

Global Change and Sustainable Development in Mountain Regions

An Introduction to the Proceedings of the Conference

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COST supports strategic workshops in order to provide the participants an opportunity to identified future research needs. The Strategic Workshop „Global Change and Sustainable Development in Mountain Regions” was convened at the Congress Hall of Innsbruck, Austria, from April 7-9, 2008. The event attracted more than 350 scientists, experts, practitioners, students, and scholars from 29 European and 10 non-European countries. It was based on three pillars ‘keynotes’, ‘discussion groups’, and ‘presentations of ongoing projects’. The keynotes were presented by leading experts in their specific field and addressed current key research questions. The format of the discussion groups ensured that every participant could articulate his experiences and ideas. The project presentations gave an overview on ongoing activities, and were used as networking opportunities.

COST

COST – the acronym for European Cooperation in Science and Technology – is the oldest and widest European intergovernmental network for cooperation in research. Established by the Ministerial Conference in November 1971, COST is presently used by the scientific communities of 35 European countries to cooperate in common research projects supported by national funds.

The funds provided by COST – less than 1% of the total value of the projects – support the COST cooperation networks (COST Actions) through which, with EUR 30 million per year, more than 30000 European scientists are involved in research having a total value which exceeds EUR 2 billion per year. This is the financial worth of the European added value which COST achieves.

A “bottom up approach” (the initiative of launching a COST Action comes from the European scientists themselves), “à la carte participation” (only countries interested in the Action participate), “equality of access” (participation is open also to the scientific communities of countries not belonging to the European Union) and

“flexible structure” (easy implementation and light management of the research initiatives) are the main characteristics of COST.

As precursor of advanced multidisciplinary research COST has a very important role for the realization of the European Research Area (ERA) anticipating and complementing the activities of the Framework Programmes, constituting a “bridge” towards the scientific communities of emerging countries, increasing the mobility of researchers across Europe and fostering the establishment of “Networks of Excellence” in many key scientific domains such as: Biomedicine and Molecular Biosciences; Food and Agriculture; Forests, their Products and Services; Materials, Physical and Nanosciences; Chemistry and Molecular Sciences and Technologies; Earth System Science and Environmental Management; Information and Communication Technologies; Transport and Urban Development; Individuals, Societies, Cultures and Health. It covers basic and more applied research and also addresses issues of pre-normative nature or of societal importance.

(Web: <http://www.cost.esf.org>)

Background

The **central focus** of the Strategic Workshop was **sustainable development in European mountain regions**, i.e. generating economic wealth in mountain regions without eroding their natural and social capital. This focus was addressed with respect to a variety of cross-thematic issues – climate change, biodiversity, demographic change, land-use change, tourism, water, transport, science-policy interface – whose occurrence in mountain regions is of key importance in the European context; as well as a fifth issue: earth observation, an essential means of identifying occurrences of natural hazards and changes in land covers in these dynamic regions (European Commission, 2004: Mountain areas in Europe: analysis of mountain areas in EU Member States, acceding and other European countries; European Topic Centre for Land Use and Spatial Information, 2008: Integrated assessment of Europe’s mountain areas, internal report, ETC-LUSI, Barcelona).

The Workshop focused on mountain regions for the following reasons:

- Mountains cover a significant proportion (29%) of the area of the European Union, and are home to 18% of its population.
- Mountain regions are not just rural areas, but also include many urban areas.

They share a range of natural and economic handicaps:

- Many mountain areas suffer high unemployment rates (Balkan, Southern Spain, Scotland, South Italy, Carpathians: 10-55 % above national average).
- Many mountain regions suffer demographic loss and aging (Carpathians, Southern Alps, Galicia, Balkans, Apennines, parts of the Scandes: decrease rate > 2% per year).
- Most mountains are remote areas with poor accessibility (more than 30 km to the next highway).
- Thus mountain areas are often peripheral regions, 'islands' in their national and international contexts.

On the other hand, mountains provide key resources to Europe:

- Mountains are European centres of both biological and cultural diversity, often arising jointly through centuries of landscape management and modification.
- Mountain regions are important current and potential sources of renewable energy, particularly hydro-electricity, but also wind, biomass, and solar.
- Mountains provide diverse important goods and services to Europe as a whole, including water, tourism, and mitigation of natural hazards.

