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Financing Nature for Water Security

EXECUTIVE SUMMARY

A HOW-TO GUIDE TO DEVELOP WATERSHED INVESTMENT PROGRAMS

Acknowledgments

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Introduction

The Executive Summary of *Financing Nature for Water Security: A How-to Guide to Develop Watershed Investment Programs* summarizes the project development cycle for **Watershed Investment Programs (WIP)**, which are initiatives designed to deliver ecosystem services (e.g., filtration, flood control, etc.) by investing in the protection or restoration of nature. WIPs aim to deliver water security and associated co-benefit outcomes via a defined portfolio of nature-based solutions (NbS) interventions within a specified service area. **Nature-based Solutions (NbS)** are actions to protect, sustainably manage, and restore natural or modified ecosystems, which address societal challenges (e.g., climate change, food, and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits (Cohen-Shacham et al 2016) (Figure 2). This guide has been written with this diversity in mind and assists readers in understanding how to design, implement, and finance NbS programs that drive long-term water security outcomes.

While the Executive Summary serves as an introduction to Watershed Investment Programs, it is suggested to read the entirety of the How-to Guide (HTG) before beginning the project development process. The main text of the HTG is also accompanied by a series of Deep Dives that provide in-depth information on specific subject matter areas including Nature-based Solutions, Sustainable Funding, Governance, and Stakeholder Engagement. See Appendix for a full list of Deep Dives.

Watershed Investment Programs and Water Security

Restoring the health and resiliency of our watersheds is urgent and achievable. By investing in NbS we can improve water security, restore biodiversity, enhance communities' resilience to climate change, and promote equitable, inclusive development. Grey and Sadoff (2007) specifically define **water security** as the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems, and production, coupled with an acceptable level of water-related risks to people, environments, and economies (Figure 1).

