

Aligning Water Fund Investment Prioritization in Latin America: General Guidance

Most of the world's watersheds now function as tightly knit socio-ecological systems. The biophysical characteristics of the landscape, governance structures and individual land owner's or user's decisions in a place determine to a large degree what activities, such as ranching, farming, forestry, rural or urban development, happen in a watershed. What people choose to do on the land then feeds back to the condition of the ecological system and changes biodiversity, soil fertility, water quality, etc. These changes in turn affect the ability of people downstream to benefit from that system through the delivery of ecosystem services such as clean drinking water, flood protection, erosion control, or hydropower production.

Water funds are a conservation finance mechanisms that takes advantage of the close ties between people and nature in watersheds. For water funds to be successful long-term mechanisms, the investors in each fund must be convinced that their investments are worthwhile. Investors' confidence will generally rely on two things; whether or not water fund objectives are met and whether or not their money is spent wisely. While other documents have detailed how to engage water users, establish the institutional arrangements of a water fund, develop funding structures, engage stakeholders, implement conservation actions and monitor outcomes, little guidance has been developed on the suitable technical approaches to identifying where water funds should be developed and how their investments should be targeted to ensure that water fund objectives are met as efficiently as possible.

This document addresses this part of water fund design and implementation and provides guidance and standards at a time when water funds are expanding rapidly around the globe. Throughout these recommendations, we draw on the experiences of many groups in Latin America who have already developed methods for choosing places to create water funds and for designing investment strategies for individual water funds. While our focus here is on experience from one region, the diversity of questions, social and ecological systems and institutional arrangements in the region provide a wide set of circumstances to learn from. This document serves as a synthesis of research and experience, and establishes a starting point for water fund prioritization that will improve and expand as new funds are established in new regions and as monitoring contributes to our understanding of water fund effectiveness. Many sections are still in development. Those that are indicate the major lines of research or discussion that are underway or planned.

Core Components of Water Fund Investment Prioritization

There are two major questions that might be asked in the process of water fund prioritization, depending on the scale of the project. First, we might want to know

where to develop new water funds. Once we have selected areas for new water fund development, we will likely want to know at the fund scale *where and how each fund should spend its money*. It is unlikely that all projects at all scales will or should follow the same set of steps and use the same

methodologies. However, several core components of water fund prioritization are emerging that will likely be useful in different ways and different combinations in each case (Fig. 1). These components are choosing objectives, diagnostic screening, selecting priority areas, choosing activities, allocating the budget, estimating project returns and designing a monitoring plan. Each component can be addressed in several ways (Fig. 1). With the exception of choosing objectives first, all other components can be used in any order to fit the needs of each project. Several different combinations have been used in existing projects. One example, for the Agua Por La Vida y Sostenibilidad fund in the Cauca Valley, Colombia, is shown in Figure 2.

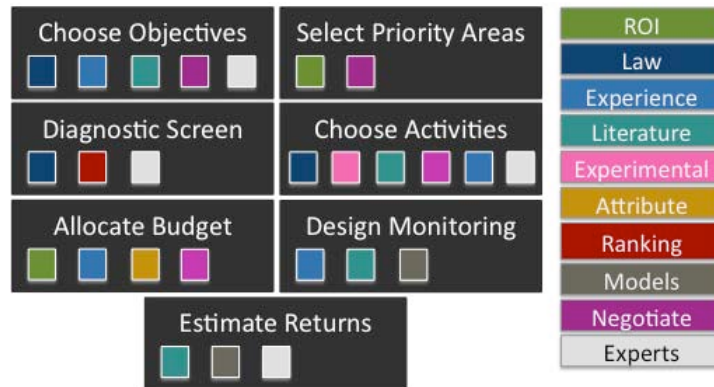


Figure 1. Core components of water fund prioritization with options for applying each component.