Thus, while many of Europe's mountains are peripheral, all of them provide important resources to European populations. Yet, due to the diverse handicaps, mountain regions are frequently at risk of unsustainable development: extractive development that does not protect the natural or social capital of these regions. This challenge is exacerbated by climate change, to which mountain regions – especially the cryosphere – are especially sensitive (Price, M.F. 2008: Maintaining mountain biodiversity in an era of climate change. In: Borsdorf, A., J. Stötter and E. Veulliet (eds.) *Managing Alpine Future. Proceedings of International Conference October 15-17, 2007*: Vienna: 17-33), as development projects seldom consider the cumulative and synergistic impacts of development and climate change. This means that the continued provision of these many goods and services is uncertain: a key risk for Europe as a whole.

Mountain regions – their ecology, economy and society – are particularly sensitive to Global Change. These three pillars need to be in balance in order not to jeopardize the livelihood of future generations. Land use is affected by the interactions of processes relating to these three pillars. Vice versa, land use management can mitigate the adverse effects of global change (e.g., protective forests, slope stabilization). In the same vein, globalization is manifest in mountain areas, for instance, in depopulation in remote regions, restructuring of urban centres, and tourism.

In spite of the dramatic impacts of global change in mountain regions, it must be stated that international research programmes have not yet reflected the urgent need for investigation on the effects and on adaptive strategies to face the challenges and to implement measurements to ensure sustainability, life quality and stability in mountain regions. At least two international research strategies were outlined in the last year: The Research Agenda to the Multiannual Working Programme 2005-2010 of the Alpine Convention (worked out by ISCAR, the International Committee on Alpine Research), the GLOCHAMORE Research Strategy by the Mountain Research Initiative, Bern.

The attendance of representatives of global networks on mountain research, like FAO's Mountain Partnership (*Douglas McGuire*) and the Mountain Forum (*Martin Price*) demonstrated the international attention the conference arose. The presence of leading national, regional and local politicians (Governor of Tyrol, *Hervig van Staa*, Vice Mayor of Innsbruck, *Eugen Sprenger*, as well as a Representative of the Austrian Minister for Agriculture, *Hubert Siegel*) also demonstrated the interest of policy makers in the results of the conference. The most important organizations responsible for alpine sustainable development like CIPRA, ALPARC, Alliance of the Alps, Club Arc Alpin and others may be seen as an indicator for the weight of the COST Strategic Workshop and also indicates that the conference really reached the stakeholders responsible for mountain sustainable development.

Until today the international research funding organizations could only partially fulfil the expectations of the scientists. It must also be stated, that the Interreg IVb Programme Alpine Space changed the objectives and funding strategy towards application and implementation of the first campaign, so that new and innovative research can no longer be financed by this programme. Scientists all over the world are convinced that new research is an urgent need, as there are still many questions open, and strategies without a sufficient theoretical framework will fail.

Objectives

Against this background the Strategic Workshop aimed at putting research topics on mountain ecosystem services on the political agenda and identifying the implications of climate and socio-economic change for current and future forms of land use. The workshop assessed impacts on selected ecosystem services such as hazard protection, recreation, and natural resources.

Furthermore, scenarios of change and their implications for societies depending on these ecosystem services were appraised. In addition to the Alps, other mountain systems were also considered.

Relation to Policy

The Strategic Workshop had a significant European dimension. Most European mountain regions cross multiple national boundaries. Solutions for sustainable development of these regions require action at a European level.

International cooperation is essential for sustainable development in mountain regions, as these regions face similar challenges and will profit from experiences in other mountain ranges. The COST Strategic Workshop is consistent with the EU Sustainable Development Strategy 2006 (SDS; see http://ec.europa.eu/sustainable/sds2006/index_en.htm). This strategy states that the participation of citizens in decision-making should be enhanced, and education and public awareness relating to sustainable development should be promoted. Citizens should be informed regarding their impact on the environment and their options for making more sustainable choices.

In accordance to the SDS, the workshop strived for detecting, identifying and conceptualizing knowledge deriving from research in order to foster proactive relationships between researchers and practitioners and enhance sustainable development in European mountain regions.

