

Project Report

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D3.1 Framework for developing funding and finance arrangements for coastal restoration

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D3.1 Framework for developing funding and finance arrangements for coastal restoration

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WP3

Lead beneficiary: GCF

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REST-COAST

Large Scale RESToration of COASTal Ecosystems through Rivers to Sea Connectivity

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REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

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Changes made in version 2 of this deliverable

This deliverable has been substantially revised based on the very helpful comments provided by the Commission's mid-term review team. Below, we summarise the changes made.

The order of the Chapters has been changed in order to have the main contributions of this deliverable, the NBS Business Model Framework (now Chapter 2) and its application to the REST-COAST Pilots (now Chapter 3) upfront.

Chapter 1: Introduction

- The Introduction has been completely rewritten in order to clarify the scope of D3.1, and how it relates to the other deliverables of WP3.

Chapter 2: NBS Business Model Framework (formerly Chapter 3)

- The introductory sections 2.1 and 2.2 have also been completely rewritten in order to introduce the framework step by step in a more practical way, also linking it to the other tasks of WP3.
- We thereby changed one aspect in the framework that was confusing. What was formally called “funding arrangement” is now called “granting arrangement”, because many usages of the word “funding” also include “funding through value capture”. Hence, in the former version of this deliverable it was difficult to distinguish between upfront funding (i.e. now granting) and ex-post value capture (still called value capture now). Funding now subsumes both granting and value capture.
- To improve the clarity of the framework presentation, we added a separate section on granting arrangements, which in the former version, was treated together with the financing arrangements in one Subsection.
- To further improve clarity, we designed a new Figure (Fig. 2.2 and modified as Figs. 2.4, 2.6, 2.8 and 2.10) that provides an overview of the four types of contractual arrangements that make up an NBS business model (i.e., granting, value capture, financing and procurement), as well as their main subtypes.
- To also improve clarity, we added to the Subsection on procurement arrangements (2.6), a practical description of the procurement process (Paragraphs 3 and 4 of Section 2.6 plus the bullets that follow).

Chapter 3: Current financial arrangements in the RESTCOAST pilots (formerly Chapter 5)

- Chapter 3 has been completely rewritten in order to more explicitly link this deliverable and its NBS Business model framework to the Pilot restoration work.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

- The Chapter now directly follows the Chapter on the Framework and consistently uses the categories of the framework. Each Pilot is now presented in terms of subsections that correspond to the core concepts of the framework.
- In addition, we have added to the presentation of each Pilot, a subsection titled “Considerations for future WP3 work” that provides practical details on how the business models identified will be further developed in the WP3 co-development Task 3.3.
- We also added additional information on the Pilots, including from D1.2 (barriers and enablers) and D5.2 (Strengths, Weaknesses, Opportunities, and Threats), and had an additional round of dedicated bilateral meetings with the Pilots to fill gaps.
- We also added a synthesis section that highlights communalities and differences between the Pilots: “3.10. Communalities and differences across the Pilots”

Chapter 5: Review of available frameworks and guidelines for developing funding and financing arrangements for NBS (formerly Chapter 2)

- We have added a newly written Introduction to Chapter 5 which better frames the purposes and scope of the review of guidances (Section 5.1).
- We have expanded Table 5.1 (formerly Table 2.1) to better describe the sample of reviewed documents, based on our selection criteria.
- We added 2 paragraphs (below Table 5.2) that elaborate on the two objectives that the review has: i) identifying the types of guidelines that have been developed so far, and ii) deriving a set of building blocks that form the foundation of further WP3 work in Task 3.3. Task 3.3 is the task dedicated to co-developing new NBS business models and financing arrangements in the Pilots.
- We added a new first paragraph in the subsection “5.4 Results: Building blocks” that explains how the building blocks identified will be used in Task 3.3.

