



White Paper: An Integrated Investment Framework

FOR CLIMATE-ADAPTIVE AND
WATER-RESILIENT FOOD SYSTEMS

NDC 
PARTNERSHIP

 **IFAD**
Investing in rural people

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UAE

Executive Summary

FINANCING GAP (PROBLEM)

This paper advocates for global collaboration to fill the \$500 billion to \$1 trillion annual investment gap in climate-adaptive, water-resilient food systems. These systems prioritize long-term sustainability over short-term gains by balancing agricultural productivity with the preservation of nature, biodiversity, and ecosystems.

Around 60% of climate adaptation projects focus on water, highlighting the close connection between water resources, climate resilience, and agricultural productivity. These projects offer significant benefits, not only enhancing agricultural resilience and productivity, but also boosting nutrition and health from improved soil and water quality. However, the paper reveals that financing for such projects faces numerous structural and design-specific challenges.

INTEGRATED INVESTMENT FRAMEWORK (SOLUTION)

The proposed solution is an integrated investment framework, encapsulated in a 4 by 4 model, addressing both structural and design-level barriers. The 4Bs – Benefit, Bundling, Building for Bankability, and Blending – are its core components:

- **Benefit:** Focuses on equitable resource access and multi-stakeholder governance, ensuring those most vulnerable to climate impacts obtain fair benefits.
- **Bundling:** Involves aggregating and prioritizing investments based on cost-benefit analysis, aligning with Nationally Determined Contributions (NDCs), National Food Systems Pathways, and National Adaptation Plans (NAPs).
- **Building for Bankability:** Enhances project bankability through sound planning, policy coordination, and strategic partnerships that aim to improve financial viability.
- **Blending:** Encourages blending of private and public funds to finance projects that might be considered too risky or unprofitable for commercial investors alone, particularly given the market's limited valuation of natural capital and biodiversity.

The integrated investment framework also features four distinct priority investment pathways, each tailored to address specific aspects of climate-adaptive and water-resilient food systems:

- **Transitions to Regenerative and Restorative Agriculture:** Focuses on investments in regenerative agriculture and land restoration to improve land productivity and reduce fertilizer costs. These investments balance initial yield losses by enhancing soil nutrient density and potentially generate extra revenue through carbon credits.
- **Landscape-Based Approaches:** Ensures a cost-effective strategy aimed at preventing water-related issues before they escalate. Financially, it strengthens agricultural productivity and generates revenue through water user fees, while safeguarding industries from climate and water risks.
- **Patient Finance for Multi-Purpose Water and Agriculture Infrastructure:** Targets large-scale investments, offering scalable revenue models and data to assess financial risks. These projects attract diverse private investors due to their size and the creditworthiness of project developers.
- **Natural Capital Finance for Wetland Conservation:** Leverages the growing interest in natural capital as an emerging asset class, appealing to investors and corporates focused on climate change impact and risk mitigation. This approach is driven by the increasing demand for assets that contribute to climate resilience, supported by carbon markets and corporate net neutrality commitments.

RETURN ON INVESTMENT (ROI) (VALUE)

Preliminary estimates suggest that integrated water and agriculture projects could yield a 5.14% greater ROI compared to standalone initiatives. The improved returns consider the increased value of natural resources and their importance for long-term farming success and the management of climate risks. These combined methods make sure that increased production and the ability to withstand challenges strengthen each other, resulting in strong food systems that can handle the unpredictability of climate change.

CONCLUSION (IMPACT)

This framework can transform investment strategies by making the case for strategic realignment of policies and funding towards climate-resilient food systems. To facilitate this, a financial execution model is outlined, supporting capital deployment across three main areas:

- a. Policy and Data, facilitating the enabling environment;
- b. Investment Origination, standardizing project designs and integrating water management practices; and
- c. Financial Structuring, using innovative financial instruments and attracting diverse capital sources for long-term sustainability.

In conclusion, this integrated investment framework presents a transformative approach to realign global investment strategies towards sustainable, climate-resilient food systems. By advocating for a comprehensive financial execution model, it paves the way for enhanced long-term sustainability and resilience in food systems.

CALL TO ACTION

To bridge the investment gap in climate-adaptive, water-resilient food systems, countries and development partners are encouraged to:

1. Invest in policy and data to foster an environment that ensures **benefits** reach the most vulnerable, particularly women and Indigenous Peoples.
2. **Bundle** food and water investments to maximize impact, **build** a project pipeline with market feasibility in mind, and **blend** financing from diversified public and private sources.
3. Utilize innovative financial strategies and diverse capital sources for sustainable investments, with a focus on the **four investment pathways** outlined in this paper.

This approach will enhance stakeholder coordination and knowledge sharing, essential for large-scale investment mobilization. By adopting these measures, we can collectively create resilient, equitable food systems that are better equipped to withstand the challenges posed by climate change, ultimately securing a sustainable future for all.

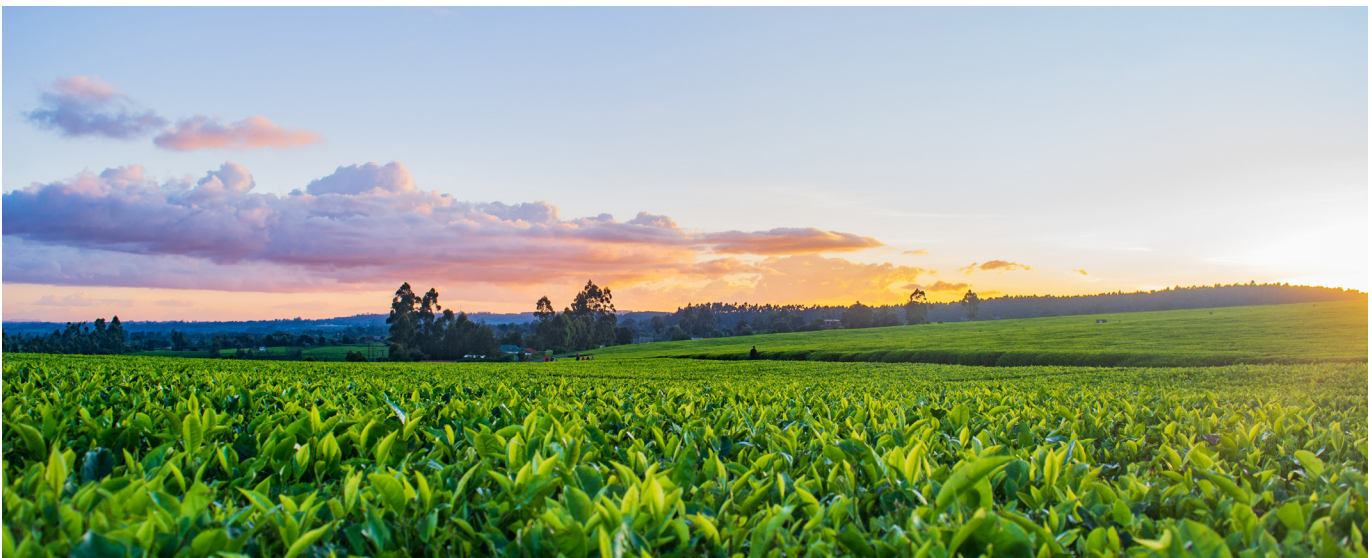


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Overview

This discussion paper is a collaborative effort framed by the International Fund for Agricultural Development (IFAD) of the United Nations and the NDC Partnership, supported by Momentus Global. The key authors contributing to this paper include Corry van Gaal, Niklas Kessler, Jyotsna Puri, Jahan Chowdhury, Amanda McKee, Deborah Brean, and Patrick Brean. This paper highlights the need for integrated investments in climate-adaptive, water-resilient food systems. It covers challenges, real-world case studies, and barriers while offering actionable recommendations for a new financial execution framework.

Proposed Citation: van Gaal, C., Kessler, N., Puri, J., Chowdhury, J., McKee, A., Brean, D., & Brean, P. 2023. An Integrated Investment Framework for Climate-Adaptive and Water-Resilient Food Systems.

Abstract

Water scarcity and water hazards, further induced by climate change, are having detrimental impacts on the world's food systems. Enduring, adapting to and rebounding from these negative impacts requires food systems that are climate-adaptive and water-resilient. Existing literature demonstrates the economic and societal importance of climate-adaptive and water-resilient food systems; however, there is limited analysis on the investment case from a financing perspective. This paper lays out a concerted investment approach for water and food systems, demonstrating the investment opportunities and returns on investment, while offering a proposed financial execution framework that addresses the barriers to public and private investments.

CHAPTER 1

Rationale for Climate-Adaptive Water-Resilient Food Systems

1.1. Why Prioritize Climate-Adaptive and Water-Resilient Food System Investments?

Most climate hazards faced by the world's poorest smallholder farmers are water-related, including unpredictable rainfall, rising sea levels, floods, and droughts (Aryal, J.P., Sapkota, T.B., Rahut, D.B. et al, 2021).

Agriculture and food processing are cornerstones of the economy for most developing countries. In many African countries (e.g. Ethiopia, Mali), it represents upwards of 25% of GDP and provides the main livelihood for 70% of the world's poorest (World Bank, 2022). Strengthening food and water-related investments is essential to meet the nutritional demands of a projected [10 billion people by 2050](#). **Since small-scale farms contribute 30-40% of the world's food supply** and predominantly rely on rainwater (Ricciardi, Ramankutty et al., 2018), the stability of clean water resources is critical to maintain safe and nutritious food production.

