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The Nature
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State of Investment in Nature-based
Solutions for Water Security

2025



Doubling Down on Nature

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Supporters



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About Forest Trends

Forest Trends Association is a 501(c)(3) organization founded in 1999. Forest Trends works to conserve forests and other ecosystems through the creation and wide adoption of a broad range of environmental finance, markets, and other payment and incentive mechanisms. Forest Trends does so by 1) providing transparent information on ecosystem values, finance, and markets through knowledge acquisition, analysis, and dissemination; 2) convening diverse coalitions, partners, and communities of practice to promote environmental values and advance development of new markets and payment mechanisms; and 3) demonstrating successful tools, standards, and models of innovative finance for conservation.

About The Nature Conservancy

The Nature Conservancy is a global conservation organization dedicated to conserving the lands and waters on which all life depends. Guided by science, we create innovative, on-the-ground solutions to our world's toughest challenges so that nature and people can thrive together. The Nature Conservancy is working to make a lasting difference around the world in 81 countries and territories through a collaborative approach that engages local communities, governments, the private sector, and other partners.

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Cover photo: The Pantanal wetlands are the world's largest tropical wetland, covering over 70,000 square miles and boasting the highest concentration of wildlife in South America. Copyright: Gabriel Gabino Moreira/TNC Photo Contest 2019.

Foreword

Water is everywhere in our lives: not just in what we drink or use to grow food, but in data centers, cooling systems, energy grids, sanitation, and manufacturing. It powers our economies and our everyday routines. And in much of the world, water is also the face of climate change. We see it in intensifying droughts, catastrophic floods, and the strain on water infrastructure from rising demand and erratic supply. In fact, not only was 2024 the driest year on record, but it also saw record-breaking floods. These extreme events took lives, displaced communities, and contaminated water supplies. The urgent need to build resilience into our water systems has never been clearer.

Fortunately, one of the most powerful tools to increase resilience is already at hand: nature. Nature-based solutions (NbS)—from restoring wetlands and protecting forests, to improving agricultural practices and naturally recharging groundwater—can play a critical role in securing water resources and buffering communities against climate shocks. When thoughtfully integrated with built infrastructure, like dams and reservoirs, NbS can offer scalable, cost-effective strategies to manage water risk and sustain healthy ecosystems and resilient communities.

This report, *Doubling Down on Nature: The State of Investment in Nature-based Solutions for Water Security, 2025*, produced by Forest Trends and The Nature Conservancy, builds on Forest Trends' landmark *State of Watershed Investments 2016*. It presents the most comprehensive global assessment to date of finance explicitly directed toward NbS with water-related objectives – such as mitigating flood risk, improving water quality, and securing supply.

Calls to scale investment in NbS have grown dramatically since 2016. Yet despite the headlines and high-profile case studies, it has remained difficult to track whether this momentum has translated into real financial commitments with action on the ground. This report answers that question with a data-driven benchmark, compiled from hundreds of sources globally,

including databases, government reports, survey submissions, and expert interviews. It tracks where finance is flowing, who is investing, what's driving growth, and what barriers remain.

The clearest takeaway is that investment in NbS for water has doubled over the past decade. Public sector funding continues to dominate, underlining the importance of policy frameworks and consistent public investment. But private finance from the water sector and other funders is also beginning to emerge, which presents new and exciting possibilities for future of NbS. Understanding how to unlock this funding stream will be critical to scaling the adoption of NbS for water around the world and further mainstreaming its implementation.

This report offers a clear-eyed view of how governments, investors, and institutions are mobilizing resources – and where the untapped opportunities lie. We hope it helps turn insight into action, accelerating and diversifying finance for NbS, closing the global nature finance gap, and building a more water-secure, climate-resilient future for all.

All the best,



A handwritten signature in black ink, reading "Michael B. Jenkins".

Michael Jenkins

CEO
Forest Trends Association



A handwritten signature in black ink, reading "Jennifer Morris".

Jennifer Morris

CEO
The Nature Conservancy

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Acronyms

CEO	Chief Executive Officer
COVID	Coronavirus Disease
CSP	Conservation Stewardship Program
EQIP	Environmental Quality Incentives Program
EU	European Union
GCF	Green Climate Fund
GEF	Global Environment Facility
IDB	Inter-American Development Bank
IUCN	International Union for Conservation of Nature
LAC	Latin America and the Caribbean
NbS	Nature-based Solutions
NGO	Non-Governmental Organization
NRCS	Natural Resources Conservation Service
OECD	Organisation for Economic Co-operation and Development
PES	Payments for Ecosystem Services
TNC	The Nature Conservancy
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
US	United States
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
USD	United States Dollar
VWBA	Volumetric Water Benefit Accounting
WQT	Water Quality Trading

Executive Summary

In recent years, the world has seen a significant expansion of interest in NbS for managing water risks—from floods and landslides to the quantity and quality of water supplies. This report presents the most comprehensive global analysis to date of funding for nature-based solutions (NbS) for water security, tracking investments from 2013 to 2023 across 140 countries.

Global Investment Trends in NbS for Water Security

- **Total investment doubled** over the past decade, reaching **USD 49 billion (B) in 2023** across more than **880 initiatives**.
- **China, the US, and the EU** dominate the landscape, accounting for **94 percent of total investment**. China alone contributed **USD 26.4B (54 percent)**. Outside the “Big Three,” investment is growing even faster, especially in **Africa and Oceania**.
- The most commonly supported ecosystems include **forests and riparian zones**, while **grasslands, shrublands, and wetlands** are region-specific.
- The top water risk addressed globally is **flooding**, followed by **water quality issues**. **Scarcity** was a primary concern in Africa and Latin America.

Investment by Payer Type

- **Governments provided 97 percent** of all funding (**USD 47.4B**), with national governments contributing **USD 33.8B**, led by China.
- **Multilateral institution** investments (non-repayable) grew **10x** to **USD 489M**.
- **Private sector** investment increased **30x**, reaching **USD 345M**. More than two-thirds of private sector investment was regulation-driven.

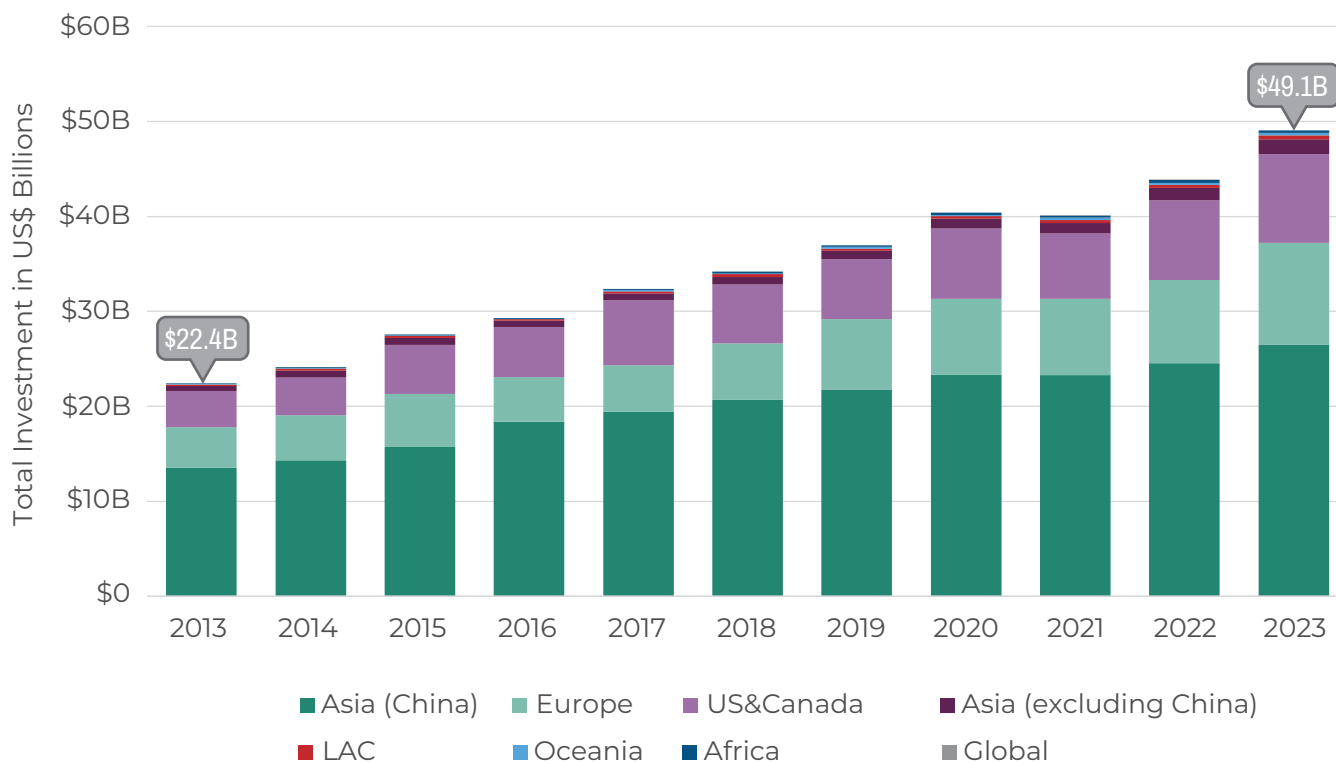
Mechanisms

- **Public incentives for landholders** are typically large, publicly funded programs operating at national or supranational scales programs that primarily pay farmers and other

landholders to improve land management practices for conservation outcomes with water benefits. They have been the backbone of NbS investment, totaling **USD 23.4B** in 2023, with an average program size of USD 1.1B per year. These programs have shown steady but slower growth (1.6x over 10 years) compared to other mechanisms.

- **Other public investments for a public good** reached USD 23.7B in 2023—making this one of the fastest growing mechanisms tracked, with a 3.3x increase over the past decade. This category spans over 600 initiatives funded by governments and development agencies, with an average size of USD 39 million (M). Unlike large-scale landholder incentives, these programs tend to be locally tailored, often investing in nature as infrastructure to address specific water risks.
- **User-driven investments**—funded by direct beneficiaries of watershed services like utilities, cities, and companies—totaled nearly **USD 2B** in 2023, representing **2.9x** growth over the last decade. Investments funded by water user fees grew 3.4x to USD 867M, led by France, South Korea, and Vietnam. User-driven investments by subnational governments have grown 2.6x globally over the past decade to USD 881M. Within user-driven investments, investments by utilities dominate in Europe, Oceania, and Asia outside of China. Investments by subnational governments play a dominant role in China, Latin America & the Caribbean (LAC), the US, and Canada, while the private sector leads user-driven investments in Africa.
- **Water quality trading** programs reached USD 21M in 2023, growing 3.3x over the past decade but still under 1 percent of global NbS investment. **Environmental water markets**, which support water resilience by purchasing or leasing water rights to maintain streamflow and recharge groundwater, totaled USD 64M, though growth has slowed. Both remain regionally concentrated in the US and Oceania, with new mechanisms emerging in Australia and the UK.

Figure ES-1. Growth in Investment in NbS for Water Security by Geography, 2013-2023



Financing Instruments

- Debt finance and bonds bringing capital to NbS for water security are emerging, including green bonds issued by the Netherlands, Australia, and several US cities.
- El Salvador implemented the world's first debt-for-nature swap explicitly focused on watershed conservation.
- Private equity is beginning to play a role, especially where outcome-based contracting models incentivize the entry of private capital.

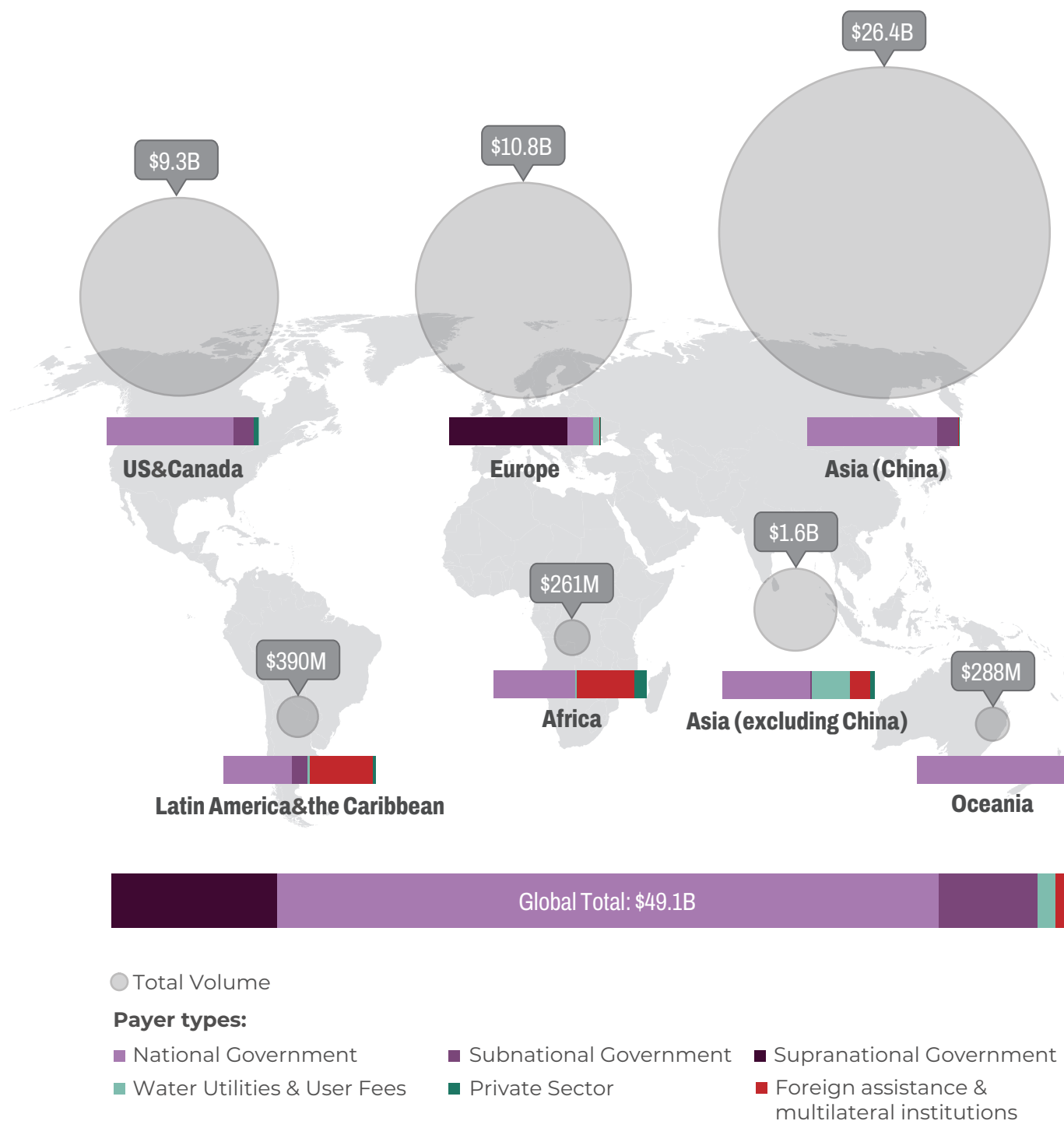
Trends by Geography

- **China** leads global NbS for water investment with USD 26B in 2023—more than the rest of the world combined—driven almost entirely by public spending (99.9 percent) through national and growing interprovincial eco-compensation programs. Flagship efforts like Cropland to Forest and Sponge Cities reflect decades of state-led reforms to restore and maintain watershed services.
- **Africa** had the fastest growth in NbS investment for water globally—5x since 2013 to USD 288M in 2023—driven by foreign assistance and multilateral institutions, which participated in 68 percent of investments. While the majority of investments occurred in East Africa, South Africa continues to lead domestic investment by governments on the continent. A growing network of 14+ water funds signal emerging public-private momentum, with private sector investment tripling in five years to eight percent of the total.
- **Europe** more than doubled NbS for water investment to USD 10.8B in 2023, led by EU funds like the Agricultural Fund (USD 5.7B). While government investment dominates (96 percent), utility-led and co-financed models are growing, with France and the UK mobilizing hundreds of millions through water agencies and catchment partnerships.
- **Asia (excluding China)**: Investment in NbS for water reached USD 1.6B in 2023, tripling since 2013, led by Japan, India, Vietnam, and South Korea. Government spending remains dominant

(60 percent), but user-funded mechanisms are rising—Vietnam’s payments for ecosystem services (PES) program and South Korea’s river funds together contributed USD 390M—while foreign assistance and multilateral institutions participated in 21 percent of investments.

- **Latin America and the Caribbean** reached USD 390M in 2023 (2.4x growth since 2013), fueled by foreign assistance and multilateral institutions (which participated in 53 percent of investments) and expanding national programs. Peru led with USD 75M and 250+

Map ES-1. Global Investment in NbS for Water Security Including Volume and Payers by Geography, 2023



projects in implementation in 2023, driven by domestic investment by governments. Long-running national PES programs continue to provide strong support in Mexico, Ecuador, Costa Rica, and the Dominican Republic, and 32 water funds that blend public-private finance are operational or in development.

- **The US & Canada:** NbS investment totaled USD 9.3B in 2023, nearly all by governments (97 percent), with over USD 52B in future commitments now uncertain due to budget cuts. The US NRCS alone contributed USD 4.6B via landholder incentives; new, state-led initiatives in the West are channeling revenue from the sale of carbon emission allowances to large investment in climate resilience with water benefits. Canada's growing role includes a USD 3.5B Natural Climate Solutions Fund. Outcome-based, utility-driven, and public-private approaches are gaining ground, though private data remain scarce.
- **Oceania** reached USD 261M in NbS investment in 2023 (3.4x since 2013), led by Australia and New Zealand. This region is known for market-based innovation—like water buybacks and nutrient trading—and Indigenous leadership, including the USD 194M Waikato and Waipā Rivers Restoration Strategy in New Zealand. Pacific Island nations rely on global funds, including the USD 416M Pacific Ridge to Reef initiative.

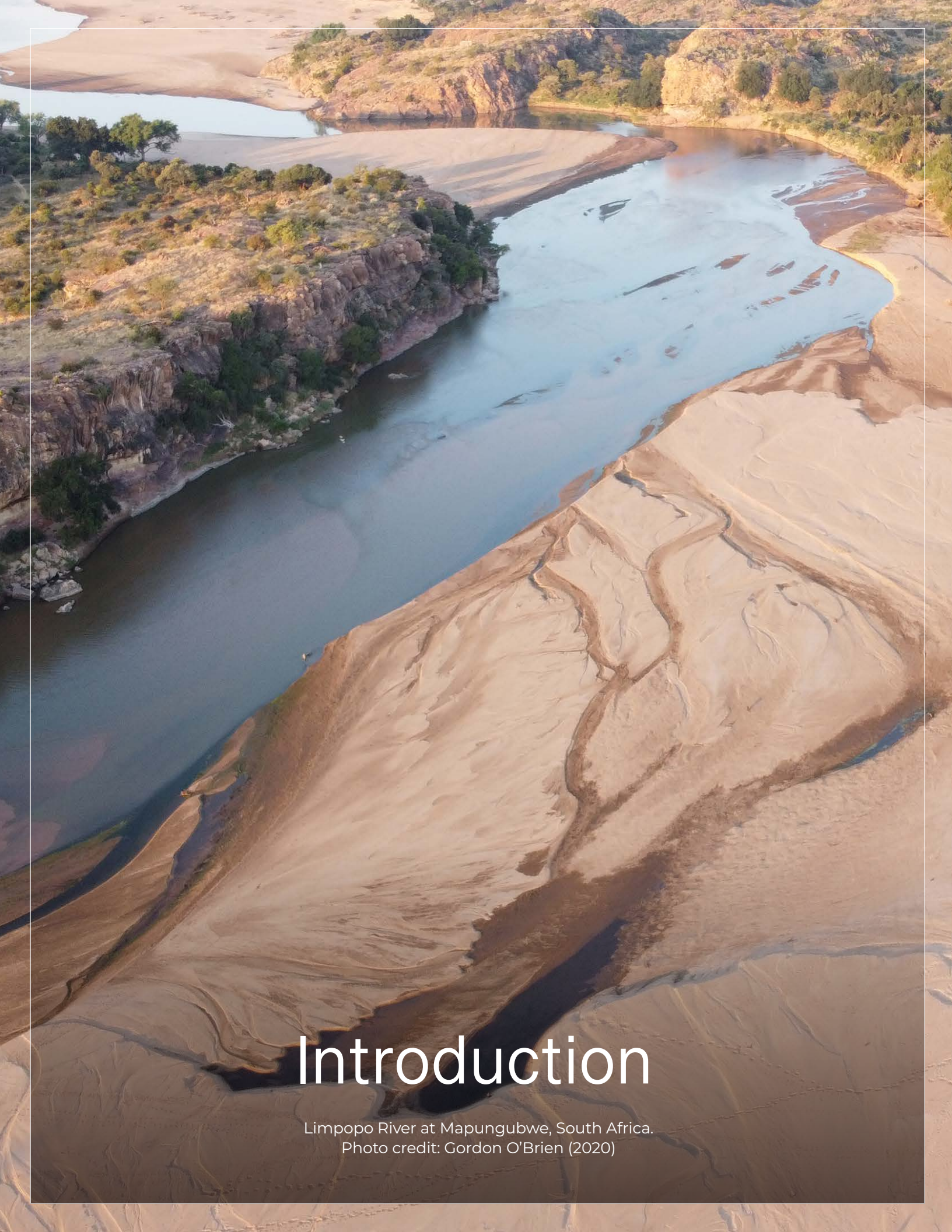
Outlook

- **Strong future growth is anticipated,** particularly in China and Europe, where policy stability, integration into national planning, and political commitment have created favorable investment environments. Elsewhere, future growth will depend on diversified financing and clearer demonstrations of water risk mitigation benefits.
- **Persistent structural barriers limit scale,** including unstable long-term funding, political turnover, fragmented institutions, and regulations that disadvantage nature-based solutions. Demonstrating the value of NbS and deploying integrated solutions remains a challenge, especially at the watershed scale, due to capacity constraints, limited data, and difficulties communicating long-term, distributed benefits to a variety of stakeholders.
- **Policy and financial integration is supporting NbS mainstreaming,** with more NbS being embedded into broader infrastructure plans, new revenue mechanisms emerging, and growing interest in monetizing co-benefits such as carbon and biodiversity to attract diverse investors. Public and political support for NbS also seems to be growing as increasing environmental crises are prompting governments and communities to take action.

Key Recommendations

Based on the report findings and their own experience, a group of experts and practitioners in the field developed recommendations to diversify and accelerate investment in NbS for water security. In summary, these are:

- 1. Build Reliable and Resilient Revenue Models:** Predictable, long-term funding is essential—particularly given rising risks to centralized public funding for NbS. While the scale of national funding will not be replaced by other payers in the short term, models that draw on direct beneficiaries of NbS, such as water users or property owners, show the greatest promise for durability and growth.
- 2. Strengthen Policy and Planning for Long-Term Impact:** Upstream policies and planning frameworks shape the feasibility and quality of NbS investments. Integrated strategies are critical to embed NbS into national infrastructure, biodiversity, water, disaster risk reduction, and other related agendas, finding synergy across sectors and ecosystem services, and attracting new partnerships.
- 3. Grow and Steer Private Investment to Highest-Value Use:** The private sector currently accounts for less than one percent of global investment in NbS for water security. While it won't replace public funding, private investment can play a catalytic role when strategically aligned, and public partners can help shape the enabling environment to channel this investment toward scalable, high-impact solutions.
- 4. Strengthen the NbS Delivery System and Evidence Base to Scale Impact:** Scaling investment in NbS for water security requires not just more funding, but a stronger delivery ecosystem—grounded in skilled professionals, trusted data, and compelling evidence of impact.
- 5. Empower Local Knowledge and Leadership:** Large-scale NbS programs often struggle to effectively engage local and Indigenous communities—despite these groups holding deep knowledge of ecosystems and playing a critical role in sustaining long-term outcomes. Successful, durable NbS requires their leadership from the start.



Introduction

Limpopo River at Mapungubwe, South Africa.
Photo credit: Gordon O'Brien (2020)

Introduction

Mní wičhóni. Wai Ora. Amman Imman. 水生万物. Across cultures and languages, traditional wisdom emphasizes the fundamental role of water in sustaining life. In modern society, freshwater remains just as essential. It serves as the lifeblood of our food, energy, technology, and transportation systems while sustaining the basic needs, health, and cultural fabric of our cities and communities.

Yet, water risks are escalating at an alarming rate. Approximately half of the world's population experiences severe water scarcity for at least part of the year, and 25 countries—home to one-quarter of humanity—face “extremely high” water stress every year (IPCC 2023; Kuzma, Saccoccia, and Chertock 2023; UN 2025). This water scarcity doesn't only impact local populations and businesses. More than half of global food production is in areas where water availability is in decline (GCE 2024).

Water risks also go well beyond water supply, encompassing disasters, declining water quality, and loss of freshwater biodiversity (Box 1). Indicators in those areas are also distressing. In 2024, water-related disasters like floods, landslides, and wildfires displaced over 40 million people and caused economic losses exceeding USD 550B. Over the past 50 years (1970-2020), freshwater populations have fallen 85 percent with dangerous tipping points fast approaching (WWF 2024).

Climate change is accelerating these risks. 2024 was the first full year with global temperatures exceeding 1.5°C above pre-industrial levels—marking a dangerous milestone in the worsening climate crisis (WMO 2024). Climate change is intensifying the water cycle, meaning that in many places, rainfall events are occurring in shorter periods and dry periods are longer, while natural sources of water storage like glaciers and snowpack are melting (IPCC 2023; UN 2025). For example, in 2024, record-high monthly rainfall events occurred 52 percent more frequently than in 2000, while record lows rose by 38 percent (Van Dijk et al. 2025).

These changes, especially when combined with population growth, are amplifying water scarcity, water-related disasters, and impacts on freshwater ecosystems (GCE 2024; UNEP 2024). Increasingly, these effects are also interacting in unpredicted ways, creating super fueled storms, wildfires, and other events that overwhelm existing risk management strategies (Cassin and Matthews 2021).

In the face of these accelerating and interacting water challenges, water managers, engineers, policymakers, and corporate leaders are re-evaluating conventional approaches to water management, including standalone investments in “gray” infrastructure (e.g., dams, levees, and treatment plants). This rethinking aims to strengthen the resilience of water systems so they are adaptive and capable of responding to shocks in ways that ensure essential services continue to be provided over the long term (Browder et al. 2019; Cassin and Matthews 2021). This rethinking is also expanding the scope of conventional water management to consider threats to water supply upstream of engineered intakes as well as a broader set of risks to water security (Brauman et al. 2007; World Bank 2023b; GCE 2024).

Increasingly, leaders around the world are finding nature to be a powerful ally in mitigating these risks. Healthy forests, wetlands, grasslands, free-flowing rivers, and well-managed agricultural lands play a vital role in regulating water (Brauman et al. 2007). Research has shown that natural systems can:

- Improve water quality by filtering pollutants and reducing erosion (Bonnesoeur et al. 2019; Croke and Hairsine 2006; Fox and Wilson 2010).
- Reduce runoff and flooding, enhance dry season flows, and recharge groundwater (World Bank 2023b; Mosquera et al. 2022; Immerzeel et al. 2020; Acreman and Holden 2013; Dadson et al. 2017; Kadykalo and Findlay 2016; Fletcher, Andrieu, and Hamel 2013).

Box 1: What is Water Security?

We understand water security broadly 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” (Gray and Sadoff 2007).

In this report, we analyze how NbS aim to enhance water security according to four key risks. These risks, based on the Organisation for Economic Co-operation and Development (OECD)’s 2013 framework for water security (OECD 2013), are:

- **Water scarcity**, including droughts and reduced water availability
- **Water excess**, encompassing minor to severe flooding and related hazards such as landslides
- **Inadequate water quality**, resulting from excessive pollutants, including sediments and chemicals
- **Threats to the resilience of freshwater systems**, including disruptions to natural flow regimes, sediment transport, fish migration, or other ecosystem processes, or reductions in the capacity of water systems to respond and adapt to shocks

By analyzing the specific water risks that NbS initiatives seek to address, we aim to provide insights into the motivations driving investment in NbS for water security.

- Support regular rainfall patterns through local and regional climate regulation (Schlesinger and Jasechko 2014; Van Der Ent et al. 2010).
- Reduce landslide, fire, and drought risk (Vanacker et al. 2022; UNDRR 2021; Vigerstol et al. 2024).

