



GLACIAL FLOODING AND DISASTER RISK MANAGEMENT KNOWLEDGE EXCHANGE AND FIELD TRAINING

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Policy tools for high mountain glacial lake and climate change management and adaptation

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Vulnerability and Adaptation (V&A), Community Consultations. *How we're engaging people: the process and expanded to something much larger*

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Objective of the module

Participants will be exposed to USAID's overall approach to climate change adaptation. This is an adaptation framework rooted in the principle of empowerment of stakeholders and in the importance of gaining understanding of their perspectives on development and vulnerability. This approach treats development outcomes as the priority and climatic changes as stresses that can undermine those priorities. Adaptation efforts are in the service of achieving development goals.

This will be followed by a more detailed presentation of how this approach was applied in the Quillcay watershed of Cordillera Blanca (Ancash, Peru) and complemented with information from the assessment report on public investment conducted by MINAM in the Quillcay watershed.

Through the experience gained in Quillcay watershed, participants will be able to learn and discuss this approach, the conceptual and pragmatic challenges involved in balancing science, development objectives of local communities, complex contextual elements, and the need to mainstream the adaptation process into the policy framework. Participants will gain first-hand knowledge of the Quillcay watershed pilot site in which USAID adaptation tools and methods are currently under implementation. The unique aspect of the Quillcay watershed is that it offers participants the opportunity to appreciate the connections between resilient local development and specific adaptation strategies to reduce the risk of glacial lake outburst (GLOF).

The Quillcay watershed

Quillcay is a glacier valley in Cordillera Blanca located immediately above the city of Huaraz. The alpine zone of the valley is located within Huascarán National Park, while the Park's buffer zone, down to the border with the city of Huaraz, is heavily populated

by rural and peri-urban communities. The watershed is 250 km². The rivers Paria and Auqi form the Quillcay river in the outskirts of Huaraz city, cutting the city into two political units: the municipal district of Independencia and the provincial government of Huaraz (together they form the city of Huaraz of approximately 130,000 inhabitants). There are 14 rural settlements, seven in each of the two jurisdictions.

Perception of the landscape where people live differs between city and rural dwellers. City residents had a negative perception of the high mountain areas as life threatening, places of risk (72,65%). On the contrary, only a smaller proportion of rural residents (27,35%) considered the high mountain areas as a source of risk to their lives or livelihoods (TMI/HMWGP 2012).

There are multiple climate related dangers impacting resources in the Quillcay valley, but paramount is the danger of a glacier lake outburst flood (GLOF) of the Palcacocha Lake. This lake burst in 1941 killing about 5,000 people in Huaraz. The lake's volume has expanded 34 times since the last engineering works to control risk conducted in the late 1970s. In spite of the relevance of GLOF risk, the priorities of rural dwellers are centered in water supply for agricultural production, water quality for human consumption and trout farming and only secondarily in the risk of GLOFs, i.e. for people development goals come first.

The implication is that adaptation to glacier recession in Quillcay involves understanding of the existing and projected irrigation systems, of the role of water in ecosystem functioning, water quality, changes in the farming systems in the valley, and finally of the social and political mechanisms required to promote management policies for adaptation in the entire watershed. In other words, the scope of adaptation measures in this glacier valley goes beyond adaptation to GLOF. The challenge is to manage the risks while also satisfying multiple development goals.

Urban policy makers set as their priority for adaptation responding to the danger of GLOF, extreme precipitation events, and water supply for the city. Two municipal governments manage the city, both largely focusing their investments in city development only. The environmental component in their respective budgets is restricted to gardens or solid waste management, although there are a few reforestation and minor development projects targeting rural areas of the Quillcay valley. The city was exposed in the past to capacity building in risk prevention, both by government programs and by non-profit organizations, but it was not sufficiently developed. Thus, while there is a degree of public concern for the risk of GLOFs, no plans, organized groups or investments are in place. Participants will be exposed to the process followed by HMGWP and MINAM to promote cooperation between the two municipalities and the catalytic role of science-based, legitimate information in the process.