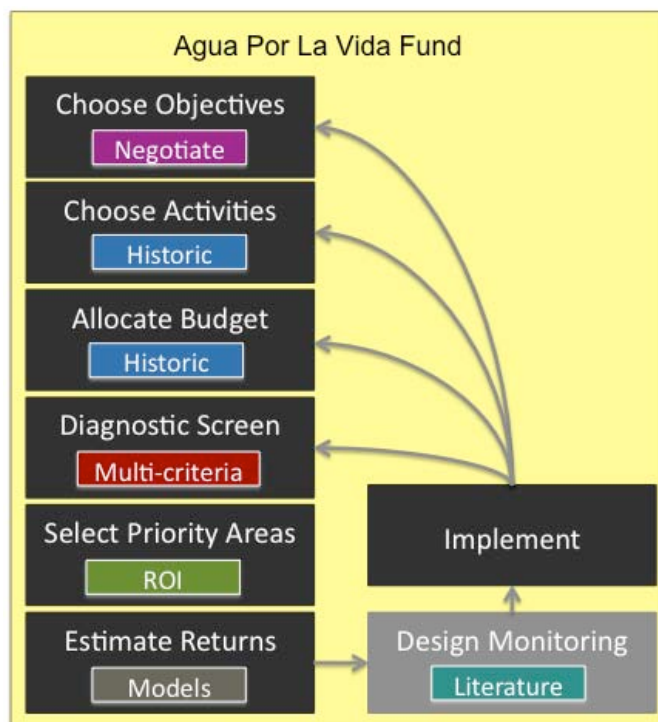


Figure 2. Use of water fund prioritization components for fund-level investment design for the Agua por la Vida y Sostenibilidad water fund in Colombia. The grey box for monitoring design indicates that that component is still in development.

The following sections will briefly introduce some of the options for implementing each component and discuss guidance from the literature and direct experience that inform which options are likely to be most effective under which conditions.

Choosing Objectives

Choosing objectives is always the first step in prioritizing water fund investments. Without objectives, it is very hard to determine how much funding is needed, which activities should be used, where activities should be targeted, how much return the project can expect and what should be measured to ensure success of the fund. It is also a critical step because the selection of objectives sets the stage for assessment of the fund's success in the future. In other words, when someone asks whether or not a water fund is successful, they are asking whether or not the fund's objectives were met.

Objectives can be focused on biodiversity, ecosystem services, purely social returns, or any combination of the three. Examples of biodiversity objectives are those commonly defined by conservation organizations such as course and fine filter targets and other kinds of objectives such as maintaining environmental flows. Water funds are likely to focus on several of the following water-related ecosystem services as objectives; erosion control; water purification (nutrients, bacteria, chemicals); water supply or regulation (timing of surface water flows) for drinking, hydropower production, irrigation or industrial use (e.g. cooling, beverage bottling); flood regulation; groundwater recharge; or support of freshwater fisheries. Some water funds may also have social objectives in addition to the benefits people receive from ecosystem services. For example, the World Bank has assessed the potential to use payments from water funds as a means to alleviate rural poverty in Guatemala. In this setting, poverty alleviation would be a specific objective of a new fund.

Funds that have multiple stakeholders in different regions may have different objectives for watersheds or sub-watersheds within the fund. For example, the FONAPA fund in Ecuador has the local government water provider and a hydropower company as stakeholders, but these stakeholders receive benefits from different sub-watersheds within one large basin, so each sub-watershed has its own objectives.

Options:

There are several options for establishing objectives (Figure 1). **Law:** In some cases, objectives are set out in laws that require the establishment of watershed payments for a specific purpose. Objectives are partially set by the law in the Brazilian Water Producer Program. **Negotiation:** In all other cases, objectives will be set through a negotiation process among the water fund stakeholders. **Literature:** In that negotiation process, information from the literature can be used to explain what

baseline or desirable conditions in the watershed are, or what kinds of changes can be expected as a result of the kinds of actions the fund could take. This information will help in identifying how much change the fund wants to achieve (see below).