A study by The Nature Conservancy (Abell et al. 2017) has also shown that incorporating nature into water security strategies can increase resilience and deliver more cost-effective results over the long term. Restoring watersheds could make financial sense for approximately 1,000 large cities around the world, with one-sixth of those cities able to pay for restoration through savings in water treatment costs alone. When accounting for the full breadth of economic and ecological benefits, the argument for investing in nature becomes more pronounced. For instance, investments in nature to improve water supplies for those same cities could improve crop production for more than 28 million farming households. These urban source watersheds are also home to nearly two-thirds of the total carbon in above-ground biomass stored in tropical woody vegetation globally; more than three-fourths are in regions of high species diversity combined with high concentrations of species unique to those regions.

Nature-based Solutions (NbS): A Long-standing Practice with Growing Momentum

The growing recognition of nature’s enormous contributions to regulating water risks has led to the emergence of nature-based solutions (NbS) as a key complement to gray infrastructure to strengthen water security while delivering additional environmental and social benefits (Box 2).

Recent years have seen dramatic growth in interest in NbS for water security, particularly in the context of climate adaptation. In the past five years, influential development finance institutions including the World Bank, the Asian Development Bank, the European Investment Bank, the Inter-American Development Bank, and the African Development Bank have all published strategies and guidance for mainstreaming NbS in water and disaster risk reduction projects, especially within the lens of climate resilience. The [Kunming-Montreal Global Biodiversity Framework](#), adopted in 2022, specifically includes a target on restoring, maintaining, and enhancing nature’s contributions to people—including to address water risks—through NbS. The [Freshwater Challenge](#), a country-led initiative to restore and protect freshwater ecosystems in

Box 2: What Are Nature-based Solutions?

Nature-based solutions (NbS) are “actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (IUCN 2016).

While the term nature-based solutions is relatively new, the concept itself is deeply rooted in human history. Indigenous communities worldwide have long relied on nature-based practices to manage water—examples include terracing to control erosion, ridge systems to enhance wetlands, and canals and infiltration technologies to recharge groundwater (Cassin, Matthews, and Lopez-Gunn 2021). More recently, in the 1930s, the United States (US) government began working with farmers to implement conservation practices, like cover crops, to combat the major threat of desertification and soil erosion known as the “Dust Bowl.” These were the first actions of what would become multi-billion-dollar programs still thriving today (NRCS 2024). The late 1990s and early 2000s saw the adoption of a slew of new mechanisms explicitly integrating the concept of ecosystem services, from New York City’s watershed protection program in the Catskill Mountains to Quito’s utility-led water fund to China’s national eco-compensation programs and the first water quality trading programs incorporating nature-based credits (Daily and Ruckelshaus 2022).

Over time, a range of related concepts—such as natural infrastructure, green infrastructure, natural capital, ecosystem-based adaptation, and the ecosystem services approach—have gained traction. While each term carries unique nuances, they all include efforts to work with nature to regulate water flows, prevent and filter pollutants, stabilize soils, and strengthen the resilience of our water systems. All of these approaches recognize that effectively managing water risks depends on working with nature, not against it.

In this study, we focus on NbS that harness or replicate natural processes to improve water management (UN 2018). Examples of NbS interventions that are included in this scope include:

- Sustainable management of forests to enhance water and soil retention
- Restoration of riparian ecosystems to stabilize streambanks, reduce sedimentation, and reduce flooding
- Protection of natural wetlands to improve water quality and reduce flooding
- Constructing artificial wetlands to support water filtration and flood mitigation
- Forest restoration and prescribed burns to reduce wildfire risk and protect water quality
- Managed aquifer recharge that includes an ecological component, like terracing, infiltration trenches, or permeable micro-reservoirs associated with vegetation
- Rotational grazing on grasslands to reduce soil compaction and improve water infiltration and groundwater recharge
- Restoring a river or flood plain through dam removal
- Removing invasive species to restore ecosystem function and reduce water extraction

connection with national biodiversity, climate, and sustainable development strategies, has a membership including 49 countries and the European Union. International platforms, from the 2023 UN Water Conference to Stockholm World Water Week to the International Water Association (IWA) Water and Development Congress and the UN [CEO Water Mandate](#), now

prominently feature NbS in discussions and resolutions, signaling rising interest from water managers and policymakers. The 2024 report by the Global Commission on the Economics of Water further emphasized the critical role of nature in regulating the hydrological cycle and the detrimental impact that the loss of forests and wetlands have had on it (GCE 2024).

Despite this momentum, a critical question remains: **Is this global shift toward NbS for water security merely a passing trend in the global narrative, or does it represent a deeper transformation in water governance?** This study provides the most comprehensive, data-driven assessment in a decade to answer that question.

About This Report

This report examines the state of investment in NbS for water security. It builds on a series of similar reports produced by Forest Trends over the last 15 years, with the most recent being *Alliances for Green Infrastructure: State of Watershed Investment 2016* (Bennett and Reuf 2016). Like that report, this one provides insights into where and why NbS investments for water security are happening. To maintain analytical focus and a manageable scope, this report does not assess the quality or effectiveness of the design and execution of NbS interventions, nor does it evaluate the direct impacts of NbS interventions on water security outcomes. The report's full methodology is described on page 63 and summarized in Box 3.

The report's Global Overview section describes how investments in NbS for water security have grown and diversified over the past decade. We analyze the payers who are funding NbS, where investments are being implemented, what kinds of nature-based interventions are being funded, what types of water-related challenges they are addressing, and finance instruments that are attracting capital to these efforts. We also examine five main investment mechanisms used to channel funds, largely following those set out in Bennett and Reuf (2016):

- **Public incentives for landholders** are large programs typically operating at national or supranational scales that primarily pay farmers and other landholders to improve land management practices for conservation outcomes with water benefits.
- **Other public good investments in watersheds** include public natural infrastructure projects that may not provide a direct benefit to payers, but rather, generate a greater public good. These include grants to farmers and community groups and projects funded by foreign assistance and multilaterals.

They are typically implemented through projects at the national or regional scale.

- **User-driven watershed investments** channel funds from water users or infrastructure managers—such as water utilities, companies, or cities—to landholders or other parties to support watershed conservation, restoration, or management. Resources can be channeled directly or through intermediary platforms, like a water fund or public agency. In contrast with the prior category, the motivation for these investments tends to be to manage water risks that directly affect the operations of the payer, and these investments tend to occur at the local or watershed scale.
- **Water quality trading and offset markets** are mechanisms that enable water users to meet regulatory or sustainability targets by funding offsite actions, typically by other land or water users, that improve water quality. These improvements are quantified into credits or similar units, which are exchanged within a defined watershed-based market. Most trading mechanisms are driven by regulatory compliance, though some operate on a voluntary basis.
- **Environmental water markets** are mechanisms that facilitate the purchase or leasing of water rights to sustain freshwater ecosystems and their functions. Typically, a public good provider like a government or foundation will acquire rights in order to prevent the water from being extracted.

Next, the Trends by Geography section dives into the scale, structure, and trends of NbS investments for water security on a region-by-region basis. In this section, as in the Global Overview, China is disaggregated from the rest of Asia, given its outsized role in driving global investments in NbS for water security.

The Outlook section of the report describes major drivers and challenges anticipated to shape the future of investment in NbS for water security.

At the end of this publication, readers will find a series of key recommendations to strengthen, diversify, and accelerate investments in NbS for water security. These recommendations were developed with the report's Advisory Group, who represent a range of global expertise and experience.

Box 3: Key Methodological Notes

This report tracks global investments in NbS for water security from 2013 to 2023. It includes 1,645 programs and projects—referred to collectively as “initiatives”—across 140 countries that implemented on-the-ground interventions in terrestrial, freshwater, or brackish ecosystems with explicit water security objectives. Projects are defined as time-bound efforts with specific deliverables, while programs coordinate multiple related activities over longer timeframes.

Many initiatives have mixed “green” and “gray” activities. If the initiative’s main purpose was to implement NbS for water security, all expenditures were included. If the initiative’s main purpose was not to implement NbS for water security (e.g., gray infrastructure projects that include some NbS interventions), only the NbS for water components were included. In the latter case, if the portion of expenditures attributable to NbS interventions could not be confidently estimated, the initiative was excluded. For programs with mixed objectives, the numbers cited in parentheses within the report are the estimated expenditures for the NbS for water component.

Reimbursable financing is counted as spending by the recipient (e.g., loans), while non-reimbursable funds are attributed to the funder (e.g., grants). Initiatives were carefully screened to avoid double counting across nested programs and co-funded efforts.

The analysis distinguishes between payer and initiative scales using consistent terms: national (central governments), regional (states, provinces), local (municipalities, watersheds), and subnational (a combination of regional and local). Data were collected through surveys, interviews, and secondary sources including public databases and donor reports. Investments are reported in USD using 2023 exchange rates. All data reported in parentheses are 2023 expenditures, unless otherwise noted.

The estimates of investments in NbS presented in this report are inherently conservative, especially regarding smaller, local, and privately funded investments. While data gaps exist, the dataset provides a robust foundation for analyzing global trends in NbS investments.

For more information on the scope and approach to data collection and analysis that informed this report, see Section 5: Methodology, page 63.

A photograph showing three people from behind, walking up a grassy hillside. They are carrying large pots of green seedlings with red tags on their heads. The person on the left is wearing a red and blue patterned shirt and blue pants. The person in the middle is wearing a light blue long-sleeved shirt and light green pants. The person on the right is wearing a light brown long-sleeved shirt and dark pants. They are all wearing rubber boots. The background is a vast, hazy green forest covering a mountain range. The sky is overcast and grey. The overall mood is one of environmental stewardship and restoration work.

Global Overview

Transporting seedlings to planting sites as part of the Guandusaca and Palmichal Micro-watershed Restoration Project, San Pedro de La Sierra, Magdalena, Colombia.
Photo credit: Corporación Paisajes Rurales (2021). Submitted by WWF-Colombia.

Global Overview

Global Investment in NbS for Water Security Doubles Over the Past Decade, Reaching USD 49B in 2023

In 2023, global investment in NbS for water security reached at least **USD 49 billion (B)**, marking a twofold increase in investment since 2013 (Figure 1). Around the world, governments,

utilities, companies, civil society, and local land users are increasingly understanding the value nature provides to managing water-related risks like floods, scarcity, and contamination. This growing awareness is driving greater funding and tangible action to protect, restore, and manage the ecosystems that are essential for water security.

Figure 1. Growth in Investment in NbS for Water Security by Geography, 2013-2023

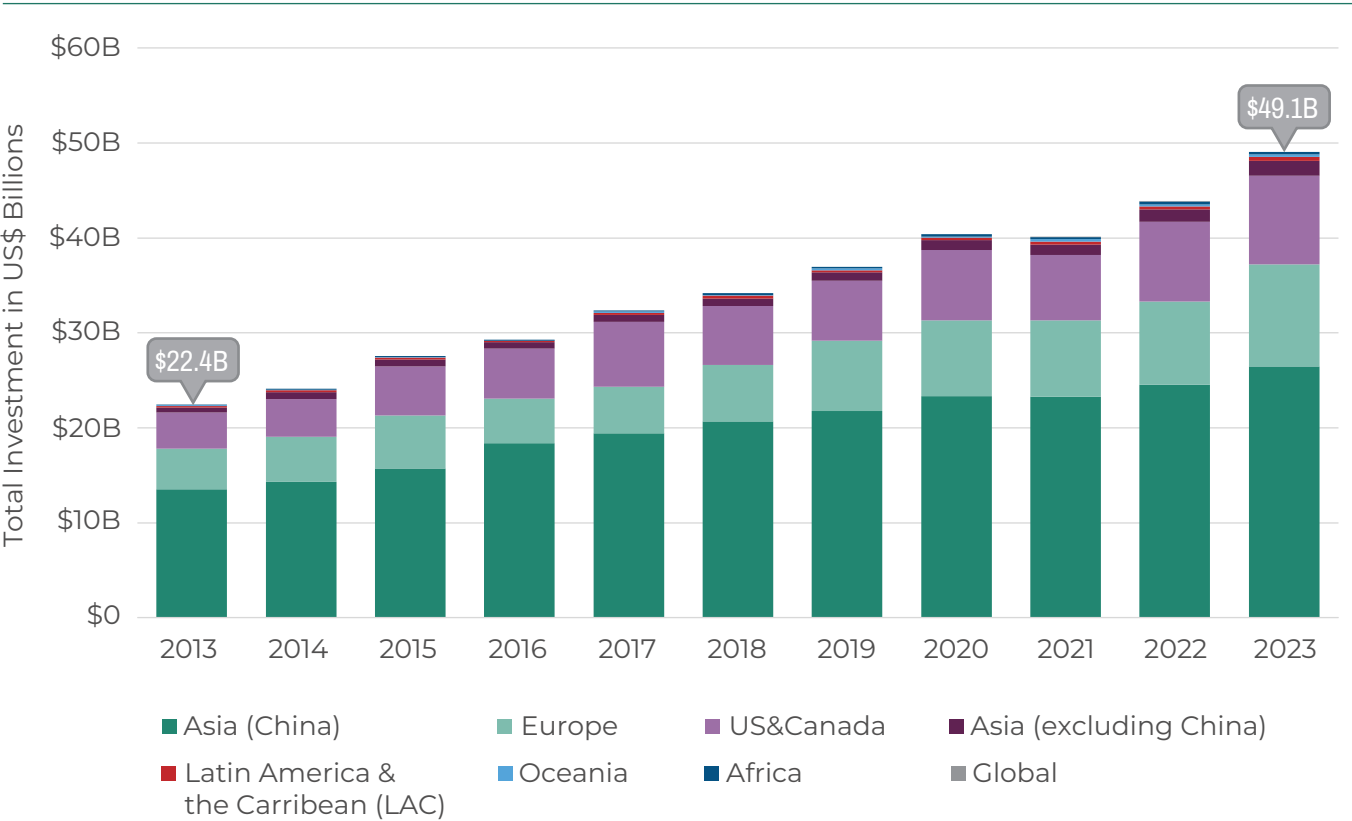


Table 1. Value and Count of Initiatives Investing in NbS for Water Security by Geography, 2023

Geography	Asia (China)	Europe	US & Canada	Asia (Excluding China)	LAC	Oceania	Africa	Total
# of Initiatives*	77	122	135	78	360	24	85	881
Volume 2023	26.4B	10.8B	9.3B	1.6B	390M	261M	288M	49.1B
% of Global (2023)	54%	22%	19%	3%	0.8%	0.5%	0.4%	100%
Rate of Growth (2013-2023)	2.0x	2.5x	2.5x	3.1x	2.4x	3.4x	5.1x	2.2x

*Initiatives with expenditures recorded in 2023.

Investments in NbS for water grew across all geographies over the last decade, but three major economies—China, the United States, and the European Union (EU)—dominated the landscape, accounting for 94 percent of global investment in 2023.

China alone accounts for 54 percent of the global investment volume in 2023 (USD 26.4B), more than the combined total of all other countries. A major catalyst for this scale of investment was the country's exposure to major water-related disasters—particularly the devastating droughts and floods of 1997 and 1998—which exposed systemic weaknesses in watershed management and galvanized national action (World Bank 2021). In the aftermath, Chinese leadership prioritized large-scale ecological restoration and governance reforms to realign incentives and improve oversight, especially regarding water resources. High-level political support has been sustained in part by Xi Jinping's "Two Mountains" philosophy, which frames environmental health as a vital asset for sustained economic development (see more in Trends by Geography, page 41).

Outside of the "Big Three" (China, EU, US), investments by other countries are growing at an even faster rate. The most rapid growth occurred in Africa and Oceania (Table 1).

In 2023, NbS for water security were implemented through over 880 initiatives worldwide (Table 1). Around the world, these investments were implemented at all scales, but national-scale initiatives drive most of the funding. As shown in Figure 2, national initiatives account for 69 percent

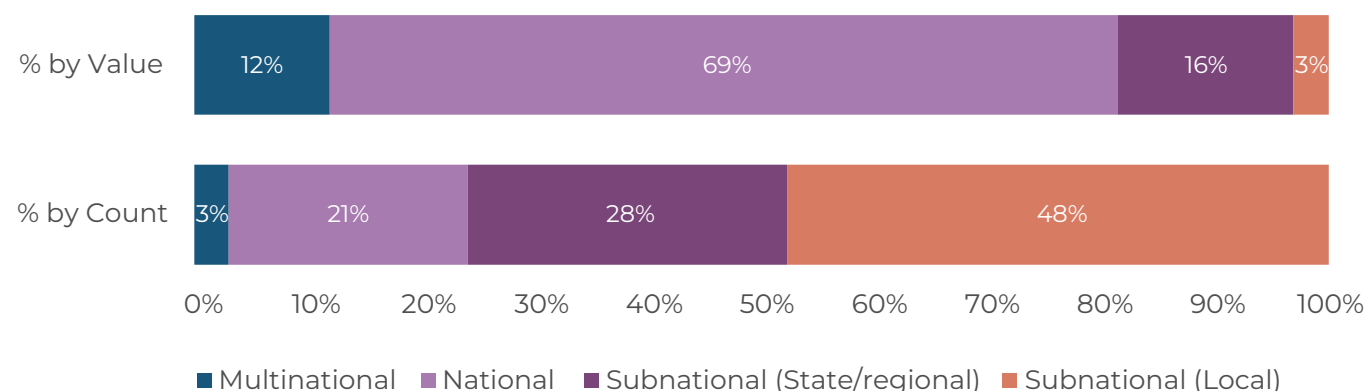
of spending despite representing only 21 percent of initiatives. In contrast, local initiatives, which make up almost half of all initiatives, contribute just 3 percent of total investment volume. These local initiatives are a multitude of smaller, place-based initiatives designed to address specific local challenges, with average spending of USD 2M in 2023, compared to an average of over USD 100 million for national-scale investments. The local efforts rely on diverse payers, including governments, philanthropy, and private actors.

Multi-national initiatives, such as the EU's [Agricultural Fund for Rural Development](#) or the World Bank's [Groundwater for Resilience project in the Horn of Africa](#), account for 12 percent of funding mobilized for NbS for water. These multi-national investments have decreased slightly over the last decade.

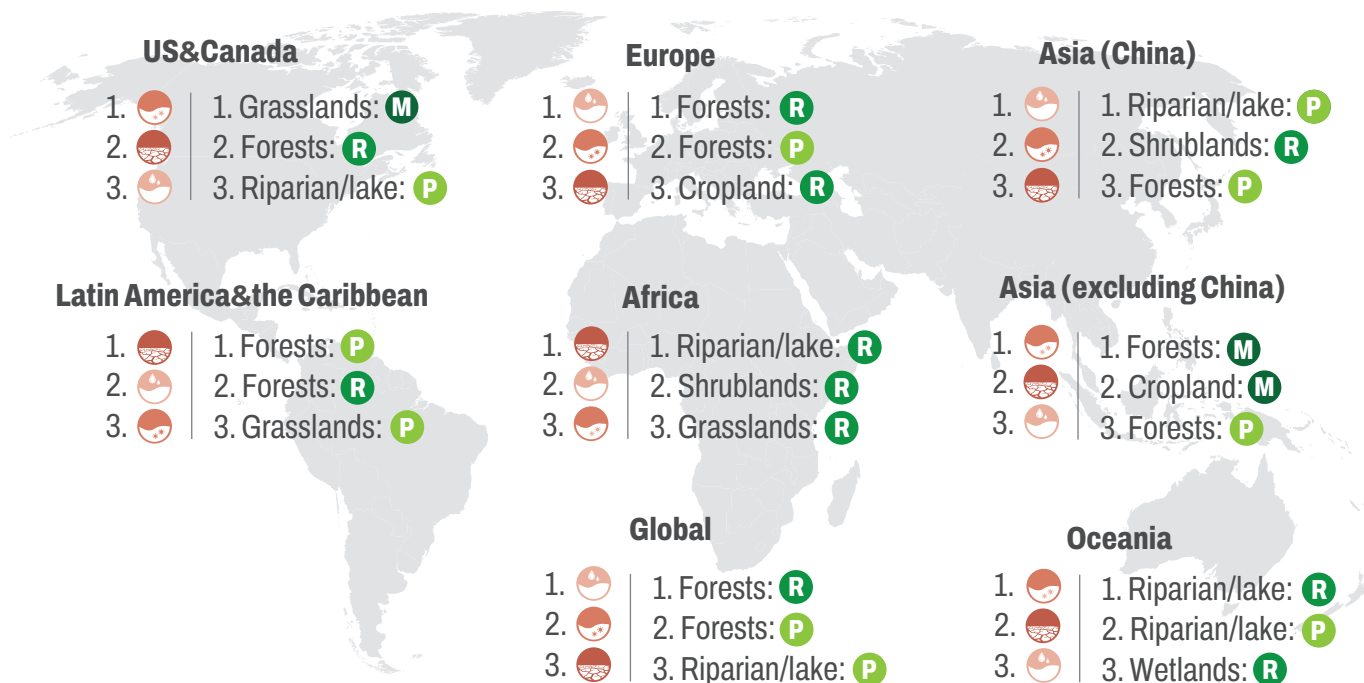
Forests and riparian or lake ecosystems were the ecosystems most supported by investments globally. Other ecosystems which were only common in certain geographies include: grasslands (Africa, LAC, and the US), shrublands (Africa and China), and wetlands (Oceania) (Map 1).

These investments respond to a wide range of water risks globally (Map 1). Globally, the risk of excess—i.e., flooding—was the water risk that drove the most investment in NbS, followed by risks to water quality. Investments in China and Europe followed the global trend, while in Africa and Latin America & the Caribbean investments prioritized reducing risk of scarcity. Inadequate water quality was the top concern in Asia outside of China, Oceania, the US and Canada.

Figure 2. Scales of Initiatives Implementing NbS for Water Security, 2023



Map 1. Global Investment in NBS for Water Security, Interventions and Water Security Objectives by Geography, 2023

**Water security objectives:**

- Reducing risk of excess (including floods)
- Reducing risk of inadequate quality
- Reducing risk of shortage (including droughts)

Intervention types:

- Protection/Conservation
- Restoration/Rehabilitation
- Management, enhancement or creation of natural processes in modified or artificial ecosystems

In addition, over half (53 percent) of the initiatives also reported reducing the risk of undermining the resilience of freshwater systems.

Payers

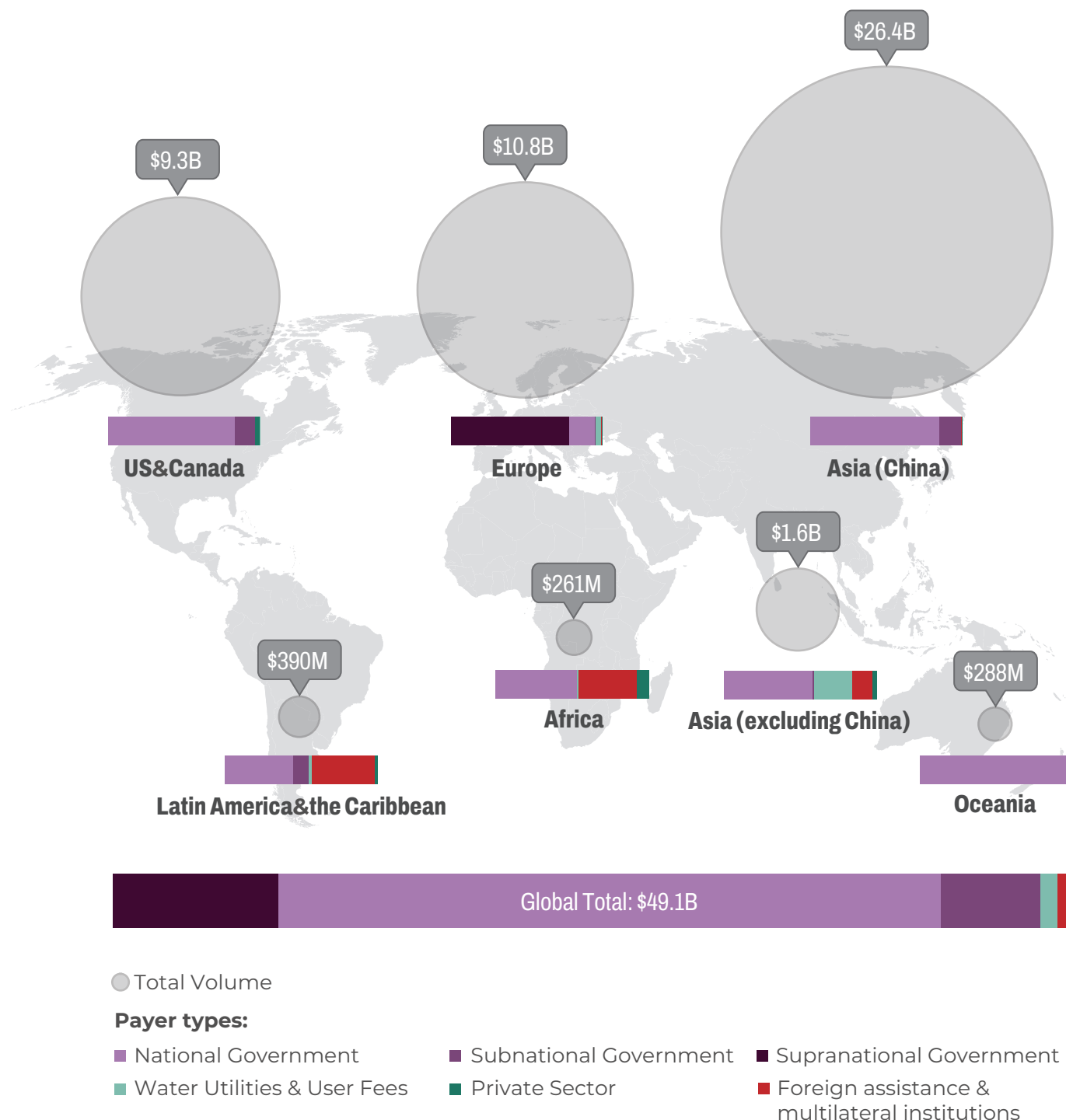
Investments in NbS for water are dominated by governments investing domestically, the bulk of which come from national governments (Map 2). Investments by other actors—including **public and private utilities, foreign assistance and multilateral institutions**, and the **private sector**—make up a small percentage of overall investment but are growing at faster rates (Table 2). An analysis of global investments by payer type is presented below, followed by an analysis of the various mechanisms through which they channel their investments.

Governments Investing Domestically Drive 97 percent of Global Investments, Led by National Governments

Investments in NbS for water are dominated by governments investing domestically (**USD 47.4B**, and 97 percent of all investment), as is most funding for nature and climate adaptation (UNEP 2023a; 2023c). All levels of government investment (supranational, national, and subnational) have grown at similar rates, between 2 and 2.2x over the last decade.

National governments (USD 33.8B) provide the bulk of funding. China continues to lead here, with its National Key Ecological Function Zones Transfer Payments accounting for USD 9B in 2023. These payments are made from national to

Map 2. Global Investment in NbS for Water Security Including Volume and Payers by Geography, 2023



local governments to compensate for restrictions on development resulting from the designation of an area as a key ecological zone, based on a combination of environmental indicators including water quality and forest area (World Bank 2021). Other large national programs include

the [US Chesapeake Watershed Agreement](#) (USD 2.2B) and the [Netherlands' Delta Programme](#) (USD 1.7B). Rapidly growing programs include New Zealand's [Jobs4Nature Programme](#) (13x growth since 2018) and [Japan's Forest Environment Fund](#) (5.6x growth since 2019).

Table 2. Growth in Investment in NbS for Water Security, by Payer Type, 2013-2023

	Payer Type						
	Government			Water Utilities (public & private) & user fees	Foreign assistance & multilateral institutions	Private Sector	Grand Total
	Supra-national	National	Sub-national				
2013	4.2B	15.4B	2.3B	253M	47M	9.3M	22.3B
2023	8.5B	33.8B	5.1B	867M	489M	345M	49.1B
% of Global (2023)	17%	69%	10%	2%	1%	0.7%	100%
Rate of Growth (2013-2023)	2.0x	2.2x	2.2x	3.4x	10x	37x	2.2x

Supranational government spending (USD 8.5B) is exclusively led by the EU. Primary funding instruments include the [European Agricultural Fund for Rural Development](#) (USD 5.7B), the [Cohesion Fund](#) (USD 2.6B), the [European Regional Development Fund](#) (USD 125M), the [LIFE programme](#) (USD 100 M), and [Horizon Europe](#) (USD 10.4M). The Cohesion Fund and Horizon investments are the fastest growing programs, each with 2.5x growth over the last five years. Details on each of these programs are provided in Trends by Geography (page 46).

