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Future agricultural land use scenarios in the Altmühl watershed

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In addition to an evolving climate, we can expect land use to evolve in a watershed with time. In rural areas, agricultural land use is particularly significant for water quality since agricultural activities can be important contributors to non-point source pollution. Given a warmer climate, agricultural activities may very well expand and/or intensify, as farmers will be presented with certain opportunities in the future, such as a longer growing season, the ability to plant higher value crops, and possibly invest more resources in biofuels.

To determine potential changes that may take place in the upper part of the Altmühl watershed (980 km2) in southern Bavaria, farmers were questioned on their decision making processes. Through the questionnaire, the current and future drivers of land use change at the farm level were established. Using this information, as well as regional and national drivers of change, the spatial distribution of potential agricultural land use scenarios were developed to the 2040 time horizon, using the CLUE-S model (Conversion of Land Use and its Effects- Small Scale) (Verburg et al. 2002).

Future changes in climate parameters for the region were also examined for this mesoscale watershed. The climate data from one run of the CRCM 4.0 (driven by CGCM3), and three runs from the RACMO2 (driven by ECHAM5) will be analyzed for changes in the growing season length to 2040. How the combined changes of the growing season length and the drivers of agricultural land use change at the farm level, affect future land use scenarios will be examined.

The poster will present results of the changes to the growing season length, the drivers of future land use change at the farm level, and the potential implications for agriculture in the watershed. The next steps will include modelling the combined impacts of land use change and climate change on surface water quality in the watershed, using the hydrological model SWAT (Soil and Water Assessment Tool) (Arnold et al. 1998).