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Land degradation assessment using airborne high resolution digital images and GIS

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During the past 2 decades, several research studies have been carried out aiming at establishing and implementing a comprehensive methodology for the assessment and mapping of land degradation areas. The results were expected to provide a better understanding of the spatial and temporal dynamics of land degradation processes. The researches based on satellite and aerial photography stressed the need for more detailed and more precise monitoring and modeling of land degradation. They found out that the identification of the most important characteristics of land degradation was scale-dependent. At a regional scale, the topographical and lithological factors in conjunction with land use play an important role in land degradation. At a local scale, morphology, material and energy transport as well as by soil properties need to be collected in sufficient detail, in much finer scale. For this purpose, the desire to access data at decimetric or centimetric resolution led to investigate the feasibility of using GIS combined with images acquired by digital cameras on board of Unmanned Aerial Vehicle (UAV). They have produced spatial high-resolution (6 cm pixel size) Digital Elevation Models (DEMs). Nevertheless, they can cover only rather limited areas from low flying heights up to 100 meters altitude. This paper is a review of assessment of land degradation using photogrammetric techniques and highlights the geospatial information for land degradation issues. It evaluates the advantages of this technology in mapping and 3D reconstitution (DEM) for land degradation, using a widely available camera and existing photogrammetric software. Attempt has been made in this research to investigate the robustness of DEMs produced from UAV sourced images. Future research to improve image acquisition and processing is also outlined.

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