Subnational government investment (USD 5.1B) includes investments by regional (84 percent) and local (16 percent) governments. China leads this category (USD 3.8B) with its ecological compensation programs funded by provincial or municipal finance bureaus. The US comes in second (USD 1.2B), led by California's [Forest Carbon Plan](#) (established in 2018), which is part of a new USD 2.7B initiative that aims to reduce wildfire risk while delivering benefits for climate adaptation, water security, and climate change mitigation. Peru also had notable growth in investments by subnational governments starting in 2015 due to changes in its public investment system, including regulations that explicitly recognize natural infrastructure as infrastructure (Benites and Gammie 2022). The countries with the fastest growing subnational investments over the last five years are the US (7.7x), Mexico (7.5x), and Ecuador (5.9x).

Despite the upward trend, these public investments across levels of government (USD 47.3B) are less than three percent of the total value of environmentally harmful public subsidies estimated by UNEP (USD 1.7 trillion in 2022) (UNEP 2023b). This disparity underscores the urgent need to reform harmful subsidies to eliminate threats to nature that drive degradation.

Water User Fees Drive Local Investment

Investments funded by water user fees have grown 3.4x over the last decade, reaching at least **USD 867M** (two percent of all investment) in 2023. These investments, which are usually managed by water utilities or public agencies, grew faster than investments by governments (Table 2). Notable examples of investments by water users managed by public agencies include:

- France's [six water agencies](#), which have been investing user fees in restoration efforts using NbS since 2018. Together, they invested an estimated USD 446M in 2023.
- In South Korea, water-user fees fund four river basin management funds (established 1998-2000), which together invested an estimated USD 268M in 2023.
- Vietnam's [Payment for Ecosystem Services Program](#) (established 2008), funded by various water users (primarily hydropower production facilities), invested an estimated USD 115M in 2023.

- In Colombia, [fees on water users](#) have been collected since 1993 and are used to cover water resource management, including an estimated USD 3.3M for the protection and restoration of water resources in national parks and conservation areas in 2023. These fees are set by the Ministry of Environment and Sustainable Development and collected by regional and municipal environmental authorities.

Other countries, such as the US, Japan, the United Kingdom (UK), Ecuador, and Peru, saw growing involvement by water utilities. In Peru, 43 of the country's 50 public water utilities have begun to implement initiatives to invest in their basin headwaters, including the use of Indigenous practices for groundwater recharge (SUNASS 2022). Emerging initiatives, like Australian water utility [Coliban Water](#)'s efforts to improve the health of the Coliban River, reflect utilities' growing role in driving localized NbS initiative.

Investments by Multilateral Institutions Grow 10x

Note: This section includes investments through non-repayable instruments by foreign assistance and multilateral institutions (e.g., grants and procurement). Disbursements through loans and other repayable instruments by the same entities are considered spending by the borrowing entity (usually national governments) and included in the corresponding category rather than in this section.

Direct investments through non-repayable instruments by foreign assistance and multilateral institutions have increased 10x over the last decade, reaching **USD 489M** in 2023. While most of these investments targeted Asia, the fastest growth took place in Latin America and the Caribbean.

Investments from multilateral institutions accounted for 98 percent of this category. In 2023, these investments were led by the Global Environment Facility (USD 187M), Green Climate Fund (USD 170M), and World Bank (USD 52M). On the other hand, investments by bilateral development agencies make up only two percent of this category. While we have seen growth in these bilateral investments over the last decade, changes in national priorities around the world have begun to reduce these

investments, including the redirection of budgets to respond to the COVID-19 pandemic, as well as food and energy security impacts of the war in Ukraine. Several countries have recently reduced budgets of their overseas development programs, including Germany, the UK, Finland, Sweden, and the US (Donor Tracker 2024; Loft and Brien 2025; OECD 2024b; Donor Tracker 2023). In early 2025, the US terminated 83 percent of foreign assistance contracts representing tens of billions of dollars and terminated or put on leave nearly all of its 4,700 full-time positions (Schreiber 2025; Tanis and Schreiber 2025). These impacts affect a wide range of development work, including direct investments in NbS for water and indirect investments in their enabling conditions.

Private Sector Investment Grows Rapidly, Driven by Regulation

The private sector is the fastest growing segment in our dataset, increasing over 30x over the last decade to reach **USD 345M** in 2023. Despite this rapid growth, it still represents less than one percent of global investment in NbS for water. This limited share reflects a fundamental challenge: private investment in NbS is often constrained by the inherently public nature of the benefits these projects provide. As the World Bank notes, infrastructure that mitigates flooding or coastal storms, for example, rarely generates the predictable revenue streams needed to attract private capital (World Bank, 2024). Nevertheless, the recent surge in private funding signals a growing recognition among companies, foundations, and individual investors of their exposure to water-related risks and the role that NbS can play in enhancing long-term resilience. This section includes such private investments (investments made by private utilities are included under "Water User Fees Drive Local Investment" above, page 21).

The majority of private investment in NbS remains regulation-driven. In 2023, more than two-thirds of private investment (USD 239M, 69 percent) was required by regulation or done with private funds as a result of regulation. The largest investment with private funds was made through a regulatory mechanism focused on emissions reductions, the [California Climate Investments](#) program (established in

2012). Under California's Cap and Trade system, regulated companies purchase emission allowances to comply with regulations (e.g., electric utilities, oil and gas companies, and other industrial facilities). Profits generated from the sale of these allowances are then used to fund initiatives that reduce greenhouse gases. Out of USD 1.7B implemented by the program in 2023, we estimate USD 222M was spent on NbS initiatives that included water security objectives (California Climate Investments, n.d.).¹ Water quality trading markets are another important mechanism for motivating and channeling private investment in NbS, as they help companies meet regulatory requirements.

Legal obligations are also fueling litigation that is unlocking significant private funding for NbS linked to water-related damages. While not new, the scale of recent settlements and awards reached in the US is notable. In New Jersey, 3M agreed to a USD 450M settlement after PFAS contamination impacted wetlands and aquatic ecosystems; much of the funding will support ecosystem restoration. In Louisiana, a USD 744M verdict was entered against Chevron for wetland loss tied to coastal drilling, with over USD 500M expected to be directed to wetland restoration.

Voluntary private investment in NbS for water is also increasing, including investments by companies (USD 89M) and foundations (USD 16M). As part of corporate water stewardship and sustainability strategies, many beverage and technology companies have established volumetric water benefit targets; NbS investments that generate water benefits delivered to ecosystems and communities can help to deliver on these targets (Water Action Hub 2024). While not all of their investments are represented in this report, beverage companies including The Coca-Cola Company, PepsiCo, Starbucks, and Anheuser-Busch InBev, and technology companies including Microsoft, Google, Meta, and Amazon, have set water stewardship targets that are translating into

investments in NbS (Erickson 2023). In 2023, investments from these two sectors alone totaled over USD 19M.

The largest voluntary private investment in NbS for water in the last decade we have identified comes from a large landholder outside the corporate sector. The [Punalu`u Stream Restoration Project](#), a USD 21.7M project in Hawai`i, executed USD 8.5M in 2023. The project was led by Kamehameha Schools, a private educational system founded by Bernice Pauahi Bishop, a member of the Hawaiian royal family that aims to create educational opportunities in perpetuity to improve the capability and well-being of people of Hawaiian ancestry. Motivated by a combination of stewardship values rooted in the native Hawaiian tradition and flood risk reduction, the initiative restored the Punalu`u stream, floodplain, and estuary, replanted over 50,000 native Hawaiian plants and trees, created a new elevated road, and engaged the local and Native Hawaiian community in the implementation of the project.

As discussed in Box 3 (page 15) and Methodology (page 63), we recognize that these estimates of voluntary private investments are conservative, given the challenges collecting data on this sector. Many companies declined to submit data for this report, due to confidentiality concerns or limited resources. Nonetheless, we are confident that the identified trends, such as the growth of the sector and the relative scale of corporate voluntary investment and public-private efforts to public sector investment, are robust.

Mechanisms

This report categorizes NbS investment into five mechanisms: **public incentives for landholders, other public investments for a public good, user-driven watershed investments, water quality trading and offsets, and environmental water markets** (See Introduction, page 14).

Public incentives for landholders accounted for 48 percent of investment in 2023 (USD 23.4B) (Figure 3). Other public good investments in watersheds equaled roughly the same amount (USD 23.7B) and are growing at the fastest rate compared to any other mechanism (Table 3). User-driven investments account for four percent

¹ This estimate includes expenditures under relevant programs, including the Forest Health Program, Fire Prevention Program, Forest Carbon Plan Implementation, Climate Adaptation and Resiliency Program, Healthy Soils Program, Wetlands Restoration for Greenhouse Gas Reduction Program, and Regional Forest and Fire Capacity.

of investment (e.g., by cities, companies and other water users). Water quality trading and offsets and environmental water markets initiatives, the most “market-like” mechanisms in terms of having standardized units of trade and prices subject to the forces of supply and demand, remain a small portion of the total investment volume (less than one percent).

Public Incentives for Landholders: The Backbone of Investment in Nature for Water Security

Almost half of the total investment volume in NbS for water in 2023 was through public incentives for landholders (**USD 23.4B**), which pay farmers, foresters, and other landholders to improve land management practices for

Figure 3. Volume of Investment in NbS for Water Security by Mechanism Type, 2023

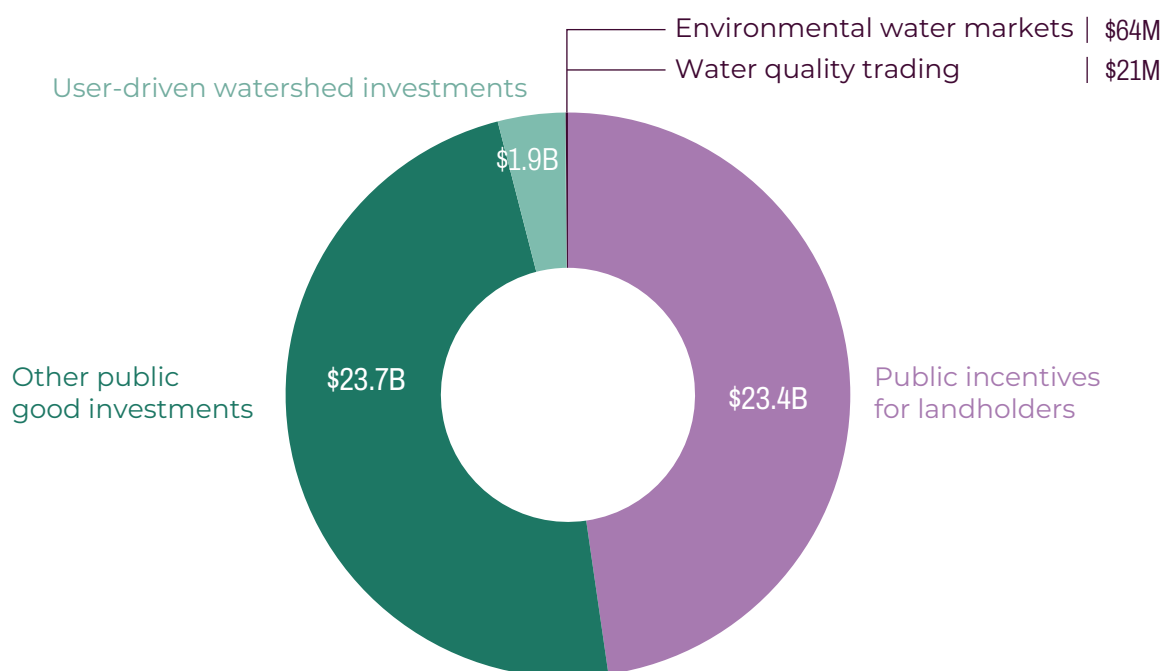


Table 3. Growth in Investment in NbS for Water Security by Mechanism Type, 2013-2023

	Public incentives for landholders	Other public good investments	User-driven watershed investments	Water quality trading and offsets	Environmental water markets
# of Initiatives*	21	607	229	6	8
Value in 2013 (USD)	14.4B	7.2B	642M	6M	93M
Value in 2023 (USD)	23.4B	23.7B	1.9B	21M	64M
% of Total (2023)	48 percent	48 percent	4 percent	<1 percent	<1 percent
Growth (2013-2023)	1.6x	3.3x	2.9x	3.3x	0.7x
Average size per initiative (USD)	1.1B	39M	8.2M	3.5M	7.9M

*While the number of water quality trading or environmental water markets initiatives has decreased since our 2016 report (Bennett and Ruef 2016), this is not necessarily an indication that there are fewer active initiatives but may be attributed to a change in scope. This report does not include certain initiatives in the 2016 report such as mitigation banking initiatives, urban stormwater initiatives, and initiatives that do not include NbS.

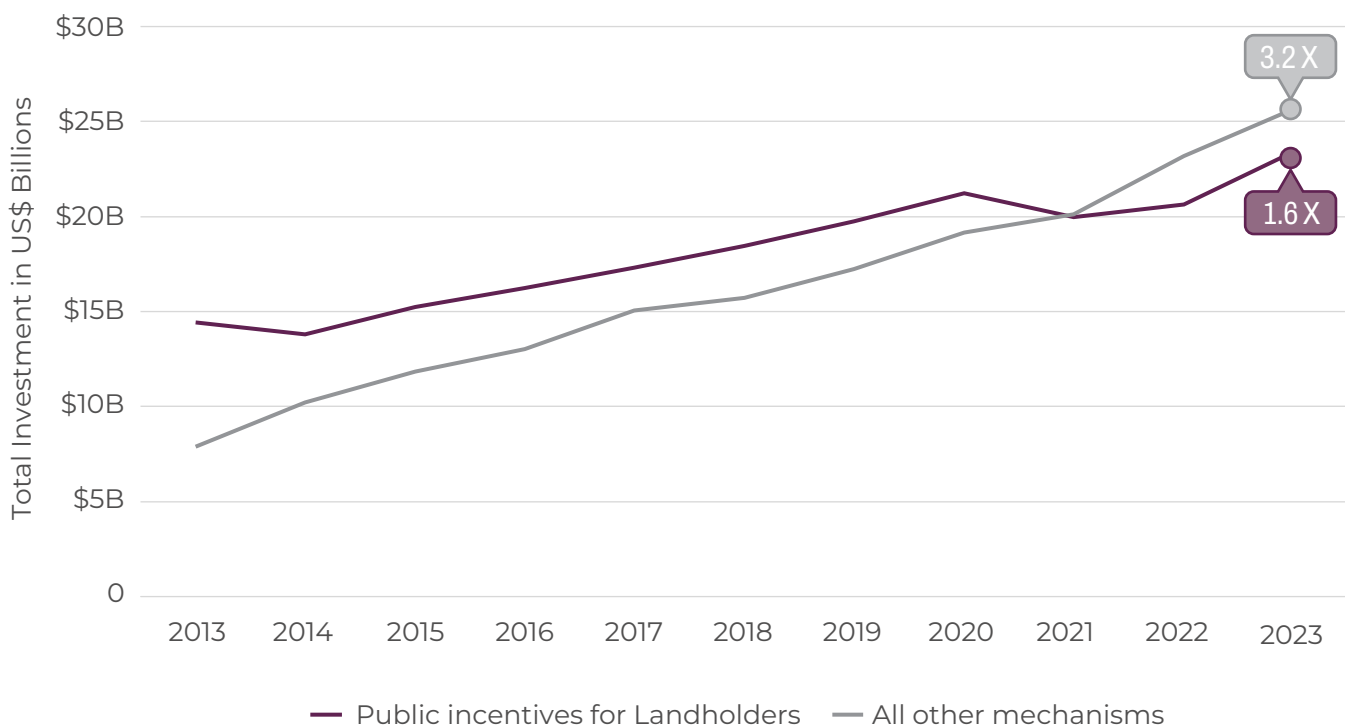
conservation outcomes with water benefits. These initiatives are typically large, publicly funded programs operating at national or supranational (in the case of the EU) scales. They usually provide incentives for voluntary actions but, in some cases, provide compensation for activities required by law. Their substantial annual budgets drive significant investment, averaging USD 1.1B per program in 2023. With many landholder incentive programs in place since the 1990s or early 2000s, they have proven to be reliable long-term funding sources for NbS at scale. This report documented 21 landholder incentive programs, including seven programs in China, seven in the United States, six in Latin America and the Caribbean, and one in Europe.

As shown in Figure 4, public incentives for landholders have been an influential driver of NbS for water security since the beginning of the decade; these programs have remained stable, albeit with slower growth compared to other mechanisms. While landholder incentive programs led investment volumes in 2013, by 2021 all other mechanisms combined surpassed them in total volume.

Globally, landholder incentive programs typically prioritize forests and forestry practices, reflecting the critical role of forests for water security. Vietnam's Payment for Ecosystem Services Program exemplifies this focus. Funded by a fee on hydropower plants, tourism companies, and other beneficiaries of ecosystem services, the program compensates landholders and communities for forest protection. Since its creation in 2008, it has grown 2.3x in annual value, outpacing the global average growth rate for landholder incentive programs. Its expenditures temporarily decreased in 2021, as reduced demand for electricity during the COVID-19 pandemic, combined with lower-than-normal reservoir levels, reduced the fees generated by hydropower plants that year.

Likewise, Mexico's [Payment for Environmental Services Program](#) has been a flagship initiative since it launched in 2003, offering incentives for landowners to preserve forests and protect vital water sources. Since 2008, the nationally funded program has prioritized funding for areas where local governments and other entities provide matched funding (Rodriguez, Pfaff, and Shapiro

Figure 4. Global Investment Value in NbS for Water Security: Public Incentives for Landholders versus Other Mechanisms, 2013-2023



2015). In 2021, the program spent nearly 4x more than it had in the preceding or following year, contributing to the sharp increase in spending observed in Latin America.

Following forestry, the largest portion of global spending on landholder incentives supports interventions related to food production, including best management practices for ranching, agriculture, and agroforestry. The EU's European Agricultural Fund for Rural Development (established in 2005) incentivizes improved farming and ranching practices through its financing of national rural development programs. The fund has explicitly recognized the preservation of ecosystems as a priority since 2013, and supports NbS practices like agroforestry, regenerative agriculture, and sustainable forestry practices.² Similarly, in the US, various programs led by the [Natural Resources Conservation Service](#) (NRCS), including the [Environmental Quality Incentives Program](#) established in 1976, pay landholders to integrate conservation into working lands. The NRCS's [Conservation Stewardship Program](#), operated by the US Department of Agriculture, offers financial and technical support to farmers and landowners to implement a range of conservation practices on their land. It has recently expanded its list of conservation practices with additional NbS like creating and restoring wetlands, maintaining vegetative soil cover, and terracing.

Another flagship example, China's Conversion of Cropland to Forests and Grasslands Program, pays farmers annual incentives to retire farmland and plant trees on highly erosive croplands or other areas prioritized for watershed health. Since it started in 1999, this program has bridged the focus on farmers and forests and continues to be one of the world's largest reforestation initiatives.

Globally, the largest share of spending by landholder incentives targets reducing risk of flooding. In China and the US, where this investment is primarily channeled through incentive programs for farmers, water quality is the primary water security risk.

Overall, while public incentives for landholders are growing, they remain a drop in the bucket compared to overall public support to farmers, which is estimated to be at least USD 842B per year (OECD 2024a).

Fastest Growing Mechanism: Other Public Good Investments Outpace Landholder Incentives

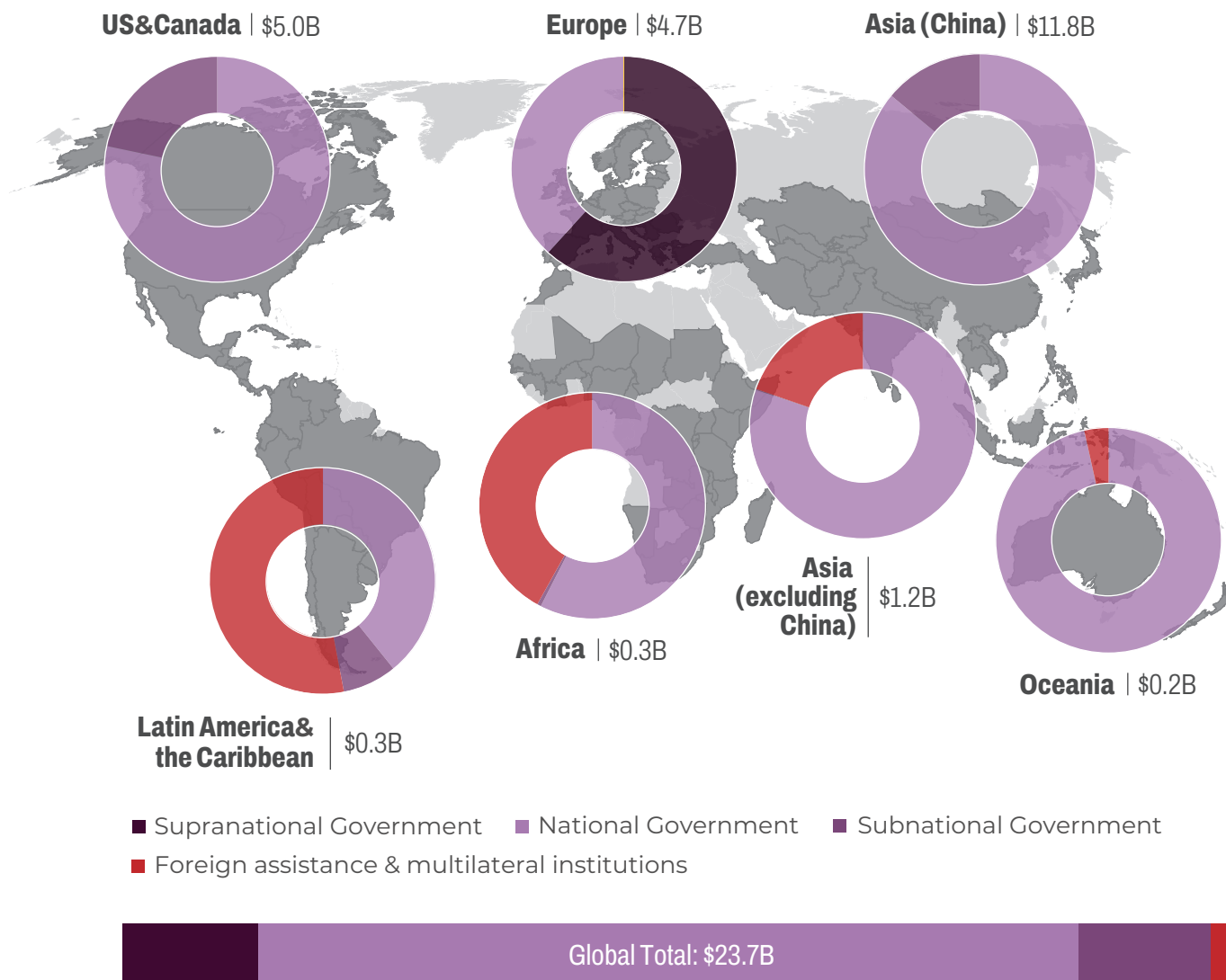
Apart from landholder incentives, other investments by governments acting on behalf of the public good was among the fastest-growing mechanisms, having grown over 3.3x over the last decade. As the fastest growing mechanism type tracked, these investments (**USD 23.7B**) include over 600 different initiatives funded by supranational, national, and subnational governments as well as bilateral foreign assistance agencies and multilateral institutions (Map 3). Unlike landholder incentives, which are characterized by fewer large-scale programs, these other investments tend to involve smaller initiatives averaging USD 39M each, which tend to emphasize local interventions and adaptability, leading to a higher diversity of designs.

These investments include direct public investment in natural infrastructure, often by national or subnational governments, which are increasingly using hybrid approaches to invest in NbS alongside gray infrastructure. For example, through its Delta Programme (established in 2011), the Netherlands invests in the restoration of floodplains to protect the country against flooding and to ensure the availability of its freshwater supplies. National and regional authorities work together to implement NbS alongside engineered structures such as locks, dams, and storm surge barriers. In Peru, regional and municipal governments have implemented over 200 NbS projects with water objectives, including restoring degraded watershed ecosystems and maintenance of permeable micro-reservoirs combined with revegetation. These projects are implemented using the same public investment system used for roads, schools, and other public infrastructure.

Grant funding is another example of other public good investments. For example, Australia provides grants to farmers and community groups to prepare for drought through its [Future](#)

² The 2014-2020 programming period established "restoring, preserving and enhancing ecosystems" as one of six key priorities. The Common Agricultural Policy, which includes the EAFRD, includes "preserve landscapes and biodiversity" as one of 10 priority objectives from 2023 to 2027 (European Commission, n.d.).

Map 3. Other Public Good Investment in Watershed Protection by Payer Type, 2023



[Drought Fund](#) (established in 2019) which funds, among other projects, agricultural practices to improve water retention and slow erosion. In Europe, many projects receive grants from centralized funds such as the LIFE program and Cohesion Fund (described further on page 46). Similarly, Canada provides grants through the [Canada Water Agency](#) and [Natural Climate Solutions Fund](#) (page 54).

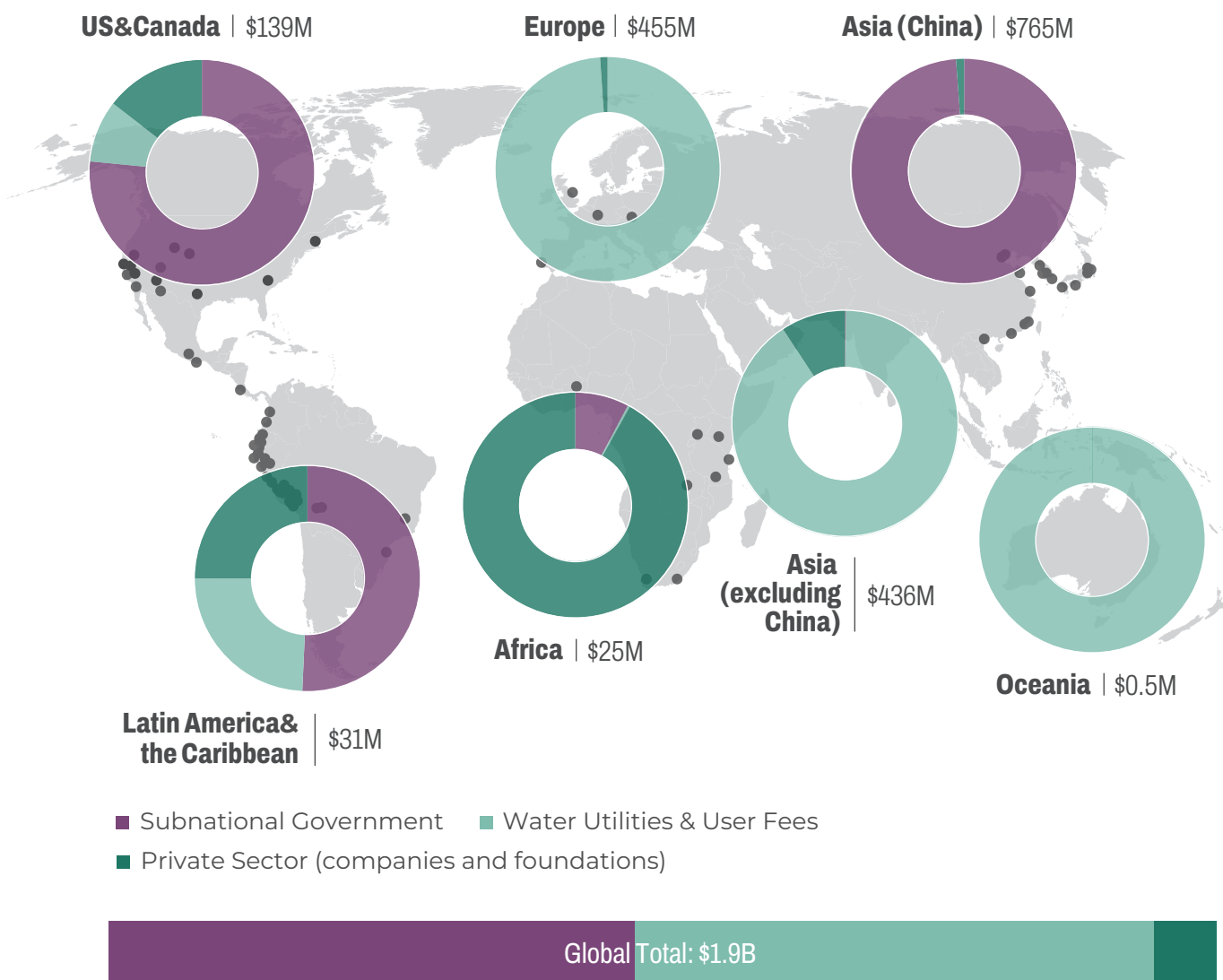
Multilateral institutions and bilateral foreign assistance agencies also invest in NbS for the public good, distributing public funds through contracts and grants. As described under “Investments by Multilateral Institutions...” above (page 22), these investments grew 10x over the last decade.

