

Geospatial AI and digital mapping for infrastructure decision-making



Artificial intelligence (AI) is increasingly being used to translate fragmented datasets into actionable insights for governments and development programmes. This learning note explores how geospatial data, earth observation and digital mapping systems are being combined with AI to support planning and decision-making in infrastructure, climate and urban systems.

Overview

Launched by the UK's Foreign, Commonwealth and Development Office (FCDO) in December 2025, the Artificial Intelligence Accelerator aims to harness UK capabilities in AI to address complex infrastructure challenges, support evidence-based decision-making and showcase the UK as a global leader in AI-driven innovation. The AI Accelerator has four broad aims:

- To leverage UK AI capability in support of infrastructure and climate programmes.
- To work with in-country teams to identify and pilot use cases, including in Ukraine and Indonesia.
- To align with other FCDO technology initiatives to present a coherent UK offer.
- To act as a hub for AI expertise across cities, infrastructure and energy.

GCIEP recently held the third of four learning sessions exploring the aims of the AI Accelerator in more detail. The event showed how geospatial data, earth observation and digital mapping systems are being combined with AI to support planning and decision-making in infrastructure, climate and urban systems.

Geospatial science and infrastructure decision-making

Examples from geoscience, climate risk modelling and open urban data platforms demonstrated how AI-enabled geospatial intelligence can translate fragmented datasets into actionable insights for governments and development programmes.

For instance, the British Geological Survey (BGS) uses geospatial science and AI to support infrastructure and environmental

decision-making. As a national geoscience authority, BGS collects and analyses large datasets on geology, environmental systems and natural hazards. These datasets underpin critical decisions on infrastructure siting, resource management and climate resilience.

AI is increasingly being used to process and interpret these datasets. Examples include modelling subsidence in rapidly growing cities; using satellite-based earth observation data to monitor ground movement and identify landslide risks; and employing machine learning to generate seabed composition maps from limited physical samples and geospatial datasets. In all these examples, AI makes large-scale, high-resolution analysis easier, allowing governments to move from static data towards dynamic, scenario-based modelling.

Translating spatial data into decision tools

The Ghana Climate Risk Observatory offered another insight into the practical application of geospatial AI. The Observatory was designed to integrate datasets, environmental conditions and socio-economic indicators to support infrastructure planning and investment decisions at a local level. However, the availability of relevant data is limited. The Observatory therefore uses AI to generate proxy datasets and integrate fragmented sources, allowing a more comprehensive understanding of risk at district and city levels.

Although the analyses performed by the Ghana Climate Risk Observatory are complex, the resulting information is presented through an accessible interface. This ensures the Observatory remains usable and accessible to policymakers without technical expertise, enabling them to identify priorities and make more informed decisions.

Open urban data and digital platforms

A third example came from the Colouring Cities programme, led by the Alan Turing Institute, which aims to create open, standardised datasets on buildings, land use and urban systems at a high level of spatial detail. The programme uses AI to help combine multiple data sources, including official records, crowdsourced data and machine learning outputs, to create comprehensive urban datasets that can be used for infrastructure research, planning and policy development.

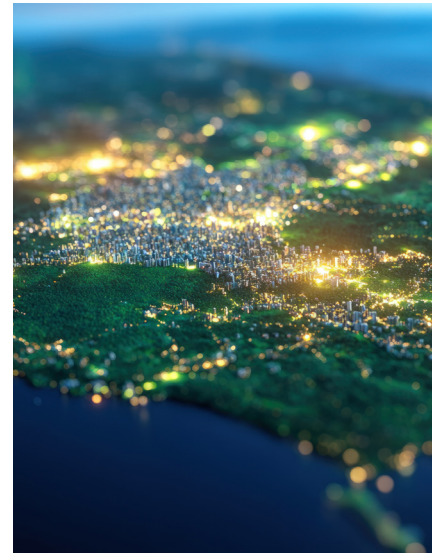
An important feature of the approach is its open and collaborative model. By using shared code and interoperable

data structures across countries, the platform enables cross-country comparison and reduces duplication of effort. For platforms such as this, data quality, privacy protection and maintaining transparency are critical considerations.

Discussion themes

Discussion at the learning session focused on how geospatial AI can be applied in practice within development programmes.

- 1. Data-poor environments:** Participants explored how spatial data and satellite imagery can help fill gaps where traditional datasets are limited, and the role of AI in generating proxy data.
- 2. Open versus proprietary data:** Questions were raised about the balance between open data platforms and commercial data providers, particularly in terms of accessibility, cost and long-term sustainability.
- 3. Capacity and usability:** The importance of designing tools that can be used by local decision-makers was emphasised, including the need to simplify outputs and align them with existing planning processes.
- 4. Data integration challenges:** Combining multiple datasets across sectors and scales remains a major barrier, requiring both technical solutions and institutional coordination.
- 5. Skills and collaboration:** Participants highlighted the need for stronger collaboration between governments, academia and development partners, as well as approaches to build local capability in data management and analysis.



Practical takeaways

The third AI Accelerator learning sessions concluded by summarising several helpful insights from the preceding presentations and discussions:

- Geospatial data is a foundational layer for many AI applications in infrastructure and climate systems.
- AI enables large-scale spatial datasets to be analysed more quickly and at higher resolution, supporting improved planning and risk assessment.
- Even in data-constrained environments, satellite data and proxy datasets can provide a starting point for analysis.
- Effective deployment depends on translating complex data into accessible tools that support real decision-making.
- Open data platforms can play an important role in enabling collaboration and scaling insights across countries.

GCIEP is a demand-driven initiative focused on sustainable green cities and climate-resilient infrastructure in lower-income countries. As the flagship programme of the UK's Centre of Expertise for Green Cities, Infrastructure and Energy, GCIEP supports the UK Government's mission to accelerate investment in, and delivery of, infrastructure and urban development that is responsible, reliable, inclusive, low-carbon and climate-resilient.

A significant proportion of GCIEP's work is carried out in seven priority countries: Ethiopia, Ghana, Indonesia, Philippines, Mozambique, Vietnam and Zambia, where a Deep Offer programme provides long-term, systemic interventions focused on transformative change and infrastructure financing.

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The UK's Green Cities, Infrastructure and Energy Programme accelerates the delivery of sustainable green cities and climate-resilient infrastructure – tackling climate change and extreme poverty.