Experts: When literature values are not readily available to help with quantitative objective setting, expert elicitation can be used. **Experience:** In some cases, water fund stakeholders may have experience making watershed investments already and their past experience can be used to inform the selection of objectives. Many stakeholders likely have their own objectives related to their ongoing work in the area and these may directly inform the water fund objectives. For example, if TNC is working in an area to conserve a particular forest type, the conservation of that forest type may become an objective of the water fund.

Guidance:

We are in the process of reviewing and incorporating existing standards used by several organizations for the development of objectives. These include SMART objectives (used by TNC) and other published reviews of what makes a good objective.

In the context of water funds, it is important that objectives be as explicit, beneficiary-specific and quantitative as possible. In the establishment of a water fund, much conversation might be needed to get stakeholders to agree on a set of core issues and establish an objective such as “maintain or improve water quality and supply”. Broadly stated goals are important politically, and agreement on those will be an important first step. But if a water fund does not go further in defining to whom those benefits should be provided and how much improvement is desired, all further steps in the prioritization process will be very difficult, and it will be almost impossible to identify whether or not a fund is succeeding in meeting its goals. Ideally, ecosystem service objectives will state a specific **benefit** to a specific **beneficiary or group** with a **quantitative target**. Here are some examples of well-defined objectives:

Biodiversity objectives

We are in the process of compiling and summarizing guidance from biodiversity conservation organizations on best practices for identifying biodiversity objectives.

Ecosystem service objectives

Maintain **drinking water supply** to **X city** at **2008 levels**.

Reduce nutrient pollution at **X water treatment facility** by **10% from 2010 levels**.

Reduce erosion upstream of **X dam** by **10,000 tons/yr**.

Reduce bacterial pollution to **drinking water standards** for **all people living below the poverty line**.

Reduce the risk of flooding in **all major population centers** by **20% from 2005 levels**.

Social objectives

Raise the income of the **poorest 10% of the population** **above the poverty line**.

Provide **at least one alternative livelihood** for **all communities bordering protected areas**.

While quantitative, benefit-specific objectives are desired, there are many cases where negotiation will play a strong role in defining objectives. We are in the process of developing guidance on how water fund stakeholders in different roles can best inform the design of objectives, and how those in a role of coordination can strike a balance with those in a role of implementation

Finally, it may be difficult to find local data to inform the selection of quantitative objectives. We are in the process of scoping a literature review and expert elicitation process to inform quantitative goal setting for ecosystem service objectives. We may focus on a sub-set of ecosystem services for which we will identify reasonable levels of change any water fund can expect to achieve. For example, if the literature and expert elicitations suggest that activities such as fencing, silvopastoral systems and revegetation can lead to a reduction in erosion ranging from 5 to 50%, no fund should develop an objective stating that they will reduce erosion by 75%.

Choosing Activities

Activities are the actions a water fund can support to create the desirable changes they hope for in the watershed. These can be quite varied and can focus on achieving protection, restoration, altered management practices in working landscapes or any combination of those. In existing funds, activities employed include hiring park guards, conservation easements, regulations (communal, local or regional government), developing alternative livelihoods for communities, education, fencing, assisted and unassisted restoration, forest enrichment, silvopastoral systems, agroforestry practices, landform management (terracing, ditching, etc) and technical training.

Options:

The selection of activities has happened in several different ways. Ideally, activities will be chosen based on their likelihood of creating the kind of change the fund aims to reach through its objectives. In many cases, this ideal selection is constrained in some way. **Law:** The activities a fund can support may be dictated partially or entirely by law. This is the case in the Brazilian Water Producer Program where restoration of riparian areas is the primary activity recommended. **Literature:** Information on how effective different activities are at delivering different outcomes can often be found in the literature. For example, there have been extensive studies in many parts of the world on how effective different vegetation types are at filtering out nutrients or sediment from surface water. Other studies have shown how well certain species respond to improvements in landscape management. These studies can help inform which activities are likely to help the fund meet their objectives most efficiently. **Experimental:** When little information is available in the literature on an activity or in a region of interest, experimental implementation can be used to learn about the effectiveness of different activities. The FONAPA water fund made experimental investments during the first 2 years of the fund to generate an understanding of which activities will work best for them. **Experience:** In some