User-driven Watershed Investments: Water Users Contribute Nearly USD 2B

Investments by the direct beneficiaries of watershed services channeled nearly **USD 2B** in 2023. This includes investments funded by water user fees (USD 867M), user-driven investments by subnational governments (USD 881M), and companies and foundations (USD 105M).

The average value channeled by user-driven initiatives in 2023 was USD 8.2M, which is two orders of magnitude smaller than the average value of landholder incentive programs for NbS. Most of the investment volume was implemented bilaterally, but at least USD 407M was implemented through collective action

Map 4. User-driven Investments in NbS for Water by Payer Type and Geography, 2023



vehicles such as water funds. Water funds are financial and governance mechanisms that unite public, private, and civil society to improve water security by investing in NbS. The Greater Cape Town Water Fund (established in 2017) is one such collective action vehicle involving non-governmental organizations (NGOs), private companies, and government entities including the City of Cape Town, National Department of Water and Sanitation, National Department of Environmental Affairs, and Provincial Department of Environmental Affairs and Development Planning. The water fund prioritizes and coordinates implementation across stakeholders and trains and employs high-angle technicians to remove invasive pine trees in the catchment, returning 55B liters of water to the system,

equivalent to two months of water supply for the city of Cape Town (Stafford et al. 2018).

The section, “Water User Fees Drive Local Investment,” (page 21) provides examples of public programs funded by water use fees (France, South Korea, Vietnam, and Colombia) and water utilities (Peru, UK, US), while the section, “Private Sector Investment...” (page 22) gives an overview of corporate investment trends.

User-driven investments in NbS for water by subnational governments have grown 2.5x over the last decade. Some notable examples include:

- China’s eco-compensation programs at the municipal level (USD 660M), as well as horizontal programs that managed

watersheds between provinces (USD 123M) (described on page 43), transfer payments from one province to another to co-manage shared watersheds, evolving a mechanism that started off as a top-down approach driven by national government to one driven by beneficiaries of watershed services.

- In the US, the New York City Department of Environmental Protection invests in the [Catskill watershed](#), while the City of San Antonio invests in the protection of the [Edwards aquifer](#). The San Antonio program was first funded through a sales tax, and later through a line item in the public budget. Additionally, hundreds of local governments in the US contribute matching funds to the US Forest Service's Source Water Protection Program to support forest management in local watersheds.
- In Japan, the Tokyo Metropolitan Government and Yokohama City Waterworks Bureau are both investing in the conservation of forests

upstream of the rivers that provide water to urban residents.

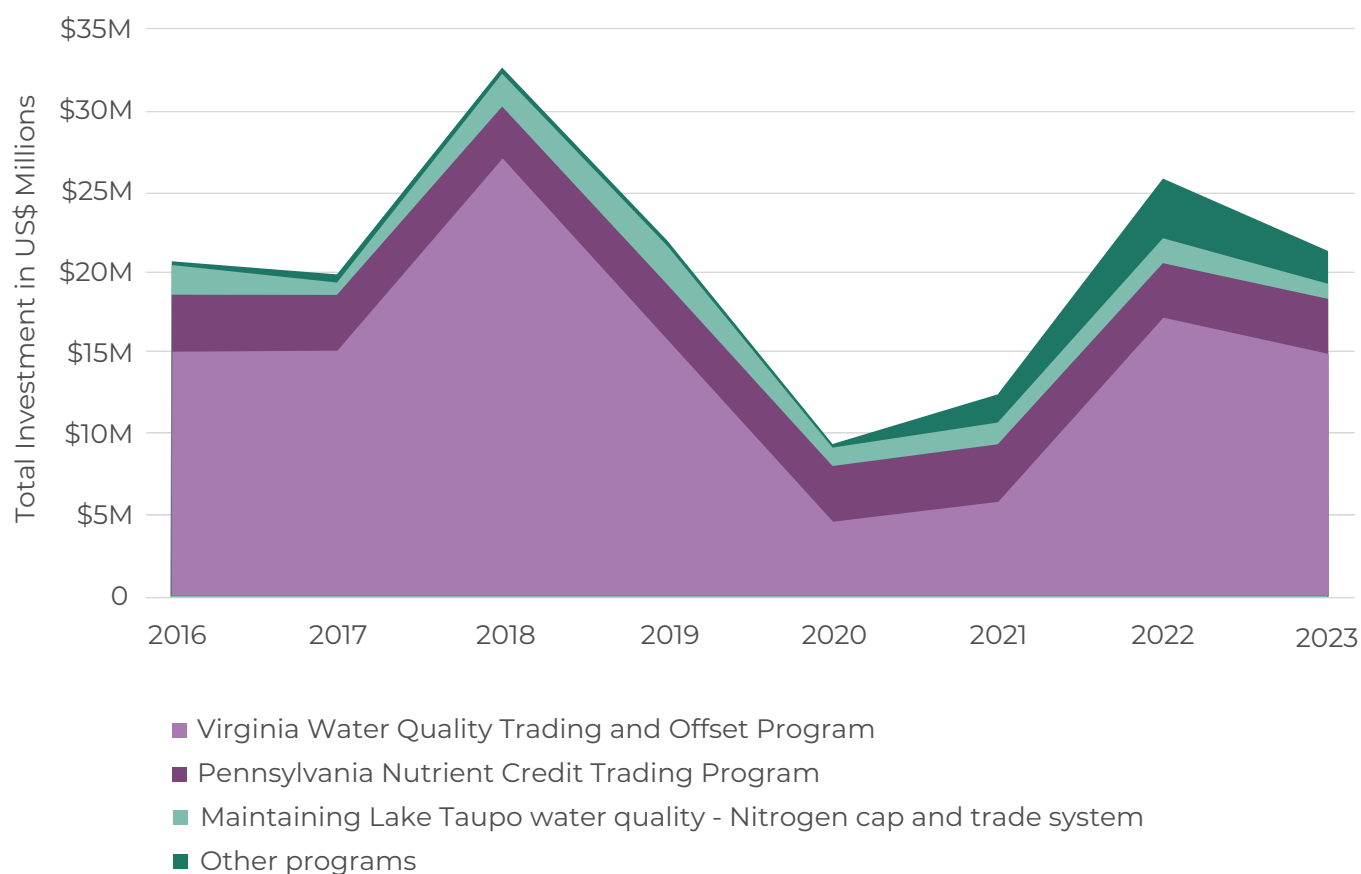
- In Ecuador, the municipalities of Cuenca and San Pedro de Pimampiro both have their own watershed investment programs, while municipalities in Loja and neighboring provinces contribute to the [FORAGUA](#) water fund.

These user-driven investments have important differences by geography (Map 4). Investments by utilities dominate in Europe, Oceania, and Asia outside of China. Investments by subnational governments play a dominant role in China, while the private sector leads user-driven investments in Africa.

Water Quality Trading Programs Remain a Small, but Growing, Share of Investments

Water quality trading (WQT) markets allow water users to purchase credits generated by practices that reduce water pollution or improve water

Figure 5. Investments in NbS for Water Security through Water Quality Trading Programs, 2016-2023



quality. In most cases, these markets are driven by regulations limiting water pollutants. In 2023, these programs transacted at least **USD 21M** in credits (Figure 5).

WQT programs that allow credits to be generated from reductions in non-point sources recognize that NbS can be a cost-effective way to reduce nutrient loads or influence other aspects of water quality, like temperature, compared to infrastructure upgrades on wastewater treatment (Walker 2019). Long-standing programs like the [Virginia Water Quality Trading Program](#) in the US and the [Lake Taupo Nitrogen Trading Programme](#) in New Zealand have been operating for over a decade, allowing credits to be generated by improved land management practices.

A newer initiative is Australia's [Reef Credits](#) program, a voluntary trading system established in 2017 which allows landholders to generate credits by improving nutrient or sediment pollution through land management activities, including gully rehabilitation and rotational grazing. Reef Credits have been purchased by the Queensland government, as well as private payers HSBC bank and Qantas airlines.

While investment in NbS through WQT programs has grown 3.3x over the last decade, it still accounts for less than one percent of the total investment in NbS for water. So far, these approaches only have a strong presence in the US, Australia, and New Zealand. These programs rely heavily on enabling regulatory frameworks to ensure trust and transparency—making them sensitive to political shifts and regulatory uncertainty. For example, the Ohio River Basin Trading Program, designed to trade credits from conservation practices on agricultural land, failed to gain traction when anticipated nutrient regulations were delayed, leaving thousands of credits without buyers (Lewis 2019).

Several factors continue to constrain broader adoption, as laid out by Thomas (2025). In the US, WQT markets are state-level systems, unlike federally standardized programs like species mitigation banking, resulting in variable rules and oversight. Credit buyers often retain liability for meeting outcome-based water quality standards, which can make green credits less attractive than gray infrastructure—even with

favorable trading ratios. Many nonpoint source credits are also time-limited (e.g., annual), while point source infrastructure investments often offer long-term compliance.

Nonetheless, momentum is gaining for water quality trading, particularly in Europe, where regulation promoting nutrient neutrality is beginning to create new demand for NbS credits, especially in the UK.

Limited Adoption of Environmental Water Markets Outside of the US and Australia

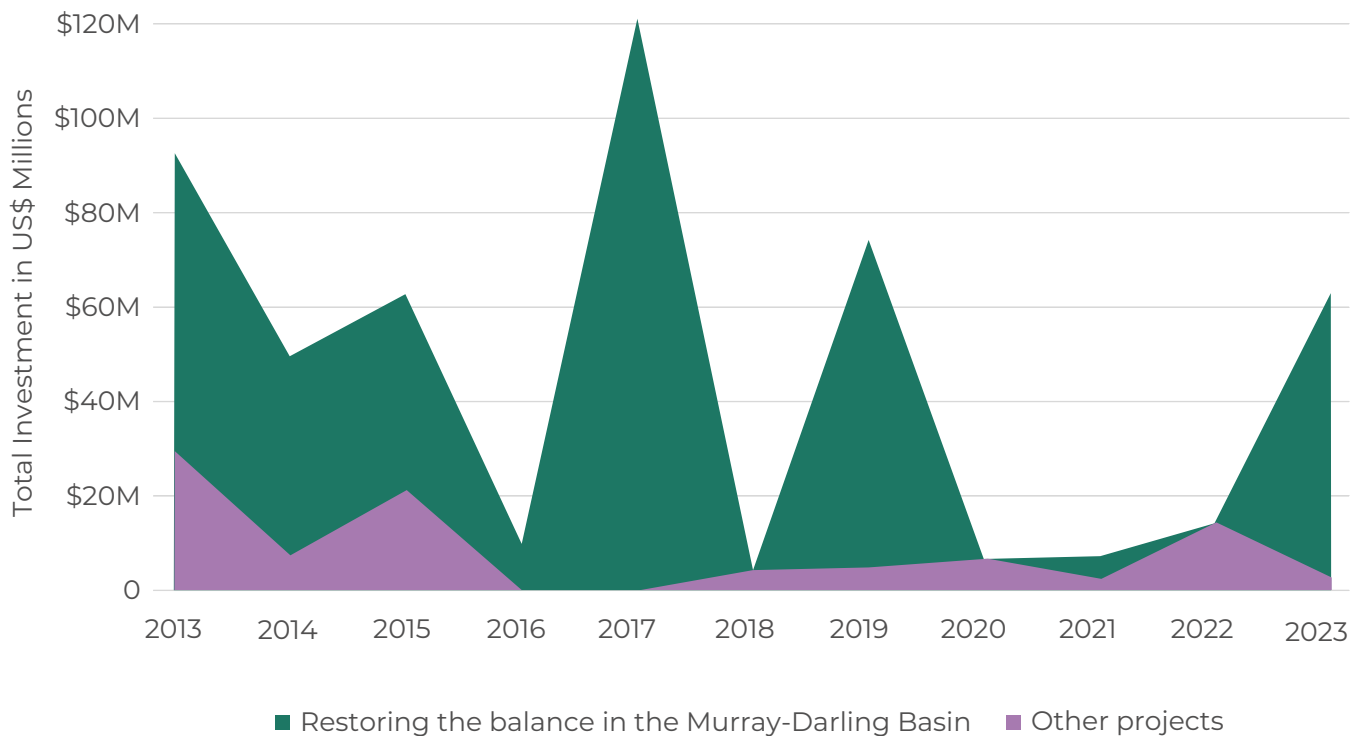
Environmental water markets channeled **USD 64M** in funding for NbS for water in 2023. This includes initiatives that act in the public interest by buying or leasing water rights, which are set aside to ensure minimum water levels to protect aquatic habitats or recharge groundwater. These initiatives have been considered as NbS in this report.

In 2023, the largest program in this category was an initiative by the Australian government to restore water to the country's largest watershed, the Murray-Darling basin, which supplies water for one-third of the country's food supply and many communities, including Canberra and Adelaide. This [program](#) has been buying surface and groundwater rights from irrigators since 2007. As of 2020, the government successfully purchased 1,230 gigalitres of water rights from farmers through buybacks. Annual water purchases vary due to shifting political priorities and scheduled government purchasing events, which influence the fluctuations observed in Figure 6.

In the United States, initiatives have been in place since the 1970s in the western part of the country and are managed by state governments and NGOs. In Montana and Idaho, local NGO [Clark Fork Coalition](#) has returned 25 billion gallons to the watershed through over 30 contracts to date.

As with water quality trading programs, investments in environmental water markets were only recorded in the US and Oceania. Overall growth has been limited, with investments declining over the past decade. Contributing factors include political

Figure 6. Investments in NbS for Water Security through Environmental Water Markets, 2013-2023



sensitivities—particularly around changing agricultural water use—and challenges in developing sustainable funding models.

Financing Instruments

Financing instruments have begun to take shape for NbS for water security, bringing public and private capital to initiatives. This section covers various instruments including **debt financing, debt conversion, and private equity**.

Emerging Momentum in Debt Finance for NbS

While most public investment—especially in advanced economies—is financed in the capital markets, primarily through bonds, debt finance explicitly linked to NbS is still not mainstream. However, lenders and capital markets are increasingly looking to invest in NbS for water security and resilience.

Bonds: Over the past decade, NbS for water security have made their way into the global bond market. In 2018, a US non-profit organization, Blue Forest, issued its first [Forest Resilience Bond](#), an innovative bond that

raises private capital for forest restoration. The bond is repaid over time by contributing beneficiaries who benefit from the restored forest, like government agencies, water utilities, and beverage companies. The Yuba I Forest Resilience Bond provided USD 4M between 2018 and 2023 for the National Forest Foundation to protect 15,000 acres surrounding upper headwaters in the Tahoe National Forest, in partnership with the Nevada City Rancheria Nisenan Tribe (Blue Forest 2023). Nature-based interventions include fire management and restoration of meadows to enhance water supply and protect water quality (Blue Forest, n.d.). Since then, Blue Forest has issued several more bonds of this type.

In 2020, a drinking water utility in the US, Central Arkansas Water, partnered with the World Resources Institute to prepare and issue a USD 31.8M [bond](#) for forest protection to support clean drinking water. The Climate Bonds Initiative reported the issuance of the bond “signals a recognition of the importance of valuing, protecting and enhancing ecosystem service functions alongside built infrastructure

to increase resilience in the delivery of essential services, such as clean drinking water. In a time of diminishing municipal budgets, Central Arkansas Water is showcasing how medium-sized municipalities can be leaders in meeting sustainable development goals by safeguarding natural assets” (Central Arkansas Water 2021).

Since then, bond issuances for NbS for water have continued to scale in size and popularity. Recently, the Dutch and Australian governments have issued separate multi-billion-dollar bonds for environmental initiatives, including NbS for water. Both were over 3x oversubscribed (Australian Government 2024; Climate Bonds Initiative 2019). The Dutch USD 5.4B [green bond](#), launched in 2023, has earmarked USD 1.4B per year through 2032 for the Delta Programme (described in Fastest Growing Mechanism: Other Public Good Investments Outpace Landholder Incentives, page 26). Similarly, the Australian government announced its inaugural USD 5.5B [green bond](#), which funds NbS for water programs like the voluntary water buyback program for the Murray Darling basin and Urban Rivers and Catchments program (both described in the Oceania section, page 55), among other environmental programs.

Loans: One important trend in this space is the increasing engagement and leadership of multilateral development banks and finance institutions like the World Bank, Green Climate Fund, Global Environment Facility, Asian Development Bank, African Development Bank, Inter-American Development Bank, and the French Development Agency. Loans from multilaterals for NbS have grown 3.3x over the last decade, reaching at least **USD 293M** worth of initiatives financed in part or entirely by loans in 2023. These investments by multilaterals, which make up 86 percent of the loans recorded, have been increasingly promoting the inclusion of NbS to improve performance, longevity, and resiliency of gray water infrastructure. For example, the World Bank lent USD 188M to [Pakistan for the Pakistan Hydromet and Climate Services Project](#) (2020-2024), which is designed to improve weather information systems and disaster risk management. In the aftermath of the 2022 flooding in Pakistan, the project was restructured to include the restoration of forest

ecosystems (World Bank 2023a; 2022). Other multilaterals are also increasingly including NbS in gray infrastructure projects.

Outside of loans by multilaterals, the remaining 14 percent (USD 48M) includes financing from other public sources and the private sector. For example, in the US, the Environmental Protection Agency manages a [Clean Water State Revolving Fund](#) which provides low-cost financing to communities for a wide range of water quality projects, including NbS interventions like nonpoint source pollution control and estuary protection.

Debt-for-nature Swaps Enter the Water Security Arena

Debt-for-nature swaps are innovative financial mechanisms in which a country's debt is refinanced at a lower interest rate, in exchange for a commitment to spend a portion of the savings on environmental conservation efforts. A notable example is El Salvador's recent [commitment](#) to allocate USD 350M in savings from a USD 1B debt refinancing toward the conservation and restoration of the Lempa River and its watershed, which supplies two-thirds of the nation's water. This is world's first-ever debt conversion for watershed conservation and water security. The agreement includes 75,000 hectares of protected aquifer recharge zones (Clark et al. 2024; DFC 2024).

Private Equity for NbS is Emerging

Private equity is beginning to play a role in financing NbS for water. In the US, performance-based procurement models have encouraged private investment by enabling more flexibility on how NbS are implemented. For example, Maryland's [Watershed Implementation Plan](#) allows counties to pay for pollutant load reductions (e.g., nitrogen, phosphorus, sediment) based on outcomes, enabling project implementers to innovate efficient ways to achieve results, rather than payment models that require specific practices. This flexibility has made it more attractive for private implementers to finance early-stage project costs such as design, permitting, and entitlement. Prince George's County and Howard County were among the first to adopt this model, with many others later following suit.

NbS can also mobilize private investment in later stages by enhancing land value. A recent World Bank report highlights two examples where NbS were integrated into flood risk reduction for new developments. In San Francisco, a defunct waterfront site was transformed into a climate-resilient neighborhood, with development costs recouped through property taxes and bonds. In Tanzania, a proposed development plans to use terracing to reduce flood risk and create 57 ha of developable land near the central business district. The development is expected to generate additional revenue for the city and national government from the private sector, through increased property values, developer fees, and the sale of 14,500 new housing units (World Bank 2025).

Impact and Sustainability

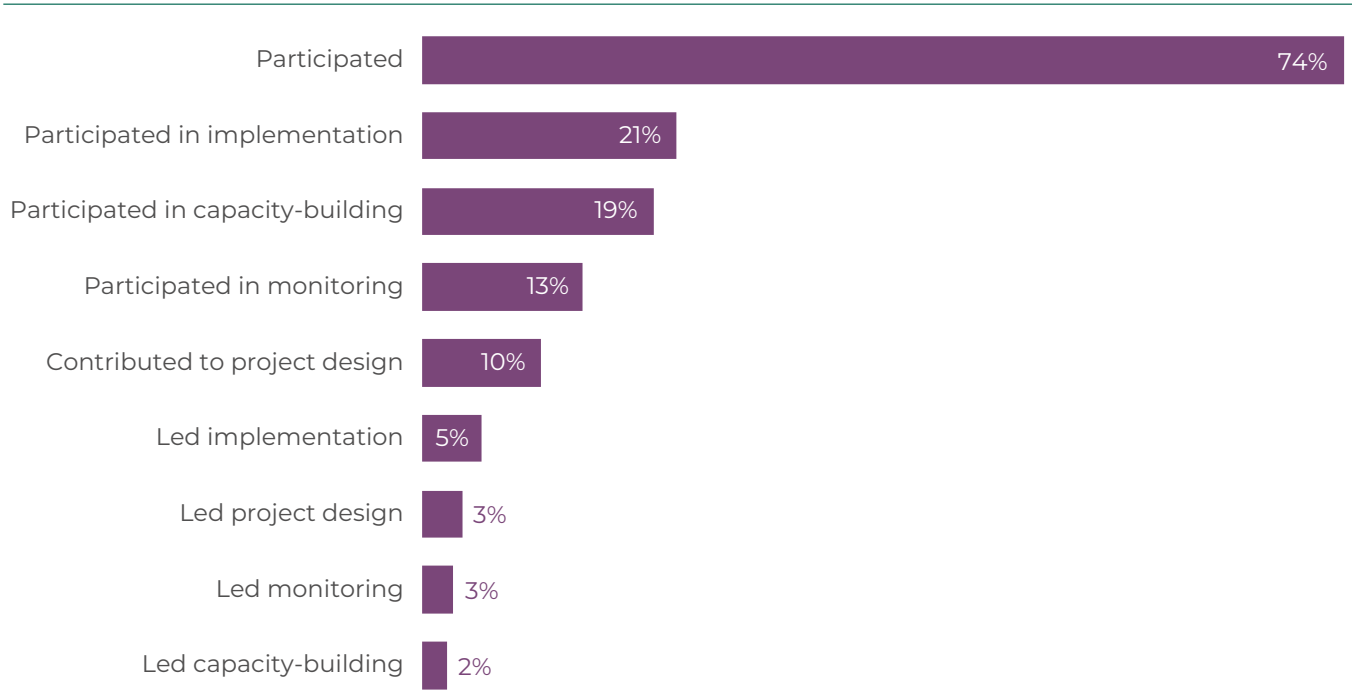
Most NbS Engage Local Communities, but Their Leadership is Limited

In many areas around the world, project sites for NbS are located within or impact territories inhabited by Indigenous Peoples and local communities. These communities hold local ecological and social expertise that are valuable

to NbS projects (Cottrel 2022), and they manage or have tenure rights to over 25 percent of the world’s land, including interconnected systems of forests, grasslands, wetlands, rivers, lakes, the underlying groundwater, and coasts (TNC 2022). Of the initiatives for which data on community participation was available, 74 percent reported participation from Indigenous Peoples or local communities (Figure 7). Communities most commonly participated in implementation, capacity building, or monitoring. It was less common for them to participate in project design, and even less so for them to lead activities or meaningfully participate in programmatic decision-making.

However, Indigenous Peoples and local communities have proven to be the most effective stewards of nature in the world—achieving greater conservation results and sustaining more biodiversity than government protected areas (TNC 2022). Robust community participation in all project stages, from initial conceptualization through planning and design, improves the effectiveness and sustainability of the project long term. Improved community leadership and participation in the design and operation of NbS projects presents an important opportunity for the sector.

Figure 7. Participation of Indigenous Peoples and Local Communities in NbS for Water Initiatives, 2023 (percent of NbS for water initiatives, n = sample size = 395 initiatives)



Targeting and Monitoring of Co-benefits, Especially Biodiversity, Increase, but Gaps in Hydrological Monitoring Persist

In addition to water benefits, NbS have the potential to deliver multiple co-benefits including climate change mitigation and adaptation, biodiversity, and human health and well-being (Ofosu-Amaah et al 2024). The increased recognition of these benefits strengthens the diversity of stakeholders who are willing to champion and invest in these solutions.

In 2023, NbS for water initiatives most often reported biodiversity conservation as the primary co-benefit (Figure 8). Monitoring of ecological benefits was even more common in NbS for water initiatives than monitoring of hydrological benefits (Figure 9). Of the initiatives for which data on monitoring were available, only 12 percent of initiatives reported having some type of monitoring program for water quantity or quality. Challenges that inhibit hydrological monitoring include access to technical expertise, costs of scientific

Figure 8. Co-benefits NbS for Water Initiatives Aimed to Deliver, 2023
(percent of NbS for water initiatives, n = sample size = 442 initiatives)

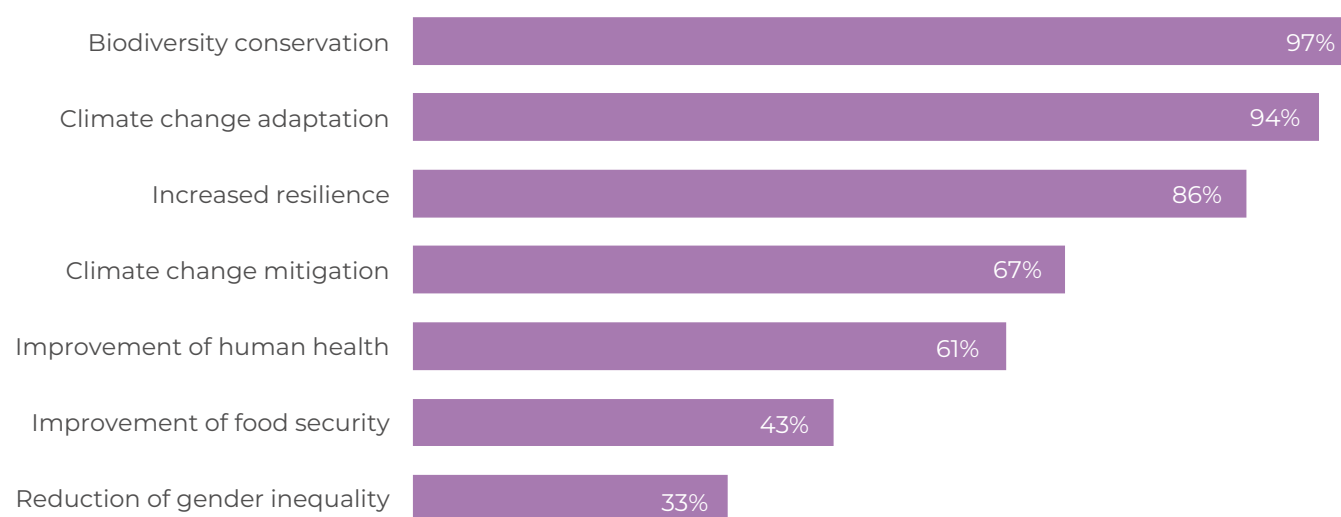
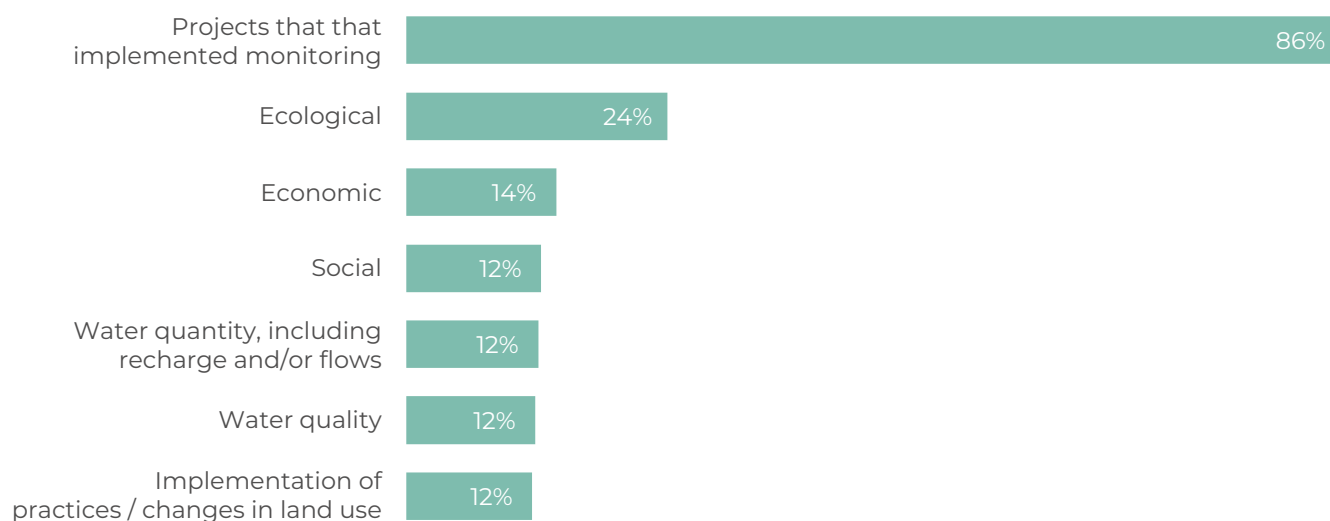


Figure 9. Types of Monitoring Included in NbS for Water Initiatives, 2023
(percent of NbS for water initiatives, n = sample size = 363 initiatives)



equipment, and the long timescales needed to observe freshwater impacts resulting from intervention on land.