Table of Contents

Changes made in version 2 of this deliverable	3
Preface	7
Summary	8
List of abbreviations	10
Chapter 1. Introduction	12
1.1 Nature-based solutions	12
1.2 Funding and financing nature-based solutions	13
1.3 WP3 and scope of this deliverable	14
1.4 The remainder of WP3	15
1.5 Other frameworks developed in WP3	16
Chapter 2. NBS Business Model Framework	18
2.1 Overview	18
2.2. The core framework	19
2.2.1 NBS business models and business plans	19
2.2.2 The four fundamental transactions of a NBS business model	20
2.2.3 Contractual arrangements governing transactions	22
2.2.4 Two ideal-typical NBS business models	24
2.3 Typology of granting arrangements	24
2.4. Typology of financing arrangements	28
2.4.1. Commercial Finance	29
2.4.2. Concessional finance	34
2.5 Typology of value capture arrangements	35
2.5.1 Direct value capture	39
2.5.2 Indirect value capture	40
2.6 Typology of procurement arrangements	42
Chapter 3. Current financial arrangements in the RESTCOAST pilots	48
3.1. Wadden Sea (The Netherlands)	48
3.2. Catalan coast/Ebro delta (Spain)	52
3.3. Venice (Italy)	56
3.4. Vistula Lagoon (Poland)	60
3.5. Foros Bay (Bulgaria)	64
3.6. Rhone Delta (France)	67
3.7. Sicily (Italy)	71
3.8. Arcachon (France)	74
3.9. Nahal Dalia (Israel)	77

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

3.10. Synthesis of findings across the Pilots	81
Chapter 4 Supply side of NBS finance	85
4.1. Sustainability in investment strategies	85
4.1.1 Financial and non-financial returns	85
4.1.2 Classification and impact	86
4.2 Market review for NBS	88
4.2.1 Supply of finance from supranational funds and multilateral development banks	90
4.2.2. Supply of finance from the private sector	91
Chapter 5. Review of available frameworks and guidelines for developing funding and financing arrangements for NBS	93
5.1 Introduction	93
5.2 Methodology	94
5.3 Results: Document Typologies	98
5.4 Results: Building blocks	105
5.4.1. Strategic (Societal) objective(s)	108
5.4.2. Situational analysis	108
5.4.3. Solution space	109
5.4.4. The funding model - who ultimately pays?	109
5.4.5. The financing model - who provides the upfront capital needed?	110
5.4.6. Governance arrangements	110
5.4.7. Working principles	111
Glossary	112
References	116
Appendix 1 Summary of the guidance documents reviewed for Chapter 5	129

Preface

The Rest-Coast Project (Large scale RESToration of COASTal ecosystems through rivers to sea connectivity) is an EU Horizon 2020 research project (Grant agreement No. 101037097) whose overall goal is to address with effective and innovative tools the key challenges faced by coastal ecosystem restoration across Europe. The approach chosen for this project will deliver a highly interdisciplinary contribution, with the demonstration of improved practices and techniques for hands-on ecosystem restoration across several pilot sites, supported by the co-design of innovative governance and financial arrangements, as well as an effective strategy for the dissemination of results.

Summary

This deliverable is the first contribution of Work Package 3 to the REST-COAST Project. The overarching purpose of REST-COAST is to provide the tools to address some of the key challenges faced by coastal ecosystems restoration. To achieve this objective, REST-COAST will improve coastal restoration practice and techniques through new hands-on restoration pilot projects, co-design effective governance arrangements and policies, and generate new tools and data for risk reduction assessment. In addition to these activities, Work Package 3 will design innovative financial arrangements and bankable business plans to support the implementation and the scaling up of coastal ecosystem restoration.

This deliverable (D3.1) provides the following **four foundational contributions to the remainder of the work of WP3**: i) NBS Business Model Framework (BMF) (Chapter 2) ; ii) Application of the NBS Business Model Framework to the REST-COAST Pilots (Chapter 3); A review of the current funding and financing landscape for NBS and coastal restoration (Chapter 4); and a review of existing frameworks and guidelines for (co-)developing financing and funding arrangements for NBS (Chapter 5).

