



Remote sensing-based estimation of degraded grassland areas in the Zona da Mata region, Minas Gerais State, Brazil

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In the present study, we performed an estimation of the grasslands development index (DI) from MODIS (Moderate Resolution Imaging Spectroradiometer) imagery series to identify low productivity grasslands that might be suitable for reforestation with eucalyptus plantations or natural vegetation recovery as well as suitable areas to improve the pasture management in the Zona da Mata region, Minas Gerais State, Brazil, characterized by existence of degraded soils, high ground slope, low fertilization, and overgrazing. Grassland degradation is a major concern in Minas Gerais, which demands the implementation of effective monitoring systems and the definition of appropriate environmental policies to avoid further biodiversity losses due to the conversion of native vegetation into production areas. We analyzed MODIS NDVI (Normalized Difference Vegetation Index) series, from 2000 till 2013, for deriving the so-called grassland development index (DI). The 16 days NDVI of September 2012 to January 2013 was compared to average NDVI of the same period in 2000-2011. DI values were classified as very high, high, balanced, low, and very low. The current grassland area in the Zona da Mata region is approximately 1.2 million hectares, and based on the methodology used in the present study, 177,322 hectares (14.61%) were classified as areas of very low grassland development, 557,698 hectares (45.96%) as low development, 433,475 hectares (35.72%) as balanced development, 39,980 hectares (3.29%) as high development, and 5,032 hectares (0.41%) as very high development. Thereby, areas with low development accounted for 60.57% of grasslands in Zona da Mata region. It is concluded that MODIS NDVI time series are potential data sources for regional evaluation of grassland productivity, and might be used to support decision-making in the grassland management.

Keywords: Degraded grasslands, MODIS, NDVI, remote sensing, Zona da Mata.

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