The Global Financing Gap: There is an estimated \$182-664B annual financing gap for water and sanitation, flood protection, and irrigation infrastructure (Rozenberg and Fay, 2019). This combined with an estimated \$300-350B annual gap in food systems finance (FAO, 2020) creates an **overall investment gap of \$500B-\$1T to build climate adapted and water-resilient food systems** globally. This exceeds the financial capacity of many individual countries, especially those that are already resource constrained.

Rising Unpredictability: In the absence of adequate investment, **there is increasing uncertainty** affecting the quality and productivity of agriculture as climate change affects water predictability, biodiversity and natural ecosystem health. The Intergovernmental Panel

on Climate Change (IPCC) noted a 50% rise in rainfall variability over the past 50 years. Climate change is making rainfall more erratic and basins less predictable and this is compounded by growing rates of water contamination.

Investment Benefits: There is extensive literature demonstrating that investing in resilient agricultural practices helps safeguard water resources, enhance food safety, and contribute to poverty reduction (Ghosh et al., 2022). These investments often incorporate **nature-based solutions to climate change by restoring forest's and soil's ability to capture carbon**. Nature and biodiversity are not only a source of food system resilience, but they also benefit from climate smart agriculture practices. Meanwhile, 27% of the global population (2.2 billion people) lack access to safe water (UNICEF, 2019). The spillover effects of integrated water, food and climate investments have positive outcomes for health and nutrition. Inclusive investment designs can advance gender equality by generating health, safety, and economic co-benefits for women.

Investment Rationale: These investment opportunities can also generate favorable economic returns, including risk reduction and increased return on investment (ROI). They enhance the overall investment grade of projects, lead to improved long-term financial returns, and reduce insurance premiums and interest rates, among other benefits (Huber-Lee et al, 2021). **Investments in resilient food systems are vital, yielding dividends in resource optimization, food security, climate mitigation, nutritional improvements, infrastructure protection, natural capital, and economic growth.**



1.2. What is a Climate-Adaptive and Water-Resilient Food System?

A **climate-adaptive and water-resilient global food system** is a strategic approach to agriculture that ensures consistent food production by employing methods, technologies, and practices that adapt to variable climatic conditions and manage water resources sustainably. This system prioritizes long-term sustainability over short-term productivity gains from land use changes and water exploitation, by balancing agricultural productivity with the preservation of nature, biodiversity and ecosystem functions.

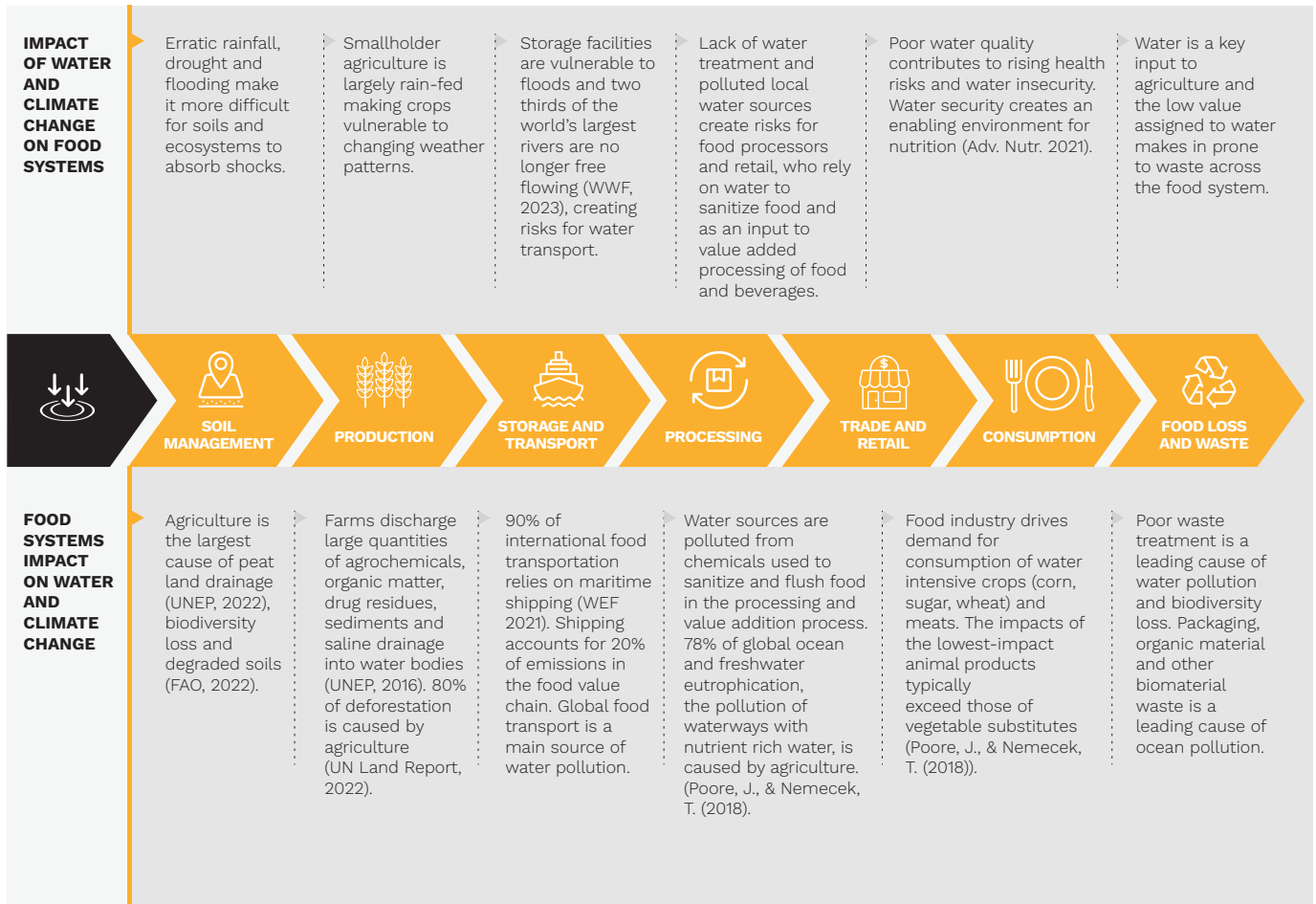
The Investment Transition: Building up the resilience of food systems requires a paradigm shift in investment strategies by both public and private sector investors from focusing solely on sector-specific productivity **to a more holistic view of system efficiency**. This involves channeling funds into integrated solutions that encompass not only agricultural technologies and practices but also improved water management, soil health, and ecosystem conservation. Such investments must favor practices that enable farmers to adapt to changing weather patterns, use water more efficiently, and reduce dependence on non-renewable resources.

The Investment Case: Notable regionally focused research from Rosenzweig et al. (1995), Taylor et al. (2013), Evenson et al. (1999), have demonstrated improved internal rates of return from integrative investments in water and agricultural initiatives. Using preliminary theoretical methods (see Annex 1), the authors of this report estimate that integrated water and agriculture projects could **yield a 5.14% greater ROI than standalone initiatives**. Analytically, this improved ROI extends beyond immediate yield increases; the equation takes into consideration natural capital appreciation and its effect on long-term agricultural viability through climate risk mitigation. This holistic approach ensures that productivity is not at odds with resilience, but rather they are mutually reinforcing, leading to robust food systems capable of withstanding the uncertainties of climate-related changes in water resources.

1.3. Interdependence of Climate, Water and Food

As Figure 1 illustrates, the convergence of water scarcity, food security, and climate change calls for a cohesive strategy in handling the financial aspects of food systems from production to consumption. Agriculture is responsible for about 70% of global freshwater withdrawals (FAO, 2017) and is a significant contributor to forest degradation and biodiversity loss, thus underscoring the critical need for an integrated approach to manage finance across the entire food value chain.

FIGURE 1: Interaction and Interdependence of Food and Water Systems



Source: Prepared by Momentus Global

Responsible Investing: According to the UN Principles for Responsible Investment (UNPRI) water is a material financial risk for agriculture companies, yet very few disclose and proactively manage water risks. **A recent assessment by the UNPRI, shows that global investor portfolios are over exposed to water-related risks in agriculture and companies are being encouraged to take collective action at the catchment level and improve disclosures on water risks in their supply chains (UNPRI, 2018).** Not only is the financial materiality of water-related risks becoming a growing concern for businesses and investors in the agriculture and food production sector, but it is also a risk to sovereign loans.

CHAPTER 2

A Structured Investment Approach to Close the Financing Gap

2.1. Barriers to Investment

Sustainable Development Goal (SDG) 2 aimed at achieving Zero Hunger receives 10% of SDG finance, yet remains at risk of not meeting its target (OECD, 2022). The sustainable reduction of hunger depends on funding for SDG 14 and 15, relating to Life below Water and Life on Land, as well as SDG 6 which target access to clean water. Combined SDG 14 and 15 only receive 3.5% of SDG finance, the least of all SDGs (OECD, 2019), and SDG 6 is lagging on all indicators (WRI, 2023). In addition, despite a significant increase in overall climate finance, support to small farms (less than 2ha) dropped by almost 44% between 2017/18 and 2019/20, well below their needs (CPI, 2023). Public entities remain the main source of finance for small scale agri-food systems making up 96% of financial flows.

Why are Private Investments Not Happening? A number of barriers to integrated climate food and water investments are present and can be categorized as: 1) structural factors affecting the broader enabling environment; and 2) project-level factors affecting the financial viability of specific initiatives.

Structural Barriers include: 1) a lack of appropriate data and analytics on the impacts of climate and water on food systems; 2) inequalities in food and water access; 3) limited value assigned to global ecological resources; 4) complex multi-level governance and interactions between natural resources and economic activities; 5) weak institutional capacities of developing countries and; 6) financial market risks (see below).

