

Source Water Protection & Climate Adaptation

The Role of Water Funds

Ecosystem based adaptation, implemented through water funds, can help build more resilient communities and cities in the face of climate change



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INTRODUCTION

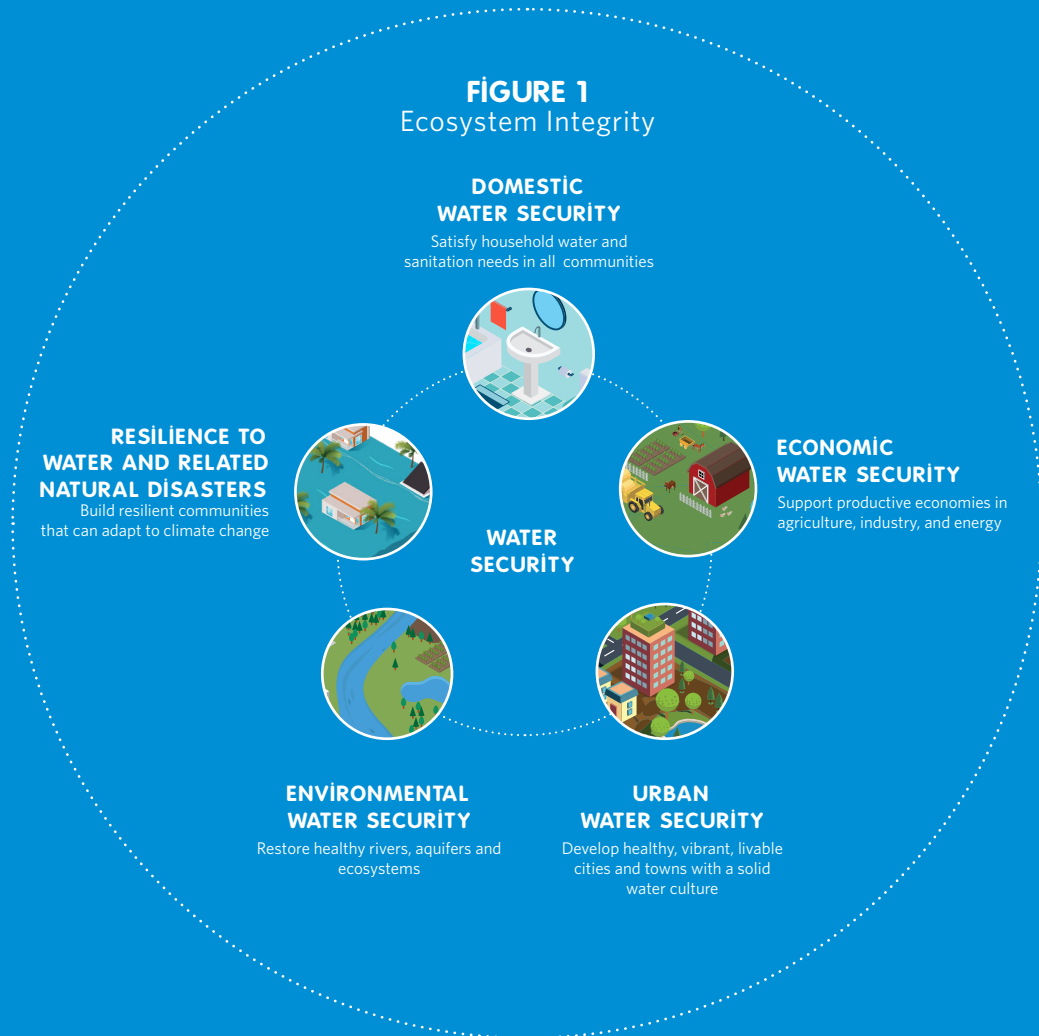
Climate change is predicted to bring about unprecedented changes in our water resources, including increased water scarcity and risks related to flooding and water quality. The ability of communities to adapt to these changes is a significant factor in the resulting extent and severity of connected social and economic impacts. Ecosystem-based adaptation provides a cost-effective approach that emphasizes the use of nature to help communities adapt to the predicted changes in water resources. Water Funds is a proven source water protection planning and implementation framework that can serve as a delivery mechanism for effective ecosystem-based adaptation for water security.

This document offers an introduction to ecosystem-based adaptation as an important tool for building resilient communities under expected climate change impacts, and to make the connection to the Water Funds as potential delivery mechanisms for ecosystem-based adaptation. The document is aimed at readers interested in nature-based solutions to water security, including water managers, natural resource decision makers, funding institutions and on the ground practitioners.

