

# Ecosystem-based Adaptation (EBA) and Water Funds Guide



LATIN AMERICAN  
**WATER FUNDS**  
PARTNERSHIP



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# 1

## Why this Guide?

ECOSYSTEM-BASED ADAPTATION (EBA) AND WATER FUNDS GUIDE

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## Why this Guide?

This document seeks to guide designers and executors of Water Funds in Latin America in order for them to understand Ecosystem-based Adaptation (EBA) approach and implement measures that reduce vulnerability of people to climate events by leveraging ecosystem services and biodiversity, as part of the actions that contribute to the water security of their watersheds. Implementation of EBA measures does not have a standardized formula; however, there are some basic criteria and guidelines that must be considered. This guide presents those guidelines that must be taken into account in both the Water Funds that are in the process of being created and those that are already in operation.

Some Water Funds may consider that they are already implementing EBA measures, as they carry out forest conservation, restoration, or sustainable production practices. However, the way in which EBA measures are designed and created is different from traditional conservation or development actions (or business as usual), which is part of what this guide is intended to explain.

On the other hand, not all Water Funds are bound to implement climate change adaptation measures under the EBA approach. It is advisable to do so only in those that show a high vulnerability or risk to climatic events, which may compromise water security of the Water Fund.

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### 1.1. Why consider the EBA Approach in my Water Fund?

Implementing climate change adaptation measures in Water Funds is relevant, as climate variability and climate change may affect water supply. According to IPCC (2014), freshwater-related risks are expected to increase significantly with global warming. Climate change is foreseen to considerably reduce renewable surface and groundwater resources in dry subtropical regions, intensifying water competition among users. At the same time, IPCC projections (2014) suggest that water resources could increase at higher latitudes, which could increase floods. In addition, climate change is foreseen to affect water quality due to increased temperature, reduced dilution during droughts, sediments and pollutant loads during heavy rains, and disruption of treatment at facilities due to floods.

Water Funds seek to contribute to water security, which includes resilience as one of its base dimensions (see Information Chart 1), which seeks to build communities that are resilient and adaptable to climate change and minimize impacts of potential climate-related disasters, primarily. Ecosystems may be important allies to increase people's resilience, so EBA results in a key approach to be considered by Water Funds.

**Additionally, Water Funds are an already proven and successful governance and financial mechanism that brings together public and private actors to implement Nature-based Solutions (NBS) in order to contribute to water security in a watershed.** This converts them into perfect mechanisms or vehicles through which specific Nature-based Solutions for climate change adaptation can be financed, implemented, and monitored, as in the case of EBA measures. Thus, Water Funds help facilitate application of the EBA approach at the watershed (or micro-watershed) level, through effective implementation of protection actions (e.g. springs and water recharge areas), restoration (e.g. of riparian forests), and sustainable management (e.g. improving agricultural and livestock practices), thus improving functionality and integrity of ecosystems and, therefore, maintaining ecosystem services associated with water.

Several countries acknowledge the importance of this type of measures as part of their climate change policies and within their commitments under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). Out of the 162 Nationally Determined Contributions (NDC) submitted to the convention, 23 explicitly include EBA in their adaptation commitments, and 109 have an ecosystem-oriented vision (IIED & IUCN, 2016). In this context, Water Funds may support countries in complying with these international commitments related to adaptation and ecosystems. In addition, Water Funds are mechanisms recognized by the Convention on Biological Diversity (CBD) as one of the entry points to strengthen ecosystem-based approaches for climate change adaptation and disaster risk reduction within the water sector (Secretariat of the Convention on Biological Diversity 2019).

On the other hand, there are exclusive international cooperation resources and global climate change financial mechanisms to support adaptation

measures implementation, especially those with an EBA approach, which may be attractive to Water Funds. Consistently and clearly incorporating the EBA approach into Water Funds may open doors to new financing sources that help leverage local resources and partners.



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Nationally Determined Contributions

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23

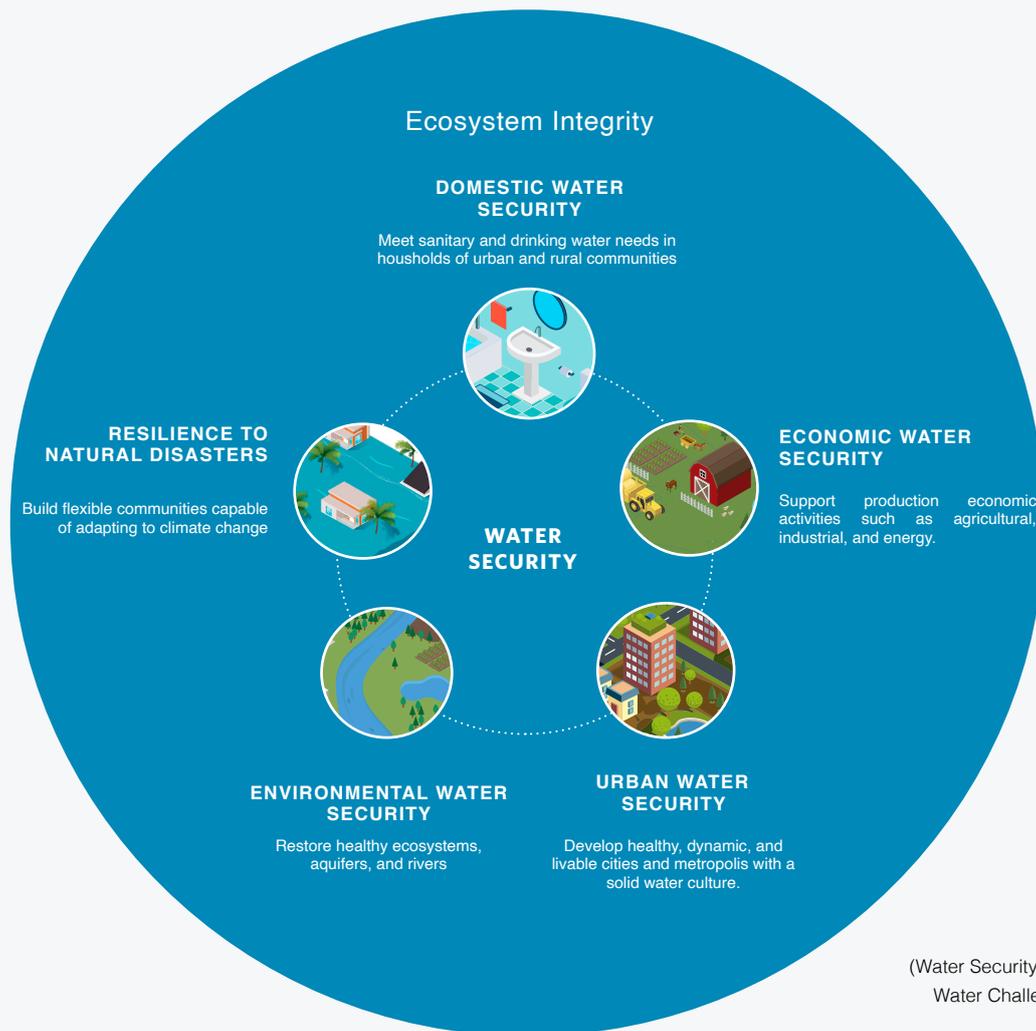
Explicitly include EBA

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Information Chart 1.  
**Water Security**

Water safety is defined as the capacity of societies to achieve successful and comprehensive management of their water resources and services in order to meet the needs of each of the dimensions covered thereby:

- 1. Environmental**  
ensures health of ecosystems, aquifers, and rivers.
- 2. Doméstica**  
meets domestic sanitary and water needs of households and communities.
- 3. Economic**  
use of water for production activities (agricultural, industrial, and energy).
- 4. Urban**  
develop healthy, dynamic, and livable cities with a solid water culture.
- 5. Resilience**  
build resilient communities adapted to climate change and other future natural disasters.



(Water Security 2019; The Water Challenge 2019)



