The Mountain and Highland Focus of the Swiss National Centre of Competence in Research (NCCR) North–South

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NCCR north south

"Research Partnerships for Mitigating Syndromes of Global Change"

The present-day world is threatened by increasing insecurity caused by global disparities and processes of global change. While in Europe, the US, and other countries of the "North" climate change has commonly been perceived as the most problematic component of global change, developing and transition countries are affected by a multitude of environmental, political, economic, socio-cultural, and technical development problems and disparities. These occur in many different contexts, and their frequency and acuteness have greatly increased in the 20th century. The challenge for research that aims to produce knowledge relevant to prevention and mitigation of such problems and disparities is that problems do not occur independently of each other, but are closely interrelated, appearing in clusters. Such clusters of problems can be referred to as "syndromes of global change."

In Switzerland, an important opportunity for funding research in this field arose in 1999. The Swiss Federal Government and Parliament, at the request of the Swiss National Science Foundation (SNSF), introduced a new mechanism to support cutting-edge research. Fourteen National Centres of Competence in Research (NCCRs) were established, with a maximum projected funding period of 12 years. One of the few programs selected from several hundred ideas, nearly 100 pre-proposals, and 34 final full proposals, was the NCCR North–South, entitled "Research Partnerships for Mitigating Syndromes of Global Change." It is co-financed by the Swiss Agency for Development and Cooperation (SDC) and SNSF (equal funding), as well as by contributions from the 7 Swiss institutions involved.

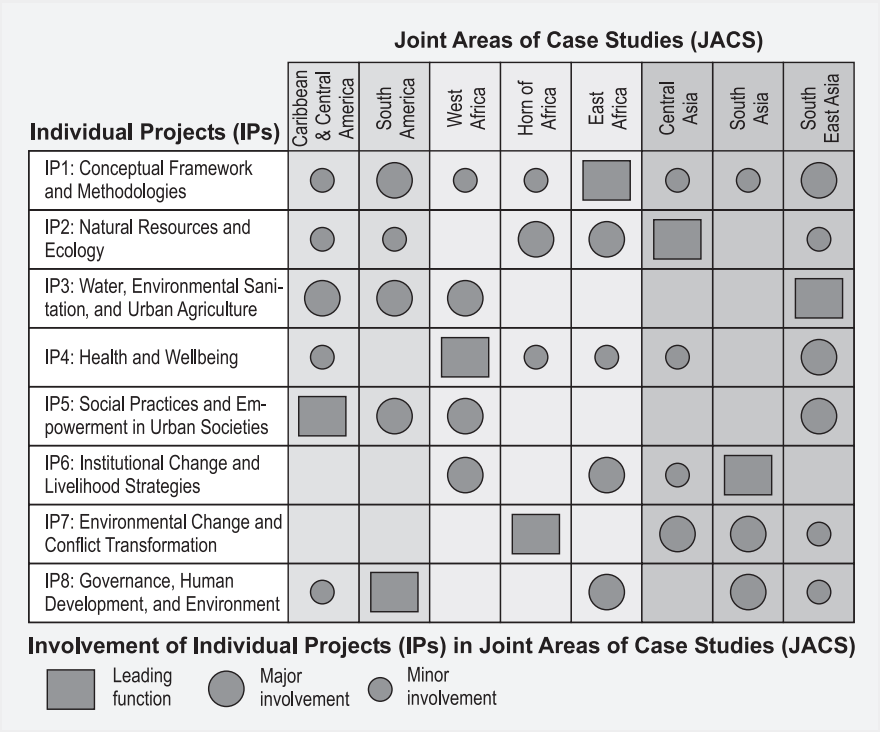
The overall goal of the NCCR North–South is to enhance sustainable development through research partnerships involving institutions within Switzerland and their partners in developing and transition countries. Three long-term objectives have been defined to achieve this goal:

- Promote disciplinary, interdisciplinary, and transdisciplinary research focusing on sustainable development;
- Help develop institutions and train staff in these fields of research, in partner countries and in Switzerland; and
- Support societies and institutions in partner countries in their autonomous efforts to address syndromes of global change over the long term.