The Workshop was also designed in accordance to the European Spatial Development Perspective (European Commission, Luxembourg 1999). It aims for balanced and sustainable development, and specifically mentions mountains as a specific spatial unit. The conference can also be seen in relation with the current debate on the future of cohesion policy and territorial cohesion, debate in which mountains are regarded as territories with specific potential and specific handicaps needing adequate and tailored response. Thus the workshop intended to encourage practitioners to base their solutions on a research-based strategy presented by leading researchers in mountain regions from all over the globe.

A further effort of the workshop was to encourage international and national research funding institutions to focus more on mountain issues. Mountain regions provide ecosystem services (water, energy, fresh air, biodiversity, mineral resources, recreation) for millions of Europeans, who live in the lowlands. It is hard to under-

stand, why other areas like coastal regions, deserts and industrial regions are dedicated to receive specific programmes, and not mountains.

The research needs were formulated during the workshop as follows:

The research needs were formulated for the following key topics of global change and sustainable development in mountain regions:

Climate change

Monitoring of climate change, development of locally valid climate scenarios, using appropriate downscaling instruments. As climate change affects natural hazards, adaptation strategies must be developed.

Demographic change

As demographic changes (aging, migration, household changes etc.) are very obvious and may be regarded as a second key driver of change in mountain regions. Depopulation and marginalization of remote areas cause many problems for ecology, economy and social coherence.

Land-use change

The desired sustainable land use requires updated concepts for land management. Research on land management and ecosystem services is a central need.

Tourism

Tourism in mountain areas is affected by climate and demographic change and other effects of globalization (new destinations, growing mobility, and new target groups). There are positive and negative effects. Research on new concepts and adaptive strategies are a strong need. Tourism in mountain regions is strongly connected to the ecology and to traditional forms of land use. Therefore climate and land use change are decisive for the development of this sector.

Water

Water is a central ecosystem service. As with the climate change and the effects of socio-economic globalization the demand will rise, but production will slow down, adaptive strategies are to be found. This also deals with juridical, ownership and governance questions.

Transport

The rising transport originate problems for the Alps. Other mountains lack by accessibility. This is why transport and transit questions have to be investigated in the regional context.

International comparison

The Alps are the best investigated mountain region. The relevant Experiences and results can serve as an excellent base for comparative studies.

Science-policy interface

Research is no longer to be done in an ivory tower. A strong theory-practice compound is as well a need as a well functioning interface with policy.

As the participants had different disciplinary backgrounds and came from almost all mountain regions of the world, the discussions demonstrated very clearly, that future research must be designed in an interdisciplinary manner, as mountains are very complex systems. Furthermore it became very clear, that stage and problems of the different mountain regions are not similar. Therefore the strategies to face the global change must be defined within the local or regional context.

Success

One year after the Innsbruck Strategic Workshop it can be stated that the conference had a strong impact. New project proposals were elaborated on the base of the workshop's results (such as mountain.TRIP and AAP [FP7]).

Researchers and practitioners formed new networks or were integrated to existing networks (like Mountain Partnership, Mountain Forum, Mountain Research Initiative). A concrete result was the formation of a research network for the Carpathian "Science for the Carpathians: S4C" right on the conference. Since than this group is the most important driving force of research in the Carpathian in strong relationship to the Carpathian Convention.

Mountain research as a whole was strengthened, and institutions received more money, staff or research infrastructure. The most important success factor can be measured by the manifold new personal contacts and even friendships in the scientific community and between researchers and practitioners, who since then found a new base of communication and exchange. The first result was the Innsbruck Memorandum, which was commonly formulated and unanimously accepted by all participants of the conference.

Innsbruck Memorandum

The more than 350 participants of the COST Strategic Workshop on Global Change and Sustainable Development in Mountain Regions, leading scientists, practitioners, stakeholders and decision makers are....

... aware of the enormous scientific expertise and human capital available in mountain regions,

... convinced that this capital must be invaluating to timely respond to the challenges of global change (climate, demographic, economic, social, political and cultural) in mountain regions,

... emphasizing that global change will have much stronger impacts on mountain than on lowland regions,

... highlighting the importance of the mountains for protection against natural hazards, as providers of water, renewable energy, and other natural resources, recreation and touristic amenities for the lowlands.

