State of hydrologic and socio-economic monitoring in water funds and principles going forward

This document provides principles for monitoring which were co-developed in working groups at the Monitoring in Water Funds workshop in Camboriú, Brazil, August 2015.

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THEME 1: HYDROLOGIC MONITORING

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THEME DEFINITION

Hydrologic monitoring is critical to evaluating the impact of water fund activities at multiple scales. This involves measuring different parameters and variables, including flow, water quality (sediments, nutrients, temperature, etc.), and climate (precipitation, temperature, etc.). Hydrologic monitoring aims to characterize the state of the project area's hydrologic system, identify trends, and relate these trends to project activities. Monitoring and/or modeling should also take into account confounding factors (outside the water fund) that can alter the effectiveness of activities in achieving desired hydrologic outcomes.

It is neither possible nor desirable to define a standard monitoring protocol that all water funds should follow. Rather, monitoring design and implementation will vary depending on the funds' objectives, the resources available, and the specific context of the water fund. Monitoring strategies should respond to the needs of the water fund partners, investors, and communities in selecting indicators. Well-designed indicators will serve to establish a link between water fund activities and desired impacts and help to ensure the long-term sustainability of water fund activities and funding.

CURRENT STATE OF HYDROLOGIC MONITORING

Successes

Eight water funds have initiated monitoring of flow, sediments, and/or nutrients. Eight additional funds are in the process of designing hydrologic monitoring programs. The most common parameter monitored is flow, followed by sediments, nutrients, and other water quality parameters. Several funds are monitoring or planning macroinvertebrate studies as indicators of aquatic ecosystem health.

These monitoring efforts translate into increased capacity and experiences that can be an asset to other water funds. The Latin American Water Funds Partnership's bi-annual meeting represents a great opportunity for water funds to share experiences in water fund monitoring design and analysis. Recently, representatives of nine water funds convened in the water funds monitoring workshop. Outcomes of the workshop included sharing experiences in monitoring cases studies and defining principles for monitoring going forward. The case studies that the water funds and NatCap are compiling are examples of how monitoring can be designed to reflect the objectives of each fund. These "theory to practice" documents will be important resources for water funds as they design their monitoring networks.

Gaps

Many water funds do not monitor indicators directly linked to their objectives. Despite having clear hydrologic services objectives, some funds still monitor only changes in vegetation cover or land use

rather than hydrologic variables. Various funds take water quality measurements just three times a year. This makes it difficult to effectively demonstrate trends because water quality can vary a lot from day to day.

A number of funds have objectives to increase groundwater recharge; however, ground water recharge monitoring lags behind. Monitoring groundwater recharge presents a great challenge because every case is different in terms of hydrology, geology, and the type of monitoring needed.

Characterizing the relationship between ecosystem services and land cover requires a hydrologic monitoring system of sufficient precision and spatial cover.

Challenges

A major challenge for hydrologic monitoring lies in the difficulty of finding control sites and ensuring conditions remain the same over time. Water funds have limited influence on the trajectory of land use change in the region of interest, making this particularly challenging.

Gathering baseline data for a sufficient length of time is also difficult. In general, water funds cannot wait 10 years to start their activities so we often lack data from before the fund was established.

Another key challenge is effectively extrapolating hydrologic changes found at the site scale to larger-scale water fund objectives, and linking this to downstream beneficiaries.

Finally, robust monitoring designs are expensive, particularly for some parameters and for measurements which require high frequency. Securing long-term permanent financing remains a common challenge.

PRINCIPLES AND STRATEGIES GOING FORWARD (WITHIN AND ACROSS WATER FUNDS)

1. Link monitoring with water fund objectives

General objectives of funds should be translated into specific objectives, utilizing a SMART framework (specific, measureable, achievable, realistic, and in a determined time frame). Water funds should monitor indicators that respond to their principle objectives. (For example, if sediment reduction is a major objective, then sediment is a parameter that should be measured.).

Water funds should identify what data are needed and how they will be analyzed, presented, and utilized at the start of monitoring design.

2. Improve monitoring design and practice

Lag times, which depend on the scale of analysis (site, microwatershed, or watershed scale as well as other factors), should be well-articulated and incorporated into study design and expected results.

Monitoring confounding factors and external conditions is critical to ensuring that changes detected can be attributed to water fund activities. Water funds should plan how data will be utilized and integrated with other data sources (e.g., national climate or hydrologic monitoring programs, census data) and/or modeling efforts (e.g. land change modeling by local university researchers) to assess attribution.

