



RAHU PROJECT: Assessing water security and climate change adaptation strategies in the glaciated Vilcanota-Urubamba river basin

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Introduction

The Peruvian Andes are a hotspot of vulnerabilities to impacts in water resources due to the propensity for **water stress**, the highly **unpredictable weather**, the **sensitivity of glaciers**, and the **socio-economic vulnerability** of its population. Despite an increasing number of studies investigating these impacts, the physical and human processes that govern them are poorly understood in many regions of the world, including Peru.

Work Packages

Understanding the variables and processes involved, their impacts, and implementing science-based **adaptation strategies** require an interdisciplinary approach. The **RAHU Project** (*Water security And climate change adaptation in Peruvian glacier-fed river basins*) proposes to address these challenges by developing an integrated model:

Leadership: UNSAAC & U. Birmingham

WP1

- CURRENT AND FUTURE GLACIER DYNAMICS
- Development of an energy balance and glacier mass model.

Leadership: SENAMHI & Imperial College London

WP2

- HYDROLOGICAL MONITORING AND MODELLING
- Design and implementation of glacio-hydrological monitoring to quantify the (non) glacial contribution.

Leadership: UTEC & CONDESAN

WP3

- ASSESSING CURRENT AND FUTURE WATER SECURITY
- Mapping of population water use to determine current and future water security levels.

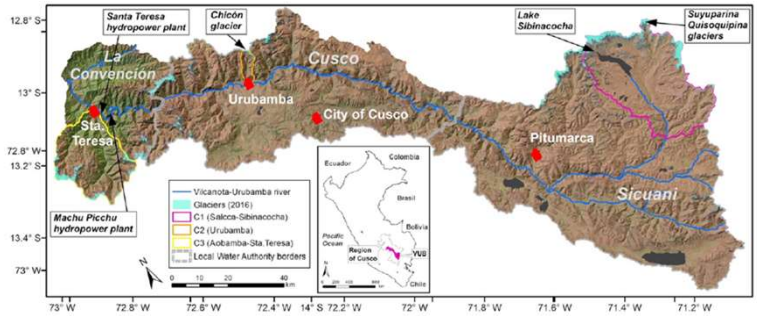
Leadership: CONDESAN & UNSAAC

WP4

- HUMAN VULNERABILITY AND ADAPTATION STRATEGIES
- Integrate data into a glacio-water security assessment model to propose integrated local strategies for adaptation to water risks.

Study Area

We selected the Vilcanota-Urubamba basin (VUB) in Southern Peru for addressing these challenges within a particular hydrological high-mountain context in the tropical Andes: One of the **greater glacier coverage** regions, **multiple uses of water** and **impacts of climate change**.



Activities and Preliminary results



- Up to date 4 months of continuous hydrological monitoring.
- Preliminary results about snow hydrological modelling in the VUB.
- Preliminary results about historical reconstruction of water use.
- Ongoing research about glacier mass balance modelling.

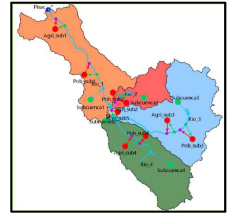


Fig. (above): WEAP umet water modelling in VUB
 Fig. (right): Hourly modelled streamflow at Pisac station

- A lumped hydrological modelling approach at hourly time-step for operational streamflow forecasting in Urubamba river.

Methods, models and basis

Regional Initiative for Hydrological Monitoring of Andean Ecosystems (IMHEA) **Citizen science**

Participatory monitoring of water resources

- Promote inclusive decision making
- Empower institutional capacities
- Prevent social conflicts

JULES **Glaciological balance model** **Glaciological projects UNSAAC**

References

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Expected Results

- New datasets on cryosphere, hydrosphere, water use, and human vulnerability, integrated in relevant local repositories.
- New modelling algorithms (glacier, hydrology, water use) integrated in operational practice.
- A locally-relevant methodology to assess human vulnerability to climate change embedded in local policy.
- Catchment interventions as climate change adaptation pathways integrated in national policy.

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