

Md Khadem Ali

Geospatial Analyst • GIS & Remote Sensing • GeoAI & Machine Learning

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📞 0009-0006-0917-3372 | 🎓 Google Scholar | 📄 ResearchGate | 📍 Natore - 6432, Rajshahi, Bangladesh

Research Interests

Remote Sensing & GIS for environmental monitoring; climate change impact assessment and hazard modelling; land use/land cover dynamics via multi-temporal satellite data; machine learning and deep learning for Earth Observation; time-series remote sensing and vegetation phenology; geospatial digital twins for infrastructure and smart supply chain/logistics optimization; disaster risk assessment and early warning systems; precision agriculture and crop monitoring.

Education

B.Sc (Honours) in Geography and Environment | National University, Bangladesh 2023–Present (Ongoing)

- **Relevant Coursework:** GIS & Remote Sensing, Geospatial Data Analysis, Python, R, ML, Cartography
- Actively engaged in independent undergraduate research in environmental systems and geospatial modelling

Higher Secondary Certificate (HSC), Science | St. Joseph's School & College, Natore Session 2020–2021

- Science Club, English Literature & Speaking Club, Programming Club (SJSC-05), Debating Club

Publications

Review Article

[1] Nur, A. H., Hasan, M. F., Afyare, A., Mohamed, I. A., **Ali, M. K.**, & Ali, O. A.. *Assessing the Drivers of Drought in East Africa and Identifying Sustainable Mitigation Strategies: A Review*. Manuscript submitted to *Frontiers in Environmental Science* (Q1, IF 3.4, CiteScore 7.0). 2026. [Under review]

Conference Paper

[1] Mafhuj, I. I., Tamim, N. F., **Ali, M. K.**, & Arsalan, M. S.. *Spatio-Temporal Analysis and Forecasting of Land Cover and Land Surface Temperature in Ishwardi Upazila, Bangladesh Using Machine Learning and CA-Markov Modeling*. Abstract submitted to the *International Symposium on Energy and Environment*. 2026. [Under review]

Preprint

[1] **Ali, M. K.**. *Integrating remote sensing and MODIS-based time-series analysis to quantify seasonal vegetation rhythm disruptions: A case study*. SSRN. 2026. doi:10.2139/ssrn.6055754

Selected Research Projects

- **Flood Risk Assessment Using ML in Chandai Union** 2026
Random Forest classifier (100 trees) on Sentinel-2 NDWI, SRTM DEM, and monsoon data; OA 98.35%, $\kappa=0.967$, AUC=0.998.
Tools: Python (GeoPandas, Scikit-Learn), Google Earth Engine
- **Spatiotemporal Flood-Induced Crop Vulnerability: Geo-Digital Twin** 2025
Synthetic geo-digital twin modelling Aman/Boro rice yield loss in Natore; integrated elevation, river influence, and flood depth layers.
Tools: Python (GeoPandas, Matplotlib, Seaborn)

- **Seasonal Disruption Mapping, Natore District (2001–2024)** 2025
MODIS-derived NDVI time-series to classify seasonal vegetation rhythm disruption into five levels; basis of published preprint.
Tools: Google Earth Engine, ArcGIS Pro
- **Land Surface Temperature Analysis, Pabna District (2010–2025)** 2025
MODIS Terra LST (MOD11A2) processed in GEE; identified significant urban warming trend over 15-year period.
Tools: Google Earth Engine, ArcGIS Pro
- **Geospatial Air Quality Analysis, Bangladesh (2000–2025)** 2025
Hourly AQI & six pollutant time-series integrated into spatial heatmaps to identify pollution hotspots.
Tools: Python (Pandas, GeoPandas, Matplotlib)
- **Precision Agriculture & Crop Yield Prediction** 2025
Random Forest models on soil moisture, temperature, rainfall, humidity, and NDVI for yield prediction.
Tools: Python, MATLAB
- **LULC, NDWI & Water Bodies of Natore District** Project SP-7/24, 2025
Executed under SERC Wetland Conservation Program; Landsat-8 analysis supervised by Mithun Kumar, SERC Bangladesh.
Tools: ArcGIS Pro
- **Crop Health Assessment, Rajshahi Division (2025)** 2025
Sentinel-2 NDVI and Vegetation Condition Index (VCI) for district-wide crop stress mapping.
Tools: Google Earth Engine, ArcGIS Pro

Full project portfolio (30+ projects): www.khademali.com/#projects | www.github.com/mdkhademali

Technical Skills

GIS & Remote Sensing: ArcGIS Pro, QGIS, Google Earth Engine, SNAP; working knowledge of ENVI, ERDAS IMAGINE, SAGA GIS, GRASS GIS

Programming: Python, R, JavaScript (GEE), MATLAB, SQL; Jupyter Notebook

Geospatial Libraries: GeoPandas, Rasterio, GDAL, PostGIS, Folium, Cartopy, PyQGIS, ArcPy, Mapbox

ML/GeoAI: Scikit-Learn, TensorFlow, Keras, PyTorch, XGBoost, RF, SVM, KNN, LR, LightGBM, LSTM