Appropriate monitoring scale

Monitoring design and siting should match the scale at which impacts are expected to occur given the location and extent of watershed interventions. The temporal and spatial scale of monitoring should allow for the attribution of hydrologic impacts to water fund activities.

Monitoring and attribution efforts should focus on the site and microwatershed scale in cases where there is limited understanding of the impacts of watershed interventions in a given location. As the water fund scales up its interventions and aims to benefit different beneficiary groups, monitoring should also be carried out at larger scales. Of course, larger (water fund scale) baseline data collection should begin as soon as possible if funding permits.

It is important to understand the impacts and benefits (or potential impacts and benefits) of activities at the water fund scale. However, attributing changes at the water fund scale to water fund activities through monitoring alone presents a difficult and oftentimes insurmountable challenge given the scale of water fund activities and the presence of confounding factors.

A typical design could include a "sampling" of principle watershed interventions at the microwatershed scale, ideally in a paired design where the quantity of benefit is determined per area intervened. This sampling could be complemented by monitoring the impacts of water fund activities at the scale of the entire intervention area. To a certain degree, this design also allows for more realistic projections of the impacts the water fund could achieve at larger scales.

3. Use other information sources to complement and expand hydrologic monitoring

Hydrologic monitoring data, alone, are often not sufficient to understand the total impact of water fund activities and attribute hydrologic changes to the water fund. Monitoring designs should take advantage of relevant scientific literature, other monitoring efforts (e.g., regional climate monitoring), and monitoring and modeling of land use change. Water funds should plan how this information will be used alongside collected monitoring data in order to more effectively understand impacts and attribute these impacts to the water fund.

Citizen science can be a very useful information source that incorporates local knowledge and encourages participation in water fund activities. However, there needs to be a clear protocol of when and how citizen science data can be utilized. Some parameters (such as chemical water quality analyses) are not appropriate for citizen science data collection, as they require specific technical expertise. Each water fund needs to clearly define their own protocol for how and when citizen science can and should be used and for appropriate data formats. Protocols need not be very rigid, but data collected should be interpretable across different water funds and contexts. It is also important to take into account that citizen science is not free information; the use of citizen science requires training, resources, and supervision throughout the process.

4. Data management and sharing

Creating data sharing agreements and partnerships is a critical step towards filling data gaps. Prior to developing a monitoring program, water funds should first evaluate what data are currently available, develop data sharing agreements, and structure monitoring efforts to fill critical data gaps.

Data collected should be accompanied by information on the equipment used and monitoring design, as well as photos of monitoring sites and installations, in order to ensure maximum compatibility with other sources.

Training and knowledge needs (the role of the Latin American Water Funds Partnership)

The Water Funds Partnership and other partners should continue providing guidance on: 1) selecting the appropriate scale of monitoring; 2) generating baseline data; 3) selecting appropriate monitoring equipment; 4) defining data analysis techniques that provide a means to clearly link the activities of water funds with their ecosystem impacts; and 5) communicating results to different types of audiences.

The LAWFP could also provide:

- Technical assistance in monitoring design
- Documented case studies that include a description of implemented activities, monitoring design, equipment employed, data collection, and budget
- A 'toolbox' and decision tree that helps funds decide What? Where? and How? to monitor
- A platform where water funds can share data and monitoring designs

In general, a critical role of the partnership should be to support the sharing of experiences, knowledge, and data. This could be through holding periodic workshops and meetings, documenting and sharing experiences, and maintaining a platform to communicate between different actors. Finally, the partnership should support ongoing fundraising efforts to ensure that water fund development includes a monitoring program in line with decision context, audience, and burden of proof.

THEME 2: RETURN ON INVESTMENT

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THEME DEFINITION

Return on investment (ROI) provides a quantitative way to compare project results to project costs. ROI analysis aims to identify, among multiple investment scenarios, the most cost-effective scenario (the lowest cost per unit target results) or the one that generates the greatest net benefit. Performed *ex ante,* ROI analysis can help to identify the best project design, or the design that maximizes the production of expected results for a given budget, while *ex post* ROI facilitates evaluation of results once the project has been implemented.

ROI is always based on the general idea of: $^{Benefits}/_{Costs}$, and can be expressed in different ways depending on the objective of the analysis and the way in which returns are measured:

Generic potential biophysical ROI: e.g., 10,000 tons of sediment/year or 50 mg/L fewer total suspended solids in a specific location for each $1 million invested in the water fund or in a certain intervention. These potential benefits may or may not result in real benefits for users.

Actual biophysical ROI for specific users, based on actual received benefits: e.g., 20,000 tons per year of avoided dredging and disposal cost for sediment from reservoir X per each $1 million invested in the fund.

