NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Noakhali - 3814, Bangladesh.

SDG PROGRESS REPORT 2024

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Comprehensive Report: SDG 12 - Responsible Consumption and Production

Noakhali Science and Technology University

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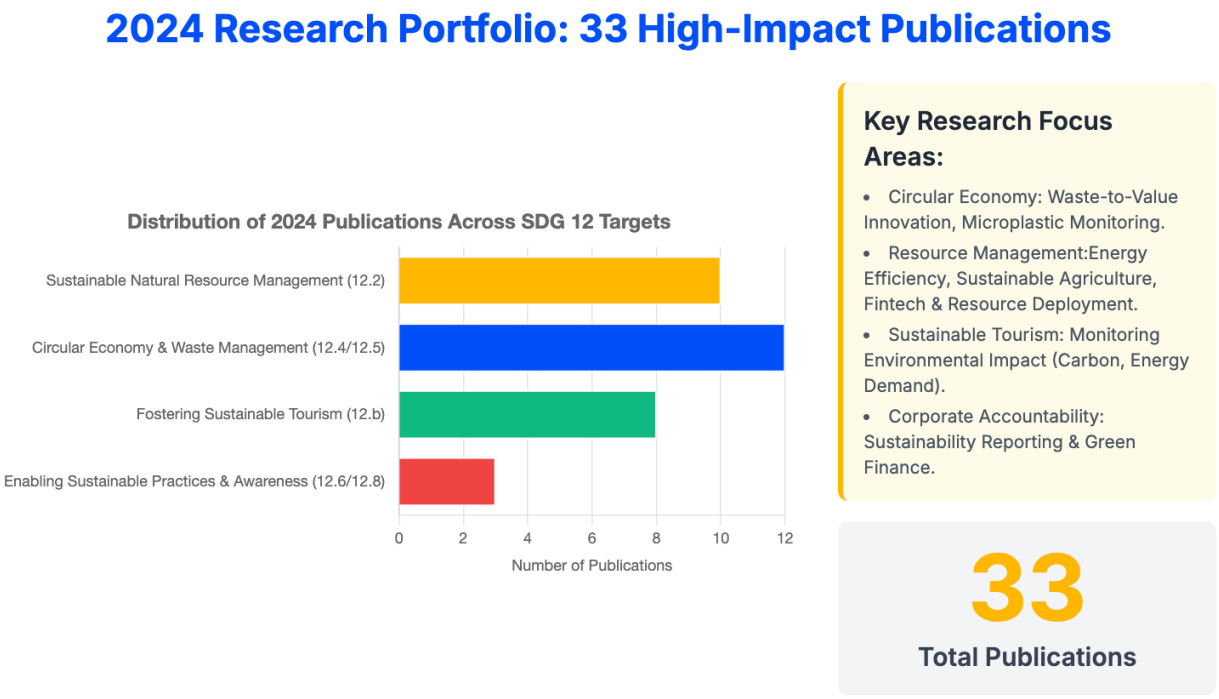
Introduction

Our institution is fully dedicated to advancing SDG 12: Ensure sustainable consumption and production patterns. This goal is central to decoupling economic growth from environmental degradation. We believe rigorous research and responsible institutional operations are essential to create the circular economy models, waste management systems, and resource efficiency policies needed for a sustainable future. Our strategy focuses on generating high-impact research (Pillar 1) across the lifecycle of consumption, and implementing accountable operational policies (Pillar 2) that model sustainable practices for our community.

Pillar 1: Progress through Research and Innovation (33 Publications)

Our 2024 research portfolio features 33 high-impact publications, demonstrating a comprehensive and deep commitment across the critical facets of SDG 12.



A. Promoting Sustainable Natural Resource Management (Target 12.2)

Research in this area focuses on improving the efficient and sustainable use of energy, land, and natural resources across key economic sectors.

- **Resource Efficiency in Industry:** Our studies provide clear pathways for efficiency, including analyzing energy efficiency and waste reduction in economies like Japan (Onwe et al.), and promoting energy-efficient practices in textile manufacturing (Tushar et al.). We also assessed the impact of technology on optimizing energy utilization (Ridzuan et al.).

- **Sustainable Agriculture and Food Production:** We are developing methods for environmentally responsible food systems. Key works include research on climate-adaptive strategies for agricultural resilience (Al Mamun et al.), analyzing the environmental impact of fertilizer use (Akther et al.), and improving the efficiency of sustainable aquaculture through induced breeding (Yasmin et al.).
- **Macroeconomic Resource Analysis:** Our researchers are analyzing the frameworks for sustainable resource deployment, including the role of Fintech (Raihan et al.) and exploring the links between resource use, ecological footprints, and economic growth in nations like Vietnam and Indonesia (Raihan et al.).

