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“Utilisation of diversity in land use systems:
Sustainable and organic approaches to meet human needs”

Development of a Regional Model Integrating Land and Water Management - Achievements and Lessons Learnt

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Abstract

The project “RIVERTWIN” developed, adjusted and tested a framework for an integrated regional model to be used for the strategic planning of water resources management in river basins under contrasting ecological, social and economic conditions. Target river basins were located in Germany, Uzbekistan and Benin Republic. The project tested and validated nine submodels covering different aspects of water and land management for assessing the effect of defined scenario options. Seven of the submodels tested in the Neckar basin were successfully transferred to the Oueme basin (Benin, West Africa) including the integration framework MOSDEW (MOdel for Sustainable Development of Water resources). Five of the submodels were transferred and adapted to the Chirchik-Ahangaran-Keles basin (Uzbekistan, Central Asia) and complemented with additional four models (HBV-GAMS, SEM, IRR_SYS, WAVE) which take into account the specific hydrological and water allocation conditions in this basin which are **(1)** heavily modified water fluxes in the lower part of the basin with reservoirs and a complex channel network **(2)** interconnection with two smaller basins (Ahangaran, Keles) and **(3)** strong competition for scarce water resources by different user groups (agriculture, energy production, ecology). The specific setting requires a dynamic integration interface which takes also into account feedback between water availability and water consumption. This requirement was met by the adapted model version MOSDEW-Chirchik.

In each river basin the developed model framework was used to perform simulation runs of scenario options which has been previously defined in cooperation with relevant stakeholder groups and to quantify their impact on selected water and land use indicators. The scenario options take into account global and regional climatic changes as well as socio-economic perspectives and interventions in the water and agricultural sector. In each basin, the results of the scenario calculations were evaluated and discussed in public stakeholder workshops.

Keywords: Benin, integrated regional model, land and water management, Uzbekistan