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"Development on the margin"

Mapping and Monitoring Land-cover/land-use Change in the Gash Agricultural Scheme (Eastern Sudan) Using Remote Sensing

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Abstract

The Gash Agricultural Scheme (GAS) is considered as one of the pilot projects that contribute to the rural development in eastern Sudan, particularly towards local population around the Gash River area. In the last decade, the scheme has undergone serious deterioration, further drought spells have led to increased pressure on meagre resources, in addition to invasion of unfavourable Mesquite trees. These factors lead to acceleration of the degradation process in the study area. This study is attempted to monitor and to assess the impacts of land degradation process on GAS area. For that, four cloud free multi-temporal Landsat images of the years 1979, 1987, 1999 and Aster data of the year 2010 covering the study area were selected for analysis. Maximum Likelihood Classification (MLC) method was used for the image classification. Five land cover/land use classes were identified explicitly; Mesquite trees, grass land, clay soil, stabilised sand and mobile sand. Visual and statistical change detection was carried out to detect the respective land use and land cover changes for the area. The results show that stabilised sand and mobile sand are the most dominant classes within the study area. They extremely affect the agricultural and residential areas as well as threaten the Gash River course during the dry season. Furthermore, the stabilised sand and mobile sand increased at the expense of the vegetation cover. The results also revealed that a rapid decrease of agricultural areas was observed over time as a result of Mesquite trees expansion. The study concludes that remote sensing provides important tools for generating and analysing information on land degradation status and its geographical extent in the semi-arid area of the GAS of Eastern Sudan.

Keywords: Gash agricultural scheme, land degradation, mapping and monitoring, remote sensing, Sudan

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