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Land Use Land Cover Changes in Response to Urban Sprawl within North-West Anatolia, Turkey

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Abstract : In the present study, an attempt was made to state the Land Use Land Cover (LULC) transformation over three decades around the urban regions of Balıkesir, Bursa, and Çanakkale provincial centers (PCs) in Turkey. Landsat imageries acquired in 1984, 1999 and 2014 were used to determine the LULC change. Images were classified using the supervised classification technique and five main LULC classes were considered including forest (F), agricultural land (A), residential area (urban) - bare soil (R-B), water surface (W), and other (O). Change detection analyses were conducted for 1984-1999 and 1999-2014, and the results were evaluated. Conversions of LULC types to R-B class were investigated. In addition, population changes (1985-2014) were assessed depending on census data, the relations between population and the urban areas were stated, and future populations and urban area needs were forecasted for 2030. The results of LULC analysis indicated that urban areas, which are covered under R-B class, were expanded in all PCs. During 1984-1999 R-B class within Balıkesir, Bursa and Çanakkale PCs were found to have increased by 7.1%, 8.4%, and 2.9%, respectively. The trend continued in the 1999-2014 term and the increment percentages reached to 15.7%, 15.5%, and 10.2% at the end of 30-year period (1984-2014). Furthermore, since A class in all provinces was found to be the principal contributor for the R-B class, urban sprawl lead to the loss of agricultural lands. Moreover, the areas of R-B classes were highly correlated with population within all PCs (R²>0.992). Depending on this situation, both future populations and R-B class areas were forecasted. The estimated values of increase in the R-B class areas for Balıkesir, Bursa, and Çanakkale PCs were 1,586 ha, 7,999 ha and 854 ha, respectively. Due to this fact, the forecasted values for 2,030 are 7,838 ha, 27,866, and 2,486 ha for Balıkesir, Bursa, and Çanakkale, and thus, 7.7%, 8.2%, and 9.7% more R-B class areas are expected to locate in PCs in respect to the same order.

Keywords : landsat, LULC change, population, urban sprawl
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