This challenging task requires a structure that fosters an iterative process involving disciplinary, interdisciplinary, and transdisciplinary research. Eight Individual Projects (IPs) cover the specific areas of scientific competence relating to core issues of sustainable development. Mitigation efforts, however, are bound to concrete situations and require transdisciplinary integration and dialogue. This exchange is promoted in 9 Joint Areas of Case Studies (JACS), where concrete efforts are undertaken jointly by the IPs and local partner institutions (Figure 1).

Today the NCCR North–South consists of 120 research projects focusing on urban and periurban, semiarid, and highland–lowland contexts. At the same time, the program has begun to fulfill its commitment to concrete mitigation of syndromes of global change. Fifty-five Partnership Actions for Mitigating Syndromes (PAMS)—based on an approach presented by Frank Haupt and Ulrike Müller-Böker at the beginning of this issue of *MRD*—have been implemented to date, focusing on concrete application of

FIGURE 1 The NCCR North–South set-up: involvement of Individual Projects (IPs) in Joint Areas of Case Studies (JACS).



research results and knowledge generated with non-scientific stakeholders. Out of a total of 395 (mostly part-time) collaborators, 98 are PhD candidates, of whom 49 are from partner countries in the South and East.

Why a highland–lowland focus in the NCCR North–South?

The International Year of Mountains 2002 increased awareness among a broad range of stakeholders of the importance of highland–lowland systems and the particular threats linked to global change in these environments. Global economic and socio-political change in mountain environments, which have specific characteristics such as great diversity in ecological and socio-cultural conditions, leads to complex problems and small-scale variations in mountain development. The call for increasingly integrated perspectives (Mountain Agenda 2002, KVA 2002) is based on this observation.

The appeal for integrated perspectives on mountain development poses a major challenge for research, in particular when the aim of such research is to contribute to more sustainable mountain development (UNCED 1992: *Agenda 21*, Chapter 13). Sustainability-oriented research can only produce robust and relevant knowledge for development initiatives if it takes into account the norms and the values of the stakeholders concerned, integrates causal relationships across different scientific fields, and involves concerned actors in a participatory way in activities that range from defining problems to identifying possible solutions (Wiesmann 1995; Nölting et al 2004). This poses a dilemma: in such a transdisciplinary process, specific approaches and solutions must basically be found for every *specific* situation and context. On the other hand, sustainable development can only be meaningfully conceived, planned, and implemented if this process is carried out at higher (generalized) policy-relevant levels. Correspondingly, it should be possible to *generalize* approaches and solutions in typical mountain and highland contexts.

The challenge for research

In short, sustainability-oriented research in mountain regions faces a major conceptual and methodological challenge, which applies to sustainability-oriented research in general: to bridge the gap between production of context-specific research and knowledge on the one hand, and generalization of findings and recommendations at a broader scale on the other. The syndrome mitigation approach explores possible ways out of this dilemma in the mountain and highland systems of the Central Andes, the tropical mountains of East Africa, the Nepalese Himalayas, the Mekong Basin, and the Swiss Alps (NCCR North–South 2003). The program pursues a dual focus with this approach. On the one hand, it aims to contribute concretely to sustainable mountain development, and on the other it strives for conceptual and methodological progress in sustainability-oriented research in general. Highland–lowland regions are thus both a means and an end of the program's research efforts.

The NCCR North–South's syndrome mitigation approach

The term "syndromes of global change" was borrowed from the German Advisory Council on Global Change (WBGU 1997), which first looked at combinations or clusters of problems of non-sustainable development. Identifying typical patterns of such clusters, the WBGU proposed and discussed 16 syndromes of global change, of which 7 were very typical of developing and transition countries. While this conceptual framework allowed for integration of context-specific knowledge in the interest of generalization, at the same time

FIGURE 2 Proposed sub-contexts for syndromes in highland–lowland areas in different common case study regions of the NCCR North–South (not assessed in West Africa and the Swiss Alps).

