UNIVERSITY OF CENTRAL ASIA
GRADUATE SCHOOL OF DEVELOPMENT
MOUNTAIN SOCIETIES RESEARCH INSTITUTE

Climate Vulnerability and Adaptive Capacity of Mountain Societies in Central Asia

Stefanos Xenarios, Sujata Manandhar, Dietrich Schmidt-Vogt,
Christian Hergarten and Marc Foggin

LIK Conference, Kyrgyzstan, 13 October 2017

Mountain Societies and Vulnerability

- Mountain societies depend on geophysical conditions for their living
- Scarce natural resources, limited infrastructure & poor communication are main constraints for sustainable development and well-being
- Natural and human-induced hazards are frequent and severely impact people's livelihoods
- Climate change can amplify the impact of major hazards on livelihoods
- Community initiatives can help mountain communities to adapt and cope with a wide range of challenges

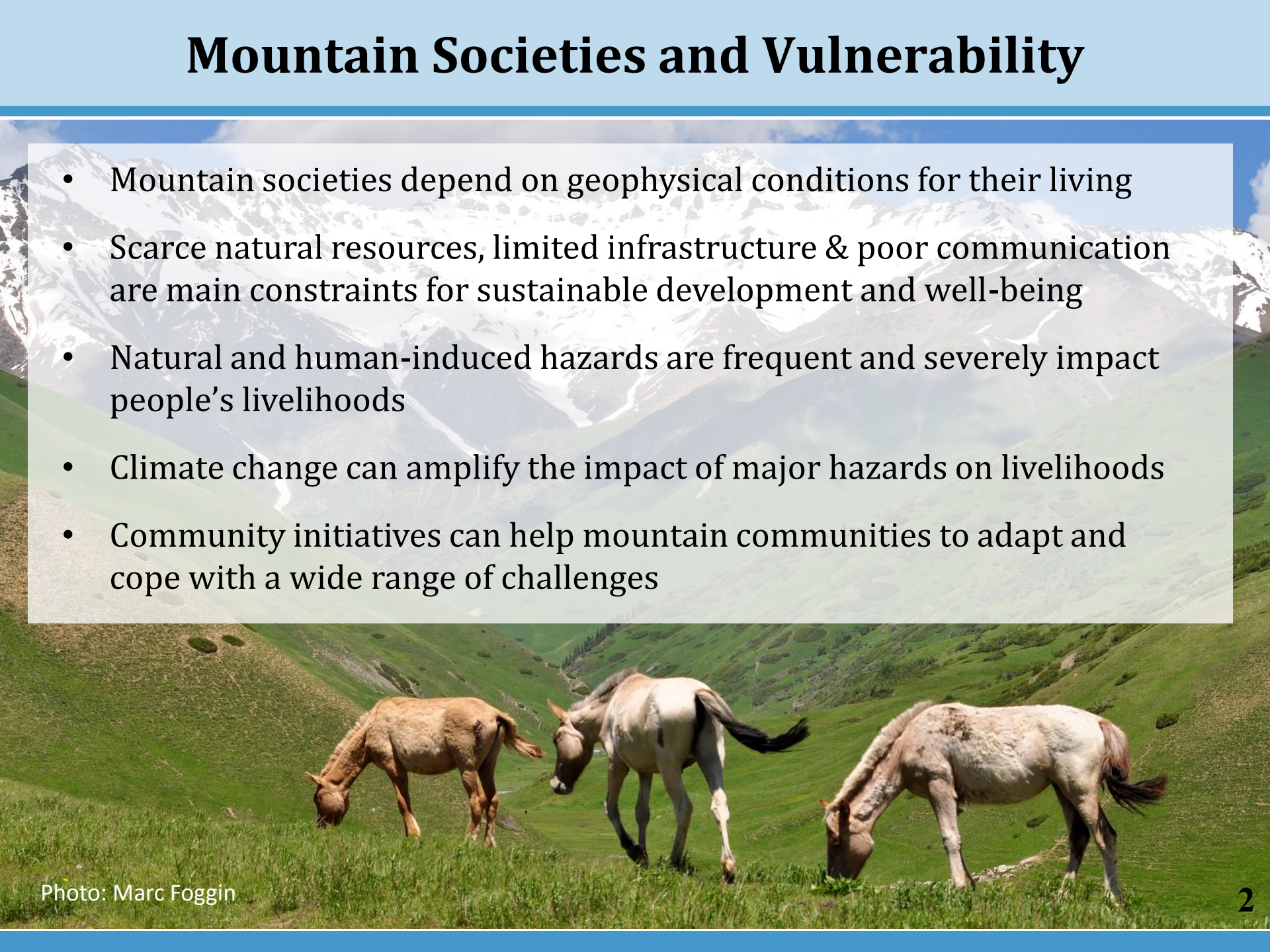

Photo: Marc Foggin

Mountain Societies in Central Asia (CA)

Source: Alford, Donald L.; Kamp, Ulrich; Pan, Caleb; Yu, Winston. 2015. Europe and Central Asia - Assessment of the role of glaciers in stream flow from the Pamir and Tien Shan mountains. Washington, D.C. : World Bank Group.

