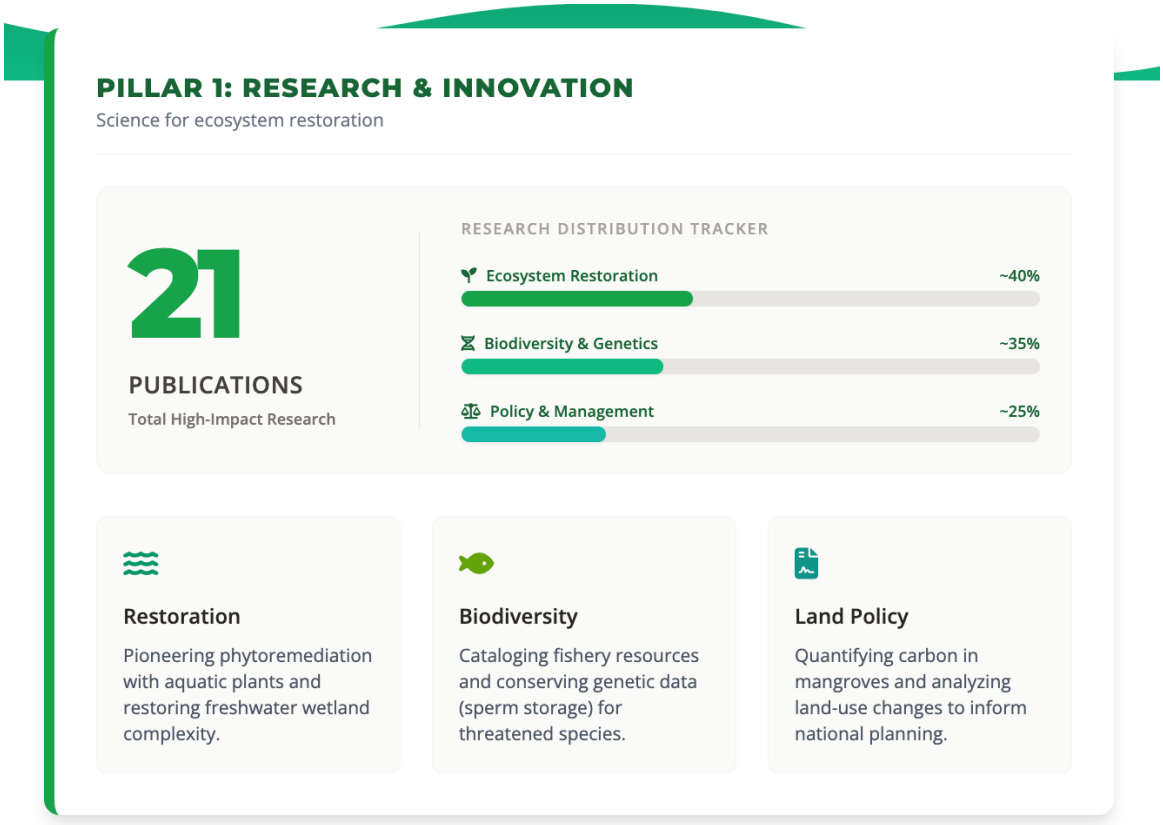
Introduction

Noakhali Science and Technology University (NSTU) is deeply committed to Sustainable Development Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Our 2024 research portfolio, featuring 21 distinct publications, demonstrates a comprehensive approach to this goal. Our work is organized around two key pillars:

- **Research and Innovation:** Engaging in monitoring, conserving, and restoring the planet's vital ecosystems—from inland freshwater habitats to coastal mangrove forests.
- **Operations and Community Engagement:** Directly protecting campus biodiversity through sanctuaries, empowering local agriculture, and implementing sustainable land-use policies.

This report details our key 2024 accomplishments supporting the targets of SDG 15.



Pillar 1: Progress through Research and Innovation

Our researchers are actively engaged in monitoring, conserving, and restoring the planet's vital ecosystems.

Section 1.1: Assessing and Restoring Terrestrial & Freshwater Ecosystems (Targets 15.1, 15.3)

A primary focus of our work is on Target 15.1 (conserve and restore terrestrial and inland freshwater ecosystems) and Target 15.3 (combat desertification and restore degraded land and soil). Our research provides critical assessments of ecosystem health and pioneers new restoration techniques.

- **Monitoring Ecosystem Degradation:** We are actively monitoring pollution in critical habitats. The study by Rahman, M.S. et al. on heavy metals in afforested mangrove sediment provides a baseline for contamination and risk in coastal ecosystems.
- **Developing Restoration Solutions:** Our researchers are innovating in ecosystem restoration. The work by Tanjin, F. et al. identifies the phytoremediation potential of aquatic plants, offering a natural solution to clean up heavy metal pollution in estuaries. Similarly, the study by Haque, M.A. et al. provides a case study on how artificially induced habitat complexity can be used to actively restore macroinvertebrate diversity in freshwater wetlands.
- **Conserving Freshwater Resources:** Our work on inland water is critical for this goal. We have produced key assessments of groundwater vulnerability (Iqbal, M.A. et al.) and analyzed the sustainability challenges of changing water extraction methods (Jakariya, M. et al.), both of which are fundamental to protecting freshwater ecosystems.

Section 1.2: Halting Biodiversity Loss (Targets 15.5, 15.6)

Our institution has a strong research focus on Target 15.5 (halt biodiversity loss and protect threatened species) by cataloging diversity and understanding the biology of key species.

