MRI Newsletter 9: MRI's Global Change Research Network in European Mountains (GCRN_EM)

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GCRN_EM: MRI's European network for global change research in mountains

MRI launched the GCRN_EM at a workshop on 1–2 February 2007 in Zurich, Switzerland: "Developing a Global Change Research Network in European Mountains: Going Beyond FP7." GCRN_EM is one of several networks supported by MRI. With the GLOCHAMORE Research Strategy, MRI has produced a framework for research, but it is through the regional networks that the strategy becomes tangible (see http://mri.scnatweb.ch/content/category/3/10/31). The workshop attracted a large audience: over 90 scientists from 21 countries, including Eastern European countries, and Turkey. Dr. Astrid Björnsen Gurung, the scientific project manager of GCRN_EM, structured the workshop in light of the call by the EU Framework Programme 7 (FP7) for a research program on climate change impacts in mountain regions. Coordinators of consortia responding to the call were invited to describe their projects. Participants interested in joining a proposal had the opportunity to describe their research.

The objectives of the workshop were: 1) to learn who is doing what in European global change research (go to http://mri.scnatweb.ch/content/category/3/47/68/ to find an overview); 2) to identify potential research partners; 3) to make more efficient use of existing resources; and 4) to agree on the most important topics from the GLOCHAMORE strategy. Brainstorming sessions, the Mountain Research Market, and Open Space work groups provided discussion and networking opportunities and were well received. During the workshop, integration and stakeholder participation arose as key issues of GCRN_EM. The GLOWA Jordan River Project—run by Katja Tielbörger, professor of vegetation ecology at the University of Tübingen, Germany, and presented at the workshop—provides exemplary responses to these issues.

The GLOWA Jordan River project: Integrated Research for Sustainable Water Management

Background

The GLOWA Jordan River Project is part of GLOWA (*Globaler Wasserkreislauf im Wandel:* The Changing Global Hydrological Cycle) and is a large-scale experiment launched by the German Federal Ministry of Education and Research (BMBF) in 2001. GLOWA produces science-based management strategies for local authorities in 5 river basins: the Elbe, Danube, Jordan, Volta, and Impetus.

The Jordan River drains parts of Palestine, Israel, and Jordan, and empties into the Dead Sea. The region has one of the lowest water availabilities worldwide, dropping below the absolute scarcity threshold of 500 m^3 to 1000 m^3 per capita/yr (Falkenmark et al 1998). Water demand is increasing rapidly due to high population growth rates and economic development. Furthermore, climate projections indicate future drying and more extreme events. Declining water availability could exacerbate conflict in the region.

The GLOWA Jordan River Project consists of 5 interlinked work packages, three 3-year phases, and 11 subprojects with over 50 partners (http://www.glowa-jordan-river.de/Project/Structure). The 1st phase (to August 2005) developed an assessment of the current situation and defined a set of climate scenarios. The 2nd phase (2005–2009) includes the development of scenarios and the evaluation of management options. The 3rd phase (starting 2009) moves to application.

The current (2nd) phase provides good examples of how to achieve integration: 1) the integration of non-scientific and scientific groups in joint scenario development through Story and Simulation (SAS) scenario development; and 2) the integration of the disciplinary results of the subprojects, and their translation for decision-makers and other local stakeholders by means of the Water Evaluation and Planning Tool (WEAP).