places where funds are developing, stakeholders may have their own experience with which activities are likely to be most effective. In the case of the Agua por la Vida y Sostenibilidad, one of the fund investors had been making investments in watershed management for several years before the water fund was formed. Through those investments, they learned what activities were likely to be most acceptable to landowners, and this social understanding has guided which activities are supported by the fund. **Experts:** In some cases, experience in the region of interest will be held by non-stakeholder groups, or experts. Including their local knowledge can be a very important approach. **Negotiate:** In some cases, activities may be chosen purely through negotiation.

Guidance:

We are still developing guidance for the selection of activities. Early recommendations include focusing on activities for which some information is available about effectiveness. When funds wish to invest in new or unstudied activities, they should do so experimentally to ensure that they can learn about effectiveness through their investments.

Diagnostic Screening

In the diagnostic screening phase, we are interested in characterizing the landscape in terms of its potential for housing a water fund and returning good benefits from that approach. The landscapes of interest can be very large regions, such as all of Latin America, or a single water fund. In this stage, we want to see where good places are for developing funds, and within a fund, where good places are for making investments. Screening criteria can be biophysical, socio-political or both. This stage sets up a later stage where priority areas are actually selected. We treat these steps separately because they may be influenced by different stakeholders, different information or separated in time.

Options:

There are two options that have been used for conducting diagnostic screening.

Models: Biophysical and socio-economic quantitative models can be used to assess how ecosystem services are delivered on a current landscape and/or to assess how different future scenarios for water fund development will alter service provision.

Ranking approach: When models are not available or take too much time, capacity or data to use, a ranking analysis can be a useful tool for diagnostic screening.

Factors can include biodiversity-relevant features such as habitat type, species ranges, vulnerability, etc; ecosystem service-relevant features such as location and density of beneficiaries, characteristics of water supply, erosion risk, groundwater recharge capacity, or flood risk; implementation-relevant features such as political will, or funding potential and socially-relevant features such as indigenous areas, household income, education level, or source of income. This approach has been used in all water fund examples that were reviewed in preparation of this document (FONAPA, Latin America Diagnostic Screening, Brazilian Water Producer Program,

Agua por la Vida y Sostenibilidad). In each case, the factors used were different and the use of weights or ranks also varied. **Experts:** Expert opinion may be a key part of a ranking approach when literature values are not available to guide selection of ranks for each criteria. Expert opinion can also be used as the sole approach to identifying important areas for water fund development, in the absence of other information.

Guidance:

Jointly Identifying the “Where” and the “What”

Diagnostic screening is often done with a focus on identifying major problem, or ‘source’ areas in watersheds. This places a focus on areas that are currently in a degraded state or under intensive management. Focusing investments in these regions would indeed reduce sources (of pollutants, sediment, flood waters, etc) at that point, but changes in these areas may not cause the greatest changes for downstream beneficiaries. For example, consider a case with two erosion sources; one large erosion area such as an open pit mine in an upper region of a watershed far from a tributary and one smaller erosion source such as an intensively managed pasture, in a lower watershed region next to the mainstem of the river. Many traditional screening approaches would focus investment efforts on the largest source (the mine in the upper watershed). However, if the landscape between the mine and the river network is heavily vegetated, that source of sediment may not have made it into the river, but may have instead been retained by the vegetation on the landscape. In this situation, investment in the smaller source closer to the river will have a larger impact on downstream water quality and associated social benefits. To account for these important connections in hydrologic systems, diagnostic screening should focus on the *change* the investment will make, and should focus on asking both *what to invest in* and *where to invest* in the same analysis.

Considering Paired Activities and Objectives

In some cases, diagnostic screening exercises use one set of factors (e.g. soil type, rainfall, vegetation cover) to identify ‘good’ areas to target investments for a water fund. However, most funds have more than one objective, and options for which activities they invest in. Diagnostic screening approaches should consider different factors for how effective each activity will be in impacting each objective. For example, fencing will not equally affect biodiversity, erosion control and water supply, and the factors that determine the impact of fencing are different than those that determine the impact of agroforestry practices, etc.

