ENTER GIS Workshop Series

Workshop 1

Environmental Open Data & Introduction to GIS

A Hands-on Introduction using QGIS

29 August 2026 | Online | 3 Hours 20 Minutes

1. Workshop Overview

Workshop 1 of the ENTER GIS Workshop Series was conducted on 29 August 2026 as an online, hands-on introductory training on Environmental Open Data, GIS and QGIS. The workshop was designed particularly for beginners and combined conceptual presentations with practical demonstrations and guided exercises.

The presentation progressed from the concepts of environment and environmental data to spatial versus non-spatial data, maps and spatial analysis, the role of GIS, Environmental Open Data, major open-data sources, basic GIS workflow and practical environmental applications.

2. Objectives

1. Introduce participants to the concept of the environment and major components of environmental information.
2. Explain environmental data and distinguish non-spatial environmental data from spatial environmental data.
3. Explain maps as a means of communicating spatial information and introduce spatial analysis.
4. Demonstrate how GIS integrates environmental datasets and supports spatial analysis and interpretation.
5. Introduce Environmental Open Data and important considerations when selecting and using open datasets.
6. Familiarise participants with major open environmental data sources and their applications.
7. Provide beginner-level practical exposure to QGIS using environmental datasets.
8. Demonstrate how ecological observations and environmental variables can be represented and analysed spatially.

3. Intended Learning Outcomes

By the end of the workshop, participants were expected to be able to:

1. Explain the meaning of environment, environmental data and spatial environmental data.
2. Differentiate spatial and non-spatial environmental information using practical examples.
3. Explain the role of GIS in storing, integrating, visualising and analysing environmental information.
4. Recognise major raster and vector environmental datasets and their basic characteristics.
5. Identify suitable open-data sources for environmental applications.

6. Understand key considerations when using open data, including source, date, resolution/scale, accuracy, coordinate system, licence and metadata.

7. Use QGIS to load, view, symbolise and work with environmental spatial datasets.

8. Formulate simple environmental questions that can be addressed through spatial analysis.

9. Follow a basic GIS workflow from defining an objective and preparing data to analysis and interpretation.

4. Topics Covered

4.1 What is the Environment?

Living and non-living components of the environment and the importance of location in environmental understanding.

4.2 What is Environmental Data?

Environmental observations and measurements relating to vegetation, biodiversity, water, climate, air, soil, terrain, disturbances and the human environment.

4.3 Non-spatial and Spatial Environmental Data

Distinction between environmental information without an explicit location and information linked to geographic position.

4.4 Maps, GIS and Spatial Analysis

Maps as a means of communication; spatial versus non-spatial analysis; and the role of GIS in environmental spatial analysis.

4.5 GIS is More Than a Map

GIS as an environment for data integration, visualisation, querying, spatial analysis and interpretation.

4.6 Why GIS is Important in Environmental Science

Use of GIS for understanding environmental patterns, relationships, distributions and spatial decision-making.

4.7 Environmental Open Data

Meaning of open data and the importance of source, date, resolution/scale, accuracy, coordinate system, licence and metadata.

4.8 Open Environmental Data Sources

Sentinel-2, Landsat, ESA WorldCover, OpenStreetMap, SRTM, WorldPop, MODIS vegetation indices, CAMS, ERA5-Land, NASA POWER, SoilGrids, HydroSHEDS, Copernicus Marine Service, NASA FIRMS and GBIF.

4.9 GIS Data and Workflow

Coordinate systems, scale, study-area boundaries, data preparation, reprojection, integration, analysis and interpretation.

4.10 Practical QGIS Applications

Thematic mapping and spatial questions involving biodiversity, roads, water bodies, land cover and environmental variables.

5. Hands-on Demonstrations and Practical Exercises

1. Tree diversity analysis based on 100 plots, including species abundance, frequency, density, basal area and IVI, followed by spatial questions concerning species concentration and relationships with streams and elevation.

2. Bird survey analysis based on 100 point-count stations, including species richness, abundance, Shannon–Wiener diversity, Simpson's diversity and Pielou's evenness.

3. Mapping bird point-count locations and exploring where richness and abundance are highest, whether diversity is higher near water bodies, whether richness is lower near roads, and whether species are associated with forest types.

4. Environmental spatial analysis using thematic maps and road buffers to explore relationships between high-biodiversity areas and roads.

5. Introduction to fire-related spatial analysis and the use of GIS to examine spatial patterns of fire probability/severity.

6. Introduction to the use and integration of open environmental datasets within a GIS workflow.

6. Environmental Open Data Component

Environmental Open Data was a central component of the workshop. Participants were introduced to representative sources across environmental themes.