Actual ROI monetized for specific users: e.g., $2 million in avoided costs for water treatment at the municipal water plant for each $1 million invested in the fund. These benefits are actually experienced by beneficiaries of the fund and a monetary value is determined using economic data.

In the first two cases (#1 & #2), ROI is $^{Benefits}/_{Costs}$ for the fund or for a specific objective, expressed in units of $^{Biophysical\ change}/_{Currency}$, while in the last case it is a unitless number ($^{Currency}/_{Currency}$, or "2" in the example given in #3).

Why are ROI studies important for water funds?

Water funds and their conservation activities may generate diverse benefits for individuals, businesses, and non-human species. In the broadest sense, all of these benefits constitute "returns" from investments in watershed conservation. Being able to quantify these returns in a trustworthy manner is increasingly important.

To date, there has not been a case where continued support is dependent on demonstrating the ROI of an existing water fund, but political changes could lead some to question the use of public funds for a program that does not provide demonstrable returns. At the same time, private investment has often

been motivated by environmental and social responsibility. These investments might be at risk during times of economic crisis without a clear business case for investors. For this reason, water funds are generally more likely to be sustainable over the long-term if they are able to demonstrate a clear relationship between their activities and relevant ecosystem services and economic benefits.

Moreover, water funds need to attract new investors in order to scale their impact (in both the watersheds where funds already exist and in areas where they do not). Achieving this requires a change in focus from philanthropy to the business case. This will help to identify opportunities for investments in natural infrastructure that are economically justified based on actual or potential returns for private beneficiaries or for society.

Nevertheless, as information and budgets are often limited, quantifying all water fund returns in a rigorous manner is not feasible. Accordingly, funds need to prioritize specific benefits for ROI analysis. As biodiversity benefits and social benefits to local land managers and communities are already being evaluated in a number of funds, water funds should focus additional rigorous analysis on priority returns for their principal funders (both current and potential future).

Although these priority returns in some cases may include things like improved relationships between a company(ies) and a local community(ies) or improvement in the corporate public image, we suggest that ROI evaluations focus on water funds as a "natural infrastructure" solution to solve (or at least decrease) problems related to water quality and quantity (or more specifically, water availability in the dry season; flooding). In this way, ROI evaluations should focus on hydrologic services returns: reducing the risk of corporate economic losses related to a decrease or interruption in hydrologic service flow or avoided costs in operation and maintenance costs or gray infrastructure repairs.

The last two hydrologic returns—lower risk of economic losses and avoided costs—are key to comparing water funds and conventional ways of providing hydrologic services. This comparison is essential to scaling up watershed conservation through attracting much higher investment from principle beneficiaries.

CURRENT STATE OF MONITORING FOR ROI ANALYSIS

Successes

Hydrologic monitoring in water funds is increasing and, through knowledge exchanges like the recent Monitoring Principles workshop, funds are increasingly focusing their efforts on designing monitoring at the appropriate scale and generating the data needed for economic analysis.

In many cases, the water funds have—or are in the process of—establishing strong relationships with key beneficiaries and institutions with technical experience. This improves capacity for monitoring and modeling of water fund impacts, obtaining access to hydrologic information at the location of beneficiaries, and obtaining information to evaluate links between services and benefits.

The Nature Conservancy (TNC) is developing a rigorous methodology for *ex ante* analysis of changes in vegetation cover/land use that could be applied in water funds and conservation projects in general. This methodology—through an analysis of "the world without the project" or the counterfactual—allows for the differentiation of impacts that can be attributed to the fund and those caused by other

factors. This methodology also takes into account the specific information needed to run hydrologic models. The Camboriú water fund provides a case study where this methodology is being applied to calculate the ROI for a principle investor who is looking to reduce suspended sediment loads at its intake point. In that case, the investor is funding watershed conservation and restoration with the goal of reducing costs and future risks to the company. TNC is looking for opportunities to apply this methodology in other water funds as well.

Gaps

A reliable ROI analysis of hydrologic services requires a good understanding of the hydrologic system. This is currently lacking in many water funds.

In actuality, analysis of "the world without the project" (counterfactual) is generally not carried out in hydrologic impact analyses in water funds. Accordingly, many times it is difficult if not impossible to attribute observed or expected impacts to the water fund activities.