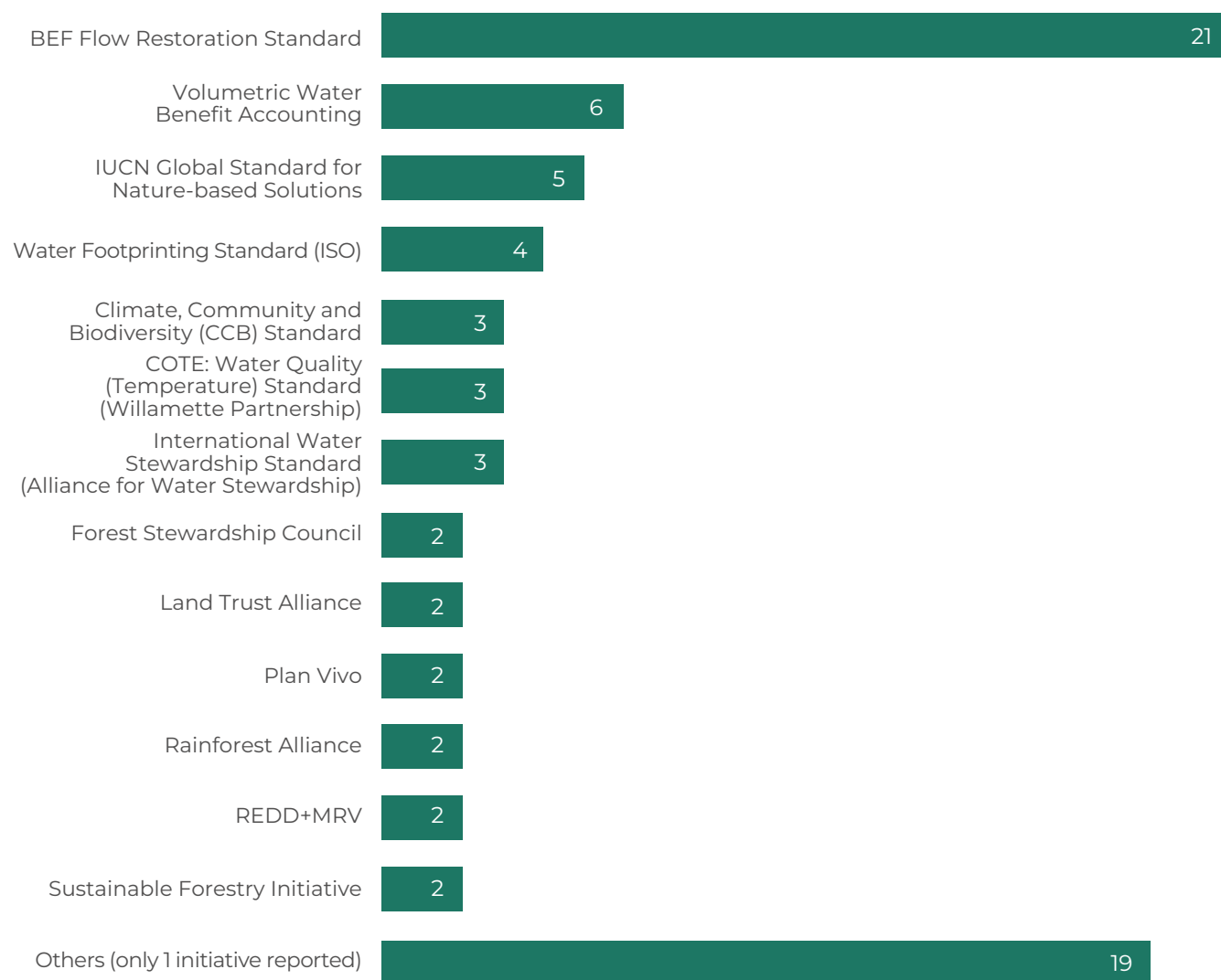
High Diversity in Standards Signals Opportunity for Streamlining

Standard methodologies for measuring and reporting benefits streamline project developers' ability to communicate and understand results, compare between projects, and replicate successes. However, standards and certifications can require high costs for monitoring, validation, and verification processes. Over 30 different standards were used, including 19 that were reported by only one initiative (Figure 10). In

addition, many use standards specific to their initiative. For example, water quality trading markets will require credit suppliers to follow specific rules and many public incentives for landholders use technical specifications for practices that qualify for compensation. While, to some extent, the use of multiple standards is to measure different parameters, the high diversity in standards reported highlights an opportunity for further standardization and streamlining across the sector.

The most commonly reported standard was [Bonneville Environmental Foundation's](#) Flow Restoration Standard, which guides the evaluation of volumetric water benefit

Figure 10. Standards and Certifications Used by NbS for Water Initiatives, 2023



or restoration benefits achieved by a specific project. While this standardization is valuable in helping the corporations that fund projects through the Bonneville Environmental Foundation understand the impacts of their water stewardship efforts, there did not appear to be a broader adoption of this standard outside of Bonneville's program management.

Volumetric water benefit accounting (VWBA) is an approach for calculating the hydrological benefits of water stewardship activities. It is used by many corporations to assess the impacts of their own direct investments or their contributions to water funds. In 2019, the World Resources Institute and its partners at Quantis, LimnoTech, and Valuing

Nature developed a standard methodology for volumetric water benefit accounting, which was recently updated between 2023 and 2024 as [VWBA 2.0](#). Five water fund programs in Latin America and Africa reported using volumetric water benefit accounting, as well as one corporate water stewardship program.

The International Union for Conservation of Nature (IUCN) developed a [Global Standard for NbS](#), which evaluates initiatives on eight criteria ranging from their ability to address societal challenges, respond to biodiversity, design to scale, and more. Based on this data, use of the IUCN Global Standard is emerging among foreign assistance and philanthropy initiatives.



Trends by Geography

Production of hedgerow plants in a nursery, Goëma, Burkina Faso.
Photo credit: TERRE VERTE (2018)

Trends by Geography

This section covers trends in investment in NbS for water security, broken down into 7 geographies: Africa, Asia (China), Asia (excluding China), Europe, Latin America & the Caribbean, the United States and Canada, and Oceania. China leads in total investment volume (Map 5), while Africa saw the fastest growth. Government funding remains the primary driver globally, with landholder incentive programs playing a major role in China, Europe, and the US. In Africa and Latin America & the Caribbean, foreign assistance and multilateral institutions are key sources of funding. Oceania stands out for its use of market-based mechanisms, while water user fees drive significant investment in Asia outside of China.

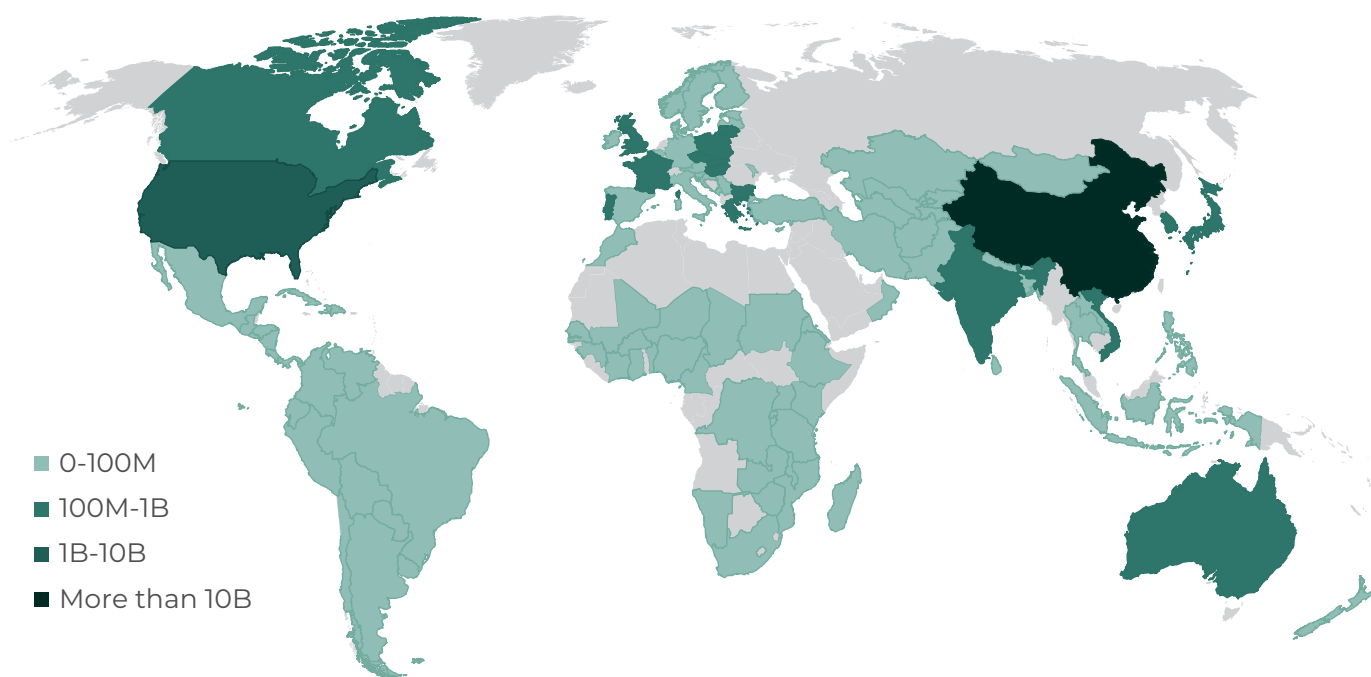
Africa

Africa Leads Global Growth in NbS for Water, Driven by Foreign Assistance and Expanding Government Investment

Since 2013, investment in NbS for water security in Africa has increased fivefold, rising from USD 57M to **USD 288M** in 2023 (Figure 11).³ This growth rate is more than double the global average, making Africa the fastest-growing region for investment in nature for water. The majority of investments took place in East Africa (Map 6, Table 4).

³ We recorded USD 1.8B in total investment in NbS for water security in Africa between 2013 and 2023. By comparison, a recent study by Collins et al. (2025), conducted by the World Resources Institute and the World Bank, documented USD 3.5B committed to NbS in Sub-Saharan Africa between 2012 and 2021. Several key methodological differences explain the difference in these findings. Collins et al. used a broader scope and captured NbS aimed at climate resilience more generally, including initiatives beyond water security and NbS intervening in marine ecosystems. Their dataset also included more urban green infrastructure and hybrid green—gray projects, which were not prioritized in our analysis. Notably, Collins et al. found that over half of the projects were led by national governments and often financed by multilateral development banks, which aligns with the trends documented in this report.

Map 5. Global Volume of Investment in NbS for Water by Country (USD), 2023



Map 6. Investment in NbS for Water Security in Africa by Country, 2023, USD

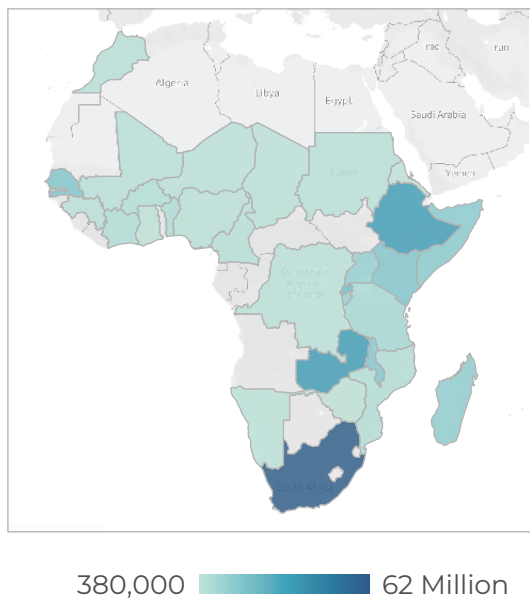
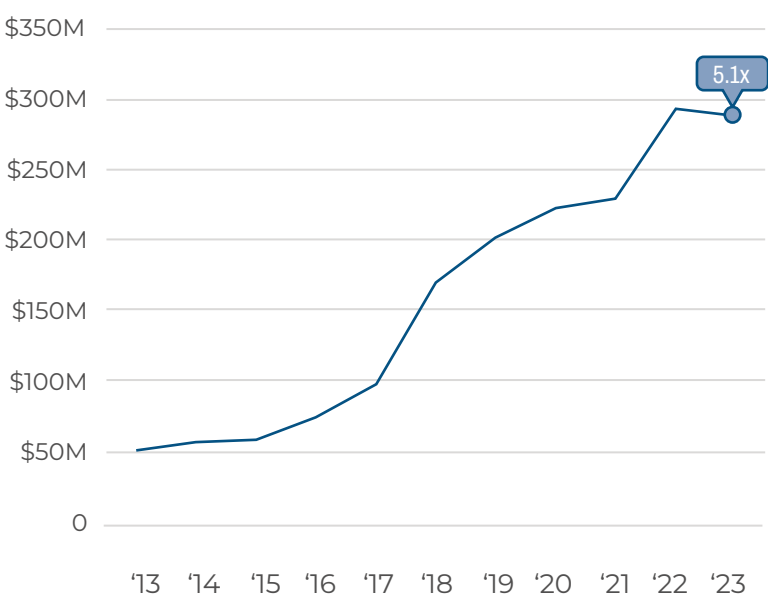


Figure 11. Investment in NbS for Water Security in Africa, 2013-2023, USD



Foreign Assistance and Multilateral Institutions Drive Investments in NbS for Water Security

Foreign assistance and multilateral institutions play an outsized role in financing NbS for water in Africa, participating in **68 percent** of investments in 2023 through direct, non-repayable funding (38 percent) or loans to governments (30 percent). This combined investment has doubled over the last five years, growing faster than any other region. In 2023, direct investments were made primarily by international finance institutions (93 percent) including the African Development Bank, World Bank, Global Environment Facility, Green Climate Fund, Adaptation Fund, and others. Seven percent were made by bilateral

foreign assistance agencies from countries in Europe, the US, and Canada. In addition, loans from multilateral institutions to governments have enabled an increasing number of large-scale public initiatives in the region. In 2023, 16 public initiatives spent over USD 1M annually in Africa—up from just one in 2013. Ten of the initiatives were financed by loans from multilaterals.

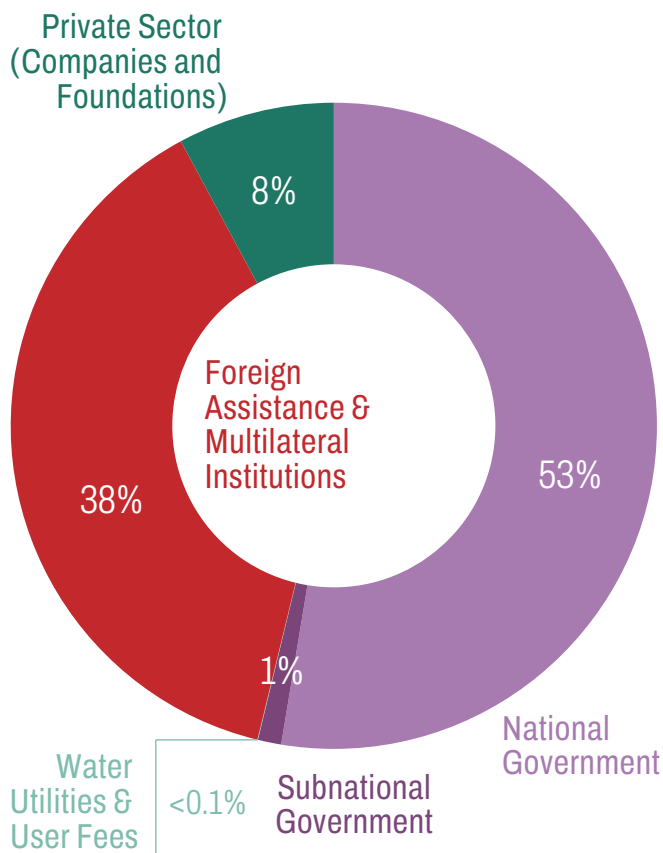
Investments by foreign assistance and multilateral institutions have been expected to grow significantly in the recent years through the implementation of the [Great Green Wall](#), an ambitious initiative launched in 2007 by the African Union. It aims to hold back the expansion of the Sahara Desert by restoring 8,000 kilometers (km) of degraded land across 11 African countries⁴ to improve water and food security, employment opportunities, and other benefits (Great Green Wall n.d.). The initiative aims to transform barren land into fertile soil and curb the desert’s encroachment through restoration interventions like reforestation, agroforestry, sustainable agriculture, and a variety of water harvesting techniques including half-moons and traditional zai-holes (Terra Forma 2024). A historic USD 19B has been committed from several multilateral

Table 4. Investments in NbS for Water Security in Africa by Area, 2023

	2023 Expenditures (USD)
East Africa	\$162M
South Africa	\$83M
West Africa	\$37M
Central Africa	\$4.4M
North Africa	\$1.8M

⁴ Countries include Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Ethiopia, Eritrea, and Djibouti.

Figure 12. Share of Investment Volume by Payer Type, Africa, 2023



and bilateral organizations including the African Development Bank, the World Bank, the Green Climate Fund (GCF), and the European Union. As of March 2023, 80 percent of the commitments had been programmed but only USD 2.5B had been disbursed, with the rest due by the end of 2025 (Jessop and Prentice 2024).

The [R4 Rural Resilience](#) initiative by the World Food Programme and Oxfam International is an innovative approach established in 2011 that provides incentives to landholders through risk insurance. It is funded by foreign assistance, multilateral institutions, private foundations, and insurance companies (Anand, Andridge, and Fawcett 2020). Through the initiative, vulnerable households can access insurance for droughts, flooding, and other risks by participating in risk reduction activities including NbS. In 2023, USD 13.8M of insurance payouts were triggered through the program in 19 African countries affected by drought, floods, and tropical cyclones (WFP 2024).

Africa Lacks Public Landholder Incentives, but South Africa Leads with Well-established Domestic Public Programs

Public landholder subsidies have not yet been recorded in Africa, highlighting a potential opportunity for governments to adapt the R4 Rural Resilience program or successful models from other geographies. In 2023, South Africa's [Working for Water](#) program was the largest NbS for water program on the continent. The program creates local jobs to remove invasive plant species that threaten water supplies. Since its inception in 1999, it has cleared more than one million hectares of invasive plants while providing employment and training to approximately 20,000 individuals (DFFE, n.d.). Following its success, South Africa has also launched its sister programs Working for Wetlands and Working for Ecosystems. These South African programs were the only public programs for NbS for water in Africa reported without financing from by loans from multilaterals.

Investments by the Private Sector and Water Funds are Growing

Africa has the highest share of private sector involvement recorded in any region. Private sector investments have tripled over the last five years, comprising **eight percent** of the total investment in NbS for water in 2023. In that year, companies (USD 16M) and foundations (USD 6M), particularly from the technology and hospitality sectors, led private contributions. Nearly all of these private investments were made as donations to non-profit organizations.

Private investment is also increasingly mobilized through water funds, which pool both private and public investment to finance watershed restoration. These funds convene corporations, utilities, conservation organizations, and governments, following a model first demonstrated in Quito, Ecuador. In Africa, the [Upper Tana-Nairobi Water Fund](#) in Kenya (established in 2015) and the [Greater Cape Town Water Fund](#) in South Africa (established in 2018) have together mobilized millions of dollars annually for water security (Ogodo 2024). There are at least 14 more water funds in development across the continent (Kihara 2023).

Asia (China)

China Leads Global Investment in NbS for Water Security, Driven by Government Spending

In 2023, China invested **USD 26B** in NbS for water (Figure 12), more than the rest of the world combined. After devastating droughts and floods in the late 1990s which exposed needs to improve watershed management after decades of intense industrialization, the Chinese government has steadily expanded efforts to protect and restore the ecological components of its water systems (World Bank 2021). China has long been a global leader in investment in NbS for water security (Bennett and Reuf 2016), and its continued investment reflects the government's vision for its future development linked to its natural infrastructure. This vision is encapsulated by the slogan, *“Clear waters and green mountains are as valuable as gold and silver mountains,”* first popularized by President Xi Jinping and later incorporated into national policy (Zhou 2023; Xinhua News Agency 2020).

China continues to innovate in financing NbS for water security, integrating multiple funding streams from national and provincial governments and mainstreaming nature into traditional infrastructure investments. The

government's emphasis on adaptable, large-scale programs allows provinces to tailor interventions to local environmental and economic needs (World Bank 2022). Recent efforts to strengthen cooperative watershed management and eco-compensation frameworks suggest that China is advancing toward more performance-based and innovative financing models. With continued policy support and expanding investment mechanisms, China is likely to remain a global leader in NbS financing for water security.

Large Investments in NbS for Water Led by Governments

Even more than in the rest of the world, domestic spending by governments overwhelmingly dominates NbS spending in China, accounting for **99.9 percent** of total investments. In recent decades, China has embraced eco-compensation mechanisms to improve watershed management outcomes by better apportioning the costs and benefits between beneficiaries and providers of watershed ecosystem services (World Bank 2021). China has embraced eco-compensation as a key national policy tool, integrating it into its past three Five-Year Plans. The 14th Five-Year Plan (2021-2025) calls for increased transfer payments to ecologically sensitive areas and river basins to incentivize conservation and sustainable

Map 7. Investment in NbS for Water Security in China, 2023



Figure 13. Investment in NbS for Water Security in China, 2013-2023, USD

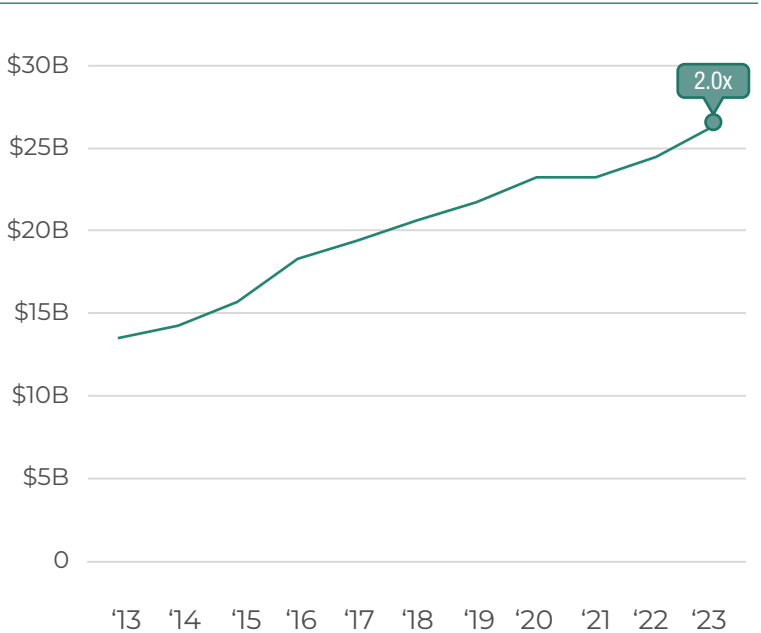
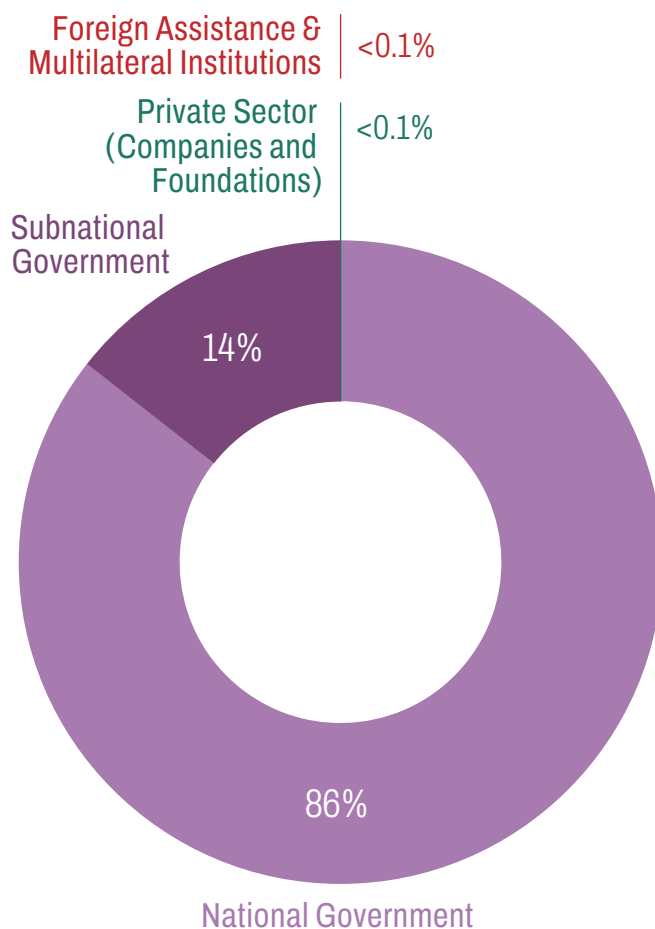


Figure 14. Share of Investment Volume by Payer Type, China, 2023



water use. Additionally, new regulations on Ecological Protection Compensation, passed in 2024, mark a major milestone in government policy and commitment to performance-based funding mechanisms for watershed protection, restoration, and management. This regulation supports both **vertical** (top-down) and **horizontal** (between provinces) eco-compensation models to strengthen the management of shared watersheds and water resources, and it appears to push local governments to explore market mechanisms to increase the participation of the private sector (State Council 2024).

Vertical programs: National government programs make up the lion's share of government investment (USD 22.6B in 2023) and include the following initiatives:

- Conversion of Croplands to Forests (established in 1999), a program described in

the Global Overview (page 26), and its sister program, Conversion of Grazing to Grassland (established in 2003), together execute an estimated USD 9.8B annually on NbS for water.

- Key Ecological Function Zone Eco-compensation is a program (established in 2008) which gives annual subsidies to governments in key ecological function zones, on which development restrictions are imposed and measures to strengthen ecological protection are required. While much of this funding helps local governments provide public services and support rural welfare, a portion of it is ostensibly for conservation and restoration activities.⁵ The program spent an estimated USD 9B in 2023.
- The Forest Ecological Benefit Compensation Fund (established in 2001) pays an annual subsidy to forest rights-holders to conserve and manage standing forest area deemed to provide key ecological services (including watershed services) and generally includes significant matching contributions from local governments. The fund spent an estimated USD 2.1B in 2023.⁶
- Ministry of Water Resources' soil and water conservation activities, while traditionally biased towards engineered solutions, increasingly include interventions to protect and restore key watershed ecosystems, spending an estimated USD 1.1B on NbS for water in 2023.
- The Sponge Cities Initiative helps cities invest in more watershed-friendly urban infrastructure to prevent and reduce flooding, such as artificial wetlands and riparian zone ecological protection and restoration, in addition to significant investments in gray infrastructure solutions like permeable concrete.⁷ The fund spent an estimated USD 425M in 2023.

⁵ For the purpose of this analysis, it is assumed that 60 percent of Key Ecological Function Zone eco-compensation is used for NbS.

⁶ While many of these rights holders (especially in southern China) include rural communities and households, a significant share also includes local forestry bureaus. Based on relatively sparse available data on provincial FECF funding, it is conservatively assumed that provincial government contributions started at 13 percent of that of national investments in 2013 and increased to 28.8 percent by 2023.

⁷ Given a lack of detail on Sponge City expenditures, it is conservatively assumed that 15 percent of these funds are used for NbS based on program descriptions.

Chinese management of natural infrastructure critical to water security has also been strengthened by new legal and regulatory frameworks for water resources, including the passage of the Yangtze River Protection Law (2020), the Yellow River Protection Law (2022), and the Wetlands Protection Law (2021), which all prioritize ecological conservation and restoration activities (PRC 2022; 2021; 2020).

Horizontal programs: In 2023, there were 13 horizontal eco-compensation schemes that managed watersheds between provinces, with expenditures totalling at least USD 123M. The government has since designed more, with at least 28 programs in place by the end of 2024 (Boxuan 2024). A major recent focus in expanding eco-compensation has been the Yangtze and Yellow River watersheds, which together support over 800 million people (United Nations n.d.; WWF n.d.). The Chinese government issued implementation plans guiding the development of horizontal ecological protection compensation mechanisms for the Yellow River in 2020 and the Yangtze River in 2021 (MOF 2020; 2021). These guidelines encourage the provinces in these watersheds to develop joint ecological management and performance-based policy mechanisms and frameworks to improve water-use efficiency and water quality. For example, Beijing has signed two rounds of ecological compensation agreements with the Hebei province upstream of the city's strategic water source, Miyun Reservoir, cumulatively investing over USD 500M in the ecological protection and restoration of the Miyun watershed (Ministry of Ecology and Environment 2024). By setting targets for water quality and quantity, the agreements encourage upstream areas to strengthen ecological protection and promote green development of local communities.