Water Security and Nature

Water security encompasses the ability of communities to successfully manage their water resources and services along five dimensions, as depicted in Figure 1:

- **Domestic:** Satisfy household water and sanitation needs for all people
- **Economic:** Support productive economies in agriculture, industry, and energy
- **Urban:** Develop vibrant, livable cities and towns
- **Environmental:** Restore healthy rivers, aquifers and ecosystems
- **Resilience:** Build resilient communities that can adapt to change



Many threats can put water security at risk, including overuse of water by one or more actors, land degradation in places where communities source their water, poor water governance, pollution from point and nonpoint sources, lack of investment in water services and natural disasters such as droughts and floods. Both grey infrastructure, such as pipes and water treatment, and green infrastructure, such as healthy forests and rivers, play important roles in the delivery of water security and in addressing these threats. Investment in and management of these resources creates a more robust and flexible system to ensure that people have a sustainable supply of sufficient clean water to support healthy communities.

There is a positive relationship between ecosystem integrity in the places where water comes from, such as mountains, forests, grasslands and wetlands, and the availability of clean water for users downstream. When we invest in the protection and restoration of these natural landscapes we are also protecting the freshwater services they provide, such as water infiltration, filtration, transport and storage. For example, vegetation such as grass and trees can help filter pollutants out of water before it reaches lakes and streams. Natural areas are also able to infiltrate more water into the soil and groundwater, providing storage of this water, which can help regulate flows during dry seasons and moderate floods.

Climate-related threats to water security



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According to the IPCC (2014), it is expected that freshwater-related risks will increase significantly with global warming. Climate change is projected to measurably reduce renewable surface water and groundwater resources in dry subtropical regions, intensifying competition for water among users. At the same time, water resources are projected to increase at high latitudes and projections show an increase of global flood risk in the future, partly due to climate change. Since the 1950's, socioeconomic losses associated with floods have increased due to greater exposure and vulnerability. In addition, climate change is projected to reduce water quality, posing risks to drinking water even with conventional treatment due to increase of temperature, sediments and pollutant loadings due to heavy rainfall, reduced dilution during droughts, and disruption of treatment facilities during floods. Some evidence indicates that climate change is already negatively impacting freshwater ecosystems by changing streamflow and water quality, however the full extent of its impacts on our water resources is yet to be seen.

Ecosystem-based adaptation (EBA)

Since the Convention on Biological Diversity (CBD) COP 10 in 2009, Ecosystem-based Adaptation (EBA) has gained significant attention in the conservation and development sectors and has prompted the development of several EBA initiatives. EBA is a people-centric approach that promotes the use of biodiversity and ecosystem services to help people to adapt to climate change, and acknowledges that human resilience depends significantly on ecosystem health. At the same time, it is generally recognized that EBA should be implemented as part of an overall adaptation strategy, complementing other solutions, since ecosystems' integrity alone may not guarantee people resilience. EBA differs from "business as usual" initiatives due to the links between conservation approaches and socio-economic benefits to achieve climate adaptation. Successful EBA initiatives should: 1) Reduce social and environmental vulnerabilities; 2) Generate societal benefits; 3) Restore, maintain or improve ecosystem health; 4) Be supported by policies at multiple levels; and 5) Support equitable governance and enhances capacities (FEBA 2017).

EBA implementation for water security is imperative considering that shifting weather patterns due to climate change are likely to impact ecosystem services which people rely on, such as water supply, flood control, food

production, among others. EBA for water may involve a wide range of measures or strategies to increase resilience of ecosystems and adaptive capacity of people to climate change, which may include (Colls et al. 2009; UNECE 2009; TNC & Fundación Alma 2014):

Sustainable river basin management

Planned and coordinated actions between stakeholders to manage rivers, aquifers, floodplains, and their land cover to ensure water provision and flood regulation services, among others.

Ecosystems restoration for disaster risk reduction

Restore mangroves to reduce storm-surges impacts, saline intrusion and coastal erosion; inland wetlands to buffer floods and droughts; and mountain forests to reduce landslides.

Sustainable agricultural systems

Conserving natural vegetation, managing diverse agricultural arrangements, implementing efficient irrigation practices, and using local knowledge of seeds, crops and livestock varieties, contributes to rural economies, food provision and water quality and quantity, among other services.

Protected areas declaration and management

Establish protected area and ensure effective management to improve or maintain the delivery of ecosystem services that increase resilience.