<table>
<tr><th>East Africa</th><th>Horn of Africa</th><th>Central Asia</th><th>South Asia</th><th>South East Asia</th><th>Central America and Caribbean</th><th>South America</th></tr>
<tr><td rowspan="2">Mountains and highlands with a broad range of conflicting uses and stakeholders</td><td rowspan="2">Highlands:
- Drought-prone, low-potential
- Highly degraded, low-potential
- Highly degraded, high-potential
- Susceptible to degradation, high-potential</td><td rowspan="2">Mountains and highlands</td><td>Marginality in mountain areas, in relation to lowlands</td><td rowspan="2">Highlands</td><td rowspan="2"></td><td>Highlands</td></tr>
<tr><td>Indigenous peoples in mountain areas, in relation to lowlands</td><td rowspan="2">Highland–lowland interactions</td></tr>
<tr><td rowspan="2">Areas of interaction between mainly productive highlands and semiarid lowlands</td><td>Highland–lowland interactions</td><td rowspan="2">Intermediate zones (foothills, lowland zones, and urbanized areas)</td><td rowspan="2">Fragility in mountain areas, in relation to lowlands</td><td rowspan="2">Highland–lowland interactions</td><td rowspan="2">Highland (rural) –lowland (urban) interactions</td></tr>
<tr><td>Humid lowlands</td><td>Lowlands</td></tr>
</table>

it encountered criticism. Indeed, not only does this concept focus on negative aspects of development, neglecting innovations and potential approaches to sustainable development that could help mitigate syndromes; it also does not comply with the basic requirements of sustainability-oriented research, ie explicit consideration of the normative dimensions of sustainability on the one hand, and the need for participatory approaches on the other.

The NCCR North–South therefore proposed a revised conceptual framework known as "syndrome mitigation research" (Hurni et al 2004). This open framework defines syndromes of global change as patterns of issues related to sustainability and mitigation that occur in different contexts. At the same time it proposes a threefold approach to yield distinct insights:

- *Assessing and negotiating sustainable development:* identification of patterns of problems of non-sustainable development;
- *Enhancing sustainable development:* identification of patterns of potentials for promoting sustainable development;
- S*upporting sustainable development:* identification of patterns of processes that either endanger or support sustainable development.

Research activities and initial insights

In its first phase, the NCCR North–South program was essentially committed to assessing and negotiating sustainable development in order to identify patterns of problems of non-sustainable development. In 8 regions of the world—the Joint Areas of Case Studies (JACS)—a transdisciplinary process was initiated through 8 regional workshops. These workshops pursued the following goals:

a) Appraising possible contexts in which syndromes of global change occur in 3 major social, economic, political, and ecological settings: urban and periurban areas, semiarid areas in transition, and areas of highland–lowland interactions;
b) Identifying the most important core problems of non-sustainable development within these syndrome contexts and in 8 regions worldwide; and
c) Setting research priorities for the first 4-year phase of the NCCR North–South.

The participants invited represented a broad range of regional research and development organizations, and thus constituted regional think tanks. The outcomes of this initial process served as a basis for setting the overall research agenda (Figure 1) and guided research during the first phase. With regard to the highland–lowland context, the following insights were achieved (Hurni et al 2004).

Syndrome contexts related to highland–lowland interactions

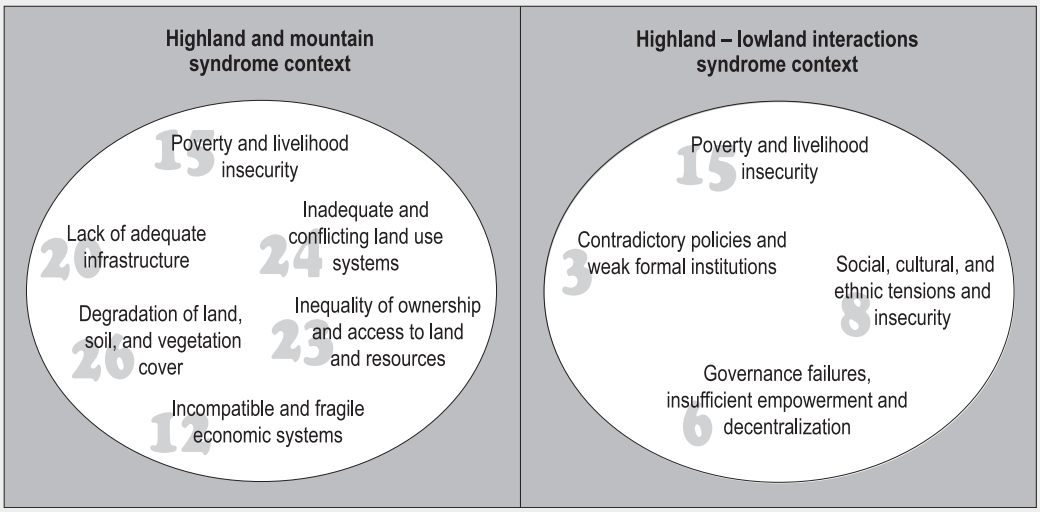
In intensive debates and negotiations, the participating academic and non-academic experts in each region identified hypothetical "syndrome contexts" corresponding to what they saw as relatively homogenous and specific clusters of core problems of non-sustainable development related to highland–lowland interactions. The same process was applied to the other 2 contexts mentioned above—urban and periurban, and semiarid in transition. The outcomes of this process for the highland–lowland context are summarized in Figure 2, showing how the think tanks differentiated between possible sub-contexts in each JACS.

