

## **MRI Newsletter 2: Global Change Research in UNESCO Mountain Biosphere Reserves**

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# MRI Newsletter 2: Global Change Research in UNESCO Mountain Biosphere Reserves



*The Mountain Research Initiative (MRI) and UNESCO are cooperating on developing a strategy for implementing global change research in mountain Biosphere Reserves around the world. The objective is to provide an integrative research framework for regional interdisciplinary studies that address the causes and impacts of environmental and socioeconomic changes in the mountain Biosphere Reserves.*

The anticipated global change of the 21st century will have serious repercussions on fragile mountain ecosystems. Change will not only affect the socioeconomic conditions of mountain people but also of many downstream communities that depend upon the flow of goods and services from mountain regions. Changing precipitation regimes, increased water runoff, reduced ice and snow storage capacities, changing frequency and magnitude of mass events, and a general increase in natural disasters in mountains will be some of the consequences of global change. Moreover, rising temperatures will shift the snow, vegetation, and tree lines in mountains and affect species habitats, populations, and distribution. Mountain people will have to cope with these drastic changes. This may be particularly difficult in developing countries, where marginalized mountain societies often depend on limited mountain resources for their livelihood. The severity of the anticipated changes will dictate their response strategies, ranging from adaptation to outright emigration.

Innovative strategies will be needed to address the potential impacts and consequences of global change in mountain regions and to identify the best approaches for effectively mitigating the impact of climate change. These strategies will not only need to integrate research within the physical sciences but must also incorporate research efforts from the social sciences.

## Mountain Research Initiative—Man and the Biosphere's cooperative research program

Linking ongoing global change research in mountain areas with the

existing UNESCO program on Man and the Biosphere (MAB) is a promising approach for coordinating and steering fragmented research activities. Within the framework of UNESCO's MAB program, mountain regions play a prominent role. They host numerous internationally recognized biosphere reserves (BRs) nominated by national governments. In many ways UNESCO mountain BRs provide ideal natural global change laboratories:

- **Zonation:** While the protected core areas offer undisturbed ecosystems for studying the direct environmental impacts of climate change, the lower-elevation buffer and transition zones that are more strongly influenced by human activities provide ideal socioeconomic and environmental gradients for comparative studies.
- **Long-term research sites:** BRs encourage research. For instance, they provide long-term security for permanent plots and monitoring activities that are necessary for distinguishing longer-term trends of climate change from the noise of short-term variability. BRs also allow for interdisciplinary research and monitoring, comparative studies, and information exchange. As such, they offer a growing database on which to build new hypotheses and experiments.
- **Logistic framework:** Apart from focusing on conservation and development, each BR fulfills a logistic function in providing support for research, monitoring, education, and information exchange related to conservation and development.
- **Comparative studies:** Lastly, the wide and varied distribution of mountain BRs across the globe provides opportunities to compare regional studies and analyze regional differentiation in environmental processes of change. Apart from changing environmental conditions along mountain slopes, changes also occur in socioeconomic conditions, land use and land manage-

ment practices, resource exploitation, and the appeal of mountain regions for tourism.

## Benefits from the partnership

Both MRI and UNESCO MAB realize significant added value from a cooperative research program. The MRI network of global change researchers clearly benefits from the UNESCO MAB infrastructure and from the valuable experience gained by UNESCO MAB concerning global change issues in the many mountain BRs (eg, on ecological processes, biological diversity, or traditional knowledge). And vice versa, the UNESCO MAB program benefits from intensified and coordinated global change research in the mountain BRs. The establishment of MRI research programs within BRs strengthens the reserves' significance, contributes to long-term monitoring of natural and human-induced environmental change, and focuses the experience of both the global change scientific community and the MRI network on mountain BR issues. The expected outcome from such an overarching research framework can be summarized as follows:

- The project provides a valuable template for research projects geared towards elucidating, assessing, and predicting global change processes in mountain regions in general and their consequences for nature and humanity.
- This global partnership facilitates the development of an observatory network in mountain BRs that provides an "early warning" system for detecting global change impacts, both in the protected core areas and surrounding buffer zones and transition areas.
- Collaboration between scientists and BR managers from all over the world stimulates in-depth reflection and discussion about our common future and facilitates the exchange of knowledge between North and South. Conducting research activi-

ties in inhabited development zones of the BRs calls for fairness: a participatory approach and the delegation of responsibility and authority to the various stakeholders, especially women, are of utmost importance.