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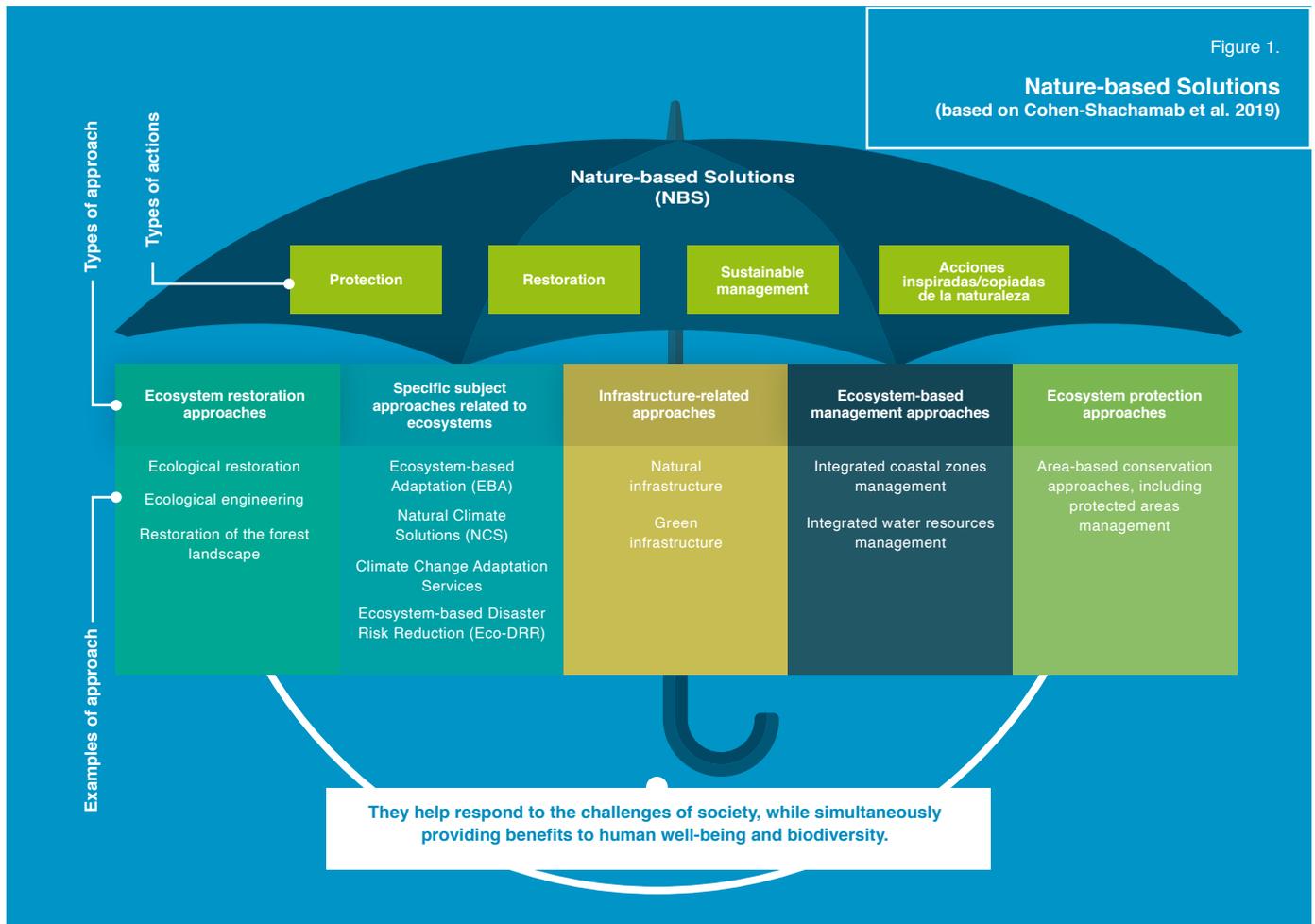
# 2

## Key Concepts

# Key Concepts

## 2.1. What are NBSs?

According to IUCN (2016), NBSs are an umbrella concept that includes all actions for protection, restoration, and sustainable management of natural or modified ecosystems, which simultaneously provide benefits to human well-being and biodiversity, in order to respond to the challenges of society, such as food security, water security, climate change, disaster risk, biodiversity loss, human health, among others. This concept includes several approaches (such as EBA, green infrastructure, integrated watershed management, among others), which seek to address different problems, but share the same interest in leveraging ecosystems to solve them, complementing conventional Infrastructure-based Solutions (Cohen-Shachamab et al. 2019) (see Figure 1).



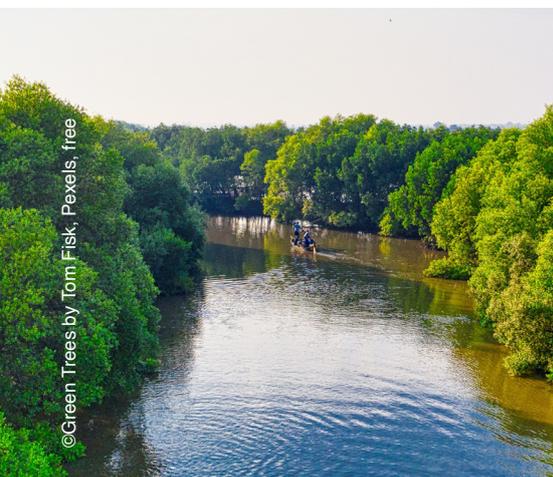
Other definitions that are even broader consider NBSs as all those actions inspired by, sustained on, or copied from nature, whether in the use or imitation of natural processes to face the challenges of society. This type of solutions may imply conservation, protection, rehabilitation, restoration, or sustainable management of natural ecosystems, as well as management, improvement, or creation of natural processes in modified or artificial ecosystems. They may be implemented on a microscale (e.g. dry toilet, permeable pavements, green roofs, etc.) or a macroscale (e.g.

landscape restoration, integrated watershed management, etc.) (European Commission 2015; WWAP/UN-Water 2018). Thus, NBSs include both those green infrastructure and natural infrastructure interventions. The first ones usually refer to projects built in urban areas with more engineering-like interventions, while the second ones focus on projects that incorporate strategic management of natural or restored landscapes, such as floodplains, wetlands, and forests, in order to provide a set of desired benefits (TNC 2018).

## 2.2. What is Climate Change Adaptation?

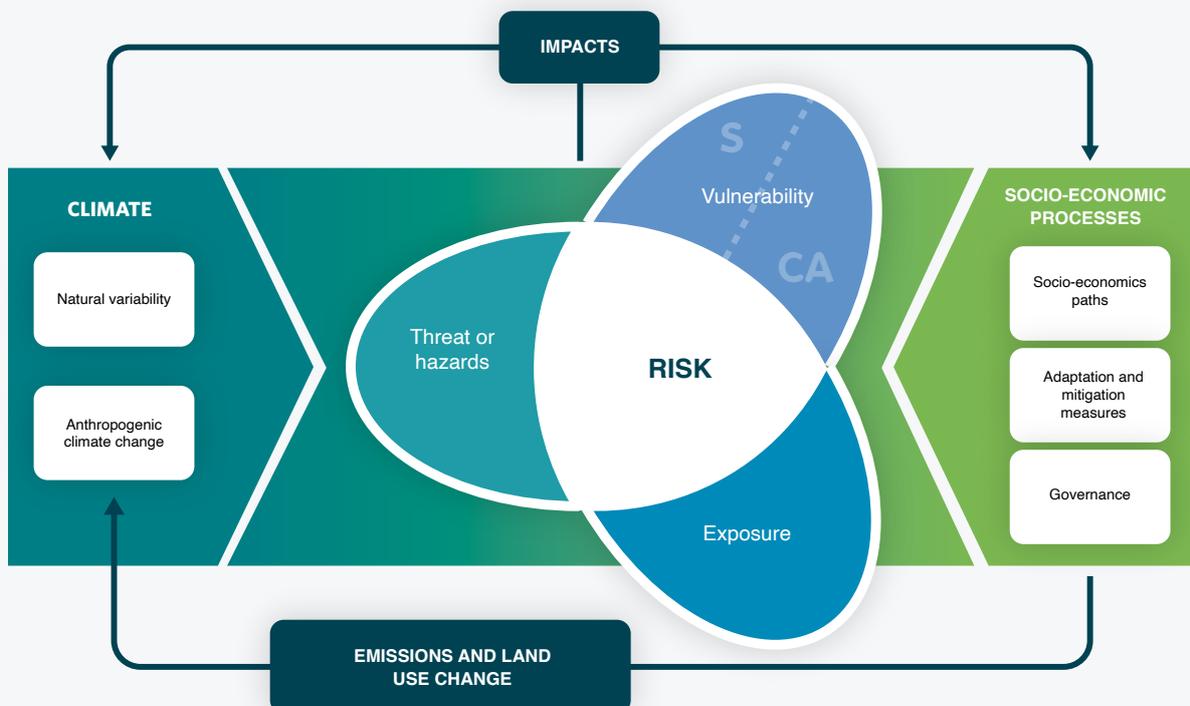
Climate change is one of mankind's great challenges. We must implement actions to mitigate it —reducing greenhouse gas emissions into the atmosphere—, as well as to adapt to the likely effects it may create. According to IPCC (2014), adaptation to climate change is the **“process of adjusting to actual or projected climate and its effects. In human systems, adaptation seeks to moderate or prevent damage or take advantage of beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to the projected climate and its effects.”**

Adaptation actions or measures to climate change and variability then seek to help people reduce risk, either by reducing their vulnerability —decreasing their sensitivity and/or increasing their adaptive capacity—, or reducing their exposure to the threat or hazards associated with current and future climate events (see Information Chart 2). For example, some adaptation measures aimed at reducing the vulnerability of a territory may be aimed at: i) decreasing the sensitivity of such territory to climate events, avoiding deforestation, erosion, water pollution, fires, ecosystem degradation, etc.; ii) increasing adaptive capacity, improving poverty issues, institutional weakness, lack of interinstitutional coordination, scarce financial resources, etc. Other adaptation measures may be aimed at reducing the exposure of a territory to threats or hazards related to climate events, mobilizing, or preventing key elements of the territory from being exposed to flood zones, landslides, sea level rising, etc. The latter may imply structural or physical solutions (e.g. dams, retaining walls, among others) or change places of people, infrastructure, crops, or other elements of the territory, which may be expensive.



Information Chart 2.  
**Key Definitions (IPCC 2014)**

- **Climate Change:** refers to a change in the state of climate that can be identified (for example, through the use of statistical tests) due to changes in the mean and/or variability of its properties, and that persists for long periods of time, typically decades or more. Due to natural or anthropogenic processes.
- **Climate Variability:** variations in the average state and other climate statistics on all spatial and temporal scales beyond that of individual climate events. Variations remain for months, years, or even decades.
- **Threat:** potential occurrence of an event, trend or physical impact of a natural or human origin, which may cause losses of lives, injuries, or other negative effects on health, infrastructure, means of livelihood, services, ecosystems, etc. In this case, related to climate events.
- **Exposure:** presence of people, means of livelihood, species, or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social or cultural assets in places and environments that could be adversely affected.
- **Vulnerability:** propensity or predisposition to be negatively affected. Vulnerability comprises a variety of concepts and elements including sensitivity (S) or susceptibility to damage and lack of adaptive capacity (AC).
- **Sensitivity (S):** the extent to which a system or species is adversely or beneficially affected by variability or climate change.
- **Adaptive Capacity (AC):** ability of systems, institutions, humans, and other agencies to adjust to potential harm, take advantage of opportunities, or respond to consequences.
- **Risk:** potential consequences where something valuable is at danger with an uncertain outcome, recognizing diversity of values. The risks result from the interaction of vulnerability, exposure, and danger.
- **Resilience:** ability of social, economic, and environmental systems to face a dangerous event, trend, or disturbance by responding or reorganizing themselves in such a manner that they keep their essential function, identity, and structure, while preserving the capacity of adaptation, learning, and transformation.



