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Assessment of Land Use/ Land Cover Changes Using Multi-Temporal Satellite Imagery (South Darfur, Sudan)

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Abstract

South Darfur lies in a region that suffers significantly from the impacts of environmental degradation. Overgrazing, deforestation and overcropping have caused soils with an inherently low fertility. As a result the land use changed and led to a further competition and overexploitation of the natural resources. Subsequently conflicts has resulted in the majority of the population abandoning their homelands and becoming internally displaced or refugees.

The aim of this study was to map and assess of land use land/ land cover change in Edd Al Fursan locality which located in Southern Darfur State during the period 1999–2008. Multi-temporal Landsat (ETM) & (Aster) data have been utilised to detect land use/ land cover change. The images were geometrically corrected to a common map projection, followed by image processing operations, namely atmospheric correction, supervised image classification and accuracy assessment. The major Land Use Land Cover classes present in the study area are: grass land, forest land, fallow land, cultivated land, and bare land. Two methods of change detection were applied; these were Post Classification Comparison (PCC), and Multivariate Alteration Detection with Maximum Autocorrelation Factor Postprocessing (MAD/MAF). The comparisons of land use/ land cover showed that the natural vegetation cover (grass and forest lands) decreased from 21 %, 19 % in 1999 to 19 %, and 17 % in 2008 respectively, while the agricultural land increased from 25 % to 30 %. Moreover the fallow land has decreased from 24.5 % to 20.5 %, at the same time the bare land increased from 11 % in 1999 to 14 % in 2008. The linear transformations of (MAD/MAF) (unsupervised change detection) were applied to examine the quality of change. The study indicates that change in land use/ land cover in the study area is due to overpopulation as the results of conflict and environmental crisis that led to clearance of forest cover either for agricultural expansion or other domestic purpose (building materials or fuelwood). On the other hand overcultivation resulted in decrease of fallow period and increased in bare land.

Keywords: Change detection, land use/ land cover change, multi-temporal data

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