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GIS-Based Spatial Distribution and Regional Concentration Analysis of Cattle and Small Ruminant Populations in Türkiye

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Abstract

The development of sustainable livestock systems is important for ensuring food security, supporting rural development, and enabling the efficient management of agricultural resources. Analyzing the spatial distribution and regional concentration of cattle and small ruminant populations contributes to understanding the structure of livestock activities and regional production dynamics. This study conducts a GIS-based and data-driven spatial analysis using province-level cattle and small ruminant population data in Türkiye. Within the scope of the study, livestock data obtained from the Turkish Statistical Institute are evaluated through GIS-based thematic mapping, regional comparisons, and spatial statistical analysis methods to examine spatial patterns, regional concentrations, and local clustering tendencies. The findings are expected to reveal that cattle and small ruminant populations are not homogeneously distributed across Türkiye and that some provinces form notable concentration areas for livestock activities. The study contributes to a better understanding of regional livestock patterns from the perspective of sustainable livestock management. The findings aim to show that GIS-based spatial analysis and spatial statistical methods can support data-driven decision-making approaches in evaluating livestock distribution, regional resource use, and rural development priorities. This study is expected to contribute to the use of digital agriculture and GIS-based analysis approaches in livestock research and to provide a data-driven basis for future studies on sustainable livestock policies.

Keywords: *Sustainable Livestock Management, GIS, Spatial Distribution, Regional Concentration, Cattle Population, Small Ruminant Population*