STRUCTURAL BARRIERS



Lack of Data and Analytical Tools

Adequate data and analytical tools are essential for managing water use in agriculture effectively. The current deficiency in these resources hinders our ability to optimize water usage, evaluate project impacts, and develop sustainable agricultural practices.



Inequalities in Food and Water Rights

The UN General Assembly recognizes the human right to adequate food, water and sanitation. Neglecting these interconnected rights can perpetuate inequality, particularly for marginalized groups, notably women and Indigenous People.



Limiting Global Mindsets and Societal Values

Current societal norms and consumption preferences that undervalue water and natural capital, resulting in excessive food and water waste and environmental degradation.



Weak Governance and Policy Coordination

Lack of coordination among different jurisdictions often results in inefficient resource allocation, conflicts over water rights and resource depletion.



Barriers to Financial Engagement

Complex market signals and market risks including commodity price volatility and exposure to political, climate and currency risk, deter financial appetite.



Capacity Constraints in Developing Countries

Developing countries face experience and technical skills gaps in planning, structuring and financing mitigation and adaptation projects.



Project-Level Barriers include those that specifically affect the feasibility, bankability and implementation of projects across the investment lifecycle (pre-feasibility, feasibility, bankability, operations, and exit). Some of these challenges include the lack of cashflow from water and natural capital investments, unestablished project cashflows in smaller scale water and agriculture projects, a lack of experienced project developers, fragmented and small project sizes, changing policy environments and commercial- and construction-related operational risks (see figure 2).

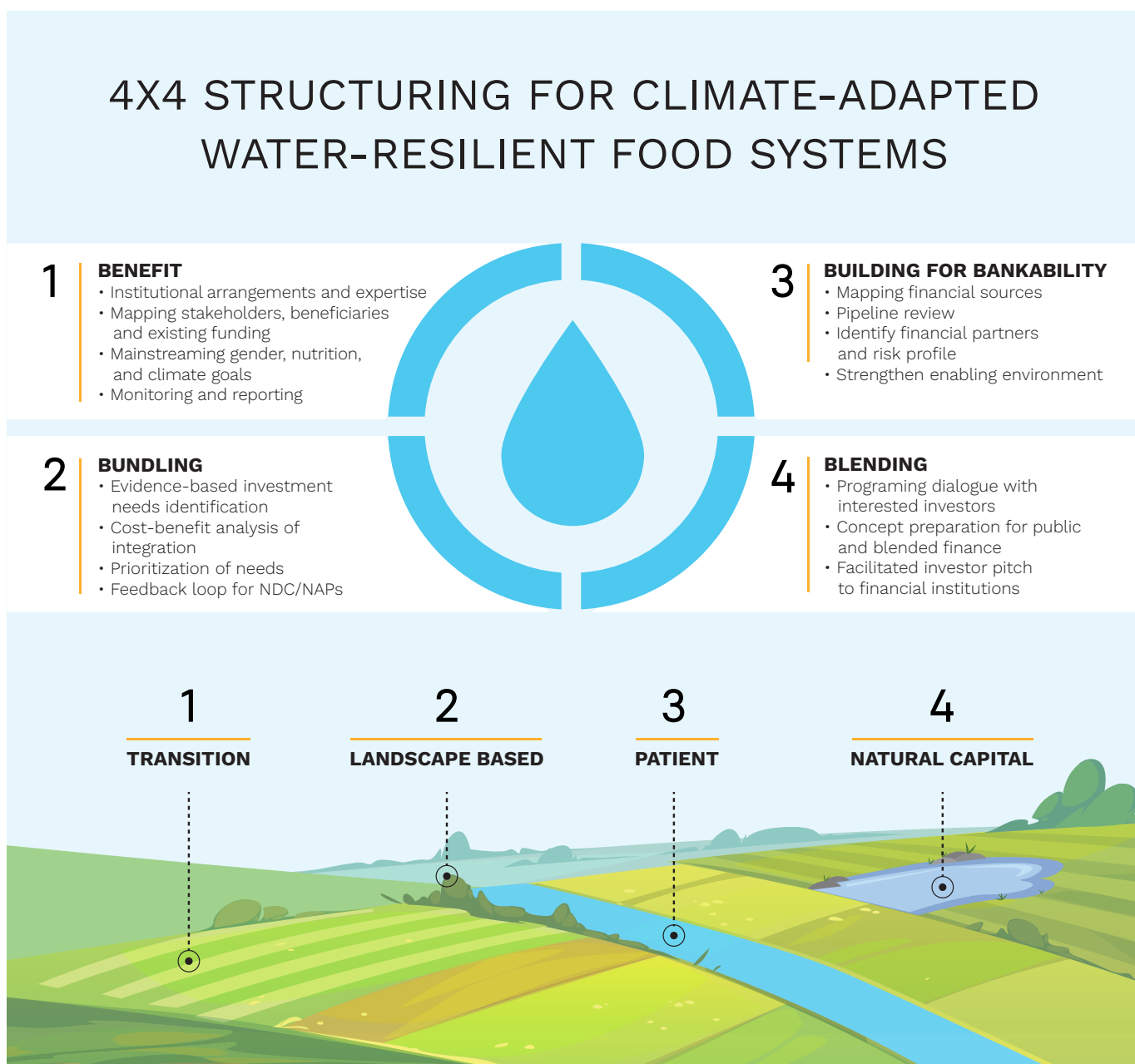
FIGURE 2: Challenges and Risks to Food and Water Projects



2.2. Integrated Investment Framework

An integrated investment framework is critical to executing and channeling financial resources into climate-adaptive and water-resilient food systems. This structured approach provides a method to tackle the core problems that hinder private investment and development by addressing both structural and project-level barriers. The strategic 4 by 4 framework (see figure 3 below), includes four actionable steps (4 Bs) with minimum criteria and four investment pathways.

FIGURE 3: The 4 by 4 Integrated Investment Framework



Source: Prepared by Momentus Global, referencing NDC Partnership Investment Planning Guide (2023)

4 ACTIONABLE STEPS (4BS)

When taken together, the 4 Bs can overcome the barriers across the investment lifecycle to improve financial and development additionality of investments:

- **Benefit Sharing:** Ensuring equitable access and usage of resources through multi-stakeholder governance, data analytics, policy coordination and impact measurement helps track and address inequalities in water and food rights, particularly for those who are most vulnerable to climate impacts.
- **Bundling:** By aggregating and prioritizing investments based on a cost-benefit analysis, governments can improve resource allocation to achieve programmatic outcomes through progressively more ambitious Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs).
- **Building for Bankability:** Sound planning and policy coordination improves the enabling environment and resource predictability. Efforts to map financial sources and target strategic partners early on can go a long way to build buy-in and technical support for the design, structuring and implementation of economically viable projects.
- **Blending:** Through dialogue with investors and by blending private and public funds, it becomes possible to finance projects that might otherwise be deemed too risky or unprofitable. This helps account for the market's limited valuation of natural capital conservation and restoration.



4 INVESTMENT PATHWAYS

The 4 Bs facilitate investments across four priority investment pathways. All four pathways present a strong case for development additionality and an emerging business case for private investment. This means all pathways demonstrate a financial investment thesis, while also achieving development impact for vulnerable populations (see figure 4). They have been prioritized based on their alignment with the broader goals of building food systems resilience to climate change, while generating poverty reduction co-benefits for the most vulnerable. The pathways target:

FIGURE 4: Investment Pathways for Blended Finance



2.3. The 4 Bs

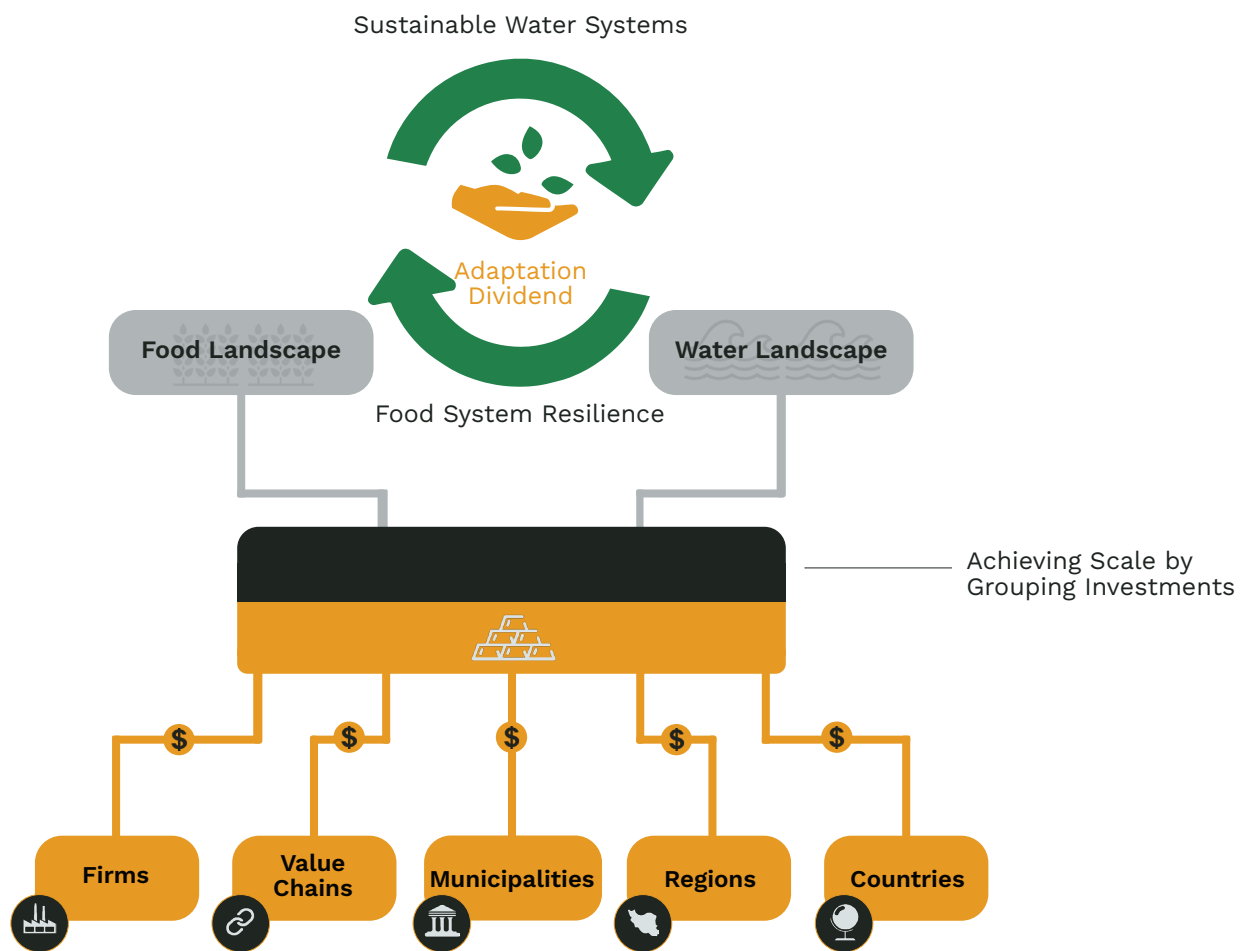
1. BENEFIT SHARING

- **Rights-Based:** Climate-adaptive, water-resilient food systems help ensure the gains from improved water and natural resource management are equitably shared, emphasizing the inclusion of marginalized groups like Indigenous Peoples and women in decision-making and resource management. This acknowledges the need to address entrenched inequalities in water and food rights and the historic marginalization of vulnerable populations, which can skew access to benefits and the sustainability of interventions. Monitoring and reporting is critical to track and address inequalities.
- **Aligning Incentives:** Project sponsors must: 1) create wealth and value for all actors; 2) establish trust between value chain actors, particularly those investing and those receiving the financial support, and finally; 3) recognize and appropriately compensate all parties for the risks they are taking to change practices, improve livelihoods and generate positive natural capital outcomes (FAO, 2023).
- **Multi-level Governance:** Multi-level governance maps and engages multiple stakeholders and devolves decision-making to the most appropriate level. This is a prerequisite to achieving win-win outcomes for communities and investors. It also supports dialogue between actors which is key to understanding and valuing social, economic and natural capital.

2. BUNDLING

- **Dealing with the Problem of Scale:** Investments in climate-adaptive and water-resilient food systems finance refers to the consolidation of financial resources to support aggregated investments in food and water. Agriculture and water investments in low- and middle-income countries tend to be smaller scale. Bundling, based on a strong evidence base and prioritization of investment needs, helps achieve scale by grouping investments across firms, value chains, municipalities, regions, countries, and across sectors by generating mutually reinforcing outcomes between food and water.
- **Greater than the Sum of the Parts:** Investments that combine food and water generate an adaptation dividend (see figure 5); whereby combined outcomes are greater than the sum of their parts. Building on recent work by the World Resources Institute (WRI, 2023), the dividend is created by: 1) building resilience to climate risks; 2) generating stronger economic outcomes from agricultural productivity gains; and 3) generating cost savings from reduced environmental and health costs over the long-term. Landscape or programmatic approaches are particularly effective in linking sustainable land management practices to agriculture and other economic land use activities, so the livelihoods of the poor are better able to withstand climate-related shocks.
- **Anchored in Policy:** An integrated approach to climate-adaptive, water-resilient food systems necessitates robust governance and policy synchronization. The inclusion of country-specific climate actions as part of the Paris Agreement, NDCs and National Food Systems Pathways ensures investment flows to initiatives that target sustainable practices, as they signal national priorities and potential areas for cross-border collaboration. As evidence-based analyses are conducted, providing a more granular and precise understanding of existing and forecasted climate impacts, countries will have a strong baseline to further refine their commitments in future iterations of NDCs and NAPs.

FIGURE 5: The Adaptation Dividend



Source: Developed by Momentus Global

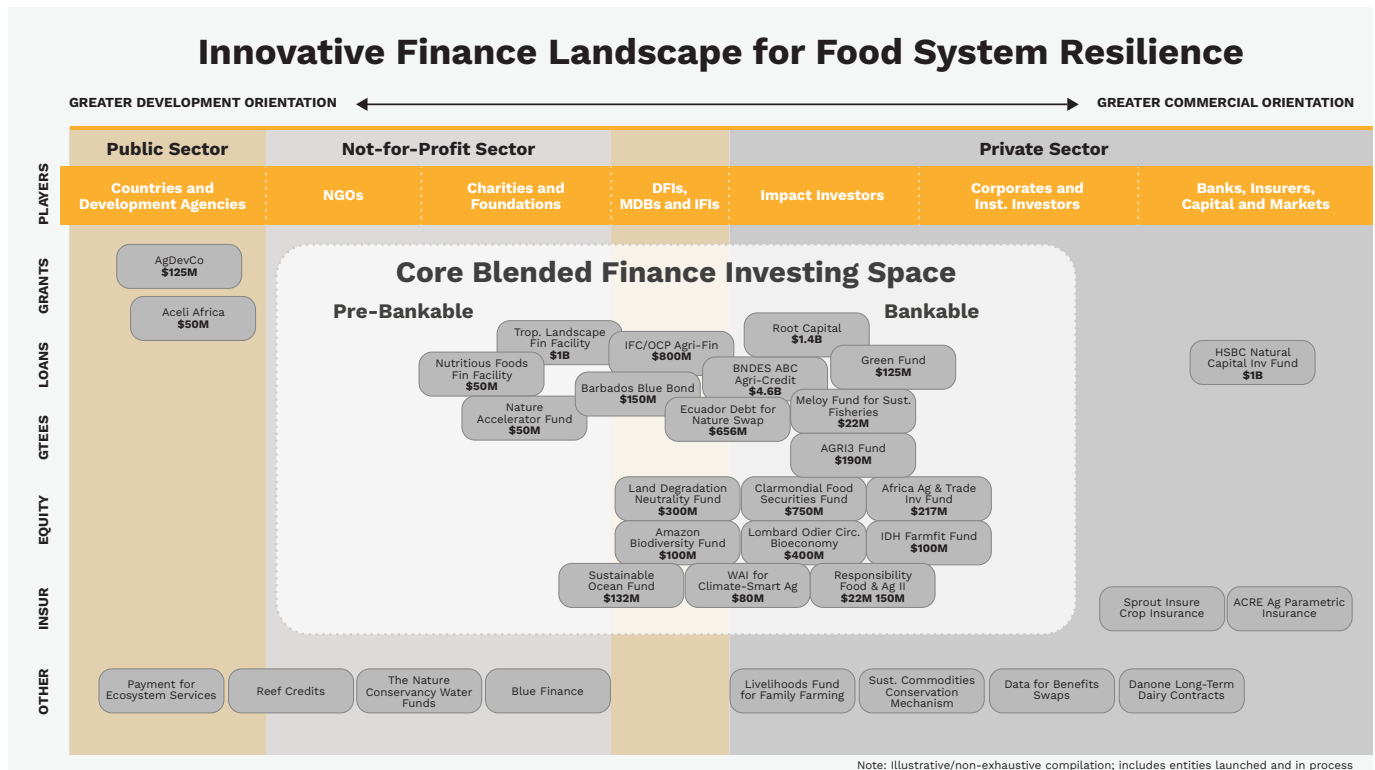
3. BUILDING FOR BANKABILITY

- **Pipeline Development:** Bankability stands as a pivotal criterion for projects integrating food systems with water-resilient finance. Since few select projects demonstrate clear feasibility and robust ROI, it is critical that governments are able to map and invest limited resources in projects with high potential to secure substantial investments.
- **Creating Incentives:** Well-structured incentives can significantly enhance a project’s appeal by adding tax benefits or regulatory costs that motivate private sector uptake of climate- adapted and water-resilient practices.
- **Disclosure of Water-Related Risks:** Climate-related disclosure has increased significantly since the Task Force on Climate-related Financial Disclosures (TCFD) released recommendations for disclosing consistent information on climate risks. Proactive disclosure has shown that increased transparency can lead to better risk management, thereby making environmental efforts more attractive to investors who prioritize sustainability (TCFD, 2017).
- **Narrowing the Data Gaps:** Technical assistance plays a pivotal role here, offering the necessary support to develop and assess projects comprehensively, ultimately mitigating risks, and building the right enabling investment climates. This multi-faceted approach to data management, encompassing incentives, risk disclosure, and technical support, is essential to advance investment in integrated food and water systems.