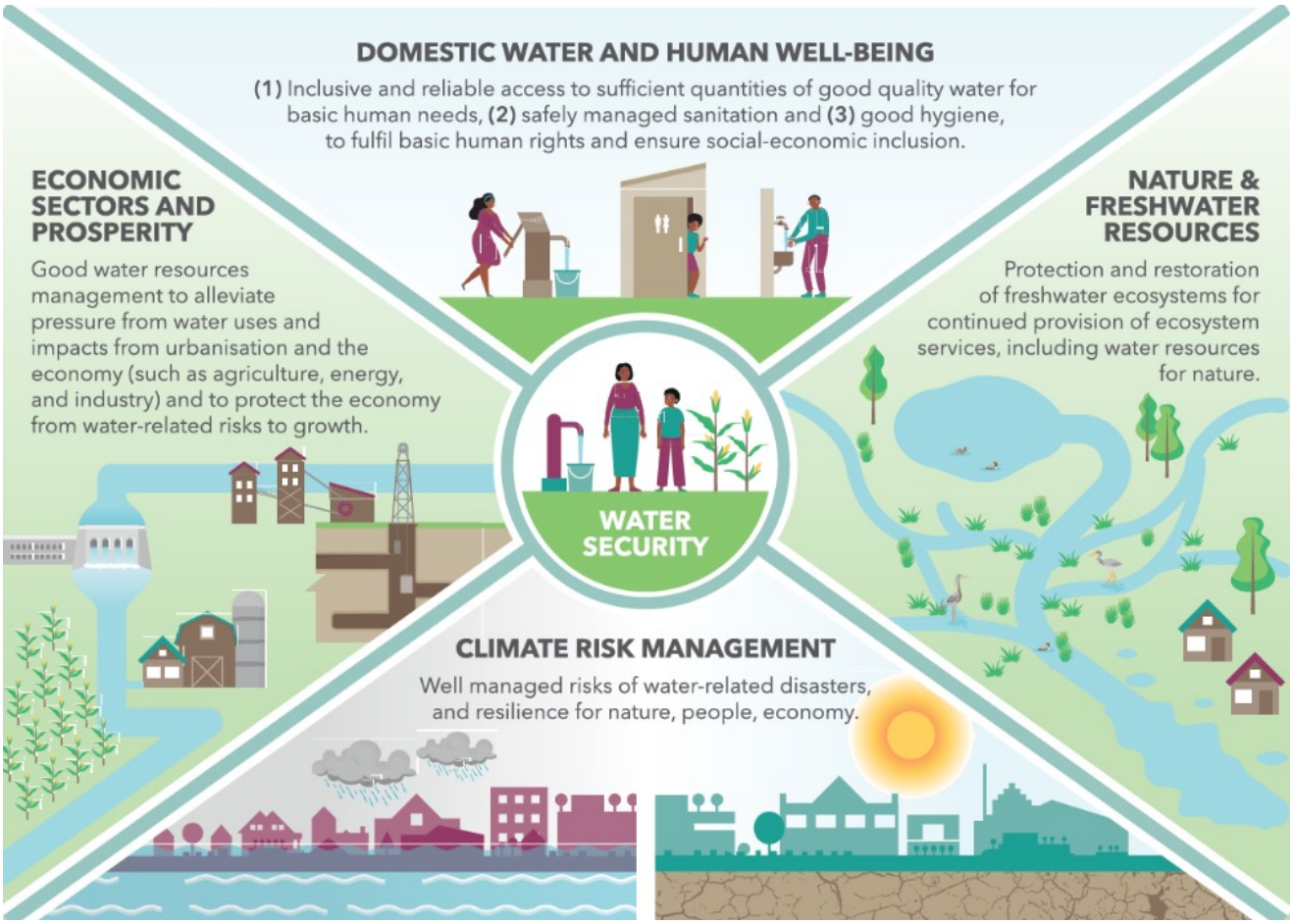

FIGURE 1. Diagram of Water Security (The Resilient Water Accelerator 2021). Societies can enjoy water security when they successfully manage their water resources and services to meet the needs of people and ecosystems over the long-term.

While grey infrastructure remains the dominant type of intervention to improve water security, increased focus on investments that provide multiple benefits has spurred interest in alternatives to traditional water security approaches—like nature-based solutions—that fail to take a systems approach (Palmer et al. 2015). There is a growing movement to implement large-scale NbS or hybrid investments, which strategically combine green and grey infrastructure to cost-effectively enhance service delivery, while also empowering communities and increasing infrastructure systems' resilience and flexibility in a changing climate (Browder et al. 2019). In addition to providing water security benefits, nature-based solutions (NbS) are attractive to investors because they can simultaneously achieve multiple benefits via protecting and restoring the health and function of natural ecosystems and/or improving the management of working lands. For example, restoring native forest cover may not only retain sediments and improve soil moisture, but can also provide habitat for wildlife, medicinal plants for indigenous communities, recreational opportunities, and flood retention benefits. Figure 2 summarizes common nature-based solutions and the benefits they may accrue.

Watershed Investment Programs are pragmatic mechanisms for practically implementing large-scale NbS or hybrid watershed investments. They can be designed and implemented in a variety of ways, as they can be driven by a variety of institutions (e.g., NGOs, government agencies, direct water users, or development financial institutions) and delivered via different types of governance arrangements (e.g., dedicated legal vehicle, hosted program, or umbrella agreement). Furthermore, WIPs can also leverage one or multiple investment funding sources. We offer a selection below to show the range and heterogeneity of NbS options, governance models, funding agents, sponsor types, and implementation models found in WIPs across the globe.

WATER SECURITY CHALLENGE	WATER AVAILABILITY		DISASTER RISK	WATER QUALITY		POTENTIAL FOR OTHER BENEFITS
Ecosystem benefit	Dry season flows	Groundwater recharge	Flood risk	Erosion & sediment	Nutrients & pollutants	
Protection						
1. Targeted habitat protection	✓	✓	✓✓	✓✓	✓	
Restoration						
2. Revegetation	✓	✓	✓✓	✓✓	✓	
3. Riparian restoration	✓	✓	✓	✓✓	✓✓	
4. Wetlands restoration	✓	✓	✓✓	✓	✓✓	
5. Floodplain restoration	✓	✓	✓✓	✓✓	✓	
Management						
6. Agricultural Best Management Practices (BMPs)		✓		✓✓	✓✓	
7. Ranching BMPs	✓	✓		✓	✓	
8. Forestry BMPs	✓			✓	✓	
9. Fire Management			✓✓	✓✓	✓	
Created Habitats						
10. Artificial wetlands	✓	✓	✓	✓	✓✓	
11. Sustainable Urban Drainage Systems (SuDS)	✓✓	✓	✓✓	✓	✓✓	