Theme	Examples
Satellite data	Sentinel-2; Landsat
Global land cover	ESA WorldCover – 10 m
Base maps	OpenStreetMap
Terrain	SRTM / DEM
Population	WorldPop
Vegetation health	MODIS NDVI / EVI
Air quality	Copernicus Atmosphere Monitoring Service (CAMS)
Precipitation / climate	ERA5-Land; NASA POWER
Soil	ISRIC SoilGrids
Hydrology	HydroSHEDS
Ocean / coastal	Copernicus Marine Service
Disasters / fire	NASA FIRMS
Biodiversity	GBIF

Participants were encouraged to recognise that open data are not automatically good data. Source, date, resolution/scale, accuracy, coordinate system, licence and metadata need to be considered before analysis.

7. Participant Profile and Reach

The registration form recorded 113 registrations. The participant profile demonstrates broad reach across academic and professional groups and supports the beginner-oriented design of the workshop.

Participant category	Number	Percentage
Student	61	54.0%
Research Scholar	39	34.5%
Others	7	6.2%
Teacher	6	5.3%

7.1 Gender Representation

Gender	Number	Percentage
Female	63	55.8%
Male	50	44.2%

The registration data show 63 female participants (55.8%) and 50 male participants (44.2%), indicating substantial participation by both groups with a slight female majority.

7.2 GIS Background

GIS background	Number	Percentage
No, I am a complete beginner	52	46.0%
I have basic knowledge	43	38.1%
I have used GIS occasionally	17	15.0%
I use GIS regularly	1	0.9%

The registration profile was strongly aligned with the introductory character of the workshop: 52 participants (46.0%) identified as complete GIS beginners, 43 (38.1%) had basic knowledge, 17 (15.0%) had used GIS occasionally, and 1 (0.9%) reported regular GIS use.

7.3 QGIS Experience

QGIS experience	Number	Percentage
Never	52	46.0%
Tried it once or twice	35	31.0%
Basic experience	26	23.0%

QGIS experience was predominantly at beginner level: 52 participants (46.0%) had never used QGIS, 35 (31.0%) had tried it once or twice, and 26 (23.0%) reported basic experience.

7.4 Institutional and Geographic Diversity

The registration dataset contains 89 distinct institution/organization entries as recorded in the form. Because institution and location fields were entered as free-text responses, spelling and naming variations occur and the institutional count should be regarded as indicative rather than a fully deduplicated count.

The location responses indicate participation beyond the host university and Puducherry, with identifiable participants from multiple regions of India, including Tamil Nadu, Kerala, Meghalaya, Jammu & Kashmir, Madhya Pradesh, Odisha, West Bengal, Karnataka, Delhi, Assam and others. This demonstrates the national reach of the online workshop.

8. Attendance and Engagement

Indicator	Number	Percentage
Registered participants	113	100%
Participants attending	88	77.9% of registrations
Feedback responses	40	45.5% of attendees

The workshop lasted 3 hours and 20 minutes, and 88 participants attended the complete session. This represents 77.9% of registered participants and indicates strong sustained attendance for an online hands-on training session.

9. Post-Workshop Feedback Evaluation

A total of 40 feedback responses were received, representing a 45.5% response rate among the 88 attendees. The feedback results therefore represent the views of respondents and should not automatically be generalized to all attendees.

Evaluation indicator	Mean / 5	Median	Rating 4–5
Overall workshop rating	4.70	5	95%
Understanding basic GIS	4.75	5	95%
Hands-on QGIS exercises	4.55	5	95%

The quantitative results were consistently positive. The overall workshop rating was 4.70/5; usefulness for understanding basic GIS was rated 4.75/5; and the hands-on QGIS exercises received 4.55/5. For all three indicators, 95% of respondents gave a rating of 4 or 5.

9.1 Most Useful Workshop Components

Component	Responses
Hands-on QGIS exercises	23

Creating environmental maps	9
Environmental Open Data	4
Understanding GIS and spatial data	4

Hands-on QGIS exercises were the most frequently identified useful component (23 responses), followed by creating environmental maps (9 responses). Environmental Open Data and understanding GIS/spatial data each received 4 responses.

10. Qualitative Feedback and Participant Suggestions

More hands-on training

Participants repeatedly requested additional practical sessions and more time for exercises.

Advanced environmental GIS applications

Suggested topics included LULC and forest-cover change, change matrices and future prediction, machine learning, NDVI and vegetation mapping, species distribution modelling, landscape connectivity and resistance modelling, terrain analysis, site suitability, multi-criteria decision analysis, spatial modelling and satellite image analysis.