In cooperation with the Ministry of Environment (MINAM), The Mountain Institute initiated a process of consultation with rural communities and urban stakeholders of Quillcay to identify development priorities, dangers, vulnerabilities and design a plan at local scale to foster implementation of adaptation measures. This process is still under way but it has already generated insights into the valley that will be shared with participants. The "field" practice component of the module is based on a rapid reconnaissance of the terrain in the vicinity of the city (the areas most exposed to GLOF) and it will also include interactions with stakeholders in two meetings, one with

representatives of rural groups and one with city administration staff. During the session participants will also discuss the policy tools available in Peru that would enable long time sustainability if applied in Quillcay watershed such as the Economic Ecological Zonation (ZEE); the National Plan for Adaptation in the Agricultural Sector (GRACC); the new risk reduction policy and the guidelines for incentives in public investment proposals that incorporate risk assessment.

Adaptation in the High-Mountain Context

An array of tools and guidance are now available in the rapidly growing field of climate change adaptation (IPCC, CRYSTAL, VIA, USAID V&A Handbooks, among others). These methods share basic principles, which are centered on the concept of vulnerability and offer relatively similar steps. Nonetheless, it is important to set these methodologies in the larger framework of development. It is also equally true that these methodologies need to be validated for different global socio-ecosystems. While glacier lakes pose very real risks to people in high mountain areas, those same people have very real development needs. Their livelihoods are being affected by climatic changes. Addressing the risks while promoting development will both protect and empower high mountain communities.

In this particular case we will be looking at examples of how these methods are applied to high-altitude mountain areas dominated by large glaciers. While each location is a unique context and there is not one recipe for adaptation, it is very important to develop case studies, identify best practices and recommend tools and examples that work to facilitate replication at larger scales. This module shares the experience gained so far in the process to test adaptation methods in one glacier watershed of Peru, which has been identified as a pilot site for learning by MINAM.

A particular feature of the Quillcay site is the effort underway to mainstream adaptation into the existing institutional and policy framework of Peru. In this sense it is important to first have a broader perspective on the importance of policy tools for the adaptation process.

Policy tools for high mountain glacial lake and climate change management and adaptation

The overall approach and process by which USAID has developed its concept of climate change resilient development, policy tools and the role of science. Rather than focus on the climatic changes in some future time frame, USAID begins by discussing development goals with stakeholders, whether at the national or local level. Often these goals align with key economic sectors, such as tourism or agriculture. Once a set of development goals is identified, stakeholders then identify the necessary inputs and conditions required to achieve the goals. For example, to achieve food security, some of the inputs and conditions include a robust agricultural sector with fertile soils, adequate water supplies, fertilizer, favorable climate, labor, markets, a transportation system. Also necessary are people who have the resources to buy food, who are healthy enough to benefit from eating. Next, stakeholders are asked to identify stresses and constraints that undermine the inputs. Climatic stresses may include a drought, delayed rainy season, heat waves, unexpected frost. Non-climate stresses include perverse economic incentives, lack of access to markets, inability to move food from farm to market. Where a climate stress clearly affects a key input, it may be necessary to do a detailed vulnerability assessment to understand exactly how the stress affects the input.

In some cases, the problem may be obvious, such as a lack of a seasonal climate forecast to help farmers plan. The process can be worked through iteratively until there are simple relationships between stress, input, and outcome. Then solutions can be identified to reduce the stress, allowing the input to be used as needed, and hopefully contributing to achievement of the outcome.

This approach gives stakeholders a strong role in identifying the areas where adaptation assistance will be provided. It draws on their knowledge of what is important to them, how they understand the impediments to growth, and allows them to co-design solutions to the problems. The approach also ensures that information that is brought into the process is relevant to the decisions being made. A farmer should be able to make it clear that the decisions he is making will benefit more from information about the next season than about the next century. A reservoir manager would have different information needs.

Mainstreaming the climate change adaptation process in Quillcay

A characteristic of the process in Quillcay has been the effort to explore opportunities to embed the process to foster climate resilient development and adaptation process in existing institutions and within the climate change policy framework of Peru. The HMGWP was designed to include a preliminary phase of consultations with stakeholders (May-July 2012) in order to design the overall program. As a result of this preliminary design phase we were able to identify a mainstreaming strategy for the program. This, in turn, facilitated dialogue with the Ministry of Environment of Peru that adopted Quillcay as one of two national pilot sites to develop adaptation measures.