Although ROI analysis requires information about how project activities impact flows of final ecosystem services, many times monitoring and modeling focuses on ecosystem functions instead of services. While ecosystem services (e.g., fewer total suspended solids at intake points) result from ecosystem functions (e.g., reduction of erosion in intervention sites), in general, services vary in space and have different metrics than ecosystem functions given that they are specific to the beneficiary (drinking water; irrigation water; water for hydropower). Accordingly, in the majority of cases, ecosystem services cannot be derived from existing monitoring or modeling of ecosystem function without additional data collection and careful analysis.

Challenges

We need to fill key existing information gaps in respect to understanding hydrologic functioning in water funds, apply counterfactual analysis, and quantify (in a sufficiently reliable manner) the changes in ecosystem service flows caused by the water fund in areas where beneficiaries are located. This requires dedicated resources, particularly if the goal is to generate estimates of actual benefits (versus potential benefits, e.g., #2 or #3 above, rather than #1).

Given scarce available resources for ROI analysis, the LAWFP must carefully evaluate where and how ROI analysis would be most useful. In many cases, the initial analysis does not need to be the most rigorous. Rather, it can serve to identify cases with the greatest potential for a high ROI. Identifying these cases can form a basis for pursuing additional funds to develop more robust ROI analyses.

The LAWFP needs a solid methodology for ROI analysis of ecosystem services that is sufficiently easy to apply and adaptable to the local context (including land use/land cover change attributable to water fund activities; hydrologic models calibrated to hydrologic services).

In many cases, creation and implementation costs of a water fund (compensation for opportunity costs; monitoring ecosystem services; transaction costs; quantification of benefits) depend on the particular context, which makes it difficult to compile robust cost estimates for *ex ante* ROI analysis of a new fund.

PRINCIPLES AND STRATEGIES MOVING FORWARD (WITHIN AND AMONG WATER FUNDS)

When is an ROI study needed?

The LAWFP needs to establish and collect evidence for ROI related to various ecosystem services in order to demonstrate that water funds are investments that bring meaningful economic returns (for both water fund contributors and other beneficiaries). This does not require a rigorous ROI for all funds.

We need to think strategically about how to generate long-term ROI case studies: Which funds have the best conditions for and interest in carrying out these studies? What specific purpose does each of these studies serve? How can we look for local partnerships to do/facilitate these studies?

ROI studies need to be linked directly to user demand. In this sense, we need to evaluate whether in a given case it is necessary to do a rigorous ROI analysis. In some cases water fund contributors just need "good arguments," or information about costs of investments in the fund and the expected types and approximate magnitudes of biophysical impacts.

Best practices for ROI analyses

Water funds should ensure that ROI analyses apply best practices. This includes: 1) using service metrics specific to the benefits of most interest to key beneficiaries; 2) focusing on ecosystem services rather than ecosystem functions; 3) rigorous attribution of impacts (using counterfactuals); and 4) applying best practices in economic valuation. This will generate the most reliable estimates of ROI based on real benefits and will help to avoid errors in analysis (such as, among others, serious over-valuation of services) that could damage the reputation of the fund or of water funds in general.

To date, water funds have focused on selecting case studies and ecosystem services based on data availability. Instead, analyses should focus on the interests of the water users. Once the interests of water users are identified, the necessary analyses and data gaps can be defined. Water funds need to identify ecosystem service metrics relevant to key beneficiaries and be able to talk about services in the same language as the beneficiaries. Involving beneficiaries in ROI studies from the beginning is critical to achieve this as well as to gain access to existing hydrologic data and understand relationships between ecosystem service flows and specific benefits.

Each fund should compile a "map" of the diverse beneficiaries of ecosystem services that will be affected in a positive manner by fund interventions. They need to describe the diverse services and specific benefits that are (or will likely be) produced for each beneficiary. This map can be utilized for designing ROI studies and for asking specific questions/formulating hypotheses within each fund such as: What are the principle services that water fund activities will affect? How much will these services increase compared to the counterfactual? Who will be the principal beneficiaries? How much do these beneficiaries care about the increase in services? What are the appropriate monitoring metrics/indicators for an ROI study?

Involving beneficiaries is key to answering these questions. Some people who we assume should be interested in service improvements may not be for non-obvious reasons (economic incentives; political matters), while others we did not think of initially may actually represent the true beneficiaries who are most interested in ROI information. Identifying key ecosystem services and benefits well is critical for

good design of ROI studies. We need to understand what is important to stakeholders to generate relevant studies.

It is important to take into account that decision makers want to have information on benefits in a timely manner. Accordingly, it is important to balance rigor and information needs with the time that it can take to generate results. Although ROI studies often will focus on a rigorous quantification of one or a few ecosystem services, we should always describe the broad range of services and benefits that a water fund produces and include these either qualitatively (descriptive) or quantitatively (using biophysical or monetary metrics). This is important as the priorities of water fund participants may change and a broad articulation of benefits may increase support beyond current supporters. Highlighting the broad range of benefits can also attract public resources geared towards projects that advance a broader suite of objectives (social, economic).

