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Authors: Makino, Yuka, Geringer, Michelle, and Manuelli, Sara

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# Promoting Mountain Biodiversity Through Sustainable Value Chains



Food and Agriculture  
Organization of the  
United Nations

Yuka Makino<sup>1,2\*</sup>, Michelle Geringer<sup>2</sup>, and Sara Manuelli<sup>2</sup>

\* Corresponding author: yuka.makino@fao.org

<sup>1</sup> Water and Mountains Team, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00153 Rome, Italy

<sup>2</sup> Mountain Partnership Secretariat, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00153 Rome, Italy

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Mountains host about half of the world's biodiversity terrestrial hotspots (Spehn et al 2010) and 30% of all Key Biodiversity Areas (UNEP et al 2020). Mountain biodiversity provides many goods and services to humankind, including food, medicine, and climate and air quality regulation. Yet land use and climate change, overexploitation, invasive species, pollution, and demographic changes are putting mountain biodiversity under pressure. The sustainable management of mountain biodiversity has been recognized as a global priority, and Sustainable Development Goal (SDG) 15 Target 4 is dedicated to its conservation. The Mountain Partnership Secretariat has supported the work of the Food and Agriculture Organization of the United Nations (FAO) in the development of the indicator for the mountain target 15.4.2, the Mountain Green Cover Index (FAO nd b), to monitor progress toward the target's achievement. Biodiversity in all ecosystems is in focus in many United Nations (UN) fora, as 2021–2030 is the UN Decade on Ecosystem Restoration and governments are preparing to negotiate the post-2020 global biodiversity framework for adoption in 2021 at the 15th meeting of the Conference of the Parties (CoP 15) to the Convention on Biological Diversity (CBD). To raise awareness of the relevance of mountain biodiversity, it has been chosen as this year's International Mountain Day theme. The Mountain Partnership (MP) at FAO, the only UN alliance dedicated to mountain ecosystems and communities, leads global observance of this UN day.

## Mountain biodiversity—a key resource for the planet

Mountains' differentiated topography, in terms of elevation, slope, and exposure, offers opportunities for high-value crops, horticulture, livestock, and forest species. This rich biodiversity holds cultural, ecological, and economic value. Large portions of the world's most precious gene pools for agriculture and medicine are preserved in mountains. Crops that are important for food security, such as maize, potatoes, barley, sorghum, tomatoes, and apples, have been diversified in mountains, and many animal species—goats, yaks, llamas, and alpacas—have originated or been diversified in mountains. For example, mountain pastoralists in Pakistan have a highly treasured livestock genetic resource pool with special traits, such as disease resilience, bred into animals.

This can help with adaptation to the changing climate (Ojeda et al 2012).

## Promoting agrobiodiversity and agroecology in mountains

Sustainable production practices and the conservation of agrobiodiversity in mountain areas ensure dietary diversity and quality, generate income for smallholder farmers, and aid ecosystem conservation and restoration (Figure 1). Mountain farmers are preserving many of the rarest varieties of crops in functioning biodiverse agroecosystems, yet the harshness of high-elevation environments and the effects of climate change are increasingly pressuring farmers to modify their traditional approaches. The COVID-19 pandemic has added to and amplified existing challenges facing mountain food systems, as evidenced by the near breakdown of food supply chains, the food shortages in many developing countries, and the increase in people suffering from acute food insecurity (FSIN 2019). Food security in mountains has been a matter of concern in recent years. Current data on vulnerability to food insecurity (FAO and UNCCD 2020) suggest that half of rural mountain people in developing countries live in areas where the daily availability of calories and protein is below the minimum threshold needed for a healthy life.

Agroecology is an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems and puts people squarely at the center of food systems (FAO nd a). Using a scientific basis of agroecological processes for food and agriculture systems, it provides holistic and long-term solutions based on knowledge sharing and innovation, including the combination of local, traditional, indigenous, and practical knowledge with multidisciplinary science (FAO 2018). Family farmers, including smallholder farmers, indigenous people, and pastoralists, are at the heart of agroecology. A key element of agroecology and mountain farming is diversity: it ensures the provision of ecosystem functions, productivity, resilience, and market diversification and contributes to human nutrition and health. In the mountainous regions of Tavush and Lori, Armenia, women have improved household economies by foraging for aromatic and medicinal plants to

**FIGURE 1** Farmers in Peru. (Photo by Heinz Plenge)

sell to organic tea producers (The Armenia Gender Project 2018). Due to the rising market demand for high-quality, traditional mountain products, mountain farmers, particularly women, can improve their livelihoods.

### The Mountain Partnership Products initiative

The Mountain Partnership Products (MPP) initiative is a certification and labeling scheme based on environmentally and ethically sound value chains. It promotes short local value chains, while ensuring transparency and trust between producers and consumers, fair compensation for primary producers, and conservation of agrobiodiversity and ancient farming techniques in mountains (Figure 2). The MPP initiative currently operates in 8 countries and includes 20 products. To date, 16 producer organizations impacting around 10,000 smallholder mountain farmers, 60% of whom are women, have benefited from training on production, product development, entrepreneurship, and marketing. Each product under the MPP initiative has a narrative label that tells the product's story. Because of the label, Jumla mixed beans in Nepal are now sold at national supermarkets, production and sales have increased by 25% in 4 years, and the sale price has increased by 20%.