B. Advancing the Circular Economy and Waste Management (Targets 12.4, 12.5)

This cluster focuses on the environmentally sound management of chemicals and wastes (Target 12.4) and substantially reducing waste generation (Target 12.5).

- **Monitoring Waste and Chemical Pollution:** We are leaders in identifying and tracking pollution. This includes critical reviews of heavy metal contamination in food webs (Rakib et al.) and urban surface water (Kubra et al.). We have a particularly strong focus on monitoring microplastic pollution in prawns (Rabari et al.), urban tap water (Belal Hossain et al.), and groundwater (Paray et al.).
- **Waste-to-Value Innovation:** Our research is pioneering the circular economy by turning waste into high-value products. Key studies include the sustainable synthesis of nano-fertilizer from solid marine wastes (Alam et al.) and developing value-added metal nanoparticles from waste (Narwal et al.).
- **Waste Management Policy and Technology:** We are developing solutions for better waste management, including analyzing policy responses to global disruptions (Hossain et al.) and developing advanced deep learning models for waste classification (Ayman et al.).

C. Fostering Sustainable Practices and Awareness (Targets 12.6, 12.8, 12.b)

This theme covers research on sustainable tourism, corporate accountability, and public frameworks for responsible consumption.

- **Sustainable Tourism (Target 12.b):** We provide the data and frameworks for a responsible tourism industry. Our research analyzes green tourism sustainability (Tafsirun et al.) and monitors the industry's environmental impact, including its effect on carbon emissions in Asia (Voumik et al.) and Eastern Africa (Chowdhury et al.).
- **Corporate Accountability (Target 12.6) and Finance:** We promote transparency through critical analysis of sustainability reporting disclosure in emerging markets (Das et al.) and research the necessary financial instruments, such as Green Bonds, to fund the transition to a sustainable economy (Kumar et al.).
- **Public Awareness (Target 12.8):** Our work promotes sustainable lifestyles by providing models for public institutions. The study by Tanzin et al. provides a framework for transforming a university library into a "Green Library," serving as a powerful, public-facing model of sustainable practices.

Pillar 2: Progress through Institutional Operations and Modeling

Our operational policies ensure that the university practices what it researches, embodying responsible consumption and production patterns.

A. Sustainable Procurement and Use Minimization

Practice Area	Status	Policy/Practice	Target Alignment
Ethical & Sustainable Sourcing (12.2.1)	Awaiting final approval	We have a Sustainable Procurement Strategy to embed ESG (Environmental, Social, and Governance) considerations into all purchase decisions, ensuring positive outcomes and ethical supply chains.	12.7
Minimization of Plastics (12.2.5)	Awaiting final approval	An institution-wide strategy is in place to minimize single-use plastics, promoting reusable, compostable, and refillable alternatives across campus. Student clubs actively support this (image attached).	12.8
Reduction of Disposables (12.2.6)	Awaiting final approval	Active reduction of disposable items (paper cups, towels, and excess printing) by adopting digital-first practices and following green event guidelines.	12.8
Supply Chain Compliance (12.2.7, 12.2.8)	Awaiting final approval	All outsourced services (catering, cleaning, and maintenance) are required to comply with our pilot waste minimization and waste management policies. Suppliers of equipment, stationery, and building contractors are actively encouraged to comply.	12.6, 12.7

B. Waste Management and Reporting

Indicator	Status	Key Action and Impact	Target Alignment
Hazardous Waste Disposal (12.2.3)	Awaiting final approval	A pilot policy and process are in place for the safe identification, segregation, storage, and vendor disposal of all hazardous materials, ensuring environmentally sound management.	12.4

Waste Measurement & Tracking (12.2.4, 12.3.1)	Awaiting final approval	The University is trialling a new system to measure all waste streams and track volumes sent to landfill versus recycled. Currently, we use approximate estimates, but the new system will enable accurate tracking in the near future.	12.5
Sustainability Reporting (12.4.1)	Annual	We publish a sustainability report annually, detailing the university's ongoing activities, performance, research, and initiatives related to environmental and social sustainability, promoting corporate and institutional transparency.	12.6

Conclusion

Our 33 publications in 2024, coupled with a rigorous overhaul of our institutional operations, demonstrate a deep, multifaceted, and practical commitment to SDG 12. We have produced a comprehensive body of work that addresses every major facet of this goal: from macro-level analysis of resource efficiency and sustainable tourism, to the micro-level development of waste-to-value technologies and the critical monitoring of microplastic pollution. Operationally, the development of a Sustainable Procurement Strategy and the creation of comprehensive policies for hazardous waste and digital waste tracking—all currently awaiting final approval—showcase our dedication to modeling responsible consumption. The annual publication of our sustainability report ensures accountability and transparency in our journey toward a circular, sustainable economy. We remain committed to scaling these efforts in both research excellence and institutional practice to further our impact on global responsible consumption and production patterns.