It was obvious that the requirement of identifying relatively

TABLE 1 Core problems of non-sustainable development in all NCCR North–South contexts and JACS regions, and average relative weighting attributed to 2 selected syndrome contexts. Transdisciplinary weightings range from 0 (= not important) to 3 (= very important).

Scientific realm	Number	Core problems of non-sustainable development	Average relative weighting attributed to selected syndrome contexts	
			Highland and mountain (3 JACS)	Highland–lowland interactions (4 JACS)
Political and institutional	1	Weak international geopolitical position and negotiation power	0.75	1
	2	Dominating and conflicting world views and ethical values	0.5	1.3
	3	Contradictory policies and weak formal institutions at different levels	1.3	2.7
	4	Inadequate legal framework and regulations, lack of enforcement and means	0.9	0.7
	5	Erosion of traditional and/or indigenous institutions	1.3	2.3
	6	Governance failures, insufficient empowerment and decentralization	2.1	2.5
	7	Unequal distribution of power and resources, corruption	2	1.3
Socio-cultural and economic	8	Social, cultural, and ethnic tensions and insecurity	1.9	2.3
	9	Prevalence of crime, violence, and violent conflicts	1	1.2
	10	Unused or restricted innovative capacities and knowledge	1	0.7
	11	Great socioeconomic and gender disparities	1	1.7
	12	Incompatible and fragile economic systems with limited market and employment opportunities	1.5	1.7
	13	Dominance of the global economy over national development	0.5	1.3
Population and livelihood	14	Restrictions on human rights and individual development potential	0.5	0.7
	15	Poverty and insecurity of livelihoods	2.3	2.3
	16	Health risks and vulnerability to ill-health	1	1
	17	Population pressure and multi-dimensional migration	1	1.1
	18	Unfavorable dynamics and imbalances in socio-demographic structures	0.8	2.3
Infrastructure, services, and land use	19	Poor water supply and environmental sanitation	0.5	0.7
	20	Lack of adequate infrastructure and management such as transport, energy, and irrigation	2	0.9
	21	Limited and inadequate socioeconomic services such as education, health, and markets	0.9	1.6
	22	Discrimination in information and communication flows and technologies	0.5	0
	23	Inequality of ownership and access to land, natural, and common property resources	2.1	2.1
	24	Inadequate and conflicting land use systems and technologies	1.2	1.6
Bio-physical and ecological	25	Inadequate availability of freshwater	0.8	1.7
	26	Degradation of land, soil, and vegetation cover	2	1.5
	27	Degradation of forests and natural habitats	2	1.3
	28	Pollution and overuse of renewable and non-renewable natural resources	0.6	0.7
	29	Loss of biological and agro-biological diversity	1.8	1.7
	30	Risks of natural and human-induced hazards and climate change	1	1.3

FIGURE 3 First hypotheses on patterns of core problems in two selected syndrome contexts. The patterns derive from a comparison between assessed importance and urgency of core problems in several regions. The numbers refer to Table 1.



homogenous units in relation to core problems of non-sustainable development would lead to a great diversity of perceived syndrome contexts in the different regions, due to their specific social, economic, political, and ecological settings. But this diversity was eventually reduced to a generalized differentiation between the "highland and mountain" context and the "highland–lowland interactions" context.