- Through such an integrated research framework, a critical mass of researchers from separate disciplines can be attained to link up research activities and explore and develop strategies resulting in integrated, coordinated, and consistent activities. The BR managers' involvement is crucial for developing effective and applied strategies acceptable to mountain people whose livelihoods may be affected.
- Policymakers and government agencies obtain important decision-making tools from information concerning, for instance, the extent of degradation of mountain resources, interactions between alternative resource management approaches, and regional trajectories of global change. The understanding gained from BRs offers enhanced technical and institutional capabilities for sustainable natural resource management.
- Demonstrating the practical benefits from global change research helps to procure greater public support.
- Furthermore, these activities serve as working examples to explore

how natural resources can be managed within sustainable limits at the local and regional levels, and what institutional and legal mechanisms are needed to achieve this.

To sum up, global change research in BRs enables countries to meet their obligations under international conventions, such as those on biological diversity, desertification, and Agenda 21.

### Selection of 25 mountain BRs

Of the 411 MAB BRs, more than 40% are situated in mountain regions widely distributed in 40 countries around the world. Given the large number of mountain BRs, it will be necessary to focus initial efforts on a few carefully selected "case study" BRs. Twenty-five mountain BRs have been identified that (1) represent most of the world's major mountain ranges, (2) span a large altitudinal gradient, (3) represent diverse physical and socioeconomic settings, and (4) host ongoing research programs representing one or more of the MRI's activities. It is envisioned that the project will expand as resources become available to include a much more inclusive network of mountain BRs.

### Outlook

The components of the implementation plan will be assembled during a work-

shop scheduled for November 2003 in the Entlebuch Biosphere Reserve, Switzerland. The primary objectives for the workshop are:

1. To review the state of global change research (natural, social, cultural, economic, and political sciences) in a range of mountain BRs that could be used as pilot study areas for implementing the activities defined by the MRI.
2. To refine and prioritize MRI activities at an operational level.
3. To identify gaps in coverage and methodological problems with respect to global change research in mountain BRs.
4. To provide guidelines for implementing, fostering and coordinating integrated global change research in mountain BRs around the world, with a view towards general applicability in mountain regions.

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**FIGURE 1** November snow on the Jungfrau-Aletsch-Bietschhorn World Heritage Site in Switzerland; view from the northwest. (Photo by Mel Reasoner)

# CDE's Integrative Approach to Research and Development in Mountain Regions



*The Centre for Development and Environment (CDE) is a university institution that conducts resource- and people-oriented research and development activities in Switzerland and abroad. It is part of the Institute of Geography at the University of Berne and is the lead institution for the Swiss National Centre of Competence in Research (NCCR) North-South.*