To develop reliable estimates of ROI, water funds should apply a counterfactual analysis *ex ante* (to improve spatial planning of interventions) as well as retrospectively (to evaluate the actual impacts attributable to the fund). Given the potential high costs of this type of rigorous analysis, studies should justify the importance of the results (opportunity for leverage/use as a demonstration site; reputational or financial risk for the fund or principal investors).

To maximize water fund benefits (versus the counterfactual) and improve cost-effectiveness, water funds should target intervention based on costs and benefits in combination with a counterfactual analysis whenever feasible.

Emphasizing the role of water funds in the context of "natural vs. gray" infrastructure can be misleading as natural infrastructure will often complement gray infrastructure. Often a more appropriate focus is on how natural infrastructure can help gray infrastructure reach its ecosystem service provision goals in a cost-effective manner, while also providing additional co-benefits. However, it is also important to look for cases where there is not a gray infrastructure alternative in order to highlight that natural infrastructure can also function in cases where conventional alternatives do not exist.

Getting the costs right is critical for a robust analysis—the costs of conservation interventions; costs of research and analysis necessary to design an intervention portfolio; transaction costs; costs of compensation to landowners; costs of monitoring and modeling to quantify the ecosystem service impacts and ROI.

Having information about the costs will be beneficial in conversations with potential investors and in formulating water fund budgets. Information on costs can also help determine when an ROI analysis is necessary to make the business case. If costs are low, analysis can focus on a few benefits that surpass the costs and are most easy to quantify, precluding the need to quantify a broad range of benefits to justify the investment.

We need to be clear that investments in natural infrastructure oftentimes take many years for there to be a net benefit or "*payback.*" This is also the case for investments in gray infrastructure. Accordingly, ROI studies should include an appropriate time frame.

Ex ante as well as *ex post* ROI analysis requires good field monitoring (for calibration and validation of models and documentation of impacts).

Finally, ROI guidance would be beneficial to water funds to help with ROI study design and supervision of contractors/consultants carrying out these studies. We also need to generate capacity within water fund teams to understand and speak the language of economics in order to better articulate water fund benefits when communicating with potential investors.

THEME 3: SOCIO-ECONOMIC MONITORING

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THEME DEFINITION

Socio-economic monitoring aims to evaluate changes in human well-being for a variety of stakeholders in watersheds where a water fund works. Stakeholders include 'upstream' communities and individuals, 'downstream' water users, as well as institutions and organizations involved in water fund governance, among others. Socio-economic monitoring focuses on how the water fund affects these stakeholders in both positive and negative ways over the short and long-term. Given that the central goal of water funds is to protect and manage watersheds for both people and nature, human well-being monitoring is a critical component of any monitoring program and, where possible, should be explicitly linked to hydrologic monitoring.

Understanding the risks and benefits brought by a water fund is important from an equity perspective as well as from a sustainability perspective. Water funds are unlikely to achieve their ecological, economic, social, or institutional objectives if they do not have the support and participation of local communities and other stakeholders. Socio-economic monitoring can serve the dual purpose of demonstrating impacts to current or potential funders or supporters, while also providing a critical risk reduction and adaptive management mechanism for the water fund to improve practices and ensure ongoing support.

This document focuses on 'upstream' socio-economic monitoring, or the impact that the water fund has on communities or individuals who participate directly in water fund activities. Monitoring and evaluation of 'upstream' socio-economic impacts provides critical information on the positive and/or negative impacts that programs provide to communities and individual participations. Many water funds have explicit 'upstream' socio-economic objectives and all water funds are completely reliant on the support and participation of local communities and landowners, making such monitoring critically important. Despite our focus on 'upstream' socio-economic monitoring, we emphasize that socio-economic monitoring should not be restricted to 'upstream' communities and landowners, as water funds will impact a range of stakeholders both within and downstream of the watersheds in which they work.

CURRENT STATE OF SOCIO-ECONOMIC MONITORING

Successes

'Upstream' socio-economic monitoring has been implemented in four water funds (Fondo Agua por La Vida y la Sostenibilidad, AquaFondo, Camboriú, and São Paulo). With support from IDB, there are 5 additional funds that are starting the process of designing 'upstream' socio-economic monitoring programs.