(IPCC, 2014)



Adaptation to climate change is often a process that implies prior planning; however, spontaneous adaptation processes may occur in some human or natural systems. In addition, adaptation processes may imply gradual changes or radical transformations. The type of adaptation to be done depends on the context and its needs:

- **Autonomous (or spontaneous) adaptation:**

it does not constitute a conscious response to climate effects, but it occurs due to ecological changes in natural systems or variations in the market or well-being of human systems (IPCC 2007, Glossary).

- **Planned Adaptation:**

it results from an express decision in a policy framework, based on the acknowledgement that conditions have changed or are about to change and that it is necessary to take actions in order to return to a desired state, maintain it, or achieve it (IPCC 2007, Glossary).

- **Incremental Adaptation:**

adaptation actions where the main objective is to maintain the essence and integrity of a system or process at a given scale (IPCC 2014, Glossary).

- **Transformative Adaptation:**

adaptation actions that seek to change the fundamental attributes of a system or process, in response to climate and its effects (IPCC 2014, Glossary).

Additionally, there are different approaches in climate change adaptation, such as EBA, Community-based Adaptation (CBA), Infrastructure-based Adaptation, Technology-based Adaptation, among others. Similarly, there may be comprehensive approaches that seek to promote and implement several of the approaches mentioned simultaneously, in order to achieve complementarity and robustness in the solutions.



**EBA is defined as the use of biodiversity and services provided by ecosystems, as part of an overall adaptation strategy to help people adapt to adverse impacts of climate change (CBD, 2009).**

## 2.3. What is EBA?

The term Ecosystem-based Adaptation (EBA) was created in 2008 as part of the 14th Conference of the Parties (COP) of the UNFCCC in Poznan, Poland. The IUCN and its members coined this term in a presentation made to the UNFCCC Ad Hoc Working Group on Long-Term Cooperation Action (AWG LCA). With the active work of several actors, in particular the countries of Latin America and the G77 Group, EBA began to be included in their formal declarations and negotiation texts in relation to the Copenhagen process. In 2009, the term was formally defined in Decision X/33 of the CoP 10 in the Convention on Biological Diversity (CBD) in Nagoya, Japan. Since then, several EBA projects and initiatives began to emerge around the world.

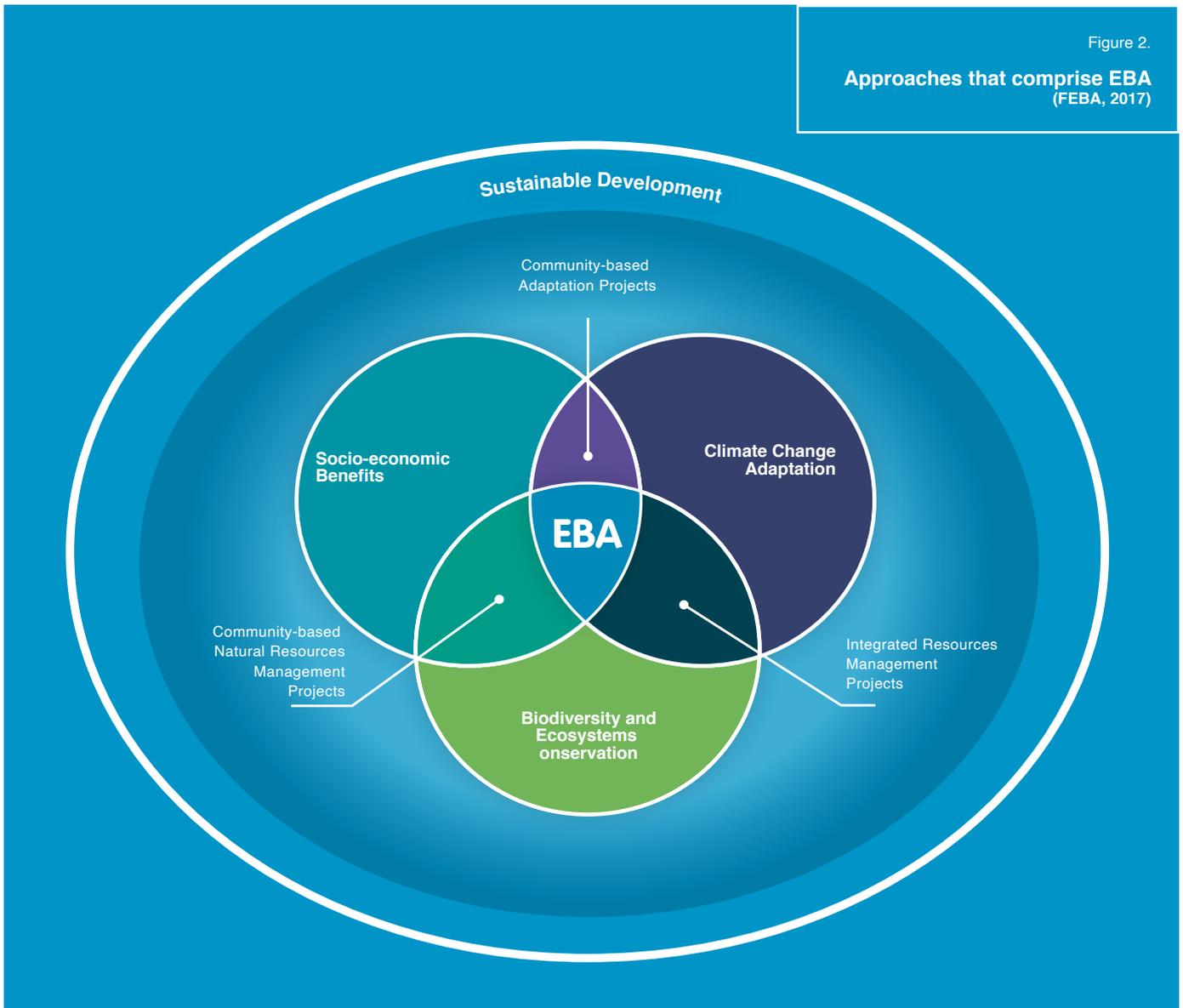
EBA is defined as the use of biodiversity and services provided by ecosystems, as part of an overall adaptation strategy to help people adapt to adverse impacts of climate change. It is therefore a Nature-based Solution (NBS) to face climate change impacts, since it acknowledges that biodiversity and ecosystems may be managed in such a manner that benefits which contribute to people's climate change adaptation effects are generated. Its objective is to reduce vulnerability –that is, reducing socioeconomic and ecological sensitivity and increasing adaptive capacity– and increase resilience of human populations and ecosystems. This management includes conservation, restoration, and sustainable ecosystems management actions, and multiple co-benefits generated thereby in social, economic, cultural, biodiversity, mitigation, and other terms (CBD 2009, FEBA 2017).

EBA encompasses different approaches linked in a complementary manner, such as Climate Change Adaptation, Biodiversity and Ecosystems Conservation, and Socioeconomic Benefits Generation (see Figure 2). Articulation of these approaches deploys several existing practices implemented by the Conservation and Development Sectors, such as Comprehensive Natural Resources Management, Community-based Natural Resources Management, and Community-based Adaptation (FEBA 2017).

**Its objective is to  
reduce vulnerability**

**and increase resilience of human  
populations and ecosystems**

Figure 2.  
Approaches that comprise EBA  
(FEBA, 2017)



EBA is an anthropocentric concept since it seeks to take advantage of ecosystems and biodiversity for human well-being. This differentiates EBA from other traditional conservation or development approaches, as it focuses on people, not on nature (FEBA 2017). This is essential, since it differs from conventional conservation or development actions, “business as usual”, as the main EBA interest is to contribute to people adaptation to impacts associated with climate. In this sense, the design of EBA measures or strategies is based on an understanding of threats, vulnerabilities and/or risks associated with climate variability and/or climate change, in the territory or system wished to be adapted. This is not essential in conventional conservation or development actions. While under the EBA approach, we want to restore a hillside forest to reduce the risk of landslides in rainy seasons, in a conventional approach, we may want to restore a forest to conserve a particular ecosystem/species or to take advantage of the ecosystem services of that forest for production purposes. Both approaches may certainly be complemented, but they are different in their concept, objective, and areas being intervened.



Nonetheless, resilient ecosystems cannot completely protect people from all impacts that climate change can cause (FEBA 2017), on the one hand, because of the magnitude and nature of some impacts and, on the other hand, because ecosystems also have their limits. There are ecological limits for the implementation of EBA. Resilience thresholds for many ecosystems could be exceeded in the long term unless greenhouse gas emissions are drastically reduced. With the increase in global warming, some physical systems or ecosystems may sustain a risky situation of abrupt and irreversible changes (IPCC 2014), this is known as “state shift” or state change, where the system enters a new range of oscillations that is not the same as “alternate stable state” previously.