4. BLENDING

- **Private Sector Engagement:** Early engagement with project developers is key to translating sustainable practices from innovative ideas to proven, practical and economically viable models. In addition, identifying and working closely with trusted financial institutions can build buy-in and expedite the investment lifecycle from conceptualization to operationalization.
- **The Effectiveness of Blended Finance:** Bankable projects require assets that generate cash flow. Typically, blended finance targets small and medium-sized enterprises (SMEs), infrastructure, or schemes like carbon credits or ecosystem payments, where there is the potential for development additionality by combining non-commercial funds from public and philanthropic sources with commercial capital. Multilateral Development Banks (MDBs) and Development Finance Institutions (DFIs) can play an important role in helping local financial institutions, including National Development Banks (NDBs), build capacity to access blended finance and build bankable pipelines (van Gaal et al. 2023).
- **Development Additionality:** This means that without an investment from the public sector, the projects would be deemed too risky for traditional financing. Public finance attracts new private investment to projects that achieve development outcomes by reducing risk and/or improving the predictability of returns.
- **Blended Finance Employs a Variety of Tools:** These can include guarantees, grants, concessional loans, equity investments, and insurance to address distinct investment challenges. Guarantees help reduce project risk, while concessional loans provide favorable conditions for projects with longer maturation periods, enhancing their financial feasibility. There are a growing number of blended finance facilities targeting food system resilience (see figure 6).

FIGURE 6: Innovative Finance Landscape



Source: Developed by Momentus Global

The Convergence [State of Blended Finance Report 2023](#) indicates a significant reliance on development agencies, which provided 49% of funding to blended projects between 2020–2022 with private sector’s share of funding declining. Still, the OECD notes that blended finance has attracted over \$200B in private funds for development in the last decade, despite underinvestment in food and water systems.

Undervaluation of Natural Capital is a Challenge: The funds depicted in Figure 6 largely target SMEs and other private sector initiatives through equity. **It is notable that very few target public goods and natural capital finance.** Long-term, non-immediate-return investments, such as those aimed at preventing deforestation, protecting wetlands or enhancing community resilience, are crucial and should be prioritized by concessional development partners, who must advocate for the recognition of their broader societal and environmental gains.

2.4. Four Investment Pathways

Climate change presents a critical challenge to water and food systems, with the most severe impacts felt by the world’s poorest communities. The following section proposes four priority investment pathways to strengthen the resilience of food systems in the context of climate change. They all use real-world examples of cases where the 4 Bs have been applied successfully to address the lack of market-based finance and mobilize new sources of private investment for climate-adaptive, water-resilient food systems.

PATHWAY 1:

Transition Finance for Restorative and Regenerative Agriculture

BUSINESS CASE

Investments in regenerative agriculture practices and land restoration help improve the productivity of land and generate cost savings from reduced fertilizer use. Over the long term, this improved cash flow compensates for short-term losses in yields as soil restores its nutrient density. If structured appropriately, these transitions can also qualify for supplementary carbon credits, further enhancing the financial viability of these transitions over time.



These investments are key for climate-adaptive water-resilient food systems and collective efforts are needed to mobilize private investments that achieve:

- More productive and water-resilient agriculture land for marginalized people
- Climate resilient rural livelihoods and reduced workloads for women and men in water stress regions
- Improved nutrition from crop diversification, clean water and nutrient rich soil
- Improved biodiversity and ecosystem health

BARRIERS TO PRIVATE INVESTMENT

Adopting climate smart and more regenerative agriculture practices present uncertainties for small scale farmers who cannot absorb near-term losses for longer-term gains in productivity. This is particularly challenging for women who lack land tenures to seek longer-term loans. The high transition risks and limited data availability create investment barriers.

CASE: LAND DEGRADATION NEUTRALITY (LDN) FUND

The LDN Fund, co-promoted by Mirova and the United Nations Convention to Combat Desertification (UNCCD), is a \$208M impact investment fund blending resources from public, private and philanthropic sources to

invest in private sector projects that restore degraded land while generating positive financial returns on investments from agroforestry, agroecological transitions and reforestation.

The Madagascar Aqre Group is one of 10 companies that received an equity investment from the LDN fund. It aims to strengthen the capacity of its suppliers (32,000 smallholder farmers) to produce high-value natural ingredients through sustainably managed and climate-resilient cropping systems.

BENEFITS	BUNDLING	BUILDING	BLENDING
Deploys best practices in impact measurement	Diversifies risk through equity fund that groups investments	Pipeline of 10 projects/ investments vetted by equity investors	Independently managed by Mirova, First-loss junior tranche to catalyze private funder participation in Senior Tranche (9 private investors)
Member of 2X Challenge to raise funding for gender lens investing		Fosters knowledge exchange between LDN Fund portfolio companies	

PATHWAY 2: Landscape-based Finance

BUSINESS CASE

Water scarcity has a big financial impact on many utility and food production companies. It is cheaper to prevent water problems at the source than to address them later. Landscape-based approaches, that link agricultural production to water and resource management strengthen agriculture productivity, generate user fees for water and help protect industry from climate and water-related risks.



Landscape based approaches improve equitable access to natural resources by local populations and improve sustainable management of ecosystems.

- Empowers local and Indigenous communities to negotiate trade-offs
- Safeguards resource dependent livelihoods (e.g., farming, fishing, livestock, food processing)
- Improves health and sanitation, reduces risk of contamination causing waterborne disease
- Strengthens food security resilience from restored ecosystems

BARRIERS TO PRIVATE INVESTMENT

The complex and integrated governance of landscaped-based approaches gives rise to highly varied investment sizes, risk profiles, borrower types, and tenors. Moreover, emphasis on local ownership among communities and Indigenous Peoples requires funding that can address communal ownership and project management. The overall complexity of collaborative planning and integration of small and fragmented investments requires strong government oversight and backing. Investments at the catchment level typically focus on higher risk municipal borrowers. It is difficult to engage experienced private sector project developers given small project sizes.

CASE: UPPER TANA RIVER CATCHMENT PROJECT

Between 2012 and 2022, IFAD, the Global Environment Facility (GEF), along with the Spanish and Kenyan Governments, invested \$61.3M alongside community contributions of \$7.5M. The project used a landscape approach targeting 24 river basins that drain into the Upper Tana. Its effort served to empower communities and improve sustainable food production for 205,000 households through better water and natural resource management of over 70,000 ha.

It set a foundation for the Upper Tana Nairobi Water Fund, managed by IFAD and The Nature Conservancy, with funding from the GEF. This project includes a Water endowment fund which has attracted investments from Kenyan utility and beverage companies, such as Coca Cola. The interest earned on endowments from private corporate users downstream is re-invested to improve water quality upstream.

BENEFITS	BUNDLING	BUILDING	BLENDING
<p>Targets gender equality with women receiving a 50% subsidy on irrigation equipment</p> <p>Uses participatory processes for community empowerment</p> <p>Provides mitigation and adaptation co-benefits</p>	<p>Programmatic approach that groups investments across productive activities and ecosystem services</p>	<p>Governance committee reviews and prioritizes qualified downstream projects for finance</p> <p>Government facilitates enabling environment allowing Nairobi City Water and Sewerage Company to introduce levy on water prices for conservation purposes</p>	<p>GEF grant, concessional IFAD and government loans, private finance from corporate users (beverage and utility companies)</p>

PATHWAY 3: Patient Finance for Multi-Purpose Water and Agriculture Infrastructure

BUSINESS CASE

Larger scale water and agriculture infrastructure investments in LICs and LMICs have revenue models, are scalable, and have some data available to quantify financial risks. The larger size and improved creditworthiness of experienced project developers can be attractive to private investors, including DFIs, pension funds, insurance companies, and sovereign wealth funds.



Blended finance and patient capital are needed to support the development of large-scale multi-use water projects that are a key resource across all aspects of the food system and remain underfunded in most developing countries. These investments:

- Restore water bodies to build agriculture resilience to floods and droughts
- Reduce contamination that can affect food quality and health of vulnerable populations
- Improve smallholder access to irrigation and water harvesting to improve productivity
- Increase access to markets through water and land transport and storage facilities

BARRIERS TO PRIVATE INVESTMENT

Water, irrigation, and landscape restoration projects require significant upfront capital, have long payback periods, and are often fragmented at municipal levels. Repayments are challenging, as water and ecosystem restoration is often an undervalued resource even for agriculture purposes. The collection of tariffs, taxes and transfers for such projects are challenging due to limited tax collection and communal/informal land ownership in some developing countries. These projects face risks due to political instability, foreign exchange, underdeveloped regulatory frameworks for water rights and siloed policies across household, industry, and agriculture water use. There is also a lack of appropriate data and analytical tools to standardize investments and attract financiers who require quantifiable risks.

CASE: THE NEXUS OF WATER, FOOD AND ENERGY PROJECT (NWFE)

The Government of Egypt aims to mobilize \$15B to support the development of nine projects (one energy, five agriculture and three irrigation and water treatment projects). Strong central planning and early engagement of multilateral partners including the European Bank for Reconstruction and Development (EBRD), IFAD and African Development Bank (AFDB) established market credibility and scale that attracted private investors and project developers.

BENEFITS	BUNDLING	BUILDING	BLENDING
Focuses on smallholder farmers Multi-stakeholder (public, private and community) participation in project design	Groups nine projects under a holistic strategy	Government Solicited project concepts and selected prioritized high potential projects for investment	Leverage Egypt's partnership to mobilize blended finance from IFAD, EBRD, AFDB and private sector financing

PATHWAY 4: Natural Capital Finance for Wetland Conservation

BUSINESS CASE

Natural capital is an emerging and rapidly growing asset class. Mainstream investors are demanding assets that have a positive impact on climate change. Corporates are also looking for products that will help them hedge against climate and water-related risks. Meanwhile, carbon markets and corporate commitments to net neutrality are creating a market for natural capital backed assets at scale.



