



## 18. Troubling water: modes of socialization of a natural resource

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## 18.1

# Integrated Assessment of the Small Hydropower Potential in Switzerland

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Consequences arising out of Climate Change and increasing energy demand urge nations to adapt their energy policies. Special emphasis is put on renewable energy production. Increased efforts are made not only in the European Union (EU 2000) but also in particular states such as Switzerland (Swiss Confederation 2007).

Until today Switzerland's largest part of energy production has been provided by hydropower. Thus, about 90% of all the rivers are already being used for electricity production. At first glance promoting the expansion of renewable energies such as hydropower seems to be inappropriate. However, recent studies reveal the possibility of an increase, taking into account the feasible Small Hydropower SHP potential and improvements in efficiency (SFOE 2000).

In order to accomplish the targets set in SFOE (2008), incentives have been introduced in 2009 to facilitate renewable energy projects (KEV). Subsequently, responsible authorities are being overcharged with numerous proposals including Small Hydropower plants. The conflicting demands of protection and utilisation flare up anew and interfere with approved solutions. Authorities clearly lack an adequate tool supporting that decision making process.

The aim of our study is to provide such a method allowing a holistic assessment of the SHP potential in a region. Accordingly, we suggest a method considering sustainability and water management from a large-scale perspective. Results will contribute to the joint research project "Investigation of the Small Hydropower Potential in Switzerland" on behalf of the Federal Office of Energy SFOE.

To cover the complexity of a river system and all the conflicting demands at its best, the authors suggest a multi-level approach. In the area of interest the streams and their adjacent area are assessed with the highest possible objectivity by means of criteria raster. That resulting value indicates the current state; it is then balanced against the hydro-electrical potential to reveal areas with priority protection. Finally, maps showing different distribution patterns for SHP implementation will be provided. These scenarios will be based on selectable intensities of use, depending on the scheduled extension of SHP production in the region considered.

In a first attempt the proposed methodology has been applied to the hydroelectrically interesting river basin Lüttschine in the Bernese Alps. However, the preliminary results show that adjustments are required. Hence, additional applications to further test areas are performed. Furthermore, key factors need to be extracted to condensate and simplify the overall method. To provide a practicable and widely accepted tool, the complexity of the assessment tool has to be reduced.

Finally results are intended to be a basic display for site-related studies such as environmental impact assessments of SHP projects.

## REFERENCES

- EU 2000: Richtlinie 2000/60/EG des europäischen Parlaments und des Rates zur Schaffung eines Ordnungsrahmens für Maßnahmen der Gemeinschaft im Bereich der Wasserpolitik. Amtsblatt der europäischen Gemeinschaften L327, L 327/1-72, 2000, European Parliament & Council of the European Union.
- SFOE 2008: Strategie Wasserkraftnutzung Schweiz. Herausgegeben von Bundesamt für Energie BFE. Swiss Federal Office of Energy, Bern.
- SFOE 2009: Das Potential der Kleinwasserkraft klären. In: *energeia* - Newsletter of Swiss Federal Office of Energy SFOE, H. 5, S. 12–13.
- Swiss Confederation 2007: Die Energieperspektiven 2035 - Band 1. Synthese. Ed. Federal Department of the Environment, Transport, Energy and Communication DETEC & Swiss Federal Office of Energy SFOE, Bern.

## 18.2

### MontanAqua: an assessment of the socio-economic and institutional setting

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Part of the project “Approaching water stress in the Alps – Water management options in the Crans-Montana-Sierre region, Valais (Montanaqua)” from the Swiss National Research Programme «Sustainable Water Management» (NRP 61), my work aims at assessing the socio-economic and institutional setting in the region.

The main objective of this transdisciplinary project is to develop strategies moving towards a more sustainable water resources management in the Crans-Montana-Sierre region (Valais), together with actors involved. The spatial perimeter is not limited to the Crans-Montana tourist resort (communes of Icogne, Lens, Chermignon, Montana, Randogne and Mollens), but is extended to the whole valley side, including high mountain areas as well as urban (Sierre) and periurban municipalities (Miège, Venthône and Veyras) situated close to the Rhone River valley. The study region is situated in the driest part of Switzerland and has been subject to dynamic economic, tourism and urban development during the last decades. The proposed research on more sustainable water management options will evaluate co-ordination and adaptation of water demand to water availability under changing biophysical and socioeconomic conditions.

Based on the framework of Bourdieu’s theory of practice, the research focus will be on the analysis of the relationships between socio-economic change and the waterscape of the Crans-Montana-Sierre region in order to understand to what extent and how water supply is negotiated. The hypothesis is that the shape of the water distribution system, in its orientations and fragmentations, is a result of supply-oriented management, which is in the process of being transformed towards demand-driven management.