**That is why EBA by itself does not guarantee human resilience and must be part of a broader adaptation strategy, in which there are complementary Infrastructure-based Solutions, Technology-based Solutions, or others. It is then important to articulate and complement EBA measures with other types of adaptation measures, as well as mitigation measures.**

### 2.3.1. EBA Criteria

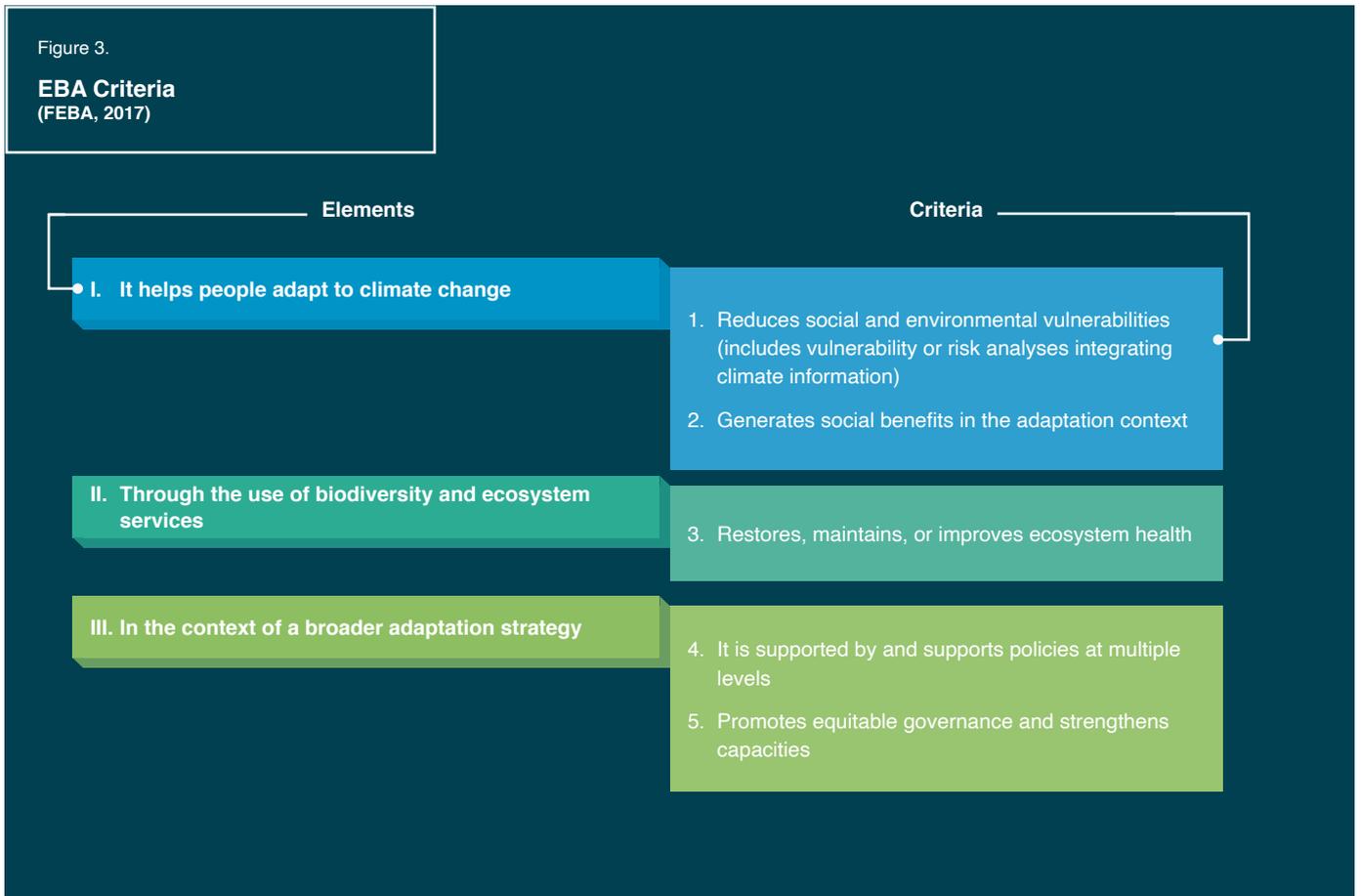
Upon understanding the EBA definition, it is still complex to understand what actions qualify or not within this approach. In 2017, the “Friends of EBA” (FEBA) defined criteria for this and thus help guide EBA implementers around the world. FEBA is an informal network of more than 75 organizations<sup>1</sup>, including TNC, which interest is to promote collaboration and sharing of EBA knowledge.

First of all, it is important to understand the three key elements of EBA, based on its definition: I) it helps people adapt to climate change, II) through the use of biodiversity and ecosystem services, III) in the context of a broader adaptation strategy. Actions, initiatives, or projects that qualify as EBA must consider these three elements in addition to the criteria each includes (see Figure 3).

<sup>1</sup> FEBA Members: <https://www.iucn.org/theme/ecosystem-management/our-work/ecosystem-based-approaches-climate-change-adaptation/friends-eba-feba/feba-members>

Figure 3.

**EBA Criteria**  
(FEBA, 2017)



### 2.3.2. What does an EBA project have?

There is no single, standardized formula to create EBA initiatives. However, there are some basic components or phases that most of these projects incorporate, which also help meet the above criteria. Each EBA project or initiative has specific resources, time, and technical capabilities, therefore the methods utilized within each component may vary depending on the context.

**1. Context Analysis Phase and Definition of the System to be Adapted:**

before starting an adaptation process, the system where adaptation actions will be carried out must be understood and characterized in a general way. It must be clear whether to work in a watershed, wetland, city, specific ecosystem, among others, and understand its characteristics and conditions in a general context (climate, biophysical and socioeconomic).

## 2. Climate Change Vulnerability and/or Risk Analysis Phase:

it is important to understand vulnerabilities and/or risks to current and future climate events, using historical climate information and future climate change scenarios. This analysis may be based on existing studies or new efforts; therefore, previous studies on vulnerability or risk to climate events in the area must be identified in order to assess their usefulness. It is ideal to guide this analysis methodologically and conceptually on the basis of the Intergovernmental Panel on Climate Change (IPCC) guidelines and the progress the country has in this regard. Depending on the context and resources available, this analysis may vary, ranging from more qualitative participatory analyzes to complex analyzes incorporating spatial or hydrological modeling. Both types of analyzes may be used in a complementary manner to choose the most effective and feasible adaptation measures.

## 3. EBA Measures Identification and Prioritization Phase:

based on the results of the previous component, an EBA measures identification and prioritization process that can contribute to reducing these analyzed vulnerabilities and risks must be undertaken. It is ideal to carry out this process with the community and institutional actors who know and inhabit the system to be adapted, incorporating local traditional knowledge and scientific knowledge. In addition, existing climate change policies or plans at the subnational or national level must be considered to see likely input and articulation.

## 4. EBA Measures Implementation Phase:

prioritized measures must be designed and implemented on the appropriate scale, in concert with local actors, aiming to reduce those previously identified vulnerabilities and risks. The design implies selection of areas, species, materials, methods, among others. It is important to carry out implementations hand-in-hand with communities, as well as to involve local or regional authorities in order to achieve articulation with existing climate change policies or plans or other planning or management instruments of the territory. This may help adopt actions and their future sustainability.

#### 5. EBA Measures Monitoring Phase:

it is important to monitor implemented EBA measures in order to see their effectiveness in terms of adaptation, as well as the co-benefits generated thereby. This is a subject still under discussion in several countries, as there are no standardized indicators or unified methods, and there is no clarity about their funding and the actor responsible for these activities (beyond projects with short implementation times). Each project, based on the measures it implements and the changes it expects to see in the future, sets forth some indicators. Ideally, these efforts are to be aligned with existing national or subnational monitoring efforts. It is worth mentioning that many of the measures have delay times to show efficient results and manage to comply with their objectives up to a certain threshold.

#### 6. Articulation with Planning/Management Policies or Instruments Phase:

this component is transversal to all others, but it is worth pointing it out separately in order not to forget about it. It is important to identify climate change policies or plans that incorporate the EBA measures being implemented and thus link the entities in charge thereof so that efforts may contribute and add to such plans. In some cases, some of the EBA measures that have been prioritized are unlikely to be part of those policies or plans, thus it is also worth promoting their incorporation therein (if they are under creation) or within other planning/management instruments of the territory that may help provide sustainability to EBA measures.





© Aerial Photography of Water Beside Forest during Golden Hour by Sindre Ström, Pexels, free

# 3

## Water Funds as a Mechanism to Implement EBA

# Water Funds as a Mechanism to Implement EBA

Water Funds are financial and governance mechanisms that bring together public, private, and civil society stakeholders around a common goal to contribute to water security through Nature-based Solutions (What is a Water Fund? 2019). Water Funds may help facilitate EBA measures planning, implementation, and monitoring in order to address potential threats to water security due to climate change. According to TNC Beyond the Source report (Abell et al. 2017), for more than 15 years, Water Funds have helped communities improve water quality by bringing users together to collectively invest in upstream ecosystem protection, watershed management, and innovative financing sources mobilization.

EBA measures implementation for water security is essential, considering that changing climate patterns due to climate change will affect the services provided by ecosystems on which people depend, such as water supply, food production, water regulation, among others. EBA actions implemented in Water Funds may include a wide range of measures or strategies to increase ecosystems resilience and people's adaptive capacity to climate change; Figure 4 includes some of these.

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Figura 4.