- **Assessing Biodiversity:** The study by Dipty, A.K. et al. provides a comprehensive assessment of the fishery resource diversity and gear efficiency in the Feni River, creating a vital inventory for conservation management.
- **Foundational Biology for Conservation:** We have produced a wealth of species-specific biological research, which is the cornerstone of any conservation program. This includes detailed studies on the breeding biology and condition of *Lepidocephalichthys guntea* (Ahmed, S. et al.), the spawning and larval rearing of *Xenentodon cancila* (Paul, S.K. et al.), the biometry and growth patterns of the polychaete *Namalycastis fauveli* (Sarker, M.J. et al.), and the consumption patterns of the Asian Clam (Aweng, E.R. et al.).
- **Conserving Genetic Resources (Target 15.6):** Our research extends to the conservation of genetic diversity, as shown in the review by Shazada, N.E. et al. on sperm storage for common carp, a critical technique for both sustainable aquaculture and the preservation of genetic lineages.

Section 1.3: Sustainable Forest Management & Integrating Ecosystems into Planning (Targets 15.2, 15.9)

Our researchers are providing the high-level data needed to promote Target 15.2 (sustainable management of all types of forests) and Target 15.9 (integrate ecosystem and biodiversity values into national and local planning).

- **Promoting Forestry and Afforestation:** We have a major research cluster on the role of forests in climate mitigation and environmental health. This includes analyses of the role of

forestry in BIMSTEC nations (Ridwan, M.K. et al.), the impact of forests on CO2 emissions in Vietnam (Raihan, A. et al.), the role of forestry in reducing India's carbon footprint (Rahman, M.M. et al.), and the role of afforestation in Eastern Africa (Chowdhury, T.S. et al.).

- **Valuing Ecosystem Services:** We are actively quantifying the value of our natural ecosystems. The study by Ahmed, S. et al. measures the ecosystem carbon accumulation in mangroves, while the work by Md Monzer Hossain, S. et al. uses a trait-based approach to quantify the ecosystem services of the Sundarbans.
- **Informing Land Use and National Policy:** Our research provides direct inputs for sustainable planning. We have produced dynamic assessments of land use alterations on ecosystem service value (Roy, S.K. et al.) and the impact of LULC change on surface runoff (Haque, M.R. et al.). This pillar also includes high-level analyses of national policies—such as optimal EV charging station locations (Ahmed, M. et al.) and energy choices (Kaya, F. et al.)—that are essential for integrating environmental sustainability into all forms of development planning.

Pillar 2: Progress through University Operations and Community Engagement

Beyond research, NSTU actively manages its land, protects local species, and educates the community on sustainable agriculture and ecosystem management.

Section 2.1: Campus Conservation and Biodiversity Protection

We have transformed our campus into a living laboratory for conservation, directly implementing policies to protect threatened species and habitats.

- **Moyna Dwip Bird Sanctuary:** NSTU directly contributes to ecosystem protection through the *Moyna Dwip Bird Sanctuary Initiative*. This designated "no-development zone" provides a safe habitat for over 50 species of migratory and resident birds, as well as diverse aquatic life. We strictly restrict plastic use, noise pollution, and human intrusion in this area to maintain ecological balance.
- **Protection of Threatened Species:** Our biodiversity policy mandates the identification and protection of IUCN Red Listed species found on campus. Currently, a specific conservation campaign is underway to protect the habitat of the endangered Fishing Cat.
- **Native Species Priority:** To reduce the impact of invasive species, NSTU follows a strict policy prioritizing native plants in all landscaping and afforestation activities. Regular

ecological surveys are conducted to identify and manage alien species that could threaten local biodiversity.

Section 2.2: Community Outreach and Sustainable Land Management

We extend our impact beyond the campus borders by empowering local communities with the knowledge to manage land sustainably.

- **Agricultural Outreach:** The Department of Agriculture conducts practical outreach programs for local farmers. A notable success story involves the cultivation of six varieties of cotton in coastal areas, guided by our faculty and the Cotton Development Board (*image attached on the left side of the previous page*). This initiative transferred vital skills for sustainable farming in saline-prone regions.

- **Promoting Sustainable Tourism:** Addressing land use for tourism, our researchers engage with communities in Saint Martin Island. By analyzing tourist perceptions, we are raising awareness about responsible behavior to protect the island's fragile coastal ecosystem.
- **Public Education Events:** NSTU organizes major events to promote environmental stewardship. The *1st International Seminar on Climate Change and Environmental Sustainability (ISCCES-2024)* brought together students, researchers, and locals to discuss smart farming and climate mitigation (see the attached image on the following page). Additionally, we collaborated with the Bangladesh Red Crescent Society to celebrate International Disaster Preparedness Day (*image attached on the previous page*), thereby fostering community resilience.

Section 2.3: Sustainable Operations and Policy

Our operational framework ensures that our consumption and waste management practices do not degrade terrestrial ecosystems.

- **Sustainable Food Procurement:** NSTU has adopted a sustainable procurement strategy for campus food. We prioritize local suppliers and ethically farmed produce, ensuring that our food systems are resource-efficient and have a low environmental impact.
- **Waste and Water Management:** We are currently in an adaptive trial phase (2024–2026) for our *Waste Management & Sustainability Policy* and *Water Management Policy*. These protocols cover the safe disposal of hazardous materials, the reduction of plastic waste, and rigorous water quality standards to prevent pollution of nearby soil and wetlands. This phased approach ensures we refine our systems for maximum effectiveness before full adoption.

Conclusion

Our 2024 contributions to SDG 15 reflect a holistic dedication to "Life on Land." Through 21 high-impact publications, we are advancing the science of ecosystem restoration and biodiversity conservation. Simultaneously, our operational actions—from maintaining the Moyna Dwip Sanctuary to training farmers in sustainable cotton cultivation—demonstrate that NSTU is not just studying the environment but actively protecting it.

Appendix: SDG 15 Targeting 2024 Publications Referenced

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