Chinese Beverage Company Invests in Source Watersheds

Moutai, a state-owned beverage company which produces the country's famous baijiu liquor, has contributed approximately **USD 6.8M** annually since 2014 to a special fund for protection of the Chishui River watershed,

where the liquor is bottled. The provincial government provides additional matching funds. Looking ahead, there have been reports of plans for other liquor companies to voluntarily contribute a portion of alcohol sales to this fund to expand this conservation model ("The Chishui River: Overview for the Fund Development" 2024).

Asia (Excluding China)

Outside of China, Strong Growth in NbS for Water Investment Across Asia is Led by Japan, India, Vietnam, and South Korea

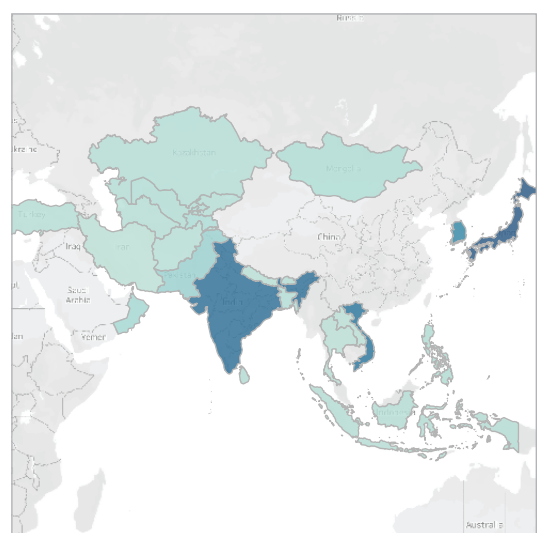
While total NbS investment in Asia outside of China remains relatively small (**USD 1.6B** in 2023), its growth rate (2.3x since 2016) has outpaced China's, reflecting increasing commitments to watershed protection and restoration (Figure 13). Over 80 percent of this investment is concentrated in four countries: Japan (25 percent), India (21 percent), Vietnam (20 percent), and South Korea (17 percent) (Map 7).

Rising Domestic Investment by Governments in Asia Supports Forest and Watershed Management

Domestic investments by governments make up **60 percent** of investments in NbS for water in Asia outside of China. In Japan, government investments in NbS for water have grown almost fivefold over the last decade, largely due to the introduction of new taxes applied nationally that are dedicated to forest and water conservation. In 2024, Japanese municipalities began collecting an annual Forest Environment Tax of approximately USD 7 per resident, generating approximately USD 417M annually for forest management and source water protection nationwide (Japan Forestry Agency 2023). Leading up to the national tax, starting in 2019, municipalities across the country had been receiving funds for forest management, with annual expenditures reaching USD 382M in 2023 (Forestry Agency n.d.).

India's investment in NbS for water has grown steadily over the last decade, supported by a suite of national programs. [The Watershed Development Component of the Pradhan Mantri Krishi Sinchayee Yojana program](#) (established in 2015) is focused on integrated

Map 8. Investment in NbS for Water Security in Asia (Excluding China) by Country, 2023, USD

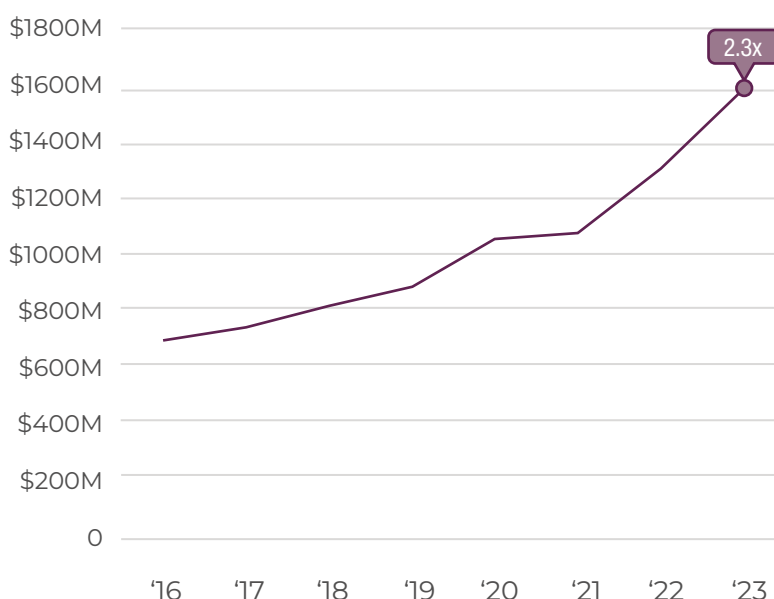


520,000 396 Million

watershed management, using a ridge-to-valley approach for activities ranging from catchment restoration to improved agricultural practices and soil moisture conservation (Government of India 2008). It has spent an estimated USD 2.8B to date, including USD 293M in 2023 (Department of Land Resources n.d.-b; n.d.-a). Phase two (2021-2026), which has a stronger emphasis on NbS and a total budget of USD 968M, will cover almost five million hectares (Department of Land Resources, n.d.-c). In parallel, the Namami Gange Programme (established in 2014) has become India's flagship river restoration initiative focusing on the rejuvenation of the Ganges River through a mix of gray infrastructure and NbS including afforestation, wetland restoration, and sustainable agricultural practices (National Mission for Clean Ganga 2020). India has also announced the Aravalli Green Wall Project, a major initiative to create a 1,400 km green buffer to combat desertification through afforestation, reforestation, and restoration of water bodies. Announced in 2023, the initiative aims to cover over one million hectares by 2027 (Bajwa 2024; PIB Delhi 2023)

Under Vietnam's [1 billion trees initiative](#) (2021-2025), the Ministry of Agricultural and Rural

Figure 15. Investment in NbS for Water Security in Asia (Excluding China), 2016-2023, USD

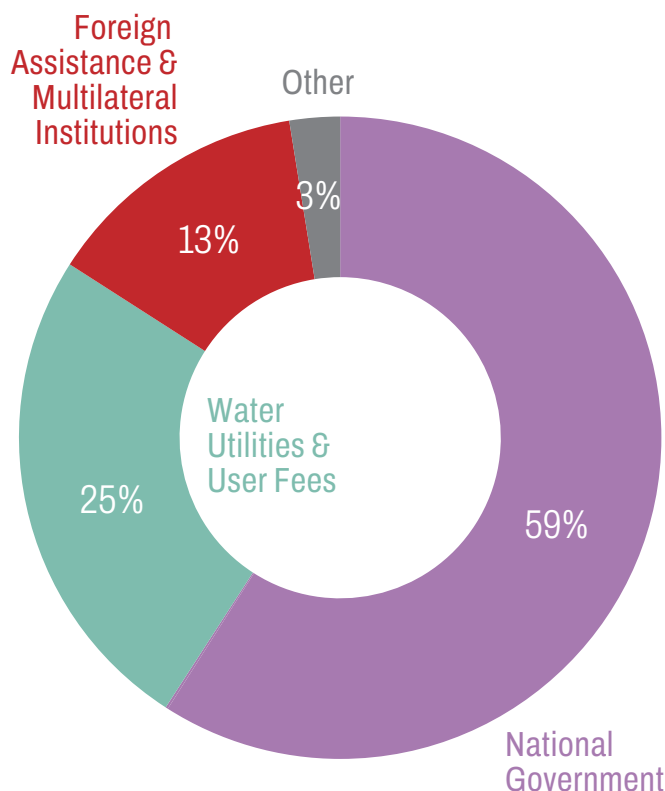


Development has committed to planting one billion trees, including within watershed forests. The country mobilized USD 380M during the first three years of the project and planted over 770 million trees. World Wildlife Fund (WWF) is a strategic partner for the initiative, which is funded by both public and private sources (Việt Nam News 2024).

Water User Fees Fund Investments in South Korea and Vietnam

This geography has the highest percentage of investments funded by water user fees (27 percent). South Korea allocates significant funding through [watershed management funds](#) for four major rivers, which together supply water to over 65 million people. These funds are supported by tariffs on water users and managed by independent River Management Committees (Ministry of Environment 2016). In 2023, the four funds invested an estimated USD 268M in watershed restoration and conservation. In Vietnam, the Payment for Ecosystem Services Program (established in 2008), funded by tariffs on water users, has tripled over the last decade, reaching USD 115M in 2023 (see Global Overview page 21 for more details).

Figure 16. Share of Investment Volume by Payer Type, Asia (Excluding China), 2023



International Investments in Asia are Growing

Foreign assistance and multilateral institutions participated in **21 percent** of investments in NbS for water in the region in 2023 through direct investment (13 percent) or loans to governments (8 percent). These investments were concentrated primarily in Central Asia, Southeast Asia, and the Indian subcontinent, and have grown 1.4x over the last five years. Direct investments were made almost entirely by international finance institutions like the World Bank, Asian Development Bank, Global Climate Fund, Global Environment Facility, and Adaptation Fund. Less than one percent were from bilateral agencies of the US, Australia, and Europe. Notable examples of foreign investment include:

- [Bangladesh Delta Plan 2100](#) (established in 2018): A 100-year visionary strategy that includes watershed restoration efforts, with the government committing 2.5 percent of its Gross Domestic Product (GDP) annually (approximately USD 5B) to the Delta Fund to support implementation. Additional technical and financial support comes

from the Government of the Netherlands, which has extensive experience with delta management in its own country. The total capital investment cost of the plan is USD 37B (de Heer and Choudhury 2019).

- [Bhutan For Life](#) project (established in 2018): A partnership between the Government of Bhutan and WWF to protect forests that are critical for the nation's freshwater ecosystems, with funding from the GCF, the Global Environment Facility, and others. The project, which is valued USD 118M, is designed to gradually phase out foreign assistance while increasing government investment (Green Climate Fund 2023).
- [Recharge Pakistan](#) (established in 2024): Established in response to the catastrophic flooding in Pakistan in 2022, this program prioritizes NbS to mitigate flood risks and build climate resilience. USD 77.8M was committed by the GCF, United States Agency for International Development (USAID), the Coca-Cola Foundation, and WWF (Coca-Cola 2024).

Europe

Europe Expands and Diversifies Investment in NbS for Water Security

Investment in NbS for water security in Europe has more than doubled since 2016, rising steadily from USD 4.7B to **USD 10.8B** in 2023 (Figure 14). With 96 percent of funding coming from governments, European governments and institutions are demonstrating significant commitments to mainstreaming NbS into strategies for improving flood control and water quality.

EU Funding Instruments Drive NbS Investment Across Europe

The EU plays a central role in funding NbS for water, with multiple programs supporting restoration and conservation efforts. EU investments include two large landholder incentive programs which have had moderate growth (1.3x) over the last decade. These two programs made up **53 percent** of European investments in 2023:

Map 9. Investment in NbS for Water Security in Europe by Country, 2023, USD

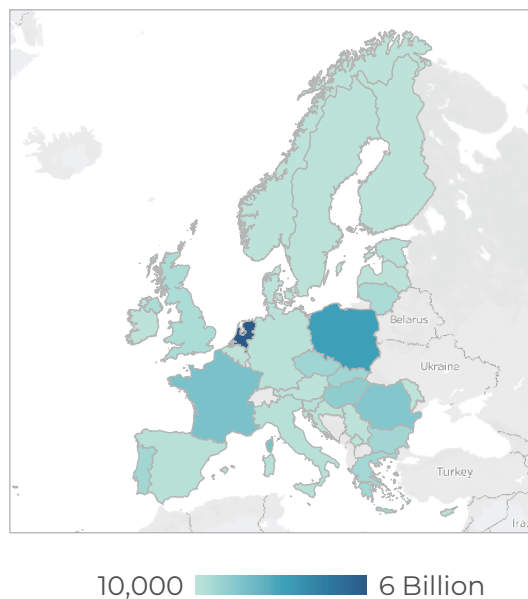
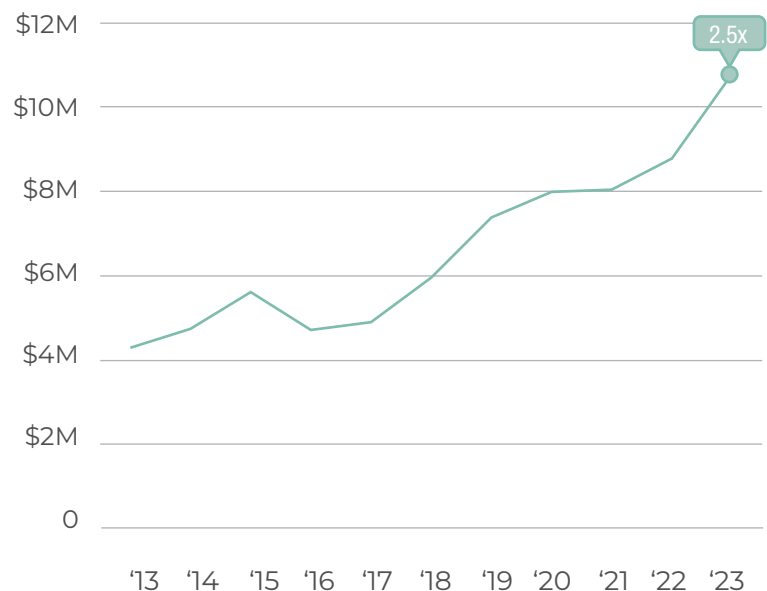


Figure 17. Investment in NbS for Water Security in Europe, 2016-2023, USD



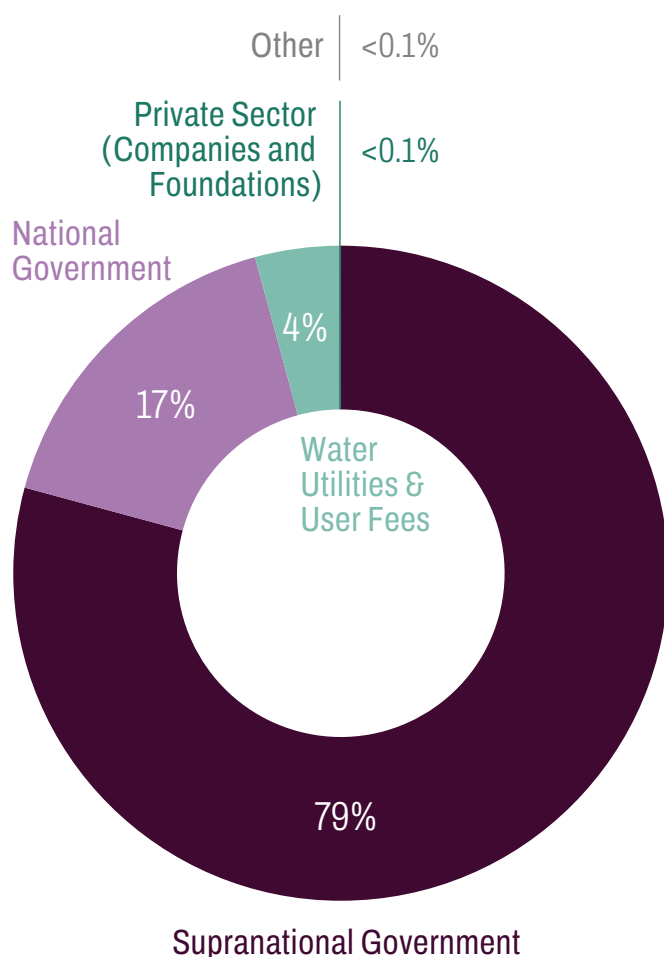
- [European Agricultural Fund for Rural Development](#): The largest source of spending on NbS for water in Europe, accounting for over 50 percent of investment in 2023. This fund, a key financial instrument of the EU Common Agricultural Policy, includes funding for sustainable agriculture and forestry practices. Its spending on measures that were clearly tied to water objectives increased 1.2x from 2018-2023 to USD 5.7B.
- [European Regional Development Fund](#): This fund—designed to strengthen economic, social, and territorial cohesion in the EU—is a key instrument of the EU Cohesion Policy, which has allocated over USD 400B between 2021 and 2027 to address development needs in all EU regions including sustainable development, job creation, and quality of life (European Commission n.d.-b). It is estimated the Fund spent USD 124M on NbS for water in 2023, including initiatives like the GreenQuays project to renature riverbanks in Breda, the Netherlands.
- [Cohesion Fund](#): Another instrument of the Cohesion Policy, the Cohesion Fund provides financial support to less developed member states for environmental and infrastructure projects. We estimate spending on NbS for water-related measures has grown 2.5x over the last five years, reaching USD 2.6B in 2023.
- [LIFE Program](#): The EU's primary funding mechanism for environment and climate action, investing an estimated USD 98M in NbS for water in 2023. The program supported over 100 NbS projects with water-related objectives, reinforcing its role as a critical enabler of sustainable water management initiatives across Europe. For example, LIFE Anthropofens restores waterways to improve water quality and water quantity in wetland habitats. Several LIFE and Horizon projects have removed dams as part of their NbS interventions, including the [LIFE Revers'eau](#) project.
- [Horizon Europe](#): The EU's key funding mechanism for research and innovation. There are seven Horizon projects in NbS for water identified in this report, which invested an estimated USD 2.1M in NbS for water in 2023. For example, the [RESTORE4LIFE](#) project

As is happening in the rest of the world, the growth of other watershed investments in Europe (1.9x) is outpacing the growth of landholder subsidies. Examples by the European Union include:

implements four demonstration sites to showcase wetland restoration in the Danube Basin.

Future European investments in NbS are expected to accelerate under key policy frameworks, including the [European Green Deal](#), a comprehensive strategy to achieve climate neutrality and a green transition in Europe by 2050. Presented just before the COVID-19 pandemic in December 2019, the strategy includes significant new investments in NbS for biodiversity, climate change adaptation, and pollution control, as well as policies to improve the management of natural infrastructure. Post-pandemic, these investments in NbS are often positioned as part of green economic recovery packages that aim to “build back better,” with many focusing specifically on “the resilience of water supplies and their associated freshwater ecosystems” (Trémolet and Karres 2020).

Figure 18. Share of Investment Volume by Payer Type, Europe, 2023



As part of the Green Deal, the [EU Biodiversity Strategy for 2030](#) commits to legally protect at least 30 percent of EU land and water, and it aims to mobilize USD 18.6B for conservation. The [Nature Restoration Regulation](#), adopted in June 2024, reinforces these objectives, setting a target to restore 25,000 km of rivers into free-flowing rivers by 2030. While the EU Green Deal has generated considerable interest and increased awareness of the potential of NbS, this analysis shows that it has not yet translated into a significant surge in on-the-ground action as of 2023. Investments have “remained limited due to regulatory barriers, high risk perception or a general lack of appreciation for what they can achieve” (Trémolet and Karres 2020). However, as these policies become embedded in national and regional planning frameworks, a significant expansion of NbS investments is expected in the coming years provided continued political will.

National Investments in Nature for Flood Control Are on the Rise

There was **USD 1.8B** of spending on NbS for water by national or subnational governments in Europe in 2023, primarily for flood control. In the Netherlands, the Dutch government is using NbS to respond to rising water levels by restoring floodplains and giving rivers more room to flood. The [Room for the River](#) program (established in 2007) includes interventions in over 30 locations along four major rivers in the country.

In the UK, the Environment Agency and the Department for Environment Food and Rural Affairs announced in September 2023 that USD 24M will be invested in projects that use [Natural Flood Management](#), supporting projects that reduce flood risk through NbS across major river catchments (UK Environment Agency 2023). The initiative focuses on collaboration with farmers and landowners to restore wetlands, peatlands, and woodlands.

In Spain, the [National River Restoration Strategy](#) (established in 2006) aims to recover and maintain the health of the country's rivers and waterways. The strategy includes restoration and rehabilitation interventions that enable the river to adapt to natural disturbances like flooding. The updated strategy for 2022-2030

aims to restore 3,000 meters (m) of rivers with an estimated investment of USD 2.6B, supported in part by the European Regional Development Fund and LIFE Program described above (Government of Spain n.d.; Zarza 2022).

User-driven Investment in NbS is Growing, Supported by Policy

Beyond government-led initiatives, water users themselves are increasingly investing in NbS in Europe, integrating natural solutions alongside traditional gray infrastructure, especially through initiatives organized at the catchment scale and encouraged by national policy. There are at least 19 cases in Europe where local governments, water management agencies, water service providers and large corporate water users have taken the lead to invest in NbS for water (Trémolet, Favero et al. 2019).

A standout example is [France's water agencies](#), which collectively spent over USD 380M on NbS in 2023. These agencies operate through a user-driven funding mechanism, with revenue collected through water user fees, pollution charges, and levies on barriers to watercourses. The agencies then invest funds in projects that improve water quality, restore aquatic ecosystems, and strengthen watershed resilience, including through NbS. By linking fees to water use and pollution, this system both finances restoration and creates incentives for businesses to reduce their environmental impact.

Another example is the United Kingdom's [Catchment Based Approach](#) (established in 2013), a nation-wide initiative that promotes ecosystem conservation and restoration aligned with the UK's target to restore 75 percent of waters to a "close to natural state" by 2027, as set out in its 25-Year Environment Plan. Under the Catchment Based Approach, local stakeholders form partnerships to plan and deliver interventions for river catchments. The national government sets out general principles to be followed, it but allows each partnership to organize itself in the way it considers most appropriate, empowering local actors like water utilities, businesses, farmers, landowners, and other organizations. Partnerships are typically hosted by a non-profit organization but supported by government financial and

technical resources. Each catchment defines its own financing model through a mix of public and private sector contributions. Overall, for every USD 1 of public investment, the 100+ partnerships have raised USD 3.5 from non-government sources. NbS for water interventions have included natural flood management and the restoration of wetlands and rivers. Spending by the program has been stable over the last five years, with expenditures of USD 108M in 2023 (CaBA 2024; Collins and Morse n.d.).

Latin America & the Caribbean

Growth in Investments in NbS for Water in Latin America & the Caribbean Is Driven by Multilateral Institutions and Domestic Government Investments

Investment in Latin America and the Caribbean (LAC) in NbS for water has increased 2.6x since 2016, reaching **USD 390M** in 2023 (Figure 15). After Africa, LAC relies on foreign assistance and multilateral institutions more than any other region, with over half of investments in NbS for water coming from these sources. Alternate funding models reliant on domestic public investment and water users are robust in Peru, Mexico, Honduras, Ecuador, the Dominican Republic, and Costa Rica. Private investment makes up a small, but rapidly growing, portion of total NbS for water funding.

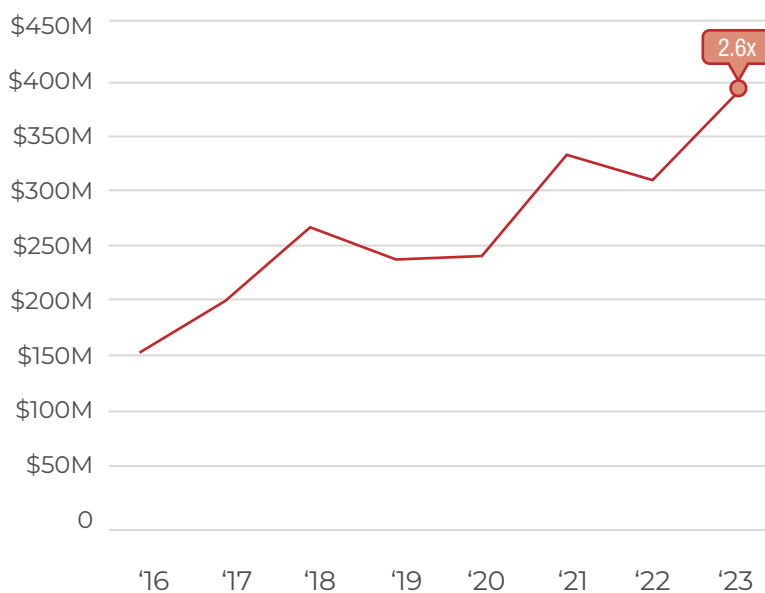
Half of Investments Are Enabled by Foreign Assistance and Multilateral Institutions

Foreign assistance and multilateral institutions participated in **53 percent** of investments in NbS for water in the region in 2023 through direct investment (41 percent) or loans to governments (13 percent). These investments have increased 1.5x over the last five years. In 2023, USD 160M of expenditures were made possible through direct investments by the GCF, Global Environment Facility, Adaptation Fund, Inter-American Development Bank (IDB), World Bank, and Climate Investment Funds. The largest direct investment in 2023 was part of an USD 82M GCF project to promote sustainable forest management in Argentina through a Results Based Payments program, which recognizes impacts of forest conservation on improving water storage and reducing flooding. Another USD 42M came from

Map 10. Investment in NbS for Water Security in LAC by Country, 2023, USD



Figure 19. Investment in NbS for Water Security in LAC, 2016-2023, USD



international actors in the form of loans,—two of which are supporting national landholder incentive programs in Mexico and the Dominican Republic, discussed below. Looking ahead, six new GCF projects⁸ in Brazil, Bolivia, Colombia, Haiti, and Peru are set to come online in the next several years with a total budget of USD 589M.⁹

Development of Domestic Programs by Governments is Widespread

Spending by governments in the region has increased 1.5x in the last five years, reaching **USD 222M**. While there were only eight government programs spending more than USD 1M annually on NbS for water in 2013, there were 24 in 2023. In

2023, six countries invested more than USD 10M in government funds annually on NbS for water, including Peru (USD 75M), Mexico (USD 31M), Honduras (USD 29M), Ecuador (USD 19M), the Dominican Republic (USD 14M), and Costa Rica (USD 10M).

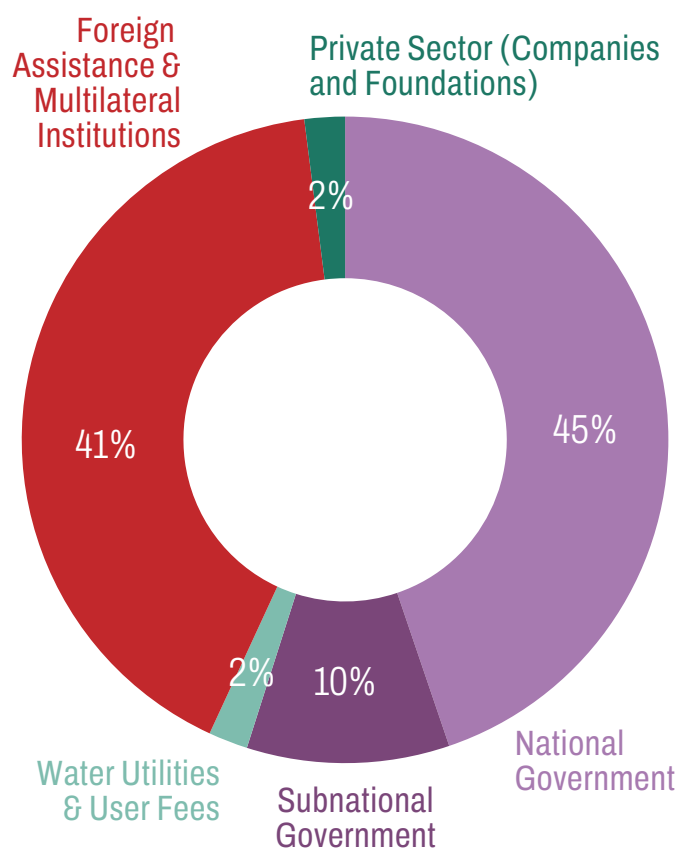
Peru is Scaling Up NbS Through Diverse Public Funding Mechanisms

Government investment in NbS for water in Peru was the highest in the region. These investments grew 8.3x since 2013, primarily through government investment projects implementing policies in diverse sectors that are mainstreaming NbS to address water risks. As of 2023, the Peruvian public investment system was actively investing in over 250 NbS projects with water objectives, which together spent a total of USD 75M in 2023. In addition, 43 out of the country's 50 water utilities have begun to implement programs to invest in the ecosystem services in their basin headwaters; specific fees levied on water users to fund these programs are expected to generate revenue of at least USD 30M by 2027 (SUNASS 2022). The country has also included natural infrastructure as part of its disaster risk management approach to prevent flooding and landslides during intense rainfall, with more than USD 270M earmarked for these projects under

⁸ Planting Climate Resilience in Rural Communities of the Northeast (PCRP); Upscaling Ecosystem Based Climate Resilience of Vulnerable Rural Communities in the Valles Macro-region of the Plurinational State of Bolivia (RECEM-Valles); Heritage Colombia (HECO): Maximizing the Contributions of Sustainably Managed Landscapes in Colombia for Achievement of Climate Goals; Enhanced climate resilience in the Trois-Rivières region of Haiti through Integrated Flood Management; Resilient Puna: Ecosystem based Adaptation for sustainable High Andean communities and ecosystems in Peru; Marajó Resiliente: Enhancing the resilience of smallholders to climate change impacts through adapting and scaling up diversified agroforestry systems in the Marajo Archipelago of Brazil.

