Participatory Social Impact Assessment of Water Funds: A Case Study from Lima, Peru

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Executive Summary

Water users and governments are increasingly recognizing watershed conservation as a critical component of a comprehensive water security strategy. In Latin America, this has inspired the launch of dozens of water funds, which facilitate investments in watershed conservation and restoration by pooling financial contributions from downstream water users, governments, and businesses.

Beyond generating hydrological benefits for downstream water users, many water funds also aim to improve the livelihoods and wellbeing of partnering upstream land users, especially where those land users are economically marginalized. Generating social and economic benefits for upstream land users is commonly seen as a critical component for ensuring equity in the fund's impact, as well as increasing the likelihood that the fund's interventions will be sustained over time.

Despite this interest in wellbeing benefits, social impacts of water funds remain poorly documented and rarely explicitly incorporated into project planning. Moreover, guidance on planning for and assessing social impact for water funds is very limited, with few applied examples to inform good practice.

This case study, therefore, addresses the need for practical guidance for social impact assessment for water funds by documenting and reflecting upon a social impact assessment process led by Aquafondo, the water fund for Lima, Peru. Specifically, the case focuses on Aquafondo's pilot project in the upstream community of Huamantanga, where the water fund plans to generate hydrological benefits through the restoration of pre-Incan infiltration canals and highland grasslands.

Specifically, this case study describes and discusses key lessons emerging from a social impact assessment workshop convened for the Huamantanga pilot project by Aquafondo, the Natural Capital Project, Forest Trends, and the Nature Conservancy. The process used was highly participatory, and involved engaging the Huamantanga community and other stakeholders in describing and evaluating assumptions about the project's context, goals, and theory of change.

The social impact assessment process – documented in detail in the full report – had many benefits, including that it helped to:

- **Improve the likelihood that the project will be equitable, effective, and durable** by clarifying assumptions in the initial project design, accordingly adjusting the project's strategy, and developing contingency plans for risks and potential negative impacts.
- **Build trust** by facilitating open communication and information sharing between the water fund project developers and upstream partners.
- **Reveal the most important social, hydrological, and economic benefits that the community perceived it would receive**, including:
  - Improving knowledge and understanding about their native grasslands and revaluing ancestral knowledge around water management;
  - Strengthening community organization and capacity for greater management of highland native grasslands;
  - Increasing water availability during the dry season; and
  - Improving overall agricultural production.

- **Clarify how upstream and downstream interests align**; for example, by showing that most of the anticipated benefits for the upstream community directly contributed to achieving hydrological benefits for downstream water users.

Based on the Huamantanga pilot project experience, we propose the following recommendations for other water funds as they design project interventions and consider social impacts:

- **Clarify project objectives with all stakeholders**: Throughout the stages of design and impact assessment, water funds should ensure that the primary objective(s) of each project is specifically and clearly articulated and reviewed with all project stakeholders.
- **Incorporate social impact assessment into project design**: Project managers aiming to evaluate impacts should not overlook the opportunity to use participatory impact assessment to improve project design and explicitly link impact assessment to adaptive management.
- **Support full participation of all groups, including women**: Workshop facilitators should work within cultural norms to find ways for women to comfortably and fully participate. Strategies for doing so may include creating an all-women group at the workshop to contribute to and review workshop outputs, ensuring that the workshop facilitation team includes women, and creating a welcoming atmosphere for children at the workshop venue.
- **Understand how history frames the current project**: Water fund project developers and social impact assessment workshop facilitators should understand well the history of partnering communities with the water fund and other governmental and civil society partners, building on positive experiences to facilitate trusting relationships while managing potential risks associated with any negative previous experiences.
- **Complement workshop sessions with other tools**: Evaluators can use additional interviews and analysis to complement the identification of potential risks and negative impacts during participatory workshops, improving the likelihood that the accounting of risks and negative impacts is robust and candid.
- **Evaluate how strategies for achieving downstream benefits also create value upstream**: Water fund project evaluators should look for potentially more immediate and more clearly attributable social impacts in "interim results," or impacts that appear before the targeted ecosystem service improvement on results chains. These may include improvements to governance, knowledge, or capacity and may also be important indicators for the quality of the execution of project strategy.
- **Look for synergies in social and hydrological monitoring**: Water fund project evaluators should look for opportunities to integrate social and hydrological monitoring, which should contribute to adaptive management, communicating success, and increasing monitoring efficiency.

The social impact assessment process described in this case study represents an early stage of a participatory water fund design and implementation process that sets the stage for effective, equitable, and durable water fund projects. Long-term monitoring that carefully tracks selected indicators to inform adaptive management and communicate project outcomes to relevant stakeholders are critical next steps to ensuring project success. It is our hope that this case study provides a practical example that will inspire water funds and similar projects to implement social impact assessments in order to increase water fund benefits for both upstream communities and downstream water users.

Acronyms

CONDESAN	Consortium for Sustainable Development in the Andean Ecoregion
IWS	Investments in watershed services
NGO	Non-governmental organization
SBIA	Social and Biodiversity Impact Assessment (refers to methodology developed by Richards and Panfil, 2011)
SIA	Social impact assessment
SMART [objective]	Specific, Measurable, Achievable, Relevant, and Time-bound

Contents

Introduction

Investment in watershed services (IWS) is a growing strategy for water resource management, environmental protection, and sustainable development (Bennett and Carroll 2014). These initiatives are based on principles of mutual gain for upstream land stewards and downstream water users through the transfer of resources from water users to "producers" in order to promote source watershed protection. As a subset of IWS, water funds convene multiple actors, including governments, private and public companies, civil society, and upstream communities, to collectively finance and implement watershed protection and restoration (Goldman-Benner et al. 2012). The potential to provide benefits for both people and nature holds great appeal, and as a result, water funds are rapidly gaining traction around the world. In Latin America alone, the number of active water funds expanded from 25 to 40 between 2011 and 2013, channeling nearly USD $7.5 million into watershed investments in the region in 2013 (Bennett & Carroll, 2014).

Despite the rapid uptake of water funds, relatively little is known about the actual hydrologic and socio-economic impacts of water funds and watershed investments in general (Asbjornsen et al., 2015; Bennett and Carrol, 2014; Porras et al., 2013; Richards 2013). Bennett and Carroll (2014) find that in 2013 only 55% of watershed investment programs reported monitoring hydrological impacts, and that less than 10% report monitoring socio-economic impacts. Moreover, even among IWS programs that are monitoring hydrological and socio-economic outcomes, it remains unclear whether monitoring and impact assessment is designed in a way that allows for meaningful attribution of detected trends to program activities.

Increasingly, however, water fund developers and their stakeholders are calling for improved monitoring, impact assessment, and reporting in order to ensure the financial, social, and ecological sustainability of water funds (Higgins and Zimmerling, 2013; Porras et al., 2013). Bennett and Carroll (2014) document a trend of increasing hydrologic and socio-economic monitoring of IWS programs, despite the fact that current rates are still low; likewise, a growing number of water funds within the Latin American Water Funds Partnership are undertaking hydrological and socio-economic monitoring (Bremer et al., 2016). Assessing the impact of water funds is increasingly recognized as critical, not only for reporting back to water funds stakeholders and supporters on the impacts of interest to them, but also for planning and adaptive management. When appropriately designed, monitoring and impact assessment programs can also be an early response system for risk management. Finally, monitoring and impact assessment advance understanding about the biophysical and socio-economic impacts of water funds and similar programs, thereby serving both the specific water fund as well as IWS program developers and supporters more broadly.