Agua por La Vida and AquaFondo both carried out a rigorous indicator selection process based on a well-articulated theory of change that was elaborated in a participatory manner with water fund staff,

community members, and NGOs. This process is being documented for both water funds and will provide a critical resource for water funds moving forward.

Agua por La Vida, AquaFondo, and Camboriú are also carrying out ROI studies focusing on the economic benefits to local communities and/or downstream investors.

Gaps

Nevertheless, socio-economic monitoring remains limited and severely underfunded. Water funds with socio-economic monitoring often lack a clear long-term plan for continuing monitoring and attributing impacts to water fund activities.

Many indicators focus on program outputs and do not extend to program impacts (Figure 1). There also needs to be greater attention to the links between hydrologic and socio-economic impacts in water funds.

Water funds lack agreed-upon protocols for social safeguards. However, in the experience of this working group, the majority are carrying out social safeguards in an informal way.

As of yet, there is no socio-economic monitoring in terms of how water funds influence water governance in watersheds where water funds work. For example, the act of uniting stakeholders in an executive board can bring benefits for governance or water resource management. These processes should be monitored, as these changes may be the most immediate and are critical water fund benefits in the context of watershed management.

Challenges

A major challenge for socio-economic monitoring is the issue of attribution. It is often difficult or impossible to prove that observed socio-economic changes are due to the water fund rather than to other projects or processes. Existing water funds often lack baseline data and designating a control population is often difficult, impossible, or unethical, making differences within differences designs (the social sciences equivalence of Before-After-Control-Impact design difficult). Thus, it is important to address attribution in other ways—creating a theory of change—which outlines the changes the water fund hopes to achieve with each activity and the steps needed to reach these results. Monitoring of indicators along the results chain (or theory of change) can serve to test the theory of change and address attribution.

A second challenge is the issue of trust versus independence in determining who should carry out socio-economic monitoring. On one hand, it is critical that communities and landowners trust the person(s) carrying out the monitoring; this requires time and relationship building and might be best accomplished by employing someone from the community or the water fund. At the same time, depending on how the monitoring data will be utilized, it may be important that the data be collected in an independent manner by someone outside of the water fund and the community. Navigating this balance requires clear articulation of the way that the monitoring data will be used and the expectations of the monitoring audience.

Finally, identifying relevant and robust indicators that are likely to change in a timely manner with water fund activities remains a challenge for water funds. Progress has been made through case studies in two water funds, but needs to be expanded to other funds.

Long-term funding and support for socio-economic monitoring is a major challenge. Monitoring should not be limited to just one period of data collection. It is better to carry out monitoring of a limited set of indicators that lasts multiple years rather than complex and complete monitoring that does not have funding to be carried out over the long term. This requires designing a monitoring program based on a well-identified set of indicators that are feasible to evaluate in the context of available water fund resources. At the same time, additional resources need to be leveraged for socio-economic monitoring.

PRINCIPLES AND STRATEGIES MOVING FORWARD (WITHIN AND BETWEEN FUNDS)

The process

Socio-economic monitoring should involve participation of local stakeholders from the beginning, starting with indicator selection and study design. This will ensure that relevant and useful indicators are selected, that the study design and questions match the interests and needs of diverse stakeholders, and can increase local support for monitoring and the water fund in general. Involving the community, particularly young people, in the monitoring process can strengthen the project and the utility of data in adaptive management.

The process of designing a socio-economic monitoring programs should start by understanding the dynamics of the community and/or population, including power structures, organizations (institutional and local), leaders, etc. This requires time and patience in building trust and relationships.

Those who carry out socio-economic monitoring should be aware that there will always be some level of bias in socio-economic studies. There is no way to study people in a completely objective manner, and it is important to reflect on the ways that people's responses may be influenced by who collects the data and how the data are collected. It is not uncommon for people to say what they think the interviewer wants to hear, particularly where trust has not been adequately established. At the same time, researchers collecting data should reflect on how their own bias affects their interpretation of results.

Those who carry out socio-economic monitoring need to explain to communities and landowners the objectives of the study and participation should involve free and informed consent (social safeguards). Researchers (or those carrying out monitoring) should be aware of how monitoring could affect community conflicts and how such conflicts could affect the information collected.

Socio-economic monitoring should consider both qualitative and quantitative information depending on the type of indicator and the population of interest. In cases where there are sufficient resources, it may be ideal to combine qualitative and quantitative methods. Nevertheless, this depends on the monitoring design and objectives.

The monitoring program should include a community feedback plan, which should also be explained very clearly to those involved.

Socio-economic monitoring recommendations

All water funds should have a protocol to ensure that social safeguards are followed (social safeguards are guidelines that assure voluntary and informed consent in program activities, including monitoring).

