Assessing Landform Patterns and Resource Potentials using Digital Terrain Models

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Abstract

This study effectively demonstrates the power of Digital Terrain Models (DTMs) in detailed micro-level mapping and landform pattern analysis, proving particularly valuable for large-scale cadastral initiatives. Integrating GIS and remote sensing techniques, DTMs enable nuanced spatial evaluations and richer visual representations. The research methodology incorporated a synergistic blend of existing cadastral maps, elevation data sourced from SRTM and ALOS DEM, field-collected GPS readings, and pre-existing Digital Elevation Model (DEM) data. This integrated approach yielded several significant outcomes for detailed micro-level mapping. Specifically, DTMs facilitated a deeper understanding of the physiographic arrangement and the identification of areas susceptible to erosion. Furthermore, they aided in comparing soil distribution patterns, revealing homogeneity or heterogeneity, while 3D visualization capabilities allowed for the analysis of intricate soil-geomorphic and physiographic interrelationships. In conclusion, the study underscores the effectiveness of DTMs in micro-level spatial investigations, especially for mapping small villages or watersheds to pinpoint erosion-prone zones. This was followed by an analysis of soil-physiographic relationships and the potential for land resource mapping, ultimately assisting in the identification of critical water conservation hotspots. Ultimately, DTMs present a cost-efficient methodology for natural resource mapping and streamlining field survey operations.

Keywords: landform patterns, DEM analysis, spatial evaluations, natural resource