## Examples of ABE Measures that may be implemented in Water Funds

EBA Measures	Role of ecosystems maintained, restored, or improved
<ul style="list-style-type: none"> <li>• Protection or restoration of forest in supply watersheds and riparian forest</li> <li>• Protection or restoration of wetlands</li> <li>• Ecotourism or nature tourism</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply regulation</li> <li>• Water quality regulation</li> <li>• Water and/or soil temperature control</li> <li>• Microclimate regulation</li> <li>• Erosion control</li> <li>• Biological control</li> <li>• Landslides reduction</li> <li>• Riverine floods moderation</li> <li>• Drought moderation</li> <li>• Raw materials provision</li> <li>• Food supply</li> </ul>

EBA Measures	Role of ecosystems maintained, restored, or improved
<ul style="list-style-type: none"> <li>• Protection or restoration of mangroves, coastal marshes, and dunes</li> <li>• Protection or restoration of coral reefs</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal flood (storm) moderation</li> <li>• Coastal erosion control</li> <li>• Water quality regulation</li> </ul>
<ul style="list-style-type: none"> <li>• Reconnection of floodable rivers and plains or restoration of space for the river</li> <li>• Restoration of natural drains or removal of obstacles from drain currents</li> </ul>	<ul style="list-style-type: none"> <li>• Water supply regulation</li> <li>• Riverine floods moderation</li> </ul>
<ul style="list-style-type: none"> <li>• Construction of rural or urban wetlands</li> <li>• Mulch latrines</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality regulation</li> <li>• Biological control</li> <li>• Pollutants reduction</li> </ul>
<ul style="list-style-type: none"> <li>• Silvicultural or agroforestry systems</li> <li>• Apiculture</li> <li>• Family or community orchards</li> <li>• Conservation, ecological or organic agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Food supply</li> <li>• Pollination</li> <li>• Nutrient recycling</li> <li>• Drought moderation</li> <li>• Biological control</li> <li>• Erosion control</li> <li>• Water and/or soil temperature control</li> <li>• Water supply regulation</li> <li>• Water-retention soil capacity regulation</li> <li>• Microclimate regulation</li> </ul>
<ul style="list-style-type: none"> <li>• Biodigesters</li> </ul>	<ul style="list-style-type: none"> <li>• Soil fertilization</li> <li>• Energy supply (biogas)</li> </ul>
<ul style="list-style-type: none"> <li>• Firefighting zones</li> <li>• Prescribed/controlled burning</li> </ul>	<ul style="list-style-type: none"> <li>• Fire control</li> </ul>
<ul style="list-style-type: none"> <li>• Green spaces (bio-retention and infiltration)</li> <li>• Sustainable Urban Drainage Systems (SUDS)</li> <li>• Permeable pavements</li> </ul>	<ul style="list-style-type: none"> <li>• Urban runoff</li> <li>• Flood moderation</li> <li>• Heat wave impact moderation</li> <li>• Pollutants reduction</li> </ul>

These measures presented above help restore, maintain, or improve ecosystems health; however, it is worth remembering that their implementation must also meet the other criteria in order to be considered a part of the EBA approach: reduce social and environmental vulnerabilities based on a vulnerability or risk analysis integrating climate information, generate social benefits in the adaptation context, are supported by and support policies at multiple levels, and promote equitable governance, and strengthen capacities.



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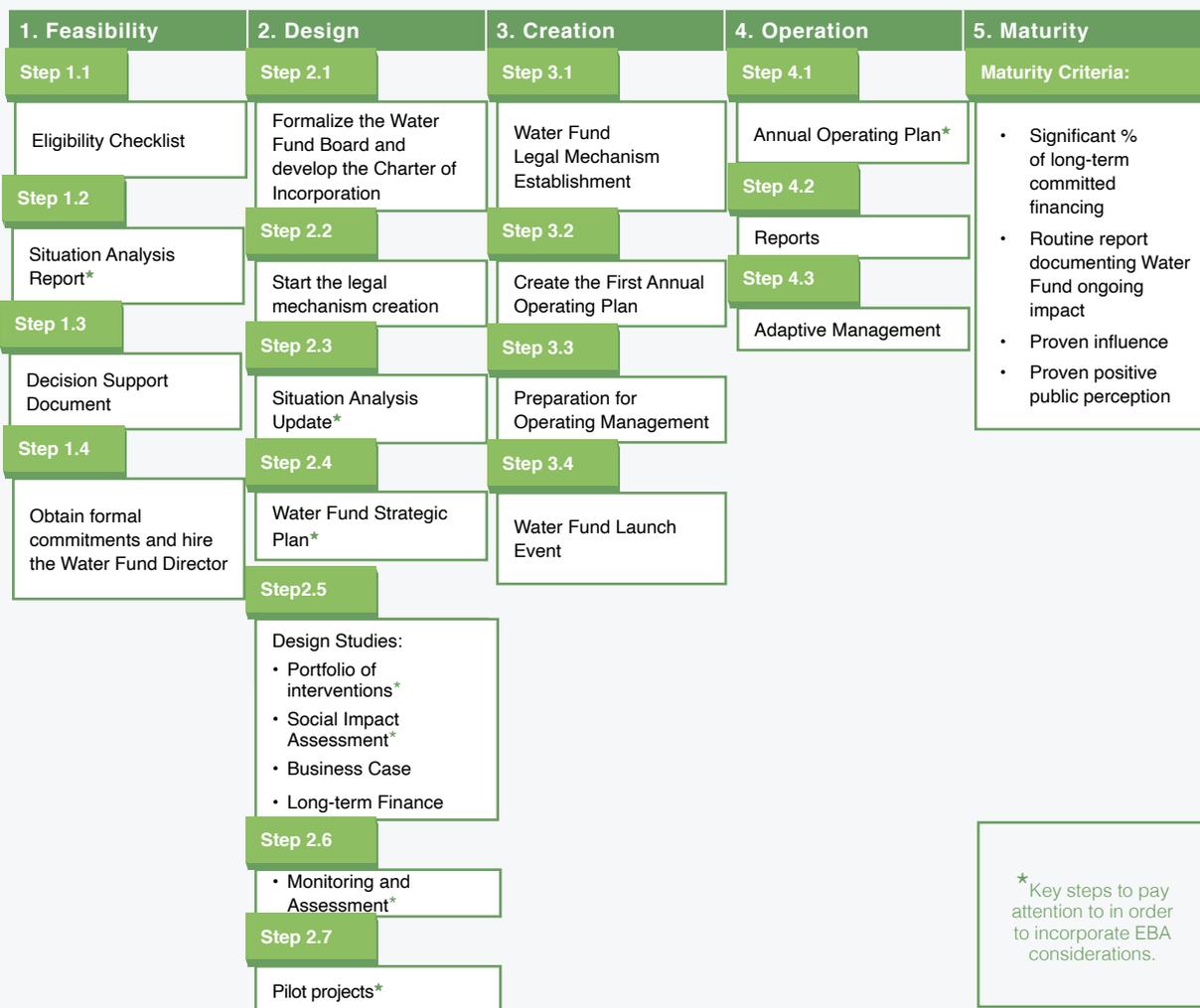
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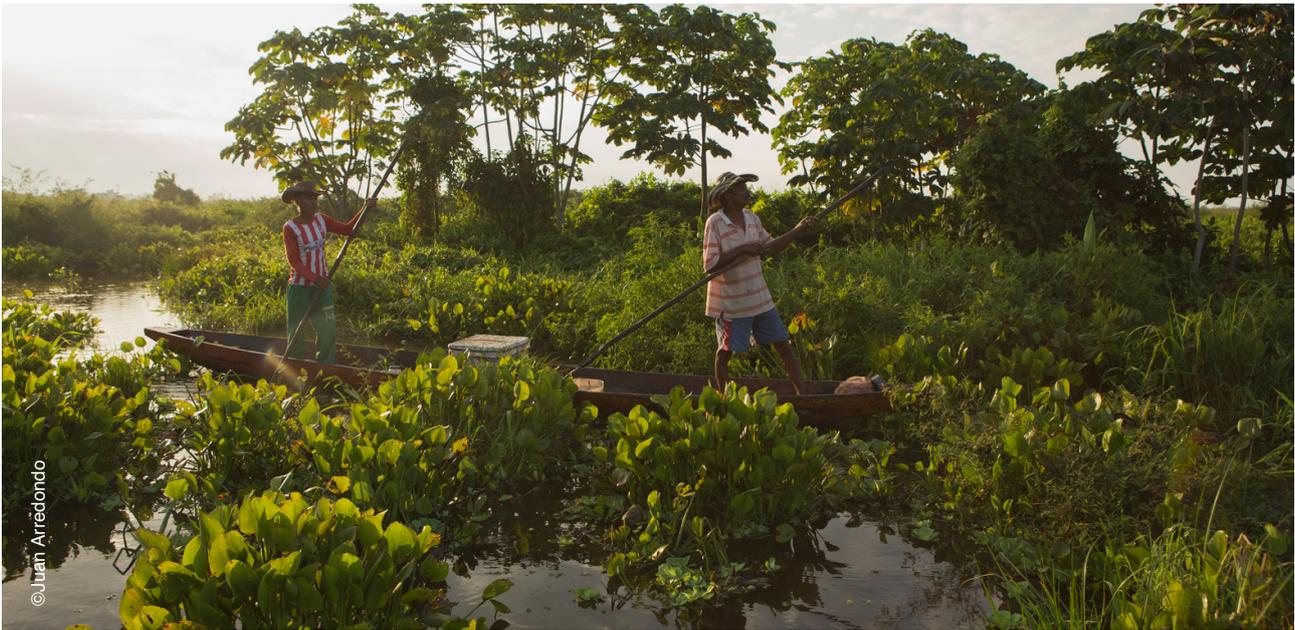
## How to include EBA in a Water Fund that has not yet been created?

# How to include EBA in a Water Fund that has not yet been created?

The Latin American Water Funds Partnership has standardized the Water Funds creation and development process in a five-phase cycle: feasibility, design, creation, operation, and maturity (Zyla 2018). Each of these phases has specific steps, in some of which certain aspects may be considered for the Water Fund to incorporate EBA from its inception (see Figure 5). Because the project cycle of each Water Fund has different resources, times, and technical capabilities, the following EVA aspects may be adapted to the context.

