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Evaluation of the Urban Landscape Structures and Dynamics of Hawassa City, Using Satellite Images and Spatial Metrics Approaches, Ethiopia

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Abstract : The study deals with the analysis of urban expansion and land transformation of Hawass City using remote sensing data and landscape metrics during last three decades (1987–2017). Remote sensing data from Various multi-temporal satellite images viz., TM (1987), TM (1995), ETM+ (2005) and OLI (2017) were used to examine the urban expansion, growth types, and spatial isolation within the urban landscape to develop an understanding the trends of built-up growth in Hawassa City, Ethiopia. Landscape metrics and built-up density were employed to analyze the pattern, process and overall growth status. The area under investigation was divided into concentric circles with a consecutive circle of 1 km incremental radius from the central pixel (Central Business District) for analysis. The result exhibited that the built-up area had increased by 541.32% between 1987 and 2017and an extension growth types (more than 67 %) was observed. The major growth took place in north-west direction followed by north direction in haphazard manner during 1987–1995 period, whereas predominant built-up development was observed in south and southwest direction during 1995–2017 period. Land scape metrics result revealed that the of urban patches density, total edge and edge density increased, while mean nearest neighbors' distance decreased showing the tendency of sprawl.

Keywords : landscape metrics, spatial patterns, remote sensing, multi-temporal, urban sprawl
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