Mir Mohammad Hamza

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Sex Male | Date of birth September 26, 1999 | Nationality Bangladeshi

I have a keen interest in mathematics and systems, and I'm focused on understanding how systems work, including their architecture, behavior, and relationships. This knowledge is integral to my goal of addressing challenges in environmental and ecological economics. I'm always eager to learn and grow, and I approach each project with a commitment to do my best. I believe in continuously reflecting on my work to foster improvement. My curiosity and love for learning inspire me to develop effective problem-solving strategies in different areas. To me, solving problems is not just a skill, but also a way to find intellectual satisfaction and joy.

Academic Background

BSc. in Economics (minor Mathematics)
Department of Economics,
School of Business and Economics
North South University, Dhaka, Bangladesh
CGPA: 3.65 out of 4.00 (90%)
Credit completed: 120 credits (Degree Requirement)
Completion: Spring 2023
Senior Capstone Project: Examining the causal relationship between Budget Deficits and Inflation in Bangladesh using a VECM and Granger Causality Approach

Graduate Record Examination (GRE)
Educational Testing Service, ETS
Score: 320 out of 340 (160 Verbal Reasoning, 160 Quantitative Reasoning, 5/6 Analytical Essay)
Exam Date: August 14, 2024

A Levels
British Council Muscat
GPA: 3.75 out of 4
Session: 2015 - 2017

IGCSE-O Levels
Sri-Lankan School
GPA: 4/4
Session: 2013 – 2015

Research Interests

- Industrial Ecology (Material Flow Analysis, Life Cycle Assessment)
- Energy Economics and Energy Policy
- Ecological and Sustainability Economics
- Systems Science
- Machine Learning Applications in Economics and Sustainability Sciences
- Applied Mathematics

Research and Academic Experience

Research Assistant

Decoupling Lab
Department of Environmental Science and Management
North South University
Supervisor: Dr. Mohammad Sujauddin, Associate Professor, ESM, NSU
Duration: January 2023 - Present

Exposure in Decoupling Lab

(1) Development of Policy and Financing Strategy/Mechanisms to Implement the National Action Plan for Sustainable Plastics Management in Bangladesh and PPP Model for Investment in Plastic Recycling

Funding By: The World Bank
Duration: January 2023 – July 2023
Description: The primary objective of this consultancy assignment is to identify and draft relevant policies and regulations to support the activities included in the action plan for sustainable plastic management in Bangladesh. It includes harmonizing with existing work plans and draft regulations and recommending public institutional structures. The policy engagement part of this assignment involves outlining the pathway to implement Extended Producer Responsibility (EPR) in plastic management, and identification of circular economy actions to tackle plastic management issues. The project also aims to propose circular business models for sustainable plastic production using the principles of industrial symbiosis. Alternatives to single use plastics are also analysed and suitable alternatives are proposed based on environmental impact analysis and economic feasibility assessment.
Role: Appointed as Research Assistant by Dr Mohammad Sujauddin
Responsibilities: The project was segmented into 4 different tasks. I worked as research assistant for Tasks 1 & 2. I was part of the research team that supported the Department of Environment (DOE) in the identification and development of national policy regulations for sustainable plastic management.

- Conducted a comprehensive analysis to identify existing national policy regulations pertaining to plastics. Identified gaps in the current regulations and determined areas requiring further development.
- Researched and gathered best practice examples of policies from around the world, specifically focusing on areas aligned with the identified gaps. Analyzed these examples to extract valuable insights related to accountability structures, communication and dissemination plans, and the involvement of the private sector.
- Utilized the gathered information and insights to contribute to the development of national policy regulations for sustainable plastic management. Collaborated with stakeholders to ensure the inclusion of anti-litter regulations and guidelines aimed at minimizing plastic packaging. Explored options for Private Sector Participation (PSP) within the policy framework.
- Contributed to the creation of a comprehensive set of national policy regulations that addressed the identified gaps and aligned with international best practices. These regulations aimed to promote sustainable plastic management, reduce plastic waste, and establish effective accountability measures.

I was involved in designing the Extended Producer Responsibility (EPR) guidelines for Task 1 (Support the Department of Environment (DOE) to identify and develop national policy regulations for sustainable plastic management) of the project. These guidelines were to assist the Government

of Bangladesh in formulating EPR regulations for plastic waste management in Bangladesh. I also assisted in the analysis of alternatives to single-use plastic products for Task 2 of the project which looked at circular business models for the Plastic Industry. I conducted a techno-economic analysis to understand the economic feasibility of various alternatives to single use plastic applications.

