

Applications of Geospatial Solutions and Technologies for Climate Resilience

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SUMMARY

Climate change and its impacts are inherently spatial, dynamic, and multi-scalar, demanding responses grounded in location-based evidence and continuous insight. This plenary examines how geospatial solutions—integrating Earth Observation (EO), GEOAI, digital twin technologies, and positioning infrastructure—provide an end-to-end framework to support climate action through five structured approaches.

First, authoritative geospatial information, EO data, and 3D digital representations establish robust baseline studies, enabling decision-makers to understand existing conditions, identify risks, and visualise what is at stake. Second, GEOAI and spatial analytics support the formulation of mitigation and adaptation solutions by integrating multi-source data, detecting patterns, and modelling climate risk scenarios. Third, continuous mapping, GNSS-enabled monitoring, and automated analytics facilitate the monitoring of change, capturing climate impacts such as sea-level rise, land subsidence, deforestation, and urban heat dynamics. Fourth, time-series analysis of geospatial information enables the measurement of effectiveness, providing objective assessment of interventions against defined targets. Finally, immersive 3D visualisation and digital platforms enhance communication, translating complex climate intelligence into actionable insights for policymakers, practitioners, and communities.

Together, these geospatial solutions position the surveying and geomatics profession at the forefront of delivering climate-resilient and sustainable outcomes