

CDE Links Regional Research and Global Efforts for Sustainable Mountain Development

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BERN

 CDE
CENTRE FOR DEVELOPMENT
AND ENVIRONMENT

The Centre for Development and Environment (CDE) at the University of Bern has long-standing experience in conducting research in mountain regions around the world. CDE considers mountain regions to be a crucial context for sustainable development. Together with its partners, CDE aims to generate in-depth contextual knowledge about the dynamic social, economic, and ecological processes in mountain regions and elsewhere, with a view to informing development practices, while at the global level it engages in activities that help bring together these regional insights with the goal of informing policy-making. In doing so, CDE addresses the specific challenges of sustainable development—in mountains and elsewhere.

Our approach to mountain development

Mountain regions provide indispensable ecosystem services and goods to a significant proportion of people worldwide, but they face persistent challenges such as widespread poverty and fragile natural resources. Some mountain-specific characteristics such as topography, ecological altitudinal zonation, fragmentation, and isolation lead to common development challenges. Other characteristics of mountain regions—such as high sociocultural, economic, institutional, and ecological diversity—trigger challenges that are place-specific, but they also offer opportunities. Today, mountain communities and ecosystems are particularly affected by global changes that are largely driven by development in the lowlands. These changes can aggravate the challenges of mountain communities, but they can also create

BOX 1: CDE in a nutshell

The Centre for Development and Environment (CDE) is the University of Bern's center for sustainable development research. CDE focuses on 6 strategic themes:

1. Global change impacts
2. Innovation for sustainable development
3. Natural resources and ecosystem services
4. Multidimensional disparities
5. Governance of resources
6. Education for sustainable development.

CDE works with universities and other partners in Switzerland and around the world and engages in research as well as in development projects and policy dialogue.

Activities in mountain regions have a long tradition at CDE. In the Swiss Alps, Eastern Africa, and the Horn of Africa, our engagement dates back to the 1970s and 1980s and has continued to the present day. In the last 2 decades, CDE has also developed partnerships in Southeast Asia, Central Asia, and the Andes.

new niches for sustainable development.

CDE recognizes that endeavors to foster sustainable development in mountain areas need to consider and relate 3 aspects: the commonalities of mountain regions, place-specific challenges and opportunities, and the embeddedness of mountains within their surroundings and overall global trends. Therefore, CDE links in-depth place-based studies of the social and ecological systems of different regions (1 in Figure 1) with activities that compare and capitalize on regional experience in order to reveal common patterns and processes (2). In doing so, it aims to provide knowledge for practice (3) and policy at different governance levels (4).

Many of CDE's programs have a long-term perspective, focus on different themes, and combine research and knowledge generation with outreach and policy dialogue (see Box 1). Our engagement has

been made possible by key long-term funding partners, the most important of which is the Swiss Agency for Development and Cooperation (SDC).

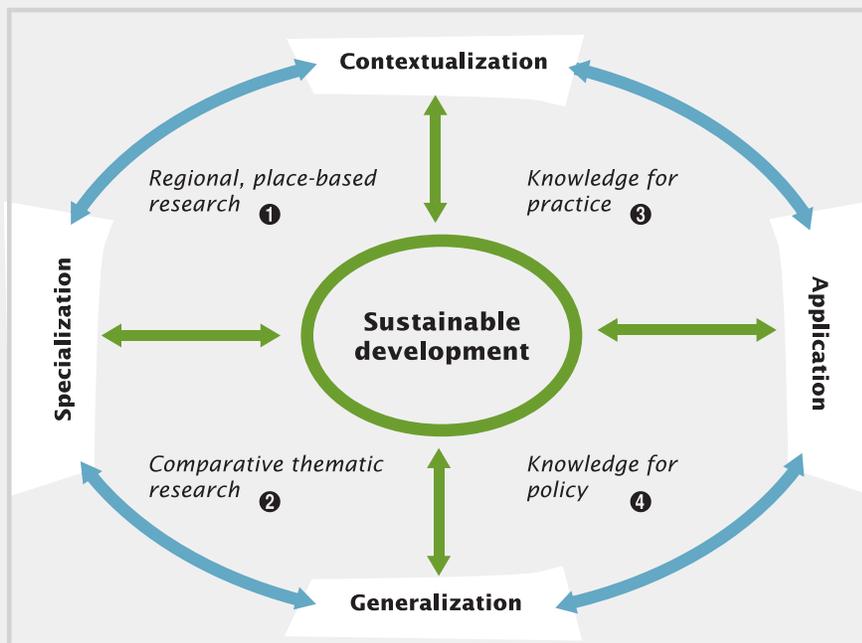
In the following pages, we present a selection of ongoing research activities in different mountain regions worldwide and examples of CDE's engagement at the global level.