There are a number of guidance documents for monitoring the social impacts of biodiversity and carbon projects (e.g., Richards and Panfil, 2011; Wongbusarakum et al., 2014; Mwampamba, Maldonado & Richards, 2014), as well as on monitoring the impacts of IWS specifically (e.g., Higgins and Zimmerling, 2013; Richards and Mwampamba, 2013). However, there are very few case studies documenting the experience and lessons learned by applying the theory of how impact assessment should be done to the practice of actually designing and implementing an impact assessment program.[1] This is particularly the case for social impact assessment as – in the case of IWS and water funds, in particular – hydrological monitoring has often been prioritized over socio-economic monitoring. While a broader literature exists on the practice of assessing and monitoring the social

[1] The Nature Conservancy, the Natural Capital Project, CONDESAN, and the Latin American Water Funds Partnership are compiling a group of case studies on hydrologic monitoring in 6 water funds in Latin America, including Aquafondo.

impacts of conservation projects more generally (e.g., Leisher et al. 2013, CMP 2013), water funds exhibit particular characteristics that warrant more specific practical impact assessment guidance. For example, Richards and Mwampamba (2013, 15-16) argue that good practice social impact assessment is particularly important for IWS programs, given that, among other reasons: they address water – "a central resource with competing uses;" they involve creating new institutions to relate or connect watershed service beneficiaries and suppliers, who are often geographically and culturally separated; they introduce incentives that can create social benefits or conflicts; and they have the potential to impact land tenure rights.

"This case study describes the process of designing a participatory, credible, and practical social impact assessment plan for Aquafondo."

This case study describes the process of designing a participatory, credible, and practical social impact assessment plan for Aquafondo, the water fund for Lima, Peru. Aquafondo was created in 2010 by civil society organizations, a national university, and a private beverage company in response to concern over growing scarcity and contamination of water supplies for over 9 million people living in Lima and surrounding areas. The water fund aims to improve water governance, water use efficiency, and watershed management in Lima's three major water sources – the Rimac, the Lurin, and the Chillon watersheds. With limited funding in its first years of operation, Aquafondo was able to develop a small portfolio of pilot projects in its watershed management line of work, which included the restoration of pre-Incan infiltration canals, the conservation of native highland grasslands, reforestation, and drip irrigation projects. With the passing of a new law requiring Peruvian water utilities to invest in watershed conservation, Aquafondo is in the critical phase of demonstrating its capacity to carry out effective and equitable natural infrastructure protection and restoration projects at a much greater scale.

In 2013, Aquafondo partnered with The Natural Capital Project, the Consortium for Sustainable Development in the Andean Ecoregion (CONDESAN), Forest Trends, and The Nature Conservancy (TNC) to assess the hydrological and socio-economic impacts of one of Aquafondo's most advanced pilot projects, in the upstream community of Huamantanga. This effort aimed to identify and demonstrate positive hydrological and socio-economic impacts of water fund activities, while also providing a framework for risk and adaptive management in Huamantanga and future project sites. The hydrological monitoring design began in early 2013 (Acosta et al. In Press) and a participatory workshop to design a complementary social impact assessment plan was held in May 2014.

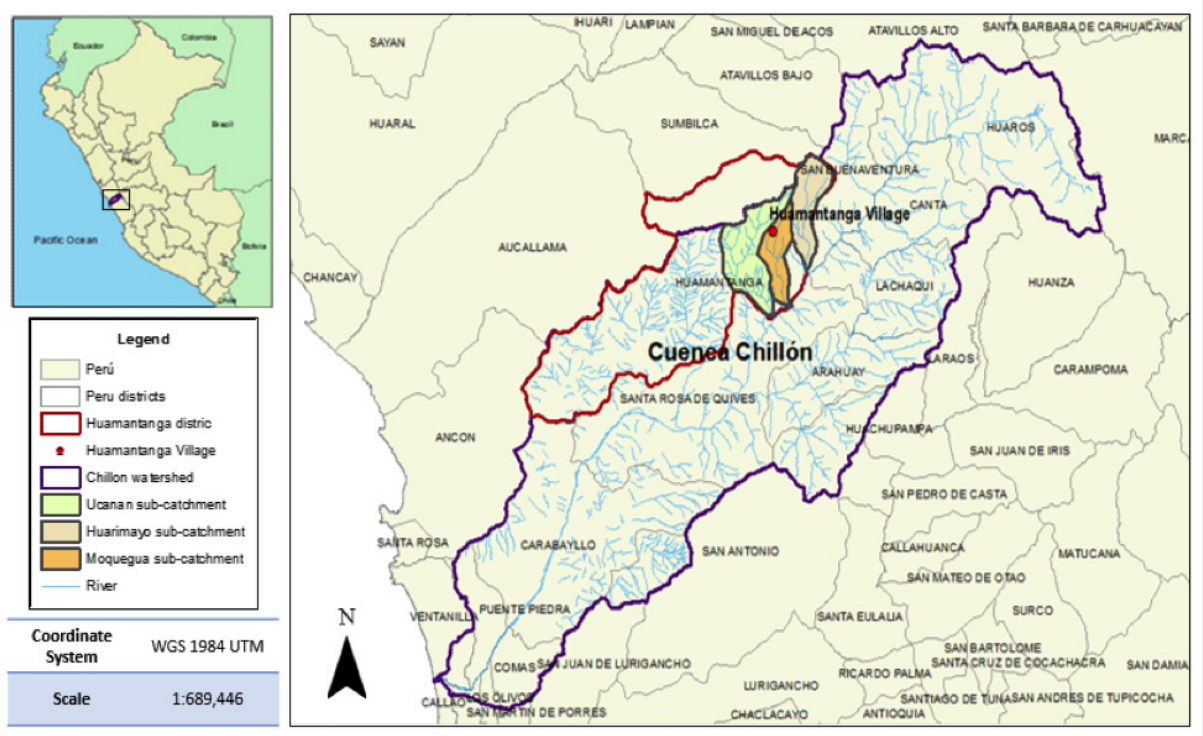
This case study describes the process, outcomes, and lessons learned at the social impact assessment workshop for Aquafondo's work with the community of Huamantanga. This workshop was the first– and, to date, only – social impact assessment workshop carried out in a water fund based on the Social and Biodiversity Impact Assessment (SBIA) methodology (Richards and Panfil 2011). This methodology has been widely used for carbon and biodiversity projects, and scoped as a potentially useful method to improve IWS program outcomes, if appropriately adapted (Richards and Mwampamba 2013).

First, we describe the Huamantanga community and the proposed community-based conservation project that Aquafondo and other NGO partners had developed with the community. Second, we describe the workshop approach, which largely follows the SBIA methodology, and present the main outcomes of the workshop. Finally, we evaluate the utility of the SBIA methodology in the water fund context, offering several suggestions for improvements, and reflect on broader conclusions for undertaking social impact assessment in a water fund context.

Introduction to the Huamantanga Pilot Project

The setting for the project considered in the social impact assessment workshop is Huamantanga, a rural community located 5 hours from Lima at approximately 3,500 meters above sea level, in the very upper reaches of Lima's northernmost watershed, the Chillon (Figure 1). Huamantanga's communal territory extends from an agricultural area around community residences to an upper watershed natural grassland area at about 3,800 meters. As with other high-elevation areas in Lima's watersheds, Huamantanga is considered a critical source water area for rural communities and the city of Lima.

FIGURE 1:
Location of Huamantanga in the Chillón watershed. (Source: Aquafondo, 2013)



From the outset, Aquafondo and its partners had proposed interventions in the Huamantanga community designed to improve water availability in the dry season. This ecosystem service of dry season flow provides benefits for multiple beneficiary groups including the Huamantanga community, whose livelihoods depend on agriculture, as well as downstream communities and urban populations, who rely on the Chillon for both drinking and irrigation water.