LEGEND	LOW	MEDIUM	HIGH
Magnitude of benefit			
Depth of evidence		✓	✓✓
Potential for multiple other benefits			

FIGURE 2. Summary table adapted from NbS Options Factsheets Deep Dive comparing typical water security benefits addressed and potential for co-benefits.

Watershed Investment Programs in Action

WIPs can be designed and implemented in many different ways, offer a selection below to show the range and heterogeneity of NbS options, governance models, funding agents, sponsor types, and implementation models found in WIPs across the globe.

Rio Grande Water Fund

© MAXWELL COOK

New Mexico, USA → The purpose of the Rio Grande Water Fund (RGWF) is to enhance storage, delivery and quality of water from the Rio Grande River through **forest management** to avoid wildfire risks and associated sediment loading, flooding and property loss. Launched in 2014, the RGWF is governed as an **umbrella agreement** with a collaborative charter across 100 entities. While each entity has its own implementation objectives and is responsible for raising the majority of its funds, there is a rotating executive committee that is responsible for executing some overarching functions. The executive committee prioritizes investments, conducts M&E, facilitates payments to implementers, and drives a **diverse set of funding commitments** across multiple organizations including to the USDA Forest Service, local water utilities, private corporations and philanthropy. It aims to restore 600k acres of the Rio Grande's forested watershed over 20 years. For additional details, see link.

Upper Tana-Nairobi Water Fund

© ROSHNI LODHIA

Nairobi, Kenya → Ninety-five percent of Nairobi's water supply originates in the Tana River, whose source watershed is host to some 300,000 farms that rely on the river for irrigation water. Expanding agricultural activities, including by smallholders into cultivating steeper slopes and riparian catchments, has led to increased abstraction and siltation, impacting downstream water supplies including local communities, the water utility and hydropower operator. In 2015 TNC and partners set up the Upper Tana-Nairobi Water Fund which today is an **independent trust** that enables sustainable practices such as terracing, riparian buffer strips and agroforestry across some 30,000 farmers to reduce soil runoff. **Blended funding** is provided by multiple partners include multiple corporates, the Global Environment Facility and in-kind support from local counties.

Cuenca Verde

© ANA GUZMAN

Medellín, Colombia → The Aburrá Valley is home to roughly 4 million people, including the city of Medellín and nine satellite cities. The utility Empresas Públicas de Medellín (EPM) is tasked with water supply management, of which roughly 70 percent is sourced from the Rio Grande reservoir. Facing growing pressures from unsustainable cattle ranching and urbanization-linked deforestation, EPM joined corporations Coca-Cola and Postobón with support from TNC and the IADB to develop the Cuenca Verde water fund, a **dedicated legal vehicle** with the aim of prioritizing and organizing upstream watershed investments including **land protection**, **forest restoration**, and **agricultural and ranching best management practices**. For additional details, see link.

Pingxiang "Sponge City"

© ASIAN DEVELOPMENT BANK

Jiangxi, China → Pingxiang municipality faces significant flood risk issues, with five floods occurring between 1998 and 2014 affecting nearly 500,000 people and leading to the collapse of approximately 3,000 homes; the 2014 flood generated US$115 million in estimated economic losses. When considering different options, primary emphasis was placed on providing additional space for the river to allow for natural seasonal water level fluctuations to provide peak flood reduction alongside water quality protection. The resulting "**sponge city**" **grey-green** integrated river rehabilitation and flood risk infrastructure package—supported by a **US$150 million sovereign loan from the Asia Development Bank alongside additional contributions by local, municipal and county governments**—involves floodplain protection, wetlands rehabilitation, detention basins and green embankment upgrades along 70km of the river, supported by new sewerage piping to free up drainage pipes for exclusive use for rainwater runoff. For additional details, see link.