Natural capital and, in particular, wetlands are key to water and climate resilience. Investments in wetland conservation is needed to:

- Build the climate resilience of rural livelihoods
- Restore nature-based solutions to climate change
- Create ecosystem services as alternatives for resource exploitation
- Sustain traditional cultures, biodiversity and water availability
- Support nutrition through diversified and traditional crops in agroforestry models

BARRIERS TO PRIVATE INVESTMENT

Half of the world's gross domestic product (GDP) is dependent on nature (WEF, 2020), yet ecosystem, wetland and biodiversity conservation do not generate economic returns. More companies are mitigating nature and water-related risks to their business. This is creating demand for natural capital assets and initiatives targeting nature-based solutions to climate change, but the supply of bankable projects remains limited. Challenges measuring emissions reductions and additionality create reputation risks of "green washing." The high upfront project implementation costs to restore ecosystems, as well as long project time horizons impede investments. Significant philanthropic and public finance is still needed for natural capital conservation projects.

CASE: NATURE SWAPS

In May 2023, Credit Suisse worked with the Government of Ecuador to exchange \$1.6B in bonds for a \$656M loan, generating a savings of \$1B of which the government committed \$450M to conservation efforts in the Galápagos Islands. An Inter-American Development Bank (IDB) \$85M guarantee and political risk insurance provided by the US Development Finance Corporation (DFC) reduced investment risks to crowd in private lenders to the largest global nature swap.

The loan is conditioned on the Government's implementation of conservation projects to support the Galápagos National Park Service with the management, monitoring, and enforcement of the waters surrounding the Galápagos Islands, including the Galápagos Marine Reserve and the newly created Hermandad Marine Reserve.

BENEFITS	BUNDLING	BUILDING	BLENDING
Designed with five government ministries in collaboration with local stakeholders	Large-scale programmatic conservation efforts	Structured by Credit Suisse and other private financial entities	Leverage blended finance from IDB (Guarantee), DFC (Political Risk Insurance)

CHAPTER 3

A Path Forward for Collective Global Action

3.1. A Financial Execution Model for Climate-Adaptive Water-Resilient Food Systems

Coordinated multilateral, bilateral and philanthropic investments are needed to crowd in private investors and close the \$500B to \$1T gap in food systems and water infrastructure finance. The 4 by 4 framework outlined in chapter 2, helps organize global efforts to scale up public, private and commercial finance for climate-adaptive, water-resilient food systems. A financial execution model would help facilitate the implementation of the 4 by 4 framework by supporting capital deployment at a global scale across three main functional areas (See figure 10).

1. POLICY AND DATA

There is a need to scale up activities that support the enabling policy environment, including through improved data access, policy and regulatory environments and governance for integrated investments at a national, regional, and global scale as follows:

- Promote **cross-sectoral financial strategies** at the national level to integrate water, food systems, and climate change mitigation and adaptation in their NDCs and National Food Systems Pathways, recognizing the interlinked nature of these sectors.
- Implement systems to **enhance transparency and accountability** in investment and funding processes. This will build trust among investors and ensure that funds are used effectively and efficiently.
- Leverage **digital technologies** for better monitoring and management of investments, including blockchain for transparency in transactions and AI for predictive analysis in investment decisions.
- Deploy small grants to help facilitate **multi-level governance** and engage producer organizations, women's groups and Indigenous People in landscape planning.

2. INVESTMENT ORIGATION AND DESIGN

To establish a robust pipeline of bankable investments within the four designated pathways, it's essential to:

- **Standardize project designs**, adopt global best practices, and effectively integrate water

management practices. The investment pathways outlined in this paper could serve as templates for project designs in the country, with the backing of bilateral and multilateral partners, philanthropic funders, and private sector entities, among others.

- Improve the **accessibility of existing financial data sets**. As these projects, focusing on water-resilient food systems, reach implementation and demonstrate success, they can create a “demonstration effect.” This success and financial outcomes can then be leveraged to improve financial models that facilitate their replication and scale by project sponsors in other contexts.
- Offering **grants or low-interest loans for early project development** stages—like feasibility studies, environmental impact assessments, and community consultations—is vital. This approach helps in mitigating initial costs and risks for local developers and project sponsors.

3. FINANCIAL STRUCTURING

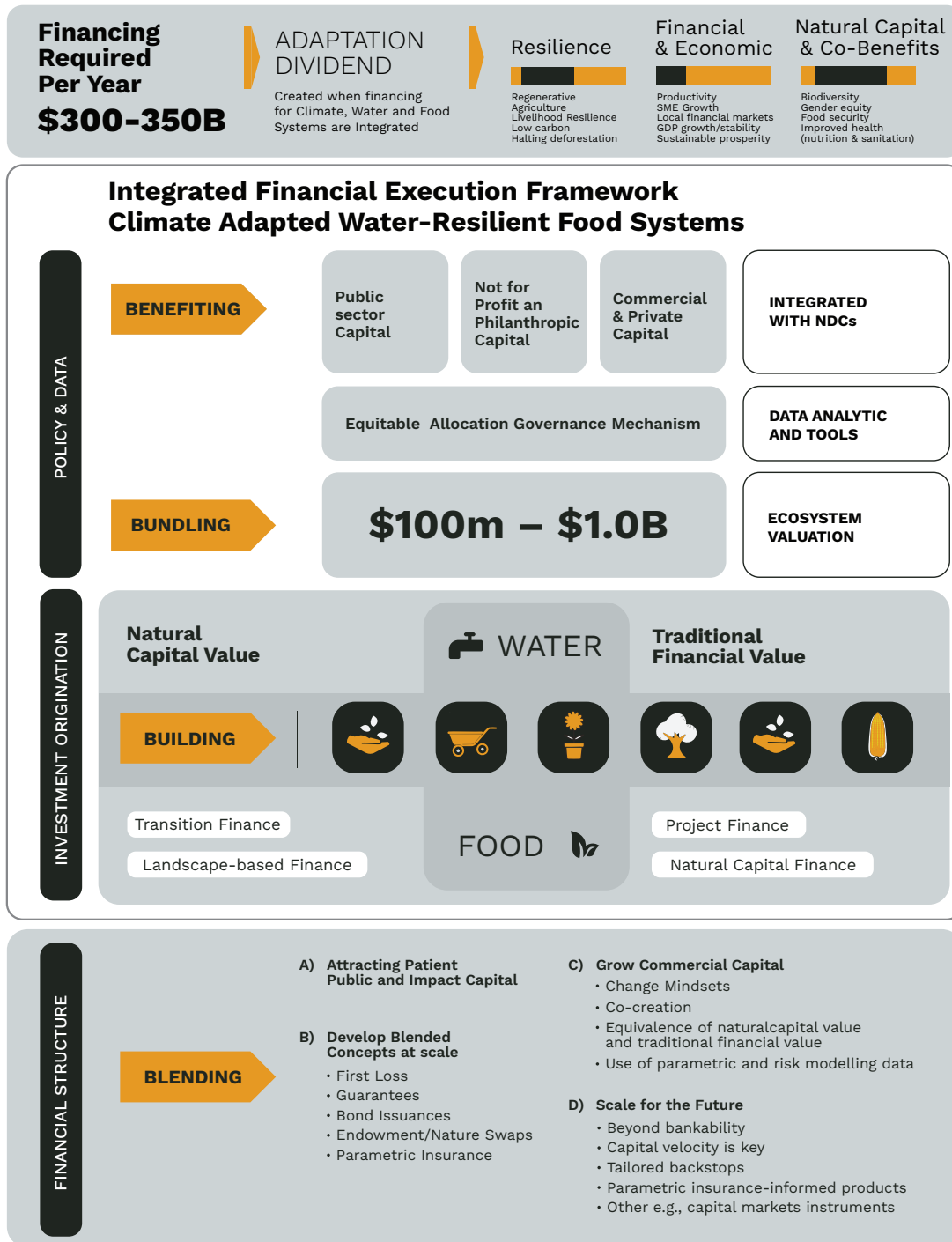
The proposed financial structures for water-resilient food system investments encompass innovative risk management and capital mobilization strategies (See Annex 2). They include:

- **A first-loss junior tranche** in a Land Transition Fund, mitigating economic uncertainties in transitioning to sustainable agriculture.
- **Guarantees** for municipal and sub-regional note issuances provide secure funding platforms, pooling local landscape investments with risk mitigation for senior capital providers.
- **Back-stopping for bond issuances** to attract institutional investors through risk-reduced long-term bonds for municipal projects.
- **Endowment funds and nature swaps** that create financial incentives for natural resource conservation, linking returns to conservation efforts.
- **Parametric insurance** through a multi-donor trust fund that diversifies risk globally for insurers and reinsurers, encouraging private sector investment in challenging environments.

These structures should be further assessed, contextualized, and market tested as they address the unique challenges of financing water-resilient food systems. These innovative structures have the potential to balance risk and reward which is crucial to attract a wide range of public and private investors.

Efforts should also focus on fostering regional collaboration and investment pools. This promotes the pooling of resources and investments at a regional level, facilitating the creation of larger, more impactful projects. Such collaboration not only amplifies the potential impact of individual investments but also plays a crucial role in distributing risks and benefits across multiple countries or regions. This approach encourages cross-border cooperation, leveraging the strengths and resources of various nations to address common challenges and opportunities in water-resilient food systems, thereby enhancing the overall effectiveness and reach of these investments.

FIGURE 10: New Global Food and Water Resilience Financing Platform



3.2. Key Takeaways and Next Steps

Climate-adaptive and water-resilient food systems will require a substantial shift in global investment strategies by governments, financial institutions and donors. This means:

- Ensuring **benefits** reach the most vulnerable, particularly women and Indigenous Peoples;
- Food and water investments are **bundled** to generate a sum greater than their individual parts;
- That projects are **built** with an understanding of market feasibility; and
- They can attract **blended** finance to bring more private actors into the fold.

