

Rangeland degradation assessment in the south slope of the Al-Jabal Al-Akhdar, northeast Libya using remote sensing technology

ABSTRACT

The degradation rate of Mediterranean steppes, especially in North Africa is 1% per year, and this considered a high a rate of degradation. This study conducted in 2014 in the south slope of the Al-Jabal Al-Akhdar, northeast Libya to quantify the vegetation recovery rate and assess selected Vegetation Indices (VIs) for mapping rangelands degradation status using remote sensing technology. Through a review of VIs we found that NDVI (Normalized Difference Vegetation Index) and MSAVI2 (Modified Soil Adjusted Vegetation Index) are the most useful indices for the study area to achieve the research objectives. Two Landsat (ETM+) satellite images (captured in September 2006 and 2014) used to map, monitor and assess the patterns of changes in plant cover. Three exclosures (fenced areas) with moderately to severely degraded soil and vegetation, were selected along a strong north-south rainfall gradient. Landscape Function Analysis (LFA) technique used to calculate Total Patch Area (TPA) for comparison purpose. According to the results, NDVI and MSAVI2 can be employed as a consistent and comparatively simple to use a tool in management and assessment of desertification processes in the Mediterranean rangelands. It seems that MSAVI2 more reliable than NDVI when the vegetation cover is very low. Overall, the plant cover did not change or increase for a large portion of regions at a time when 80% of the study area still under very severe and severe conditions of land degradation status.

Keyword: Al-Jabal Al-Akhdar; Libya MSAVI2; Total patch area; Vegetation indices