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Water use demand in the Crans-Montana-Sierre region (Switzerland)

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Crans-Montana-Sierre is an Alpine touristic region located in the driest area of Switzerland (Rhone River Valley, Canton of Valais), with both winter (ski) and summer (e.g. golf) tourist activities. Climate change as well as societal and economic development will in future significantly modify the supply and consumption of water and, consequently, may fuel conflicts of interest. Within the framework of the MontanAqua project (www.montanaqua.ch), we are researching more sustainable water management options based on the co-ordination and adaptation of water demand to water availability under changing biophysical and socioeconomic conditions. This work intends to quantify current water uses in the area and consider future scenarios (around 2050).

We have focused upon the temporal and spatial characteristics of resource demand, in order to estimate the spatial footprint of water use (drinking water, hydropower production, irrigation and artificial snowmaking), in terms of system, infrastructure, and organisation of supply. We have then quantified these as precisely as possible (at the monthly temporal scale and at the municipality spatial scale). When the quantity of water was not measurable for practical reasons or for lack of data, as for the case for irrigation or snowmaking, an alternative approach was applied. Instead of quantifying how much water was used, the stress was put on the water needs for irrigating agricultural land or on the optimal meteorological conditions necessary to produce artificial snow.

A huge summer peak and a smaller winter peak characterize the current regional water consumption estimation. The summer peak is mainly caused by irrigation and secondly by drinking water demand. The winter peak is essentially due to drinking water and snowmaking. Other consumption peaks exist at the municipality scale but they cannot be observed at the regional scale. The results show a major variation in water demand between the 11 concerned municipalities and between the various uses. All this confirms the necessity of modelling the future demand of water, which would allow prediction of possible future use conflicts. In a second phase of the project, the collected data will be introduced into WEAP (the Water Evaluation And Planning system) model, in order to estimate the future water demand of the Crans-Montana-Sierre region. This hydrologic model is distinct from most similar models because of its ability to integrate climate and socio-economic scenarios (Hansen, 1994).

Reference

Hansen, E. 1994. WEAP – A system for tackling water resource problems. In Water Management Europe 1993/94: An Annual Review of the European Water and Wastewater Industry. Stockholm Environment Institute: Stockholm.