The **NBS Business Model Framework (BMF)** provides a consistent terminology for describing NBS business models to be applied in the remainder of WP3. It does so by describing the core components of NBS businesses in terms of the following four core economic and financial transactions involved,

- The **granting transaction** refers to a grantor paying for the NBS (through funds, grants, donations, etc.) in expectation of non-monetary rewards such as individual benefits from the NBS or the enhancement of natural capital or social welfare through the NBS.
- The **value capture transaction** refers to beneficiaries of the NBS directly or indirectly paying for the value delivered to them through ecosystem services of the NBS. Typical ways of capturing NBS values include the sale of products from NBS, sale of carbon credits, tariffs and taxes (e.g., levies paid by homeowners that are flood secured by ecosystem restoration).
- The **financing transaction** refers to an investor providing financial capital up front with the expectation to be repaid with financial returns - e.g. interest, dividend. Investors can be both public and private, including commercial investors providing capital at market rates and impact investors providing capital at sub-market rates
- The **procurement transaction** refers to the initiator “outsourcing” some stages of NBS delivery to subcontractors involved in the delivery. For example, the NBS initiator can outsource the implementation or operation of a NBS to a subcontractor.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The **NBS Business Model Framework** was then applied to the **REST-COAST Pilots**, in order to take stock and describe consistently the current NBS business models in place (Chapter 3). The findings across the REST-COAST Pilots confirm what is prominently said in the literature, namely that NBS projects mainly rely on grants from the public sector. Public granting is generally limited in size and only available for relatively short funding cycles. Currently, none of the REST-COAST pilots have established financing arrangements. Only two Pilots, the Vistula Lagoon and Sicily, have value capture arrangements in place generating cost savings in the former case and some tourism revenues in the later case. The generated values and the associated public and private beneficiaries have, however, been, for the most part, identified, which offers opportunities in establishing additional value capture arrangements, and through this, potentially attracting financing. Regarding procurement, all Pilots follow rather conventional practices for public procurement.

The **review of the current funding and financing landscape for NBS** and coastal restoration (Chapter 4) finds that most money put into NBS comes from public funding, with private sponsorship being rather marginal and mostly consisting of philanthropic and corporate social responsibility investments. The business case for restoration has not yet been consolidated. Unlocking private sector participation in NBS finance requires supportive policy frameworks and incentives, comparable performance data, and broader partnerships between private and public actors. NBS nevertheless are part of the emerging market for sustainable investment. Changing preferences that emphasise the importance of non-financial factors and the real economic and societal impact of investments suggest that there will be more opportunities to scale up NBS finance in the future.

The **review of existing frameworks and guidelines for (co-)developing financing and funding arrangements** for NBS (Chapter 5) leads to the identification of 6 main building blocks that can serve as a roadmap for the work ahead. These building blocks, which are aligned for a large part with the NBS Business model Framework of Chapter 2, represent the main pieces of information and analyses that need to be collected and conducted, with stakeholders and partners, in order to develop a fit-for purpose financing arrangement for the RESTCOAST cases. Furthermore, a set of guiding principles has been identified that are said to be key in the further process. These are the need to take a collaborative, lifecycle, systems, and interdisciplinary approach, as well as the need for an adaptive and scenario-based approach.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

List of abbreviations

ASEAN	Association of South-east Asian Nations	IBA	Important Bird Area
BMDG	Nature-based Solutions Business Model Development Guide	IKI	International Climate Initiative
BMF	Nature-based Solutions Business Model Framework	IN	Abbreviation of document: Investing in Nature (EIB 2018)
BOO	Build-Own-Operate	INPA	Israel Natural Park Authority
BOT	Build-Operate-Transfer	IPCC	Intergovernmental Panel on Climate Change
BNCF	Blue Natural Capital Financing Facility	IUCN	International Union for Conservation of Nature
BTO	Build-Transfer-Operate	ICZM	Integrated Coastal Zone Management
CC	Abbreviation of document: Capitalizing Conservation (Clarmondial 2017)	IWRM	Integrated Water Resource Management
CCF	Abbreviation of document: Catalyzing Climate Finance (UNDP 2011)	LBIN	Abbreviation of document: The Little Book of investing in Nature (Tobin-de la Puente, Mitchell, and Mardas 2021)
CF	Cohesion Fund	Lit-rev	Abbreviation of document: Mobilizing private finance for coastal adaptation: A literature review (Bisaro and Hinkel 2018)
CFin	Abbreviation of document: Conservation Finance – From Niche to Mainstream (Credit Suisse AG and McKinsey Center for Business and Environment 2016)	LVC	Land Value Capture
CPI	Climate Policy Initiative	OECD	Organisation for economic cooperation and development
CPR(s)	Common-pool Resource(s)	O&M	Operation and Maintenance
CSR	Corporate Sustainability Reporting Directive	MIB	Market-based Instrument
DB	Design-Build	MDB	Multilateral Development Bank
DBB	Design-Bid-Build	NBS	Nature Based Solution
DBFO	Design-Build-Finance-Operate	NbS-B	Abbreviation of document: Nature-Based Solutions Business Model Canvas Guidebook (McQuaid 2019)
		MC	
DBO	Design-Build-Operate	NGO	Non-governmental Organisation
EBRD	European Bank for Reconstruction and Development	PES	Payment for Ecosystem Services
EDF	Environmental Defence Fund	PPP	Public-Private Partnership
EEA	European Economic Area	R&D	Research and Development
EEF	Nature-based Solutions Enabling Environment Framework	SDG	Sustainable Development Goal