Efforts are already underway through the NDC Partnership, and significant scope exists to scale these up. Through the Partnership, countries draw upon members' expertise and funding, turning their NDCs into actionable policies, programs, and projects. This includes integrating their NDC ambitions, including mitigation and adaptation targets, into climate and development plans, and further translating these plans into tangible, realistic investments that benefit people and communities. At COP28 in UAE, more than 100 national governments endorsed a leader-level Emirates Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action, recognizing the need to accelerate action at this nexus and across this continuum of planning, investment, and implementation. Strengthening the integrated management of water in food systems and agriculture is a top objective of the Declaration. Each country's approach will differ depending on its unique context, ambition, and capabilities. Using the framework outlined in this paper as inspiration, countries can request support through the NDC Partnership to build capacity and attract investments in climate-adaptive water-resilient food systems.

A focus on key investment pathways will help ensure better stakeholder coordination and knowledge sharing to generate the data and evidence needed to mobilize larger-scale investments. Building the climate resilience of developing country food systems to absorb, adapt and recover from climate related risks, will require strong policy engagement, collaborative efforts to build investment pathways and pipelines and innovative new financial structures. The task will require collective action and significant financial resources to better manage water resources and natural capital in the face of climate change and help ensure food security for the most vulnerable.



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Annex 1: Return on Investment (ROI) Calculation

Assumptions

- Initial Investment: \$1 million @ \$1000 per ha (illustrative)
- Natural Capital Appreciation: 2% per year (source: World Bank)
- Average Annual Rate of Return on Agriculture 10.74% (source: FarmTogether, Forbes)
- Productivity Gains: 41% increase in crop productivity over 30 years (source: Nature Communications)
- Average Water Cost per ha: \$16 (source: USDA)
- Water Cost Reduction: 35% reduction in water usage (source: Sustainable Agriculture Initiative Platform)
- Expected carbon sequestration from regenerative agriculture: 1 to 2 tons of CO2e per hectare per year, with diverse agroforestry systems in the tropics achieving 30 to 40 tons of CO2e per hectare per year (source: Toensmeirer, 2016) at an average price of \$20 per CO2e (Source: Price paid by Cargill in 2022)
- Risk Mitigation: Not quantified due to variability and complexity

Calculations

• Natural Capital Appreciation:

Year 30 Value = \$1,000,000 * (1 + 0.02)³⁰ = \$1,811,364

• Productivity Gains:

Additional Revenue from Productivity = (\$1,000,000 * ((0.1074 * 1.41) - 0.1074)) = \$44,000 per year

• Water Cost Reduction:

Annual Water Cost Savings = (\$16 * (0.35)) * 1,000 = \$5,600 per year

• Revenue from Market Premiums:

Annual carbon credit benefits = (2 * \$20) * 1000 = \$40,000 per year

Total Annual Returns:

\$44,000 (Productivity) + \$5,600 (Water Savings) + \$40,000 (Carbon credits) = \$89,634

ROI after 30 years:

ROI = (Total Returns - Initial Investment) / Initial Investment

Total Returns = \$89,634 * 30 + \$1,811,364 (Natural Capital Appreciation)

ROI = (\$4,500,384 - \$1,000,000) / \$1,000,000 = 350%

The annualized return on investment (ROI) can be calculated using the formula for Compound Annual Growth Rate (CAGR), which provides a smoothed, annualized rate of return. The formula for CAGR is:

$$= \left(\frac{\text{ENDING VALUE}}{\text{BEGINNING VALUE}} \right)^{\frac{1}{\text{NUMBER OF YEARS}}} - 1$$

In this scenario:

Ending Value = \$4,500,384 (Total Returns after 30 years)

Beginning Value = \$1,000,000 (Initial Investment)

Number of Years = 30

Plugging in these values:

$$=(4.5003)^{\frac{1}{30}} - 1$$

CAGR \approx 0.0514 or 5.14%

=> the annualized return on investment for this project would be approximately 5.14%. This means that the investment would have grown by an average of 5.14% per year over the 30-year period.

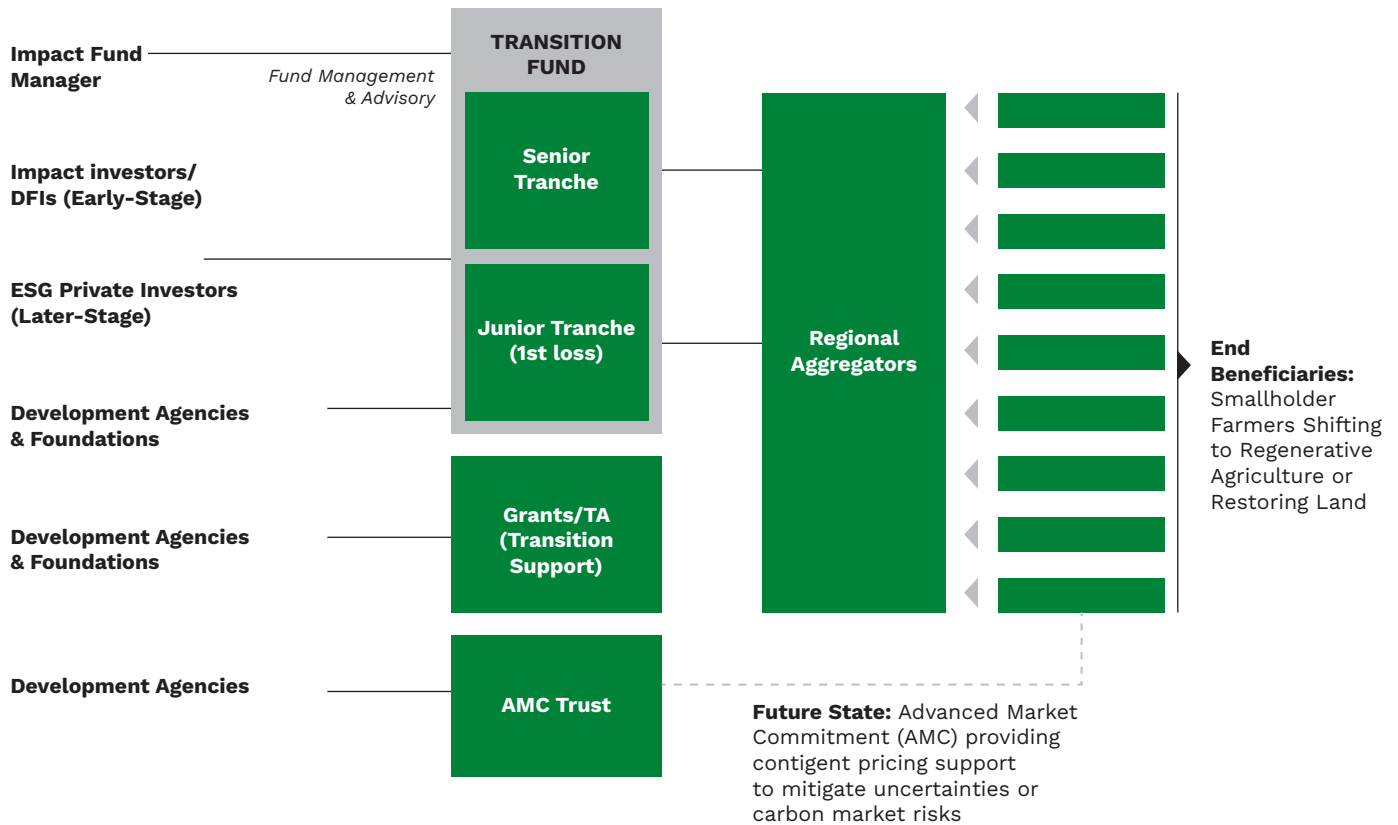
Annex 2: Illustrative Blended Finance Structures

Financial Structuring for Scale

Examples of possible blended finance structures include:

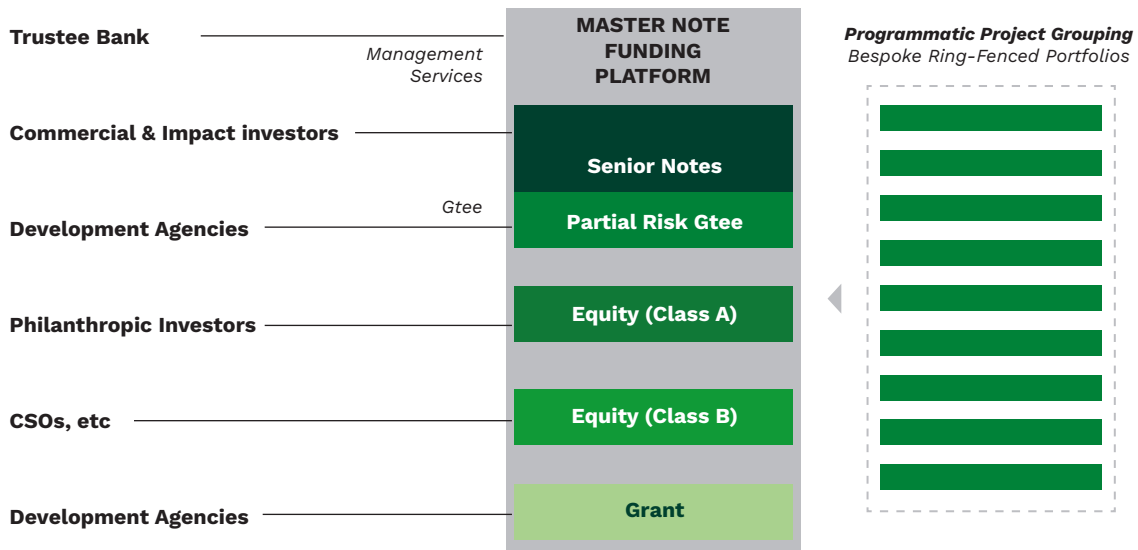
3.2.1 FIRST-LOSS JUNIOR TRANCHE

Structured finance or equity investments have merit in order to provide long-term finance and aggregate blended capital. Structures need to allocate funder risks and returns by providing the upfront finance to support economic uncertainties arising from transitions to climate-adaptive, water-resilient food systems changes. A fund could be designed to support and encourage smallholder farmer shifts to regenerative agriculture practices. The Fund could comprise a Senior Tranche (with early- and later-stage investors) and Junior Tranche (first-loss) combining public and private capital. Capital could be used to fund Producer Organizations and other regional aggregators, who in turn support local smallholders with required transition funding and related assistance. Near-term economic uncertainties from untested farming practices are mitigated via an advance market commitment-like mechanism to provide contingent pricing support to smallholders if/as needed.