Aquafondo's first intervention strategy in Huamantanga built on previous work of other civil society organizations[2] working with the community to restore a system of pre-Incan infiltration canals, called *mamanteo*. These canals divert stream water during the wet season into canals where the water

[2] Alternativa, a Peruvian NGO, initiated this work with the partial restoration of one mamanteo canal in 2012.

is channeled across the mountain, on average one kilometer, until it is allowed to infiltrate into the mountainside (Photo 1). The community was skeptical at first that mamanteo restoration would improve water availability. However, by the time of the workshop, community members expressed great satisfaction with the project, anecdotally reporting positive benefits for dry season water availability and agricultural production. While the community – with the support of Aquafondo and other NGOs – plans to restore an additional nine canals to complete the restoration of the *mamanteo* system, at the time of the SIA workshop only the first canal was operational.

Photo 1: A restored *mamanteo* channel in the community, which is believed to "seed" water from the wet season for supply during the dry season. Photo: Leah Bremer

Community enthusiasm for the *mamanteo* led them to ask Aquafondo and CONDESAN what types of additional activities they could do to improve dry season flow. Upon learning that the grazing of highland *puna* grasslands in the upper reaches of the community's territory might be reducing the water retention capacity of their highlands, community leaders decided to engage in a pilot *puna* conservation project in collaboration with Aquafondo. Characterized by organic matter-rich soils with high water retention capacities, *puna* grasslands are considered among the most important ecosystems for hydrological regulation in Lima's watersheds. At the time of the workshop, field visits had revealed that much of the community's *puna* area was degraded (marked by reduced vegetation cover and disturbance of soils) due to overgrazing. Aquafondo had been working with the community to develop a plan for shifting livestock grazing off of the *puna* and into other, less hydrologically important areas of the community territory. No activities associated with this intervention had yet been implemented at the time of the SIA workshop.

Existing research suggested that overgrazing reduced vegetation cover and water retention capacity of *paramo* soils, a similar ecosystem (Buytaert et al., 2006, 2005), and anecdotal reports by the community supported the idea that the *mamanteo* restoration had increased dry season water availability. However, the hypothesis that the restoration of both the *mamanteo* and the *puna* will result in increases in water supply in the critical dry season for both the upstream community of Huamantanga and downstream users – eventually, the city of Lima – had not yet been tested in any of the Lima watersheds. Moreover, the division of hydrological benefits between upstream and downstream users – and the resulting value of these services to different beneficiary groups – had

not been estimated or robustly discussed at the time of the workshop. Furthermore, to date no study has addressed the socio-economic outcomes specifically of *puna* or *mamanteo* restoration projects. Accordingly, understanding the joint socio-economic and ecological impacts of reducing grazing in puna grasslands and of restoring *mamanteo* systems was timely for Huamantanga and beyond given that these activities may become widespread in the region.

Prior to the workshop, the project partners designed a hydrological monitoring program based on understanding the impact of impacts of reduced grazing pressure on dry season flow. Aquafondo and CONDESAN, in partnership with TNC and the Natural Capital Project, worked closely with the community of Huamantanga to design the hydrological monitoring program in a way that tested the hypotheses that reduced grazing would increase dry season flow, but also respected the social dynamics of the community. The final before-and-after control-impact design incorporates paired micro-watersheds chosen by the community for their similarity in size and characteristics, as well as for their importance for water supply for different community groups. Baseline data are currently being collected for both watersheds, and conservation activities will be implemented – first in one micro-watershed, and, in several years, in the second micro-watershed. While, ideally, the second watershed would remain a control, the community felt it would create conflict to restrict conservation activities to the first micro-watershed if the actions indeed brought positive outcomes for dry season flow (Acosta et al. In Press).

Participatory Social Impact Assessment Workshop: Methodology, Experience, and Results

The May 2014 workshop convened representatives from the Huamantanga community, Aquafondo, Forest Trends, The Natural Capital Project, CONDESAN, The Nature Conservancy, and others, and followed the SBIA methodology (Richards and Panfil 2011). The SBIA methodology outlines a participatory approach to impact assessment led by project proponents and stakeholders, contrasting with technical, expert-led approaches. As discussed by Richards and Mwampamba (2013), the methodology relies on a theory of change approach to link observed social and environmental changes to project interventions (i.e., attributing impacts to the project). This differs from other approaches to social impact assessment that rely on experimental approaches with statistical comparisons between treatment and control groups, or on the recollection of project stakeholders to report on the state of social and environmental dynamics before and after the project. Richards and Mwampamba (2013) first suggested this methodology for use in IWS programs, highlighting the value of the participatory, multi-stakeholder process for these programs.

The SBIA methodology works iteratively through the following seven stages:

1. Starting conditions study and stakeholder analysis
2. "Without-project" social and biodiversity analysis, involving the development of "conceptual models"
3. Project design and theory of change
4. Negative impacts, risks, and mitigation/ prevention measures
5. Identification of monitoring indicators
6. Developing the monitoring plan
7. Data collection, analysis, and reporting

Participants at the Aquafondo social impact assessment workshop worked through the first six stages over a period of one week, divided into three parts. The first part, held in Lima over two days, gathered approximately 20 participants from the convening organizations, technical experts, and two leaders from the Huamantanga community to develop the basic contextual and logical framework for the project's interventions (corresponding roughly to stages 1-3, above). The second part, held in Huamantanga in one session, convened a smaller group of representatives from the convening organizations as well as approximately 50 community members. This part of the workshop aimed to improve and validate the conceptual models and results

BOX 1.
Key Terms from the SBIA Methodology

Focal Issues — The problems that need to be addressed for the project to be successful

Conceptual Models — A diagram that illustrates the current, "without-project" situation

Results chains — A diagram that clarifies how project interventions are expected to change causal negative factors, reduce threats, and consequently, achieve a positive impact in the status of the focal issues

Theory of Change — A statement that expresses the overarching logical assumptions underlying a project and makes explicit its expected results, in an "if…then…" structure.

Risks — External factors that could interfere with the project's ability to achieve desired and expected results

Negative impacts — Potential, yet unintended, results of the project intervention

chains developed in Lima, as well as to identify potential risks and negative impacts of the project (reviewing stages 1-3 and adding stage 4, above). Finally, the third part, held in Lima with a smaller group of representatives from the convening organizations, aimed to identify relevant indicators and a monitoring design (stages 5-6).

Part 1: Framework Development

The first part of the workshop laid the foundation for describing how the project would intervene within the existing social-ecological context to create a desired change. In line with the SBIA process, the workshop began with the identification of **focal issues**, or the most important and central issues the project needed to address in order to be successful. After defining the project's focal issues, a conceptual model was developed by sub-groups for each of the focal issues. The **conceptual models** describe current social-ecological dynamics, including key drivers behind problems related to the focal issue as well as assets and opportunities to solve identified problems. Once the conceptual models were developed, the group identified which actors were more likely to be affected positively or negatively by the project broadly. The next step was to develop **results chains** (see Figures 2 and 3), or causal chains showing how project interventions were expected to change the current social-ecological dynamics (depicted in the conceptual models) to improve the focal issues. Through a sequence of linked positive results, result chains outline how a given strategy is to achieve its expected outcomes and impacts. Finally, **theory of change statements** synthesizing the project's high-level implementation strategy in a causal "*if…then*" manner were developed. In essence, theory of change statements are verbal summaries of the result chain diagrams. All of the frameworks (including conceptual models and results chains) were developed visually, as diagrams, in working groups.

The first task was to identify the focal issues that community representatives and other Aquafondo stakeholders viewed as key for the project to address (stage 1). In the first round of discussions, the group selected three focal issues: *overgrazing*, *lack of knowledge*, and *insufficient dry season flow*. "Overgrazing" referred to excessive cattle grazing levels in the *puna* grasslands above the community; "lack of knowledge" referred to the perceived low level of understanding and consciousness regarding how *puna* grazing could affect native vegetation cover and water resources; and "insufficient dry season flow" referred to insufficient water availability during the dry season for irrigation and drinking.

