Mountain Research and Development: An Adaptive Institutional Response to Evolving Knowledge and Needs

Libor Jansky¹, Nevelina Pachova¹, Luohui Liang²

¹United Nations University, UN Campus, Hermann-Ehlers-Str. 10, D-53113 Bonn, Germany, E-mail: <u>jansky@vie.unu.edu</u>; <u>pachova@vie.unu.edu</u>

²United Nations University, 5-53-70 Jingumae, Shibuya-ku, Tokyo 150-8925, Japan, E-mail: <u>liang@hq.unu.edu</u>

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Introduction

The United Nations University, an independent research institution in the system of the United Nations, works towards contributing to the resolution of pressing problems facing the global community through network-based research, multi-stakeholder policy dialogues and capacity development. Mountain research and development have been a core theme of UNU's work since the time of its establishment in the 1970s. During the first two decades of its engagement with mountain research and development issues, UNU focused on supporting the generation of scientifically-based knowledge on mountain ecosystems and resource use and management practices in a highland-lowland interactive context, raising public awareness and understanding of mountain development issues, and situating them on the international policy agenda. Over the past decade UNU has shifted its efforts towards initiating and facilitating the implementation of innovative knowledge-based approaches for bring policy commitments to bear on local realities in targeted highland hotspots around the world. An overview of UNU's institutional and programmatic response to the changing policy realities and needs in the field of mountain development, but also to the evolving understanding of the notion of research and the role of knowledge in supporting sustainable development over the past three decades is presented below.

Reversing global myths and policies: knowledge generation for sustainable mountain development

UNU's efforts to contribute to mountain research and development started with an innovative project on Highland-Lowland Interactive Systems within the framework of a broader research and training program on the Use and Management of Natural Resources, which included three other components, namely on agro-forestry systems, rural energy systems, and waterland interactive systems. The program was initially focused on the humid tropical and subtropical regions but subsequently grew to embrace arid and semi-arid areas. Similarly, the Highland-Lowland Interactive project started from the sub-tropical northwestern hills of Thailand. Under the leadership of renown mountain science authorities from research centers in Switzerland and Canada, the initiative moved on to establish partnerships with research institutes across developing countries and to launch research and training activities in the Himalayan region in India and Nepal, in Yunnan, China, in the Pamir mountains in Tajikistan, in the Highlands of Ethiopia and East Africa, as well as in the Andes, and Madagascar. Field excursions and conferences were also held in Papua-New Guinea, Tibet, the Tien Shan and western Szechwan, China, Chile, Ecuador, Bolivia, Switzerland, Japan, and the United States. The outreach of the project across most of the world's continents indicated the global scope of mountain research and development concerns, and a need for institutionalized channels for exchange of knowledge and strengthening cooperation across institutional partners.

In response to this need UNU supported the establishment in 1980 of the *International Mountain Society* (IMS) - an association encompassing the major international agencies concerned with mountain research and development issues - for the purpose of advancing knowledge and disseminating information about mountain research and mountain development throughout the world. The IMS aims to promote sustainable mountain development through improved communication among institutions and individuals, with a particular focus on mountain ecoregions in the developing world. In 1981 UNU also co-founded the quarterly journal of *Mountain Research and Development* (JMRD, 2008), with IMS as a copy-right holder. MRD, which is currently based at the Center for Development and Environment (CDE) of the University of Berne, became a major platform for communication on mountains, emphasizing both research and development, and including special sections devoted to exchanges of experience among institutions and individuals. In addition to these global initiatives, UNU supported the establishment of the African Mountain Association and the Andean Mountain Association as regional vehicles for cooperation and information exchange.