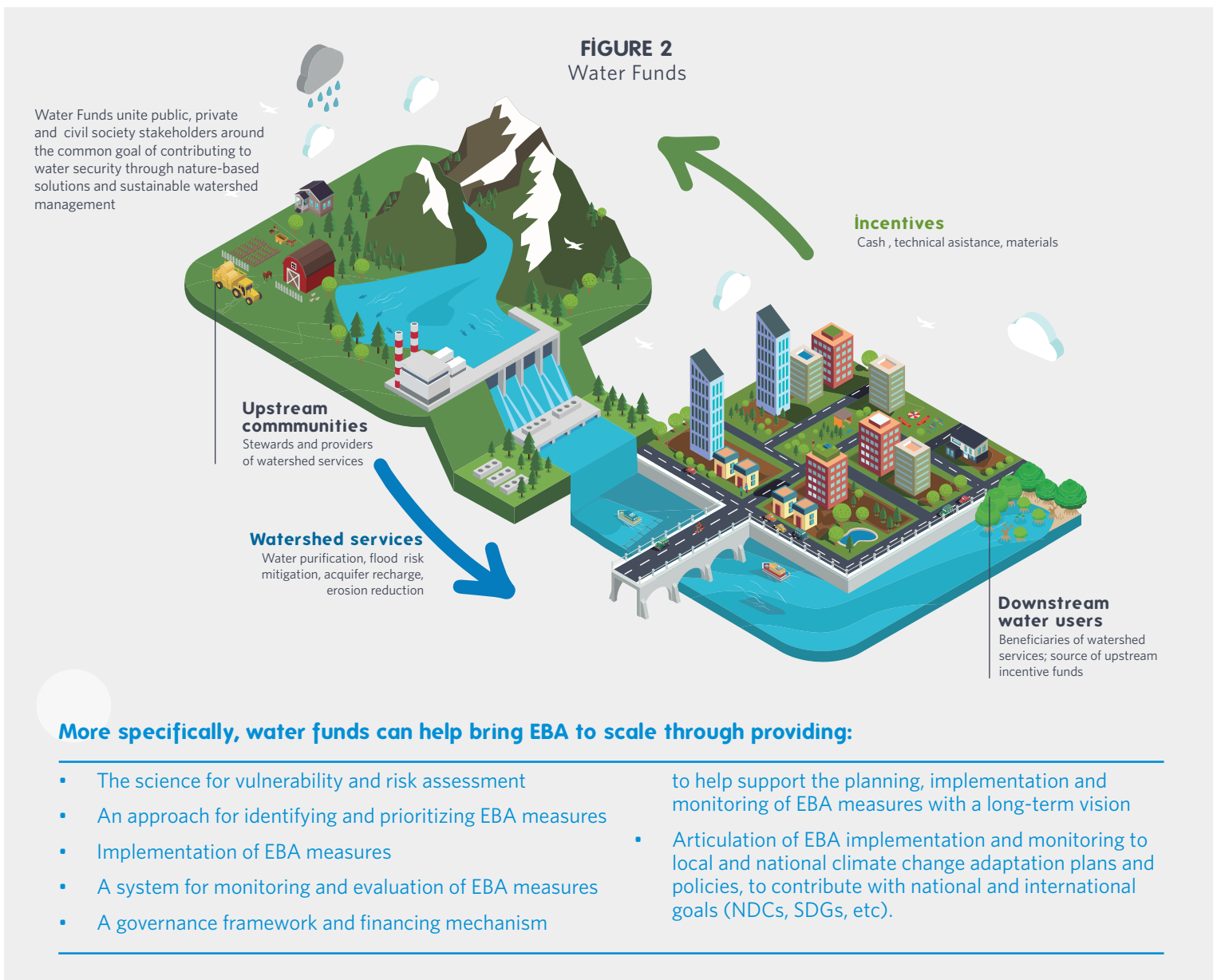
Forest fire management

Maintenance practices in shrublands and forests to limit magnitude and frequency of uncontrolled forest fires.



Water funds

Water Funds are organizations that design and enhance financial and governance mechanisms that unite public, private and civil society stakeholders around a common goal to contribute to water security through nature-based solutions. Water funds can help facilitate the planning, implementation and tracking of EBA to address possible threats to water security from climate change. As documented in TNC's *Beyond the Source* report, for over 15 years Water Funds have helped communities improve water quality by bringing water users together to collectively invest in upstream habitat protection and watershed management and to mobilize innovative sources of funding (Abell 2017). As a permanent governance, investment and source water protection implementation mechanism, Water Funds provide the framework for collective action, connecting land stewards in rural areas and water users in urban areas to share in the value of healthy watersheds, as illustrated in Figure 2.



Since the first Water fund was established in Quito in 2000, 34 more Water Funds have been established around the world, including in Latin America, Africa, North America and Asia, with more than 40 additional Water Funds in design. The Nature Conservancy and its partners are working to accelerate expansion of Water Funds through mentorship, training and capacity building. Their vision is a world in which the protection and restoration of nature is recognized as an important tool to help communities adapt to climate change and ensure long term water security.

