



## **Climate variability in the North Andes, implications for human health.**

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Scenarios from climate models predict substantial changes in the atmospheric conditions over the next decades. The tropical Andes are a particular vulnerable region regarding the impact of climate change on the mountain cryosphere. Indeed, glacier retreat is under way in all Andean countries, from Colombia and Venezuela to Chile. This will have fundamental consequences for the local population, exacerbating directly and indirectly the degradation of ecosystems altering food systems or leading to the (re-)emergence of infectious disease pathogens. For water-related infectious diseases, there are four means of transmission: ingestion through water supplies (water-borne), lack of water for personal hygiene (water-washed), via an aquatic host (water-based), and via insect vectors that depend on water (vector-borne).

Changes in timing and distribution of freshwater runoff, will affect water supply for cities and agricultural use. This is the case for Ecuador, Peru and Bolivia. For instance, the Peruvian Andes have lost at least 22 percent of their glacier area since 1970, and those glaciers feed rivers crucial to the sprawling cities and shantytowns in this dry region. Increasing difference between the wet and dry season will increase the risk of water-related diseases.

Malaria and dengue continues to pose a serious health risk in Latin America, where 262 million people (31% of population) live in tropical and subtropical regions with some potential risk of transmission (IPPC, 2007). The pattern of vector borne diseases in humans is inherently sensitive to environmental changes, influencing the life cycle

dynamics of the pathogen, its vector, and its host.

In preparing for the challenges that climate change is posing in the region, research priorities should be focused on resolving the constraints already identified in terms of facing current climate variability and trends within a regionally specific context . This challenge demands a transdisciplinary approach because of the complex feedbacks between biophysical and human systems and the importance of considering the priorities and needs of a wide range of concerned stakeholders. We are proposing to develop a transdisciplinary project which main objectives are:

1. Reconstruct the hydrology of key sites (upper basins in the Andes), using data from glaciers retreat studies and results from existing regional climate and hydrological models.
2. Assess the impact the climate variability and ENSO on the spatial and temporal distribution of climate-hydrology related to human health especially to water-related infectious and vector borne diseases.
3. Identify ecological and social vulnerability zones in the North Andes region to the precipitation and stream flow linked to water and vector borne diseases.