Appendix: SDG 12 Targeting 2024 Publications Referenced

1. Howlader, M., Shuvo, S.N.A., Selim, A., Fahad, A.A., Rahman, M.M. (2024). Abundance and distribution of anthropogenic marine litter on the beaches of Sonadia Island: An Ecologically Critical Area. *Regional Studies in Marine Science*.

2. Aspy, N.N., Voumik, L.C., Esquivias, M.A., Das, M.K., Pattak, D.C. (2024).[4] Impact of tourism, globalization, and technological patents on ecological footprint in ASEAN countries: static and dynamic panel regression approaches. *Discover Sustainability*.
3. Ridwan, M.K., Akther, A., Tamim, M.A., Esquivias, M.A., Wibowo, W.P. (2024). Environmental health in BIMSTEC: the roles of forestry, urbanization, and financial access using LCC theory, DKSE, and quantile regression.[5] *Discover Sustainability*.
4. Raihan, A., Guneysu Atasoy, F., Coskun, M.B., Atasoy, M., Yer, H. (2024). Fintech adoption and sustainable deployment of natural resources: Evidence from mineral management in Brazil.[6] *Resources Policy*.
5. Rakib, M.R.J., Sarker, A., Nahida, Z.T., Kumar, R., Malafaia, G. (2024).[7] A critical review on heavy metal contamination in aquatic food webs by edible fish species: a special case concerning Bangladesh.[8] *Environmental Monitoring and Assessment*.
6. Onwe, J.C., Ridzuan, A.R., Uche, E., Ridwan, M.K., Razi, U. (2024). Greening Japan: Harnessing energy efficiency and waste reduction for environmental progress. *Sustainable Futures*.
7. Ridwan, M.K., Akther, A., Al-Absy, M.S.M., Yağiş, O., Jaheer Mukthar, K.P. (2024). The Role of Tourism, Technological Innovation, and Globalization in Driving Energy Demand in Major Tourist Regions. *International Journal of Energy Economics and Policy*.
8. Tafsirun, U., Farhana, A., Alam, M.F.E., Castanho, R.A. (2024). Green tourism sustainability and its impact on green environment achievement. *Cultural Gastronomy and Adventure Tourism Development*.
9. Alam, M.K., Sahadat Hossain, M., Islam, M.S., Bahadur, N.M., Ahmed, S. (2024). Sustainable synthesis and characterization of nano-triple superphosphate from solid marine wastes. *Materials Advances*.
10. Tushar, S.R., Imtiazh, M.S.A., Noor, R.B., ISLAM, A.R.M.T., Kabir, M.M. (2024). An Intuitionistic fuzzy approach to modeling the drivers to promote Energy-Efficient textile Manufacturing: Implications for sustainable development. *Journal of King Saud University Science*.
11. Akther, T., Selim, M.M.I., Hossain, M.S., Kibria, M.G. (2024). Synergistic role of agriculture production, fertilizer use, tourism, and renewable energy on CO2 emissions in South Asia: A static and dynamic analysis. *Energy Nexus*.
12. Al Mamun, M.A., Li, J., Cui, A., Chowdhury, R., Hossain, M.L. (2024). Climate-adaptive strategies for enhancing agricultural resilience in southeastern coastal Bangladesh: Insights from farmers and stakeholders. *Plos One*.
13. Raihan, A., Hasan, M.A., Voumik, L.C., Akter, S.M.S., Ridwan, M.K. (2024). Sustainability in Vietnam: Examining economic growth, energy, innovation, agriculture, and forests' impact on CO2 emissions. *World Development Sustainability*.
14. Voumik, L.C., Islam, M.A., Nafi, S.M. (2024). Does tourism have an impact on carbon emissions in Asia? An application of fresh panel methodology. *Environment Development and Sustainability*.

15. Deb, S.K., Nafi, S.M., Valeri, M. (2024). Promoting tourism business through digital marketing in the new normal era: a sustainable approach.[10] *European Journal of Innovation Management*.

16. Rabari, V., Rakib, M.R.J., Patel, H.V., Malafaia, G., Trivedi, J.N. (2024). Microplastic prevalence in epipelagic layer: Evidence from epipelagic inhabiting prawns of north-west Arabian Sea. *Marine Pollution Bulletin*.