Figure 5.  
Water Funds Project Cycle





## Feasibility

### \*Step 1.2 Situation Analysis Report

It is intended to understand the situation in the area/region defined to assess the feasibility to create a Water Fund and how it can positively contribute to water security. Such report contains 4 general chapters: Executive Summary, Water Resources, Regional Context, and Water Security, each with their respective sections. In order to begin considering EBA aspects, it is important to take the following into account:

### Section 3.1 Government Agencies, Policies, and Regulatory Framework

the description of existing national or subnational climate change and/or adaptation policies or plans must be included. Ideally, it must be indicated which type of EBA guidelines or measures promote these policies or plans that may help reduce climate change vulnerability of communities in the Water Fund. In this section, it is also particularly important to indicate the country's NDCs to the UNFCCC, specifically those on adaptation topics that are most related to the Water Fund. NDCs of each country may be consulted at the following link: <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>. Besides, in this section, it is essential to include the entity in charge of implementing these policies, plans and NDCs, so that the Water Fund may articulate efforts with the responsible parties in order to add to national adaptation goals.

### Section 4.5 Resilience to Disasters Related to Natural Water-related Events:

it is important that, as part of this section, an analysis of vulnerability and/or risk of the Water Fund watershed to current and future climate events is developed, in order to establish whether water security can be compromised and, therefore, require efforts to be directed to continue incorporating the EBA approach into the next steps of the project cycle. Development of this analysis may be done on the basis of the following two options:

- Based on existing studies: to this end, it is recommended to consult the National Communication before the UNFCCC of the country, especially the chapter containing climate change scenarios and vulnerability/risk analysis. In addition, if there is any plan or study that incorporates these topics at the subnational or local level for the Water Fund area, it is also advisable to consult it, especially if they include vulnerability/risk analyzes related to ecosystem services or water resources.
- The analysis is developed: for this, the IPCC conceptual framework must be used (see Information Chart 2) and the country, if there is a conceptual or methodological approach at the national level, which is normally included in the vulnerability/risk chapter of the National Communications before the UNFCCC. The methodology of this analysis will depend on the context, technical capabilities and available resources, participatory and qualitative analyzes may be carried out, even more complex analyzes incorporating spatial or hydrological modeling (see Section 6 “Supporting tools and information”, some examples and methodological recommendations).

Based on these analyzes, the main threats or hazards to which the Water Fund area is exposed, under variability and climate change (changes in temperature and precipitation and associated events: floods, droughts, landslides, sea level rising, etc.) must be made clear. Additionally, the aspects that make this territory vulnerable to climate events; that is, those aspects that increase sensitivity (deforestation, erosion, water pollution, fires, ecosystem degradation, etc.) and those that reduce adaptive capacity (poverty, institutional weakness, lack of interinstitutional coordination, scarce financial resources, etc.). And thus determine the current and future level of risk to climate events (see Information Chart 2, to better understand the above concepts).



These same suggestions must be considered in **Step 2.3 Update of the situation analysis** in the DESIGN stage, as this involves an update of the information gathered in this analysis developed in the Feasibility stage.

## Design

### \*Step 2.4 Water Fund Strategic Plan

This step seeks to create the long-term plan (5 years) that clarifies the reference framework and work focus, as well as the roadmap to implement important strategic decisions led by the Water Fund. This plan has 10 sections (see TNC Strategic Plan Template 2018), from which the following two must be paid attention to, with the aim to ensuring EBA considerations are included:

#### Section 5. Interventions

include EBA measures as part of the strategic interventions proposed to solve problems with the Water Fund. It is ideal if these measures help reduce current and future climate vulnerabilities and risks, and if they are promoted by NDCs, climate change policies and/or plans, which must have been identified in **Step 1.2 Situation Analysis Report**. Selected EBA interventions may contribute to compliance with the NDC and other policy and management goals, so coordination of efforts with the relevant institutional actors is essential.

#### Section 6 Engagement of stakeholders and communications

remember to incorporate as part of the critical actors of the Water Fund those national and subnational entities in charge of compliance with NDCs, climate change policies and plans, especially those related to adaptation. Normally, the Ministry of Environment in each country takes over international commitments before the UNFCCC, as well as national climate change policies or plans. However, in several cases there may be specific climate change plans at the subnational level led by governments or regional environmental authorities. It is worth incorporating these actors in order to achieve articulation with the Water Fund actions that contribute to these policies and plans, for which this must be included in the matrix explaining the fundamental reason and expected 5-year results of each actor (which would aim at adding to the goals of such national and/or subnational plans).

Creation of the strategic plan is initially carried out during the design phase and then repeated every 5 years during its operation. Therefore, the suggestions made in this section must also be considered in **Step 4.1 Annual Operating Plan** of the OPERATION phase.



### \*Step 2.5 Design studies: Portfolio of interventions

Design studies are a critical step in the development process that guides the establishment of measurable objectives for a Water Fund. The results of these studies help build the scientific basis that supports the overall strategy described in the Water Fund Strategic Plan (e.g. types of interventions implemented, conservation objectives, expected results, etc.). The Portfolio of intervention allows, based on the use of models, to assess the range of likely interventions and combinations in space and time to help determine the combination that will provide the greatest benefit (return on investment), in terms of change in ecosystem services given the available resources (Zyla 2018).

In order to develop this portfolio of interventions, a series of steps are taken, which in general terms imply defining the questions wished to be answered, identifying the ecosystem services wished to be modeled, identifying information and data available, selecting the most suitable model, and executing the study (Step-by-Step Tool Selection 2019). Typically, RIOS software (NATCAP 2020) is used to identify where to perform restoration and conservation interventions in the watershed, considering biophysical, social, and economic information in order to maximize the ecological return on investment. Besides, it is often used in conjunction with other models that allow modeling of ecosystem services of interest with a baseline (or current condition) and the portfolio proposed by RIOS, which allows to establish what changes would be expected in the ecosystem services when applying such interventions.

Modeling of ecosystem services of interest requires climate information, usually historical data series. However, in order to propose EBA measures, it is also useful to consider the future climate, which we know will have different characteristics that will affect the provision of ecosystem services of interest to the Water Fund. For this reason, it is recommended to include climate change scenarios in the model that is decided to be used in order to model the ecosystem services (SWAT, InVEST or others) to assess the portfolio of interventions resulting from RIOS (or the model used). This will allow to compare the expected response of ecosystem services under the portfolio with historical climate, as well as under climate change scenarios, in order to be able to analyze whether or not the proposed interventions contribute to adapting (see Figure 6).

This comparison may generate some decision-making dilemmas since if the proposed portfolio of interventions does not contribute to keep ecosystem services of interest under future conditions, it may give a warning signal. However, Water Funds have 5-year planning and climate scenarios show changes in 40, 70, or 100 years. For this reason, it is recommended for Water Funds to assess their portfolio of interventions with climate change scenarios every 5 to 10 years, based on their technical and financial capabilities, in order to identify these alerts, trends, and likely interventions must be adjusted for a changing future.

Climate change scenarios generated by the government may be used; however, their scale must be revised in order to determine whether they are useful depending on the spatial and temporal scale/resolution required by the model being used (e.g. SWAT, InVEST, others). All countries that are part of the UNFCCC must submit National Communications to the Convention in which they present, besides other information, the country's climate change scenarios. This is why it is useful to consult this document to identify the scenarios presented by the government and thus be able request the competent entity to provide this information (monthly or annual databases, as the case may be). For national communications that have been submitted to the Convention, please consult the following links: <https://unfccc.int/non-annex-I-NCs> (for developing countries, which are not Parties to Annex I to the Convention) and <https://unfccc.int/NC7> (for developed countries, which are those Parties to Annex I to the Convention).

**If there are any, climate change scenarios that have a more appropriate scale/resolution for modeling and the Water Fund area may be used, whether they have been developed by universities, independent research centers, or other entities. If there are soil use projections, they may also be incorporated, as the idea is to have the portfolio of interventions modeled in a future scenario.**

If there are no climate change scenarios developed previously by other organizations, which are useful for modeling, they must be developed by the Water Fund as part of the portfolio of intervention preparation exercise. There are different scaled reduction techniques to develop climate scenarios, whether basic, statistical, or dynamic, using different General Circulation Models or GCMs) that best respond to regional and local characteristics. For this, it is recommendable to review guidelines and guides

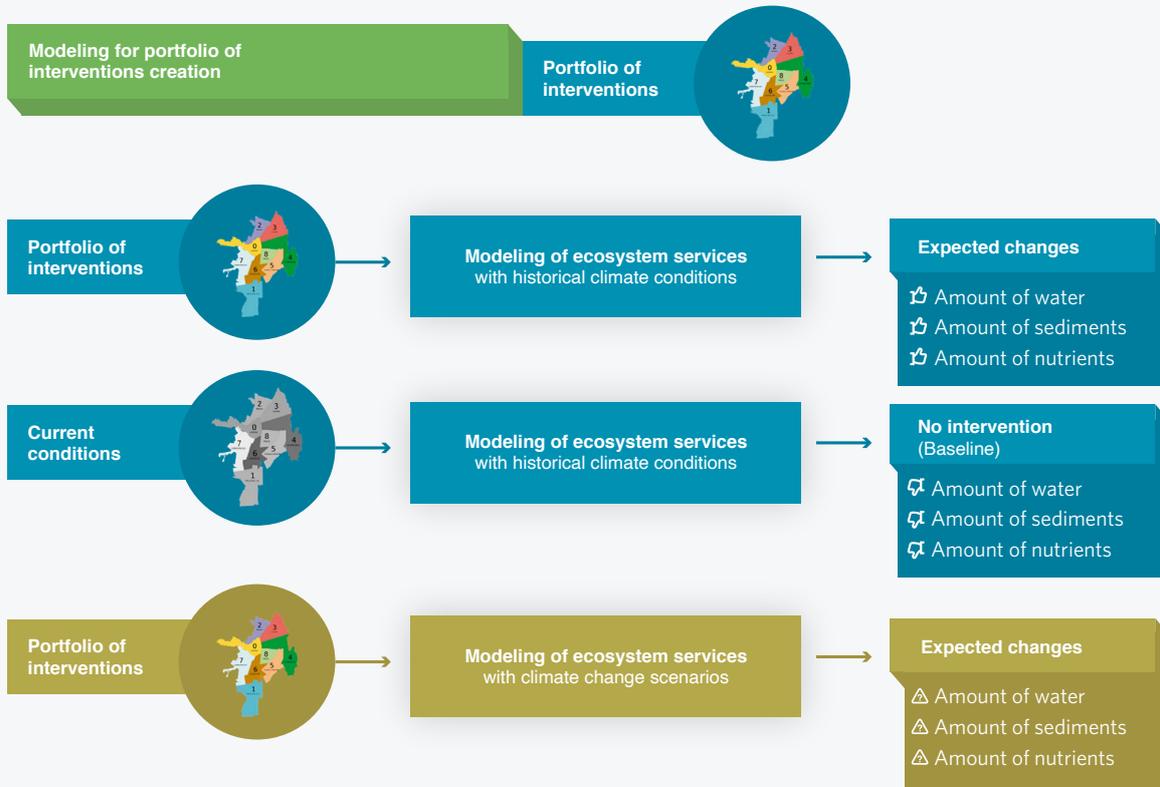
developed by IPCC <https://www.ipcc-data.org/guidelines/index.html> or other organizations such as UNDP (2011) “Formulating Climate Change Scenarios to Contribute Climate-Adapted Development Strategies – A Guide for Practitioners”. Historical climate variability analyzes may also be developed to help understand trends in climate change, provided that historical data of 30 years or more are available.