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

EIB	European Investment Bank	SFDR	Sustainable Finance Disclosure Directive
ERDF	European Regional Development Fund	SFN	Abbreviation of document: State of Finance for Nature (UNEP 2021)
EPI	Abbreviation of document: Enabling private investment in climate adaptation & resilience (Tall et al. 2021)	SLM	Sustainable Land Management
ES(S)	Ecosystem Service(s)	SME(s)	Small and Medium-size Enterprises
ESG	Environment, Social, Governance	SCI	Site of Community Importance
ESIF	European Structural Investment Fund	SPA	Special Protection Area
ESMA	European Securities and Markets Authority	SPV	Special Purpose Vehicle
ESO	Abbreviation of document: Acting on Ecosystem Service Opportunities (Rode, J., Wittmer 2015)	TIF	Tax-increment Financing
EU	European Union	UFF	Abbreviation of document: Why 'blended finance' could help transitions to sustainable landscapes: Lessons from the Unlocking Forest Finance project (Rode et al. 2019)
FinCC	Abbreviation of document: Financing nature-based solutions for Coastal protection (Eiselin et al. 2022)	UNEP	United Nations Environment Program
FFWS	Abbreviation of document: Handbook for the Implementation of Nature -based Solutions for Water Security (Altamirano et al. 2021)	UNDP	United Nations Development Program
FS	Abbreviation of document: Keep it Fresh or Salty (Herr, D et al. 2014.)	UOF	Nature-based Solutions Upscaling and Outscaling Framework
GBM	Abbreviation of document: A short guide to developing green business models (Antal and Burrows 2018)	VAT	Value-added Tax
GCF	Global Climate Forum	WBG	World Bank Group
GFDRR	Global Facility for Disaster Risk Reduction	WP3	Work Package 3
GHG	Greenhouse Gases	WP5	Work Package 5

Chapter 1. Introduction

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1.1 Nature-based solutions

Coastal areas are socio-ecological systems shaped by the complex interplay between land and oceans. This interaction makes coastal ecosystems such as salt marshes, seagrass meadows, coral reefs and mangrove forests among the most productive and diverse ones on our planet. This abundance of resources has always supported human livelihoods, and today approximately 40% of the global population lives within 100 km of the coast (Cohen et al., 1997).

Climate change impacts, including extreme weather events, have resulted in extensive damage to marine and coastal ecosystems, and will continue to do so as global warming intensifies (IPCC, 2022). Moreover, coastal systems are also threatened by a combination of anthropogenic pressures that result from population growth, increasing economic activities, urbanisation and resource exploitation. The degradation of coastal ecosystems' environmental conditions drastically reduces their capacity to support biodiversity and deliver climate mitigation and adaptation, among many other essential functions. The protection and restoration of coastal ecosystems is a priority that must be addressed and upscaled to make our society and the environment truly resilient to climate change.

Nature-based Solutions (NBS) recently emerged as an innovative approach for coastal adaptation, preservation, and restoration, addressing the multitude of challenges in degraded landscapes. In a few years, NBS have received support from a variety of large international organisations and NGOs, as well as private sector representatives (Melanidis and Hagerman, 2022). In March 2022, the Fifth session of the UN Environment Assembly (UNEA-5) formally adopted the definition of NBS as “actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.”

