


Chapter 11

Geospatial Tools for Corporate Sustainability Reporting and ESG Compliance

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ABSTRACT

This chapter explores the transformative role of geospatial tools in corporate sustainability reporting and ESG compliance. GIS, remote sensing, and IoT-enabled spatial data enable organizations to visualize environmental footprints, assess social impacts, and verify regulatory adherence across geographic scales. Applications in environmental monitoring, risk assessment, supply chain analysis, and community engagement demonstrate how spatial intelligence enhances transparency, accountability, and operational efficiency. The chapter also examines challenges in data quality, technical capacity, and integration, and highlights emerging trends such as AI-driven analytics and real-time ESG dashboards, offering pathways for dynamic, spatially informed sustainability management.

INTRODUCTION

Over the last few years, the issue of corporate sustainability and the need to adhere to Environmental, Social, and Governance (ESG) have become the key tenets of responsible business practices (Barbosa et al., 2024; de Souza Barbosa et al., 2023; Dicuonzo et al., 2022). Stakeholders, such as investors, regulators, consum-

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ers, and communities, are making more and more demands, seeking transparency in the manner in which organizations conduct their operations in regard to their environmental footprint, their social impact, and their governance mechanisms. The increasing realization that long-term financial performance is closely linked to sustainability and socially responsible operations has accelerated this shift (Audi & Yu, 2024; Coelho et al., 2023; Sarfraz et al., 2023). Thus, organizations are feeling increased pressure to measure, report, and reduce their effects in a manner that is both accurate and verifiable.

Although the focus on ESG compliance grows over time, effectively capturing and reporting environmental and social impacts presents a major challenge to companies. The use of traditional reporting methods tends to be based on aggregated, non-granular, or self-reporting data that can be neither spatially specific nor time-granular, and contextually relevant. Indicatively, greenhouse gas emissions reporting at the facility or corporate level can hide localized environmental risk, such as being near a protected area, water-stressed area, or climate-vulnerable communities (Wang, 2023). Similarly, social impact evaluations often overlook geographic labor allocation, community participation, and environmental resource availability, thereby limiting their ability to inform decision-making and demonstrate accountability.

Geospatial applications such as Geographic Information Systems (GIS), satellite and aerial images, and spatial data powered by the Internet of Things (IoT) can provide a strong set of tools to solve these problems. With the combination of location-based intelligence and conventional corporate data, organizations are in a position to visualize environmental footprints, evaluate risk exposure, create social impacts, and confirm regulatory framework compliance across various geographic levels (Chen et al., 2022; Soares et al., 2025; Zhang et al., 2021). Actionable insights are delivered by real-time dashboards, predictive analytics, and spatial modeling to allow a broader, more transparent, and evidence-based approach to sustainability reporting.

This chapter explores how geospatial technologies can enhance corporate sustainability reporting, making it more sustainable and ESG-compliant. It begins by examining how spatial tools have been utilized to support ESG metrics, and then proceeds to describe some of the most significant technologies and data sources. Applications in environmental monitoring, risk assessment, social impact assessment, and compliance checks are then presented in the chapter. The application of geospatial intelligence in the sustainability of corporate operations is bound to present both practical advantages and challenges, as shown by real-life case studies in the energy, agricultural, and manufacturing sectors. Lastly, the chapter concludes with a discussion of emerging opportunities, ongoing challenges, and future directions for integrating geospatial tools with ESG reporting and decision-making frameworks.

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