Data Science: Pandas, NumPy, Matplotlib, Seaborn, SPSS, Power BI, Excel

Academic Tools: LaTeX, Zotero, Notion, Canva, Microsoft Office

Selected Certifications & MOOCs

- **Machine Learning for EO Modelling, S1** - Destination Earth/ECMWF Apr 2026
- **GIS for Climate Action** - Esri Apr 2026
- **Going Places with Spatial Analysis** - Esri Mar 2026
- **ArcGIS Imagery MOOC: Foundations and Frontiers** - Esri Dec 2025
- **Spatial Data Science: The New Frontier in Analytics** - Esri Oct 2025
- **Cartography** - Esri Oct 2025
- **Associate Data Scientist in Python** - DataCamp (23 courses) May 2025
- **Machine Learning Fundamentals** - DataCamp (4 courses) Apr 2025
- **Advanced Diploma in Geographic Information Systems** - Alison Mar 2025
- **Data Analytics Essentials** - Cisco Mar 2025

- **Geospatial Analysis** - Kaggle

Apr 2025

85+ verified certifications across GIS, Machine Learning, and more: www.khademali.com/#certifications

Society Memberships

- **Individual Member** - International Society for Photogrammetry and Remote Sensing (ISPRS) Jan 2026 – Present
Membership ID: 65639
- **Student Member** - American Psychological Association (APA) Jan 2026 – Present
Membership ID: C2605709635

Professional & Teaching Experience

Head of Research, GDA* Department | Climate and Environmental Research Institute (CERI), Somalia | Remote Apr 2026 – Present

- Leading research initiatives in geospatial analysis and data-driven environmental studies
- Managing and guiding projects involving GIS, remote sensing, and spatial modeling
- Coordinating with interdisciplinary teams to produce impactful research outputs
- Overseeing data analytics workflows and ensuring quality research standards

* *GDA = Geospatial & Data Analytics*

Geography & Environment Instructor | Learning Point Coaching Center, Pabna | On-Site Jan 2025 – Sep 2025 (Part-time)

- Taught Geography and Environment to Class 9–10 students using evidence-based pedagogy
- Served as graphic designer for educational content creation

Assistant Teacher | Polash Cadet School, Pabna | On-Site May 2024 – May 2025 (Part-time)

- Taught General Mathematics, General Science, and Bengali to Classes 3–5
- Fostered an inclusive and supportive classroom environment

Private Tutor | Self-employed 2021 – Present

- Assisted 25+ students in improving academic performance; consistent positive parental feedback

Voluntary & Community Activities

- **Finance Secretary; formerly Magazine Sub-Editor and Member** - Taranga, Natore Jan 2015 – Present
Joined as Member (Jan 2015 – Dec 2018), later served as Magazine Sub-Editor, IT & Project (Jan 2019 – 07 Sep 2025), and currently serving as Finance Secretary (since 07 Sep 2025)
Managing club finances, budgeting, and fund allocation; maintaining transparent financial records and reports; overseeing fundraising initiatives and donation management; editing and writing science articles; managing IT tasks and small tech projects; contributing to event planning and youth leadership
- **Program Executive; formerly Volunteer (SERC-V20250602)** - Space & Environment Research Center (SERC), Rajshahi 04 Jun 2025 – Present
Started as Volunteer (04 Jun 2025 – 25 Jun 2025), promoted to Program Executive (since 26 Jun 2025)
Program Executive: Project Team Lead; executed NDWI and LULC mapping for Natore; led urban–rural GIS classification projects
Volunteer: Assisted in GIS and Remote Sensing tasks during initial training and field support phase
- **Academic Team Member; also Content Writer & Proofreader** - Tachyon, Sylhet 04 Jun 2025 – Present
Joined as Content Writer & Proofreader (24 Jun 2024 – 25 Jun 2025), later took on Academic Team responsibilities

(since 04 Mar 2026)

Academic Team: Conducted academic research and supported research coordination activities; contributed to environmental and physics-based projects; worked collaboratively within the academic team to achieve project goals
Content Writer & Proofreader: Developed writing skills, proofreading, and presentation practice support

- **Volunteer** - Durbin, Pabna Apr 2024 – Present
Science education programs and astronomy awareness campaigns
- **Volunteer** - Bangladesh Wildlife Olympiad, Dhaka 22 Oct 2024 – 03 May 2025
Forest ecology, sustainable forest management, and urban forestry
- **Youth Delegate** - Safe Woman of Bangladesh, Natore May 2023 – May 2024
Involved in international relations and delivered public speeches at national awareness events

Achievements & Awards

- **2nd Runner-Up, Mapathon: Cartography Category** - RUET GIS Club (Esri Recognized) Dec 2025
GeoPlan 1.0, Project: “Vegetation Dynamics in Natore Zila (2015–2025) Using Landsat 8 NDVI on GEE”
- **2nd Place, Recreational Games Competition** - St. Joseph’s School & College Apr 2024
- **1st Place, Science Olympiad (Senior Category)** - Taranga Feb 2018
- **1st Place, Project Showcase (Senior Category)** - Taranga Feb 2018
- **Honorable, Quiz Competition** - D.K High School Feb 2018
- **1st Runner-Up, Quiz Competition (Science Olympiad)** - D.K High School Jan 2017

Language Proficiency

- **English** - Professional working proficiency; Duolingo English Test: 129 (CEFR C1), Oct 2025
- **Bengali** - Native proficiency

Interests

- **Professional:** Geospatial research, environmental data analysis, teaching and mentoring, academic writing, science communication
- **Personal:** Reading fiction and non-fiction books, watching films, travel and nature photography, recreational sports (cricket and football)

References

Dr. Md Al Amin
Assistant Professor & Head
Dept. of Geography & Environment
Shahid M. Mansur Ali College

Md Rokibul Islam
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University of South Carolina, USA
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Additional references available upon request.