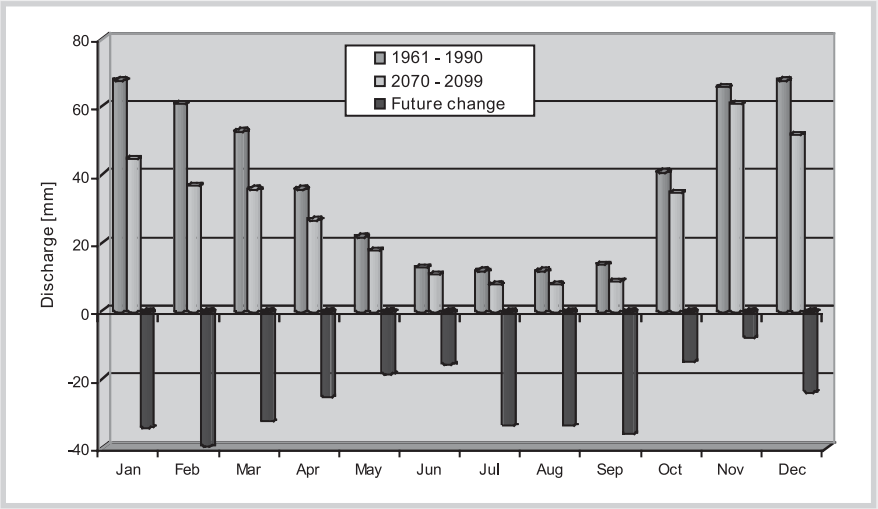
Scenario development

The GLOWA Jordan River Project uses the Story and Simulation scenario approach (Alcamo 2001) to integrate stakeholder knowledge on an equal footing with scientific findings. Engaging stakeholders early on increases their trust in the process, thereby rendering the project's results much more meaningful in the policy arena.

In 2006 the project leaders invited administrators and scientists from Israel, Jordan, and Palestine to a first scenario workshop. The workshop participants brainstormed the factors that influence water scenarios for the Jordan River. These factors included global warming, demography, regional stability (peace/war), and trade. Then they focused on major uncertainties, collapsing these into 2 axes that define the scenario space of the Jordan River watershed. The first axis, labeled "Finance and Pricing," has recession at one end and growth at the other. The second axis, "Access to and Allocation of Water," contrasts unilateral appropriation of water with multi-lateral water sharing. Finally, participants defined which of the factors identified earlier were particularly sensitive under each of the 4 scenarios defined by the 2 axes.

At the second scenario workshop in early 2007, the stakeholders developed initial storylines for each scenario. While "trade" had earlier been defined as a relevant factor, participants now had the task of

FIGURE 1 Monthly mean discharge in mm of the Upper Jordan catchment (control run vs future IPCC scenario B2), at gauge Yoseph Bridge. The dark bars show the massive percent reduction in discharge predicted for 2070–2099 by the hydrological model WASIM, which will be problematic both during winter and summer months. (Source: Kunstmann et al 2006)



"telling the story" of this factor's development under, for instance, the scenario "recession with multilateral water sharing." The project scientists quantified the scenarios on the basis of the storylines and data from, for instance, the climate or hydrological models of the subprojects. Thus each scenario consists of specific values for factors influencing water management under conditions defined by the major uncertainties. An iterative process of refining qualitative scenarios with quantified factors will produce a set of rich, plausible and relevant quantitative scenarios by the end of 2008.

The development of understandable and policy-relevant results

The GLOWA Jordan River Project uses the decision support system "Water Evaluation and Planning Tool" (WEAP) developed by SEI (Stockholm Environment Institute, http://www.sei.se) to merge the models developed within the scientific subprojects (see http://www.glowa-jordan-river.de/Project/Models), and to project the outcomes of the scenarios. Figure 1 shows discharge outcomes associated with a climate change scenario. WEAP translates such hydrological outcomes into terms more relevant to policy and decision-makers.

The underlying structure of WEAP is a spatial representation of the area indicating the major supply and demand nodes of the region, as well as any other water-relevant natural and built structures. WEAP then translates the quantified scenarios into changes in water supply and agricultural productivity. WEAP uses water as a currency and will provide the costs and benefits of management alternatives (eg of an orange plantation versus a housing development) under different scenarios (http://www.weap21.org/).

Application

The goal of producing applicable results has motivated the project from the beginning. Stakeholder involvement in scenario development promotes ownership of the process and its results. WEAP's ease of use and transparency are great advantages when it is used in water negotiations across sectors as well as between countries.

Cultural tact and diplomacy will be critical in the third phase of the project. Prof. Tielbörger and her co-workers are preparing the ground for its introduction with the water authorities, a task easier in some countries than in others. The openness of authorities to WEAP depends on the availability of their own tools, on their partners in development aid, and also on concerns about data sharing. Of course, the results depend not only on the acceptance of the program, but also on the quality of the data fed into the system. Training workshops are planned in all 3 countries to transfer the scenarios and the WEAP tool to water managers and policy-makers. Once implemented via WEAP and SAS, the GLOWA Jordan River Project promises to be a successful example of the use of research for developing practical solutions.

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