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Spatial Analysis Approach for Identification of Urban Sprawl Pattern: A Case Study of Matara DS Division

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In this study, the urban sprawl of Matara DS Division was analysed from 1990 to 2020. Landsat satellite imageries were used in this study to extract the built-up area. Shannon's Entropy method and Fractal Dimension of Box Counting method were used to analyse urban sprawl. NDBI was used to extract the built-up area from Landsat TM/ETM+/TIR satellite imageries which are necessary for calculation of both methods. A number of grids coinciding with the built-up vector layer had been used to calculate fractal dimension. The accuracy assessment shows an accuracy more than expected (above 80%). Additionally, built-up area has changed by a huge number. An area of 1.097 km^2 is shown in the year1990, and in the year 2020, it was shown as 11.669km^2. Shannon's Entropy was increased from 1990 to 2020 from 1.23 to 1.67, and the year 2000 showed 1.46 while the year 2010 showed 1.52. It has increased gradually and reached error range (>1.5). Fractal Dimension also was increased from 1990 to 2020 from 1.24 to 1.65 and year 2000 showed 1.498 and year 2010 showed 1.520. It 28as also reached to error range (>1.5). Hence, these results proved that urban sprawl has increased in the study area and the Shannon's entropy calculation categorised a high sprawl, sprawl and no sprawl. Isadeen town, Kadawediya East, Kadawediya West, Kotuwegoda North, Kotuwegoda South, Mathotagama, Noope, Uyanwatta, Uyanwatta North, Welegoda East, Welegoda West, Weliweriya East, Weliweriya West GN Divisions are identified as high sprawl GN Divisions. There is a close relationship between Shannon's Entropy and Fractal dimension method as revealed by the graphical representation. Finally, this study identified the pattern of urban sprawl such as low-density development, commercial strip development andscattered and dispersed developments in the study area. The result revealed that, in the year 1990, only scattered development happened in the study area. But when it came to 2020, it showed 3 development patterns of urban sprawl and didn't show leapfrog development.

Keywords: *urban sprawl, dimension, Shannon's entropy, landsat*