Photo 2: Huamantanga community leader works with Forest Trends, the Natural Capital Project, CONDESAN, and Aquafondo to develop results chain in Lima workshop. Photo credit: Jhonny Quiroga

These three focal issues were related through their focus on the causes and consequences of *puna* management, and, subsequently, dry season flow. While discussing conceptual models and results chains, participants decided to reduce the number of focal issues to focus on one new focal issue: *native vegetation cover*. The group then reclassified *overgrazing* and *lack of knowledge* as "threats" to native vegetation cover. The assumption in this reclassification was that *native vegetation cover* was a proxy for dry season flow. Through further discussion, however, the group decided native vegetation cover should be reclassified as a condition for obtaining greater dry season flow, the true main objective of the project. Accordingly, ***insufficient dry season flow*** emerged as the main focal issue of the project.

Photo 3: Another Huamantanga leader works with CONDESAN and other project partners to develop a conceptual model of the current situation. Photo credit: Jhonny Quiroga

Photo 4: Lima SIA workshop day 1. Photo credit: Jhonny Quiroga

The conceptual model (stage 2) outlined the perceived causes and outcomes of insufficient dry season flow (Appendix Figure 1). Perceived causes of dry season flow broadly grouped into three categories: 1) insufficient knowledge and understanding of the links between land management and water outcomes; 2) poor community organization and governance; and 3) inadequate capacity to improve agricultural production in lower elevation areas and protect highland areas. These factors were thought to lead to over-grazing of the highland puna grasslands. In turn, overgrazing led to vegetation and soil degradation, ultimately resulting in insufficient dry season flow due to reduced regulation capacity of the natural ecosystem. In turn, Huamantanga leaders suggested insufficient dry season flow reduces agricultural production and household income, which leads to high rates of emigration of young people. Emigration of young people was one of the community's most important social concerns, and reducing this trend was seen as an important potential ecosystem service benefit of restored dry season flow.

The group then created the results chains (stage 3), which sought to identify project interventions that would address the causal factors and problems identified in the conceptual model. In response to the perceived causes of insufficient dry season flow, the project interventions outlined in the results chain (Appendix Figure 2) focused on:

- Improving knowledge and understanding about the importance of the *puna* and revaluing ancestral knowledge surrounding the *mamanteo* system.[3]
- Strengthening community organization and capacity for greater management of the highlands.
- Improving agricultural production in lower elevation areas.

Along with other factors, the hypothesis was that these interventions would lead to greater dry season flow through a restored *mamanteo* system and protection of the highlands.

Finally, participants in Lima developed three related theories of change, summarizing the results chains:

- *If we generate technical information and we value our ancestral knowledge, and if we raise the capacity for using this information, then we will have the ability to make [informed] decisions relating to the conservation of grasses and native vegetation.*

[3] See Figure 2 for this specific portion of the overall results chain.

- *If we strengthen the capacity of community members for managing grasses in the lower part and if we comply with the norms and protect the area in the upper part, then [native] grasses will be conserved and a better water supply will be available for everyone.*
- *If we restore the mamanteo system and the native vegetation cover in the highlands and if we have a trained community in sustainable production, then we can increase agricultural production, which would increase income.*

Photo 5: Luis Acosta, of CONDESAN, highlights the role of monitoring and scientific investigations in reaching improved water outcomes. Photo credit: Leah Bremer

FIGURE 2:
Partial results chain, "zoomed in" on interventions targeting knowledge and information management

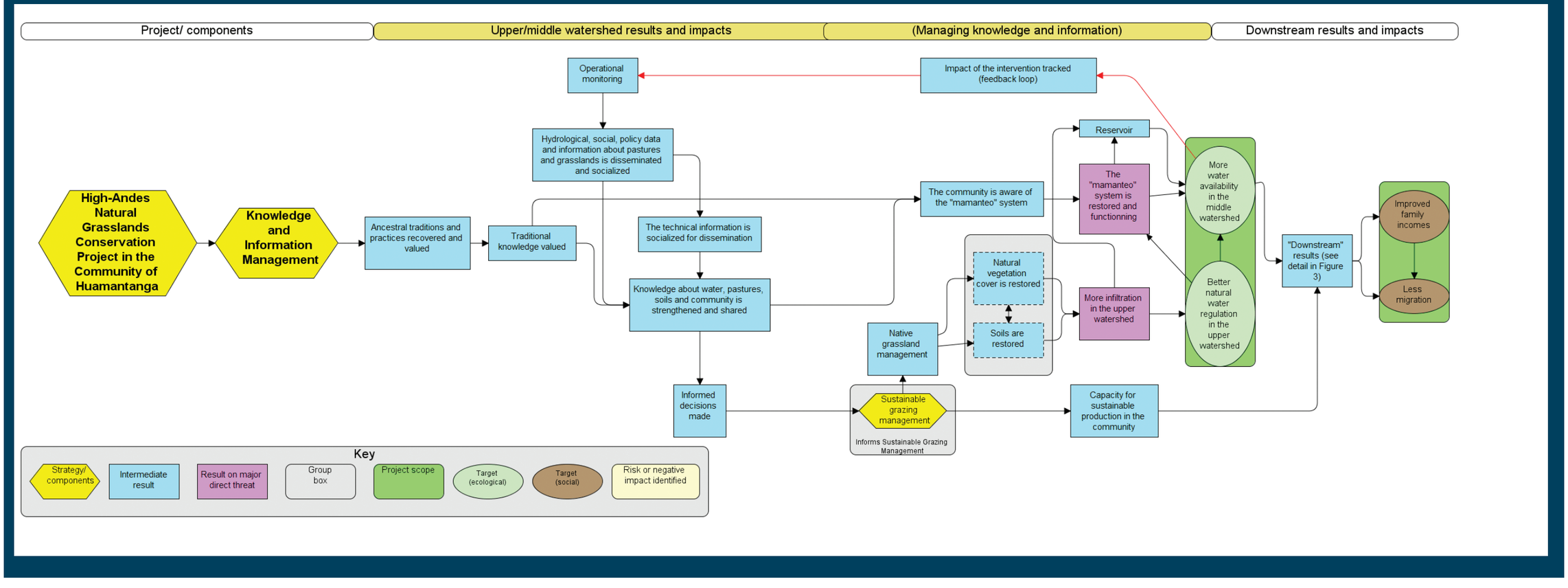
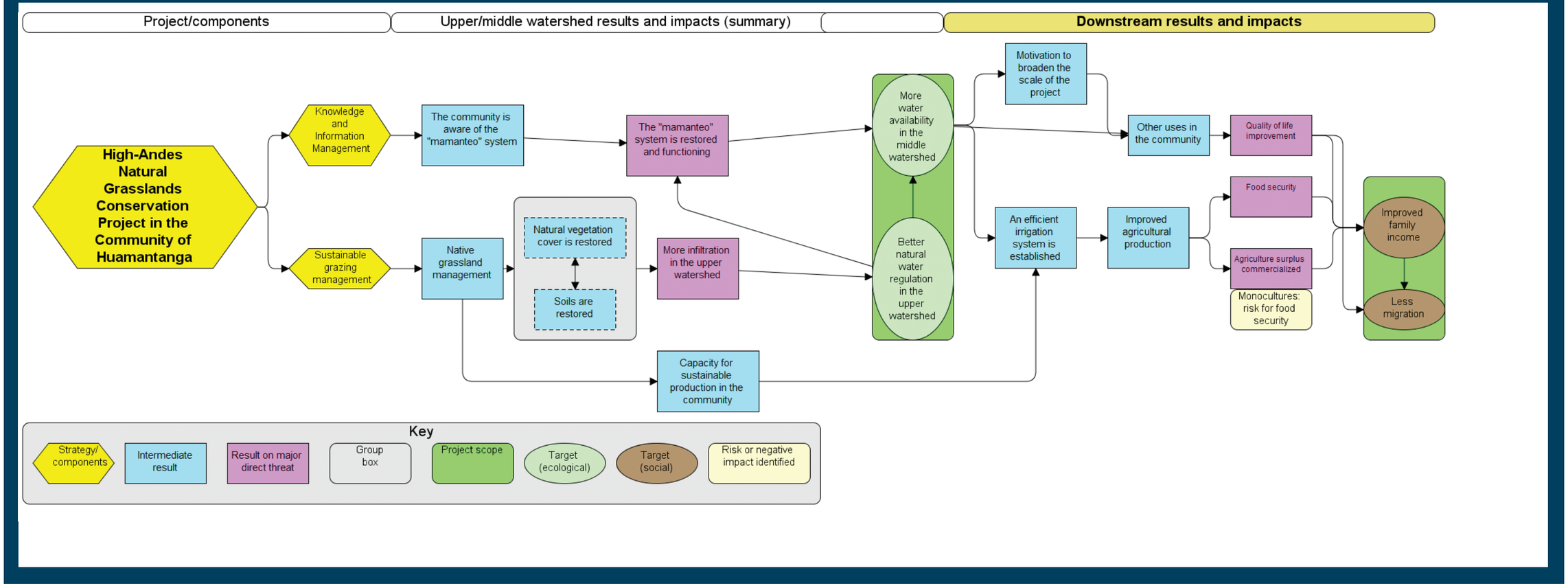