The Watershed Investment Program Development Lifecycle

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The WIP process is composed of four interconnected phases—Pre-Feasibility, Feasibility, Design, and Execution—grouped into Program Preparation and Program Implementation (see Figures 3 and 4). For ease of use, the Guide presents the process in a sequential manner, though in reality the WIP development processes are not always clear-cut or neatly sequential. Phases and activities build on information gleaned throughout the process in an iterative manner. Within each phase, similar bodies of work are grouped into five workstreams (Figure 3), and the Guide moves the reader through the process with the aim of understanding:

- The purpose of each phase,
- Questions that should be addressed by phase conclusion,
- Activities and outputs useful in answering these questions, and
- Key transition milestones that are foundational before moving on to the next phase in the program development lifecycle.

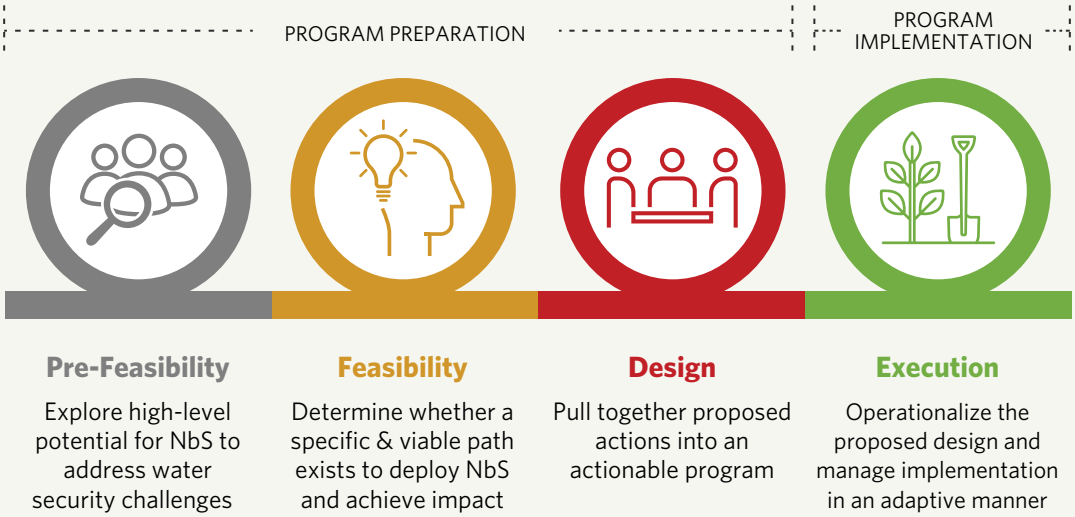

FIGURE 3. The Watershed Investment Program Development Lifecycle.

Stakeholder Engagement. Engaging relevant and motivated stakeholders in your WIP's development to ensure program viability and social acceptance.

Science. Building the case for the WIP through scientific analysis and ensuring credibility through monitoring and evaluation of NbS investments.

Funding and Financing. Attracting the required resources is a fundamental enabling condition for program execution, and motivating WIP investors typically requires a blend of science-based evidence, program co-creation and political will.

Governance. Outlining the roles and responsibilities of different stakeholders when making decisions about the WIP's development and long-term execution.

Implementation. Understanding the implementation requirements and associated capacity-building needs to roll-out the WIP against the target execution timeframe.

FIGURE 4. The five primary workstreams within each phase.