The strengthened knowledge base and channels for communication and cooperation on mountain research and development issues across like-minded research and development agencies were important achievements, which provided the basis for taking mountain research and development issues a step further, from the field of international research to that of international policy making. The budding concept of sustainability provided an impetus for mobilizing conceptual and institutional efforts towards situating mountain research and development issues in the emerging global environmental governance regime. Critical in facilitating this next step proved the interdisciplinary theoretical basis underpinning UNU's project on Highland Lowland Interactive Systems, renamed Mountain Ecology and Sustainable Development to reflect the expansion of its scope, Project 6 on the impact of human activities on mountain ecosystems under UNESCO's Man and the Biosphere (MAB) Programme, as well as the work of the Commission on Mountain Geoecology of the International Geographical Union and the newly established IMS. This work set the basis for the evolving theoretical framework on coupled human-environment systems in mountain regions and situated them in the broader framework of sustainable development.

Alongside theoretical advances, applied research on targeted mountain development issues such as what came to be known as the "Himalayan Dilemma" played a critical role in raising public awareness and attention and profiling mountain development issues in the international policy-making arena. Throughout most of the final thirty years of the last century the major multi-lateral, bilateral, and national aid and development agencies had centered much of their investment in the Himalaya on the pursuit of policies based on an unsound assumption. This presumed that the Himalaya were facing an environmental crisis driven by massive deforestation of the mountain slopes by the rapidly expanding subsistent agricultural populations who depended upon forest products. This was causally linked with soil erosion and landsliding and increasingly severe flooding in Gangetic India and Bangladesh. An international conference co-organized by UNU in 1986 brought this dominating paradigm under critical scrutiny. It was found to be unsound and the supporting arguments were published in book form in *The Himalayan Dilemma: Reconciling Development and Conservation* (Ives and Messerli 1989) and further elaborated by Ives (2004), Hofer and Messerli (2006).

This process of fundamental research followed by critical discussion exemplified the unique opportunity that academic status provides for UNU. The Himalayan controversy was one of several that were tackled by the UNU mountain project. It was the critical one, however, that provided much of the initiative leading to the inclusion of Chapter 13 (Managing fragile environments - sustainable mountain development) into Agenda 21 during the Rio de Janeiro Earth Summit in 1992. This impetus continued through to the special General Assembly of

the UN on the occasion of the Rio-Plus-Five (Messerli and Ives 1997) and helped facilitate the recognition of 2002 as the International Year of Mountains (IYM).

IYM brought out the policy-relevance of the accumulated knowledge on mountain development and UNU played a leading role in this respect by synthesizing the lessons learnt from its research (Ives et al. 2002) and organization of a series of public debates leading up to the signature of the Tokyo Declaration for the International Year of Mountains (Jansky et al. 2002). UNU also facilitated the dissemination of the outputs from the Bishkek Global Mountain Summit (BGMS), the closing IYM event, through the publication of an edited volume including the key BGMS contributions and results (Price et al. 2004). Furthermore, UNU became a core member of the *Mountain Partnership* launched during the World Summit on Sustainable Development in 2002, as well as of a number of regional and thematic partnership networks, which supported the initiation of a number of targeted mountain development projects discussed in more detail in the following sections.

The IYM served as a time for recapitulation, setting new priorities and devising new means for achieving them for agencies involved in mountain research and development. UNU took the chance to reset its strategy with regards to mountains as well. While the foundations for change had been set out in the earlier years, IYM helped to crystallize the shift to a new type of mountain initiatives at UNU which were intended to catalyze the process of implementation of global policy commitments at targeted highland hotspots around the world. This entailed a shift from an inter- to a trans-disciplinary concept of research, which constituted a part of the broader process of re-conceptualizing the notion of knowledge as an integral part of the development process, and development as a process of knowledge-generation and learning itself.

Changing local realities: sustainable mountain development as a process of knowledge generation

Drawing upon its disciplinary expertise in a range of resource-specific fields, but also on its innovative work on coupled human-ecological systems, over the past decade UNU has devised and undertaken a range of targeted initiatives aimed at addressing capacity and knowledge gaps constraining the sustainable development of mountain regions, such as the loss of indigenous knowledge in highlands in developing states, the brain-drain and inadequate state support for modernizing resource use and management education and research in transition countries, as well as barriers to knowledge generation and information exchange across multiple stakeholders arising from political borders and top-down sectoral policies cutting across the spatial integrity of highland ecosystems, communities and their resource use and management practices. The focus and approaches employed in these initiatives are outlined below.