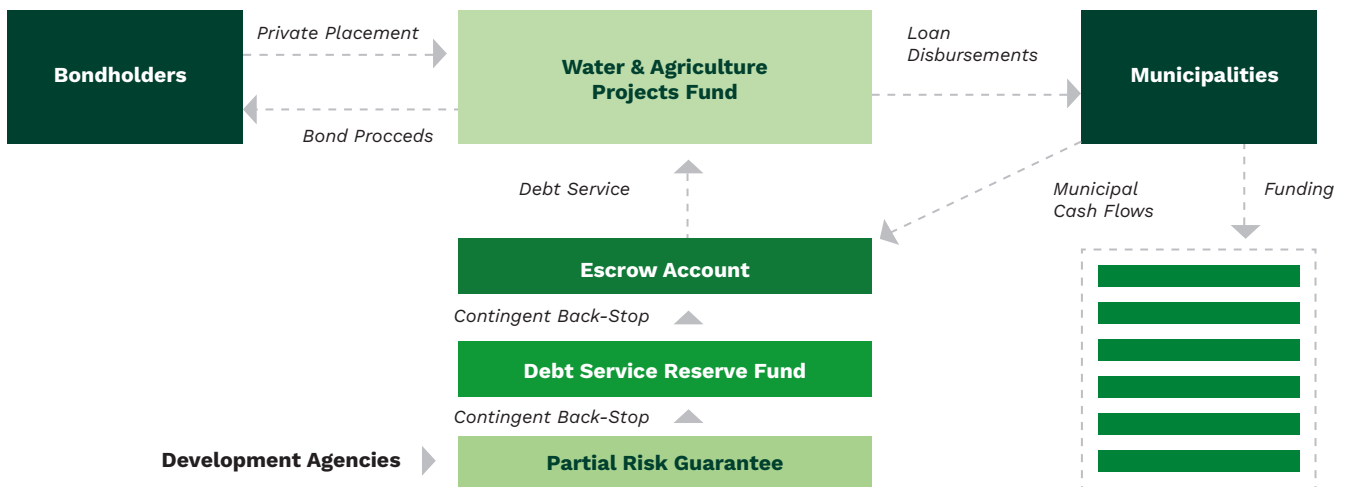
3.2.2 GUARANTEES FOR MUNICIPAL/SUB REGIONAL NOTE ISSUANCE

Municipalities, National Development Banks and other local intermediaries are key stakeholders in the design and development of local landscape investments. They can facilitate programmatic project groupings at the local level through bespoke ring-fenced portfolios. A Master Note Funding Platform, with a portfolio guarantee could serve as an intermediary between tiered funders and cashflows arising from portfolio projects. The Master Note Funding Platform allows for participation by various funder types potentially ranging from senior capital to equity and grants. A partial risk guarantee helps mitigate repayment risks for senior capital providers and class A note holders. Funders are repaid via cash flows arising from a grouping of programmatic projects.



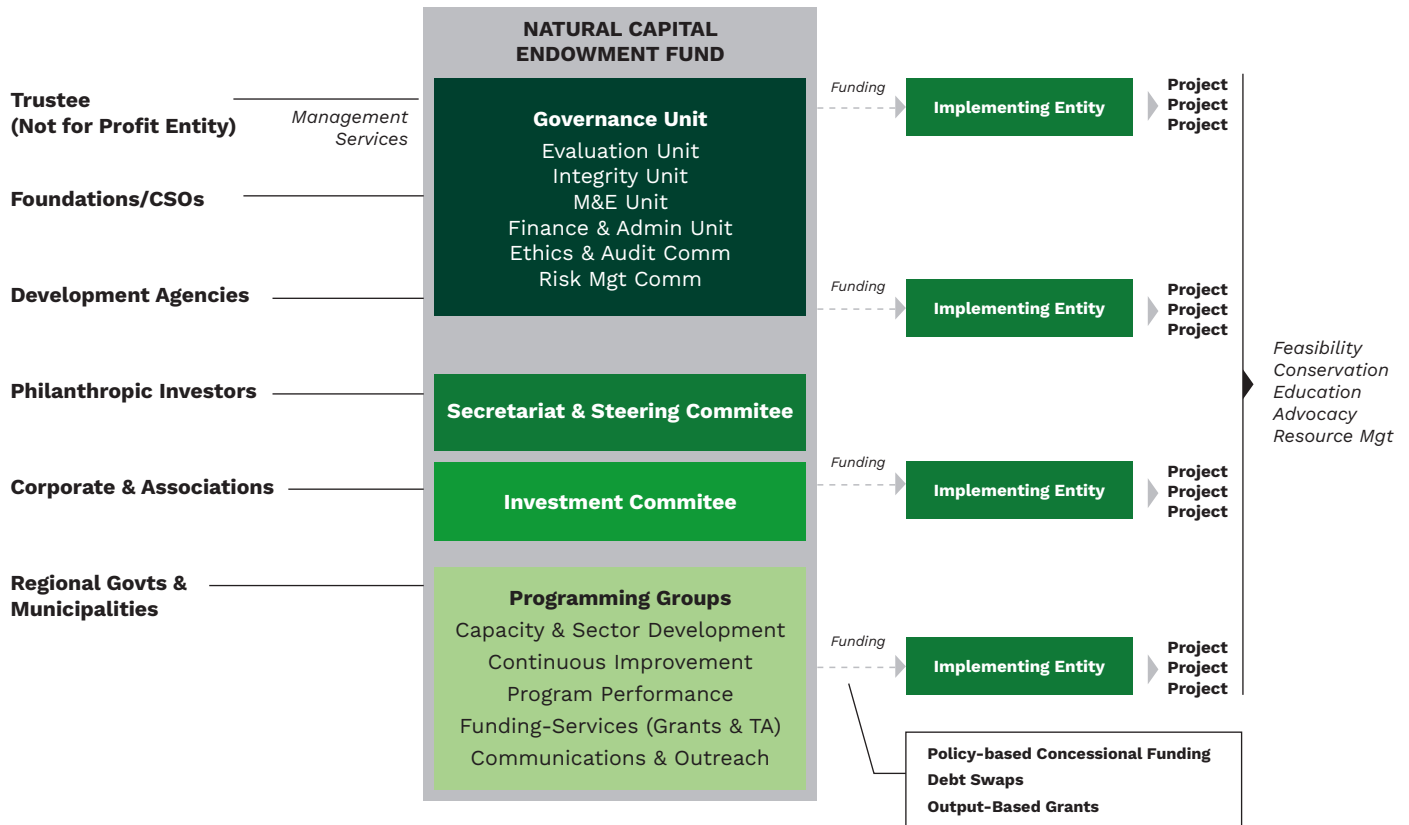
3.2.3 BACK-STOPPING FOR BOND ISSUANCES

Project pooling approaches warrant consideration, given higher-risk elements such as sub-national (e.g., municipal) credit risk and uncertain cash flow. Fixed income products, such as long-term bonds, tend to attract institutional investors when backstopped by high-quality third parties (e.g. DFIs, MDBs) to ensure adequate risk mitigation. Bondholders could subscribe to a private placement of bonds issued by a Pooled Fund Entity, which uses the proceeds to make loans to municipalities for on-funding to local water and agriculture projects. Cash flows to service the bonds are provided by municipalities via an escrow account, backstopped by a debt service reserve fund and a partial risk guarantee.



3.2.4 ENDOWMENT FUNDS / REINVESTABLE DIVIDENDS/NATURE SWAP

The lack of financial and economic value attributed to natural resources limits the cashflows that can be generated from conservation efforts. Financial incentives that help developing country governments finance these activities can be structured to leverage private investors interested in offsetting their environmental impacts. Endowment funds, equity with reinvestable dividends and nature swaps are attracting private investments by linking the financial returns to conservation efforts. For example, public and private funders could contribute to an Endowment Fund where financial returns are generated from investment returns on the endowment or savings from the re-issuance of debt at lower rates. These returns are then used to provide funding to implementing entities overseeing various natural capital-related projects.



3.2.5 PARAMETRIC INSURANCE

A Multi-Donor Trust Fund could be established to mobilize private-sector capital and risk capacity in two ways -- first, by encouraging more private investment into projects located in challenging and risky environments, and second, by motivating more private-sector insurance and reinsurance providers to offer risk capacity to support these kinds of projects. In this case, donor agencies would provide a combination of grants and guarantees into a Multi-Donor Trust Fund, which acts as a “first loss” layer that helps reduce risks for public and private-sector insurers and reinsurers in providing insurance cover – i.e., the “excess loss” insurance capacity – to worthy projects. This insurance cover, properly structured, can help encourage private sector investors and other capital sources to provide funding to projects in these host countries by mitigating specific risks.