## Mission

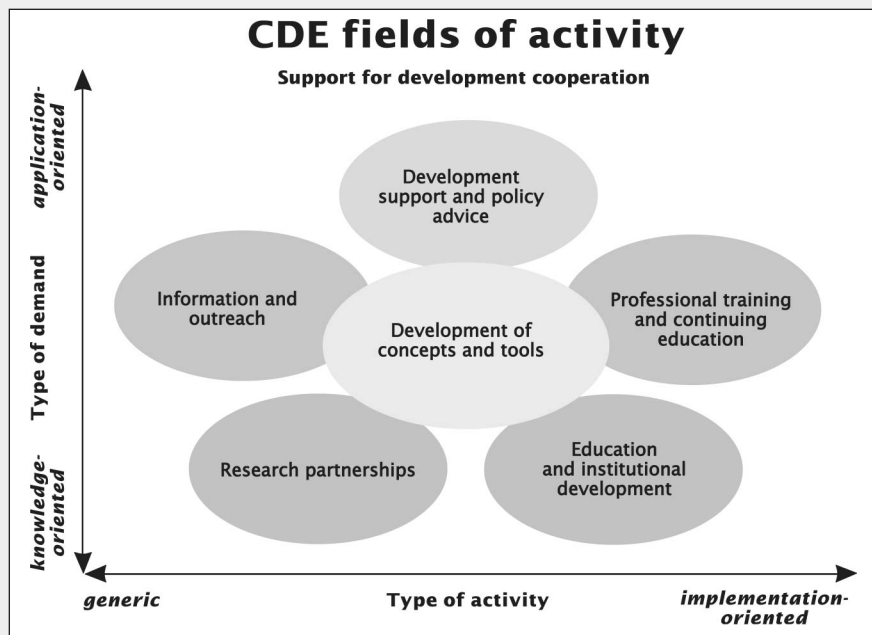
CDE's mission is to contribute to sustainable development in countries of the North, South, and East through research partnerships, education and training, development of concepts and tools, sensitization, and policy advice. Our focus is on management of natural resources, integrated regional development, and interventions that mitigate syndromes of global change. CDE places special emphasis on high-land-lowland interactions and on high potential-low potential and center-periphery relationships.

## Fields of activity

CDE programs and mandates have a long-term perspective and are sustainability-oriented. They combine research and knowledge generation with outreach and application in a broad range of activities, depending on the type and nature of our partnerships.

## Mountain-related activities during the International Year of Mountains

During the International Year of Mountains (IYM2002), CDE stepped up its research and development activities in mountain regions. In particular, this took the form of backstopping for various IYM activities launched by the Swiss Agency for Development and Cooperation (SDC), which played a key role in promoting sustainable mountain development in Switzerland and at



the international level. Mountain-related activities in 2002 included:

### Events

- Participation in the Bishkek Global Mountain Summit (BGMS) and several preparatory events. This included involvement in the formulation and negotiation of the BGMS platform statement, participation in the preparatory Mountain Forum electronic conference, and conducting several BGMS workshops (eg, on the role of energy, transport, and access in mountain development and on gender mainstreaming in mountain development).

### Policy support

- Preparation with SDC of the official Swiss position paper on sustainable development in mountain regions presented by the Swiss government at the World Summit on Sustainable Development (WSSD).
- Support for the development of Switzerland's proposal for an International Partnership for Sustainable Development in Mountain Regions, launched at

the Johannesburg WSSD by the Swiss government.

- Collaboration with FAO and other partners in preparing the implementation of the International Mountain Partnership.
- Involvement in preparing a management and protection plan for the first World Natural Heritage Site in the European Alps (Jungfrau-Aletsch-Bietschhorn region in the Swiss Alps).
- Coordination of the United Nations University's Global Mountain Partnership Programme (UNU-GMPP).

### Publications

- Preparation of the proceedings of the 4-day Interlaken World Mountain Symposium 2001 on *Community Development between Subsidy, Subsidiarity and Sustainability* (CD-ROM and summary brochure).
- Preparation of a status report on SDC's experience in mountain development in the past 25 years (*Mountains and People*).
- Production of a status report by the Mountain Agenda and SDC on *Sustainable Development in Mountain*



*Areas: The Need for Adequate Policies and Instruments*, prepared for and presented at the WSSD in Johannesburg, South Africa.

