

Analysis and Modelling of Change in Land Use Systems as Exemplars of Coupled Natural and Human Systems.

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This paper uses a synthesis and review of case study examples of land use change from both Europe and the USA in order to explore some theoretical, methodological, and practical issues that support the interdisciplinary and integrated analysis of land use change. Land use systems are treated as exemplars of coupled human and natural systems and the paper particularly focuses on the varied processes that produce changes. It is argued that analysis and modelling of land use change, for development of understanding of past changes and for projection of possible future changes, should draw on a broad range of scientific methodologies and enabling technologies, and must adopt a fully integrated approach that couples natural and social science perspectives. Examples of land use change case studies used in the paper are primarily from rural areas throughout Europe and the USA and include a wide variety of drivers of land use change including changes in structure/policy (e.g. CAP reform, Conservation Reserve Program), environmental conditions (e.g. climate), society (e.g. amenity, lifestyle), economies (e.g. price support, market changes, globalization), and technology (e.g. transportation, land management technologies). The examples also address spatial and temporal issues for analysis and modelling such as non-stationarity (in both space and time), and scale. Finally, the synthesis and review of examples is framed in the context of the IHDP/IGBP Global Land Project.

Notes on background: This paper seeks to further land use science by examining causes and consequences of land use trends and dynamics through development of models and analysis based on exploration of land use systems as exemplars of coupled natural and human systems. I have worked on land use change in both the USA and in Europe, have experience of linking science with policy related to land use at national, regional and local scales, and am committed to international collaboration on land use change as a member of the Science Steering Committee of the Global Land Project, Editor of the Journal of Land Use Science, and Chief Executive of the Macaulay Land Use Research Institute.