Agrobiodiversity: In-situ conserving through farmer experimentation and demonstration

In the late 1990s, a project on People, Land Management and Environmental Change (PLEC) was initiated as an off-spring of UNU's earlier work on interactive agro-forestry systems. The project made a major contribution towards bringing the indigenous knowledge of farmers to the forefront in the process of developing sustainable technologies for conservation, particularly of biodiversity, in marginal lands, including highlands, in the semi-arid and sub-tropical regions of Ghana, Guinea, Kenya, Tanzania, Uganda, China, Thailand, Papua New Guinea, Brazil, Peru, Mexico and Jamaica (Liang et al. 2001). The project established multi-disciplinary cluster groups at key research institutions in each country. Field research, experimentation and training were based at selected "demonstration sites" on small farmers' agricultural plots, within which profitable biodiversity-rich management systems and techniques were identified and demonstrated through farmer-to-farmer trainings. Over 30 demonstration sites, on agricultural lands, located in priority ecosystems and managed by farmers and pastoralists, were established in the framework of the project.

From 1998-2001, the Global Environmental Facility provided financing to support activities in eight of the project countries.

Forests: Strengthening capacities for forest education and research in the Western Balkans In 1996 the United Nations University, the Finnish Forest Research Institute (METLA), and the European Forest Institute (EFI) started a global research program on World Forests, Society and Environment (WFSE), which subsequently grew into a network of over 200 scientists from across the world (Wardle et al. 2003). In 2002, building upon the knowledge and institutional partnerships established through WFSD, UNU, EFI and its Silva network initiated an applied project on strengthening the capacities for Forestry Policy and Economics Education and Research (FOPER) in the mountainous Western Balkan states (Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Former Yugoslav Republic of Macedonia and Albania). Despite the long tradition of forestry in the former socialist countries, the brain-drain and limited funding available for education and research in the process of on-going market and political reforms made sustaining and upgrading forest management in line with the changing global policy and economic context, which required a re-consideration of the multiple values of forests, a critical challenge constraining the sustainable development of rural highlands in the Western Balkan states (Jansky et al. 2003, 2004). In response FOPER initiated the establishment of a regional MSc. program on Forest Policy Economics and Research and the development of a modern vocational training system on forest policy and economics in the participating countries with funding from the Finish government.

Headwaters: Generating shared knowledge through multi-stakeholder dialogue and research Drawing upon its earlier work on transboundary water management, in 2002 UNU, together with a consortium of partners, co-organized an international conference on the Sustainable Management of Headwater Resources in Nairobi, Kenva. The conference provided an international forum for multi-level stakeholders in water resources management to share their perspectives on the best approaches to contribute to the promotion, development and evaluation of land management strategies suited to the sustainable development of headwater regions. The conference resulted in the Nairobi Headwater Declaration as one of the first contributions to the International Year of Freshwaters 2003 and in the publication Sustainable Management of Headwater Resources: Research from Africa and India based on outputs from the conference (Haigh et al. 2004, Jansky et al. 2005). The shared knowledge generated through the conferences highlighted the closely interlinked issues of mountain development and water resources management and situated them in the international policy-making arena. Subsequent work undertaken by UNU on the microfoundations of water conflicts and disputes at the local as well as at the transboundary levels have added to the understanding of these interlinkages (Pachova et al. 2008)

Land: Integrated & transboundary approach to sustainable land management in Central Asia A project on Sustainable Land Management in the High Pamir and Pamir-Alai in Central Asia was initiated as an off-spring from the Bishkek Global Mountain Summit in 2002. The project aims to address the interlinked problems of land degradation and poverty in one of the world's biodiversity hotspots and water towers of regional importance (Jansky and Pachova 2006). With financial support from the Global Environment Facility and a consortium of national and international partners, an integrated trans-boundary approach was designed to improve the technological, institutional, policy and legislative environment required for enabling mountain communities in the region to take primary responsibility for the productive and sustainable management of their local ecosystem resources. In the course of the project a regional strategy and action plan for sustainable development of the Pamir Alai mountains will be developed through participatory multi-level and multi-sectoral stakeholder consultations. To stimulate and ensure the effective and efficient implementation of the regional strategy, participatory community-based resource assessment, land use planning and micro-project implementation will be undertaken at selected hot spots in the context of the trans-boundary framework. In addition to enhancing the knowledge and capacities of the multi-level stakeholders involved in the use and management of Pamir-Alai resources, the project is intended to generate a replicable 'model' for an integrated development strategy that can be used to address the problems of land degradation in similar mountain environments. The project is implemented by UNEP and executed by UNU, together with the governments of Tajikistan and Kyrgyzstan.