FIGURE 3:
Partial results chain, "zoomed in" on downstream results and benefits



Part 2. Validation and Risk Assessment

On the third day of the workshop, a subset of participants from the workshop in Lima travelled to Huamantanga for Part 2 of the workshop. This four-hour session took place in the center of the Huamantanga community, in the evening after community members completed their work for the day. Approximately 50 community members attended, and about half of the participants were women. Through active discussions in focus groups of 10 to 15 people, community members added to and modified the conceptual models and results chains developed by the first group of workshop participants in Lima (validating stages 1-3). Working groups of community members also lead the identification of potential project risks and negative impacts (stage 4). In this context, **risks** are external factors that could make the project interventions less successful, and **negative impacts** are potential unintended and undesired consequences of project interventions. Identifying risks and negative impacts that could occur is critical to prevent, reduce, and/or mitigate them.

Community members were generally in agreement with the conceptual and results chains diagrams previously developed. However, they suggested adding more detail and, in some cases, arrows that showed additional causal links. A major change to the diagram related to how *puna* grassland conservation would occur. Prior to the Huamantanga portion of the workshops, workshop participants assumed that a fence would be built to eliminate all grazing on these lands. However, the community preferred to first remove wild animals that were actively overgrazing the area, then use community planning and governance to shift grazing practices. Ensuring the *puna* grasslands would be grazed for a shorter amount of time and by fewer cows, they reasoned, would allow for their regeneration. With their inputs, the three result chains were adjusted and then merged into one single, consolidated diagram (Appendix Figure 2).

Discussions with the community also identified potential risks and negative impacts, as well as measures for avoiding, mitigating, or compensating them. Although community members were much less forthcoming in the discussion of risks and negative impacts than they had been when considering potential benefits in the results chain discussions, a list of six potential risks and five potential negative impacts emerged from the conversation, along with potential mitigation measures (Appendix 1). The most worrying risk to the project was the potential for conflicts between two neighborhoods in the community due to restricting access to grazing lands. Mitigation measures were developed to address this risk, including supporting increased production in lower elevation areas – particularly for community members who relied on the highlands – and increasing participation in community meetings and agreements.

Part 3. Monitoring Plan Development

The final day of the workshop was held in Lima with a smaller working group composed of the workshop's host organizations. Based on the results chains, theories of change, and identified potential risks and negative impacts, the group identified monitoring indicators and developed a monitoring plan (corresponding to stage 6 of the SBIA methodology). Following the SBIA methodology, the most critical interim results in the results chains (represented as nodes on the results chains) are selected as foci for monitoring, and a SMART (specific, measurable, achievable, relevant, and time-bound) objective is identified for each result. From the identified results and objectives, indicators are developed to evaluate project outcomes. Finally, a monitoring plan is developed to determine precisely how those indicators will be measured over time and attributed to program activities.

To select indicators, workshop participants formed two subgroups, with each tasked with choosing six to eight results to focus on. Within each subgroup, each person reviewed a printed copy of the results chains and selected those impacts that he/she thought would be most important to track in order to assess the progress and success of the project in achieving the focal issue. Each subgroup then reconvened and decided on the top six to eight results for the group. This process resulted in the overall selection of 13 interim results. A SMART objective was then identified for each selected result,

and a list of potential indicators developed that could be measured to evaluate progress against the objective over time.

After further discussion and analysis, Aquafondo prioritized four expected results for socio-economic monitoring (listed below and explained in detail in Appendix 1). This prioritization was based on a consideration of the following attributes:

- Most likely to change with the project;
- Most important to the community and to other Aquafondo stakeholders; and
- Most useful for tracking progress of the project and helping validate the theories of change.

The four prioritized results were:

1. Improved awareness of the relationship between *puna* vegetation and soils, water, and community well-being;
2. Improved community organization and participation;
3. Greater water availability for the community; and
4. Improved agricultural production in the community.

The first two results are enabling conditions important for project success, and can also be viewed as positive social outcomes. The third result is closely tied to the hydrologic monitoring and the fourth is related to both greater water availability and improved capacity and resources for agricultural production. (See Appendix 2 for the SMART goals and indicators proposed during the workshop, and the proposed post-workshop changes to evaluating the prioritized results.)

Next Steps: Applying The Impact Assessment Framework And Monitoring In Huamantanga

Given that the conservation project had not yet begun, Aquafondo had the distinct advantage of being able to establish a hydrologic and socio-economic baseline focusing on the four prioritized results and indicators, as well as additional indicators related specifically to hydrologic monitoring. In July 2014, CONDESAN, in collaboration with Aquafondo, the Natural Capital Project, and the Huamantanga community, began collecting baseline hydrologic data in two micro-watersheds (one control and one impact) in the highlands. In addition to monitoring focused on understanding the impacts of *puna* conservation on dry season flow, CONDESAN is also working with the community to monitor the impacts of the *mamanteo* and impacts on downstream water supplies.[4]

In October 2014, Aquafondo contracted an independent consultant to carry out a socio-economic baseline assessment, focused on the selected indicators as well as on gaining better understanding of community organizations; livelihoods; norms and rules surrounding water access, use, and control; and community members' understanding of Aquafondo and the grassland conservation project (Benites 2014). This baseline was based on data collected through:• Household surveys (n=70);

- Semi-structured interviews with community authorities, state representatives, and community members (n=24);
- Community workshop (n=1);
- Observation of community meetings, field trips to agricultural lands and recreational areas, and informal conversations; and
- Document analysis (census, community agreements, etc.).

[4] For a complete description of the hydrologic monitoring plan see Acosta et al. (In Press).

Additionally, a thesis that examined agricultural practices in Huamantanga through detailed participant observation served as a baseline for current production levels.

Using information gained through these baseline studies, the list of monitoring results, SMART objectives, and indicators was revised to better track meaningful change. (See Appendix 1 for a complete list of the changes made.) While the key monitoring objectives and themes remained the same, the in-depth baseline allowed for clarification of some of the results and refinement of the indicators. For example, the selected result of "improved community organization and participation" was revised to the more specific target "improved community organization and participation related to *puna* conservation." The baseline assessment found that those interviewed felt that community organization was not a problem per se, but rather that community organization and participation specifically related to *puna* conservation was a key barrier to project success.