Regional research

Sustainable water management in Africa, Central Asia, and Europe

CDE has been working in the Ethiopian Highlands since the late 1970s and in the Kenya Highlands since 1980. In Ethiopia, our work is now coordinated by the Water and Land Resource Centre (WLRC) in Addis Ababa. In Kenya, CDE's work has been coordinated for many years through the Centre for Training and Integrated Research in Arid and Semi-arid Land Development (CETRAD), a research and training institute based in Nanyuki. Current

FIGURE 1 Components of CDE's approach to research for sustainable development, which is highly applicable to mountain regions. (Source: adapted from Humni and Wiesmann 2011)



work focuses on 2 transboundary river basins in a highland-lowland context in the Horn of Africa and East Africa: the Blue Nile/Eastern Nile basin in Ethiopia, and the Ewaso Ng'iro basin in Kenya and Somalia. In these river basins, transboundary negotiations and decision-making on water management are extremely challenging. Project participants believe that supporting negotiations and diplomacy based on sound data and participatory processes involving a range of stakeholders will help overcome the obstacles to sustainable water and land governance in the region.

In Tajikistan, CDE focuses on integrated watershed management (IWSM). Farming and firewood collection are practiced in ecologically fragile areas such as the upper zones of watersheds, resulting in soil degradation and increased water runoff, which increases the risk of disasters such as floods and landslides. CDE is engaged in an SDC initiative that seeks to manage trade-offs between basic human needs and the protection of watersheds. Results show that

effective IWSM practices can be delivered if local contexts and people's knowledge are integrated. Tajikistan's ongoing reform of the water sector provides an opportunity for knowledge produced by this initiative to guide and support national regulatory efforts.

In the Caucasus, CDE works with local partners in action research promoting community water management in Azerbaijan and Georgia. While water management receives much attention at the national and international levels (for example, through Environmental Action Plans and the Helsinki Water Convention), this project supports bottom-up approaches in water management including transboundary exchange and includes a small grant for implementation. The activities are funded by the Swiss Federal Department of Foreign Affairs.

MontanAqua—a major transdisciplinary project with CDE involvement in the Swiss Alps—dealt with climate change and its effects on future water supplies in the

Crans-Montana-Sierre region (Valais canton), one of the driest places in Switzerland. The project developed 5 core messages relating to the situation projected for 2050, making the key point that social and economic change will have a more crucial effect on water availability than climate change.

Sustainable land management in Africa and Central Asia

In the Ethiopian Highlands, CDE and partners developed a high-resolution database as part of the Economics of Land Degradation project. The study is based on a detailed land cover and land use map at 30×30 m pixel size for the $600,000 \text{ km}^2$ rain-fed agricultural area of Ethiopia, which is concentrated in the country's highlands. In 8 scenarios, the study calculated the net present values of investments in soil and water conservation over the coming 30 years, showing that sustainable land management is economically viable for the farmers in all 150 districts of the country.

In Central Asia, where the transition from centrally planned land use to a more decentralized, market-oriented system has taken place, CDE works in sustainable land management, resource governance, and decision support for land use planning with the aim of promoting innovative approaches to capacity building, research, and knowledge management. CDE engages in long-term collaboration with the nongovernmental organizations CAMP Alatau in Kyrgyzstan and CAMP Kuhiston in Tajikistan, which CDE helped create, as well as with the Mountain Societies Research Institute of the University of Central Asia.

Evidence-based planning in Southeast Asia

In the uplands of Lao PDR, the transition from subsistence to market-oriented farming is in full swing. In addition, the demand for land for logging, mining, and hydropower is growing rapidly.

Effective and evidence-based land use planning is thus essential for sustainable use of natural resources and for enhancing local people's livelihoods. Such planning is one of the aims of The Agro-Biodiversity Initiative (TABI, www.tabi.la), a joint effort of the government of Lao PDR and SDC. CDE supports TABI in participatory land use planning. Several hundred upland communities have benefited from the program to date. A second project, Lao DECIDE info (www.decide.la), promotes data and information sharing within the country to improve evidence-based planning and decision-making. Funded by SDC, the project supports the Lao Department of Statistics in providing user-friendly, web-based statistical and spatial data to a wide range of users, including on issues such as concessions for mining, hydropower, timber, and rubber.