Research and thesis applications

Participants expressed interest in applying GIS techniques to their own thesis, project, research and field datasets.

Supporting learning materials

Participants requested presentation materials and suggested assignments or exercises after the session.

Beginner support

A small number of respondents found the initial map-making steps or practical sequence somewhat confusing and suggested more explanation or time at the beginning.

10.1 Illustrative Participant Feedback

“Kindly continue the workshop Sir. Its really helpful and informative.”

“I really enjoyed the practical part of the workshop.”

“The workshop was very useful. Looking forward to more practical GIS workshops in the future.”

“The delivery and presentation were simple and understandable.”

“More time is needed for the hands-on experience.”

“Some assignments or exercises can be given after the session.”

11. Key Achievements

1. Reached 113 registered participants through an online national-level capacity-building activity.

2. Achieved 88 full-session attendees over 3 hours and 20 minutes.

3. Reached a diverse academic audience comprising students, research scholars, teachers and other participants.

4. Engaged participants with varied GIS backgrounds, including a large proportion of complete beginners.

5. Introduced Environmental Open Data as a central theme aligned with the ENTER project.

6. Provided practical exposure to QGIS and environmental spatial analysis.

7. Generated strong participant demand for continued hands-on and advanced GIS training.

8. Established a useful baseline of participant interests and learning needs for subsequent workshops.

12. Lessons Learned

1. A beginner audience benefits from a clear conceptual sequence before practical GIS work.

2. Hands-on exercises were the most valued component and should remain central to future sessions.

3. A 3-hour-plus session can sustain strong attendance, but additional practical time would be beneficial.

4. Prepared datasets are useful for introductory training, while future sessions can progressively incorporate participant datasets.

5. Short step-by-step practical checklists may reduce confusion among first-time QGIS users.

6. Post-workshop exercises and shared presentation materials can strengthen learning beyond the live session.

13. Recommendations for Future ENTER GIS Workshops

1. Retain the practical, demonstration-plus-participant-exercise format.

2. Allocate a greater proportion of workshop time to guided hands-on practice.

3. Develop a progression from beginner GIS to advanced environmental spatial analysis.

4. Consider LULC/change detection, NDVI/vegetation mapping, terrain analysis, MCDA, biodiversity analysis, spatial modelling and machine learning as potential future topics.

5. Use real-world datasets and progressively introduce participant-generated or research datasets.

6. Provide a concise practical guide/checklist and datasets before each workshop.

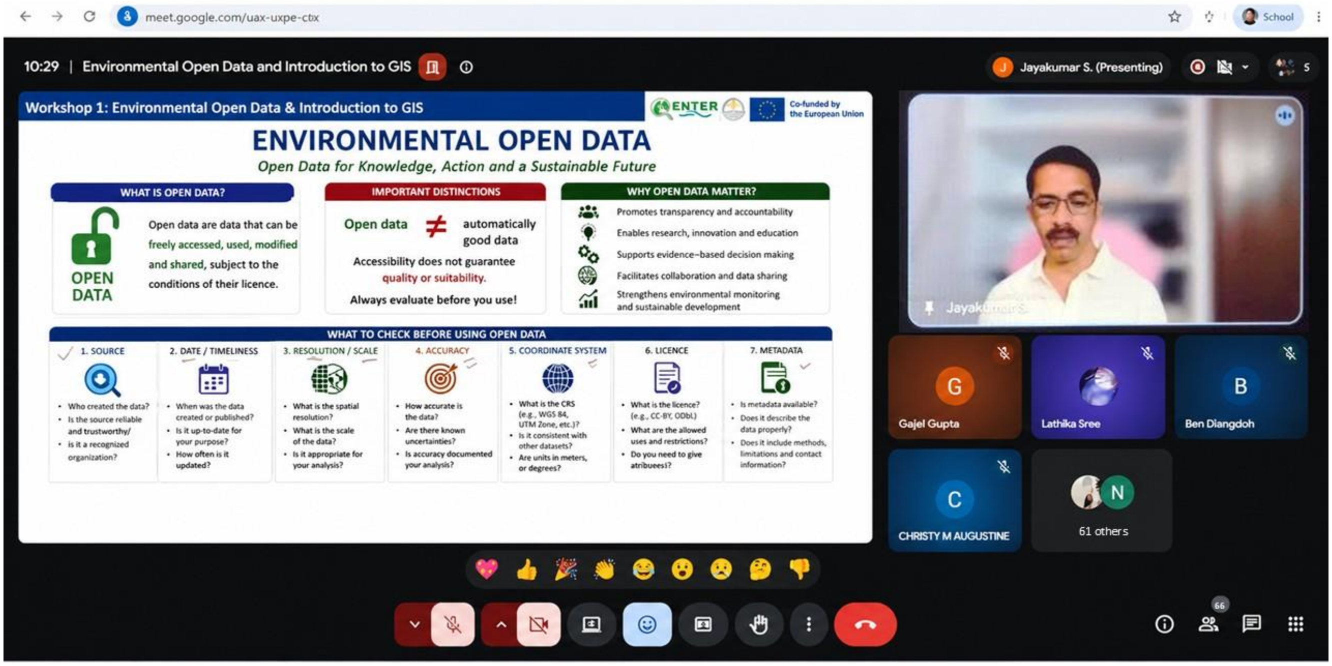
7. Offer an optional post-workshop exercise or assignment to encourage continued practice.