To promote organic agriculture and diversified farming systems in mountains, MP is creating a global mountain participatory guarantee system (PGS) and has established the first international mountain PGS network, in collaboration with IFOAM–Organics International. PGSs are quality assurance systems for organic products, suitable for smallholder farmers. For partners committed to the “Ranikhet Declaration” (FAO nd c), the first regional training course was carried out in 2019, and further training courses are planned for 2020. In collaboration with the Coalition of Fragile Ecosystems, the MPP initiative is also developing a sustainable tourism model in the Cordillera Administrative Region of the Republic of the Philippines to improve the value chains of mountain products by connecting small-scale producers with tourism service providers, allowing visitors to discover and support gastronomic heritage. Mountain farmers often lack adequate marketing skills to reach markets. To tackle this issue, the MPP initiative is working with EcorNaturaSi, the Italian organic retailer and distributor, to assist farmers with marketing.

**FIGURE 2** Mountain farmers sort apples in an orchard in Kyrgyzstan. (Photo by Alma Uzbekova)

### Outlook

Mountain biodiversity provides essential benefits for all people, including nutritious food, clean water, areas for recreation, and protection from extreme events and disasters. Its loss and degradation jeopardizes progress toward multiple SDGs. The conservation and sustainable use of mountain agro-biodiversity is key to sustainable mountain agriculture and sustainable livelihoods. But mountain communities need further assistance. Enhanced capacities of mountain farmers, combined with appropriate certification of their products, can help to narrow the gap of limited market access and unfair prices and improve incomes. MP's next steps include the expansion to 4 countries through an alliance with the Global Environment Facility Small Grants Programme implemented by the United Nations Development Programme, as well as a series of webinars with IFOAM–Organics International to assist partners in setting up the PGS. The MPP initiative has also been selected as one of 25 Global Best Practices for Expo Dubai in 2021.

### REFERENCES

- FAO [Food and Agriculture Organization of the United Nations]**. nd a. *Agroecology Knowledge Hub*. Rome, Italy: FAO. <http://www.fao.org/agroecology/overview/en/>; accessed on 29 July 2020.
- FAO [Food and Agriculture Organization of the United Nations]**. nd b. *Sustainable Development Goals. Indicator 15.4.2—Mountain Green Cover Index*. Rome, Italy: FAO. <http://www.fao.org/sustainable-development-goals/indicators/1542/en/>; accessed on 19 August 2020.
- FAO [Food and Agriculture Organization of the United Nations]**. nd c. *The RANIKHET DECLARATION for a Global MOUNTAIN PGS Network*. Rome, Italy: FAO. [http://www.fao.org/fileadmin/user\\_upload/mountain\\_partnership/docs/Ranikhet%20Declaration.pdf](http://www.fao.org/fileadmin/user_upload/mountain_partnership/docs/Ranikhet%20Declaration.pdf); accessed on 6 November 2020.
- FAO [Food and Agriculture Organization of the United Nations]**. 2018. *FAO'S Work on Agroecology: A Pathway to Achieving the SDGs*. Rome, Italy: FAO. <http://www.fao.org/documents/card/en/c/19021EN>; accessed on 19 August 2020.
- FAO [Food and Agriculture Organization of the United Nations], UNCCD [United Nations Convention to Combat Desertification]**. 2020. *Vulnerability of Mountain Peoples to Food Insecurity: Updated Data and Analysis of Drivers*. Edited by Romeo R, Grita F, Parisi F, Russo L. Rome, Italy: FAO and UNCCD. <http://www.fao.org/3/cb2409en/CB2409EN.pdf>; accessed on 5 January 2020.
- FSIN [Food Security Information Network]**. 2019. *Global report on food crises 2019*. <https://www.fsinplatform.org/global-report-food-crises-2019>; accessed on 16 July 2020.
- Ojeda G, Rueff H, Rahim I, Maselli D**. 2012. *Sustaining Mobile Pastoralists in the Mountains of Northern Pakistan*. Evidence for Policy Series, Regional Edition Central Asia, No. 3. Arynova M, editor. Bishkek, Kyrgyzstan: NCCR [National Centre of Competence in Research] North-South.
- Spehn EM, Rudmann-Maurer K, Körner C, Maselli D**. 2010. *Mountain Biodiversity and Global Change*. Basel, Switzerland: GMB [Global Mountain Biodiversity

Assessment]-DIVERSITAS. <http://www.fao.org/3/i2868e/i2868e00.pdf>; accessed on 19 August 2020.

**The Armenia Gender Project.** 2018. *Wild Harvest Value Chain Assessment Report Armenia*. Washington, DC: World Bank Group–International Finance Corporation. <http://documents1.worldbank.org/curated/en/258201534170791650/pdf/129405-WP-PUBLIC-ReportWildHarvestSectorReviewJune.pdf>; accessed on 19 August 2020.

**UNEP [United Nations Environment Programme], GRID-Arendal, GMBA [Global Mountain Biodiversity Assessment], MRI [Mountain Research Initiative].** 2020. *Elevating Mountains in the Post-2020 Global Biodiversity Framework 2.0*. UNEP, GRID-Arendal, GMBA and MRI. [https://mountainresearchinitiative.org/images/Articles\\_Newsletters\\_2020/FEB\\_2020/ElevatingMountainsPolicyBrief.pdf](https://mountainresearchinitiative.org/images/Articles_Newsletters_2020/FEB_2020/ElevatingMountainsPolicyBrief.pdf); accessed on 19 August 2020.