	PROGRAM PREPARATION			PROGRAM IMPLEMENTATION
	 Pre-Feasibility	 Feasibility	 Design	 Execution
OBJECTIVE	Understand the water security challenges and explore the high-level potential for NbS to address them	Determine whether a specific viable path exists to deploy NbS and achieve impact	Marry interest and ambition into a cohesive actionable package	Operationalize proposed design and adaptively manage to ensure long-term objectives
KEY QUESTIONS	• What is the water security challenge? • Which NbS options are most relevant? • Which stakeholders care, and why? • Is there a favourable institutional and funding context? • Can collective action serve to enhance outcomes?	• What is the local absorption capacity, social acceptance, and costs and benefits profile for prioritized NbS options? • What is the target implementation scenario, and do funders believe it has an attractive benefit/cost profile? • Is additional fundamental work required (e.g., technical analysis, stakeholder engagement) to move to WIP design?	• What is the institutional vision and concrete technical objectives? • What is the governance, funding and operational arrangement to achieve those objectives?	• How to maximize operational efficiency and transparency? • How can field monitoring be used to validate results? • Do core program objectives (e.g., NbS options list) require revision?
ACTIVITIES AND OUTPUTS	• **Pre-Feasibility package** to define water security threat, identify preliminary NbS options, and evaluate stakeholder landscape and culminates with a go/no-go decision; perhaps accompanied by pre-feasibility ROI evaluation • *Pending Pre-Feasibility 'go' evaluation*: **MOU with key stakeholders** (or similar agreement) to conduct and guide Feasibility Phase	• **Feasibility assessment** that includes detailed NbS options evaluation and full-lifecycle program costing, biophysical modelling, and detailed ROI evaluation • *Pending Feasibility 'go' decision*: **MOU with key stakeholders** (or similar agreement) to execute Design Phase activities	• **Strategic plan** capturing core institutional vision and SMART Objectives, which are aligned with validated financial and governance structure and are calibrated against operational and M&E aspects • **Secure sustainable funding commitments** to deliver against full-lifecycle program costs for Execution • **Execute pilot interventions** (as relevant) to validate NbS portfolio • **Secure permits** for implementation activities (as relevant)	**Start-up:** • **Operating manual** to define systems and processes • **Appoint core staff** (as relevant) • **Implementation entity establishment** (as relevant) **Operation:** • Deliver **annual implementation plan** addressing financial, implementation, communication & other operational needs • **Mobilize capacity for implementation** • **Monitoring and evaluation program activation** • Provide **impact reporting** • **Secure additional funding commitments** as required for program to meet technical objectives

FIGURE 5 provides a more detailed overview of the objectives, key questions, and activities/outputs for each phase.

The Role of Partnerships, Sponsors, and Champions

PARTNERSHIPS

Although the form and focus of every WIP will be different, all WIPs require partnerships to meet their objectives. Water security issues are multi-dimensional and affect and engage multiple stakeholders particularly when upstream source watersheds are also considered. From the beginning of the process, it is important to understand the stakeholder landscape and how the WIP will fit into this landscape. Building strong partnerships through targeted stakeholder engagement, both to deliver your WIP and to enable your WIP to thrive in its institutional environment, is a critical element in each phase (Figure 5).

Pre-Feasibility

- Identify core partners and validate their collaboration interest
- Identify coordination needs and opportunity to leverage existing efforts
- Understand existing landscape of water sector institutions and respective remits
- Identify quick wins

Feasibility

- Align on priority implementation portfolio and estimated costs/benefits
- Validate funders' needs and concerns
- Determine social buy-in for proposed NbS interventions

Design

- Obtain feedback and buy-in from stakeholders on proposed structure for operationalizing NbS investment program (governance, funding, etc.)
- Structure funding commitments with key stakeholders

Execution

- Ensure program director and governance parties agree on relative roles and responsibilities and have confidence in program direction
- Re-visit the needs of stakeholders throughout implementation to ensure that tradeoffs are mitigated and ongoing buy-in exists from champions and local communities

FIGURE 6. Stakeholder engagement by phase

SPONSORS & CHAMPIONS

Watershed Investment Programs typically require a Sponsor and one or more Champions to ensure their success. These two roles can sometimes be accomplished by the same person or entity, but typically are split among multiple parties.

