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The Global Mountain Safeguard Research (GLOMOS) Programme: Linking Academia and the United Nations System for Transformative Resilience in Mountain Regions



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Population growth, climate change, and unsustainable natural resource management are putting pressure on mountain ecosystems and making mountain communities increasingly vulnerable to climate and disaster risks. The international academic community is committed to finding solutions to the challenges faced in mountain regions. Governments, too, have been developing adaptation plans and policies to improve living conditions and opportunities for mountain communities. However, ensuring that these efforts have a strong impact requires coordinated action between theory and practice. Global Mountain Safeguard Research (GLOMOS) seeks to respond to this need with its mission to turn science into action.

Introduction

Global Mountain Safeguard Research (GLOMOS) is a collaborative scientific program between the United Nations University Institute for Environment and Human Security (UNU-EHS) and Eurac Research (Figure 1). GLOMOS conducts applied and transdisciplinary research to support mountain livelihoods and sustainable mountain development. Hence, it facilitates a greater recognition of mountain issues within science-informed policymaking and international frameworks, such as the 2030 Agenda for Sustainable Development.

By co-creating knowledge to be applied in practice and in policymaking, GLOMOS aims to strengthen multi-stakeholder synergies and complementarity (see Box 1). This function is enabled by UNU-EHS's official mandate to function as a bridge between the international academic community and the United Nations system within the field of risk and adaptation related to environmental hazards and global change. It is further supported by Eurac Research's competency in solution-oriented and innovative scientific approaches that are tailor-made for mountain environments.

History of mountain research at UNU

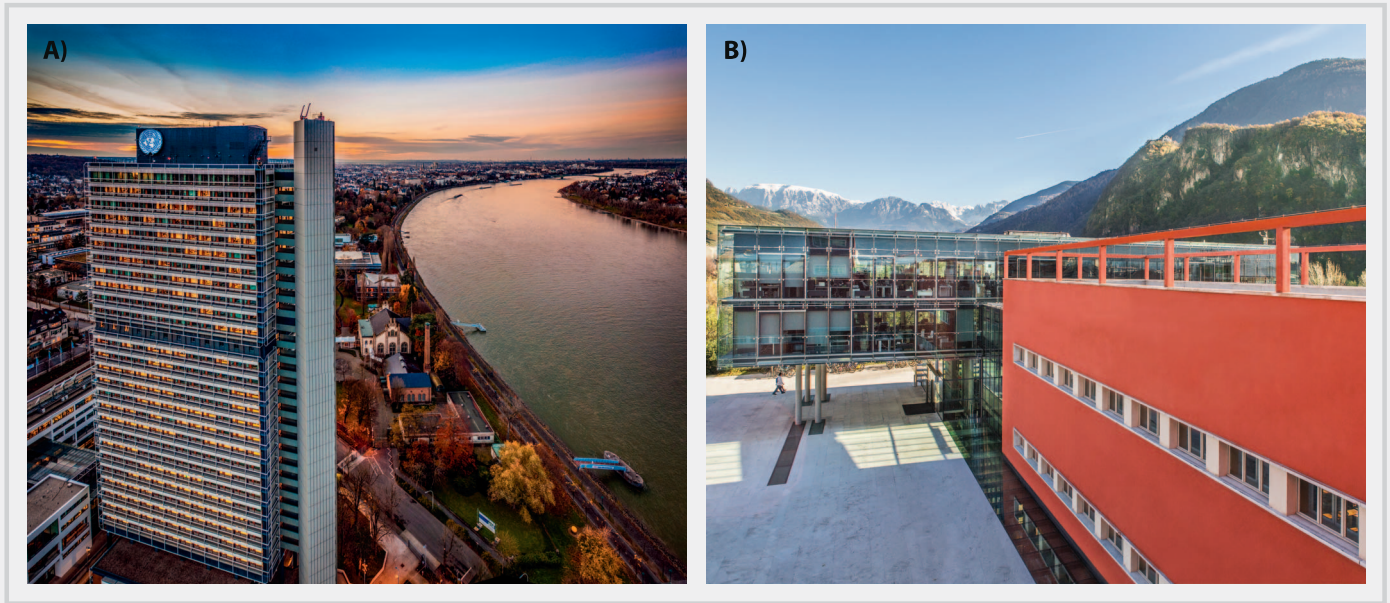
As a mountain-focused scientific program, GLOMOS builds upon previous achievements of UNU's "Highland-Lowland Interactive Systems" project, which started in 1978 and was later renamed "Mountain Ecology and Sustainable Development." This international project led to significant scientific output and policy impact. Notably, UNU, together with governments and other international research organizations, lobbied for the inclusion of the first mountain-specific article within a global UN framework agenda: Chapter 13 of Agenda 21 of the 1992 Rio Declaration (UNSD 1992). The program's research results were summarized in the 1997 book *Mountains of the World: A Global Priority* (Messerli and Ives 1997). UNU was also a founding member of the International Mountain Society (IMS), which was established in 1979, inter alia, to serve as a publisher of the international journal *Mountain Research and Development* (MRD), launched in 1981.

