Geophysical Research Abstracts
Vol. 14, EGU2012-3364, 2012
EGU General Assembly 2012

Quantifying tradeoffs between water availability, water quality, food production and bioenergy production in a Central German Catchment

M. Volk (1), S. Lautenbach (2), M. Strauch (3), and G.W. Whittaker (4)

(1) Helmholtz Centre for Environmental Research - UFZ, Landscape Ecology, Leipzig, Germany (martin.volk@ufz.de), (2) Helmholtz Centre for Environmental Research - UFZ, Landscape Ecology, Leipzig, Germany (sven.lautenbach@ufz.de), (3) TU Dresden, Institute of Soil Science and Site Ecology, Tharandt, Germany (michael.strauch@tu-dresden.de), (4) USDA, ARS, National Forage Seed Production Research Center, Corvallis, USA (whittakg@onid.orst.edu)

Worldwide increasing bioenergy production is on the political agenda. It is well known that bioenergy production comes at a cost – several trade-offs with food production, water quality and quantity issues, biodiversity and ecosystem services are known. However, a quantification of these trade-offs is still missing. Hence, our study presents an analysis of trade-offs between water availability, water quality, bioenergy production and production in a Central German agricultural catchment. Our analysis is based on using SWAT and a multi-objective genetic algorithm (NSGA II). The genetic algorithm is used to find Pareto optimal configurations of crop rotation schemes. The Pareto-optimality describes solutions in which an objective cannot be improved without decreasing other objectives. This allows us to quantify the costs at which several levels of increase in bioenergy production come and to derive recommendations for policy makers.