Water Scarcity in Inner-Alpine Regions

Options for sustainable water use in the Crans-Montana-Sierre region (Valais)

Rolf Weingartner et al.

The Crans Montana-Sierre region in Valais will be facing significant changes in water resources and water uses in the future. For the first time, local actors in policy, economy and the population will be participating actively in the study to guarantee an exchange of interests and to integrate practical questions into the research process. The goal of the transdisciplinary study is to develop options for sustainable water management at a commune level.

A typical form of stocking drinking water in the Crans-Montana region: reservoir lake at Zeuzier. © Emmanuel Reynard

The water turn-out from the tunnel of Mont Lachaux on the Ertentse. © Emmanuel Reynard

Climate change and current social and economic trends are likely to modify water resources and water use in the coming decades and may therefore lead to conflicts of interest. Drier areas in the Alps will probably be particularly vulnerable to these changes.

Water distribution in Alpine regions takes place today mostly at the commune level. Water management is the expression of a historically evolving interaction between biophysical and social factors. The regulation of these socio-ecological dynamics is the core of water management, which determines where water is tapped and stored as a public good, and how it is distributed to the different water users according to socially negotiated rules. Until now, one could usually assume that water supply is more or less constant – taking into account natural annual and seasonal fluctuations. As a result, water management focused on distributing available water; it did this according to water demand. One therefore took it for granted that water yield was not a limiting factor. But as this might change – at least seasonally – due to climate change, water management needs to be fundamentally revisited: what changes in the availability of water resources should we expect and how can actors who decide on the distribution and use of water react constructively to these changes? These are the central questions addressed by "MontanAqua", a research project briefly presented here.

Water resources, use and management

Within the framework of the National Research Programme "Sustainable Water Management" (NRP 61), comprehensive interdisciplinary studies subsumed under the project title "MontanAqua" have being conducted in the Crans-Montana-Sierre region since February 2010.

The research area is characterized by a very strong hydrological gradient. Thus, today water yield – i.e. the difference between precipitation and evaporation – averages about 150 mm/yr on the valley floor in Sierre (550 m a.s.l.) and over 2200 mm/yr at high elevations (3000 m. a.s.l.).

> *„Local and regional actors will be involved in a dialogue about what might constitute optimal water management."*

The aim of this research is a detailed collection and modelling of spatial and temporal data on water available now and in future in the area, including resources stored in the Plaine Morte glacier. At the same time, researchers are calculating the amount of water used by various user groups; they are also estimating future water use depending on different economic and social scenarios. Existing legal and practical governance of water management is another focus of inquiry, with a view to identifying current and future sources of conflict. These research activities on water yield, water use and political structures are mainly being conducted within the frame of four PhDs (Emmanuel Reynard, Martina Kauzlaric, Mariano Bonrisposi und Christine Homewood). The project features a synthesis module led by Flurina Schneider (Postdoc), the aim of which is to link the different results based on the overarching concept of the multifunctional landscape. This concept implies studying the different and simultaneous functions of specific parts of a landscape (e.g. vineyards, cultivated land and alpine pastureland) as well as analyzing the interactions between, and priorities of these functions. On the basis of such an analysis, it is possible to deduce existing, competing, and contradictory claims to the landscape made by the different parts of the population. By showing how the multifunctionality of landscapes is modified under different climate change scenarios and socio-economic development options, it will be possible to highlight future actor-specific claims to landscapes and make them accessible for discussion and planning.

Bisse de Sillonin: a centuries-old irrgation channel still in use. © Olivier Graefe 2010

Participation of local and regional actors

The overall aim of these coordinated interdisciplinary studies is to develop options for optimal distribution and management of water resources together with stakeholders involved. Thus local and regional actors will be involved in a dialogue about what might constitute optimal management, while considering biophysical and socioeconomic factors that are likely to change. In doing so, the project creates a space for transdisciplinary communication aiming at the co-production of knowledge by researchers and representatives of policy makers, administration and civil society.. To this end, a working group with actors from the communes, the region and the canton has already been founded and first meetings have taken place. This group will support the research process and thus guarantee that the studies succeed in integrating as well as possible the expectations and interests of the local population.

Bringing results to fruition

The research project will also develop various options for sustainable management of future water resources, to be used by the local population as a basis for decisions. As required, the project team will also invite regional, national and international actors to join a working group and verify to what de-

gree the results of the studies in Crans-Montana-Sierre are valid for and can be implemented in comparable regions in the Alps.

All in all, this inter- and transdisciplinary research project, jointly carried out by the Universities of Bern (Gruppe für Hydrologie and CDE), of Fribourg and Lausanne, will generate new knowledge in the field of more sustainable water management.

For how much longer will irrigation in the vineyards of Valais be possible?
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Weblinks

www.MontanAqua.ch
http://www.hydrologie.unibe.ch/index.html
http://www.cde.unibe.ch/
http://www.unifr.ch/geoscience/geographie/home/doku.php
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