

Land Use, climate change and BIODiversity in cultural landscapes (LUBIO): Assessing feedbacks and promoting land-use strategies towards a viable future

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Land-use and climate change are important, pervasive drivers of global environmental change and pose major threats to global biodiversity. Research to date has mostly focused either on land-use change or on climate change, but rarely on the interactions between both drivers, even though it is expected that systemic feedbacks between changes in climate and land use will have important effects on biodiversity. In particular, climate change will not only alter the pool of plant and animal species capable of thriving in a specific area, it will also force land owners to reconsider their land use decisions. Such changes in land-use practices may have major additional effects on local and regional species composition and abundance. In LUBIO, we will explore the anticipated systemic feedbacks between (1) climate change, (2) land owner's decisions on land use, (3) land-use change, and (4) changes in biodiversity patterns during the coming decades in a regional context which integrates a broad range of land use practices and intensity gradients. To achieve this goal, an integrated socioecological model will be designed and implemented, consisting of three principal components: (1) an agent based model (ABM) that simulates decisions of important actors, (2) a spatially explicit GIS model that translates these decisions into changes in land cover and land use patterns, and (3) a species distribution model (SDM) that calculates changes in biodiversity patterns following from both changes in climate and the land use decisions as simulated in the ABM. Upon integration of these three components, the coupled socioecological model will be used to generate scenarios of future land-use decisions of landowners under climate change and, eventually, the combined effects of climate and land use changes on biodiversity. Model development of the ABM will be supported by a participatory process intended to collect regional and expert knowledge through a series of expert interviews, a series of transdisciplinary participatory modelling workshops, and a questionnaire-based survey targeted at regional farmers. Beside the integrated socioecological model a catalogue of recommended actions will be developed in order to distribute the insights of the research to the most relevant regional stakeholder groups.