

POLICY FORUM

SUSTAINABLE DEVELOPMENT

Accelerating the movement for mountain peoples and policies

Policies can have impacts extending far downstream

By **Yuka Makino, Sara Manuelli, Lindsey Hook**

In the early 1970s in the Himalayan state of Uttarakhand, India, women in what became known as the Chipko movement wrapped themselves around trees to prevent them from being felled. One factor contributing to the start of the movement was an increase in landslides, which the communities connected to increased logging. This movement, highlighting the importance of mountain ecosystems and their close interconnection with communities, eventually influenced government policy on the exploitation of forests (1). Today, in addition to challenges of land use and development, mountain ecosystems are also facing the threat of climate change: from glaciers in the high mountains, to threatening lives and livelihoods of communities along the elevation gradient, to ultimately affecting communities in the lowlands. Many national, regional, and international efforts have emerged to bring attention to, and develop scientific evidence on, the risks and opportunities facing people living in mountainous regions. But translation of these efforts into specific policies, strategies, and actions could be much improved. Mountain communities started the mountain movement, and the time has come for it to accelerate.

Covering 27% of the world's surface (2), mountains are key ecosystems that provide essential goods and services such as water, food, biodiversity, and energy to communities in and near mountains and also far downstream. More than 40% of global mountain area is covered by forests (3). Yet, mountain ecosystems are fragile and highly vulnerable to disturbances such as land-use change, unsustainable resource use, population increase, natural hazards, and hydrological events aggravated by climate change.

The mountain ecosystems support diverse communities of people, cultures, and indigenous food systems. Home to about 1.11 billion

of some of the world's poorest people, one in two rural mountain dwellers faces food insecurity, and their access to services and infrastructure is lower than in the lowlands (4). The livelihoods of mountain communities in developing countries are particularly vulnerable to impacts of natural hazards because of their high dependence on agriculture and limited access to infrastructure in particularly remote areas (5). With the rise in popularity of mountain-related tourism, increasing stress is being put on already fragile ecosystems (6). Outmigration has been an issue in certain mountain regions with drivers including socioeconomic marginalization and high vulnerability to food insecurity (7).

GLOBAL TO LOCAL

To support the lives and livelihoods of mountain communities, the international community has agreed upon numerous principles and actions to promote sustainable development in mountains. During the 1992 United Nations (UN) Earth Summit, governments agreed in Chapter 13 under Agenda 21 that mountains are important fragile ecosystems with unique features and resources that need to be sustainably managed (8). The UN General Assembly proclaimed 2002 the International Year of Mountains to increase awareness of the importance of sustainable mountain development. The Strategic Plan for Biodiversity 2011–2020, agreed upon by the Parties to the Convention on Biological Diversity (CBD), specifically incorporates mountain biodiversity. The Sendai Framework for Disaster Risk Reduction 2015–2030 emphasizes the need to mainstream disaster risk assessment, mapping, and management into rural development planning and management of mountains. In 2016, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development came into force. Though each SDG, particularly those concerning disaster risk reduction and climate change, is relevant to mountain regions, three targets specifically mention mountains and emphasize their important ecosystem services that are essential for sustainable development [targets 6.6 (water-related ecosystems), 15.1 (terrestrial

and inland freshwater ecosystems), and 15.4 (mountain ecosystems)].

Yet, despite reassuring momentum in terms of international commitments, global alliances, and partnerships, few governments, apart from governments of largely mountainous countries, have translated these global commitments into national policies and mainstreamed them into local priorities and actions. One method to gauge the extent of importance that a particular government has placed upon mountains is through a review of Voluntary National Reviews (VNRs) submitted by governments since 2016 at the annual High-Level Political Forum on Sustainable Development (HLPF) organized to monitor progress toward the 2030 Agenda.

Of the VNRs submitted from 2016 to 2019, 48 were from member governments of the Mountain Partnership (MP), a UN voluntary alliance, launched in 2002, dedicated to improving the lives of mountain peoples and protecting mountain environments around the world. Because these governments already recognize the importance of mountains, their VNRs were analyzed to determine how many specifically mentioned mountains in monitoring their progress on SDGs. Of those 48, 20 do not mention mountains at all, and 4 mention mountains simply as an aspect of SDG targets 6.6., 15.1, 15.3 (arid ecosystems), or 15.4, which does not imply that their national policies actually consider mountains. Twenty-four countries specifically mentioned mountain-related actions and policies, and only one country, Andorra, includes the mountain perspective as an inherent part of their sustainable development decisions.

There are five key issues in mountain regions identified by the governments of these 24 countries that are of particular importance to the scientific community (ordered from highest to lowest frequency of mention in their VNRs): provision of ecosystem services, namely, water, forests, and biodiversity; hazards such as landslides, flooding, and avalanches; cultural heritage and tourism; people's livelihoods and marginalization of mountain communities; and energy/hydropower.