Following this definition, NBS address a wide range of societal challenges, including climate change adaptation and mitigation, biodiversity loss, public health, urbanisation, economic development, food and water scarcity, and natural extreme events (Brears, 2022). Because of the significant emphasis on synergetic solutions across environmental, social and economic policy agendas, NBS

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

have strong alignments with the Sustainable Development Goals of the United Nations' Agenda 2030 (Andrikopoulou et al., 2021), as well as with the "three-pillar" sustainability approach (Purvis et al., 2019).

Given the broad scope of the challenges that NBS address, there are also many different kinds of measures that can be considered as NBS (Dorst et al., 2019). Generally, this includes the protection and restoration of degraded ecosystems, hybrid measures that combine natural and artificial features, and hard structures that rehabilitate natural processes. For the coastal domain addressed here, this includes the nourishment of beach-dune systems, managed realignment and wetland restoration, and salt marsh restoration, among others.

While the concept of NBS is relatively new, the basic ideas of managing natural features to meet society's needs have already been well established within the scientific literature for decades. Ecosystem restoration approaches (De Groot et al., 2013), ecosystem-based adaptation (Vignola et al., 2013), the concept of natural capital (Costanza and Daly, 1992; Jansson, 1994), payments for ecosystem services (Gómez-Baggethun and Muradian, 2015) and green infrastructure (Connop et al., 2016) are, to varying degrees, concepts that fall under the more comprehensive umbrella concept of NBS (Dorst et al., 2019; Nesshöver et al., 2017).

1.2 Funding and financing nature-based solutions

Although NBS are, as described above, not entirely new, their implementation still faces a number of technical, governance and financial barriers that need to be addressed for scaling up their implementation (Sánchez-Arcilla et al., 2022). One critical class of barriers thereby relates to the lack of sufficient funding and finance, and this is the one WP3 of the REST-COAST project addresses.

At present, NBS are predominantly funded by governments and other public bodies (UNEP, 2022). However, the capacity of public authorities to fund NBS through conventional granting approaches is diminishing due to competition with other public policy priorities (Toxopeus and Polzin, 2021). Generally, NBS have failed to attract finance from the private sector, although the overall level of climate change investment has been increasing steadily in recent years (Toxopeus and Polzin, 2021).

The challenges involved in funding and financing NBS are not surprising from an economic perspective, because when regarding NBS as economic goods, they exhibit a number of characteristics that render it difficult to make those who benefit from the good (NBS) pay for it. These characteristics include:

- NBS deliver their benefits through natural processes, which means that the uncertainties involved are usually (much) higher compared to "standard" goods that deliver their benefits through technological processes (Vatn 2005).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

- NBS often require more time for their benefits to become apparent compared to grey solutions, resulting in inconsistencies between short-term decision-making cycles and long-term NBS implementation (Kabisch et al., 2017)
- NBS deliver benefits (and disbenefits) to several heterogeneous groups of beneficiaries because NBS provide multiple ecosystem services that address different needs (e.g. flood protection, biodiversity, water purification, carbon sequestration, etc.).
- Furthermore, due to the interconnectedness of natural systems (Hagedorn, 2008), there are often important trade-offs involved in the delivery of multiple ecosystem services (Seddon et al., 2020a).
- The benefits delivered by NBS are often non-excludable (i.e., common pool or public good), which means that beneficiaries have incentives to free-ride and not contribute to the delivery or maintenance of NBS (Ostrom, 2005).

Scaling up funding and financing of NBS means addressing these specific economic goods characteristics of NBS through appropriate contractual arrangements (for funding, financing, value capture and procurement) that redistribute the costs and benefits among the diverse actors involved in funding, financing, implementing, operating, and benefiting from NBS. The challenge thereby is that both NBS projects and funding and financing arrangements are complex and diverse, with no one-size-fits-all solution available. NBS are diverse in terms of socio-economic context and scale, which makes them differ in terms of investment size, timing and revenue generation, risk profiles, public acceptance, co-benefits and dis-benefits generation. In a similar fashion, funding and financing arrangements are also diverse as they differ in terms of the involvement of public and/or private actors, financial instruments (e.g., direct equity, bonds), value capture mechanisms (e.g., taxes, tariffs, land sale) and procurement models. Matters are complicated even more because the terminology used to describe the financing of restoration and NBS is inconsistent across sectors and organisations, which hinders both innovation as well as the application of existing knowledge to projects under development.

