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Examining Land Use and Cover Change Along the Great Ruaha River Catchments in Southern Tanzania with Remote Sensing and GIS Techniques: 1986 – 2015

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Abstract

The Great Ruaha River flows from Mbeya through Njombe and Iringa regions in the Southern Highlands of Tanzania and connects to Kilombero and Rufiji Rivers in Morogoro and Coast regions, respectively. The River and its catchments form Kilombero wetland, which is a potential ecosystem to the Tanzania's economy. However, the intense utilisation of land resources for various human activities has resulted into some changes in the land cover type along the river basin and its catchments. To analyse the spatial-temporal changes, multispectral LANDSAT imageries of 1986 and 2015 time periods were used. A total of seven land cover types were identified and classified and later change detection analysis was performed. The dynamic index of land use and land cover was computed to quantitatively monitor the change in intensity of one land cover type. Over the period under study farming activities along the river catchments increased by 27 %, with a dynamic degree of 0.2541 percent. On other land cover types, forest, bushland and grassland decreased by 27 %, 24 % and 11 %, with dynamic degree of (-0.0501), (-0.3633), and (-0.7848) percentages respectively. It was detected that wetlands increased by 7 %, with a dynamic degree of (5.9813) percent. The land cover change detected contributing to depletion of natural vegetation, which may cause changes in the water balance in the river and its catchments. The study highlights the need for a management plan for enhancing the sustainable conservation of the Great Ruaha River, considering the human activities, climatic anomalies and hydrological conditions of the River basin and its catchments.

Keywords: Farming expansion, Ruaha River catchments, Tanzania, vegetation loss

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