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Pathways to Active Community Water Management in the Ancash Region

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The severity of water challenges facing communities in the Cordillera Blanca and Huayhuash mountains in the Ancash region of Peru has been documented by studies in glaciology and hydrology (Bury J. T., et al., 2011; Bury, et al., 2013; Kaser, et al., 2003; Salzmann, et al., 2009). Though historical records are sparse, work indicates that the glacial base flow in 7 of the 9 major rivers has reached its peak and will continue to decline (Mark, et al., 2010). Additionally, downstream communities face physical risk from fast filling glacial lakes in steep valleys that could produce extreme flood events triggered by avalanches (Kaab, Reynolds, & Haeberli, 2005; Carey, et al., 2012). The impacts on the livelihoods of communities from climate change and water stress are also a main concern as food security and ecological systems will continue to become more vulnerable (Bury, et al., 2013; Carey M., 2005). These issues mandate the need for organization within rural communities to develop adaptation measures and resource management strategies.

This work addresses the issue of community participation for adapting to local water challenges through two main strategies. The first is developing a portfolio documenting the water problems in rural communities in the Ancash region, specifically communities who are members of the Tres Cuencas Commonwealth. The goal of this strategy is to perform basic diagnostics of water quality and quantity issues in the communities and make the information publicly available to municipalities and the Commonwealth so they can apply for project funding through the regional government. The second strategy is to implement small scale water and climate data collection through community committees. The scarcity of climate and hydrologic data has made it difficult to quantify changes on the community scale, though people overwhelmingly agree on noticing changes in temperature and rainfall patterns. The goal of this is to provide simple instruments for measuring water quantity, quality, and climate, along with teaching a group of committed individuals in the community how to perform the tests. With this system in place, this project also seeks to test the feasibility of transferring data via text messaging to an internet

database. Since the cellular network coverage in Ancash is widespread, and usage and familiarity among the population are extremely high, transmitting data through mobile technology is a feasible prospect should the community be interested in adopting these methods.

Section I: Documenting Water Challenges in the Tres Cuencas Commonwealth

Since many Andean communities in Ancash depend on seasonal snowmelt from glaciers as a base flow water supply during the dry season, they are highly vulnerable to changes in climate and variations in seasonal rainfall patterns. In recent decades, these sources of fresh water have become less reliable, and many of the rural communities have experienced water shortages during the dry season – a phenomenon that is expected to continue as glacial melt declines. The impacts of these shortages have been felt most acutely by farmers and ranchers in the region who have noticed changes in crop yields and struggled to maintain adequate pastureland. Natural mineral contamination in several of the region's watersheds compounds water availability issues. The contamination is so concentrated in some areas that stream water is unhealthy for livestock and irrigation use, contributing to the water shortage crisis for these farmers and ranchers.

As a proactive response, 19 campesina communities and 8 municipal districts have formed the Tres Cuencas Commonwealth (Commonwealth) for the sole purpose of mitigating water issues within the three watersheds (*cuencas*) that feed the region's rivers: the Santa, Fortaleza, and Pativilca (see Figure 1 for a map of the participating communities). In establishing themselves as a nationally recognized entity, the Commonwealth has initiated steps at the local and national levels to address their water concerns. Communities in the Commonwealth lack the financial and technical resources to develop a solution strategy for their community-scale water issues.

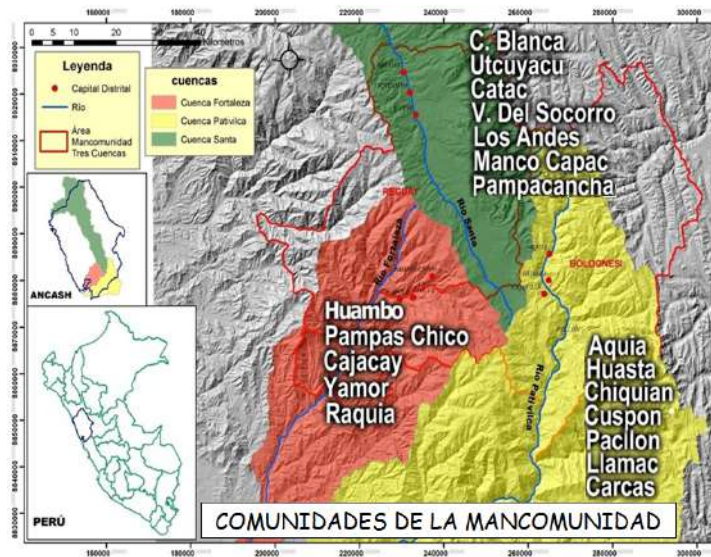


Figure 1. Comunidades de la Tres Cuencas Commonwealth (courtesy of Fidel Rodriguez)

