World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:18, No:04, 2024

Mapping Soils from Terrain Features: The Case of Nech SAR National Park of Ethiopia

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Abstract : Current soil maps of Ethiopia do not represent accurately the soils of Nech Sar National Park. In the framework of studies on the ecology of the park, we prepared a soil map based on field observations and a digital terrain model derived from SRTM data with a 30-m resolution. The landscape comprises volcanic cones, lava and basalt outflows, undulating plains, horsts, alluvial plains and river deltas. SOTER-like terrain mapping units were identified. First, the DTM was classified into 128 terrain classes defined by slope gradient (4 classes), relief intensity (4 classes), potential drainage density (2 classes), and hypsometry (4 classes). A soil-landscape relation between the terrain mapping units and WRB soil units was established based on 34 soil profile pits. Based on this relation, the terrain mapping units were either merged or split to represent a comprehensive soil and terrain map. The soil map indicates that Leptosols (30 %), Cambisols (26%), Andosols (21%), Fluvisols (12 %), and Vertisols (9%) are the most widespread Reference Soil Groups of the park. In contrast, the harmonized soil map of Africa derived from the FAO soil map of the world indicates that Luvisols (70%), Vertisols (14%) and Fluvisols (16%) would be the most common Reference Soil Groups. However, these latter mapping units are not consistent with the topography, nor did we find such extensive areas occupied by Luvisols during the field survey. This case study shows that with the now freely available SRTM data, it is possible to improve current soil information layers with relatively limited resources, even in a complex terrain like Nech Sar National Park.

Keywords : andosols, cambisols, digital elevation model, leptosols, soil-landscaps relation
Conference Title : ICERSTA 2024 : International Conference on Environmental Remote Sensing Techniques and Applications
Conference Location : Cape Town, South Africa
Conference Dates : April 11-12, 2024