Three institutional components were identified to design the project in Peru:

1. Creating awareness of risk of GLOFs and risk management programs through the national schools system (e.g. the Ministry of Education curricular program on risk of disaster management or the Parent Training program)
2. Development of Local Adaptation Plans for Action in the Quillcay watershed developed through participatory processes in conformity with the regulations of the National Disaster Risk Management System(SINGERD), the National Civil Defense Institute (INDECI) and therefore by definition in partnership with local governments, and finally by seeking linkages with the Local Water Authority (ALA).
3. Developing the adaptation process to build a pilot site for learning of lessons and particularly the application of science-based information to inform decision-making. The strategy of working in a pilot site facilitates replication of the process in other glacier valleys of the region. Involve local university Santiago Antunez de Mayolo.

The support of the Ministry of Environment provided for additional opportunities to mainstream the adaptation plans through (i) training programs for municipalities on the design of public investment projects to support local adaptation plans; (ii) graduate level short courses on climate change adaptation for government functionaries; (iii) stronger linkages of the local plan to the Regional Level climate change policies; (iv) improved access to other government agencies to access information, technical support or

resources, and (v) small funds to support immediate adaptation, non-regret measures, in small scales.

Steps to Adaptation

This methodology is based on USAID “Adapting to Climate Variability and Change: A Guide for Development Planning”, which is due to be released soon.

While the initial design of the project had a focus on the specific threat of a Glacial lake Outburst of Palcacocha, a risk of potentially devastating consequences for the city of Huaraz and the economy of the entire region, consultation with stakeholders in the project area made clear that they were placing their local development priorities first and we had to therefore place the threat of a GLOF into a broader context.

A keystone aspect of this approach which supports each of the following seven steps as they are implemented, is an intensive process of stakeholder consultation, more demanding in the diagnostic phase but equally important throughout the entire process. Consultation is also synonymous with the process of building trust with stakeholders, understanding their development priorities. Trust is an intangible asset that is nonetheless crucial to sustainability of the adaptation plan. Building a bottom-up adaptation plan is also a commitment to facilitate the linkages with government and other decision-makers that have key resources or information needed by stakeholders. Activities that sensitize stakeholders about different aspects of climate change or prospective adaptation measures is also an activity that may be specially intense in the first steps but is needed through out the seven-step process. Sensitization will be needed at all decision-making levels: from local communities to government decision-makers.

The first step for the entire process is to identify development priorities and economic drivers.

As stated above, through a stakeholders’ consultation process, participants will identify their development priorities and key economic or livelihood activities. Ideally, these will be drawn from existing development plans. This step really frames the rest of the process. Different stakeholders may have different priorities, but through this collaborative process, they should be able to either come to agreement on priorities, or identify areas for work that will meet multiple needs.

The process of building a local adaptation plan requires the trust of local communities, i.e. respond to their development priorities. Communities are quite direct in posing the question of relevance to these types of planning exercises (“Is it worth investing our time in this planning process?”) To the extent that the planning process is responsive to their priorities they have an incentive to engage in the process.

At this stage we revised the existing “Municipal Concerted Development Plan” [Planes de Desarrollo Concertados PDCs], which is a document that all local governments are mandated to have in order to steer public investment. MINAM also conducted an assessment of actual public investment in the Quillay valley to contrast local development plans drafted through consultation against actual performance.

We also defined the geographic boundaries and the sectors upon which we would be working to identify vulnerabilities. The geographic space we defined was the whole Quillcay watershed and not only the valley of Palcacocha lake because the consultation process showed that this was the proper scale to address the development priorities identified (e.g. water quality, food production, off-farm income, livestock production, tourism). The geographic scope of work responded to consultation with stakeholders.

In spite of its proximity to glacier valleys and the fact that Huaraz city itself is a mountain town, there is a divide between the city and its hinterland at the level of education, development, and governance. This divide exists in spite of the fact that the rural areas are deeply integrated into the city: a large proportion of rural villages have double residency (in their communities and in Huaraz); male farmers have seasonal or even year long day jobs in the city; women produce crops, small animals and medicinal and aromatic plants to sell in city markets, students from rural communities attend secondary and university in Huaraz, etc. In spite of integration, there is a cultural and social divide between city and valley: the city school system has no program to train students in mountain geography, or risk issues associated with living at the foot of the mountains (e.g. GLOFs), nor climate change lessons, or field expeditions to know their mountain environment; as noted before, municipal and regional government investments in rural areas are quite marginal.