1.3 WP3 and scope of this deliverable

The purpose of **Work Package 3 (WP3) of the REST-COAST project** is to contribute to address the above-mentioned challenges by:

- Identifying innovative funding and financing arrangements from around the world that are or can be applied for restoring coastal ecosystems and NBS at different spatial scales (Task 3.2).
- Co-developing tailored funding and finance arrangements, bankable business plans and financial scalability plans for the Pilots (Task 3.3).
- Providing avenues for scaling funding and financing beyond the Pilots, by making results easily accessible, replicable and transferable to coasts worldwide and developing suitable policy reforms.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

This deliverable (D3.1) is the outcome of Task 3.1 (T3.1) “Stock taking and framework development” and sets the foundation for the rest of the work in WP3. Following the description of work, D3.1 provides the following four foundational contributions to WP3:

1. Its main contribution is the development of a descriptive-analytical framework, which we call the **NBS Business Model Framework (BMF)**. The BMF consistently describes restoration/NBS projects in terms of the main funding and financing arrangements involved in their business models (Chapter 2). This framework provides a consistent terminology to be applied throughout the rest of WP3.
2. An **application of the NBS Business Model Framework to the REST-COAST Pilots**, in order to assess and describe consistently the current funding and financing arrangements in place (Chapter 3).
3. A review of the **current funding and financing landscape** for NBS and coastal restoration (Chapter 4).
4. A **review of existing frameworks and guidelines** for co-developing funding and financing arrangements for NBS (Chapter 5).

1.4 The remainder of WP3

Further research of our work package will focus on overcoming economic and financial barriers through the identification (Task 3.2) and implementation (Task 3.3) of innovative and sustainable funding and financing arrangements (Figure 1.1). We will explore promising approaches to public and private funding, financing and provisioning that have been applied - or could be applied - to coastal ecosystem restoration and NBS at various spatial scales and latitudes, with the goal to transfer their innovative elements to the Project Pilots.

For each of the pilots, customised arrangements, bankable business plans and financial scalability plans will then be developed through intensive cooperative interactions with local stakeholders (Task 3.3). The NBS Business plan will be a core concept thereby. It describes the business model and impact, the roles and contractual arrangements between all actors involved, including quantified cash flows and non-monetary rewards, risks, as well as risk mitigation measures, relevant markets and legal structures.

Finally, the data and knowledge accumulated throughout the entire process will be used to develop guidelines and policy recommendations to expand the funding and financing of NBS for coastal adaptation beyond the Pilots (Task 3.4). By translating our results into easily understandable propositions, we will facilitate the replication and transfer of our accomplishments in future coastal restoration initiatives.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