The baseline assessment also helped to better incorporate risks and potential negative impacts into the monitoring design. For example, the prioritized result "improved water availability for the community" was modified to reflect concerns about the potential negative impact of conflicts between neighborhoods in the Huamantanga community with improved water availability. The baseline assessment thus explored more deeply the potential conflicts that changes in water supply could invoke and identified a set of risk mitigation measures, including elaborating a protocol for mediating conflicts related to water availability. The revised monitoring plan still calls for hydrologic monitoring of dry season flow, but also focuses on both the potential positive (agricultural production) and negative (increased conflict) impacts of a change in hydrologic services. Similarly, the baseline study noted that emigration was a critical theme and concern of those interviewed, highlighting the importance of including this result from the perspective of the community. The final prioritized results, indicators, and SMART objectives will be monitored through time to assess project progress and success.

Discussion and Recommendations

"When co-developing projects, water funds must find a balance between the objectives of downstream and upstream stakeholders."

As one of the first studies documenting a social impact assessment process for a water fund project, this case offers an important opportunity to reflect on some of the key considerations for water fund project developers, stakeholders, and evaluators. Below, we discuss our key findings and recommendations.

Clear Project Objectives Are Critical

Water funds are powerful conveners of multiple interests around water resources, and, as a result, their stakeholders can be diverse and often seek different outcomes. When co-developing projects such as the one in Huamantanga, water funds must find a balance between the objectives of downstream and upstream stakeholders. The primary project objective, or "focal issue" in SBIA parlance, should represent a negotiated balance of mutual interests, particularly between the upstream community and the fund's investors.

In Huamantanga, the community and Aquafondo agreed on the importance of protecting the highlands and restoring the *mamanteo*, which the community viewed as a means of improving their livelihoods through increased water supply in the dry season. However, the community emphasized that improved livelihoods also depended on improving agricultural productivity. For example, the community thought that improving the quality of their cattle could improve their agricultural output while reducing the number of overall cattle needed, thus reducing pressure on the highland grasslands.

In both these cases – protection of the highlands and improvements in cattle quality – mutual benefits from reduced grazing in the *puna* can accrue to the Huamantanga community and downstream water users. However, not all project activities to improve agricultural productivity in upstream communities would necessarily have the same net-positive effect for both downstream and upstream interests. For example, some types of crop improvement projects might end up increasing agricultural production, but actually decreasing water availability downstream. As water fund activities are co-designed with communities, it is critical that the distinct interests are clear and that the causal pathways of benefits to the different stakeholder groups are clearly defined. This process may require more time and finesse than expected at the outset.

Participatory Assessment Improves Project Design

This case clearly demonstrates that the benefits of a social impact assessment can go far beyond improved capacity to evaluate impacts. The social impact assessment workshop described here strongly emphasized project design, with the first half of the workshop focusing exclusively on developing the conceptual models and results chains before beginning to evaluate or suggest a monitoring strategy for "social impacts." Although the project had already been partially designed with leaders of the Huamantanga community, the *project design* component of the workshop was valuable for refining and clarifying the project's intervention strategy.

Explicit, integrated, and visual descriptions clarify the project context

It is widely accepted that conservation projects that are designed with a good understanding of the existing socio-ecological context are more likely to be sustainable. Creating integrated conceptual models that chart out the *socio-economic* dynamics (e.g., community knowledge of watershed services, governance challenges, and technical assistance needs) and the *ecological and hydrological* dynamics (e.g., compacted soils, hydrological impacts at multiple scales) in one holistic framework highlights the critical interaction between these components. For example, in the Huamantanga results chains, positive hydrological outcomes depend on strengthened community governance to implement sustainable land use planning, a causal link that might not have emerged without such integrative analysis. Whereas these components are often considered separately due to the division of disciplines, explicit consideration of these social and ecological systems in one diagram supports understanding of their interactions.

Including women is critical and may require careful attention

Capturing gender differences in the social dynamics that influence project design and impact assessment is critical to a successful project for many reasons. For example, as the primary water users in many communities, women may have particular knowledge of water management issues and may be disproportionately impacted by decisions around water resources management. Additionally, in many places it has been shown that water resources have been more effectively management when women have had a prominent role in decision-making, management, and monitoring (Richards 2013). For the often-invisible gender issues to be revealed, it is strongly advised, in accordance with the wider literature on gender issues in water resource management, that gender-differentiated stakeholder analysis and/or a rapid social assessment of gender issues forms part of the SIA process (see Richards (2013) for brief guidance on this). Encouraging and enabling female participation in SIA workshops is therefore also a critical step for ensuring the legitimacy and quality of the workshop outcomes.

In this case, workshop facilitators were generally pleased with the number of women who attended the workshop, as they represented just under half of all participants. Several women brought children and infants. Small group workshop sessions with the community were facilitated by female members of the Aquafondo staff, which facilitators believed helped empower female members of the Huamantanga community to express their opinions. However, while female participants did contribute to the analysis, they were on the whole less vocal than their male counterparts. On reflection, the workshop leaders concluded that there should have been an all-women group instead of distributing women throughout the small groups, at least for the analysis of risks and negative impacts. This may have been more effective in eliciting female perspectives.

Participatory assessments will be more successful under certain enabling conditions

A successful social impact assessment can build trust, but is also more likely to be successful if trust and strong relationships have already been built between the community and other project stakeholders. In the case of Huamantanga, the community had had a long relationship with a local NGO and subsequently the water fund. These institutions built trust with the community by focusing on *mamanteo* restoration, which provided direct community benefits through increased water availability. The openness of the community to the Aquafondo project and the social impact assessment was built on these relationships. The time, dedication, and goodwill it takes to develop these relationships and trust should not be underestimated.

Robust assessment of risks and negative impacts may require consideration beyond the participatory workshop

While the SBIA methodology provides a mechanism to identify risks and negative impacts in a participatory manner, limiting this assessment to the workshop sessions may not be sufficient in some circumstances. In the case of Huamantanga, community members seemed reluctant to express their ideas about potential negative outcomes or risks of the projects in a group setting. Given that it takes

"This case clearly demonstrates that the benefits of a social impact assessment can go far beyond improved capacity to evaluate impacts."

time and trust to create a space where people feel comfortable putting forward and discussing risks and negative impacts, additional workshops and/or complementary methodological tools may be necessary.

In this case study, the baseline socio-economic study included greater attention to the potential for negative impacts or trade-offs (e.g., conflict related to increased water supply). This issue came up during the SIA workshop, but needed further exploration in a different format (e.g., interviews and focus groups). Accordingly, combining approaches may increase the accuracy of the social impact assessment.

BOX 2.
Recommendations for Social Impact Assessment of Water Fund Projects

- Throughout the stages of design and impact assessment, water funds should ensure that the primary objective(s) of each project is specifically and clearly articulated and reviewed with all project stakeholders.
- Project managers aiming to evaluate impacts should not overlook the opportunity to use participatory impact assessment to improve project design and explicitly link impact assessment to adaptive management.
- Workshop facilitators should work within cultural norms to find ways for women to comfortably and fully participate. Strategies for doing so may include creating an all-women group at the workshop to contribute to and review workshop outputs, ensuring that the workshop facilitation team includes women, and creating a welcoming atmosphere for children at the workshop venue.
- Water fund project developers and social impact assessment workshop facilitators should understand well the history of partnering communities with the water fund and other governmental and civil society partners, building on positive experiences to facilitate trusting relationships while managing potential risks associated with any negative previous experiences.
- Evaluators can use additional interviews and analysis to complement the identification of potential risks and negative impacts during participatory workshops, improving the likelihood that the accounting of risks and negative impacts is robust and candid.
- Water fund project evaluators should look for potentially more immediate and more clearly attributable social impacts in "interim results," or impacts that appear before the targeted ecosystem service improvement on results chains. These may include improvements to governance, knowledge, or capacity and may also be important indicators for the quality of the execution of project strategy.
- Water fund project evaluators should look for opportunities to integrate social and hydrological monitoring, which should contribute to adaptive management, communicating success, and increasing monitoring efficiency.