#### REFERENCES

- Bourdieu, P. (1980) : *Le sens pratique*. Ed. de Minuit, Paris.
- Mollinga, P. (2008): *Water, Politics and Development : Framing a Political Sociology of Water Resources Management*. *Water Alternatives* 1(1) : 7-23.
- Reynard, E. (2000): *Gestion patrimoniale et intégrée des ressources en eau dans les stations touristiques de montagne. Le cas de Crans-Montana-Aminona et Nendaz (Valais)*. Thèse de doctorat. Université de Lausanne, Lausanne, Institut de Géographie, Travaux et Recherches n° 17,2 vol.

## 18.3

### Water and women in rural Amhara: A 'naturalized' connection reflecting a restricting political agenda in Ethiopia

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The connection between water and women in the rural context of a country of the Global South commonly seems to be the concern of development project experts treating the subject mostly from a local actor's perspective. By doing so, political, historical and societal frame conditions are often not sufficiently considered in understanding why women are so 'naturally' connected to water and fail to improve their status in society beyond their usual function as domestic water managers. The presented MA thesis suggests an alternative approach to understanding women's social role in rural Ethiopian society as part of a broader power setting.

By applying Pierre Bourdieu's three concepts of *Habitus*, *Field* and *Symbolic Violence* to water supply in a rural district in Amhara, improved access to drinking water for the rural population can no longer be assessed purely positively. Rather this theoretical approach reveals hidden power mechanisms functioning in different societal relations that speak for a clearly repressive political regime. Such power relations are especially efficient because of their incorporation into social practices of both, the powerful and the powerless.

Deriving from the results of field research conducted in rural Amhara, the author of the MA thesis argues that by granting easier access to safe drinking water, women's daily work load might be reduced, hence, water access improvements appear as positive. But, as the 'naturalized' connection between water and women is not questioned in a broader political sense, improvements in water access hide the curtailing effect such technical interventions have on women's room for manoeuvre and self-determination in an overall repressive political situation. Rather, they serve an authoritarian government to distract the population's and the international community's attention from the fact that improved access to safe drinking water only provides basic need and welfare, but further, more profound personal and political rights and freedoms are deliberately withheld and denied.

#### REFERENCES

- Biseswar, I. 2008: A new discourse on 'gender' in Ethiopia, Research article, *African Identities*, 6/ 4, 405 - 429
- Dörfler, Th., Graefe, O. & Müller-Mahn, D. 2003: *Habitus und Feld, Anregungen für eine Neuorientierung der geographischen Entwicklungsforschung auf der Grundlage von Bourdieus „Theorie der Praxis“*, *Geographica Helvetica*, 58/ 1, 11- 23
- Lefort, R. 2007: Powers – mengist – and peasants in rural Ethiopia: the May 2005 elections, *Journal of Modern African Studies*, 45/ 2, 253 - 273
- O'Reilly, K. 2006: „Traditional“ women, „modern“ water: Linking gender and commodification in Rajasthan, India, *Geoforum*, 37, 958-972

## 18.4

## Water Scarcity in Inner-Alpine Regions

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

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Climate change as well as societal and economic development will in future significantly modify the supply and consumption of water, and consequently fuel existing or create new conflicts of interest. Dry valleys in the Alps will be particularly affected, as one has to assume that in these regions general water offer will become even scarcer and seasonal distribution might be changing significantly. At present, the use and distribution of water is generally organized at the communal level and follows historically evolving norms and regulations.

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.

The transdisciplinary research project “MontanAqua” investigates water related problems and issues of the study area, the Crans-Montana-Sierre region in the Valais, integrating biophysical and socioeconomic dimensions. It is divided into three work packages (doctoral theses) and one synthesis package (post-doc). Available water resources will be measured and modelled in and for the different altitudinal zones, from the Plaine-Morte glacier down to the Rhone valley (WP1). The study of water use will focus on drinking water, energy production, agri- and viticulture, as well as tourism (WP2). Decision-making related to water use will be studied through the socioeconomic structure, incorporating various levels from the municipality to the canton (WP3).

The synthesis package (SP) aims at investigating the links existing between the issues addressed by the three work packages, using the multifunctional landscape as an integrative bridging concept. This concept implies studying the different and simultaneous functions of specific parts of a landscape (e.g. vineyards 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.



The aim of these coordinated interdisciplinary studies is to develop options for optimal and at the same time balanced distribution and management of water resources. Local actors will be involved in a dialogue about what might constitute optimal and balanced management, while considering biophysical and socioeconomic factors likely to change. The project thus creates a space for transdisciplinary communication aiming at the co-production of knowledge between researchers and representatives of policy makers, administration and civil society.