⁹ The total budgets are financed through a combination of grants, loans, and co-financing.

Figure 18. Share of Investment Volume by Payer Type, LAC, 2023



the National Infrastructure Authority. Many of these Peruvian investments incorporate ancestral water management practices. This robust growth is attributed to innovative policy reforms that recognize natural infrastructure as a public asset and a nationwide policy that directs water utilities to set aside a portion of user fees for watershed services (Benites and Gammie 2022).

Several Countries Sustain Investments Through National Landholder Incentives

Several longstanding national programs, many dating back to the 1990s or early 2000s, continue to invest in watershed management using established landholder incentive mechanisms. In 2023, USD 56M was invested through landholder incentives, representing 1.2x growth over the last five years. In addition to watershed services, these programs recognize additional ecosystem services like carbon sequestration, biodiversity, and disaster risk management, as well as improved livelihood opportunities for communities.

In Mexico, several initiatives managed by the National Forestry Commission (CONAFOR) have been pivotal in promoting ecosystem conservation and sustainable water management. This includes three programs that make up three-quarters of the country's spending in NbS for water in 2023, which operate entirely or partially through landholder subsidies. The largest of them, the [Payments for Environmental Services Program](#) (PSA) (established in 2003) provides economic incentives for landowners who preserve forests. The program spent an estimated USD 22.6M in 2023. Similarly, the [Strengthening entrepreneurship in productive forest landscapes project](#) (established in 2018), supported by grants and loans from the World Bank and its BioCarbon Fund, also includes a Payment for Ecosystem Services mechanism for conservation activities. The program spent an estimated USD 3.2M in 2023.

In Ecuador, the Ministry of Environment manages the [Socio Bosque program](#) (established in 2008), which provides economic incentives to landholders who voluntarily commit to the conservation and protection of forests and other ecosystems. The size of the payments depends on the area of land registered into the program and compliance with activities established within the restoration plan. The plan may include restoration activities like tree planting and prohibit activities like burning, grazing, or commercial hunting (Ministerio del Ambiente 2014). The program spent an estimated USD 5.3M in 2023.

In the Dominican Republic, the Ministry of Public Works implements the [Sustainable Agroforestry Development Program](#) (established in 2018), which aims to improve income of small agricultural producers and increase climate adaptation. The program provides direct support to smallholder farmers to cover the cost of adopting agroforestry practices, and it funds restoration of degraded public lands (IDB 2017). The program was made possible through a loan from the IDB and benefited from lessons learned from the region's first payments for ecosystem services program in Costa Rica. The program spent an estimated USD 13M on its component related to agroforestry in 2023.

Costa Rica's National Forestry Financing Fund (FONAFIFO) [Payment for Ecosystem Services Program](#) (PPSA) (established in 1997) provides direct payments to forest landowners who adopt sustainable land and forestry practices. The program—which is funded by a mix of different sources including fuel and water tariffs, carbon credits, biodiversity certificates, and other public and private sources—has been identified as one of the drivers enabling the country to increase its national forest cover to 54 percent (UNCC n.d.) (Arguello 2024). Expenditures reached USD 26M in 2020 but have dropped in subsequent years down to USD 10.4M in 2023.

Honduras' New National Program Responds to Deforestation, Highest 2023 Expenditures in the Region

A newer entry to national programs in this region is Honduras' [Father Andres Tamayo National Reforestation and Watershed Protection Program](#) (established in 2022). The program is designed to help the country meet its Nationally Determined Contributions and restore 22,000 hectares of degraded and deforested land in 300 micro-watersheds, ultimately benefitting more than two million people (ICF n.d.). Interventions include reforestation, community watershed management, and agroforestry. In 2023, the program spent an estimated USD 26M, the highest expenditure of any individual initiative on NbS for water in the geography.

Water Funds Spread Throughout the Geography with Steady Growth

There are 32 water funds in various stages of development in Latin America, 26 of them framed in the [Latin-America Water Funds](#) partnership (TNC n.d.). Based on 13 funds in Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, and Ecuador that submitted data for this report, investments have grown 1.4x over the last five years, reaching **USD 14M** in 2023. In many cases, these water funds leverage public and private funds to invest in their watersheds, as is the case for the water fund in Quito, Ecuador ([FONAG](#)). In Brazil, the National Water Authority manages water funds through the Water Producers program, through

which municipalities collect fees from water users and make direct payments to farmers and ranchers who protect and restore forests on their land.

Private Investment Is Small but Growing Rapidly

Excluding private funds raised by water funds, private investments for NbS for water in the geography have grown 5x since 2016, reaching **USD 7.9M**. Despite the fast growth rate, this represents only two percent of investments for NbS for water in the geography. These investments are led by private foundations and companies from the technology and agriculture sectors.

US & Canada

Government Investment Sustains Investments in NbS for Water in the US & Canada, Driven by Landholder Incentive Programs

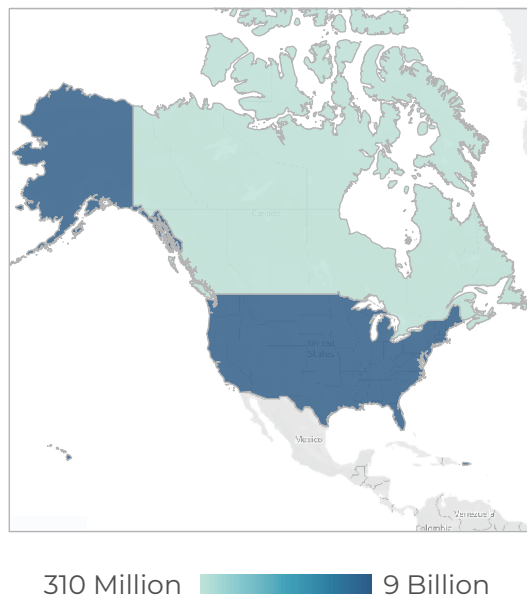
In 2023, investments in NbS for water security in the US and Canada exceeded **USD 9.3B**, representing a 2.5x increase since 2013 (Figure 16). Almost all of this funding (97 percent) came from government investment, with large investments by federal agencies responsible for water, conservation, defense, agriculture, and more. Looking ahead, more than USD 52B has been pledged to NbS for water in the US & Canada over the next decade through various commitments and legislative initiatives.¹⁰ However, the potential impacts to this funding from US federal programmatic and budget reductions are unclear.

US Federal Agency Drives Half of Investment Through Landholder Incentives

The US Natural Resource Conservation Service (NRCS) alone accounts for almost half of the total investment (USD 4.6B) in NbS for water in the geography in 2023. Among its at least

¹⁰ This number encompasses several commitments discussed in this section including: United States: Bipartisan Infrastructure Law, Inflation Reduction Act, Chesapeake Bay Watershed Agreement; Canada: Natural Climate Solutions Fund, Freshwater Action Plan, BC Watershed Security Fund.

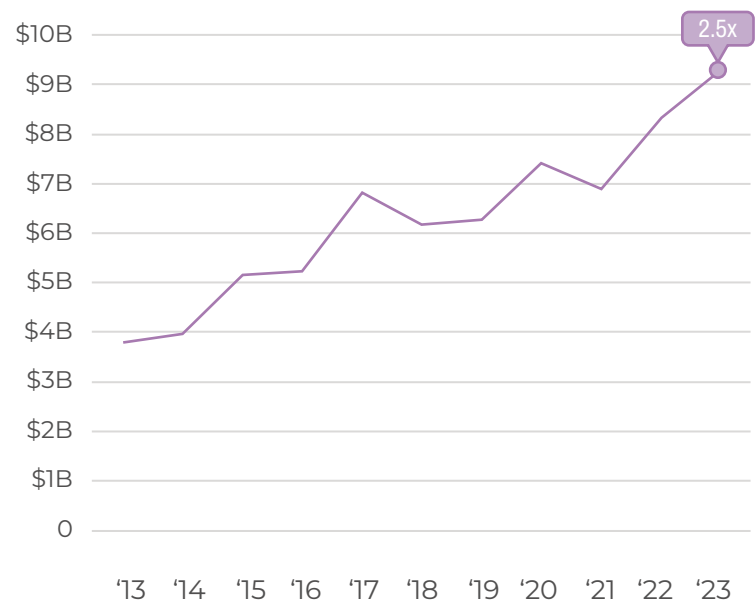
Map 11. Investment in NbS for Water Security in the US and Canada by Country, 2023, USD



ten programs that invest in NbS for water,¹¹ the largest expenditures were made by two long-standing landholder incentive programs authorized through the US Farm Bill. These expenditures incentivize American farmers to adopt conservation practices on working lands and include the [Environmental Quality Incentives Program](#) (EQIP), which provides assistance to farmers and ranchers who are new to conservation practices, and the [Conservation Stewardship Program](#) (CSP), which contracts landholders already engaged in conservation (Johnson 2021). Recent changes in these two programs have been large enough to influence the trends in Figure 19. The 2018 Farm Bill reduced financial assistance to farmers and ranchers in 2021 by 60 percent compared to the previous year (Coppess 2023). In contrast, the

¹¹ In addition to the EQIP and CSP, this report tracked expenditures for Agricultural Management Assistance (AMA), Agricultural Water Enhancement Program (AWEP), Chesapeake Bay Watershed Initiative (CBWI), Conservation Reserve Program (CRP), Conservation Security Program (CSP), Conservation Stewardship Program (CSP), Emergency Watershed Protection Program, Environmental Quality Incentives Program (EQIP), Regional Conservation Partnership Program (RCPP), and Wetlands Reserve Program (WRP, now part of the Agricultural Conservation Easement Program (ACEP)).

Figure 19. Investment in NbS for Water Security in the US & Canada, 2013-2023, USD



budget for EQIP has steadily increased under the 2018 Farm Bill to enhance and expand its purposes, which has contributed to the rebound and continued growth of regional investment through 2023 (USDA 2020).

US Department of Defense Invests in Landscapes Around Military Installations and Civil Infrastructure

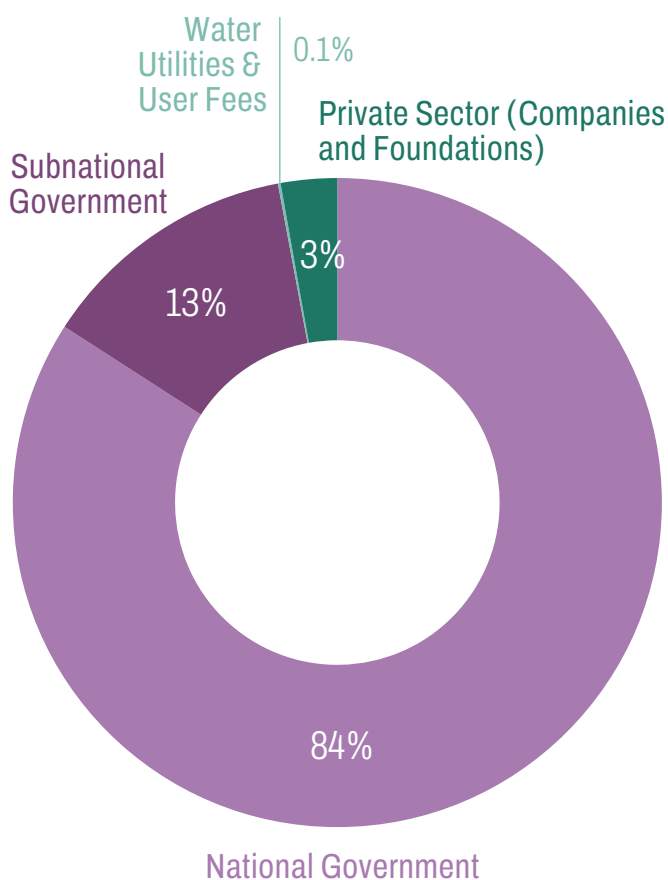
Another federal agency, the Department of Defense, has been implementing NbS for water projects through the US Army Corps of Engineers (USACE), which is responsible for both military and civilian infrastructure projects. The USACE has invested in coastal storm protection, flood risk management, and ecosystem restoration projects through its [Engineering with Nature](#) program (established in 2010), and recently signed a memorandum to further expand the use of NbS in its civil works projects (Department of the Army 2024). The Department of Defense has also been investing in landscapes around military through its [Readiness and Environmental Protection Integration Program](#) (established in 2002), specifically towards avoiding land-use conflicts and addressing environmental restrictions that limit military

activities. Since its inception, the overall program has leveraged USD 1.5B of the Department's funds with nearly USD 1.4B of additional partner contributions, some of which has gone towards NbS for water, including placing watersheds around military bases at risk of development under conservation easements. The Department of Defense is also part of the [Sentinel Landscapes partnership](#) (established in 2013), which advances sustainable land-use practices around military installations, including natural resource management for water quantity and quality. While the military may be an unexpected actor in conservation efforts, these programs demonstrate the power of aligning conservation co-benefits with a diversity of potential funders.

Regional Initiatives in the US Are Driven by Federal and Local Funding Sources

In the Eastern US, the Chesapeake Bay is a key focal point for watershed restoration with an emphasis on water quality, with at least USD 2.2B invested in NbS for water security in the Bay in 2023. Decades of excess nutrient and sediment pollution from agriculture, urban runoff, and wastewater severely degraded aquatic ecosystems, prompting the establishment of the nation's most ambitious Total Maximum Daily Load (TMDL) in 2010 to restore the Bay's health (US EPA 2021). This marked a shift from fragmented, state-by-state action to a shared regional responsibility, reinforced by the 2014 [Chesapeake Bay Watershed Agreement](#), which expanded restoration goals beyond water quality to include climate resilience, habitat, and fisheries, and brought together state and local jurisdictions with seven federal agencies spanning environmental protection, agriculture, infrastructure, transportation, research, and defense. While wastewater treatment upgrades have delivered substantial nutrient reductions, progress has been slower in curbing nonpoint source pollution—particularly from agriculture (STAC 2023). Market-based mechanisms like water quality trading have helped to engage agricultural producers and other non-point sources of pollutants, but in the same period overall non-point source pollution has increased, and by 2020 still only about one-third of the Bay met water quality standards (STAC 2023). Pay-

Figure 20. Share of Investment Volume by Payer Type, US and Canada, 2023



for-success mechanisms—such as [DC Water's 2016 Environmental Impact Bond](#) and [Prince George's County's Clean Water Partnership](#) launched in 2015—have been developed in the region over the past decade to mobilize private capital and improve performance in NbS, especially related to stormwater management. These outcome-based financing models are now gaining renewed traction as states seek more cost-effective, accountable ways to accelerate progress toward Bay restoration goals, as illustrated by the 2025 launch of [Virginia's Pay-for-Outcomes Nonpoint Source Nutrient Reduction Pilot Program](#), which includes investment in reforestation, nitrogen-fixing grasses, and oyster reefs.

In the Western US, several new initiatives have emerged in response to increasing drought, flood, and fire intensified by climate change, increasingly funded by carbon emitters. California is investing USD 2.5B to implement its

[2021 Wildfire and Forest Resilience Action Plan](#), which focuses on large-scale forest restoration efforts that also recognize water quality benefits. Complementing this plan, the [California Climate Investments](#) program (established in 2012) invests revenues generated from the state's greenhouse gas cap-and-trade system in initiatives that reduce greenhouse gases. Out of USD 1.7B implemented by the program in 2023, this report found USD 222M for NbS for water initiatives including reforestation, fire management, healthy soils, and wetland restoration (California Climate Investments n.d.); many of these investments serve as matching funds for federal investments in forest management, and some private project developers are building out models to complement state funding with private capital through credits generated based on carbon and water benefits. Washington State launched a similar [Cap-and-Invest program](#) in 2023 that directs 25 percent of its revenue to a Natural Climate Solutions Account. Funds from this account are supporting wildfire prevention and the restoration of riparian areas and floodplains to reduce flood risks and enhance ecosystem resilience.

Recent US Policies Pledge Billions for Natural Infrastructure but Implementation Now in Question

In 2021 and 2022, the US passed two major pieces of legislation that included important investments in natural infrastructure. The [Bipartisan Infrastructure Law](#) earmarked more than USD 28B¹² for NbS related to water (The White House 2022), and the [Inflation Reduction Act](#) allocated USD 20B for NbS for water, including USD 8.4B for NRCS's EQIP, USD 4.9B for its Regional Conservation Partnership Program, and USD 4B for the Bureau of Reclamation's Drought Mitigation program in the American West (The White House 2023). The integration of NbS into major national infrastructure bills represents a transformative approach, recognizing natural infrastructure as critical not only for environmental protection but also

for economic growth and climate resilience. However, the implementation of the funding allocated by these bills is not guaranteed. While the data in this report captures part of the investment under the Inflation Reduction Act in 2023, many projects expected to begin implementation in 2025 have been put on hold, contributing to uncertainty around the future of federal investments in NbS for water.

Canada Makes New National and Regional Commitments for NbS for Water

In Canada, more than **USD 300M** was invested in NbS for water domestically between 2021 and 2023 via the federally funded [Natural Climate Solutions Fund](#) (established in 2020). In total, the fund will invest a total of USD 3.5B through 2031. Additionally, the national Freshwater Action Plan, first announced in 2017 and renewed in 2023, includes a commitment by the Canadian government to allocate more than USD 450M to watershed protection and restoration over ten years. The plan is implemented by the [Canada Water Agency](#), which was established in 2023 and coordinates federal efforts related to water management, including coordination with local government, indigenous communities, and stakeholders. At the provincial level, British Columbia announced its USD 70M Watershed Security Fund in 2023, co-governed by the provincial government and First Nations leadership.

User-driven Investments Grow, Despite Limited Data on Investments by Utilities and Private Sector

User-driven investments have grown 2.4x over the last decade, reaching at least **USD 139M** in 2023, including watershed investments by local governments and utilities in cities like [New York](#), [Denver](#), [San Antonio](#), and [Raleigh](#). While data on direct investments by private companies were underreported, the report tracked several instances of private investment channeled through other mechanisms like the California Climate Investments (mentioned above), collective action mechanisms like the [Northern Arizona Forest Fund](#) and the [Delaware River Restoration Fund](#), bonds (See Emerging Momentum in Debt Finance for NbS, page 31), and water quality trading programs (below).

¹² Of the USD 64B earmarked for water infrastructure, more than USD 14B (18 programs) is for NbS. In addition, USD 18B (ten programs) will focus on or incorporate NbS for water security under the Resilience and Environmental Remediation categories.

Investments Through Water Quality Trading Programs Grow

Investments through water quality trading programs in the region grew 5.5x over the last decade, including well-established programs in states like [Virginia](#) and [Pennsylvania](#) that recognize reductions by non-point sources such as agricultural runoff to meet nutrient limits. Investments also include municipal programs like those established by The Freshwater Trust for cities of [Ashland](#) and [Medford](#), which help local wastewater treatment plants meet the temperature limits in their discharge permits through planting and maintaining native trees along waterways.

On the other hand, environmental water markets did not show clear signs of growth despite several active efforts to acquire water rights to protect streamflow in the western US, such as those by the [Colorado Water Conservation Board](#) and [Clark Fork Coalition](#).

Oceania

Oceania Drives Innovation through Market-based Mechanisms and Indigenous Leadership

Map 12. Investment in NbS for Water Security in Oceania by Country, 2023, USD



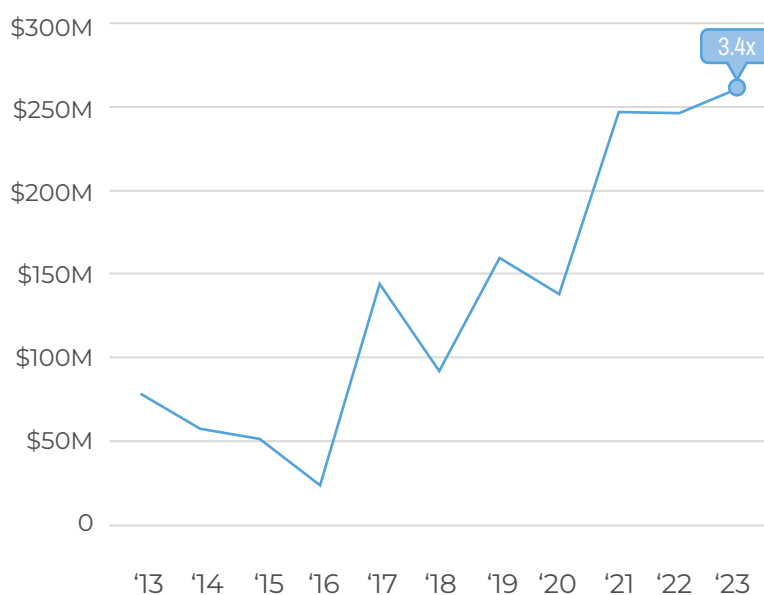
162,000 165 Million

Investments in NbS for water security in Oceania are dominated by Australia and New Zealand (Map 11), with additional investment in Pacific Island nations of Fiji, the Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, the Solomon Islands, Tonga, Tuvalu, and Vanuatu. Since 2013, investment volumes have increased 3.4x, reaching **USD 261M** in 2023 (Figure 17). While there were localized drops in investment in 2018 and 2020 due to fluctuations in Australia's instream buyback programs, the overall trend in the region remains one of sustained growth.

Investments in NbS for Water Are Driven by Government Investment, Led by Australia and New Zealand

In line with global patterns, domestic spending by governments dominates in the region, accounting for over 97 percent of the investment in NbS for water security in 2023, including USD 165M in Australia and USD 89M in New Zealand. In Australia, the [Reef Trust partnership](#) (established in 2018) aims to improve the health of the Great Barrier Reef through a variety of practices, including a USD 126M water quality component which uses NbS like improved farming practices to improve downstream water quality (Great Barrier Reef Foundation n.d.). The partnership is implemented by the Australian

Figure 21. Investment in NbS for Water Security in Oceania, 2013-2023, USD



Government's Reef Trust and the Great Barrier Reef Foundation. Also in Australia, the [Urban Rivers and Catchment Program](#) (established in 2022) has provided USD 128M to restore the health of urban waterways. This program is financed by the country's [Green Treasury Bonds](#).

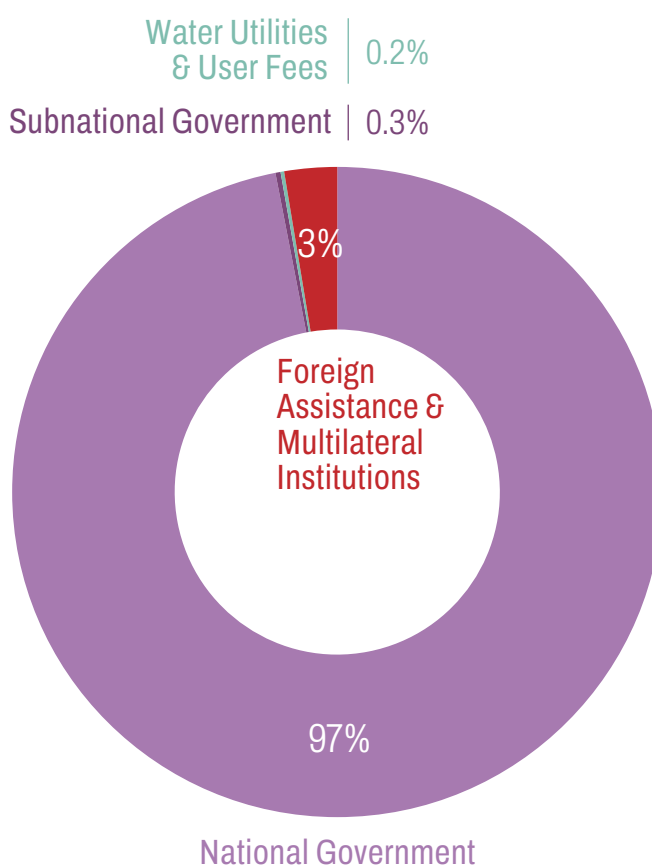
In New Zealand, investments in NbS for water are largely driven by the [Jobs for Nature](#) program, an economic recovery initiative introduced in response to the COVID-19 pandemic. The program has committed over USD 700M in total funding for projects that create economic opportunities while delivering environmental benefits (NZ Government 2024). Some of the Jobs for Nature funding contributes to the [Freshwater Improvement Fund](#) (established in 2016), a separate but related initiative which is distributing USD 100M over ten years to projects that clean up New Zealand's rivers, lakes, and aquifers (Ministry for the Environment 2023; Smith 2016). NbS interventions in recently funded projects include restoration of freshwater ecosystems to improve water quality.

Innovative Market-based Mechanisms

Oceania stands out for its innovative financing mechanisms, including several established market-based mechanisms in Australia and New Zealand which manage water quantity or quality. Within the domestic investments by governments cited at the beginning of this section are USD 64M of investments through market-based mechanisms. Investments from these mechanisms have fluctuated throughout the decade, reaching a peak in 2017 at USD 124M. These programs, also introduced in the Global Overview section, include:

- [Voluntary water buyback program for the Murray-Darling Basin](#) (established in 2007): This program is part of a broader national effort to restore environmental water to Australia's largest watershed by buying back surface and groundwater rights from willing irrigators in over-allocated systems. The program is also financed by Australia's Green Treasury Bonds.
- [Reef Credits](#) (established in 2017): A newer initiative is Australia's Reef Credits program, a voluntary trading system which allows

Figure 22. Share of Investment Volume by Payer Type, Oceania, 2023



landholders to generate credits by improving nutrient or sediment pollution through land management activities including gully rehabilitation and rotational grazing. Over 50,000 Reef Credits have been generated, representing over 50 tonnes of Dissolved Inorganic Nitrogen prevented from entering waterways. Reef Credits have been purchased by the Queensland government, as well as private investors HSBC Bank and Qantas Airlines. Over 40,000 of those credits have been retired, generating more than USD 1.8M (Green Finance Institute 2024).

- [Lake Taupo Nitrogen Cap and Trade System](#) (established in 2007): The world's first agricultural non-point-source pollution water quality cap-and-trade program aims to improve water quality in New Zealand's Lake Taupo by allocating nitrogen discharge allowances that farmers can trade amongst themselves within an overall cap established

for the catchment (Duhon, McDonald, and Kerr 2015). The USD 46.5M fund was created with contributions from local and national government (Barns and Young 2013).

Indigenous Leadership in Land and Water Management

Indigenous peoples in Oceania are leading water management alongside national governments. In New Zealand, the USD 194M [Waikato and Waipā Rivers Restoration Strategy](#) was established by the Waikato River Authority, a co-governance entity with equal representation from Indigenous Māori people and the Crown, along with the local river council and dairy association. Among other objectives, the strategy aims to improve water quality including through NbS like restoring wetlands and planting native species for erosion control (Neilson et al. 2018).

Small Pacific Island Nations Depend on Foreign Assistance and Multilateral Institutions for NbS for Water Investments

Foreign assistance and multilateral institutions participated in three percent of investments in NbS for water in Oceania through direct investments. While only a small percentage, it is the only funding source recorded for the many small island nations outside of Australia and New Zealand. Key initiatives include:

- [Pacific Ridge to Reef Initiative](#) (2014-2022): This program, building on previous Global Environment Facility (GEF) efforts in the region dating back to the 1990s, aims to maintain

ecosystem services in 14 Pacific Island Nations through a landscape approach that links watershed management in freshwater and coastal ecosystems (Pacific R2R n.d.). The program was approved with a total cost of USD 416M, including an USD 83M GEF grant and additional co-financing from national and local governments, international agencies, bilateral foreign assistance agencies, the Coca-Cola company, and NGOs (GEF 2013).

- [Kiwa Initiative](#) (established in 2020): This initiative aims to strengthen the resilience of ecosystems and communities in Oceania by supporting NbS through grants and technical assistance. The USD 82M initiative, which is managed by the French Development Agency with additional financial support from the European Union and foreign assistance agencies of Canada, Australia, and New Zealand, recognizes the preservation of water resources as one of many co-benefits of NbS (AFD n.d.).
- [Climate Resilient by Nature](#) (established in 2021): This USD 13M initiative funded by the Australian Government, in partnership with WWF-Australia, advances NbS in the Indo-Pacific. Funded projects include protecting and restoring rainforest ecosystems that provide clean water.