Specializing Factors Across Scales

It is very likely that the factors that are relevant to a diagnostic screening for deciding where new water funds should be developed will be different than those that are relevant to deciding where and in what to invest within a water fund. For example, information on the location and density of beneficiaries, existing governance and capacity, opportunities for funding and implementation will all be

more important for determining where new funds will go. However, diagnostic screening within a fund can be scale-independent. In other words, the same factors will be important within a small local water fund and a large regional water fund.

We are exploring the certainty of this statement in the development of a tool that attempts to answer both questions. Our current hypothesis is that we can use the same set of steps to ask where new funds should go and how to invest within a fund, but that the key factors may change. This is still under development.

Including Stakeholder Knowledge

The good places for a water fund to invest cannot be determined solely based on biophysical and ecological data. The fund must be able to successfully implement the kinds of changes needed to gain returns (improvements in objectives) from those areas for them to be good places to invest. In other words, the proposed investments a water fund is to make must also be feasible and socially acceptable. In most fund regions, local stakeholders will have a wealth of knowledge that can inform the selection of feasible and acceptable areas for investment. It is very important to have a means for incorporating this information in the diagnostic screening process. This information can be of three types; 1) knowledge of which activities will be feasible on which kinds of existing lands (e.g. revegetation may not be feasible in high-income croplands), 2) knowledge of which activities will be feasible in which areas of the water fund (e.g. particular landowners who are likely to participate, areas of instability where no activities will be feasible, etc) and 3) knowledge of areas where specific activities will have the biggest impact (e.g. knowledge of a highly erosive region, location of headwaters, etc). This kind of information may be given the same weight as biophysical and ecological information in the screening process, or it may be weighted more or less heavily, depending on the context.

Allocating the Budget

Once a fund has determined how much money will be available for watershed investments, it must decide how the money will be spent. There are several components of that question. If the water fund encompasses several sub-watersheds or watersheds, how will funds be allocated among those units? If the fund is investing in more than one activity, how much funding will go to each activity? Or, will funds be distributed based solely on the likely return on investment each activity can provide in each part of the water fund area?

Options: These questions can be answered in several ways. **Negotiation:** There may be strong political conditions that require the budget to be allocated in a certain way. For example, some stakeholders may feel that funds they contribute should be allocated to activities that favor their objectives the most. **Experience:** If any of the stakeholders in a fund have made investments historically, they may wish to keep the balance created by those investments. Expectations of a community that has

been receiving funds may be hard to alter, and maintaining an existing pattern can help establish credibility and trust for a new fund that is formalizing historic, uncoordinated activities among several stakeholders. **Attribute:** Some funds may want to establish a sense of equality in the way funds are allocated among watersheds or users. In this case, the budget could be allocated among watersheds based on their area or the density of users within each watershed. With this approach, the most money would go to the largest watersheds, and/or those with the most beneficiaries. **Return on Investment:** Return on investment can be used to help allocate the budget to the activities that are likely to provide the greatest benefits per amount spent. To use an ROI approach, the fund would need information on how much each activity will cost and some way to estimate how much return to expect from each activity. The budget could then be allocated among activities based on their cost to benefit ratio.

Guidance:

Using return on investment is strongly advocated for this step because it gives the fund the best chance of spending their money efficiently. There may be social or political limitations on this approach that must be respected, but those should come with the recognition that there is likely a tradeoff with efficiency. Conversely, the return on investment approach may lead a fund to invest solely in one activity. For example if one activity a water fund can implement is much cheaper than all others, all areas suitable for that activity will be selected first. At a relatively small budget level, this may lead the fund to invest all its money in one activity. If that activity has a high probability of success and a relatively high impact on the desired objectives, this could be a fine approach. If however, there is uncertainty in the probability of the approach being implemented effectively or in the reliability of its impact on objectives, the fund may wish to diversify activities while more is learned about each activity's success. In this case, the fund could pre-allocate some portion of the budget to each activity or a subset of activities to ensure some diversity in the investments.

