

Message to decision makers on environmental changes in High Elevation Regions of Central Asia and research needs for addressing the consequences of these changes.

Summary of the Focus Group Reports and Presentations at the International Workshop on the Northern Eurasia High Mountain Ecosystems; Bishkek, Kyrgyzstan, 9-13 September 2009.

What is going on in the high elevation regions of Central Asia? There is a broad range of uncoordinated studies in these regions that address environmental changes and their cumulative impact on runoff originating from the mountains that serves a major water supply to the densely-populated lowlands. Remote sensing products have become widely available. During the past several decades, dramatic changes in all components of climate, hydrosphere, and cryosphere of the mountainous Central Asia have been observed. Some of these changes (surface air temperatures increase, glaciers' and seasonal snow cover retreat, earlier freshet) feed back to regional climate changes, affect the probability of natural hazards such as landslides, and closely intervene with water supply to densely-populated regions in the valleys and further downstream. During the past two decades, climatic, hydrological, and environmental monitoring networks have declined in the region (especially at higher elevations). In many regions, these have become insufficient for the evaluation of ongoing changes. Several acute problems prevent advances in land cover and land use changes studies. These include: (a) Inaccessibility of existing data due to governmental restrictions and sectoral barriers, discontinuity of information before and after the social reform, and lack of proper system to collect/archive/search the land use information; (b) Ineffective land use management, and (c) A poorly developed academic education system. The workshop concludes that *global climate is changing rapidly and high elevation regions of Northern Eurasia are particularly susceptible to observed and projected changes. Therefore, urgent actions are required to prevent dangerous impacts on ecosystems and societies and develop viable adaptation strategies.*

What is needed?

(A) Securing the wider environmental data availability is the first necessary and immediate step. The sharing of the existing data/information among the scientific community must be emphasized. WMO Resolution 40 recommending governments to supply hydrometeorological data free of charge (other than cost of data recovery) for non-commercial use should be implemented and expanded towards all environmental data. Accessible channels of information dissemination should be implemented to provide stakeholders (including general public) with environmental information for further academic, practical, and educational use. A much wider network of high altitude meteorological and hydrological stations is required. In particular, a special-observatory network should be developed in mountainous regions of Central Asia including energy balance, water balance, air quality, and other specialized observations.

(B) Follow-up urgent and thorough scientific studies are warranted to better describe the processes that cause the environmental changes in the high elevation regions of Central Asia and, thereafter, to project their further dynamics. Firstly, detailed characterization of the state of the climate, hydrology, cryosphere, biosphere, and land use of mountainous regions has to be conducted using *in situ* observations, remote sensing products, and high resolution models suitable for these regions. Secondly, multi-model projections of future regional climate, cryosphere, and hydrosphere should be developed for these regions with high spatial resolution using a selection of numerical regional climate models, high resolution hydrological and cryospheric models coupled with viable land/water use management schemes.

(C) Long-term strategic efforts to promote a culture of science evidence-based policy-making; to promote capacity building/public awareness; to improve / invest more into the academic education system in Central Asia (in particular, training and educational programs involving the leading experts, developed internationally but implemented locally, with an objective of preparing a new generation of highly skilled professionals working in mountainous regions); and to build efficient bridges between science, policy and practice.