RAHU: IMPLICATIONS OF GLACIER SHRINKAGE ON FUTURE TROPICAL ANDEAN WATER SECURITY AND MANAGEMENT

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In the Tropical Andes, year-round streamflow from glaciers is an important water resource that supports human livelihoods and ecosystems further downstream. However, the advanced shrinking of glaciers, in combination with low adaptive capacity, makes this mountain region among the most vulnerable. A case in point is the vanishing of the second-largest tropical glacier fragment worldwide, in the Vilcanota-Urubamba river basin in southern Peru, which leads to serious implications for local water security. However, the spatiotemporal variability and evolution of both the meltwater propagation through the terrestrial water cycle and its contribution to changing patterns in water availability at the catchment scale are complex, poorly understood, and highly uncertain. New approaches need to take into account the complex interactions and feedbacks between drivers of water supply and demand within an extended upstream-downstream perspective. In this context, the international project RAHU (WateR security And climate cHange adaptation in PerUvian glacier-fed river basins; snowy mountain in Quechua) aims at developing an integrated glacier-water-security-assessment approach to improve evidence and transform the understanding of glacier shrinkage impacts and human vulnerabilities on water security. RAHU includes an international consortium of scientists in close collaboration with local stakeholders and is supported by a new partnership between Peru and the United Kingdom. The project includes four components : WP1 foresees to develop a fully-distributed, physically-based glacier surface energy balance model; WP2 helps to design and implement a glacier-hydrology-water resources monitoring approach to quantify non-glacial contributions to water resources and the impact of catchments interventions; WP3 focuses on mapping of human water use at high spatiotemporal resolution and determining current and future levels of water (in)security; and, WP4 was built to integrate the aforementioned WP's to evaluate and support the implementation of locally embedded climate change adaptation strategies at the science-policy-operation interface. With this integrated set-up, it is expected to achieve important outcomes on new glaciohydrological and socioeconomic datasets, glaciohydrological modeling approaches integrated into operational practice and locally relevant methodologies to assess socio-ecological vulnerabilities.

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