Focus Issue: Water Governance in Mountains

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Source: Mountain Research and Development, 33(3) : 193-194

Published By: International Mountain Society

URL: https://doi.org/10.1659/mrd.3303

Mountain Research and Development (MRD)
An international, peer-reviewed open access journal
published by the International Mountain Society (IMS)
www.mrd-journal.org

Editorial

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Dear Readers,

The United Nations Commission on Sustainable Development recognized that "mountain ecosystems play a crucial role in providing water resources to a large portion of the world's population" in its Rio+20 outcome document, The Future We Want *(UNGA 2012). While the role of mountains as a water resource base is well recognized, their role in sustainable use and management of water—for food and agriculture, for livelihoods and poverty alleviation, for drinking water and sanitation, for energy, cities, and industries, and in combating desertification, land degradation, and drought—is significant but underappreciated. The role of water governance in mountains, and how mountains relate to the plains, is a "blind spot" in the literature, especially when compared to water governance in the plains, where there is a large body of work on integrated water resource management.*

Water governance relates to management of water, to policies and institutions for water use and conservation, and to processes of decision-making in relation to water. Mountain water governance systems have developed in unique ways over time but require special attention in the context of growing competition for water, and changing dynamics given climatic and other global changes. Attention is required at a range of scales and across scales: from considering how communities manage their waters, to reflecting on upstream–downstream issues, thinking about national development interests, and—last but not least—exploring transboundary water issues, since many rivers originating from mountains cross boundaries, and close cooperation between states and nations is needed. In this context, the present issue of Mountain Research and Development *(MRD) explores potentials and challenges of water governance for securing water availability and access, for promoting sustainable, equitable, and beneficial use, for enhancing livelihoods and alleviating poverty, and for conserving ecosystems and their services both inside and downstream of mountain areas worldwide.*

The MountainDevelopment section begins with 2 papers—the first by Juana Vera and Linden Vincent and the second by Karsten Paerregaard—focusing on the Colca Valley in Peru, where the state took over a key water governance role in the 1980s by instituting a national water policy and building an irrigation channel originally foreseen for the lowlands. Both papers investigate the struggles of the upland communities to maintain their access to irrigation water as well as their traditional water governance system. Based on their anthropological insights, the authors of both papers provide development recommendations and principles that are relevant in areas where people in mountains and plains contend for water. The third paper, by Jessica R. Daniel, Sandra L. Pinel, and Jase Brooks, focuses on barriers to collaborative transboundary water management in a fragmented governance setting in the United States. Based on their analysis of how competing state, tribal, and local jurisdictions are being dealt with, they argue strongly for creative and communicative solutions that go beyond simply establishing new formal institutional arrangements or the legal space for such arrangements to exist. In the fourth paper, Flurina Schneider and Christine Homewood assess water governance arrangements in the Swiss Alps, using the analytical framework of adaptive capacity to tease out where options exist for negotiating new arrangements in the context of increasing uncertainties due to climate change and socioeconomic dynamics. The last paper in this section has a slightly different focus: Renate Renner and co-authors assess experience garnered with transdisciplinary knowledge production processes in the Swiss and Austrian Alps, pointing out what strategies are particularly effective in helping researchers and nonscientific stakeholders to jointly contribute to sustainable water governance in mountains.

In the MountainResearch section, Margot Hill compares 2 very different water governance regimes in the Swiss Alps and the Chilean Andes, using a set of governance-related adaptive capacity indicators (ie proxies for future climate change); she shows that a number of adaptive responses are not necessarily enabling enhanced adaptability to the mounting challenges from climate change impacts and suggests possible solutions. In the next paper, Alvaro-Martín Gutiérrez-Malaxechebarría presents a multi-level analysis of informal irrigation systems and their relation to national water resource management in the Colombian Andes; he concludes that the coexistence of very different community and state institutions poses challenges for planning and organizing water resource management more efficiently and sustainably for producers, the government, and other stakeholders. The next article, by María Verónica Iñiguez Gallardo and her Ecuadorian and American colleagues, uses J.S. Gruber's 2010 comparative framework for assessing the feasibility of collaboratively governing a proposed Ramsar wetland in the Southern Andes of Ecuador across multiple communities and jurisdictional boundaries; the authors conclude that land tenure conflicts and institutional frameworks need to be given special attention to ensure the sustainability of collaborative governance designs. This is followed by another Andean wetland paper: Andres Verzijl and Silvano Guerrero Quispe present a detailed analysis of bofedales, *ie a largely ignored small-scale irrigation system invented 200 years ago by alpaca herders to maintain and expand the local wetlands; climate change, population pressure, and socioeconomic change constitute major challenges for this unique and nationally relevant irrigation system in the Peruvian Andes. The last paper focusing on water governance in mountains in this issue is by Joe Hill, who describes the role of authority in post-Soviet collective management of hill irrigation systems in Kyrgyzstan and Tajikistan; he, too, concludes by pointing out how important it is not to privilege externally created formal institutions when very diverse informal arrangements exist that support mountain agriculture and the mountain environment in general.*

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The MountainResearch section ends with 4 additional papers on other topics relevant to sustainable development. Two of them present recent research on a threatened mountain wetland bird species, the black-necked crane: John D. Farrington and Zhang Xiulei focus on the crane's breeding habitat in a nature reserve in Qinghai, China, while Zhaolu Wu and colleagues present data on the species' wintering habitat in another nature reserve in Yunnan. Both underline the need for increased protection of the crane's habitats in the face of climatically and anthropogenically driven changes. Jing-Gang Zheng and co-authors analyze the association of vegetation patterns and environmental factors on the western slopes of the Helan Mountains in China, which constitute a natural barrier against sandstorms and other factors leading to increasing desertification in this southern Mongolian environment. Finally, Axel Borsdorf and Rodrigo Hidalgo present an analysis of the real estate and retail sectors for Valparaíso-Viña del Mar in Chile, and underline that this mountainous and coastal urban environment is undergoing dynamic changes, the sustainability of which ought to be better taken into account.

The MountainPlatform section offers a presentation by the Consortium for the Sustainable Development of the Andean Region (CONDESAN) of its achievements after 20 years of activities and commitment to supporting sustainable development in Andean mountains. It is followed by the MountainNotes section, in which a paper by Ram M. Shrestha presents a review of patterns of energy supply, energy consumption, and greenhouse gas (GHG) emissions for 1995–2008 in 5 Hindu Kush–Himalayan (HKH) countries, along with a review of major studies on future energy use and GHG emission for the period 2005–2030 in the HKH in the absence of climate policy interventions. The author underlines the urgent need for a spatially disaggregated (ie district-level) but consistent energy database to be able to make more accurate estimates of energy use and associated GHG emissions in the HKH region.

Through this knowledge and advancement of science on mountain water governance, MRD and its authors make their contribution to the UN-declared Year of Water Cooperation 2013.

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