17. Das, S.K., Khalilur Rahman, M., Roy, S. (2024).[11] Does ownership type affect sustainability reporting disclosure? Evidence from an emerging market. *International Journal of Disclosure and Governance*.

18. Roy, S.K., Alam, M.T., Mojumder, P., Al Mamun, M.A., Mahtab, S.B. (2024). Dynamic assessment and prediction of land use alterations influence on ecosystem service value: A pathway to environmental sustainability. *Environmental and Sustainability Indicators*.

19. Iqbal, M.A., Siddiqua, S.A., Faruk, M.O., ISLAM, A.R.M.T., Salam, M.A. (2024). Systematic review and meta-analysis of the potential threats to respiratory health from microbial Bioaerosol exposures.[12] *Environmental Pollution*.

20. Yasmin, R., Rahman, M.M., Chakraborty, S., Arai, T., Hossain, M.B. (2024). Comparative evaluation of the efficacy of three GnRH analogues in induced breeding of stinging catfish, Heteropneustes fossilis under hatchery conditions.[13] *Frontiers in Sustainable Food Systems*.

21. Raihan, A., Voumik, L.C., Ridwan, M.K., Soseco, T., Ismail, N.A. (2024). Indonesia's Path to Sustainability: Exploring the Intersections of Ecological Footprint, Technology, Global Trade, Financial Development and Renewable Energy. *Studies in Systems Decision and Control*.

22. Chowdhury, T.S., Mawa, M.J., Islam, R.U., Uddin, I., Rahman, M.H. (2m, R.U., Uddin, I., Rahman, M.H. (2024). Nature and cause of CO2 emission in Eastern Africa: Role of tourism and afforestation towards reduce CO2 emission. *Social Sciences and Humanities Open*.

23. Kumar, B., Tiasha, A.M., Shah, A., Urbee, A.J. (2024).[14] Green Bonds in Modern Portfolios: Risk-Return Dynamics. *Green Bonds and Sustainable Finance the Evolution of Portfolio Management in Conventional Markets*.

24. Tanzin, M., Hoq, K.M.G. (2024). Transforming the Dhaka University Library into a Green Library: Opportunities and Challenges.[15] *Electronic Green Journal*.

25. Belal Hossain, M.B., Yu, J.J., Sarker, P.K., Paray, B.A., Arai, T. (2024). Microplastic accumulation, morpho-polymer characterization, and dietary exposure in urban tap water of a developing nation. *Frontiers in Sustainable Food Systems*.

26. Paray, B.A., Yu, J.J., Sultana, S., Li, Y., Belal Hossain, M.B. (2024). Contamination, morphological and chemical characterization, and hazard risk analyses of microplastics in drinking water sourced from groundwater in a developing nation. *Frontiers in Environmental Science*.

27. Narwal, N., Katyal, D., Malik, A., Rakib, M.R.J., Kakakhel, M.A. (2024). Sustainable advances in the synthesis of waste-derived value-added metal nanoparticles and their

applications.[16] *Green and Sustainable Approaches Using Wastes for the Production of Multifunctional Nanomaterials*.

28. Ridzuan, A.R., Abd Rahman, N.H., Keshminder, J.S., Voumik, L.C., Ali, M. (2024). Assessing the Impact of Technology Advancement and Foreign Direct Investment on Energy Utilization in Malaysia: An Empirical Exploration with Boundary Estimation. *Lecture Notes in Networks and Systems*.
29. Deb, S.K., Kuri, B.C., Nafi, S.M. (2024).[17] Application of Knowledge Management in Tourism and Hospitality Industry: A Sustainable Approach. *Contributions to Management Science*.
30. Hossain, M.A., Ferdous, N., Ferdous, E. (2024).[18] Crisis-driven disruptions in global waste management: Impacts, challenges and policy responses amid COVID-19, Russia-Ukraine war, climate change, and colossal food waste.[19] *Environmental Challenges*.
31. Rahman, M.H., Voumik, L.C., Nafi, S.M., Zimon, G. (2024). Effects of tourism and other macroeconomic variables on women's employment in agricultural, industry and service sectors: evidence from African countries. *Current Issues in Tourism*.
32. Kubra, K., Mondol, A.H., Ali, M.M., Siddique, M.A.B., ISLAM, A.R.M.T. (2024). Assessment of As, Cr, Cd, and Pb in urban surface water from a subtropical river: contamination, sources, and human health risk. *International Journal of Environmental Analytical Chemistry*.
33. Ayman, U., Rahim, M.A., Haque, I.A., Saha, D., Rahat, M.A.M. (2024). EfficientNet-Based Deep Learning Model for Advanced Waste Classification. *2024 27th International Conference on Computer and Information Technology Iccit 2024 Proceedings*.