Vision and mission

At GLOMOS, mountains are placed at the core of research and practice, with a focus on the challenges of the Anthropocene (climate change, environmental hazards, pandemics, poverty, inequalities, etc). GLOMOS's transdisciplinary approach to climate change adaptation and mitigation, disaster risk reduction, and emergency response preparedness operates toward strengthening resilience of global mountain communities, in addition to protecting their highly sensitive social-ecological systems from the loss of biodiversity, cultural diversity, and ecosystem services (Figure 2).

With the overarching mission of turning science into action, the program conducts transdisciplinary research and technology transfer in specific socioeconomic, institutional, ecological, and cultural contexts (see Box 1). It seeks to

FIGURE 1 (A) UN Campus in Bonn, Germany; (B) Eurac Research building in Bolzano, Italy. (Photos by V. Lannert and Eurac)



bridge science and the global UN conventions and frameworks (see Figure 2) (UNGA 2015; UNISDR 2015; UNCCD 2015; UNFCCC 2016; UN 2016, 2017).

International activities and strategic partnerships

Unfortunately, research and development activities that work toward the UN frameworks in Figure 2 are often still dominated by Western narratives that can obscure traditional and local knowledge and ignore the cultural and spiritual importance of specific mountain areas.

“Localization” of research and development activities is therefore paramount to transformative resilience in mountain regions, and governance structures need to be redesigned with local actors taking the lead in implementation. However, “local” actors are a complex collective of diverse actors working from varying and often distinct ideologies at different levels and scales. This is

BOX 1: Main objectives of GLOMOS

1. Support the generation of significant knowledge in mountain research that is relevant for decision-makers and policymakers, regionally and globally.
2. Provide scientific support and ensure the practical implementation of local, national, and regional initiatives to foster sustainable development and transformational processes in mountain regions worldwide.
3. Increase awareness of the significance of mountain regions in global social–ecological processes and related international frameworks; increase recognition of GLOMOS as a key UN mountain-related *science–policy–practice* interface.
4. Support capacity building of organizations and institutions from diverse sectors with respect to sustainable development.

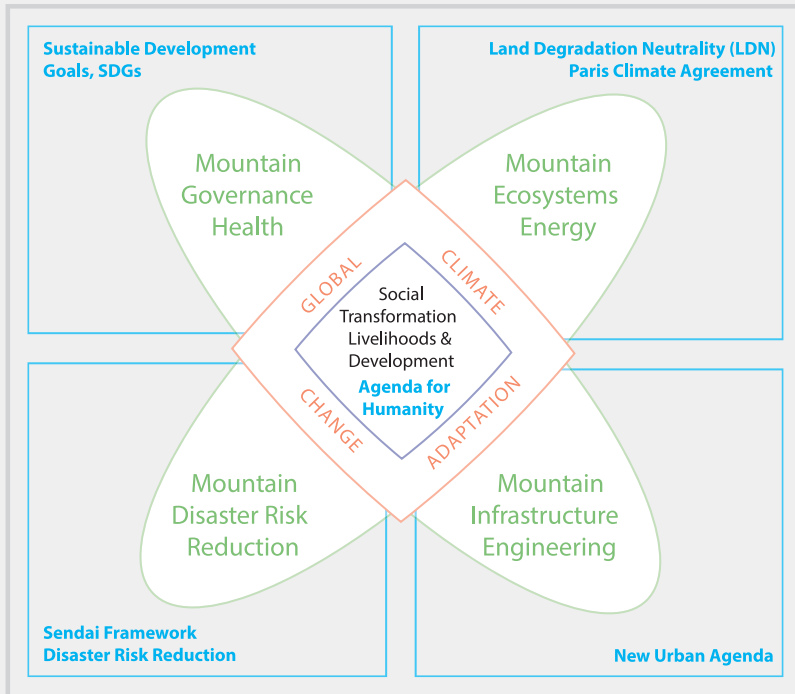
reflected in the many entities with which GLOMOS interacts (see Box 2), which include the following: the Mountain Partnership (MP) hosted by the Food and Agriculture Organization (FAO); other UN agencies, such as United Nations Climate Change (UNFCCC), the United Nations Environment Programme (UNEP), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD), the United Nations Office for Disaster Risk Reduction (UNDRR), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Atomic Energy Agency (IAEA), and the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA); international organizations, such as the Alpine Convention (MRI); practitioners in the field; political and local stakeholders; government representatives; nongovernmental organizations; and, finally, the private sector.

Embracing the importance of localization and of collaboration with regional partners, GLOMOS is currently focused on establishing strategic partnerships (see Boxes 2, 3). In 2019, a Memorandum of Understanding was signed with the Afromontane Research Unit (ARU) of the University of the Free State (UFS), South Africa. Further institutional bonding is foreseen with regional associations, such as with the International Centre for Integrated Mountain Development (ICIMOD), the Consortium for Sustainable Development of the Andean Ecoregion (CONDESAN), and the Albertine Rift Conservation Society (ARCOS).