Transformation of agrarian systems in the Andes

In the Andes, CDE works mainly in Bolivia and Peru, often partnering with the Centre for Agroecology (AGRUCO), and concentrating on bio-cultural diversity, agrarian reform, and transformation of agrarian systems, with the aim of strengthening endogenous development. Together with national partners, we run a number of PhD and MSc programs in both countries. For example, a study currently underway on constitutionality and socio-ecological outcomes in Bolivia explores the high spiritual significance of mountains for indigenous people. CDE is also engaged in a global research project that aims to make the concept of food sustainability operational for national policies, which includes the highlands of Bolivia. The project will look at the performance of individual food systems, from large-scale industrial to small-scale subsistence systems, and will identify factors that would help make their coexistence more sustainable.

Impacts of migration and tourism in the Hindu Kush–Himalaya

Outmigration is an important issue in many rural mountain areas worldwide, including the Hindu Kush–Himalaya. Together with partners in Switzerland and in Nepal (mainly the International Centre for Integrated Mountain Development [ICIMOD] and the Nepal Center for Contemporary Research [NCCR]), CDE is undertaking a study in the hill zone of Nepal that examines the impacts of migration on land management and livelihoods. First results reveal that the main degradation problem is the spread of invasive plant species; on the other hand, bush and forest have increased, and soil erosion and landslides are much less of a problem than anticipated. As men migrate, a feminization of local agriculture can be observed. CDE's second field of interest in the region is tourism; we have monitored lodge development and investigated local people's perceptions of change over the previous decades relating to availability of natural resources.

Protected areas research in Switzerland and other parts of Europe

In the Swiss Alps, CDE and the Institute of Geography of the University of Bern have been active for several decades. The Man and Biosphere (MAB) program (MAB-6; 1978–1986) was instrumental in the establishment of the World Heritage Site Swiss Alps Jungfrau-Aletsch (SAJA) in 2001. Currently CDE and its partners are involved in monitoring key SAJA assets such as glaciers, farming, biodiversity, water, and cultural landscapes. They are also helping to prepare information materials for tourists and residents. Recently CDE has also taken up work on management of common property resources, especially pastures.

In the Carpathian Mountains of Slovakia, increasing participation of and benefit-sharing with local populations in and around protected areas is a relatively new goal on the

country's agenda. The Slovak Nature Conservancy (SNC) together with CDE is now developing a participatory component within a larger nature conservation program. Through the involvement of local stakeholders, conservationists, and administrators, the component seeks to reconcile conservation and local development in the country's protected areas, largely remote mountainous regions. The program began in 2012 and is set to run through 2015 with funding from the Swiss Contribution to the New Member States of the European Union.

In 6 protected areas in European mountains, CDE is carrying out a project with partners that looks at the importance of culture for sustainable regional landscape development. Results show that cultural events act as a stimulus for revitalizing marginal regions affected by depopulation. Language, customs, and artisanal activities are all important drivers of development. Local people attach great importance to the preservation of the cultural landscape, as it forms a substantial part of their identity.

Global engagement

Mountain Agenda

CDE is part of the Mountain Agenda, an informal global network of key persons active in mountain research and development since the late 1990s. The Mountain Agenda aims to enhance the position of mountains in global debates. In 2013 and 2014, CDE and partners prepared publications on mountain farming (a contribution to the International Year of Family Farming in 2014), tourism, and climate change (the latter in support of the United Nations Framework Convention on Climate Change 20th Conference of Parties in Lima). CDE also prepared a case study for the United Nations Environment Programme's *Africa Mountains Atlas* (UNEP 2015). CDE was a member of the core group that prepared the World Mountain

Forum in Cusco in May 2014 and will contribute to the global conference on mountain research in Perth, Scotland, in 2015. Our mountain engagement was put on a sound financial footing thanks to the Austrian Development Agency (ADA) and SDC's program Sustainable Mountain Development for Global Change (SMD4GC). This advocacy and knowledge-sharing network includes 5 regional hubs across the mountain world and 2 globally active players: the Department of Geography of the University of Zurich and CDE.

World Overview of Conservation Approaches and Technologies (WOCAT)

WOCAT (www.wocat.net) is a global network of sustainable land management (SLM) specialists from over 50 countries. Its secretariat is at CDE. WOCAT's goal is to prevent and reduce land degradation through SLM technologies and implementation approaches. Since its launch in 1992, WOCAT has developed standardized SLM methods and tools and established a knowledge-management system covering many mountain regions. WOCAT documents SLM practices and their benefits for food security, livelihoods, climate change, and water availability. In 2014, WOCAT's long-term engagement for SLM led to its being officially recognized by the United Nations Convention to Combat Desertification as the primary recommended database for SLM best practices, including measures of adaptation.