This project has selected six communities in the Commonwealth, two in each sub-basin for pilot assessment: Pampas Chico, Yamor, Huasta, Pacllon, Utcuyacu, and Canrey Chico. The project is in the process of completing assessments of water systems, which include measuring water quality and quantity in springs, reservoirs, and canals. These assessments are completed in coordination with members of the campesina community and provide an opportunity for participatory monitoring. The long term goal is that other communities in the Commonwealth can adopt similar systems with the help of The Mountain Institute and regional government. The portfolio project will compile all quantitative assessment data as well as a social description of the community, the livelihoods and basic demographics of the population, and a GIS map of the area.

One further segment of the assessment is to determine whether the community is interested in a mobile phone data collection system, or if they instead prefer a paper collection system. For those with mobile coverage and a willingness to participate, a pilot mobile system will be tested in which members of the community send a coded text message to a number provided with a certain data point, and the information is stored on a database accessible to anyone interested and with access to the internet.

Section II: Addressing conflict through capacity building and water management in Laguna Paron

Social conflict between the campesina community, Cruz del Mayo, and the owners of the hydroelectric plant, Duke Energy, over water allocation and rights has been ongoing since around 1992. <<history of paron conflict – adam? >> The conflict has created new difficulties in managing water from the Paron watershed, since Duke

Energy has a right to claim a rather large amount of water – 8 m³/s and a total of 365 MCM <CHECK THIS> per year. In addition, the conflict has led to new opportunities for collaboration and cooperation within the community for developing a water management plan and become organized to better address existing and future conflicts.

This project seeks to build capacity through holding a series of workshops in the Cruz del Mayo community and establishing a data collection system such that the community can quantitatively track changes in their watershed and local climate. The first diagnostic workshop was held in March 2013 to understand the problems the community members perceive regarding water. A results summary from surveys and group conversation are shown in Table 1, where the community identified and discussed water-related issues.

Table 1. Summary of community priority water issues in Cruz del Mayo community

Issue	Description
Municipal Water Supply	One sector has experienced shortage in the dry season since 2008
Animal sickness	Cows (diarrhea), pigs (cholera, fever), sheep (allergies); when it rains the animals get sick more frequently
Hydropower	Duke Energy wants to own the operations of Paron
Agriculture	Crops have plagues more often; canal infrastructure and maintenance; production costs
Land management	The pastures and forests are both valuable; when it rains the eucalyptus flourishes but that means pasture is limited; in periods of no rain there is abundant pasture but then no eucalyptus
Mining	Possible contamination from activities in the area

Subsequent workshops focused on risk perception of both the physical risks of avalanches and glacial lake outburst flooding, and also with risks to economic development and family health. The community identified risks of crop plagues, animal sickness, and climate change to be threats to livelihoods as well. The associated vulnerabilities were identified within the group to include a lack of capacity and organization within the campesina community to deal with such issues.

The next steps following the workshop series are to help the community organize internally and develop a water management plan, as well as a civil defense committee to address potential risks in the basin. Primary approaches to achieving this will be to

continue to work on the ground with the community, educating interested members on how to measure water quantity and quality, providing instrumentation to do so, as well as map the areas of risk in the watershed.

Future work will include collecting local level data on water usage in the canal system, and writing an optimization model to allocate water among stakeholders and users in the basin. This model may point to areas of cooperation between Duke Energy, the campesina community, and the municipality of Caraz, where water can be allocated more efficiently and the benefits of cooperation may outweigh individual gains.

Conclusions

Based on the field experiences thus far in this project, there is a sense that communities understand the problems they face, and want to address actions on the local campesina level; however, many lack the technical data and access to resources to move forward with projects. The interest in wanting to measure data and begin to track water use and changes in climate likely stems from this understanding, as concern for future water accessibility grows. Thus, there is an opportunity to introduce conservation in irrigation practices and education for potable use as potential adaptations. Scaling small solutions to communities with similar water issues and agriculture practices is a possible way for introducing new technologies and relying on local knowledge to realize practical adaptations.

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