Rural communities established as their development priority to improve their farming systems at different levels. There was a widespread interest in rural villages to improve their irrigation systems, developing new crops like medicinal plants, improving access to quality potable water, which they associated with several health problems, among others.

The second step is to identify critical inputs and conditions necessary to support the development goals.

At this step, participants begin to break down key livelihood activities into their components. Robust agriculture requires seeds, land, fertilizer, water, labor, etc. Each of those may be vulnerable to different stresses; understanding how each is vulnerable is useful to developing ways of reducing that vulnerability. In addition, policies may be necessary to enable a sector to thrive. Secure land tenure may be necessary to enable farmers to make investments in their farms. A reliable weather or climate forecast may be necessary to help farmers make decisions on what to plant and when.

The third step is to identify stresses – climate and non-climate – that negatively affect the inputs identified in step 2.

Climate stresses include a delay in the rainy season, inadequate rains across the growing season, melting glaciers, and/or higher temperatures. Non-climate stresses may include a lack of land tenure, inadequate or inaccurate weather forecasts, policies that discourage production, lack of access to seeds, etc.

A survey conducted in the valley (n= 162) and city (n=62), followed by 25 in-depth interviews with key informants and 5 workshop with men and women representing grassroots and villages in the Quillcay rural areas, provided information to understand the climate related dangers perceived by communities, the resources these dangers were

impacting, the nature of the exposure and sensitivity associated with them and the consequences that they were having in terms of risks to their well-being as rural societies. Non-climatic stresses included low prices for agricultural products; increasing prices of industrial farming inputs; male migration to city labor markets as well as permanent out-migration of young people and thus a reduced farm labor force; abandonment of agricultural plots.

The main climate related stresses include glacier recession; variability of climate and thus displacement of seasons from traditional planting calendars; more extreme high and low temperatures, and thus more frequent incidence of frosts; stronger winds and more extreme rain events, followed by longer dry spells. These climate tensions were combined in different ways depending on what resource was at stake. The resources impacted by climate were those that sustain their development priorities:

- Water (quantity and quality)
- Agriculture (subsistence and markets)
- Domestic Animals (livestock, ovines, horses and donkeys)
- Natural grasslands

The fourth step is to identify possible solutions to address the stresses identified in step 3.

In some cases, solutions may be clear. In others, additional analysis may be needed. This is the step in which a more detailed vulnerability assessment might be launched. However, one might not be needed. If the biggest impediment to development is a lack of a seasonal climate forecast, the next step would be to work with the meteorology department and key “clients,” such as agricultural extension, to conduct a needs assessment. A capacity building effort might begin to enable the meteorological service to better meet the needs of those clients. On the other hand, if there is a physical stress, there may need to be a vulnerability assessment to clarify the nature of the stress and response.

Some of the potential adaptation measures identified by communities can be classed as non-regret and therefore targeted for immediate implementation at small, pilot scales, once they are subject to analysis and priority setting. In Quillcay, this was possible thanks to special funds provided by the Inter-American Development Bank/Ministry of Environment adaptation project (MINAM/IDB). The purpose of focusing first in non-regret measures is that these are interventions that will be beneficial under any future climate scenario. For example supporting women groups in more efficient production of medicinal plants, building shelters for livestock, or building the capacities of local leaders to engage government agencies to support implement of their plan are non-regret alternatives that will have environmental and social benefits under any future climate condition.

The analysis of adaptation options is a step not yet completed in the Quillcay process. While the participatory analysis focuses initially in the support of non-regret and autonomous adaptations, and these can be identified to start the adaptation actions, there are other adaptation measures like the building of reservoirs that will need more detailed vulnerability analysis and further economic, environmental, social and political analysis

(e.g. understanding the role and vision of Huascarán National Park regarding these adaptations is crucial because which access and use of alpine areas located inside this protected area).

In order to prepare for the longer-term challenge of mainstreaming climate change adaptation in public investment, the Ministry of Environment (MINAM) has initiated a training process with staff in municipalities and regional government offices to revise the portfolio of projects that could support the adaptation plan of both the city and valley. Training creates awareness, willingness and empowers local agencies to support the plan. As noted before, all along this planning process the HMGWP/MINAM-IDB partnership is supporting the two municipalities develop Task Forces for Risk of Disaster Management (as mandated in the national legislation), expecting that they can be a key element to support analysis of adaptations and also implementation of the plan.