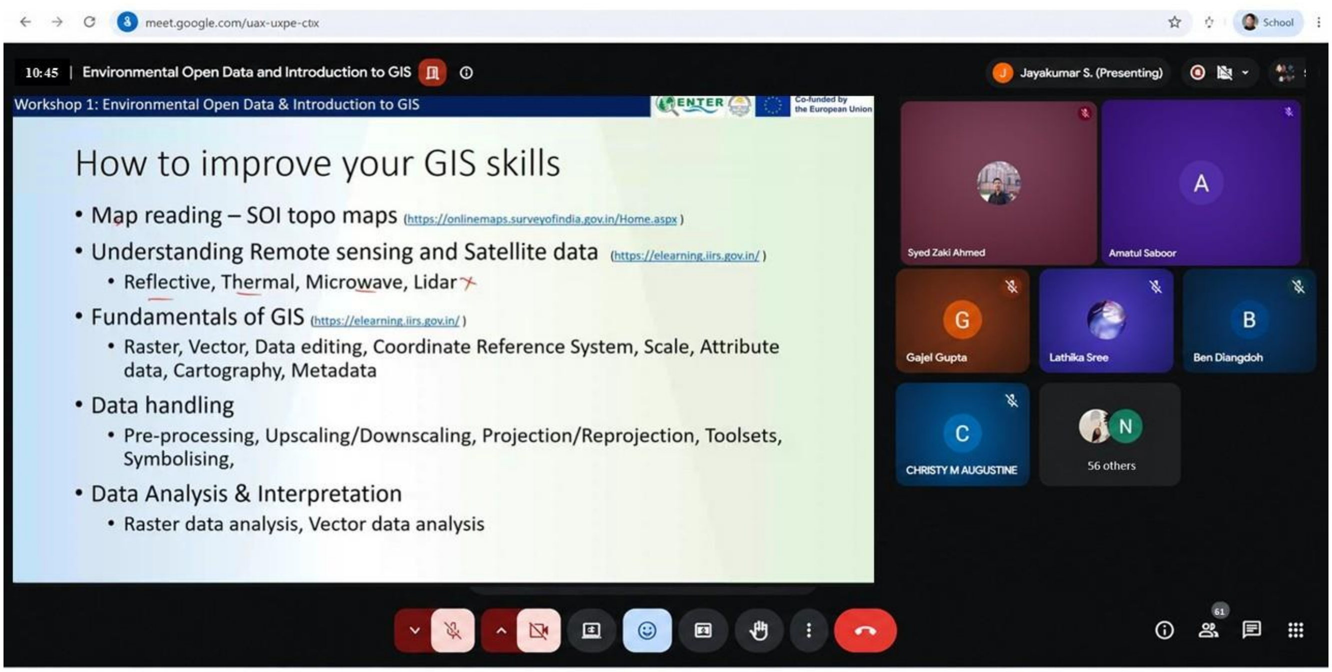
8. Continue using a short standardised feedback form to monitor satisfaction, learning value and future training needs.

14. Conclusion

Workshop 1 of the ENTER GIS Workshop Series successfully established a practical and accessible introduction to Environmental Open Data, GIS and QGIS-based spatial analysis. The workshop attracted 113 registrations and 88 participants attended the complete 3-hour 20-minute session. The registration profile demonstrates broad participation by students, research scholars, teachers and other participants from institutions and regions across India, with strong representation of beginners in GIS and QGIS.

The post-workshop evaluation was highly positive among the 40 respondents, with mean scores of 4.70/5 for the overall workshop, 4.75/5 for understanding basic GIS and 4.55/5 for the hands-on QGIS exercises. The dominant participant message was a request for continued hands-on training and progressively advanced, research-oriented environmental GIS applications. These results provide a strong basis for continuing and expanding the ENTER GIS Workshop Series.





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