

Sustainable mountain pastoralism: challenges and opportunities



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A significant part of mountains and uplands is occupied by extensive pastoral systems allowing a large number of communities throughout the world to make a living. In the Hindu Kush Himalayan Mountains (HKH), for example, 60% of the land cover is rangeland [1]. In Peru, 86% of the highlands are covered by pastures grazed by 70% of the country's livestock population [2].

Ajar herder transhumance to upland pastures in summer, Pakistan (H. Rueff)

Mountain pastoralists graze their animals according to season on a vertical landscape to produce high-quality livestock products sustainably. To do so, mountain pastoralists use marginal lands and practices of nomadism, transhumance and agro-pastoralism, the latter integrating fodder crop with grazing (3). These marginal lands would otherwise remain unproductive because their climate or topography makes them unsuitable for cultivation. Cultivated highlands may exist but often at the expense of environmental degradation.



Mountain pastoralists endure a number of stressors such as climate hazards and disasters (flash floods), and shrinking pastures due to competing forms of land uses. Mountains affect weather regimes, creating local climate variability over short distances. Mountain pastoralists receive little attention and investment, because they do not follow conventional production models and are poorly integrated into supply chains. As a result, they are often marginalized and do not have access to basic support services. Power relations between landowners and mobile pastoralists find the latter at a disadvantage. Policies tend to seek to "modernize" pastoralism through intensification rather than support these systems, which efficiently use marginal resources (4). Aid agencies still struggle to effectively support mountain pastoralism (5). As an example, land rehabilitation with monoculture afforestation in the past 20 years in the Pakistan HKH has obstructed transhumance routes for herders, forcing them to accelerate migration to upland pastures in summer. Early arrival at summer pastures fosters degradation because animals graze on grass sprouts. Afforestation programmes planting adapted tree fodder species could fulfil land rehabilitation needs while providing mobile pastoralists with fodder for their livestock when herds are moving (6).

Lessons learned



- Keeping marginal mountain lands productive through pastoralism is a rational use of land especially when considering the pressing food security agenda in many developing countries.
- Governance of mountain range-lands needs to adopt an integrative approach, based on the awareness of the wide array of services provided by pastoralists beyond the supply of livestock products. This should be reflected by payment schemes and investments in mountain pastoral systems and sector-based approaches.
- Switzerland's payment scheme for mountain farmers has substantial returns on investment. Swiss alpine pastures managed by farmers "produce" the Swiss mountain landscape, attracting tourists globally and generating Switzerland's fourth-largest income source (12).

Pastoralists provide regulating ecosystem services (climate regulation, flood and erosion control), provisioning services (food, water, genetic resources and fuel), cultural services (heritage and landscaping) and supporting services (nutrient cycling, habitat and primary production). A study conducted in the Naran Valley in the Pakistan HKH shows that high-altitude pasture management contributes more to climate change mitigation with a superior carbon store averaging 12.2 t C per ha as compared to cropping (7).

Building awareness about the services provided by mountain pastoralism could attract investments, improve development approaches and benefit herders and society. A workshop for landless mountain pastoralists, landowners, government officials and local academics held in Pakistan in 2012 resulted in the creation of a "pastoralism cell" within the Khyber Pakhtunkhwa Province ministry of agriculture. This body was charged with addressing mountain pastoralists' needs for support and voicing their interests through community-based organizations. This cell should also implement measures to secure transhumance routes by purchasing land for resting places. The University of Peshawar has also committed to promote pastoralism studies and to host pastoralist students by waiving tuition fees for their education (8).

Mountain pastoralists' economic contribution often goes unnoticed

Mountain pastoralism supports regional economies. For example, an estimate of pastoralists' production in Kyrgyzstan, a large part of which takes place in highlands, shows that the sector contributed 20.5% to the national income (9). The Ajar pastoralists, a community of about 7,400 landless households in the Khyber Pakhtunkhwa Province of Pakistan, market small ruminants worth USD 68 million per year (7). Mountain pastoralists also keep highly valuable livestock genetic resources with traits adapted to steep slopes, rugged terrain, poor-quality forage and resistant to diseases. These breeds are optimally suited to meet mountain pastoralists' needs for production, draught power and cash from sales. Their reproductive and productive performances relative to body weight are higher than those of exotic breeds (10, 11).

