Chapter 5
Mapping Green Infrastructure Harnessing OSM Data for Sustainable Development

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ABSTRACT

The chapter provides a comprehensive analysis of global studies on urban green spaces (UGS), highlighting their diverse methodologies and findings. Spanning countries such as the USA, Kenya, Germany, Finland, Portugal, China, Brazil, Belgium, Ukraine, Norway, Spain, South Africa, and many more, these studies underscore the pivotal role of UGS in enhancing urban quality of life, addressing socio-economic disparities, and mitigating environmental challenges. Utilizing approaches such as citizen science mapping, spatial analysis, and socio-economic assessments, the research emphasizes the importance of equitable UGS access, efficient urban planning, and community engagement. Furthermore, the findings offer policy recommendations aimed at optimizing UGS provision, enhancing accessibility, and integrating green infrastructure into urban development strategies. This research highlights the worldwide importance of UGS and provides crucial insights for policymakers, planners, and communities aiming for healthier, more sustainable cities.

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INTRODUCTION

Urban green spaces refer to any areas within urban environments that are predominantly covered by vegetation, such as parks, gardens, forests, and even roadside greenery. These spaces play crucial roles in enhancing the quality of urban life by providing recreational areas, promoting biodiversity, mitigating urban heat island effects, improving air quality, and offering opportunities for social interaction and physical activity. Urban green space (UGS) provides numerous environmental and social benefits and is increasingly prioritized in urban policies (Texier, Schiel, and Caruso 2018).

Spatial data, which includes geographic information system (GIS) data, remote sensing data, and other location-based information, can greatly aid in analyzing urban green spaces. Spatial data allows for the accurate mapping of urban green spaces, including their location, size, shape, and characteristics. This mapping can be done using satellite imagery, aerial photography, LiDAR data, and ground surveys. Spatial data can enable the quantification of various attributes of green spaces, such as vegetation cover, canopy density, species diversity, and habitat connectivity. This quantitative information helps in assessing the extent and quality of green spaces within urban areas.

GIS techniques can be used to perform spatial analysis on green space data. This includes proximity analysis to determine accessibility to green spaces, spatial interpolation to estimate vegetation density across urban areas, and hotspot analysis to identify areas with high or low levels of greenery. Spatial data can also be used to assess the environmental impact of urban development on green spaces. This includes analyzing land use changes, monitoring vegetation loss or fragmentation, and identifying areas at risk of habitat destruction.

OpenStreetMap (OSM) is a collaborative project that aims to create a free and editable map of the world. It allows users to contribute and edit geographic data to improve the accuracy and completeness of maps. OSM data can contribute to green space analytics in several ways. OSM provides a wealth of geospatial data, including information on parks, gardens, forests, and other green spaces within urban areas. This data can be accessed and used for various analytical purposes. OSM allows users to update and maintain information about green spaces in real time. This enables the continuous improvement of green space data, ensuring that it remains accurate and up-to-date.

Moreover, OSM data can be easily integrated with GIS platforms for spatial analysis and visualization. By combining OSM data with other spatial datasets, analysts can gain insights into the distribution and characteristics of urban green spaces. It can foster community engagement and collaboration, allowing users to contribute local knowledge about green spaces. This crowdsourced approach can