In 2020, 6 member states of the MP have committed to submitting their first VNRs, and 15 will submit an update of their previous ones. Though a simple analysis of VNRs does not necessarily reflect a review of all mountain policy, given that each government can decide the format and the specific SDG on which to report, development and analysis of these reports are an opportunity for the scientific community to work with their governments to analyze mountain-related issues, actions, and policies implemented in their countries.

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ALLIANCES AND MECHANISMS

Key resources for improving the translation of high-level aspirations and commitments into actual policy and practice are the many organizations, partnerships, alliances, and programs at global, regional, and national levels working to promote a common understanding of issues that mountain ranges encounter, and to enhance the global exchange of knowledge and experiences.

At the global level, the MP addresses challenges facing mountain regions through the exchange of knowledge, experience, and expertise among its members (60 governments, 16 intergovernmental organizations, 294 major groups). Its main role is to facilitate dialogue between civil society, research organizations, and governments on priority

The MP also provides members with national policy and strategy support, capacity development, and South-South knowledge exchanges. For example, training jointly organized since 2008 by the MP and partner universities has trained over 300 field practitioners on topics such as resilient mountain development and mountain agrobiodiversity. The MP Secretariat also publishes reports on priority issues identified by its members, such as vulnerability to food insecurity in mountain regions, as recently reported by the MP partnering with the UN Convention to Combat Desertification (4).

At the regional level, the seven Andean countries, in 2007, established the Andean Mountain Initiative, together with the MP, the Consortium for the Sustainable Devel-

and protection of mountain ecosystems. Two main conventions focus on mountains: the Alpine Convention and the Carpathian Convention. Launched in 1991, the Alpine Convention was the first international treaty that covered the transnational mountains between the eight Alpine countries and the European Union. Its aim is to ensure the sustainable development and protection of the Alps as one territory. Focused on topics such as youth, landscape management, climate change, economy, and transport, countries under the Alpine Convention have shared their experiences on water management, the role of mountain forests in climate change mitigation, and how to tackle increasing natural hazards. Countries have worked with their local governments to raise awareness of local elected officials and to document traditional infrastructure that could be beneficial to address climate change (9).

The Carpathian Convention is the only multilevel governance mechanism that covers the entire Carpathian area. In 2003, the seven countries that share the Carpathians committed to protecting the diverse native flora and fauna while developing the peripheral region in a sustainable manner. Carpathian Convention efforts aim to establish common protocols and agree upon strategic objectives ranging from spatial planning, agriculture, transport, and tourism, to climate change.

During the International Year of Mountains in 2002, 78 national, multidisciplinary committees were set up around the world to promote an integrated approach to sustainable mountain development, identify priorities, tailor solutions to local needs, and involve local communities in decision-making processes. Of these, four national committees (Argentina, Chile, Madagascar, and Romania) have evolved into permanent bodies. In 2017, the Andean countries agreed on a strategic agenda for regional cooperation on climate change adaptation in the Andes Mountains, outlining concrete measures to address socioeconomic vulnerability, ecosystem protection, and strengthening of governance mechanisms. One of the key actions agreed upon was to increase the coverage of hydrometeorological stations to improve data quality and coordinate research to monitor and compare the regional effects of climate change. These data and information will feed into country-specific strategies on addressing climate change (10).

LINKING SCIENCE TO POLICY

All efforts to facilitate sustainable development must address and link environments, economies, and societies. Filling in the gaps remaining in the implementation of policies requires research and evidence on



Ziquejie terrace, at an elevation of 500 to 236 m in the Xuefeng Mountain Range in China, is globally recognized for aesthetic beauty, agricultural biodiversity, resilient ecosystems, and cultural heritage.

issues. The MP Secretariat's triennial report to the UN Secretary General (next due in 2019) on the status of mountain development has resulted in recommendations by the UN General Assembly on specific actions by its members. Key recommendations relevant to the scientific community include promotion of comprehensive, long-term monitoring and forecasting of hydro-metrological events; national validation of the Mountain Green Cover Index (MCGI); collection and dissemination of disaggregated economic, social, and environmental data at local, national, regional, and international levels; and documentation of indigenous and traditional knowledge in mountain communities.

opment of the Andean Eco-region, the UN Environment Program, and the Swiss Agency for Development and Cooperation. In 2017, in collaboration with the Global Island Partnership, the MP began the Coalition for Fragile Ecosystems. The coalition promotes political commitment and investments for improving the livelihoods of communities to address vulnerability to climate change, food insecurity, isolation, and marginalization. The first project under the coalition began in 2019, focused on food and sustainable tourism in a mountainous region of the Philippines.

Regional governments that have common mountain ranges have come together and agreed upon sustainable management

the linkages and global relevance of mountain ecosystems.