Profiling Mountain Societies in CA

- Remote communities residing in the Pamirs and Tien Shan foothills face natural and human-induced adversities
- Approx. 10,500 km^2 in the Pamirs and 2,300 km^2 in the Tien Shan are covered by glaciers, susceptible to high levels of climatic variability
- Rural communities are largely dependent on subsistence farming, both farming and agro-pastoralism

- Tajikistan: very small plots available for cultivation, high land sloping, poor soil conditions
- Kyrgyzstan: high mountains and rangelands offer good potential for pastoralism, however land degradation common across vast regions

Photo: Marc Foggin

Climate Change Processes in the Mountains of CA

- Some literature available on climate change scenarios, impacts, and adaptation options in Central Asia
- Temperature increase, changing precipitation patterns, aggravation of natural hazards, key reference points
- However, CC processes in high altitudes and mountain ranges may need thorough assessment and close monitoring
- Study of CC impacts requires detailed knowledge of various technical and socio-economic perspectives and processes, over a range of spatial scales
- Adaptation to CC necessitates an understanding of geophysical context, also willingness of local people and communities to adopt new practices

Climate Change Complexities in Mountain of CA

- Interaction of temperature fluctuations with water and energy input-output not yet defined
- Microclimate depends on mountain topography, surrounding atmosphere still not well understood
- "Black Box" hydrological modeling and GCMs cannot fully describe climate change effects in water basins
- Exact assessment of climatic vs non-climatic drivers in aggravation of livelihood status not an easy task
- Comparative assessment of hazards in pre/post Soviet era tobe cautiously evaluated

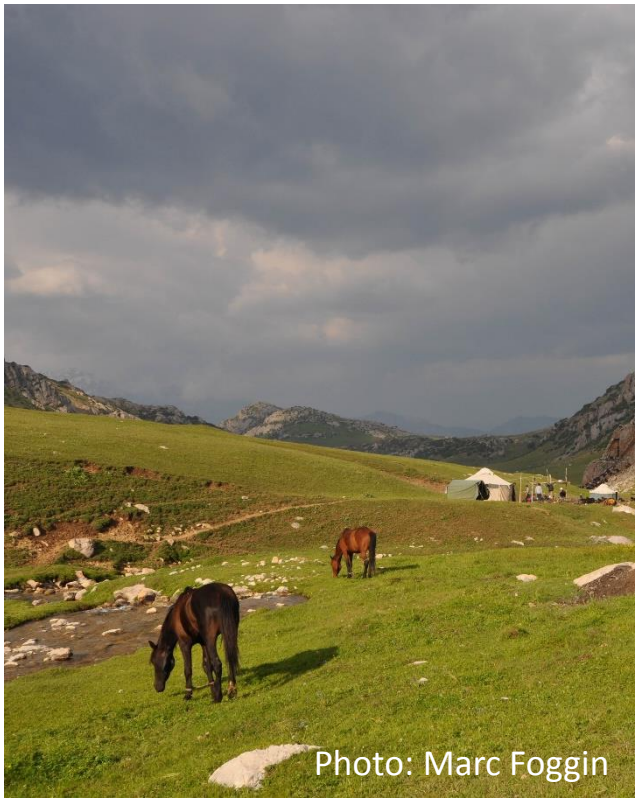
Photo: Marc Foggin

Hydro-meteorological Observation Networks

Climate Change Interventions – Research Aspects

- Better glacier monitoring through direct measurements, remote sensing, modeling
- More hydromet measurements in highlands, network of stations
- Better analysis of climate-glacier-water-land interactions and their relations to risks and hazards
- Better evaluation of water losses/gains and their contributions to major river basins in Central Asia
- More analysis of climate vs non-climate drivers affecting human development and quality of life

Photo: Sujata Manandhar

Climate Change Interventions – Development Aspects

- Installation of simpler systems (hydromet devices) in high altitudes, capacity building to support data collection by local stakeholders
- Training local stakeholders for environmental monitoring programs, promoting citizen science, ensuring maintenance and data collection (e.g. hydromet stations) with local personnel
- Promoting climate smart agriculture including livestock, pastureland and rain-fed crops, backed by accessible micro-finance initiatives
- Improving farming and pastoral market knowledge, building links with regional trades hubs, also supporting low-risk, low-cost technologies
- Supporting targeted high-impact interventions, multipurpose projects

Thank you!

UNIVERSITY
OF CENTRAL ASIA

Stefanos.Xenarios@ucentralasia.org