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Exploring the role of land degradation on land use change dynamics

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The role that a variety of both natural (climate; biophysical characteristics) and human induced (land use; socio-economic) factors play on the occurrence of land degradation (LD) is a general major research topic. However the entity and type of role played by LD on such factors is still underexplored and only partially known. The aim of this work is to investigate the role of LD on the land use change (LUC) trajectories of land abandonment (LA) and urbanization (URB) occurred in Italy from 1990 to 2012, by means of the environmental niche factor analysis (ENFA). ENFA is a multivariate approach borrowed from zoological studies which allows to compute habitat suitability (HS) models without the need of absence data. Four quality indices about climate (CQI), soil (SQI), vegetation (VQI) and land management (MQI) have been analyzed for the years 1990 and 2000 and related to the trajectories of LA and URB, respectively, for the periods 1990-2000 and 2000-2012. Results indicated that different driving factors are linked to LA and URB, and that for each trajectory, the role of some factors changes through times. While in north and central Italy, during 1990-2000, LA mainly occurred in low quality soils, with respect to the LD status of 1990, in 2000-2012 such trajectory showed a reverse trend, with respect to the LD status of 2000. Accordingly, as for south Italy, LA in 1990-2000 resulted mainly driven by climatic conditions, while in 2000-2012, the bad vegetation and soil quality assumed a major role. As for URB, during 1990-2000 both bad vegetation quality and land management represented the main driving factors throughout the country; to the contrary, during 2000-2012, only land management played a key role, and URB trajectories preferentially occurred in areas characterized by high human pressure in 2000. Notably, in north Italy, during 2000-2012, URB tended to occur in areas that in 2000 were characterized by good soil quality. The corresponding habitat suitability maps were also produced for LA and URB. Starting from this work, next steps will be trying to predict future LA and URB trajectories according to the current land quality status.