

Topic: Advances in linking models in order to address impacts across scales or sectors

Submitting author: Schönhart, Martin

E-mail address: martin.schoenhardt@boku.ac.at

Affiliation: BOKU University of Natural Resources and Life Sciences, Vienna, Austria

Integrated Impact Modelling of climate change and adaptation policies on land use and water resources in Austria.

Schönhart, M., M. Zessner, A.P. Blaschke, J. Parajka, G. Hepp, B. Strenn, H. Trautvetter, E. Schmid

Climate change is a major driver of land use and ecosystems. Changes in climatic conditions will affect the quality and quantity of water resources. Autonomous adaptation by farmers can influence the compliance with the good ecological and chemical status according to the EU Water Framework Directive. We present results from an integrated impact modelling framework (IIMF) to analyze policy options for planned adaptation in agricultural land use and sustainable management of land and water resources until 2040. The IIMF consists of the bio-physical process model EPIC, the regional land use optimization model PASMA[grid], the quantitative precipitation/runoff TUW model, and the surface water emission model MONERIS. Stakeholder driven scenarios facilitate multi-actor knowledge transfer. Climate change scenarios are combined with socio-economic and policy pathways. The latter include water protection measures on fertilization management, soil and crop rotation management. The results show that the selected climate change and policy scenarios impact average agricultural gross margins by $\pm 2\%$. However, regional impacts are more severe particularly under assumptions of decreasing precipitation patterns. The water protection policies can alleviate pressures compared to the business as usual scenario but do not lead to sufficient conditions in all watersheds. To conclude, the IIMF is able to capture the interfaces between water quality and land use and to cover multiple policy and climate scenarios. However, despite efforts to increase the robustness of data and model interfaces, uncertainties need to be tackled in subsequent studies.