Core problems of non-sustainable development

A list of core problems of non-sustainable development was negotiated for each of the defined syndrome contexts. These lists were then consolidated in a single common list classified by region, in order to comparatively assess the *importance* and *urgency* of each problem in the different contexts. This list now represents a combination of experience, knowledge, and normative definitions. The elaboration of the list was a major transdisciplinary step towards developing a common and explicit view and understanding of sustainable development in specific regions by specific think tanks. Table 1 shows a synopsis of the core problems identified in the 8 regions. It also shows the relative weighting attributed to the 2 syndrome contexts presented here: highland and mountain, and highland–lowland interactions (Hurni et al 2004).

Similarities: The weightings in Table 1 indicate that the 2 syndrome contexts share some common important core problems:

- Governance failures, insufficient empowerment and decentralization (number 6);
- Poverty and insecurity of livelihoods (15); and
- Inequality of ownership and access to land, natural and common property resources (23).

At the same time, the think tanks determined that the importance of certain core problems of non-sustainable development was not so high in both contexts (numbers 4, 14, 19, 22, and 28).

Differences: While similarities were observed between the 2 syndrome contexts, the weights attributed to other core problems also clearly revealed differences between the 2 contexts, suggesting that they are discrete. Thus, the core problems that were perceived as particularly acute in the highland and mountain syndrome context (left column) are:

- Unequal distribution of power and resources, corruption (number 7);
- Lack of adequate infrastructure and management such as transport, energy, and irrigation (20);
- Degradation of land, soil, and vegetation cover (26);
- Degradation of forests and natural habitats (27).

By contrast, the syndrome context of highland–lowland interactions (right column) was seen as characterized by a prevalence of:

- Contradictory policies and weak formal institutions at different levels (number 3);
- Erosion of traditional and/or indigenous institutions (5);
- Social, cultural, and ethnic tensions and insecurity (8);
- Unfavorable dynamics and imbalances in socio-demographic structures (18).

First hypotheses on syndromes of global change

With a view to elaborating first hypotheses on syndromes of global change, the synopses produced by these 8 regional workshops also

tried to identify initial *patterns* of core problems of non-sustainable development (Hurni et al 2004). The question addressed was whether *typical* clusters of core problems in a syndrome context exist that appear in the same combination in different JACS. As part of an initial appraisal of such patterns, clusters of core problems that appear in the same combination in at least 3 out of 4 comparable JACS were selected. These hypothetical clusters, which give an initial indication of patterns of core problems (syndromes), are shown in Figure 3.

It is obviously too early to refer to these 2 major patterns of core problems as proven syndromes of global change in mountain and highland areas generally. First, there is a need for further evidence from ongoing research on the dynamics and impacts of these core problems and their underlying causes. In addition, initial efforts are being made to understand the interrelations among different core problems, and to compare these problems between the different JACS, mainly through more integrative post-doctoral research that is also guided by transversal themes.

Outlook

Are highlands and mountains a meaningful frame of reference for generalizations about sustainability-oriented research, knowledge production, and development activity? At this point, the question cannot be answered conclusively. However, the NCCR North–South is currently producing evidence by studying core problems of non-sustainable development in such areas, with a special focus on their underlying causes and impacts, and most importantly, on interrelations and possible patterns.

These efforts will be strengthened in the second phase of the program between 2005 and 2009. First, integration of knowledge will be enhanced by increasing collaboration between the 8 different Individual Projects (IPs) in 4 Work Packages (WPs), allowing for broader comparative research in different regions of the world. Second, integration of different scientific disciplines in specific highland–lowland settings will be supported within the various JACS. Finally, the program will undertake efforts to explicitly appraise and study potentials for sustainable development in all regions and thematic areas, in order to complement research on syndrome mitigation.

This research will help to overcome the gap between context-specific research and generalization—a challenge that inevitably has to be resolved by sustainability-oriented research. Highlands and mountains play a crucial role, constituting both an ideal platform for conceptual and methodological innovations and a field where integrated development knowledge is urgently needed. Even if the existence of specific syndromes of global change in highlands and mountains may not be fully demonstrated, the success of the underlying syndrome mitigation approach will ultimately be measured by its benefits for sustainable mountain development.

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