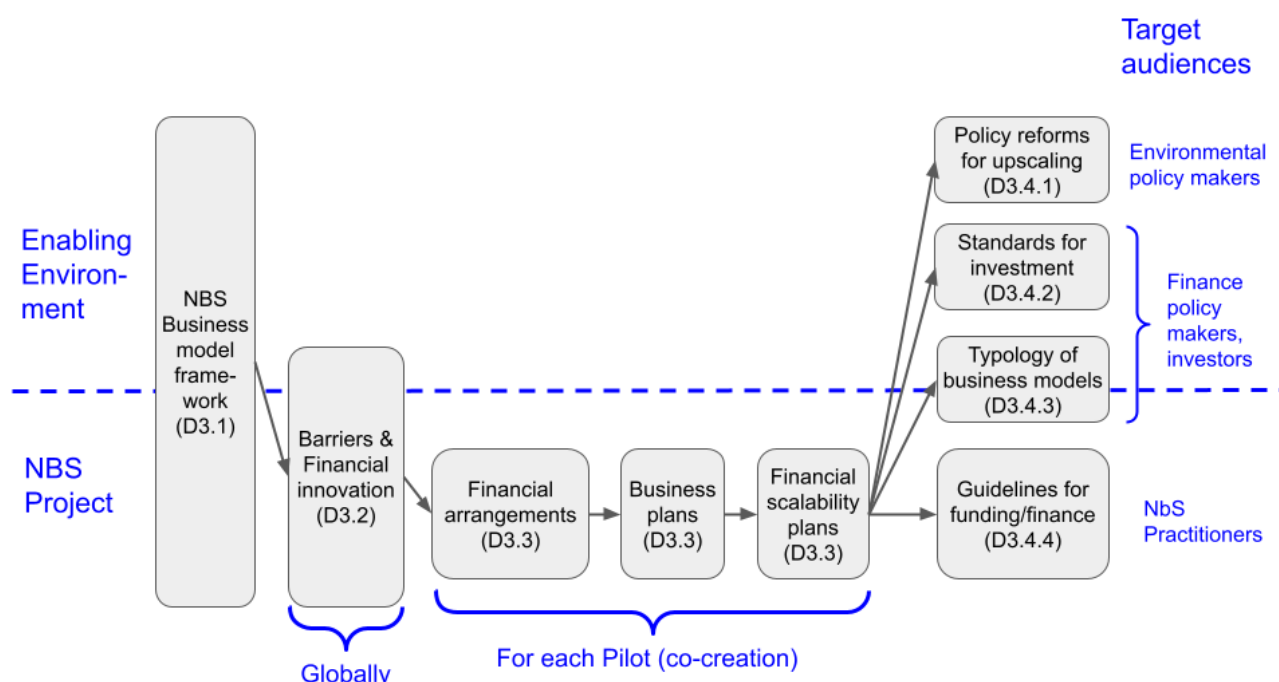


Figure 1.1 WP3 workflow and deliverables.

1.5 Other frameworks developed in WP3

As WP3 will also develop two other frameworks, we will briefly present them here and establish their relationship with the NBS Business Model Framework (BMF) presented in this deliverable (Figure 1.2). The BMF is a **descriptive framework** that focuses on the analysis of NBS business models at the project level. Its goal is to identify the involved actors and understand the contractual arrangements between them, which include funding transactions (granting and value capture), financing, and procurement of works and services. This framework will be used in WP3 to describe the various NBS pilots and to identify which financing arrangements fit which kind of NBS. With the exception of minor integrations and refinements, the BMF will be fully developed in the current deliverable as its main focus.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