The participants request the responsible in the European and International Bodies, in Research, Political and Economical Programmes, in National and Regional Corporations and Institutions to initiate, facilitate and expand their programmes and research strategies for mountain science to secure sustainable development under global change in mountain regions. The participants of the conference are convinced that this would not only sustain people's livelihoods in mountains but also in the adjacent lowlands.

Final remarks to the Conference and acknowledgments

It was impressive to see the enormous progress of mountain related research not only in the Alps but in all mountain ranges. Not only the state-of-the-art was presented by the keynote speakers, they also identified priority research questions for future. It became clear that there is a large human capital and research experience, which can be in-valuated to address/solve the problems of global change and to implement strategies for sustainable development in mountain regions.

Any conference has side-effects: Networking, contact-making, exchange of plans, visions, and project ideas. For this conference the informal scientific exchange was considered to be determinant for the success. Coffee breaks, lunch times, workshops and the poster session provided the platform for these informal encounters. We got the impression that we reached our goals in this aspect.

We would like to thank COST for its considerable support in the organisation of this conference, particularly the President of the Committee of Senior Officials Prof. Francesco Fedi, the Director of the COST Office Dr. Martin Grabert and the organising team from the COST Office, Senior Science Officer Günter Siegel and Ms. Svetlana Voinova. Furthermore, to the Scientific Committee of the Conference (Astrid Björnsen MRI; Roland Psenner, LFU; Thomas Scheurer, ISCAR; Ulrike Tappeiner, EURAC), to the conference helpers of the Mountain Research Institute IGF of the Austrian Academy of Sciences, especially Kati Heinrich and Sigrun Kanitscheider; to the realization of a web-cast by Astrid Björnsen, which was a key factor for the dissemination of the results in the virtual web; to all keynote speakers, workshop chairs and participants in the discussions; to all presenters of posters on the Mountain Research Market Place, and to the Congress Innsbruck, the Federal State of Tyrol and the Ministry for Agriculture, Forest, Environment and Water Management, which contributed to the realization of this conference.

The publication of the conference proceedings

A conference is a single event, and in many cases, when time goes on, the results may be less and less acknowledged. The web-cast, which presents not only videos of all presentations but also the illustrating material, is a quite innovative method not only to disseminate the results immediately to all mountain researchers and practitioners all over the world but also to provide the results even for those, who could not attend the workshop. However, the organizers furthermore decided to look for a more traditional method to provide the findings for future research: the publication of this book. It presents the main topics of the conference, the key notes and speeches, and the findings of the many intensive workshops. The editors are convinced that these will enhance all kind of necessary research in mountain regions on a global, national, regional or local scale.

The book is structured in accordance to the conference agenda. In 13 chapters it presents contributions to basic research, to socio-economic topics and regional studies. The risks related to climate change are also addressed as water issues, high elevation ecosystems and monitoring methods. Forestry, tourism and ecosystem services of mountains are most important to evaluate the economy and the output of mountain systems. Mountains all over the world are challenged by global change. This is illustrated by regional examples of the Carpathians, the Andes, the Rocky

Mountains and the Pacific North West of Canada. Well known authors in the scientific community and high ranking practitioners, like Gerhard Berz (Germany), Dan Binkley (U.S.A.), Philippe Bourdeau (France), Witold Fraczek (USA), Yolina Hubenova (Bulgaria), Thomas Köllner (Switzerland), Christian Körner (Switzerland), Jacek Kozak (Poland), Paul Mitchell-Banks (Canada), Hugo Romero (Chile), Dieter Stöhr (Austria), and Rolf Weingartner (Switzerland) contribute to this issue. A complete overview on all contributions and the results of the workshops are published in Jandl, R., A. Borsdorf & G. Siegel 2008: Global Change and Sustainable Development in Mountain Regions. Executive Summary. Recommendations for Research. (ed. by M. Khorchidi & M. Price). Wien, Brüssel.

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It is a common human experience, that joint ventures may create good friendships. For us, one of the striking effects of the cooperation organizing the conference and publishing the proceedings is the foundation of a deep friendship of the editors of this book. We are convinced, that the workshop not only will lead to more joint activities in our case, but also for common efforts of those participants who found new friends in those days or deepened their existing friendships.

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