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Figure 6.

**Incorporation of Climate Change Scenarios into Modeling**



\*Step 2.5 Design studies: Social impact assessment

Design of a Water Fund also implies carrying out a Social Impact Assessment (SIA) to determine the impacts that the implementation of the Fund may have on the communities residing in the area. This is a useful tool to ensure that potential social impacts, both positive and negative, are carefully considered. This assessment is not just about assessing social impacts in economic terms, but about understanding who the key actors are and how the Water Fund could present benefits and risks to its existing means of livelihood and social structures (Social Impact Assessment 2019).

It is then essential within the SIA also considering those impacts related to the benefits or risks that the Water Fund may generate in terms of adaptation to climate change. This implies considering those current, but also future, potential impacts (under climate change scenarios), both in economic and cultural terms, cohesion, health, recreation, or others, which may increase or decrease the vulnerability of communities to climate events.



### \*Step 2.6 Monitoring and Assessment

Once the Water Fund has its objectives and portfolio of interventions clear to achieve these objectives, it is essential to design a monitoring program in order to monitor different environmental, social and economic parameters that to provide basic information to assess the types and degrees of change that occur in the Water Fund (Zyla 2018).

**Water Funds that implement EBA measures must then include within their monitoring plan indicators that enable them to assess whether such interventions generate changes over time, which contribute to reduce the vulnerability of communities to current and future climate events.** This implies Water Funds measure climate and hydrological variables, in order to establish their correlation with biophysical and socioeconomic variables, allowing to establish whether the measures implemented in fact help or not improve certain conditions in dry or humid seasons (e.g. reduction of sediments in water bodies, reduction of landslides, maintenance of profits or agricultural production, smaller number of people affected during El Niño or La Niña phenomena). It is recommended to review the following guide on EBA measures monitoring: [https://www.adaptationcommunity.net/download/ME-Guidebook\\_EbA.pdf](https://www.adaptationcommunity.net/download/ME-Guidebook_EbA.pdf)

In order to select indicators, the theory of change must be defined first, in order to identify the desired changes that the Water Fund intends to achieve, which must include those expected changes in terms of adaptation. Once this is clear, the output indicators and results must be prepared. The first ones refer to the deliverables of the Water Fund (e.g. restored hectares, number of local beneficiaries, number of trees planted), while the second ones help track the great things the Water Fund wants to achieve (e.g. 10% reduction in turbidity between the baseline and five years later, tons of carbon equivalent avoided between the baseline and five years later). While defining these indicators, it must be remembered that some allow to assess expected contributions or attributions of EBA measures (Leisher et al. 2019).



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# 5

## How to include EBA in an existing Water Fund?

## How to include EBA in an existing Water Fund?

When we have a Water Fund that is already in operation, but we want to consider the EBA approach thereon properly, it is recommended to assess the interventions we make aimed at increasing resilience and reducing vulnerability of ecosystems and people, and based on the results of this assessment, make the appropriate adjustments.

Many Water Funds argue that they are implementing EBA measures as they carry out protection, restoration, or sustainable production management actions; however, these actions could have been designed and implemented for water conservation or safety purposes, but not from an adaptation perspective. In other words, the areas where these interventions are being carried out may be responding to areas critical to biodiversity or key areas for aquifer recharge, but these areas are not necessarily those with the greatest vulnerability or risk regarding climate change. Undoubtedly, the actions that are implemented can help meet multiple objectives, but before this is taken for granted, it is important to review and assess whether in fact those implemented actions contribute to these multiple objectives, including reduction of vulnerability to climate change in the Water Fund communities. In addition, as mentioned at the beginning of this guide, the EBA approach not only implies actions that restore, maintain, or improve ecosystem health, but also reduce vulnerabilities, generate social benefits, have support from and support policies, support governance, and strengthen capacities (see the 5 EBA Criteria).

FEBA (2017) establishes an assessment framework to determine how strong a given EBA initiative is. Many Water Funds argue that they are already implementing measures under this approach; therefore, they can test them under this framework in order to assess them and make the necessary improvements. This framework defines some quality standards for each of the five EBA criteria (see Section 2.3. What is EBA?), which must be objectively qualified by Water Fund managers and their technical teams (see Figure 7), where 1 is very low or weak and 5 is very high or strong.

**The EBA approach not only implies actions that restore, maintain, or improve ecosystem health, but also**

**reduce vulnerabilities, generate social benefits, have support from and support policies, support governance, and strengthen capacities**

Figure 7.

### EBA Measures Assessment Framework

EBA Criteria		Quality Standards		Qualification														
				Adaptation Measure No. 1					Adaptation Measure No. 2					Adaptation Measure No. 3				
				1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Reduces social and environmental vulnerabilities	1.1 Use of climate change scenarios																	
	1.2 Use of local and traditional knowledge to identify vulnerabilities																	
	1.3 Use of vulnerability and/or risk to climate change analysis																	
	1.4 Aims at reducing vulnerability to an appropriate scale for the Water Fund <sup>2</sup>																	
2. Generates social benefits in the context of adaptation to climate change	2.1 Quantity and quality of social benefits compared to other adaptation options																	
	2.2 Sustainability of social benefits over time																	
	2.3 Economic viability and advantages compared to other adaptation options																	
	2.4 Number of beneficiaries																	
	2.5 Distribution of benefits in different social groups																	
3. Restores, maintains, or improves ecosystem health	3.1 Interventions have an appropriate management scale to provide results in adaptation to the Water Fund																	
	3.2 Prioritization of key ecosystem services within adaptation management																	
	3.3 Monitoring and follow-up of health and stability of ecosystem services of interest for adaptation																	
	3.4 Coverage of the area under protection, restoration and/or sustainable management in the Water Fund																	
	3.5 Level of interventions co-management (public institutions, communities, private sector)																	

<sup>2</sup> In case a vulnerability and/or risk to climate change analysis of the Water Fund is not available, existing analyzes developed by other institutions containing the Water Fund (either from the watershed or the relevant administrative area) may be consulted. The sensitivity and adaptive capacity indicators used must be reviewed to assess whether or not the Water Fund interventions help reduce that sensitivity or increase the adaptive capacity.

		Qualification														
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
EBA Criteria	Quality Standards	Adaptation Measure No. 1					Adaptation Measure No. 2					Adaptation Measure No. 3				
4. Receives support from policies at multiple levels	4.1 Compatibility with policy frameworks, planning/ management instruments, and support of the actors responsible for them															
	4.2 Involvement and commitment of multiple actors and multiple sectors (communities, civil society, private sector)															
5. Supports equitable governance and improves capacities	5.1 Accountability and representation of multiple actors															
	5.2 Consideration of gender equity and empowerment															
	5.3 Incorporation of indigenous, local, and institutional knowledge															
	5.4 Long-term capacity to ensure sustainable governance															

Upon qualifying each of the ABE measures being implemented or planned to be implemented, attention must be paid to those standards where qualifications are between 1 and 3, in order to define improvement actions that may be assumed by the Water Fund. It is important to mention that this assessment framework must be applied several times over time in order to review whether or not there have been improvements and changes in the standards.

There are also other tools that may be used in this step, such as the questionnaire prepared by IIED (Reid et al. 2017), in order to assess effectiveness of EBA initiatives. This questionnaire may be found at: <https://pubs.iied.org/pdfs/17606SIIED.pdf>



Improvement actions to be carried out must be considered by the Water Fund Manager in order to make the necessary adjustments and thus have really sound EBA measures. Where possible, these improvements must be included in the **Annual Operating Plan (step 4.2)**, a step that all Water Funds develop when they are in their operation phase (see Figure 5). This ensures their execution or progress during the year, as well as the allocation of resources and efforts by the team.

### In selecting and implementing Adaptation Actions

On the other hand, some of these improvement needs or EBA considerations may be included in the terms of reference of the actions or interventions that the Water Fund wants to execute under this approach. Thus, if the Water Fund has planned to take EBA measures, it may then ensure that the terms of reference for this work include some aspects that so support it, such as:

Identification of threats, vulnerabilities and/or risks associated with variability and climate change in the Water Fund, based on:

- **Existing analyses and/or studies.** National Communications before the UNFCCC to be submitted by countries that are Convention members contain a chapter on vulnerability and/or risk analysis, which may serve as a starting point. However, the more local and specific the information is, the better. Some climate change or adaptation management plans or instruments may be consulted, which may also contain this information, as well as local studies from universities, research institutes, or NGOs.
- **Development of vulnerability and/or risk to climate change analyzes** of the watershed where the Water Fund is located (or the micro-watershed where adaptation efforts are to be focused), using the IPCC conceptual framework and utilizing participatory methodologies with local community and institutional actors, or quantitative methodologies using spatial or hydrological modeling. The type of methodology will depend on the resources, times, and capabilities available. It is usual that this type of analysis needs to be developed specifically for the Water Fund, since existing national analyzes do not normally allow the level of detail to adequately focus adaptation efforts. Performing these analyzes will help identify microwatersheds or areas with more vulnerability and risk where EBA actions must be focused.

