



NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY

Noakhali - 3814, Bangladesh.

SDG PROGRESS REPORT 2024

2 ZERO
HUNGER



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Comprehensive Report: SDG 2 - Zero Hunger

Noakhali Science and Technology University

December 2024

Introduction

Noakhali Science and Technology University (NSTU) is unequivocally committed to Sustainable Development Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Our strategy for this goal is comprehensive, built upon two interconnected pillars:

1. **Research and Innovation:** A high-impact 2024 research portfolio (31 publications) dedicated to creating and evaluating the solutions needed to achieve Zero Hunger.
2. **Operations and Community Engagement:** Institutional policies and direct-action programs that ensure food security on our campus and transfer knowledge to our local community.

This report details our progress across both of these critical areas.

Pillar 1: A Holistic Research Portfolio

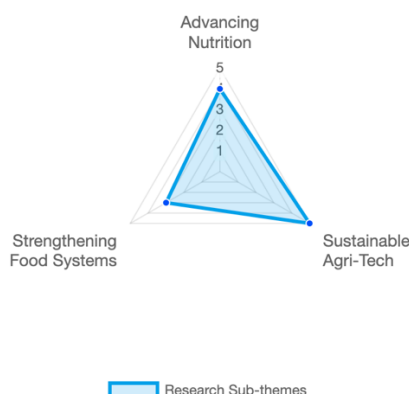
Focus Areas of 2024 Research

Our 2024 research is strategically
balanced across

31

High-Impact Publications

This body of work addresses every facet of the food system, from individual nutrition to global financial policy, grouped into three core pillars.



Pillar 1: Progress through Research and Innovation

Our institution is dedicated to research that advances SDG 2. Our 2024 research portfolio, consisting of 31 high-impact publications, demonstrates an exceptionally broad and deep commitment. Our work is strategically organized across three core pillars.

Section 1.1: Advancing Nutrition and Household Food Security (Targets 2.1, 2.2)

Our research first addresses the most immediate targets of SDG 2: ending hunger and all forms of malnutrition. We have produced a cluster of critical studies focused on identifying at-risk populations and promoting nutrient-rich, accessible food sources.

- **Identifying Vulnerability:** To target interventions effectively, our researchers identified the key predictors of malnutrition. Studies by Halima, O. et al. and Mondal, S. et al. provided a multivariate analysis of the individual, household, and socioeconomic factors driving child undernutrition in Bangladesh. Concurrently, the work of Begum, N. et al. harnessed machine learning to predict the nutritional status of pregnant women, a vital tool for early public health intervention.
- **Leveraging Local Solutions for "Hidden Hunger":** We have a strong focus on utilizing local, sustainable food sources. The research by Mamun, A.A. et al. on dried marine fish, along with studies by Khan, M.A. et al. and Belal Hossain, M.B. et al. on small indigenous fish, provides a comprehensive nutrient, mineral, and fatty acid profile. This work champions these accessible foods as a powerful, cost-effective tool to combat micronutrient deficiencies.
- **Linking Livelihoods to Nutrition:** The study by Belal Hossain, M.B. et al. on homestead pond fish culture provides a direct link between a sustainable livelihood (SDG 1) and improved household food security and dietary diversity (SDG 2).
- **Ensuring Food Safety at Home:** Recognizing that food security is incomplete without food safety, the study by Al Mamun, M.A.A. et al. assessed the knowledge, attitudes, and practices of mothers regarding food cleanliness, identifying key educational gaps.

Section 1.2: Innovating for Sustainable & Resilient Agriculture (Targets 2.3, 2.4)

Our institution is at the forefront of developing and evaluating the technologies and strategies needed to create a sustainable, productive, and climate-resilient agricultural future.

