Applications of Google Earth Engine (GEE) in Natural Resource Management

Objectives: After the training, participants will be able to:

- Utilize geospatial data in Bangladesh's natural resources sector.
- Compile geographic data and create/use maps.
- Analyze geospatial information and manage big data.
- Develop algorithms to process geospatial data.

Venue and Duration of the Training Program: Second floor, Office of the DSA, Khulna University.

Training Method: In-person.

When: Eight consecutive Saturdays (Full day) starting from the second week of January 2024.

Instructor: Dr. Md. Saidur Rahman, Professor, Forestry and Wood Technology Discipline, Khulna University, Bangladesh.

Target Participants and Eligibility:

- Maximum of 30 participants from any currently registered students (BSc third year and above) in any disciplines related to natural resources management.
- Students researching natural resource management are also welcome.
- Participants need to bring their own laptop and have a Gmail account.
- Attendance in all classes and hands-on sessions is mandatory for certificate eligibility.
- Applicants with prior knowledge of GIS and remote sensing will benefit.
- Applicants with no prior knowledge should demonstrate eagerness to learn quickly.

Participant Fee: Free for current students. Participants need to bring or arrange their lunch and snacks.

Content: The program will cover GIS and Remote Sensing using ArcGIS software and geospatial data analysis with Google Earth Engine (GEE).

Expected Outputs of the Training Program:
Participants are expected to apply geospatial information in natural resources management, including mapping, visualization, reporting, land use classification, and interpreting results.

Registration Process: Interested students can register through the link provided below by December 31, 2023, at 11:59 PM. Successful applicants will be notified by January 05, 2024.

Organizer: Professor Md. Sharif Hasan Limon, Director of Students Affairs, Khulna University, Khulna.

https://forms.gle/Am9QsurQsMLzZqQy8

Tentative Topics and Schedule of the Training Program (subject to change depending on the type of participants and their demands)

Week	Time	Content of the lecture
GIS		
Week 1 Morning	10:00 – 10:45	**Opening remarks** **Introduction to GIS**: spatial data types, navigating ArcGIS and representing. spatial data, symbology, making high-quality maps.
	11:00 –13:00	Hands-on practical session
Week 1 Afternoon	14:00 – 14:45	**Exploring ArcGIS**: Importing GPS data, working with attribute table, Digitization, understanding vector data and its application in forestry.
	15:00 –17:00	Hands-on practical session
Week 2 Morning	10:00 – 10:45	**Working with Vector data**: Editing vector data, working with common proximity and overlay tools such as buffer, Near, Intersect, Clip and others.
	11:00 –13:00	Hands-on practical session
Week 2 Afternoon	14:00 – 14:45	**Spatial Analysis**: Spatial analysis with vector data, Digital elevation models, Hillshade analysis, Drawing cross-profile.
	15:00 –17:00	Hands-on practical session
Week 3 Morning	10:00 – 10:30	**Advanced GIS**: Geodatabase, Geoprocessing: model builder, Handling continuous data, Vector to raster conversion (vice versa).
	10:45 –12:30	Hands-on practical session
Remote sensing		
Week 3 Afternoon	14:00 – 14:30	**Introduction to remote sensing**: spatial, temporal resolution of different satellite images, downloading satellite images, visualization in ArcGIS, Basic interpretation.
	14:45 –16:30	Hands-on practical session
Week 4 Morning	10:00 – 10:45	**Working with raster data**: Creating mosaic, true color/false color composite, image enhancement, filtering, Calculation of NDVI.
	11:00 –13:00	Hands-on practical session
Week 4 Afternoon	14:00 – 14:45	**Classification of images**: Supervised and unsupervised classification, accuracy assessment.
	15:00 –17:00	Hands-on practical session
Week 5 Morning	10:00 – 10:45	**Interpolation techniques**: Kriging methods and applications, mechanisms, different types of kriging methods
	11:00 –13:00	Hands-on practical session
Week 5	14:00 – 14:45	**Introduction to Google earth engine (GEE):** Understanding Google Earth Engine Coder (API).

Afternoon	15:00 –17:00	Hands-on practical session
Week 6 Morning	10:00 – 10:45	**Exploring GEE-1**: Data type in EE, Managing Assets, Exporting data, Client VS Server
	11:00 –13:00	Hands-on practical session
Week 6 Afternoon	14:00 – 14:45	**Exploring GEE-2**: Image Collection, Filter, Reduce, Functions, Feature collection.
	15:00 –17:00	Hands-on practical session
Week 7 Morning	10:00 – 10:45	**Exploring GEE-3**: Time series chart, Global Forest change, Time lapse videos, RADAR, LiDAR, Black Marble
	11:00 –13:00	Hands-on practical session
Week 7 Afternoon	14:00 – 14:45	**Classification:** Image classification, supervised and unsupervised, accuracy assessment
	15:00 –17:00	Hands-on practical session
Week 8 Morning	10:00 – 10:45	**Handling complex data in GEE:** Time lapse videos, RADAR, LiDAR, Black Marble
	11:00 –13:00	Hands-on practical session
Week 8 Afternoon	14:00 – 14:45	**GEE apps**: GEE apps examples, Creation of a GEE app, Various app widgets
	15:00 –17:00	Hands-on practical session
	17:00 – 18.00	**Closing and certificate giving ceremony**