The Land Matrix: monitoring land deals worldwide

The Land Matrix Initiative (www.landmatrix.org, www.landobservatory.org) collates information on large-scale land acquisitions and leases worldwide, including in mountain areas. The focus of the matrix is on land deals for agricultural use. The initiative is based on data derived from various

sources such as research reports, documents produced by public agencies, private companies, and NGOs, and information by individuals. All data in the global database are freely available to the public. National and regional land acquisition observatories have been piloted as well. Currently 11 organizations from the North and South are part of this effort; CDE is one of the founding partners.

Global analysis of mountain vulnerability

In support of a study in preparation by the Food and Agriculture Organization's (FAO) Mountain Partnership, CDE has compiled a global database on the status and trends of mountain environments and populations. The database, an update of the Huddleston report (2003), contains information at a spatial resolution of 500 m, with a special focus on the development of populations and land cover between 2003 and 2013. Preliminary results suggest that mountain populations decreased worldwide during this time, while the global population increased. FAO plans to publicize the final results of this project later in 2015.

Mountain Research and Development (MRD)

CDE is strongly committed to MRD as a donor and host of the journal's editorial office, underlining CDE's belief in the importance of bringing together peer-reviewed disciplinary, interdisciplinary, and transdisciplinary research on mountains, but also of capitalizing on development experiences in order to enable evidence-based policy and decision-making for sustainable mountain development.

Education for sustainable development in and beyond mountains

Long-term commitment to sustainable mountain development

requires that the next generation is also well educated and conversant in the challenges and opportunities of mountain regions. CDE integrates mountain topics in its higher education courses and in the supervision of students, at the University of Bern and at other institutions in Switzerland and abroad. Currently, CDE staff are supervising more than 40 bachelor's and master's degree students; many of them are studying sustainable land management and regional development in mountain regions using disciplinary, interdisciplinary, and transdisciplinary approaches. With its integrative focus at the PhD level, the annual Summer School of the International Graduate School (IGS) North-South (www.igs-north-south.ch) also deals with research and development in various mountain regions of the world.

CDE is convinced that development-oriented research on mountains provides thought-provoking ground for inter- and transdisciplinary learning and training. Experiences gained and lessons learned in mountain areas provide valuable knowledge for sustainable development efforts in other challenging rural contexts worldwide. CDE's activities in and for mountain regions are thus in line with its overall mission to produce and share knowledge for sustainable development in cooperation with partners in the global North and South.

RECENT MOUNTAIN PUBLICATIONS

The following list presents selected recent mountain publications with CDE involvement.

Ariza C, Maselli D, Kohler T. 2013. *Mountains: Our Life, Our Future. Progress and Perspectives on Sustainable Mountain Development from Rio 1992 to Rio 2012 and Beyond.* Bern, Switzerland: Swiss Agency for Development and Cooperation, and Centre for Development and Environment.

Debarbieux B, Oiry Varacca M, Rudaz G, Maselli D, Kohler T, Jurek M, editors. 2014. *Tourism in Mountain Regions: Hopes, Fears and Realities.*

Sustainable Mountain Development Series.
Geneva, Switzerland: University of Geneva, Centre
for Development and Environment, and Swiss
Agency for Development and Cooperation.

Kohler T, Wehrli A, Jurek M, editors. 2014.
Mountains and Climate Change: A Global Concern.
Sustainable Mountain Development Series. Bern,
Switzerland: Centre for Development and
Environment, Swiss Agency for Development and
Cooperation, and Geographica Bernensia.

**Wymann von Dach S, Romeo R, Vita A, Wurzinger M,
Kohler T, editors.** 2013. *Mountain Farming Is Family
Farming: A Contribution from Mountain Areas to the
International Year of Family Farming 2014.* Rome,
Italy: Food and Agriculture Organization, Centre for
Development and Environment, and University of
Natural Resources and Life Sciences (BOKU).

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2003. *Towards a GIS-Based Analysis of Mountain
Environments and Populations.* FAO Working Paper
Report No 10. Rome, Italy: Food and Agriculture
Organization (FAO).
- Hurni H, Wiesmann U, with an international group
of co-authors.** 2011. Global change research for
sustainable development. In: Wiesmann U, Hurni H,
editors, with an international group of co-editors.
*Research for Sustainable Development:
Foundations, Experiences, and Perspectives.*
Perspectives of the Swiss National Centre of
Competence in Research (NCCR) North-South,
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UNEP [United Nations Environment Programme].
2015. *Africa Mountains Atlas.* Nairobi, Kenya: UNEP.

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