# MD RAKIB HASAN

An aspirational graduate in Soil, Water, and Environment from the University of Dhaka, with 4 years of expertise in data analysis and 2+ years of interdisciplinary research. Passionate in using data-driven insights to address pressing social and environmental challenges, including water quality, public health, and sustainable development. Experienced in community engagement through 1.5 years of volunteer work, collaborating with local stakeholders to design actionable solutions in water quality.



## **Contact Information**

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# Areas of Expertise

## SOCIAL IMPACT RESEARCH

Environmental Health Risk Assessment Public Health Hazards Monitoring Ground & Surface Water Quality Variable Impact Monitoring

#### **DATA FOR DEVELOPMENT**

Real Time Monitoring (ArcGIS+Python) Remote Sensing (Google Earth Engine) Data analysis (Python, R, SQL) GIS Mapping (ArcGIS, QGIS)

## SUSTAINABILITY & RESILIENCE

Disaster Risk Assessment & Monitoring Climate Adaptation Workflow Resource Management

## PROJECT MANAGEMENT

NGO Program Coordination Grant Reporting Monitoring & Evaluation (M&E)

## **COMMUNITY ENGAGEMENT**

Stakeholder Collaboration Participatory Research Fieldwork

# ADDITIONAL TECHNICAL SKILLS

Communication & Presentation
Data Handling (Pandas, Numpy)
CI/CD Tools (Docker, Kubernetes)
Machine Learning (TensorFlow, PyTorch)

#### Certification

- **➤** Google IT Support Professional
- **■** Google IT Automation With Python
- ➤ Google Cloud: Cloud Architect
- ➤ Mathematics for Machine Learning
- ➤ DataOps with Apache Iceberg using Spark, Nessie, and Dremio

# **Educational Qualification**

# BSc in Soil, Water And Environment, University of Dhaka

Jan 2020- Feb 2025

CGPA: 3.62/4.00;

Research Project: Health Risk Assessment from Heavy Metals in Dried Fish of Dhaka.

## **Higher Secondary Certificate (HSC)**

Graduated in 2019

Letter Grade: A (Science), Government Bangla College

## **Secondary School Certificate (SSC)**

Graduated in 2017

Letter Grade: A+ (Science), Lalmatia Housing Society School & College

# **Professional Experience**

## **Atomic Energy Center; Bangladesh Atomic Energy Commission**

Research Associate

Mar 2024 - Nov 2024

- Developed and deployed deep learning models using TensorFlow and Scikit-Learn for water quality forecasting, enhancing environmental monitoring of the Turag, Buriganga, Shitalakshya, Dhaleshwari, and Balu rivers.
- Analyzed water pollution dynamics and documented findings in 7+ study, contributing to 10+ journal articles.

## Department of Soil, Water And Environment, University of Dhaka

Research Associate

Mar 2023 - Nov 2024

- Led 15+ analytical chemistry and deep learning projects to assess the impact of soil, sediment, and water quality on human health, analyzing over 500 samples across the Gangetic Delta.
- Used 5+ mathematical and statistical approaches to improve soil organic carbon (SOC) model accuracy by 15%.
- Contributed to 7+ peer-reviewed journal articles on analytical and AI-driven solutions for environmental sustainability.

## **Project**

# Water Quality Modeling Using Enhanced CNN, RNN, LSTM, GRU of Turag



- Analyzed Turag River water and developed a novel method for modeling dissolved oxygen (DO) and biological oxygen demand (BOD) using stacked CNN, RNN, LSTM, and GRU under atomic energy center project.
- Deep learning models outperformed machine learning models, improving accuracy by 3.88%, reducing errors by 7.41%, and increasing reliability by 95.56%.

## **Ground Water Arsenic Pollution Modeling Using Ensemble Techniques**

- Analyzed groundwater from 909 wells to assess Arsenic pollution and developed a novel ensemble techniqueusing multi-scalar data fusion (soil, climatic, anthropogenic, satellite imagery) for prediction.
- The approach is expected to improve prediction accuracy by 5-10% compared to traditional deep learning models.
- Collaborated with Dr. Anwar Zahid\* from the Institute of Water Modeling, BWDB on the project.

#### **Extracurricular Activities**

Section Leader (SL)

Stanford University
Code In Place Programme (CIP 2025)

Vice President (Technical)
Silica Lab
Geo-Biome Society,

**University of Dhaka** 

Runnersup in Dhaka Division BCB Young Tigers Cricket (2017)

# Interpersonal Skills

# Languages

English (Fluent), Bengali (Native), Hindi

#### **Communication Skills**

Expert in communication with senior leadership and decision-making teams.

## **Programming Languages**

Python	4Y
R	3Y
SQL	3Y

# Dashboarding

2Y
2Y
3Y

# **Data Handling**

Pandas	4Y
Numpy	4Y
Scipy	3Y

## **Machine Learning**

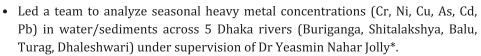
Scikit-Learn	4Y
TensorFlow	4Y
Pytorch	2Y

# App Development

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Django	1.5Y
Flask	1.5Y

## **Project**

## Heavy Metal Contamination and Health Risk Assessment in Dhaka's Rivers



- Identified Pb and Cu as primary pollutants, with winter concentrations exceeding WHO/USEPA limits by up to 300% due to reduced runoff.
- Quantified ecological and health risks using advanced indices (Igeo, PLI) and Monte Carlo simulations, revealing moderate-to-high carcinogenic risks from Pb/As via ingestion/dermal exposure.

# Soil Organic Carbon Dynamics Of Ganges Basin Delta By Deep Learning

- Collected Soil Samples from Sundarbans, Moribund, Mature & Active Delta of Ganges Basin of Bangladesh, analyzed physico-chemical characteristics under the supervision of Dr Md Jashim Uddin\*.
- The soil organic carbon analyzed from the lab was then mapped with satelliteimageries and historical weather data of 32 years and feed into Ensemble Deep Learning Model to predict soil organic carbon sequestration.
- The inter-relationship of variables was analyzed and findings are being compiled into a manuscript.

All Other projects can be found on Github 💿

#### **Publications**

## Journal of Next Research, Elsevier (Under review)

Hasan, M. R., Rahman, A., Zubyer, S., & Jolly, D. Y. N. Comparative analysis of water quality forecasting of enhanced CNN, RNN, LSTM, GRU-based multivariate and univariate deep learning architectures for the urban Turag River.

#### Journal of Biological Science, University of Dhaka (Under review)

Uddin, M. J., Hasan, M. R., Arabi, F. Z., & Ali, A. Z. Spatial soil variability and carbon dynamics in the Moribund Delta of the Ganges of Bangladesh.

## Journal of Environmental Science Ecosystem, Elsevier

Hasan, M. R., Arabi, F. Z., Uddin, M. J., & Mohiuddin, A. S. M. The potential soil organic carbon stocks in Sundarbans tidal mangrove forest ecosystem of Bangladesh.

# Journal of Environmental Geochemistry and Health, Elsevier

Rahman, A., Hasan, M. R., Zubyer, S., Jolly, Y. N., & Akter, S. Heavy metals and health risk assessment of Buriganga, Shityalakshya, Balu, Turag, Dhaleshwari river sediments and water around Dhaka.

#### References

# Dr. ASM Mohiuddin

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