Conclusions

The overview of the history of UNU's involvement in mountain research and development indicates the evolving focus and approaches employed by the university to respond to the changing policy context and needs, in line with an expanding understanding of the role of knowledge and research for catalyzing a sustainable development change. To sum up, the first two decades of UNU's work on mountain research and development issues were guided by the need to profile mountains as an integral concern of global policy debates on sustainable development. The last decade has focused on bringing the global recognition of the role and importance of mountains to bear on national policies and local resource use and management practices in targeted hotspots around the world.

In light of the complexity of mountain development issues and their differential role in the national development of individual states, a range of diverse approaches have been undertaken to building the knowledge base and research capacities needed to support the development of endogenous solutions to the challenges facing mountain regions in developing and transition states. Approaches vary depending on the critical resources under pressure in specific geographic regions and socio-economic and political systems, as well as on the capacity needs of the stakeholder groups at stake. While in some cases targeted capacity building on specific themes was given a priority, in others an integrated approach addressing the capacity and knowledge gaps across the range of stakeholders involved was deemed necessary to make a tangible contribution to sustainable mountain development.

Measuring the relative effectiveness of the alternative approaches or devising frameworks for identifying the appropriate response is beyond the scope of this paper. It is notable, however, that a clear trend underlies UNU's activities in the field of mountain research and development, namely the recognition of the importance of different types of knowledge beyond traditional disciplinary categorizations for enabling the generation of sustainable solutions to mountain development challenges. These include the level of knowledge and capacities of individual stakeholders groups to innovate and adapt in a changing mountain development context, as well as the systemic capacities of existing institutions to support the generation of new knowledge in response to emerging challenges.

Indeed, many of the barriers to sustainable mountain development remain the same as spelled out in the range of policy declarations made during the IYM¹. Globalization and climate change, as well as recent developments in global environmental governance regimes have added to traditional mountain development challenges but have also given rise to new opportunities. Many of them are increasingly recognized by researchers and other stakeholders in developing states as indicated by the issues taken up e.g. in the *Journal of Mountains Science* (JMS, 2008) launched by the Institute of Mountain Hazards and Environment of the Chinese Academy of Sciences with the support of UNU.

Further strengthening individual, institutional and systemic capacities across mountain development stakeholders to generate knowledge and learn from their experience is essential for responding and adapting to the emerging challenges and opportunities. The

¹ The Tokyo Declaration (attached) provides a good overview of the critical mountain development challenges identified through a multi-stakeholder dialogue in 2002.

establishment and strengthening of new knowledge hubs and platforms for information dissemination and exchange based in developing states and managed by them could help further these efforts. These are critical task around which the efforts of national and international agencies, concerned with mountain research and development, need to converge if sustainable solutions to the development of mountain regions are to emerge.

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Links

United Nations University, accessed October 2008 <u>http://www.unu.edu</u> United Nations University Vice-Rectorate in Europe, accessed October 2008 <<u>http://www.vie.unu.edu</u>> Journal of Mountain Research and Development, accessed October 2008 <<u>http://www.mrd-journal.org</u>>

Journal of Mountain Science, accessed October 2008

<http://www.imde.ac.cn/journal/index.htm>

Tokyo Declaration for the International Year of Mountains 2002:

We, the participants in the UNU International Symposium on the Conservation of Mountain Ecosystems, held in Tokyo (Japan) on 1 February 2002,