Identification and prioritization of EBA measures based on threats, vulnerabilities and/or risks identified in the previous step.

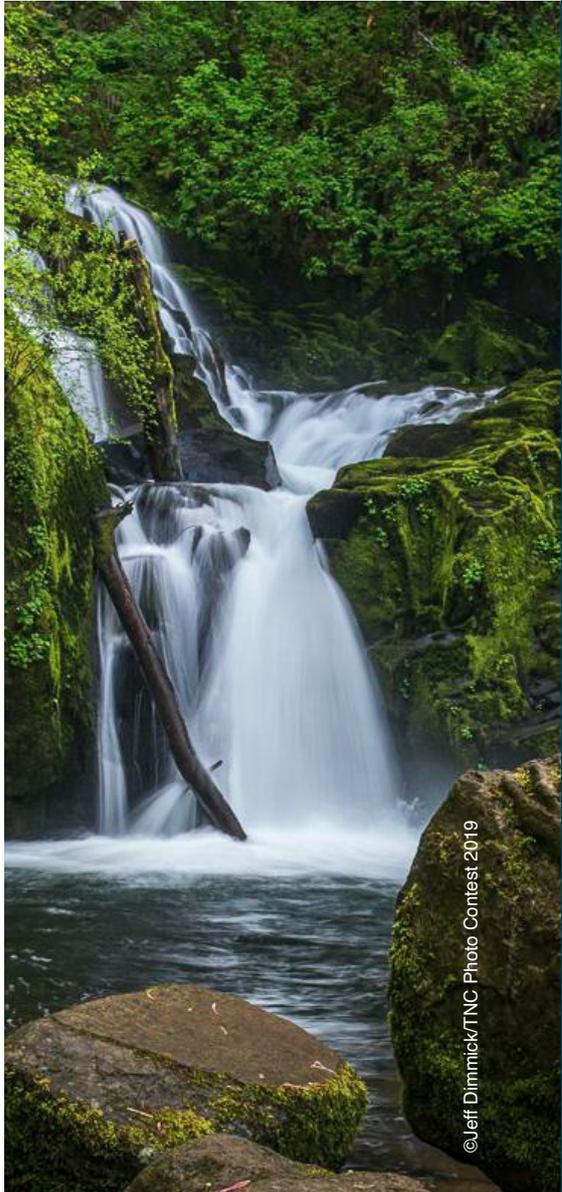
Identification and prioritization of measures must be carried out in a participatory manner with local community and institutional actors, ideally considering traditional knowledge and a gender approach to consider the ideas of women and men in an equitable manner. For prioritization, it is ideal to consider community criteria (e.g. interest of actors, capacities, articulation with local actions), though also technical (e.g. technical feasibility, resources, and times available, articulation with planning policies or instruments, governance, contribution to vulnerability reduction).

Identification of national or local climate change policies, management instruments, or plans, with emphasis on adaptation, which promote ABE measures that have been prioritized and will be implemented.

This is in order to articulate actions with the leading institutions of these plans and thus contribute to adaptation actions in the region or country. Besides, it is also recommended to review Nationally Determined Contributions (NDC) of each country in order to review whether the implementations to be made at the Water Fund can add to those national goals. NDCs of each country can be consulted at the following link: <https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

Monitoring and assessment of EBA measures implemented, ideally in case available resources and time allow it.

If the Water Fund already has a monitoring system, the possibility of integrating biophysical and socioeconomic indicators, that allow to monitor and assess over time whether the measures implemented contribute to reducing vulnerability to climate change, may be analyzed. It is recommended to review the following guide on EBA measures monitoring: [https://www.adaptationcommunity.net/download/ME-Guidebook\\_EbA.pdf](https://www.adaptationcommunity.net/download/ME-Guidebook_EbA.pdf)



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# 6

## Supporting Tools and Information

**• IPCC Reports:**

IPCC: [https://archive.ipcc.ch/publications\\_and\\_data/publications\\_and\\_data.shtml](https://archive.ipcc.ch/publications_and_data/publications_and_data.shtml)

**• National communications before the UNFCCC:**

- <https://unfccc.int/non-annex-I-NCs> (for developing countries, which are not Parties to Annex I to the Convention)
- <https://unfccc.int/NC7> (for developed countries, which are those that are Parties to Annex I to the Convention)

**• NDCs of each country:**

<https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx>

**• Regulatory Framework for Climate Change Adaptation in Latin American Countries where Water Funds currently exist:**

- **Colombia:**
  - [EBA Guide for Colombia \(2018\)](#)
  - [Climate Change Act \(2018\)](#)
  - [National Climate Change Policy \(2017\)](#)
  - [National Climate Change Adaptation Plan \(2016\)](#)
  - [National Climate Change System - SISCLIMA \(2016\)](#)
  - [Comprehensive Territorial Climate Change Management Plans](#)
  - [Comprehensive Sectoral Climate Change Management Plans](#)
- **Ecuador:**
  - [National Climate Change Strategy 2012-2025](#)
  - [New Constitution \(2008\)](#)
  - [National Environmental Policy – PAN \(2009\)](#)
  - [Interinstitutional Committee on Climate Change - CICC \(2010\)](#)
- **Peru:**
  - [Framework Law on Climate Change \(2018\)](#)
  - [National Strategy for Climate Change - ENCC \(2015\)](#)
  - [National Commission on Climate Change \(1993/2013\)](#)
- **Mexico:**
  - [Intersecretarial Commission on Climate Change - CICC \(2005\)](#)
  - [Special Climate Change Program 2009-2012 - PECC](#)
  - [General Climate Change Act - LGCC \(2012\)](#)

- Declaration for Joint Action on Climate Change in the Yucatan Peninsula (2010)
- State Climate Change Action Programs - PEACC
- **Guatemala:**
  - National Climate Change Policy (2009)
  - Framework Law to Regulate Vulnerability Reduction, Compulsory Adaptation to Climate Change Effects and Greenhouse Gas Mitigation (2013)
  - National Council on Climate Change - CNCC
  - National Action Plan for Climate Change Adaptation and Mitigation (2016)
- **Brazil:**
  - National Climate Change Policy (2008)
  - National Adaptation Plan (2016)
  - National Climate Change Fund
- **Argentina:**
  - Minimum Budgets for Climate Change Adaptation and Mitigation Act (2019)
  - National Bureau for Climate Change
- **Chile:**
  - National Climate Change Action Plan 2017-2022
  - National Climate Change Adaptation Plan (2014), with the following sectoral plans:
    - Silvoagricultural Sector (2013)
    - Biodiversity (2014)
    - Fisheries and Aquaculture (2015)
    - Health Sector (2016)
    - Infrastructure Services 2017-2022
    - Cities (in formulation)
    - Tourism (in preparation)
- **Dominican Republic:**
  - National Council for Climate Change and Clean Development Mechanism (2008)
  - National Action Plan for Climate Change Adaptation - PANA (2008)
  - Climate Change-Compatible Economic Development Plan - DECCC (2011)

- National Development Strategy 2030 (2012)
- National Strategy for Climate Change Adaptation in the Agriculture Sector of the Dominican Republic 2014-2020
- Gender and Climate Change Plan (2018)
- **Costa Rica:**
  - National Climate Change Strategy - ENCC (2009)
  - ENCC Action Plan
  - National Climate Change Adaptation Policy 2018-2030

**• EBA Approach Application:**

- FEBA (2017): [Making Ecosystem-based Adaptation Effective](#)
- Reid et al. (2017) of IIED: [Ecosystem-based Adaptation: A Guide of Questions to Assess Effectiveness](#)
- Secretariat of the Convention on Biological Diversity (2019): [Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction and supplementary information](#)

**• Climate Change Scenarios Development:**

- IPCC: <https://www.ipcc-data.org/guidelines/index.html>
- UNDP: [Formulating Climate Change Scenarios to Contribute to Climate-Adapted Development Strategies - A Guide for Practitioners](#)

**• Ideas of vulnerability and/or risk to climate change analysis methodologies or experiences:**

- Vulnerability studies in Latin America and the Caribbean, recommendations through experience: [CDKN \(2017\)](#)
- Methodology with hydrological modeling and spatial analysis: [IDEAM & TNC \(2019\)](#)
- Participatory Methodology with Communities: [TNC & Fundación Alma \(2018\)](#)
- [Climate Vulnerability and Capacity Analysis Manual \(CVCA\)](#)
- [Community Risk Assessment Tool – Adaptation and Means of Livelihood \(CRiSTAL\)](#)

**• EBA measures ideas:**

- [TNC & Fundación Alma \(2019\)](#)
- [PNUMA](#)
- [EBA Solutions en Panorama](#)

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- Monitoring and Assessment of EBA measures:

- GIZ, UNEP-WCMC and FEBA (2020): [Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions](#)

- Communities or networks for the exchange of adaptation information, methodologies, and experiences:

- Overview: <https://panorama.solutions/en/portal/ecosystem-based-adaptation>
- Global Adaptation Network: <https://www.unenvironment.org/gan/>
- Adaptation Community: <https://www.adaptationcommunity.net/>
- Community in EBA Practice: <http://abecomunidad.com/es/>
- EBA Solutions: <https://solucionesabe.org/>
- PEDRR: <https://pedrr.org>



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# 7

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