As part of the consultation process, communities identified a number of measures that they consider will reduce their vulnerability. These potential responses comprise a range of types, from autonomous to potentially more directed adaptations. Autonomous adaptations include, for instance, the recent but quite extended development of medicinal and aromatic plants produced by women who are adapting not only to higher risk in traditional agricultural production but also to a reduced male work force as a result of migration to nearby city labor markets. Directed adaptations include both small initiatives identified locally like building small barns or reforestation with native species in the alpine to shelter animals from extreme low temperatures, and larger measures such as building water reservoirs or extending canals. In fact some of these projects are already in the funding pipeline of government agencies but need to be analyzed to become “climate smart”

In order to provide more detailed vulnerability analysis to assess solutions to address the stresses identified in step 3, the HMGWP team at the Department of Water Resources Engineering, University of Texas at Austin, developed models to represent and analyze the impacts of GLOF (Palcacocha), extreme precipitation events, the hydrology of the Quillcay and geographic information systems as a tool to gather the information necessary for further analysis of vulnerability. These models inform the consultation process both with city stakeholders and rural communities.

The fifth step is to select an action plan.

As indicated above, the methodology followed in Quillcay is based on the concept of empowering stakeholders to manage their plan. The challenge is to develop an action plan that is embedded in local institutions involves understanding the opportunities in the existing policy framework for adaptation. Thus the HMGWP/MINAM partnership is providing technical assistance to both municipalities to develop a commonwealth, a legal mechanism by which local governments can set shared objectives, like cooperation to reduce risk of GLOFs over the city, improve the management of natural resources in the valley to protect water quality or reduce risk of landslides, and promote integrated watershed management of Quillcay. Also, there a number of local organizations that have emerged in steps one and two as potential champions of the plan. While the reality of the watershed is that each village or community operates independently, the goal is to promote inter-village cooperation. Candidates to champion

the action plan include existing water user associations set up to manage or develop irrigation infrastructures that serve multiple settlements.

The action plan will be built by each community that participated in the consultation and the expectation is that once the commonwealth is in place it will serve as the mechanism to gather settlements to validate the plan.

The sixth step is to implement the adaptations.

As noted above, this step will initially involve the implementation of non-regret measures (through the support of MINAM-IDB). The small projects to be supported will be also an opportunity for rural organizations to engage their local governments and prepare to participate in the citizen consultation process during the annual budget cycle.

This period is also an opportunity to explore development mechanisms such as the establishment of Local Research Action groups. For instance, already during step one, communities in Quillcay (Auqui river section) identified climate related threats to the quality of their potable water as a priority and expressed an interest in joining diagnostic studies conducted by a grantee of HMGWP/Climber Scientist.

The seventh step is to evaluate the adaptations.

While the precise mechanism to support stakeholders' evaluation of the effectiveness of their plan, some tools already under development could help that process. These include, the establishment of a GIS internet-based platform for Quillcay that can evolve to incorporate visuals, metrics and analysis of adaptations; the legislation of municipal commonwealths presents the opportunity to develop a "Citizen Conference" which regularly gathers stakeholders precisely to plan and monitor implementation of projects (in this case with an adaptation to climate change focus); local grassroots research action groups are a form of "citizen science" that can gather local people interested in cooperation with scientist to evaluate the effectiveness of adaptations.

Conclusions

- This module presents the V&A tools and mainstreaming approaches as currently implemented in the Quillcay valley in Cordillera Blanca. It offers concepts, tools and examples from the field. While the process is not yet complete, the participants will be exposed to strategies that help build sustainability in adaptation to climate change.
- Exposition to the V&A approach through the concrete example of Quillcay, helps participants capture lessons that can be applied to their own countries and sites.
- The relevance of a pilot site is that it offers the opportunity to link science-based information to local perspectives and institutions. A pilot site is a socio-ecosystem that demonstrates the importance of addressing complexity by acting in both the ecological and societal components of adaptation. A pilot site is also learning place where lessons can be captured and methods refined to become even more useful tools for adaptation.