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# Spatial analysis of badland dynamics in the lower Chambal Valley India

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The badlands in the lower Chambal River (ca. 100 km$^2$) are considered to be a major sediment source of the rivers' sediment yield. Currently, it is, however, not clear whether the badland area is still expanding by regressive gully erosion or whether this area is decreasing due to land levelling for the creation of cropland. This study analyses the spatial pattern of land use and the factors controlling badland dynamics over the last 40 years (1971-2010). Historical CORONA imagery from 1971 and very high resolution satellite imagery (Geo-Eye from 2010) were used to map land use in 24 representative sample areas (1 km$^2$) in very detail. These maps were validated based on field observations. A comparison of the land use maps of 1971 and 2010 shows that much more badland area has been converted to cropland than vice versa. Over the studied period the badland area has decreased by 27%. A logistic regression model was developed that links soil, hydrological and topographic properties and the accessibility of the land units with the observed land use conversions. The results show that the spatial pattern of badland - cropland conversion is clearly linked with the increase in local population and with position within the badlands.

Key-words: Land use, Chambal valley, CORONA, GeoEye, logistic regression