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## Applying Remote Sensing Tools for Assessing Desertification Process Within the Agrosilvopastoral System, North Kordofan- Sudan

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### Abstract

North Kordofan State is located in central area of the gum-belt across Sudan. More than 80 % of the state population depends on subsistence rain-fed farming and animal herding activities together with traditional gold mining. Agrosilvopastoral system is considered as one of the leading farming sectors in the state. Semi-arid climate dominates the area of the state and makes it vulnerable to land degradation and desertification risks. Erratic rainfall varies significantly in distribution and timing, thereby magnifying the risks of crops failure. Irrational land-use practices in terms of destructive shifting cultivation, forest degradation, removal of vegetation cover and overgrazing have led to drastic change and transformation in the farming system components. Therefore, the objective of this paper is to screen and assess the impacts of desertification process within the agrosilvopastoral system in the area by using remote sensing and GIS tools in relation to some socioeconomic and human factors. After clarifying the main concepts, indicators and modules, the remote sensing and GIS tools were applied for the purpose of the study. Historical records in terms of some variables such as rainfall, temperature, wind speed, crop yield, and animal and human populations for two specific (1980–1990 & 2000–2005) periods of time were used in association with the remotely sensed data. The results showed that the agrosilvopastoral system in the area is significantly susceptible to land degradation and desertification risks. This was reflected by significant increasing in bare-lands coupled with sharp decreasing in crops productivity as moving from south to west in the study area. Furthermore, land cover change (LCC) has occurred rapidly and occupied large areas, especially in the northern part of the state, which constitutes the most vulnerable one pertaining to the desertification process. The cases covered by the paper gave strong arguments that link the process and drivers of desertification to the change and transformation within the agrosilvopastoral system. Understanding dynamics and nature of this change/transformation is essential to setup an efficient land use strategies for resilience of the agrosilvopastoral system against crisis.

**Keywords:** Change and transformation, GIS tools, remote sensing