- **The Agri-Tech Revolution:** Our researchers are harnessing the power of AI, IoT, and machine learning to revolutionize food production. This includes frameworks for "Digital Twins" in livestock farming (Arulmozhi, E. et al.), IoT-enabled sustainable irrigation (Rana, M.Z. et al.), and using machine learning for soil classification and crop prediction (Rahman, F. et al.).
- **Precision Agriculture:** We are developing advanced deep learning and CNN models to detect diseases in mangoes (Porna, S.B. et al.), potatoes (Khan, M.A. et al.), and rice (Shakib, M.S. et al.), as well as to classify rice varieties (Rahat, I.S. et al.).
- **Climate-Smart Adaptation:** We are producing vital data for climate resilience. The work of Al Mamun, M.A. et al. provides stakeholder-driven insights into climate-adaptive strategies for coastal farmers, while the analysis by Dia, R.B. et al. on evapotranspiration trends is critical for future water resource management.
- **Sustainable Inputs & Crop Science:** We are exploring eco-friendly solutions, including research on carrageenans as plant biostimulants (Hossain, M.M. et al.) and identifying genetic traits for resilient soybean crops (Islam, M.S. et al.). We are also tackling the negative impacts of current methods through research on fungicide and antibiotic resistance in plant pathogens (Islam, T. et al.).
- **Innovating Future Food Sources:** Looking ahead, the comprehensive review by Siddiqui, S.A. et al. on microalgae as a raw material for plant-based seafood alternatives charts a course for sustainable food innovation.

Section 1.3: Strengthening Entire Food Systems (Targets 2.a, 2.c)

Beyond the farm, our 2024 research addresses the systemic, economic, environmental, and safety issues that govern our food systems.

- **Ensuring Food Safety & Monitoring Contamination:** We are actively monitoring threats to the food chain. Key studies identified the emergence of multidrug-resistant *Bacillus* spp. in animal feed and human food (Haque, M.A. et al.) and provided the first record of microplastic ingestion by estuarine copepods in Bangladesh, highlighting a critical vector for food web contamination (Khan, N.S. et al.).
- **Economic, Social, & Policy Frameworks:** Our research provides high-level guidance for policymakers. This includes an assessment of agricultural trade openness on food security (Fan, L. et al.), an analysis of macroeconomic factors affecting women's employment in agriculture (Rahman, M.H. et al.), and an editorial emphasizing the critical role of occupational health and safety for workers in the agri-food sector (Bhowmik, S. et al.).
- **The Agriculture-Environment-Finance Nexus:** We are analyzing the complex interplay between food production and planetary health. This includes research on the impact of agriculture on CO₂ emissions (Akther, T. et al.; Raihan, A. et al.) and the effect of land-use changes on ecosystem services (Roy, S.K. et al.). Critically, our research extends to the financial mechanisms needed to support this transition, as evidenced by the work of Kumar, B. et al. on Green Bonds, which explores the risk-return dynamics of the very financial instruments needed to fund a global shift to sustainable agriculture (Target 2.4) and invest in rural infrastructure (Target 2.a).

Pillar 2: Progress through University Operations and Community Engagement

NSTU's operational strategy translates our research commitment into direct action, ensuring food security and promoting sustainable agriculture on our campus and in the surrounding community.

Section 2.1: Student Food Security and Affordability

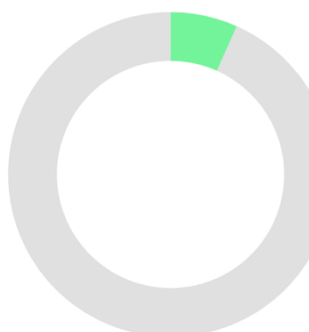
NSTU is committed to alleviating student food insecurity. The university administration actively regulates and monitors food prices across all campus outlets to ensure affordability, as demonstrated by the officially approved and enforced price lists. We provide subsidized dining facilities in all five residential halls, complemented by numerous on-campus restaurants, shops, and vending machines. This ensures continuous access to healthy, low-cost, and nutritious food choices for all students. Cooking facilities are also available for students who wish to prepare their own meals.

Section 2.2: Sustainable Food Choices

We actively promote sustainable food choices. All food outlets on campus provide vegetarian and vegan options. Sustainability is further embedded by the use of non-disposable plates and glasses and the provision of safe drinking water, which significantly reduces plastic waste. Our vendors are encouraged to use local ingredients and minimize food waste, aligning with our eco-friendly goals.