- Acknowledging with gratitude the United Nations General Assembly Resolution A/RES/53/24 to declare the year 2002 as the International Year of Mountains, thus drawing the world's attention to the need to foster sustainable mountain development;
- 2. Recognizing that mountains are fragile ecosystems with unique natural and human resources, as stipulated in Agenda 21, Chapter 13;
- 3. Noting with concern that human pressure on mountain resources from extraction of mineral resources, soil erosion, touristic exploitation, etc. continues to affect the mountain environment adversely, particularly with regard to endemic, rare and endangered species of wild fauna and flora in mountains, and also depletes mineral resources;
- 4. Noting further, with concern, that climate change can seriously affect water regimes in highlands as well as lowlands, which can pose problems with the quality and quantity of available freshwater resources for human consumption and agriculture and increase competition between different interest groups, in which mountain dwellers are usually the disadvantaged members, leading to an increase in the potential vulnerability of mountain people;
- 5. Noting also that ca. 500 million people in mountains live below the poverty line (80 per cent of the world's mountain population);
- 6. Recognizing that environmental management of mountains needs to take holistic approaches in conserving the environment, while at the same time providing sustainable incomes for mountain dwellers, including appropriate compensation for their services;
- 7. Affirming that scientific studies on mountain systems, management of natural resources and monitoring of mountain environments are essential for fostering sustainable development in line with conservation and development objectives;
- 8. Conscious that mountain dwellers, especially women, are the main stakeholders and often the true managers who ensure the sustainable development of mountain environments and participate in the utilization and management of mountain resources;
- 9. Conscious also that mountain dwellers safeguard important cultural diversity that needs to be maintained and allowed to evolve further in a world moving towards globalization;
- 10. Aware that there is a considerable gap in knowledge and perception of mountains between academia and the general public, for whom the mass media serve as the main source of information regarding mountains;
- 11. Aware also that mountains and areas under the influence of mountains accommodate and provide a livelihood not only for poor communities, as often perceived, but also for a significant proportion of the urban population of the world, whose resource consumption has a heavy impact on utilization and management of mountain resources; and
- 12. Realizing that mountains, including the human inhabitants and the natural environments in mountain areas, especially in developing countries, are highly susceptible to serious and increasing physical violence and destruction, for example from armed conflicts, due to their particular geographical features;

Declare that:

- 13. UNU should continue its work with mountain populations to appraise their situations, to identify gaps in knowledge, needs and constraints, and to help them work towards more sustainable development;
- 14. Every effort should be made to support mountain research and monitoring in the field of environmental conservation and sustainable mountain resource use;
- 15. Capacity-building and education targeted at all levels and segments of mountain populations and minorities traditionally dependent on mountain resources must be further strengthened so as to counteract the looming marginalization of mountain dwellers;

- Cultural diversity in mountains needs to be maintained and developed, as it can be a powerful means for counteracting social, economic and environmental degradation in mountains;
- 17. Holistic and transdisciplinary management schemes for environmental conservation and sustainable development should be applied in mountain regions (as is the case in biosphere reserves);
- 18. More efforts should be made to disseminate proper and correct information to the public by working with the mass media as well as by improving the coordination of activities between researchers and practitioners;
- 19. Greater attention should be given to the urban aspect of mountains, through additional research and monitoring of highland-lowland interactions;
- 20. Empowerment of poor local communities, especially of women, should be supported in order to facilitate sustainable development of mountains in a self-supporting manner;
- 21. The issue of conflicts and resulting destruction of mountain ecosystems and livelihoods should receive more serious consideration from academia and policy makers; and
- 22. The possibility of new approaches to mountain issues should be explored, for instance, by identifying hot spots and creating and discovering successful approaches applicable to different problems and contexts of sustainable mountain development.

We therefore call upon UNU, UNESCO, FAO, UNEP, UNDP and other concerned international and national organizations and NGOs to facilitate mountain research, monitoring, capacity building, sustainable development, conservation of mountain ecosystems, and maintenance of cultural diversity in mountains so as to create linkages and synergies among mountain scientists, mountain communities, policy/decision makers, practitioners and the general public.