PICTURE 1: The study area: Crans – Montana – Sierre (Photo: Bruno Schädler)

## 18.5

Les bisses et leurs modes d'organisation au XXI<sup>e</sup> siècle, un modèle de gestion durable ?Schweizer Rémi<sup>1</sup>

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L'approvisionnement en eau d'irrigation des régions de montagne subissant un climat sec ou aride a, de tout temps, représenté un défi majeur pour les communautés s'installant dans ces zones. Sur le plan matériel, cette lutte pour l'eau s'est traduite par la construction de canaux d'irrigation plus ou moins spectaculaires – dont les bisses du Valais représentent un célèbre exemple –, tandis que sur le plan social, elle a mené à la mise en place de modes de gestion et d'organisation communautaires qui représentent de bons exemples de *CPR institutions* (Ostrom 1990) et qui sont caractérisés par des modalités de partage et de distribution de l'eau particulièrement strictes.

Ces modes d'organisation font l'objet d'une abondante littérature, notamment en ce qui concerne les bisses du Valais. Toutefois, ces travaux adoptent souvent une perspective historique, et une minorité seulement traite de l'exploitation telle qu'elle se pratique à l'heure actuelle. Paradoxalement, en dépit de cette méconnaissance des modes de gestion contemporains liés à l'exploitation des bisses, il a été affirmé à plusieurs reprises dans la littérature que ces derniers représentaient des « modèles de gestion durable ». Or, des conclusions en termes de durabilité ne sauraient être tirées de l'analyse des modalités historiques de gestion et requièrent au contraire de répondre à une série de questions complexes qui restent pour l'heure sans réponse : comment ces modalités de gestion ont-elles évolués en parallèle à la complexification des réseaux d'irrigation et à l'évolution socio-économique de son environnement ? quelle place reste-t-il pour les modalités historiques de gestion ? quels rôles jouent la souplesse et l'informalité dans la gestion de réseaux autrefois caractérisés par des modalités très strictes de distribution de l'eau ? C'est à ces questions, qui nous paraissent centrales dans le contexte actuel de regain d'intérêt – patrimonial, touristique, mais surtout plus récemment environnemental – dont les bisses font l'objet, que la présente communication entendra tout d'abord répondre, afin d'offrir quelques éclairages sur la manière dont les modes de gestion qui encadrent les usages des bisses se composent à l'heure actuelle.

Dans un deuxième temps, l'objectif sera, sinon d'apporter une réponse définitive quant au caractère durable ou non des systèmes d'irrigation liés à l'exploitation des bisses, en tous les cas de proposer une grille de lecture novatrice à même d'évaluer les modalités de gestion contemporaines sous l'angle de la durabilité. Pour ce faire, notre analyse s'appuiera sur le cadre théorique des *Régimes Institutionnels de Ressources* (RIR). Ce cadre théorique, qui est le fruit des réflexions d'une équipe de chercheuses et de chercheurs menée par Peter Knoepfel, Ingrid Kissling-Näf et Frédéric Varone (2001, 2003), considère que l'état physique des ressources naturelles est fonction de l'ingénierie sociale qui l'entoure, soit, plus spécifiquement, des règles qui en régulent les usages. L'objectif est de tenir compte de la complexité de la gestion des ressources et d'intégrer l'ensemble des dimensions régulatrices pertinentes afin d'en identifier, dans des situations concrètes, les lacunes et les incohérences. Le postulat central de ce modèle consiste à considérer que plus les usages d'une ressource seront régulés de manière étendue et cohérente, plus les conditions de son exploitation pourront être considérés comme durables. La mise en œuvre de ce cadre théorique nous permettra, à travers l'assimilation d'un réseau d'irrigation à un complexe multiressourciel composé des ressources *eau*, *bisse* (infrastructures du réseau) et *sol*, d'élaborer une grille de lecture dont l'application rigoureuse rendra possible l'évaluation, sur le terrain, de la durabilité des modes de gestion mis en place.

Ces deux objectifs – clarifier les modalités de gestion actuelle liés à l'exploitation des bisses et élaborer puis tester une grille de lecture pour évaluer leur durabilité – seront atteints à travers une étude empirique réalisée à Savièse. Cette commune, où la gestion est caractérisée par l'imbrication de modes de gestion appartenant aux sphères privée, publique, communautaire (consortages) et associative d'une part, et par l'importance de la souplesse et de l'informalité de l'autre, représente un terrain d'étude particulièrement riche en enseignements.

## REFERENCES

- Ostrom E. 1990, *Governing the Commons: the Evolution of Institutions for Collective Action*, University Press, Cambridge, 280 pp.
- Knoepfel P., Kissling-Näf I., & Varone F. (Eds) 2001, *Institutionelle Regime für natürliche Ressourcen : Boden, Wasser und Wald im Vergleich*, Helbing & Lichtenhahn, Basel/Genf/München, 258 pp.
- Knoepfel P., Kissling-Näf I., & Varone F. (Eds) 2003, *Institutionelle Regime natürlicher Ressourcen in Aktion*, Helbing & Lichtenhahn, Basel/Genf/München, 376 pp.