Graduates in Sustainable Agriculture

Educating the next generation of leaders in food security.



103 of 1,541 graduates are from Agriculture & Aquaculture.

Key Campus Initiatives

Food Affordability

Actively regulated and monitored pricing, with subsidized dining in all 5 residential halls.

Sustainable Choices

Vegetarian/vegan options at all outlets, use of non-disposable plates, and reduced plastic waste.

Food Waste Management

Partial measurement and vendor encouragement are active, with a full quantification system in progress.

Section 2.3: Staff Food Access

This support extends to our staff and faculty. An improved lounge provides affordable, on-demand meal services for teachers and officers. Staff can also place meal orders in dormitories and access all general on-campus cafeterias, grocery shops, and vending machines, ensuring convenient and low-cost access to daily meals and snacks.

Section 2.4: Food Waste Management

NSTU is actively addressing food waste.

We conduct partial measurements through periodic monitoring in campus cafeterias and canteens and encourage our outsourced vendors to track and report waste. A systematic, university-wide system for full quantification and reduction is currently in progress.

Section 2.5: Education for Sustainable Agriculture

We are educating the next generation of leaders in this field. In 2024, **103 graduates**, out of a total of **1,541**, were from our agriculture and aquaculture programs. These courses are embedded with critical sustainability aspects, preparing our students to tackle future food security challenges.

Section 2.6: Community Knowledge and Technology Transfer

Our commitment to Zero Hunger extends directly to the local community. We provide free access to knowledge, skills, and technology for local farmers and food producers.



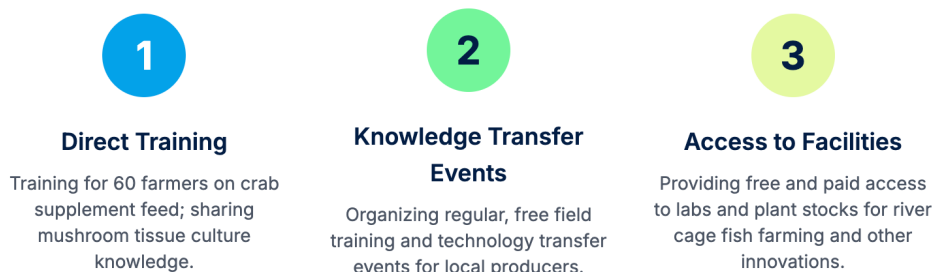
- **Direct Training:** Examples include a training program for 60 farmers in Cox's Bazar on crab supplement feed (image on the left) and sharing mushroom tissue culture knowledge with local farmers.
- **Knowledge Transfer Events:** Our Agriculture and Fisheries departments regularly organize free field training and technology transfer events.
- **Access to Facilities:** We provide local producers with access to university facilities, such as labs and plant stocks (both free and paid), to improve sustainable farming, as demonstrated in our river cage fish farming training.

Section 2.7: Sustainable Procurement

Finally, our institutional practices reinforce our commitment. NSTU prioritizes the purchase of products from local and sustainable sources, as clearly outlined in our Sustainable Procurement Strategy. This ensures our procurement decisions contribute to sustainable development, reduce environmental impact, and strengthen the local economy.

Pillar 2: Operations – Community Knowledge Transfer

Our commitment extends directly to local farmers and food producers, providing free access to knowledge, skills, and technology.



Conclusion

Noakhali Science and Technology University's 2024 contribution to SDG 2 is exceptionally comprehensive. Our strategy is truly holistic, demonstrating a clear link between our high-impact research and our practical operations. We are not only identifying the predictors of malnutrition and the technologies for resilient agriculture; we are actively implementing solutions. From ensuring affordable meals in our residence halls to transferring sustainable aquaculture technology to local farmers, NSTU is fulfilling its role as a key driver in the mission to achieve Zero Hunger.

Appendix: SDG 2 Targeting Publications Referenced

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