The future

GLOMOS is carefully listening to the urgent calls of concerned mountain communities to emphasize the importance of nature-based solutions and cross-cutting approaches, to recognize ancestral knowledge, to address inequalities and rural–urban–rural mobility schemes, and to

FIGURE 2 GLOMOS research topics (in green, orange, and black) and related UN frameworks (in blue).



BOX 2: GLOMOS activities at a glance

GLOMOS–UN synergies

UNFCCC Conference of the Parties (COP) 25 high-level side event, 2019, Madrid, Spain: Organization of a high-level side event in close collaboration with FAO, UNEP, UNESCO, and UN-REDD.

Strategic partnerships and networks: UNEP; research in support of UNESCO sites.

International Mountain Day 2019: Organization of awareness-raising actions; promotion of UN's sustainable development efforts; support of education on applied research in mountain areas.

GLOMOS awareness-raising efforts

6th National Adaptation Plan (NAP) Expo, 2019, Songdo, Republic of Korea: Organization of session “Adaptation in mountain systems: Challenges and opportunities” in collaboration with ICIMOD.

International Mountain Conference (IMC), 2019, Innsbruck, Austria: Organization of session “Scientific support for the coherent monitoring and implementation of post-2015 UN frameworks in global mountain regions” in collaboration with MRI and Centre for Development and Environment (CDE) and workshop “Natural hazards risk governance under changing framework conditions.”

GLOMOS-hosted events

GLOMOS kick-off workshop, 2018, Bolzano, Italy: Workshop with international mountain scientists and practitioners to discuss the state of the art in relation to “Emerging risks and future challenges for mountain regions worldwide.”

1st GMS Forum, 2020, Sexten, Italy: Forum with international scientists and practitioners to discuss “Sustainability governance: international frameworks and local contributions.”

GLOMOS publications

GLOMOS seeks to provide publication opportunities for international scientists. To this end, a first major publication entitled *Safeguarding Mountains. A Global Challenge: Facing Emerging Risks, Adapting to Changing Environments and Building Transformative Resilience in Mountain Regions Worldwide* will be published by Elsevier in 2021, containing contributions from distinguished international mountain researchers, colleagues from the UN system, and regional stakeholders.

BOX 3: Current examples of GLOMOS research**Impacts of COVID-19 in rural mountain communities worldwide**

GLOMOS researchers have benefited from their wide geographic network to investigate the impact of COVID-19 in different global mountain regions. Through interviews in Peru, Ecuador, South Africa, and Kurdistan, insight has been gained into the mountain-specific challenges posed by the pandemic. Results will be published in late 2020.

South Africa

The scientific cooperation between ARU and GLOMOS focuses on a unique and complex region, the Maloti-Drakensberg. It is the largest and highest mountain system in southern Africa and forms the north-eastern border between South Africa and Lesotho. It is the primary water catchment supplying southern Africa. The interdisciplinary team of GLOMOS and ARU scientists have the overarching aim of gaining a holistic understanding of the challenges facing the region and how these are interrelated across sectors, in order to foster collaboration across scientific disciplines and among varied stakeholders. Within this aim, primary research topics are the following: environmental monitoring systems; causes of and solutions to highland degradation; watershed ecological systems and lowland water management; and rural–urban–rural migration.

Recent research results are summarized in a scientific article to be published in 2020. An edited volume addressing the challenges faced in the mountain city of Phuthaditjhaba is in preparation for publication in 2021.

Ecuador

GLOMOS aims to build collaborative partnerships with CONDESAN and other partners at all levels. The aim is to build networks of regional knowledge transfer and to localize sustainable mountain development in the Andean mountain range, which is a highly sensitive region of global importance with high biological and cultural diversity. Current GLOMOS research seeks to gain a holistic understanding of the impacts that the recent COVID-19 pandemic has had on rural mountain communities of the Ecuadorian Andes and how this limits their climate resilience. At the same time, the opportunities that have arisen from this pandemic and the consideration of ecosystem-based approaches are pivotal elements towards a sustainable and climate-resilient recovery post-COVID-19, in line with the UN postulate of “building back better.” The research results will be reflected in further scientific and op-ed publications. Further expansion to other Andean countries and collaborative projects is envisaged.

enhance the livelihoods and resilience of rural mountain communities. Therefore, the program will continue to localize cutting-edge solution-oriented research, inclusive capacity development, and technology transfer. The coherent work with local actors, according to their specific requirements, provides the foundations for bridging the science–policy–action gap, with the overarching goal of leaving no one behind in global mountain regions. To this end, among the current lead initiatives of GLOMOS are the 1st Global Mountain Sustainability (GMS) Forum, where scientists and practitioners gathered to discuss “Sustainability governance: International frameworks and local contributions,” as well as an edited volume that features contributions from scientists and key multi-stakeholders, *Safeguarding Mountains: A Global Challenge—Facing Emerging Risks, Adapting to Changing Environments and Building Transformative Resilience in Mountain Regions worldwide* (see Box 2 for further details).

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