Consider Social Impacts Within the Project's Core Strategy

In this case, taking a systematic and design-focused approach to impact assessment allowed for a more comprehensive and strategic evaluation of social impacts. Before the workshop, many participants expected the social impact assessment to focus on the social and economic impacts that would result from successfully increasing dry season water availability for Huamantanga. However, several of the results selected for monitoring (see Appendix 2) were related to interim results of the project intervention that were logical antecedents to achieving an increase in dry season water availability (the focal issue), rather than a subsequent benefit of increased dry season flow. For example, the conceptual model hypothesized that weak understanding of the relationship between *puna* conservation and dry season water availability was a major driver of the *puna* degradation. Accordingly, education and assimilation of knowledge gained through the project's hydrological monitoring was a major social impact that the project expected to achieve and planned to monitor. Compared with the socio-economic benefits of watershed services (improved agricultural production, etc.), these interim benefits should occur in a shorter time frame and be more easily attributable to the project interventions.

"The SBIA methodology was found to be a valuable tool for supporting project design and impact assessment in the water fund setting."

Design Monitoring for Adaptive Management and Efficient Evaluation

Logistically, hydrologic and socio-economic monitoring may be done separately, but need to be conceptually integrated in planning, analysis, and reporting for the greatest benefit. In some cases, project developers may find synergies in data collection – using results from one discipline to inform impact assessment in another. For example, to assess upstream socio-economic benefits, the project will monitor how much water is withdrawn by the Huamantanga community in the dry season. This data, however, may also be used to monitor potential risks to hydrological benefits for downstream users, which could arise if the project results in very large increases in water withdrawals by the upstream community.

Evaluation of the SBIA Methodology in a Water Fund Context

As the first full application of the SBIA methodology in the water fund context, this case offers an important opportunity for reflection on the utility of this methodology for IWS. Overall, the SBIA methodology was found to be a valuable tool for supporting project design and impact assessment in the water fund setting, for a number of reasons, including:

- The explicit, participatory, and iterative articulation of the project's vision and focal issue(s) creates space and a framework for clarifying project objectives, which often may be multifaceted in a water fund setting where many interests are represented.
- The integrated, participatory, and visual nature of the project design component of the SBIA workshop – in particular for the development of conceptual models and results chains – allows for a multi-disciplinary assessment of challenges and solution strategies, also critical in a water fund setting where projects must address social, economic, ecological, and hydrological aspects together.
- The explicit, visual mapping of socio-ecological interactions facilitates integration of social and hydrological monitoring for improved adaptive management and efficiency in monitoring.

- The SBIA methodology encouraged workshop participants to think more broadly and strategically about social impacts, allowing for identification of important social impacts that had not been considered at the beginning of the process.

The present case also highlights several areas where the SBIA methodology could be adapted or expanded to specifically serve water fund projects more effectively. For example, as noted above, participatory workshops described in the SBIA methodology can and should be complemented by additional interviews and analysis, especially to inform the identification of potential risks and negative impacts, as some stakeholders may not feel comfortable voicing important concerns in a workshop setting.

Additionally, in the Huamantanga case, it was clear that one week of workshops provided insufficient time to complete stages 5 through 7 of the SBIA process, including the identification of indicators and development of a monitoring plan (e.g., deciding on the data collection methods for measuring the identified indicators).

Indeed, a more effective use of the last day might have been a training of project staff on how to develop a monitoring plan, as well as guidance on data collection methods and analysis, reporting the monitoring data, and how the monitoring results can be used to inform adaptive management (by feeding back into and informing revision of the conceptual models and results chains). This training would also be in accordance with the experience gained in other SIA or SBIA processes that it is better to hold a separate small monitoring plan workshop of about 10 to 12 key people, especially project staff, rather than attempt this difficult final stage at the end of the larger workshop, with tired – often exhausted – workshop participants (Richards pers. comm. 2015).

In general, and relevant to the previous observation, guidance on how to prioritize results, select indicators, and collect data for monitoring could be developed in the water fund context, especially considering opportunities for integrating social and hydrological monitoring, and using proxy indicators to extrapolate findings at scale.[5]

[5] It should be noted that Part 2 (Richards 2011) of the SBIA Manual is a toolbox of SIA data collection methods and analysis.

Conclusion

Outcomes of this SIA workshop suggest that, through careful attention to focal issue definition and greater resources and time spent on developing monitoring indicators and evaluation design, the benefits of an SIA include:

- Enhanced understanding of the socio-economic context under which water funds work, enabling improved project design and implementation;
- Improved capacity to broadly evaluate impacts, including interim results; and
- Preliminary identification and mitigation of potential risks and negative impacts.

Key strengths of the SIA include a focus on broad stakeholder participation and potential to illuminate links and synergies among multiple social and hydrologic goals. Additional guidance on navigating negotiations between stakeholders in defining focal uses in a water fund context could greatly enhance future SIAs. More time is also needed to develop socio-economic indicators based on results chains and further guidance incorporating monitoring information into adaptive management. Finally, it is recommended that an SIA be considered one part of a greater effort of project design and evaluation, as outcomes of the SIA can be complemented by surveys, interviews, focus groups, and participant observation.

The SIA process will continue to be revised and adapted to the water fund context, but the results of this workshop suggest it is a promising opportunity to "mainstream" social impact assessment in water funds and similar programs.

Overall, the application of the SBIA methodology for the Aquafondo pilot project was indeed found to benefit the project in the ways that Richards and Mwampamba (2013, i) suggested:

> It is argued that "good practice" SIA will strengthen the design of IWS programs with regards to their social sustainability, reduce their risk levels, increase their capacity for adaptive management, and (if done in a participative way) increase stakeholder participation and ownership of project objectives.

It is our hope that this will improve outcomes for both the ecosystems and people in the watersheds where water funds work.

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Appendix: Workshop Outputs

Appendix 1: Draft Risks and Negative Impact Assessment

Risk (R) or Negative Impact (NI)	Mitigation Measure
Conflicts between communities [NI]	Community agreements Community meetings (Asamblea Comunal) Increased participation in community events Diversifying cattle varieties (“cuyes”) Develop new norms/consensus
Conflict within the community [NI]	Education and outreach about links between land management and water Community agreements Community meetings (Asamblea Comunal)
Conflicts with external stakeholders [NI]	Identify potential conflicts and create agreements to avoid them. Training in how to deal with conflict
Over-production requires more water consumption [NI]	Community agreements to limit production
Insufficient grasses for cattle (lowlands) (NI)	Assess carrying capacity Diversify production
Overgrazing in the lowlands [NI]	Improve grasses Cattle rotation Training in cattle management Rule enforcement Improve irrigation
Lack of rotation (of cattle in the lower part) [R]	Cattle housing, fodder

Global warming [R]	Build awareness
Lack of rain [R]	Improve irrigation technologies Improve “mamanteo” Puna conservation Education and awareness building for young people Reservoir
Distance impedes selling wild cattle meat [R]	Gradual hunting
Cattle from other communities invading [R]	Surveillance (regidores comunales)
“Regidores” quitting their jobs [R]	Economic compensation