(2) Navigating the Circularity of Textile Waste: Environmental and Economic Assessment of Recycled Yarn

Duration: November 2023 – July 2024

Description: This comprehensive study investigates the environmental impacts, technical feasibility, and economic viability of incorporating pre-consumer textile waste (PTW) into yarn production for Bangladesh's knitwear industry. The research employs Life Cycle Assessment (LCA) to quantify the environmental impacts of various yarn compositions, ranging from 100% virgin cotton to blends with up to 80% recycled content. Technical evaluations of yarn quality were conducted using standardized testing methods, while economic assessments considered factors such as material costs, availability, and designer preferences. The study integrates these diverse criteria using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) multi-criteria decision-making method to identify optimal yarn compositions under various scenarios. Additionally, the research explores potential future scenarios, including the adoption of organic cotton, shifts in energy sources, and projected raw material scarcity.

Role: Appointed as lead researcher by Dr Mohammad Sujauddin

Responsibility:

- Designing and coordinating the overall research project
- Overseeing primary data collection and analysis
- Performing Life Cycle Assessment and technical evaluations
- Implementing the TOPSIS multi-criteria decision analysis
- Interpretation of results and manuscript writing

(3) Assessment of the present and future state of municipal solid waste management of Dhaka, Bangladesh: A material flow and life-cycle approach

Funded By: North South University. Grant ID: CTRG-22-SHLH-48. Grant amount: USD 5,000

Duration: October 2021- On going

Description: The objective of this study is to build a comprehensive picture of the MSW landscape of Dhaka City. This will include quantifying both the present solid waste generation characteristics and investing its socio-economic determinants, as well as forecasting future trends in waste characteristics. An assessment of existing waste management governance in Dhaka will be carried out as well. The goal is to help decision-makers understand the long-term needs, prospects, and challenges of the solid waste management system in Dhaka and assist in the formulation of effective waste management policies.

Role: Research Assistant

Responsibility:

- Survey and collect data on demographic and socio-economic factors affecting waste generation in Dhaka.
- Conduct an in-depth review of existing strategies, plans, policies, practices, legislation, and the institutional capacity of relevant entities.
- Manuscript writing.
- Building and estimating an econometric model for determinants of MSW waste generation

(4) Modelling future pathways for urban plastic waste generation in Bangladesh using a dynamic stock-flow system.

Duration: April 2024 – On going

Description: The objective of this study is to model plastic waste generation in urban centres in Bangladesh using a dynamic stock-flow system. The system architecture encapsulates plastic generation to final disposal as well as intermediary processes such as collection, sorting, and recycling. A baseline scenario is developed which assumes no interventions and the pathways for 3 types of plastics are modelled over a temporal bound of 25 years at discrete one-year intervals. 8 interventions are then modelled along with their associated economic costs and applied under 4 scenarios; (i) Collect and Dispose (CDS), (ii) Recycling (RES), (iii) Reduce and Substitute (RSS), and System Change (SES). Additionally, life cycle assessment is conducted to assess environmental impacts of the studied plastic waste types along the value chain. The study is expected to provide insights into the dynamics of plastic waste generation in Bangladesh at a national level, including the accumulations of plastic waste in terrestrial and aquatic environments, as well as the costs associated with various combinations of interventions. The model is built using MATLAB and data inputs such as per-capita waste generation, flow coefficients, stock capacities, and costs are collected from field surveys, literature review, and national documents.

Role: Appointed as lead researcher by Dr Mohammad Sujauddin

Responsibilities:

- Research Design and Methodology
- Model code writing and documentation
- Overseeing data collection, data cleaning and validation
- Writing the manuscript

(5) Investigating the potential of Closed-Loop Metabolism of Textile Fibres in the Textile and Apparel Industry in Bangladesh

Duration: November 2023 – December 2024

Description: The objective of this study is to conduct a static Material Flow Analysis (MFA) of the textile and apparel industry in Bangladesh using Economy-Wide Material Flow Analysis (EW-MFA) indicators. The system boundary encompasses raw material inputs through production, consumption, and final disposal, including intermediary processes such as recycling and reuse. The analysis focuses on quantifying material flows, waste generation, and recycling/reuse rates for the base year 2021. The study aims to provide insights into the current state of material flows and the potential for implementing closed-loop metabolism in the textile-apparel sector. Key indicators such as Direct Material Input (DMI), Total Material Requirement (TMR), and cyclical use rate are calculated to assess the industry's resource efficiency and circularity. Based on the static analysis, projections for future scenarios and potential interventions are discussed. The analysis is conducted with data inputs on material flows, waste generation rates, and recycling capacities collected from UN Comtrade, industry surveys, expert interviews, and literature review. The study provides a comprehensive snapshot of the textile-apparel material flows in Bangladesh, forming a basis for future policy recommendations and sustainability strategies.