Water funds with socio-economic objectives should carry out a monitoring program based on human well-being indicators that are relevant and important for participating communities and landowners as well as for other stakeholders interested in the results or involved in decisions (like donors, water fund staff, board members, etc.).

Where adaptive management is a key monitoring objective or where there is a high risk of negative impacts, a participatory social impact assessment is recommended. In addition to developing a theory of change and selecting indicators, a participatory social impact assessment identifies strategies to avoid or mitigate potential risks or negative impacts. This process serves a dual goal of helping to improve project planning while also identifying indicators that can be used for both adaptive management and communication of project impacts. Participatory social impact assessments should always be employed where funds pose a high risk of negative impacts for participants (for example, programs which imply displacement of people, limit access to natural resources and/or involve vulnerable communities or individuals) as it can help to reduce or mitigate these impacts.

Water funds should also consider the impact of water funds on equity, both for those who are participating as well as those who are not participating (equity in access), and equity in terms of the impacts for various stakeholders. Equity should be considered in terms of gender, socio-economic status, and cultural groups. Monitoring should also include an analysis of whether the fund is generating conflicts. For example, it should evaluate whether the fund is generating conflicts in production, social conflict, etc. The fund should be attentive to this through an alert system to mitigate the situation.

Whenever possible, and always where there is high risk or a high burden of proof, socio-economic monitoring design should include a way to assess attribution. Nevertheless, it is not the case that there has to be a control population or control community. Such a control group is nearly always difficult to find given that it is rare to have very similar populations that will stay the same through time, with the exception of the water fund. Moreover, baseline data is rarely available, making it difficult to establish the pre-water fund state of the control and impact population. Finally, water funds should not restrict participation in water fund activities because an individual or community has been designated a control. However, there are other ways to demonstrate attribution, including using a theory of change developed in a participatory manner.

The LAWFP should identify at least one fund to carry out a robust and ‘best practice’ socio-economic monitoring program as a demonstration case.

Indicator selection

Indicator selection should be directly linked to water fund interventions through the creation of results chains and theories of change. They should attributable to water fund activities and change should be able to be detected in line with the time frame of the project. Human well-being indicators should reflect what is most important and relevant to stakeholders who are interested in the results and who are going to use the data for decision-making (including individuals, participant communities, investors, donors, etc.). This will include indicators directly related to changes in water quality and quantity (e.g.,

treatment costs, health) and those not directly related to water (improved community participation due to water fund activities). The theory of change should also identify other factors (outside the water fund) that could affect a given indicator and track these factors as part of the monitoring program to better assess attribution.

In the initial phase of designing a monitoring program, water funds should explore and collect secondary data in a collaborative and participatory manner with local authorities and other institutions. However, it is important to focus on indicators which are relevant and attributable to the fund and its objectives and not to focus on an indicator just because it is already being collected.

One possible indicator of satisfaction with the fund could be the time involved and number of contracts signed between communities and the water fund. Nevertheless, the group of indicators should be developed in accordance with water fund objectives and the expected utility of tracking those changes.

Next steps

Write up and share experiences of water funds that are in the process of carrying out socio-economic monitoring like Fondo Agua por La Vida y la Sostenibilidad, AquaFondo, Camboriú, and others.

The LAWFP can play an important role in compiling case studies of socio-economic monitoring in water funds, so that other water funds can build off of these experiences. However, it is important to note that each fund will have distinct socio-economic, political, and cultural dynamics that need to be taken into account when designing socio-economic monitoring.

Document standards for social safeguards (protocols that insure free and informed consent and that the water fund does not cause harm).

Develop decision trees that can serve as guides depending on available resources and the monitoring objectives. See Figure 2 below for an example decision tree.

Identify at least one water fund to focus resources to carry out an intensive socio-economic monitoring effort.