- **A Sponsor.** The institution that kicks off the WIP development process and is the principal leading force for organizing resources and stakeholder engagement. The Sponsor is often an existing local counterparty with significant watershed influence (e.g., water utility, local government, basin authority, or NGO).
- **A Champion.** A local individual, often representing an institution, with significant pre-existing knowledge of local watershed management and is motivated to advocate for the WIP and its cause. They are a driving force, cheerleader, and spokesperson for the WIP; moreover, they typically have political and institutional gravitas that enable them to be an effective advocate. If there is a WIP Steering Committee, Champions typically sit on such structures and may even chair them. In some cases, champions may instigate the initial idea of WIP formation: furthermore, Champions may initiate the WIP concept (effectively acting both in 'Sponsor' and 'Champion' capacities).

ENGAGING INDIGENOUS PEOPLES AND LOCAL COMMUNITIES

Environmental programs to conserve freshwater resources and promote human development are more likely to achieve positive, long-term outcomes for people and nature when led by Indigenous peoples and local communities (IPLCs). It's important that watershed investment programs are designed to strengthen the Voice, Choice and Action of IPLCs, especially if the program could impact or involve the management of traditional lands and waters:

- **Voice:** inclusion of traditional knowledge, identity, local priorities and values in developing your WIP's NbS intervention portfolio, objectives, and strategic and annual operating plans.
- **Choice:** builds leadership and engagement in your WIP's decision-making process.
- **Action:** opportunities for communities to initiate and participate in the implementation of your WIP and the management of resources that affect their well-being.

Working Toward Maturity

WIP maturity is reached when your program is well-established, and operational, and can confidently point to lasting contributions to water security. Such mature programs are critical for acting as showcases of the power of NbS to be deployed at scale in a watershed context and help make the case towards allocating a meaningful portion of water sector investment to the natural systems they are dependent upon. The criteria below provide a rough checklist to indicate whether the Maturity stage has been attained.

Criterion	**Strategic Vision, Planning & Procedures**	**Implementation**	**Measurement & Reporting**	**Sustainable Funding**	**Governance & Influence**
Criterion Purpose	Does the WIP have strategic planning documents to guide its work and establish clear financial planning?	Is the WIP implementing activities, including NbS investments, as outlined in its Strategic and Annual Operating plans?	Is the WIP transparently reporting its work to key stakeholders?	Does the WIP have enough funding to reach its SMART Objectives and have its intended water security impacts?	Is the WIP an effectively governed decision-making body and is its value recognized in the area where it operates?
Criterion Require-ments	Produce Strategic Plan and Annual Operating Plan	Achieve WIP Annual Plan implementation objectives for three consecutive years	Publicly publish Annual Report & Annual Financials for at least one year	Funding to operate for three years; sustainable funding covers at least 50% of program costs	Governed by decision-making body for three years; WIP formally recognized where it operates

FIGURE 7. WIP Maturity Criteria

Moving Forward

The water we use every day is directly dependent on the landscapes through which it flows. Our watersheds—the lands around rivers, lakes, and streams—are some of the most undervalued natural systems on Earth. Nearly half of all drinking water sources are significantly degraded, threatening the quality and quantity of water reaching our communities and cities (McDonald et al. 2016, Abell et al. 2017). About 4 billion people—nearly two-thirds of the world's population—already experience severe water scarcity at least one month of the year (Mekonnen and Hoekstra 2016), and pressures on freshwater resources are only expected to increase in the face of climate change, urbanization, and intensification of agriculture. Indeed, the UN estimates that increased agricultural demand could drive a 42% gap in freshwater availability by 2030 (UN Water 2018). The persistent degradation of these watersheds and our freshwater ecosystems has driven an 84% decline in freshwater species populations since 1970 (WWF 2020). More than three-fourths of urban source watersheds are within regions of high species diversity and high endemicity (Abell et al. 2019).