Role: Research assistant appointed by Dr Mohammad Sujauddin

Responsibilities:

- Conduct Economic Valuation of Textile Material Flows
- Perform uncertainty analysis on Material Flow parameters
- Conduct policy analysis to identify gaps in existing policy landscape in Bangladesh and identify opportunities for closed-loop metabolism

Teaching Assistant

I am serving as a Teaching Assistant (TA) to Dr. Mohammad Sujauddin in the Department of Environmental Science and Management, North South University since Spring 2023. I am dealing with several advanced level undergraduate courses. I generally give lectures on the following topics in these specific courses:

1.) **ENV 455: Research Methods**
    a. Experimental Design
    b. Sampling Methods
2.) **ENV 418: Conservation and Sustainable Development**
    a. Life Cycle Assessment
3.) **ENV 414: Waste Management**
    a. Circular Economy
    b. Industrial Symbiosis
    c. Material Flow Analysis

Consulting experience

Lead Consultant for "Task 3: Estimating Infrastructure Needs for sustainable Management of Waste Plastic Stock in Urban Growth Centres" for the World Bank financed project: Development of Policy and Financing Strategy/Mechanisms to Implement the National Action Plan for Sustainable Plastics Management in Bangladesh and PPP Model for Investment in Plastic Recycling

Funded by: World Bank
Implementing Agency: Maxwell Stamp Ltd.
January 2023 – February 2024

- Designed a dynamic Stock-Flow system based on an Ordinary Differential Equation (ODE) Network to simulate the stocks and flows of plastic waste within Bangladesh.
- Estimated costs of waste management of plastics based on the stock-flow model
- Findings were used to guide policies and interventions designed to tackle the growing plastic waste problem in Bangladesh.
- Estimated GHG emissions along the plastic value chain using P2O model
- Cost estimates are utilized to identify key areas for interventions and infrastructure investment through a Public-Private Partnership (PPP) financing mechanism.

Skills and Expertise

Research based Computer Skills

- R programming language
- LaTeX
- STATA
- Python
- PyTorch
- MATLAB

Office and Productivity Software Skills

- MS Word
- MS Excel
- MS PowerPoint
- G-suite applications

Communication skills

I have honed my communication skills while serving as an executive member of the Young Economists' Forum on two separate terms. I was responsible for the coordination of club activities and for communicating with relevant authorities and potential funding agencies. This had provided me with the opportunity to hone my skills for communication and diplomacy. I have also hosted various events during my university life, one notable event being the National Conference on Current Economic Challenges held in February 2023 at North South University.

Organizational and managerial skills

- Quite adept in organizing and coordinating efforts and events.
- Served as the President of the Young Economists' Forum (2022-23) of North South University where I had to coordinate the club members and organize vents and seminars.
- Served as the Treasurer of the Young Economists' Forum (2021-22) where I was in charge of overseeing the club's budgets and finances.
- An active member at my university department, where I have helped organized various seminars and conference events.

Organizational Experience

- *Executive Board Member of Young Economists' Forum (YEF) of North South University (Treasurer, President) (2021 – 2023)*
    - Coordinated the activities of the club to be inclined with the mission and vision of the club.
    - Connected with various relevant organizations e.g., Bangladesh Bank, National Board of Revenue (NBR), Ministry of Finance
    - Conducted a series of events such as Econsilium (Bangladesh's first economic consultancy-based case competition), National Conference on Current Economic Challenges, Brown Bag Seminars for the Department of Economics where various esteemed researchers from around the world presented their research, and various other seminars and webinars designed to promote the field of economics.
    - Oversaw the administrative and financial responsibilities of the club.

- *Host of the National Conference on Current Economic Challenges held in February 2023 at North South University, in my capacity as President of the Young Economists' Forum (the organizing body of the event).*

Private Tutor – Mathematics, Economics, English, and Computer Science

2015 – Current

- I tutor students from grade 8 upto grade 12 in the IGCSE, IAL, and IB curriculums.

Honours and awards

- Edexcel High Achievers Award for outstanding results during my O Levels (2015)
- Edexcel High Achievers Award for World highest in IAS Business Studies (2016)
- Second Runner Up at SDG Policy Challenge Competition organized by ICCAD and Embassy of Sweden in Bangladesh (2023)
- First Place, ACCA Accounting Case Competition, British Council Muscat (2016)

English Proficiency

I have a strong footing in the language as English has been the primary medium of instruction both in school and during my undergraduate program. I have obtained an A grade in IGCSE English Language and I have an 8.5/9 band score in IELTS (2018)

Referees

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