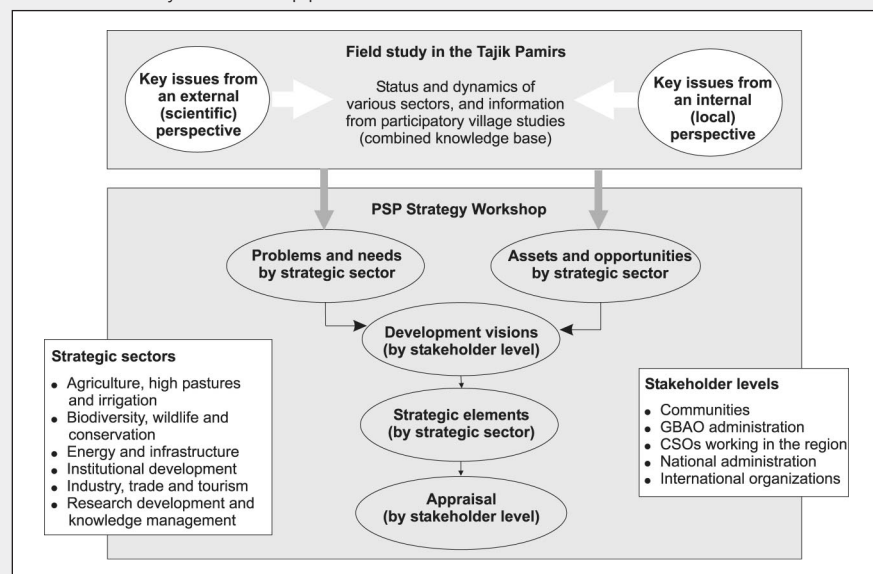
### Projects and Programs

- Increased support for *Mountain Research and Development* (MRD) editorial and promotional activities, including representation at key mountain conferences.
- Research on highland–lowland interactions and mitigation of syndromes of global change within the framework of the National Centre of Competence in Research (NCCR) North–South.
- Central Asia Mountain Partnership (CAMP): implementation of a partnership approach that promotes ownership of projects, local self-governance at the village level as a foundation for sustainable development, integrative capacity building, multi-stakeholder policy dialog, and networking activities through the Dom Gor (house of mountains).
- Several Eastern and Southern Africa Partnership Programme (ESAPP) projects with a focus on natural resource management and regional development in mountain regions in Ethiopia, Kenya, Madagascar, and Tanzania.
- Public–private partnership initiatives such as the Sustainable

### The CDE approach

*CDE uses disciplinary and transdisciplinary approaches and methods. Linking analysis and synthesis and combining high-end and low-end methods—such as GIS-based geoprocessing and participatory field-based approaches—are typical of our programs. CDE supports the principles of subsidiarity, empowerment, and partnership, while acknowledging the importance of research, planning, and decision-making at regional, national, and international levels.*

The PSP field study and workshop process.



Land Management Programme in the Eritrean Highlands, funded by the Syngenta Foundation for Sustainable Agriculture (soil and water conservation).

- Implementation of the Pamir Strategy Project (PSP). This activity is described briefly below to illustrate the type of integrative approach developed by CDE.

### The Pamir Strategy Project

The Tajik Pamirs are currently undergoing a profound transformation that affects society, the economy, and the natural environment. Promoting sustainable development in such a remote high mountain area is a major political, economic, social, and ecological challenge. As the most important step toward success, strategic elements and development priorities must be agreed on and supported by all stakeholder groups.

In cooperation with major NGOs and INGOs as well as local authorities, the PSP focused on preparation of a development strategy for the Tajik Pamir Mountains. Activities included collection of field data on the status and dynamics of various sectors and information from participatory studies conducted at village level. A Geographic Information System (GIS) was also prepared to bring the various components together.

On the basis of this knowledge, a strategic vision for the region was

negotiated with all stakeholder groups during a Workshop for Sustainable Development of the Tajik Pamirs, held in Khorog in October 2002. Nearly 80 participants from 5 stakeholder groups exchanged and assessed knowledge about 6 strategic sectors and highlighted problems and opportunities for sustainable development (see Figure above). Finally, strategic elements for the region's development were elaborated, on the basis of the stakeholder groups' visions.

Joint appraisal of these elements enabled the stakeholder groups to agree on the importance and urgency of the selected development priorities. Besides the GIS-based multistakeholder appraisal of future development goals, the PSP also provided a conceptual and methodological approach to sustainable development that can be applied in other mountain areas.

A synthesis report focusing on the studies, workshop, and methodology applied is now available at CDE (and online at [www.cde.unibe.ch](http://www.cde.unibe.ch)). Follow-up activities based on the outcomes of the project are being planned.

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