By investing in NbS through watershed investment programs we can improve water security, restore biodiversity, enhance communities' resilience to climate change, and promote equitable, inclusive development. Adopting an NbS approach has multiple potential benefits, including:

- **Addressing key water security issues:** Surface water quality, groundwater quality, floods, and water scarcity.
- **Addressing a broader set of critical issues:** NbS-WS have shown to have long-lasting effects broader than solely water security outcomes including protecting ecosystems and reversing biodiversity loss, as well as mitigating and adapting to climate change, job creation, food security, human health, and disaster risk reduction (Mishra et al. 2021).
- **Resilient design:** Grey water security solutions are vulnerable to variability in the quantity and quality of source water. Furthermore, grey infrastructure can actively lead to environmental degradation and can be energy hungry in its build and implementation. Investments and NbS-WS can improve the resiliency of existing built infrastructure in the face of watershed land use change and climate impacts.
- **Cost-Performance:** Both green and hybrid projects can meet or exceed the cost-performance criteria of comparable grey investments while also supporting other agendas, such as quality of life, ecological resilience, and flexibility in the face of climate and economic uncertainty.

Those looking to learn more about developing Watershed Investment Programs can view the full How-to Guide and associated Deep Dives at the embedded links. If you're a Sponsor or Champion of an existing Watershed Investment Program and are looking for technical support, explore service offerings from The Nature for Water Facility, a built-for-purpose technical assistance facility designed to develop impactful watershed investment programs.

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Appendix : How-to Guide Deep Dives

Deep Dives offer detailed guidance on key subject matter areas for WIP preparation. The Deep Dives are resources that provide in-depth guidance on key technical processes and considerations and can be used in conjunction with this guide as additional resources to assist in the development of your WIP. Colored-in boxes indicate the primary phases emphasized within the respective Deep Dive.

DEEP DIVES	PRE-FEASIBILITY	FEASIBILITY	DESIGN	EXECUTION
Co-benefits and Trade-offs. One of the key advantages of NbS over grey solutions is their potential to deliver on multiple benefits, often called co-benefits. Equally important, if not more important, is awareness of the trade-offs that should be taken into account when considering investment in specific NbS. This brief explores types of co-benefits and trade-offs and how to identify, quantify and financially value these potential outcomes of WIPs, local community engagement and communications.	■	■		
Economic and Financial Analysis. Detailed, comprehensive methodology required to articulate the economic and/or financial benefits of your watershed investment program.		■		
Green-Grey Infrastructure. Delivering the most resilient, robust solutions to water security challenges often requires a combination of green and grey solutions. This technical brief is intended to provide readers with insights into how each type of solution works to address water security challenges within a water management system and explore pathways for integrated planning.	■	■		
Governance. Review of common WIP governance models and aspects to consider when designing the governance, operational and legal structure of your program.	■		■	■
Monitoring and Evaluation Program Design. Monitoring progress and evaluating the impact of a WIP is critical for reducing uncertainties and adaptively managing the program over time. This brief introduces some key principles in monitoring and evaluation (M&E) program design and directs readers to resources that provide detailed guidance on metric selection, monitoring design and data collections and analysis.			■	■
NbS Option Factsheets. The NbS factsheets aim to provide an initial overview of key characteristics of 12 selected Nature-based Solutions for Water Security. They are intended to guide prospective funders and financiers of Watershed Investment Programs and other parties in respect to the typical properties of each NbS option including the water security challenges addressed, additional co-benefits, typical cost profiles and risks.	■	■		
Policy and Regulatory Mapping. This Deep Dive outlines the legal and regulatory policy mapping process and provides a list of suggested initial questions readers should be answering and resources that should typically be relied on in such evaluation.	■			
Stakeholder Mapping. Establishing a WIP requires engaging with the stakeholders who are responsible for, benefit from and potentially provide funding towards watershed stewardship and water management. Mapping these stakeholders and analysing their mandates and priorities needs to be undertaken in the pre-feasibility phase to determine which stakeholders are most essential to WIP advance and the appropriate method to engage them.	■			
Sustainable Funding. This guidance aims to help WIP sponsors understand the key steps for creating a sustainable funding strategy, with the goal of ensuring that funding commitments meet the full program lifecycle costing needs to meet the program's technical objectives.	■	■	■	■