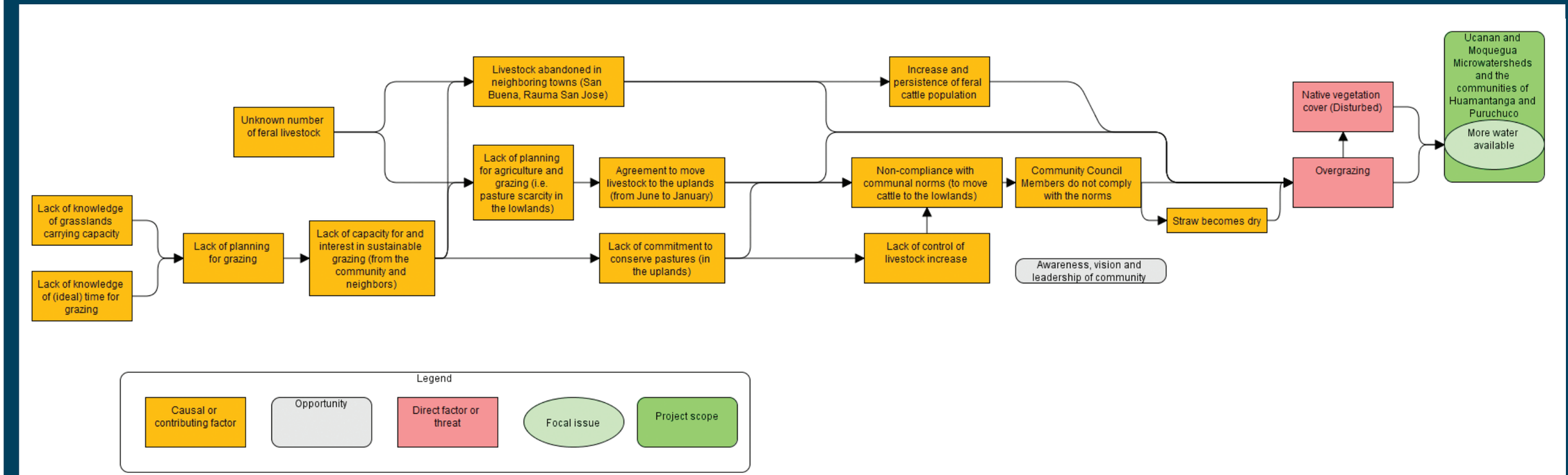
Appendix 2: Draft Monitoring Framework

Objective	Result	SMART objective	Indicator
1	Improved awareness of the relationship between puna vegetation and soils, water, and community well-being	By 2017 over xx % of the Huamantanga community will have changed their attitudes towards water conservation	# of community leaders who have been trained and report positive changes in attitude
		By 2017 over xx% of the Huamantanga community will recognize the relationship between grasslands, soil, and the community well-being	# of people who identify conservation as a critical issue for sustaining the community
	Training workshops and activities	At the end of 2015, at least xx% of the community will have been trained on the importance of the relationship between soils-water- and grasslands	At least xx % of workshop attendees demonstrate improved knowledge of the relationship between water, soil and grasslands
			# of capacity building workshops/activities that reached xx people
			# of training materials produced and handed out to the target population

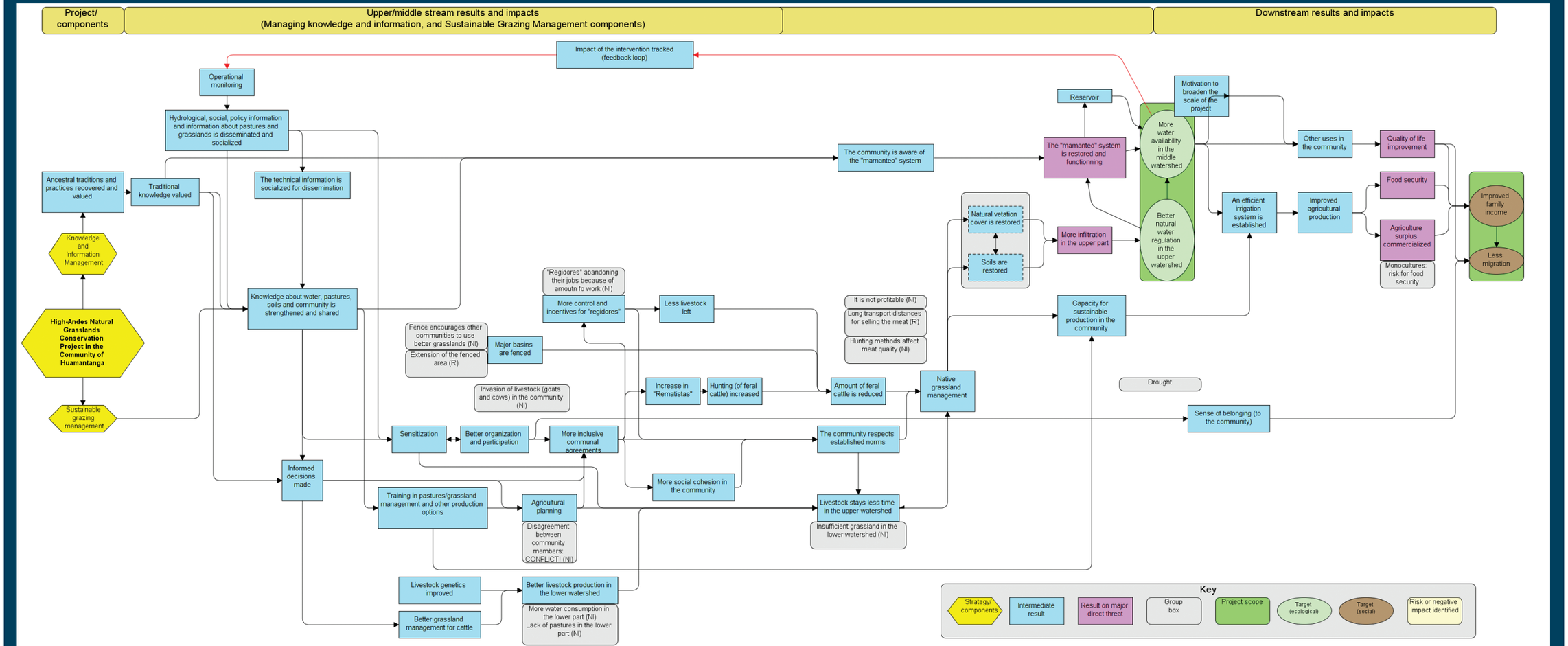
2	Hydrologic, social, political, and ecological information about grassland disseminated and explained	At the end of 2015, at least xx% of the community will have been trained and informed about the ecological relationship between water, soil and native grasslands	At least xx% of workshop attendees will demonstrate improved knowledge of the relationship between water, soil and grasslands
			# of workshops/activities disseminating information directed at xx people
			# of dissemination materials produced and handed out to target population
3	Improved organization for grassland conservation	By 2017 the community of Huamantanga will consider and engage in grassland conservation as part of the responsibility of all community members	# of participants in grassland conservation work days
			# of women who participate in grassland conservation work days
	Action plan for grassland conservation implemented	By 2016 the community will have created an action plan for grassland conservation	At least xx% of community members participate in meetings to create an action plan for grassland conservation
			Agreement – established by community act and ratified by community members - to initiate community work days with xx frequency
		By 2015 there will have been xx meetings to define the action plan for grassland conservation	At least xx% of community members participate in meetings to create an action plan for grassland conservation

4	Greater water available for the community does not damage relationships between neighborhoods	By 2017 Aquafondo will have reconciled xx% of conflicts due to greater water availaibilty between or within neighborhoods	# of conflicts between neighborhoods due to water availability/# of conflicts between neighborhoods in general
			# of conflicts within neighborhoods due to water availability
			# of conflicts between neighborhoods due to water availability
			# of conflicts due to water availability mediated by Aquafondo
5	Protocol for mediating conflicts related to water availability implemented	By 2016 Aquafondo will have implemented the protocol	
		By 2015 Aquafondo will design a protocol for mediating conflicts due to water availability	

SUPPLEMENTARY FIGURE 1:
Example of a conceptual model developed in the first part of the workshop (in Lima) and validated during the second part (in Huamantanga) for the original focal issue of insufficient dry season flows.



SUPPLEMENTARY FIGURE 2:
Complete results chain with possible risks and negative impacts in grey.



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