

## Soil Degradation Mapping Using Geographic Information System, Remote Sensing and Laboratory Analysis in the Oum Er Rbia High Basin, Middle Atlas, Morocco

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**Abstract :** Mapping of soil degradation is derived from field observations, laboratory measurements, and remote sensing data, integrated quantitative methods to map the spatial characteristics of soil properties at different spatial and temporal scales to provide up-to-date information on the field. Since soil salinity, texture and organic matter play a vital role in assessing topsoil characteristics and soil quality, remote sensing can be considered an effective method for studying these properties. The main objective of this research is to assess soil degradation by combining remote sensing data and laboratory analysis. In order to achieve this goal, the required study of soil samples was taken at 50 locations in the upper basin of Oum Er Rbia in the Middle Atlas in Morocco. These samples were dried, sieved to 2 mm and analyzed in the laboratory. Landsat 8 OLI imagery was analyzed using physical or empirical methods to derive soil properties. In addition, remote sensing can serve as a supporting data source. Deterministic potential (Spline and Inverse Distance weighting) and probabilistic interpolation methods (ordinary kriging and universal kriging) were used to produce maps of each grain size class and soil properties using GIS software. As a result, a correlation was found between soil texture and soil organic matter content. This approach developed in ongoing research will improve the prospects for the use of remote sensing data for mapping soil degradation in arid and semi-arid environments.

**Keywords :** Soil degradation, GIS, interpolation methods (spline, IDW, kriging), Landsat 8 OLI, Oum Er Rbia high basin

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