



THE HIGH MOUNTAINS ADAPTATION PARTNERSHIP

HELPING HIGH-MOUNTAIN COMMUNITIES
ADAPT TO CLIMATE CHANGE



Photo by: Daniel A. Byers

Developing countries in high-mountain regions are facing significant climate change impacts such as rising temperatures, melting glaciers, and related threats to water quality and water supply.

USAID supports these countries by assisting communities as they develop local adaptation plans, supporting an international community of practice, and funding applied scientific research. These activities can help save lives and preserve development gains by reducing vulnerability to climate change.

CLIMATE CHANGE IMPACTS IN HIGH-MOUNTAIN REGIONS

The glaciated, high-mountain regions of the world provide essential water resources to many downstream communities. Temperature changes and other climate impacts dramatically affect hydrologic patterns in these high-mountain watersheds. Higher temperatures often lead to glacial melt, resulting in unpredictable water supplies, reduced water quality, increased threats from glacial lake outburst floods (GLOFs), and related impacts on economic development, lives, and livelihoods.

GLOFs are a major concern in the Himalayas and the Andes, where melting glaciers have created large, fast-growing lakes held by natural dams of soil, ice, and rock. When these natural dams burst, flash floods can cause deaths and extensive physical damage to communities, agricultural fields, roads, hydropower facilities, and tourism infrastructure in the valleys below.

USAID PROMOTES ACTION THROUGH THE HIGH MOUNTAINS ADAPTATION PARTNERSHIP (HiMAP)

USAID supports HiMAP (<http://www.highmountains.org>) to strengthen adaptation planning capacity, knowledge-sharing, and research capabilities related to climate-resilient development and disaster risk management in the glaciated regions of Peru, Nepal, Tajikistan, Pakistan, Bhutan, and other mountainous countries.

HiMAP evolved from a series of three USAID-co-sponsored workshops on glacial melt and related impacts held in Peru and Nepal. Peru, which has more than 40 years of experience managing its glacial lakes, hosted a 2009 workshop on "Adapting to a World without Glaciers." Because Nepal was just beginning to experience glacial retreat impacts such as flooding, a Nepali participant asked the

IMPACTS OF RETREATING GLACIERS AND GLACIAL LAKE OUTBURST FLOODS

Rapidly melting glaciers are among the most dramatic indicators of climate change, and the impacts can be devastating.

In Peru:

- Glacial retreat has reached critical conditions with a 22% reduction of total glacial area over the past 35 years.
- In 1970, the Ancash earthquake triggered the collapse of an unstable mass of glacial ice. This caused an avalanche of ice, mud, and debris, burying the town of Yungay and killing 20,000 residents.

In Nepal:

- Ten glacial lakes have burst during the past 40 years.
- Imja Lake is one of the largest and fastest growing glacial lakes. It did not exist in 1960; today it is 380 feet deep and 1.25 miles long, and is expected to grow another half mile in the next six years.
- The potential cost of property, agricultural, infrastructure, and revenue damages from a single GLOF at Imja Lake is estimated at more than US\$ 12 million.

RESULTS AT A GLANCE

HiMAP assists Nepal, Peru, and other developing countries in high-mountain regions in building resilience to climate change. To date, HiMAP:

- Created and supports an international Community of Practice (CoP).
- Supports development of Local Adaptation Plans for Action (LAPAs) in Peru and Nepal.
- Hosts international workshops on glacial retreat and related impacts.
- Encourages active community participation in glacial lake risk assessment.
- Developed and funds the Climber-Scientist Small Grants Program. Projects are investigating issues such as:
 - Changes in glacial lake size and structure
 - Impact of glacial melt on water quality
 - Socio-economic impacts of flooding on downstream communities.
- Conducts critical scientific research on the threats of climate change, including GLOFs and receding glaciers:
 - Ground-penetrating radar (GPR) surveys at Imja Lake in Nepal provide data on the structure of the lake's terminal and lateral moraines, and will help inform an engineering solution to the threat of a GLOF.
 - Bathymetric surveys provide data on Imja Lake water volume. Subsequent modeling is shaping the development of risk reduction strategies.
- Collaborates with the governments of Peru and Nepal, and promotes exchange between these and other countries.



(Photo of research crew at Imja Lake by Daniel Byers)

Peruvian experts to share their knowledge with Nepal. This request led to an international workshop in Nepal, where participants recommended the creation of a community of practice (CoP) dedicated to reducing risks from climate change impacts in glacial regions. HiMAP and the CoP were initiated in March 2012, and HiMAP held its most recent international workshop in Peru in 2013. This provided opportunities for knowledge exchange and field training on glacial flooding and disaster risk management to scientists, practitioners, and decision makers from high-mountain countries across the globe.

USAID ACHIEVES RESULTS THROUGH HiMAP

Through HiMAP, USAID is supporting numerous activities that help high-mountain communities adapt to the impacts of climate change, including:

Conducting local adaptation planning. HiMAP supports the development of Local Adaptation Plans for Action (LAPAs) in Peru and Nepal. Local adaptation planning integrates climate change considerations into community-level development planning and, where relevant, into regional- and national-level planning processes. This approach helps local communities and decision makers identify vulnerabilities to climate change, prioritize adaptation options, and ensure effective implementation of these options. In Nepal, HiMAP is working on a LAPA with communities and stakeholders in the Khumbu region, near Mount Everest. Nepal pioneered the idea of the LAPA, and through connections fostered by HiMAP, the concept was introduced to Peru. In Peru, HiMAP assists the city of Huaraz and nearby mountain communities in the city's watershed to develop a LAPA focused on reducing risks from glacial lakes and other climate-based threats. USAID also provides vulnerability and adaptation training to the communities and promotes a community-based approach to developing adaptation solutions and connecting them with development priorities.

Circulating lessons learned through communities of practice. Through the HiMAP CoP, USAID strengthens pathways for local communities, scientists, and development practitioners to share their knowledge about glacial lake risk reduction and other adaptation approaches for high-mountain areas. The HiMAP workshops also facilitate the "South-South" exchange of information and experiences between Peru, Nepal, and other countries on glacial lake management.

Carrying out scientific research. USAID's Climber-Scientist Small Grants Program cultivates the next generation of researchers by providing field-based, hands-on opportunities to individual scientists and practitioners, academic institutions, and organizations working in high-mountain regions. The program focuses on applied research that assists mountain communities in adapting to climate change. In addition, USAID supports research conducted by HiMAP's GLOF Rapid Reconnaissance and Modeling team, which collects and analyzes glacial lake data to evaluate the risk of GLOFs and to manage glacial lakes in Nepal and Peru.

For more information about HiMAP, including contact information and a library of articles, fact sheets, videos, and photos, please visit <http://www.highmountains.org>.