Selecting Priority Areas

Usually following a diagnostic screen, a decision will have to be made about where to invest first. We are calling these places 'priority areas' as they will be the ones that receive initial attention and investment. In most prioritization exercises, it will be important to build in the flexibility to reassess priorities on a regular basis as more is learned about the effectiveness and feasibility of different activities and as understanding of land use and climate change effects becomes richer.

Options:

Selecting priority areas has been done in two ways. There are likely other options.

Negotiate: In some cases, strong political preferences will guide where initial investments are made, and where future priority areas are. **Return on Investment:** A diagnostic screening or modeling exercise can be used to identify the areas that

will likely have the largest returns for each possible activity in each area. If the fund or region also has information on costs for different activities, they can use a cost to benefit ratio to guide where investments will be most effective. In this case, returns may be changes in biodiversity, ecosystem service or social objectives.

Guidance:

The selection of priority areas is an important step to coordinate with the design of the fund's monitoring program. The number, type, location and previous knowledge of the impact of each investment the fund will make should inform the location and degree of replication built into the monitoring design.

Estimating Project Returns

Once a set of priority areas has been identified, estimates can be made of how much return can be expected from a given level of investment. In some cases, a region or fund may only know about how much money will be spent on different activities or about how many funds will be established. In other cases, a specific fund may have established 'investment portfolios' that show exactly where and in what activities the fund will invest. It is easier to estimate conservation, ecosystem service and/or social project returns in the latter case, but it is possible in all cases described.

Options:

There are at least three options for estimating project returns. **Literature:** In some places, experimental research will already have been published that describes how much benefit one can expect from an activity. For example, a study may have been done in a large river basin that shows that silvopastoral systems reduced erosion by 1 ton/ha/yr. If a fund plans to invest in 500 ha of silvopastoral systems, they can use this published estimate or returns to estimate what their project will yield (~500 ton/yr reduced erosion). Other literature may document how service changes translate into economic or social change. For example, in most places, research has shown a non-linear relationship between turbidity and water treatment costs. Such known relationships can be used to estimate economic returns from water fund investments. **Models:** If literature is not available that documents the effectiveness of each activity that will be supported in a region or fund, models can be used to estimate returns. Several models have already been developed that can be used to estimate ecosystem service returns in biophysical terms. These include SWAT, InVEST, FIESTA, HEC-RAS, and many others. InVEST also allows estimation of economic returns for a few water fund-related services, but not all. **Experts:** In some cases, the best available information will rest with local experts who can estimate, based on their own experience, what the likely ecological, ecosystem service and social effects of a particular water fund or investment strategy might be.

Guidance:

We are in the process of exploring options for providing both relative and absolute estimates of project returns for all possible water fund objectives. Guidance will be developed as we better understand what is feasible and desirable for this step.

Showing the Value of Science

Conducting a rigorous prioritization process can be time consuming and will require additional resources. Given that most payment for ecosystem service approaches historically have not used a rigorous prioritization approach, we still need to establish the case for using this approach and explore the improvement in investment efficiency we are likely to gain from using it. In response to this need, water fund developers can compare the estimated returns from their priority areas selected through the above prioritization process with estimated returns from an alternative, 'business-as-usual' selection process. While this is not a core component of water fund prioritization, it will likely be an important exercise until the effectiveness of water funds is better established and we have multiple cases with observed results. We are developing guidance for how to conduct these 'value of science' analyses in a rigorous, yet feasible way.

Designing Monitoring

There is a working group lead by TNC that is developing guidance for monitoring program design. It is very important that their efforts and ours are aligned. We have identified several places in the discussion of prioritization core components where monitoring needs to be considered (e.g. objectives, diagnostic screening, selecting priority areas, estimating project returns) and will include any relevant guidance here as it develops.