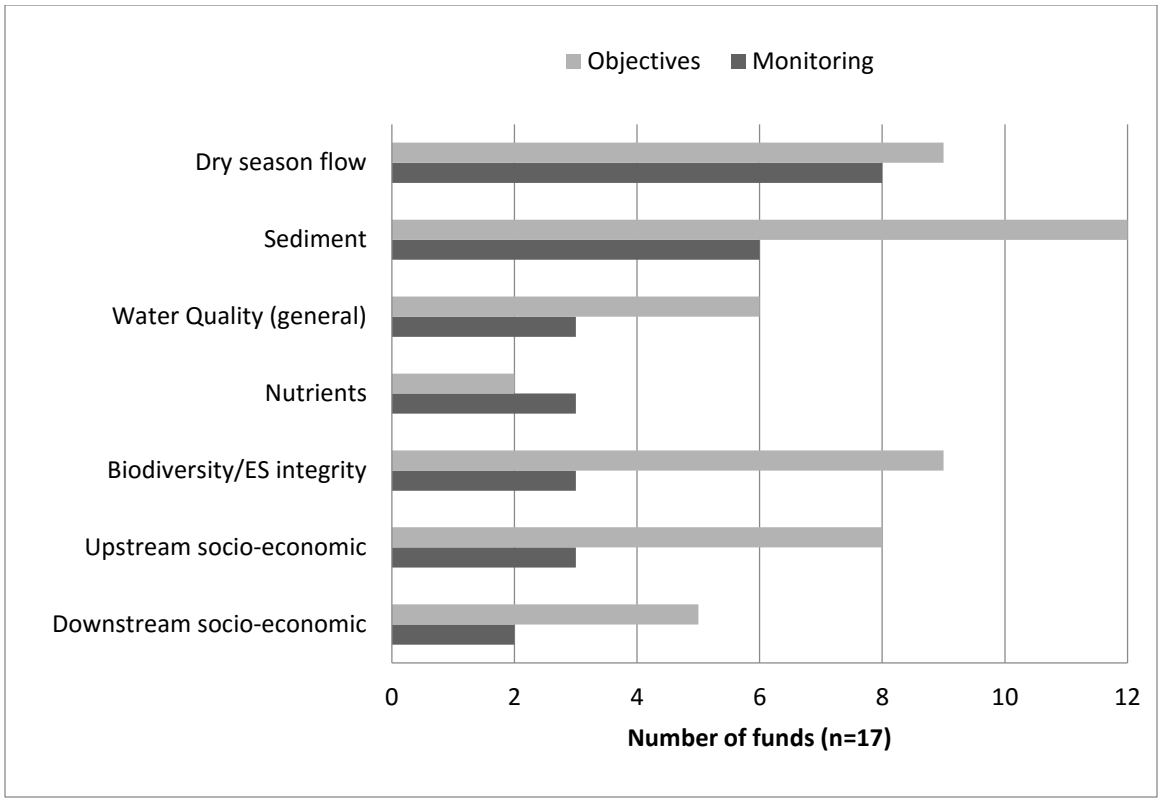

Figure 1. Water fund objectives vs. monitoring

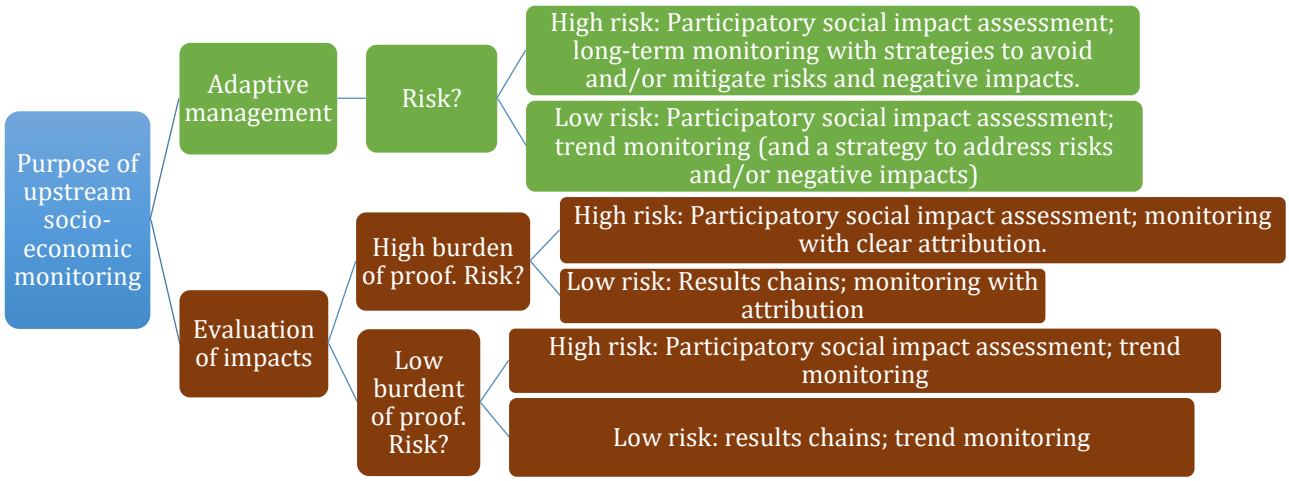

Figure 2. Example decision tree