2005

GLOCHAMORE

Global Change and Mountain Regions

Research Strategy*

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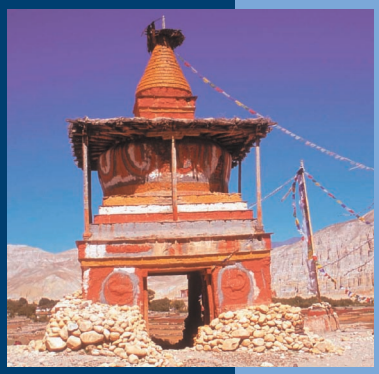

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1. Climate

Research goal: To develop consistent and comparable regional climate scenarios for mountain regions, with a focus on MBRs.

2. Land Use Change

2a. Quantifying and Monitoring Land Use

Research goal: To monitor land use change in mountain regions using methods that are consistent and comparable.

2b. Understanding the Origins and Impacts of Land Use Change

Research goal: To detect and assess the importance of drivers of land use changes and their implications for mountain ecosystems and the livelihoods of people dependent on mountain resources.

3. The Cryosphere

3a. Glacier Extent

Research goal: To predict the areal extent of glaciers under different climate scenarios.

3b. Glacier Mass Balance and Melt Water Yield

Research goal: To observe and predict the change of glacial mass and the proportion of that loss in the form of runoff under different climate change scenarios.

3c. Snow Cover

Research goal: To observe and predict the spatial and temporal extent of snow cover under different climate scenarios.

3d. Snow Melt

Research goal: To predict the timing and amount of runoff generated from the snow pack under different climate scenarios.

3e. Permafrost

Research goal: To map, monitor and predict the extent of permafrost in mountain regions.

4. Water Systems

4a. Water Quantity

Research goal: Determine and predict water balance and its components, particularly runoff and water yield of mountain catchments (including wetlands and glaciers) under different global change scenarios.

4b. Water Quality and Sediment Production

Research goal: To predict water quality and sediment delivery from mountain catchments under different scenarios and understand their effects on human health, ecosystem functioning, and economies dependent on such water resources.

4c. Aquatic Community Structure

Research goal: To monitor the ecological status of mountain lakes and streams; this includes the study of biodiversity, the functioning of food chains, and water quality parameters .

5. Ecosystem Function and Services

5a. Role of Alpine Areas in N and Water Cycles

Research goal: To understand how biogeochemistry changes under different climate change, land use and pollution scenarios, and how these changes affect ecosystem services (such as providing drinking water), and to investigate the relative importance of those external drivers.

5b. Role of Forest in C Cycle and Resource Production

Research goal: To predict the amount of carbon and the potential yield of timber and fuel sequestered in forests under different climate and land use scenarios.

5c. The Role of Grazing Lands in C, N and Water Cycles, Slope Stability and Household Economy

Research goal: To predict the future structure and function of mountain grazing lands along with the likely impacts on material cycles, geomorphic processes and household incomes.

5d. Soil Systems

Research goal: To assess and understand the impact of global change on soils i.e. the effects of changes in temperature and precipitation and associated land use change scenarios on evatranspiration, soil organic matter (SOM) levels and pools, carbon store, and biodiversity (in particular keystone species or species with unique functions such as symbiotic microorganisms).

5e. Pollution

Research goal: To explore the effects of changing and increasing levels of organic chemicals on physiological, species, community and especially ecosystem-level processes.

5f. Plant Pests and Diseases

Research goal: To predict the future abundance, distribution and impacts of pests and diseases on natural and cultivated systems.

6. Biodiversity

6a. Biodiversity Assessment and Monitoring

Research goal: To assess current biodiversity and to assess biodiversity changes.

6b. Biodiversity Functioning

Research goal: To define functions and services associated with biodiversity and predict the possible effects of global change on these interactions.

6c. Biodiversity Management

Research goal: To identify adaptive management practices that mitigate global change effects on biodiversity.

6d. Alpine Community Change

Research goal: To detect and understand the shifts in species abundance and distribution driven by climate change, and to understand how limiting factors for plant life may change.

6e. Key Fauna and Flora

Research goal: To predict the probability of local persistence of key species under different global change scenarios.

6f. Forest Structure

Research goal: To predict future forest structure and composition under different climate change and land use scenarios.

6g. Culturally Dependent Species

Research goal: To understand the fate of species, and species assemblages that depend on particular cultural practices as a basis for developing and demonstrating sustainable land use systems.

6h. Impacts of Invasive Species

Research goal: To predict the threats by invasive alien plants to mountain ecosystems, and to develop management strategies (precautionary principle).

7. Hazards

7a. Floods

Research goal: To predict changes of lake systems and incidence of extreme flows in terms of frequencies and amounts, under different climate and land use scenarios.

7b. Wildland Fire

Research goal: To predict the incidence, intensity and impacts of fires under different climate, land use, and management scenarios and to evaluate the impacts of different wildland fire management strategies.

7c. Mass Movements

Research goal: To predict incidence of landslides and debris flows under different scenarios.

7d. Avalanches

Research goal: To understand and predict the potential change in avalanche activity on the mountain ecosystem and hazard level under different global change scenarios.

8. Health Determinants and Outcomes Affliciting Humans and Livestock

Research goal: To understand the current and future distribution and intensity of climate-sensitive health determinants, and predict outcomes that affect human and animal health in mountain regions.

9. Mountain Economies

9a. Employment and Income

Research goal: To predict the impacts of global change scenarios on the economies of mountain regions and economies dependent on mountain goods and services. To assess the resilience of mountain societies (especially in developing countries) to global environmental change.

9b. Forest Products

Research goal: To predict changes in the availability of economically important forest products in mountain regions.

9c. Mountain Pastures

Research goal: To understand and predict changes in the mountain pasture conditions and availability of economically important mountain meadow products.

9d. Valuation of Ecosystem Services

Research goal: To assess the value of mountain ecosystem services and how that value is affected by different forms of management.

9e. Tourism and Recreation Economies

Research goal: To characterize the tourism and recreation sectors and to project their future nature and extent.

10. Society and Global Change

10a. Governance Institutions

Research goal: To understand the origins and functioning of existing governance institutions, their effectiveness in terms of range of potential stakeholders goals, and options for improved effectiveness with respect to different goal sets.

10b. Rights and Access to Water Resources

Research goal: To understand the role of water resource institutions in the functioning of mountain economies and environments.

10c. Conflict and Peace

Research goal: To systematically monitor economic and social conditions leading to and maintaining conflicts in mountains.

10d. Traditional Knowledge and Belief Systems

Research goal: To identify the kinds of knowledge (traditional and modern) associated with the research activity and the relationship between those knowledge systems.

10e. Development Trajectory and Vulnerability

Research goal: To characterize the vulnerability of different social groups associated with MBRs to future global change.

10f. Urbanization in Mountain Regions

Research goal: To understand the environmental, economic, and demographic processes linking rural and urban areas in mountain regions, as well as those leading to urbanization, peri-urbanization and metropolization.