These investments in the region are also supported by a USD 2.5M project to support enabling conditions for NbS in Pacific Island Nations funded by the New Zealand government called Promoting Pacific Island Nature-based Solutions (established in 2022).



Outlook

One of the Xochimilco wetland channels that supply water for traditional agricultural systems under restoration with the Chinampa-Refugio model, Mexico City, Mexico.

Photo credit: Victor Martinez. Submitted by: Conservation International

Outlook

Strong investment trends in NbS for water security are likely to continue—particularly in countries like China and Europe, where political commitment, clear policy mandates, and integration into national planning have created a stable environment for investment. Elsewhere, practitioners and experts suggest that future growth will depend heavily on the diversification of financing sources and the ability of NbS initiatives to demonstrate clear value in mitigating water-related risks.

Barriers to Scale: Fragile Funding and Political Support, Technical Challenges, and Capacity Constraints

While the overall trajectory of investment in NbS for water is upward, significant structural barriers continue to limit the scale, sustainability, and effectiveness of initiatives. Survey respondents across regions consistently cited a core set of challenges that constrain their ability to grow or deepen investment—spanning financial uncertainty, institutional fragmentation, regulatory hurdles, and implementation constraints.

The most frequently cited barrier remains the **persistent difficulty of securing stable, long-term funding**. Although capital is becoming more available through instruments like bonds and concessional loans, most initiatives still struggle to secure reliable revenue streams to repay up-front finance and cover operational costs over time. Given that the water benefits provided by nature are inherently public, they are subject to many classic collective action problems and persistently at risk of underinvestment (World Bank 2025). Political and economic volatility is exacerbating these concerns. National governments have historically been the largest funders of NbS for water, but that foundation is showing signs of strain. In Colombia, practitioners flagged a lack of enduring financial commitments and wavering political will to sustain existing programs. Respondents across Eastern and

Southern Africa noted a marked reduction in development aid for NbS, as donors increasingly prioritize conflict response and humanitarian assistance. In the United States, ongoing cuts to government spending have cast uncertainty over the future of federally-funded NbS investments. This trend may accelerate: data from SIPRI ((Stockholm International Peace Research Institute (SIPRI) 2025) shows a global surge in defense spending and expectations that fiscal tightening could increasingly crowd out investment in natural infrastructure. Beyond financing, practitioners also highlighted **major gaps in stakeholder understanding and engagement**. In many contexts, the long-term and landscape-scale nature of NbS makes them difficult to communicate—particularly to actors like water utilities, investors, and Environmental, Social and Governance (ESG) raters who are used to infrastructure solutions with shorter feedback loops and more directly attributable outcomes. In the US and Canada, respondents cited challenges in explaining how upstream watershed investments translate into quantifiable benefits for downstream users. In Brazil, companies were described as slow to act, still perceiving NbS and climate adaptation more as expenses than strategic investments—despite growing climate and water risks.

Legal and institutional barriers further compound these issues. Across Latin America, respondents emphasized that frequent turnover in government administrations, coupled with bureaucratic delays in public procurement processes, often derails or stalls project implementation. In Mexico, these transitions are seen as one of the most significant threats to continuity. In Brazil, respondents flagged the complexity of overlapping regulatory mandates across water, environment, and land management agencies. Even when political will exists, such fragmentation makes coordinated action difficult. In other contexts, specific legal limitations block investment entirely, for example where water utilities are prohibited from investing in ecosystem protection beyond

their service areas, despite clear hydrological interdependencies. This was the case in Peru, before national reforms required water utilities to consider investing in their upstream ecosystems; now, the primary institutional barrier to investment is a complex public investment system that imposes extensive requirements for deploying funds available for NbS and is not sufficiently aligned with strategic planning processes and timelines (OECD 2021).

Another recurring theme was the **difficulty in quantifying and communicating the benefits of NbS**, particularly at the watershed scale. Respondents across regions reported that the lack of standardized metrics and robust monitoring frameworks makes it harder to effectively make the case for investment. In Thailand and Brazil, program leads noted that without commonly accepted definitions and valuation methodologies, it is difficult to build trust or attract funding. In US and Canada, practitioners observed that corporate ESG frameworks do not effectively accommodate shared or landscape-level outcomes, limiting private sector participation. Ironically, the **increasing climate volatility**—while a major driver of interest in NbS—also poses risks to their effectiveness. In Mexico, prolonged drought has threatened the viability of nature-based interventions and undermined the impact of groundwater recharge initiatives. In Brazil, flooding events have disrupted restoration efforts and weakened landholder engagement. These experiences underscore that while NbS are intended to build resilience, they are not immune to climate shocks themselves.

Finally, even where financing, policy support, and strong design frameworks exist, a **shortage of delivery capacity** remains a bottleneck. Many places lack the trained personnel, institutional infrastructure, and implementation partners required to move from funding to results. India's flagship Namami Gange program has struggled to deploy its budget due to challenges with technical and financial planning, with some years seeing less than half of allocated funds utilized (PRS Legislative Research 2023). In Peru, a national disaster reconstruction program has had trouble awarding multi-million dollar contracts to develop natural infrastructure projects because

the market of service providers were not prepared to respond to technical requirements. In the United States, while the Forest Resilience Bond has successfully mobilized capital for watershed restoration, its developers continue to encounter implementation delays due to shortages in the workforce, contractor capacity, and equipment needed for forest restoration.

Drivers and Opportunities: Rising Water and Environmental Crises, Stronger Policy Drivers, and Strategic Integration of NbS

Despite the challenges described above, the outlook for investment in NbS for water security remains positive. **Survey respondents across all regions anticipated continued growth**, with many projecting significant increases in payments transacted over the next three years. On average, respondents estimated a global investment growth of 48 percent, with some regions such as North America anticipating more than double that rate. Notably, these projections were made in early 2024, before recent political shifts that may influence future trajectories.

One of the most frequently cited drivers of future growth was the **rising toll of environmental crises**. Practitioners emphasized that floods, droughts, water scarcity, and other climate-exacerbated disasters continue to increase both the urgency and visibility of water-related risks. These events often act as catalytic moments, prompting governments, donors, and communities to invest in upstream, preventative measures such as NbS. The role of environmental disasters in driving policy and large investment is evident historically—for example, major floods and water quality challenges drove China's historic policy reforms and eco-compensation programs, and the Dust Bowl in the US drove the beginning of its monumental investments in NbS through the NRCS. Likewise, from Malawi to Brazil, in 2024 respondents described increasing climate extremes as an expected driver of support for nature-based approaches.

At the same time, **how these investments are framed will be critical for sustaining political support**. While climate change is a major underlying driver of many water-related crises, recent GlobeScan and WWF research indicates that public support is stronger and more

bipartisan when NbS are positioned as strategies to protect freshwater ecosystems and ensure water quality (GlobeScan and WWF 2025; pers. comm with the author). These issues resonate deeply across political and ideological divides and are often viewed as more immediate and tangible than abstract climate goals.

Survey responses and experts also revealed a **growing trend toward integrating NbS into broader infrastructure and watershed planning**. Rather than being treated as standalone projects, NbS components are now being embedded in broader initiatives—such as hydropower development, wastewater management, and flood protection. Development banks and national planning processes are beginning to institutionalize hybrid green-gray approaches, creating new entry points for NbS. Respondents from Italy, Spain, Brazil, and Kazakhstan reported examples of this trend, including the use of EU water directives to support catchment-based planning, new partnerships with utilities to implement NbS at scale in coordination with gray infrastructure, and the linkage of NbS to biodiversity and disaster risk goals. This also enables new forms of finance for NbS, like land value capture (World Bank 2025).

The presence of **dedicated funding mechanisms backed by policy** also emerged as a key enabler. Several countries are taking steps to establish stable revenue streams for NbS implementation,

including ringfenced watershed restoration budgets in South Africa and a proposed catchment investment levy for water users in Uganda. These mechanisms signal a maturing policy environment that is beginning to treat NbS with the same financial seriousness as built infrastructure.

Finally, a growing number of initiatives are working to **monetize the co-benefits** of NbS—particularly carbon sequestration, biodiversity conservation, and local livelihood improvements. Initiatives in Kenya, Mexico, and Ecuador reported pursuing carbon finance and biodiversity credit markets to diversify revenue and increase return on investment. Survey respondents noted that this trend is helping to bring new partners to the table and improve the financial viability of multi-benefit interventions.

Taken together, these insights suggest that the global NbS field is gaining traction through both necessity and innovation. Stakeholders are increasingly aligning efforts across sectors, embedding NbS into broader strategies, and experimenting with blended finance and outcome-based approaches. Public support for water-focused solutions, reinforced by direct experiences with acute water crises, offers a uniquely strong foundation for further investment—if it can be matched by the enabling policies, technical capacity, and coordination needed to realize that potential.

A wide-angle landscape photograph showing a herd of white alpacas grazing in a wet, green valley. The alpacas are scattered across the foreground and middle ground, some standing in shallow water. The background features rolling brown hills under a sky filled with large, white and grey clouds, with a small patch of blue sky visible. The overall scene is a high-altitude, arid environment.

Methodology

SEDAPAR, the water utility serving the city of Arequipa, Peru, invests in partnership with local communities and the National Protected Area Service in its source watersheds in the Salinas y Aguada Blanca National Reserve.

Photo credit: Forest Trends

Methodology

This report offers the most comprehensive global analysis to date of investment in NbS for water security. It spans investments from 2013 to 2023, covering 1,645 initiatives in 140 countries. The methodology was designed to ensure consistency in scope, avoid double-counting, and allow comparison across geographies, payers, and investment mechanisms. Data were compiled through a combination of primary research, secondary data sources, and expert consultation. The following describes the scope of initiatives included, key definitions and classifications, data sources and assumptions, and known limitations.

Scope of the Analysis

This report includes programs and projects (when discussed together, called “initiatives”) that executed funds to implement NbS for water in the period 2013-2023 that meet all of the following criteria:

1. Nature-based interventions must have been implemented on the ground to:
 - a. conserve or protect ecosystems;
 - b. rehabilitate or restore ecosystems; or
 - c. manage, enhance, or create natural processes in modified or artificial ecosystems.
2. The nature-based interventions must have occurred in terrestrial, freshwater, or brackish ecosystems.
3. The initiative must have had an explicit objective related to water security.

Initiatives served a wide variety of water users and uses, including drinking water, hygiene, agriculture, aquaculture, energy, industry, transportation, recreation, ecosystem health, and cultural practices.

To maintain an analytical focus, the report excludes:

- Initiatives supporting nature-based interventions in marine ecosystems, such as mangroves and coral reefs

- Initiatives funded through wetland or streambank mitigation banking

Likewise, we did not focus data collection efforts on initiatives focused on urban green infrastructure, such as green roofs, bioswales, green streets, rain gardens, permeable pavement, urban greenways, and street trees. This area is underrepresented due to limitations in collecting data from the municipal level.

There are some differences in the definition of scope for this report compared to Forest Trends’ *State of Watershed Investment 2016* report (Bennett). For example, some mitigation banking programs and environmental water markets not exclusively focused on NbS were included in the 2016 report, but are excluded from the current report. This change in scope accounts for the apparent decline in reported water quality trading between the two reports. For an apples-to-apples comparison, please refer exclusively to the data presented across time in this report.

Many initiatives have mixed “green” and “gray” activities. If the initiative’s main purpose was to implement NbS for water security, all expenditures were included. If the initiative’s main purpose was not to implement NbS for water security, only the NbS for water components were included (e.g., gray infrastructure projects that include some NbS interventions). In the latter case, if the portion of expenditures attributable to NbS interventions could not be confidently estimated, the initiative was excluded. For programs with mixed objectives, the numbers cited in parentheses within the report are the estimated expenditures for the NbS for water component.

Characterizing Investments in Nature-based Solutions and Avoiding Double Counting

We use the term “investment” to describe financial expenditures to build and sustain natural assets. This is analogous to how a utility might invest in gray infrastructure. While some NbS generate financial returns, most deliver benefits in the form of cleaner or more reliable water supplies, avoided treatment or rebuilding

costs, or even co-benefits like increased incomes for farmers participating in a watershed investment program.

Investments may take the form of direct funding for activities or results-based payments (e.g., in trading markets). They may be financed through reimbursable (e.g., loans) or non-reimbursable instruments (e.g., grants, procurement contracts). In this report:

- The payer in **reimbursable** finance is the recipient institution (e.g., when a national government borrows from a development bank, the payer is the national government).
- **Non-reimbursable** finance is attributed to the institution providing the funds (e.g., the development bank issuing a grant is the payer).

To prevent double counting, respondents were asked to identify umbrella programs, funding sources, and partners. Where overlaps were identified, expenditures were counted only once.

Projects and Programs

The dataset distinguishes between projects (discrete efforts with defined outputs and timeframes) and programs (coordinated groups of projects with shared objectives and longer time horizons). This distinction helps to assess the scale, continuity, and institutional design of NbS investments.

- **Project-level reporting** was used when specific project data were available (e.g., from the Green Climate Fund, Adaptation Fund, or UNDP).
- **Program-level reporting** was used when project-level detail was unavailable (e.g., for the European Agricultural Fund for Rural Development).

Scales

We use the following terms consistently across the report to describe payer types and initiative scales:

- **National:** Central or federal governments
- **Regional:** States, provinces, governorates, or other intermediate jurisdictions

- **Local:** Cities, towns, municipalities, and watershed-scale efforts
- **Subnational:** Inclusive of both regional and local levels

Data Collection

Data were gathered from May 2024 to early 2025 through:

- **Primary sources:** Online surveys and direct outreach was conducted to managers and funders of NbS initiatives.
- **Secondary sources:** These included publicly available datasets, government reports, donor databases, credit registries, and program evaluations. In some cases, private data sources were accessed through agreements with database owners.
- **Expert consultation:** Interviews helped interpret findings and shape narrative sections such as trends and outlooks.

Exchange Rates

All investments are reported in USD. Currency conversions used 2023 exchange rates published by the US Internal Revenue Service or [exchangerates.org](https://www.exchangerates.org) when necessary.

Key Assumptions

- **Expenditures:** Wherever possible, actual expenditure data were used. In its absence, disbursement data or budgets were used as proxies.
- **Annualization:** Multi-year budgets were divided evenly over project lifespans unless better data were available.
- **China-specific data:** Given difficulties in accessing data and the importance of these investments in the global context, some additional assumptions were made for the China dataset. Consistent or growing expenditures were assumed during years with data gaps if these assumptions were justified by future data points, official policy timelines, or other knowledge specific to the initiative.

Data Limitations

Despite our efforts to gather robust and consistent data, readers should consider the following limitations when using our data.

- **Conservative estimates:** Many initiatives lack publicly available expenditure data. At least 318 known active initiatives were excluded for this reason.
 - **Bias toward large programs:** National and supranational programs are more visible due to centralized reporting. Subnational and community-led efforts may be underrepresented.
 - **Private sector and utility underreporting:** Data on investments by private companies and utilities are often confidential, not publicly accessible, and/or fragmented, making them difficult to collect and report on. For those reasons, we believe that actual volumes are higher than reported in this study. However, given their relative scale, they are unlikely to significantly affect overall expenditure estimates or trends relative to other payer types.
 - **Overrepresentation in Peru:** Due to prior reports by Forest Trends on NbS investment for water security in Peru (Benites et al. 2022; Estrada et al. 2023), our relative sample size may be higher in Peru than in other countries.
 - **Improved recent-year data:** Earlier years of the study period (2013—2015) may be undercounted due to data gaps. For this reason, some trends are shown from 2016 onward.
- Despite these factors, we are confident that the data collected is robust enough to provide meaningful insights into the relative sizes and trends across payers, mechanisms, and geographies.

An aerial photograph of a river bend in Croatia. The sun is low in the sky, creating a bright reflection on the water and long shadows on the grass. A large flock of sheep is grazing on a lush green bank in the foreground. The river is surrounded by dense green trees and forested hills in the background.

Key Recommendations

The Krupa River in Croatia winds through a karst canyon, but pockets of lush pasture—actually small alluvial plains—support grazing livestock like sheep.

Copyright © Cyril Jazbec/TNC

Key Recommendations to Diversify and Accelerate Investments in Nature-based Solutions for Water Security

These recommendations were developed and endorsed by a group of experts and practitioners, acting in our individual capacities

Nature-based solutions (NbS) are no longer a fringe concept. They are becoming an essential tool to address water security in the face of climate change, growing demand, and ecosystem degradation. NbS driven by water goals now represent one of the most resilient sources of financing for nature (UNEP 2023). This report shows that investment in NbS for water security has more than doubled over the past decade—even through disruptions like the COVID-19 pandemic.

Beyond water security, NbS advance national and global goals on biodiversity, disaster risk reduction, and climate change—critical areas facing persistent financing gaps. For instance, the COP29 UN Climate Change Conference called for scaling climate finance to USD 1.3 trillion annually by 2035, and the Global Biodiversity Framework set a target of at least USD 200B per year. This report shows that water-driven NbS investment reached USD 49B in 2023, demonstrating its potential as a scalable pathway to help close these gaps.

Yet the field remains fragmented and faces persistent challenges. Drawing on the first global assessment of investment in NbS for water in a decade and our own experience, we observe the following set of challenges to continuing to scale effective, sustainable investment in NbS for water security:

- **Nature-based solutions are not fully integrated into gray infrastructure planning or as part of hybrid approaches**, resulting in missed opportunities to increase resilience, co-benefits, and cost-effectiveness.
- **Financial gaps remain, particularly for long-term funding for operational expenditures (OPEX) needed to sustain and monitor NbS benefits over time**—a challenge that affects all infrastructure but is often especially acute for NbS given limited precedent and dedicated funding streams.
- **In places where demand for NbS has grown, implementation capacity often lags behind**, with shortages in the workforce (from skilled project developers and procurement officers to local labor) and restoration equipment slowing project delivery.
- **Funding from national governments continues to dominate**, but outside of China, continued growth—or even maintenance—of NbS investments is uncertain, as investments may become politicized and public resources are redirected to address national security concerns and economic turbulence.
- **Private sector engagement and funding is inhibited** by high perceived risks, lack of awareness, and insufficient regulatory drivers. Additionally, preference for unilateral investments in NbS by businesses has led to fragmented, siloed projects rather than effective collective action.
- **Transaction costs remain high for these investments and difficult to cover**, despite being essential to making NbS investable. These costs—including early investments in business case preparation, project design, capacity development, collective action mechanism setup, and rigorous result evaluation—are often excluded from direct

investment figures; if nature were fully integrated into infrastructure planning and finance, such costs would be systematically priced into the system.

- **Current delivery models of NbS often fall short in enabling Indigenous and local communities to participate in and lead NbS design and implementation**, limiting the integration of traditional knowledge and raising concerns about community buy-in, ownership, and long-term success.
- **Data on the water-related benefits and cost-effectiveness of NbS investments are not systematically collected or made publicly available.** Rigorous ex-post evaluations remain rare, due to insufficient data collection practices and difficulties establishing baselines and counterfactuals. This makes it hard to assess outcomes, attribute impacts, and improve future planning and business cases.
- **Data on investments by the private sector and other water users, like utilities, are also often not publicly available or easily accessed**, limiting visibility into the scale, nature, and potential of these emerging sources of finance.

Considering these challenges, we offer five key recommendations to diversify and accelerate NbS investments:

1. Build Reliable and Resilient Revenue

Models: Predictable, long-term funding is essential—particularly given rising risks to centralized public funding for NbS. While the scale of national funding will not be replaced by other payers in the short term, models that draw on direct beneficiaries of NbS, such as water users or property owners, show the greatest promise for durability and growth.

- **Mainstream Revenue Models based on User Fees:** This report highlights effective, long-term funding models supported by water users, including user fees consolidated in public agencies, like South Korea's watershed funds, France's water agencies, and Brazil's watershed committees, and tariff-based mechanisms managed by utilities, as in Peru, the UK, and the US (see User-Driven Investments

section, pg. 27). Successful models are typically incorporated into tariff structures and are obligatory contributions by water users within a given jurisdiction or utility service area. Recent public opinion surveys suggest such measures may garner strong public support, especially if framed as protecting and restoring freshwater and natural resources. Ministries and regulators should strengthen and replicate these models to ensure that NbS have a reliable, long-term source of funding, just like built infrastructure needs, for both capital investments, maintenance, and monitoring.

- **Leverage Co-benefits to Diversify Funding Pool:** NbS generate value beyond water—including carbon sequestration, livelihood benefits, biodiversity protection, climate resilience, and property value gains. These co-benefits can be harnessed to unlock additional funding through mechanisms like other ecosystem service markets (e.g., based in the US, Virridy has developed a methodology for carbon credits projects that support NbS by accounting for avoided emissions from gray infrastructure that would have been needed without them), or through land value capture strategies, where increased property values linked to NbS generate public revenue, as in the Msimbisi Basin in Tanzania.
- **Bridge Gaps in Low-resource Settings:** In least developed countries, development assistance and philanthropy will remain essential in the near term to fund NbS, as opportunities for local revenue generation remain limited. With aid levels declining, support should focus on building the foundations—legal frameworks, capacity, and pilots—for future self-sustaining models.

- ## 2. Strengthen Policy and Planning for Long-term Impact:
- Upstream policies and planning frameworks shape the feasibility and quality of NbS investments. Integrated strategies are critical to embed NbS into national infrastructure, biodiversity, water, disaster risk reduction, and other related agendas, finding synergy across sectors and ecosystem services, and attracting new partnerships.

- **Leverage National Commitments Under Global Policy Frameworks:** Countries should clearly link both public and private investments in NbS to their plans for meeting national targets under global frameworks, including the Sustainable Development Goals, Nationally Determined Contributions and National Adaptation Plans under the UN Framework Convention on Climate Change, and National Biodiversity Strategies and Action Plans. The Freshwater Challenge can be a helpful platform for reporting progress across these frameworks. These plans should be articulated across sectors, to highlight national priorities and position countries that unlock climate, biodiversity, and development finance—serving as a kind of “shopping list” for potential partners. This approach can also help to identify opportunities for synergy at multiple levels.
 - **Integrate NbS into National and Subnational Infrastructure Planning:** Governments should integrate NbS into national infrastructure and water resource management master planning processes, ensuring nature is included in long-term investment priorities. Lenders, including multilateral development banks, should offer policy loans to help government agencies build a pipeline of green or hybrid green-gray investments supported by enabling policies, including national commitments.
 - **Strengthen Regulatory Frameworks for Public Investment and Contracting for NbS:** Policymakers and regulators should explicitly recognize NbS within infrastructure planning, investment, and procurement rules. Beyond removing barriers to NbS, these rules can leverage significant public funding for NbS to shape the future of the sector, including by promoting efficiency and private sector investment (e.g., through results-based procurement and public-private partnerships), facilitating greater participation by local and Indigenous communities, and requiring monitoring and reporting to promote transparency around NbS outcomes.
- 3. Grow and Steer Private Investment to Highest-Value Use:** The private sector currently accounts for less than one percent of global investment in NbS for water security. While it won't replace public funding, private investment can play a catalytic role when strategically aligned, and public partners can help shape the enabling environment to channel this investment toward scalable, high-impact solutions.
- **Strengthen Policy and Regulatory Incentives:** Where politically feasible, regulations are the most effective tool to expand private participation in NbS. This includes requiring contributions to publicly-run initiatives based on water use (e.g., Vietnam's Forest Protection and Development Fund), creating frameworks that link compliance with ecosystem outcomes (e.g., state-led water quality trading programs in the US), requiring companies to disclose water and nature-related risks and mitigation measures, and offering tax breaks associated with NbS.
 - **Leverage Collective Action and Public-Private Delivery Models to Unlock Private Capital:** In watersheds where multiple actors share common water risks, NbS proponents should explore a spectrum of public-private partnership models to secure private sector engagement, accelerate delivery of NbS, and generate greater impact. By using public or philanthropic funds to underwrite transaction costs associated with developing collective action and public-private partnerships, NbS proponents can incentivize private investments, which are often outcomes-focused. Coordinating around an anchor institution—often a utility, government agency, or major company that has a large, long-term stake in a specific watershed (e.g., Quito's EPMAPS water utility or China's Moutai liquor company in the Chishui watershed)—can help sustain funding and momentum long term. In cases where there is a large private sector anchor, the issuance of corporate bonds for NbS may be viable to provide up-front capital.

Performance-based arrangements (like public procurement based on impervious acre reductions in the Chesapeake Bay in the US, or DC Water's Environmental Impact Bond to finance urban green infrastructure for stormwater runoff) incentivize private investment by linking payment to verified environmental outcomes. Such models also tap into private sector delivery capacity and innovation.

4. **Strengthen the NbS Delivery System and Evidence Base to Scale Impact:**

Scaling investment in NbS for water security requires not just more funding, but a stronger delivery ecosystem—grounded in skilled professionals, trusted data, and compelling evidence of impact.

- **Strengthen the NbS Delivery Ecosystem:** Whether in master planning, project preparation, or operations, there is a dearth of NbS professionals. To grow the field, urban planners, water managers, engineers, procurement officers, and local implementers should receive training in NbS design, contracting, and maintenance in sectors and geographies where demand is growing rapidly. Clear, region-specific technical standards for NbS—such as intervention specifications and survival benchmarks—can also streamline procurement and improve quality control, while building confidence among investors and creating predictable markets for private service providers. Standards should remain adaptable to local conditions and community knowledge.
- **Strengthen Monitoring and Evidence through Collaboration and Technology:** NbS implementers, beneficiaries, funders, and governments should work together to build robust, flexible monitoring, evaluation, and learning systems that ensure transparency and accountability across scales, while remaining relevant to local priorities. Harnessing technologies like remote sensing and artificial intelligence—alongside local knowledge—can lower costs, improve consistency, and scale performance monitoring of environmental, water, and livelihood outcomes.

- **Make Outcomes Visible to Build Support and Drive Investment:** Communicating tangible, local benefits, such as improved livelihoods, water quality, or flood protection, through robust data as well as community voices and grounded storytelling can build public and political will. Additionally, sharing data on investment flows and outcomes through publicly-accessible platforms can further improve transparency, foster learning, and highlight opportunities to scale NbS where it matters most.

5. **Empower Local Knowledge and Leadership:**

Large-scale NbS programs often struggle to effectively engage local and Indigenous communities despite these groups holding deep knowledge of ecosystems and playing a critical role in sustaining long-term outcomes. Successful, durable NbS requires their leadership from the start.

- **Strengthen Indigenous and Community Leadership in NbS:** NbS initiatives should embed local and Indigenous leadership—including women, men, elders, and youth—in design, decision making, and implementation rather than exclusively as beneficiaries. This includes directly funding Indigenous and local communities, incorporating their knowledge and practices, and removing systemic barriers to their participation, including adapting procurement processes or facilitating partnerships that create accessible entry points, especially for women and youth. Canada's Coast Funds offer a robust model for co-governance—through boards with First Nations representatives and grantmaking to Indigenous groups tied to Indigenous-led land use plans that incorporate ecosystem-based management.
- **Prioritize Direct Benefits and Community Priorities in Program Design:** Initiatives should ensure that local communities implementing and maintaining NbS receive equitable compensation and share in the benefits created by the effort. For example, successful programs, like New Zealand's

Jobs for Nature, have demonstrated how linking NbS to rural employment can generate these local benefits while building political support and ensuring delivery capacity. Likewise, equitable compensation and benefit-sharing should prioritize community needs, which may expand beyond water security to education, health, or cultural practices. The Upper-Tana Nairobi Water Fund Trust hosts youth track races for local communities, and Tribes participating in the Rio Grande Water Fund have invested in youth education and food security initiatives, like seed banks.

NbS for water security are gaining traction, but unlocking their full potential requires targeted action across finance, policy, delivery, monitoring and community engagement. The sector must replicate successful models while building the systems—workforce, standards, learning, and innovation—to expand effectively without losing flexibility. Sharing learnings from diverse approaches and incubating promising solutions to the challenges above can help the field deliver on its potential.

These recommendations offer a roadmap to move from scattered innovation to sustained, scaled investment—ensuring NbS can deliver scaled impact for people and nature.

These recommendations were developed and endorsed by a group of experts and practitioners, acting in our individual capacities:

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An aerial photograph showing a landscape with a stream at the top, a dense strip of trees and vegetation in the middle, a large brown plowed field below that, and a green agricultural field at the bottom. The stream has some yellowish-green patches in it. The tree strip acts as a buffer between the plowed field and the green field.

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An agricultural field is separated from a small waterway by a strip of plants and trees in Michigan in the United States. Buffer strips are one of several best management practices that can be implemented on a farm. They serve as a “buffer” to prevent nutrients and soil from running off the field and directly entering waterways.

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