In Latin America, Water Funds work is supported by **Latin American Water Funds Partnership (LAWFP)**. Created

in 2011, the LAWFP is an agreement between the Inter-American Development Bank (IADB), FEMSA Foundation, the Global Environment Facility and (GEF), International Climate Initiative (IKI) and The Nature Conservancy (TNC) to contribute to water security in Latin America and the Caribbean through the creation and strengthening of Water Funds. In 2018, the International Climate Initiative (IKI) joined the Latin American Water Funds Partnership as a new partner to strengthen the Water Funds to become a major engine for climate change adaptation to reduce water risks for major cities in Latin America. With their support Water Funds are mainstreaming the EBA approach in their work.

FIGURE 3
Source Water Protection Activities implemented by WFs and benefits in terms of Climate

Skip activity	Examples	Functions maintained or restored	Climate Change Impact Potentially Addressed					
			Increased flood peaks	Less precipitation in dry season	Decreased snow pack	Increased water and air temperatures	Increased rainfall erosivity/ soil erosion	Increased fire risk
Targeted and protection	Forest protection, grassland, wetland protection	Maintain ability of landscapes to filter and infiltrate water; slow down overland runoff; fog capture from forests	↓	↓	↓	↓	↓	
Revegetation	Reforestation, afforestation, grassland restoration	Restore more natural hydrology; restore ability of landscape to filter and infiltrate water, slow down overland runoff	↓	↓	↓		↓	
Riparian restoration	Replanting riparian vegetation fencing along streams to allow vegetation to grow and keep out animals	Restore ability of riparian vegetation to filter runoff before it reaches the stream; increased vegetation can decrease stream temperatures				↓	↓	
Agricultural best management practices	Cover crops, conservation tillage, nutrient management, soil management, agroforestry, crop switching, diversification of crop types	Reduce water use and/ or consumption; restore or maintain soil health, including ability of soil to store moisture; reduce nutrient and chemical application or concentration in runoffs; increase filtration of pollutants at edge of field		↓	↓		↓	
Ranching best management practices	Rotational grazing, fencing prescribed fire, shrub control, silvopasture, pasture management	Restore or maintain vegetative cover and soil health; restore or maintain ability of vegetation to filter pollutants and slow down overland runoff; maintain and restore ability of top soil to store moisture	↓	↓	↓		↓	
Fire risk management	Prescribed fire controlled burn	Reduce risk of catastrophic fires and subsequent risks of major soil erosion and water quality impact; help maintain ability of landscape to filter and infiltrate water and to slow down overland runoff				↓	↓	↓
Wetland restoration and creation	Restoration of previously existing wetlands or construction	Ability to store water and release it slowly over time; allow water to infiltrate; filter pollutants; slow down and decrease overland runoff	↓	↓	↓			
Road management	Grading and drainage management, upgrading road material	Reduced erosion						↓



FIGURE 4
Water Funds in Latin America

24 Water Funds created	227,173 ha conserved	23,823 families participating in projects upstream	US \$205,608,594 leveraged by the WF's	89 M people potentially benefited	+490 public and private partners
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Current opportunities

There are many opportunities through which Water Funds can support EBA, as shown on Figure 3. Given the importance of EBA for water security for communities, and the ability of Water Funds to support successful delivery of EBA, we are seeking to maximize this potential in the following ways:

Implement EBA measures to increase water funds resilience

Bring funding to implement new or current relevant EBA measures in water funds, such as forest restoration, freshwater and forest ecosystems conservation through agreements or private protected areas, conversion of extensive grazing systems into silvopastoral or agroforestral systems, improved agricultural productive practices, sustainable wetland management, floating treatment wetlands for freshwater treatment, among others.

Improve water funds contribution to climate adaptation:

Conduct climate change risk assessments as part of the design process for all water funds. Based on the results, develop an analysis of the current Water Fund's activities under implementation to evaluate their contribution to reduce the risks identified. This will allow us to improve implementation or include additional actions to increase watershed resilience.

Compare green versus grey options:

Develop a cost-benefit analysis of EBA and infrastructure-based adaptation measures implemented in water funds, to compare both options and their contributions in terms of adaptation.

Monitor contributions of water funds for climate adaptation:

Monitoring climate, hydrological and socio-economic data in water funds to evaluate the effectiveness of water security activities implemented and their contribution to climate adaptation.

Increase funding sources and partners for Water Funds:

Bring new funding sources targeted to support climate change adaptation and resilience, as well as joining efforts with other organizations with expertise on this topic.

Evaluate contribution of EBA in water funds to national and international goals:

Work with public entities to articulate EBA measures implemented under water funds, to national climate adaptation plans and policies in order to contribute with international goals and commitments regarding adaptation, sustainable development, restoration, biodiversity, among others (NDCs, SDGs, AICHI, Bon Challenge, etc.).



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Conduct climate change risk assessments as part of the design process for all water funds.

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