Interactions between climatic variability and land-use changes are critical for developing resilience and preventing degradation in mountains. But there is little information on how land use in mountains is changing. Global and regional efforts to collect spatial and temporal data on mountain ecosystems aim to help fill this gap. Of the 232 individual indicators that monitor progress toward the SDGs, two specifically monitor some aspects of mountain ecosystems. The CBD is monitoring coverage by protected areas of important sites of mountain biodiversity (indicator 15.4.1). The FAO and MP Secretariat are monitoring the MGCI (indicator 15.4.2) (3), which helps show how forest expansion and degradation in mountains occur at a global scale. The Intergovernmental Panel on Climate Change (IPCC) is preparing a Special Report on the Ocean and Cryosphere with a chapter on high mountains, which will be discussed at the 51st session of the IPCC later this month, and Working Group 2 on adaptation and vulnerability will focus on mountains in a 2020 report.

Yet other gaps still exist. For example, more environmental information is needed on the impact of climate change at different altitudes for specific mountain ranges, including on flora, fauna, and hazards. A landscape perspective is needed on the impact of upstream activities on downstream areas in terms of ecosystem services, such as water flow and increase in disaster risks. Currently, much mountain-related research either is fragmented or focused on highly specific locations, flora, or fauna.

Additionally, disaggregated socio-economic data for mountain regions are needed, including evidence of migration into and out of mountain regions. Most national statistics are aggregated; mountain data are combined with lowland data, skewing the information needed to perform accurate analyses. The indigenous peoples' food systems and traditions of the mountain communities need to be documented and shared as an important aspect of sustaining capacity for adapting to climate change. These data need to be integrated with information on disaster and climate change risks to determine priority areas to focus policy.

Several important organizations are working to integrate scientific information, perspectives, and expertise into national policies and strategies. In the South Asia region, the International Center for Integrated Mountain Development (ICIMOD) brings together scientists and policy-makers to promote mountain-specific investments and research. In 2019, they published the Hindu Kush Himalaya

(HKH) Assessment, which assesses key challenges such as climate change, governance, gender, flood or drought risk, ecosystem services, energy, and green economy. This assessment found that there has been a substantial increase in the number of wet days and extreme rain events recorded in the western Himalayas and the Karakoram, and the eastern Himalayas are experiencing higher amounts of rainfall in shorter periods. This translates into an increase in slope-related hazards. Another key scientific finding was that the HKH will warm more than the global mean and more rapidly in higher elevations (11).

The Mountain Research Initiative (MRI) brings together practitioners and researchers in mountain regions across the world. MRI and ICIMOD co-lead IPCC's sixth assessment report's cross-chapter paper on mountains. The World Meteorological Organization (WMO) is a co-custodian of SDG 13 on climate action and leads many programs, in particular the Executive Council Panel of Experts on Polar and High Mountain Observations, Research and Services, who play a crucial role in terms of science and policy to address climate change in mountain regions. The WMO, FAO, and the MP will host the High Mountain Summit in October 2019 to convene the international community to close the data and information gap regarding existing and emerging challenges from changes in High Mountain regions.

At the government level, the Working Party on the Management of Mountain Watersheds (WPMMW), established in 1950 under the FAO European Forestry Commission, is a technical body that aims to translate science into policy. The goal is to build bridges between science and practice, and track implications of global issues such as climate change, disaster risk management, and the valuation of watershed ecosystem services. For example, hydrological studies in mountain catchments in central Europe revealed environmental impacts of "acid rain" produced, largely, by coal-burning power stations in southern Poland, eastern Germany, and northern Bohemia during the 1980s. These contributed to the 1985 Helsinki Protocol on the Reduction of Sulfur Emissions or their Transboundary Fluxes (12). This in turn triggered a larger effort in 1990 resulting in the First Ministerial Conference on the Protection of Forests in Europe. The Strasbourg Resolutions focused on technical and scientific cooperation to provide data for common measures for European forests—a major step to initiate the incorporation of scientific data into political action to protect Europe's forests. One of the six Resolutions (S4) was on "Adapt-

ing the Management of Mountain Forests to New Environmental Conditions."

Currently, the WP is gathering experiences of members on their protective forests and their effectiveness in reducing disaster and climate risk, to be published in 2020. There are five other regional forestry commissions (Latin American and the Caribbean, North America, Africa, Near East, Asia-Pacific) that also have the potential to address mountain development.

The foundation for global and regional collaboration, research, and sharing of information and experiences has been laid. There is growing momentum in the scientific community to study the impact of climate change in mountains. The next step is to translate global strategies into national and local policies and practices. Because mountain ecosystems are intrinsically connected to downstream communities, there is a need to raise awareness of the relevance of mountain ecosystems, and the risks they face, to our everyday lives. Developing this awareness is fundamental to ensuring that investments increase the resilience of mountain people and the protection of mountain ecosystems. ■

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