



## Quillcay Disaster Management Plan

### Executive summary (24 June 2014):

The Mountain Institute's High Mountains Adaptation Partnership (HiMAP) team coordinated with the Ministry of Environment to establish a multi-stakeholder platform in which to discuss strategies and actions for reducing the risks posed by a potential glacial lake outburst flood (GLOF) from Palcacocha that would affect the city of Huaraz. The platform identified as a priority action the installation of an early warning system for Huaraz. This platform was incorporated into the Waraq Municipal Commonwealth when the latter was officially recognized by the Peruvian government in December 2013.

The role of the HiMAP team was to provide support to the platform. The meetings of the platform were jointly called by the Ministry of Environment and The Mountain Institute's HiMAP. These meetings identified the early warning system (EWS) as a priority project and directed follow-up and citizen involvement in a process that concluded with the preparation of a public investment project that is currently completing final analysis for funding at the Ministry of Economy.

The project developed for public investment is titled "Palcacocha Lake Glacial Lake Outburst Early Warning for Quillcay Watershed, Huaraz Province, Ancash Region." Once approved, the project is to be implemented by the Waraq Municipal Commonwealth. The project profile was prepared by the economist Ricardo Guerrero and by engineer Cesar Portocarrero (the study was commissioned by the Ministry of Environment).

The following studies, presented as attachments to this executive summary, were financed by the Ministry of Environment:

1. Palcacocha GLOF Early Warning System (Public Investment Project developed for the National Public Investment System)
2. Technical Report on Palcacocha GLOF: Risks and Hazard Map
3. Survey methodology for the assessment of current early warning systems
4. Preliminary Environmental Impact Assessment of Early Warning System

Summary explanations follow:

1. The "Palcacocha GLOF Early Warning System" project is an adaptation measure to reduce the vulnerability of people living in the Quillcay watershed and the city of Huaraz. The project reduces the risk to 34,783 residents of the watershed who are located in the area of highest risk ("highest risk" means near-total destruction of infrastructure and life).

The value of the proposed project, as registered with the National System of Public Investment at the Ministry of Economy, is equivalent to \$788,063 US (soles S./ 2,127,771). The project includes investments in:

- Technical studies

- Infrastructure improvement of base camp
- Infrastructure: emergency management center
- Equipment and materials
- Communication equipment
- Civil Defense Sirens
- Other equipment
- Evacuation routes: hazard maps and billboards
- Capacity building/training
- Local knowledge/participation
- Public outreach

The results expected are a 90% reduction in the level of risk currently faced by the population of the city of Huaraz and Quillcay valley.

2. The “Technical Report on Palcacocha GLOF: Risks and Dangers map” describes the nature of the 1941 GLOF and the events of 2003 that left the city of Huaraz without potable water for ten days. The study documents the technical reports issued by the Unit of Glaciology since 2010, which recommended immediate action. These recommendations were implemented through a norm that declared the emergency and allowed the establishment of a temporary system to syphon the lake. The purpose of this temporary measure was to allow time to complete the studies required to lower the lake. The “temporary” measure was renovated eleven times between October 2010 and August 2012. Considering the complexity of a project to reduce the lake with government funds, the report proposes a priority need to quickly implement an early warning system (EWS). This was validated by a Task Force of government agencies convened by the Office of the Prime Minister. An additional reason to establish the EWS is that during future works to lower the lake there is always a risk that the work in the moraine may trigger a flood. This technical study presents the geo-morphological features of the terminal moraine and the glaciers above Palcacocha lake; the growth of volume in the lake; and the results of the HiMAP/University of Texas models to assess the extent of damage in case of a GLOF.

3. The “Survey methodology for the assessment of current early warning systems” is a questionnaire developed to assess the level of knowledge, preparedness, and willingness of the population to participate in activities associated with the proper operation of an EWS. It was applied to a sample of 134 residents in the parts of Huaraz that would be most affected by a potential GLOF originating from Palcacocha.

4. The “Preliminary Environmental Impact Assessment” of the project is required because the EWS involves work and equipment in Huascarán National Park. The document presents guidelines to reduce potential environmental impact (impact is minor).

As noted, this set of documents is the response called for by the Quillcay platform, with financial support of the Ministry of Environment. The HiMAP project had a catalytic role in this process.