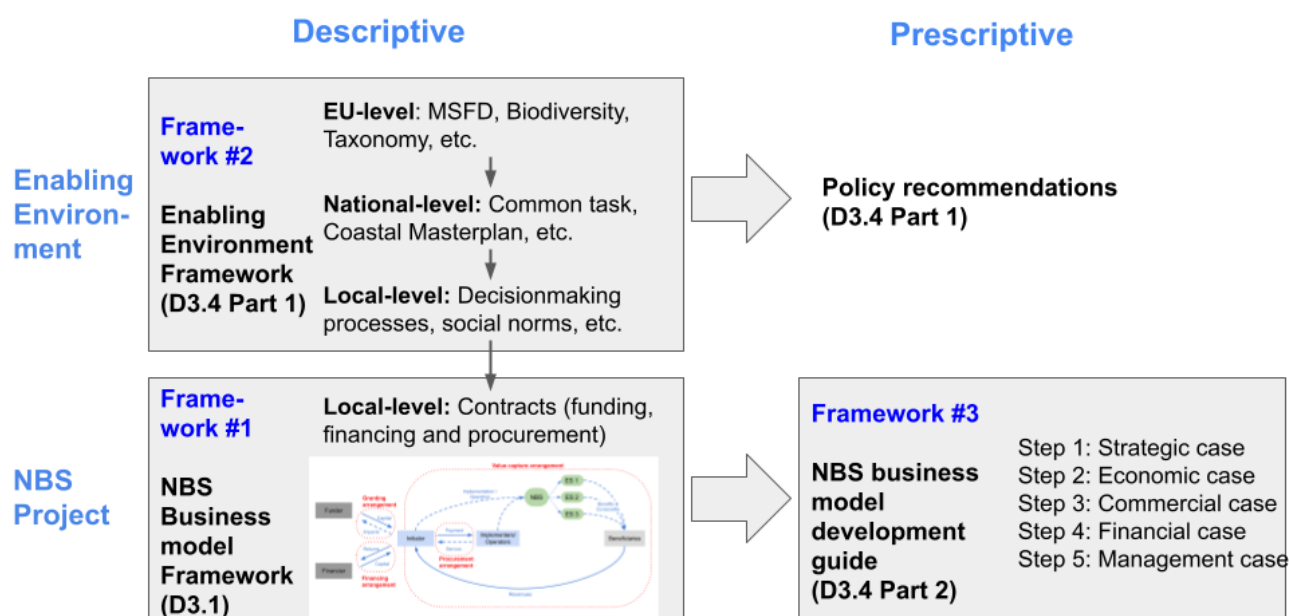


Figure 1.2 The relationships between the 3 frameworks developed in WP3.

In the further course of implementing WP3, we will also develop the **NBS Enabling Environment Framework (EEF)**. Similar to the BMF, EEF is a **descriptive framework**. However, the framework specifically focuses on the multi-level institutional/governance context of NBS business models. The EEF is designed for advanced study of the enabling/disabling environment in which NBS are embedded - policies, market conditions, norms, funding/financing sources, etc. This framework will primarily benefit from the research and outputs expected for Task T3.4.4 of WP3, which is dedicated to policy recommendations and the upscaling of financing and funding for NBS. The framework will be fully developed in the future to capitalise on the findings of Work Package 5 (WP5) (in particular from T5.2 and T5.3) of the REST-COAST Project on transformative governance for restoration and upscaling.

Similarly, the third framework developed in WP3.3 is the **NBS Business Model Development Guide (BMDG)**. It is a **prescriptive framework** detailing steps to define and implement business models and business plans for NBS upscaling. This framework will compound our research findings and lessons learnt from the previous descriptive frameworks and the development of tailored business plans in each pilot, undertaken in Task 3.3. Similarly to the EEF, the BMDG will be developed at a later stage.

Chapter 2. NBS Business Model Framework

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2.1 Overview

In this section, we present our NBS Business Model Framework (BMF) (Figure 2.1), which is the core product developed in this deliverable. The purpose of the BMF is twofold:

1. to provide a language for consistently describing NBS business models at the project level from a funding and financing perspective. The work on funding/financing NBS lies at the intersection of various fields (e.g., resilience, adaptation, mitigation, entrepreneurship and biodiversity conservation), different scientific disciplines (e.g., engineering, ecology, economics, finance and governance), and different sectors (e.g., public sector, private sector, civil society). As a result, a large “stew” of definitions, perceptions and terms has been combined to develop financial strategies for coastal restoration and nature-based solutions. We address the inconsistency in terminology across various fields, disciplines and sectors by offering a unified framework.
2. to allow the application of economic, financial and governance theories that can help in identifying suitable financing and funding arrangements for the implementation and upscaling of NBS. As revealed in our review of available frameworks (Section 5), it is evident that NBS funding and financing frameworks have been developed mostly ad-hoc, lacking solid foundations in economic and financial theory. This is surprising considering that fields such as institutional economics, transaction cost economics and contract theory provide the necessary foundations.

The presentation of the NBS Business Model Framework (BMF) is divided into two parts. First, we present the core elements of this framework in Section 2.2. Here, we define, explain, and relate the four fundamental transactions of granting, financing, value capture, and procurement that collectively form a NBS business model. Second, we present typologies for each of the four core elements in four subsections: a typology for granting arrangements (Section 2.3), a typology for financing arrangements (Section 2.4), a typology for value capture arrangements (Section 2.5) and a typology for procurement arrangements (Section 2.6). The intention is to establish clear nomenclature and descriptions that can be used for mapping and referencing NBS projects for coastal adaptation. The complexity of contractual arrangements highlights the need for developing theoretical frameworks that systemise knowledge. The classification in typologies is a theoretical

method that provides homogenous abstract models, or ideal types, which represent consistent configurations described in terms of multiple dimensions (Doty and Glick, 1994). Ideal types are the result of simplification and exaggeration and are not intended for a detailed portrayal of reality. They provide models so that deviations from the typology can be observed and justified (Weber, 1949).

2.2. The core framework

2.2.1 NBS business models and business plans

The central concept of our framework is the **business model**, which explains how an organisation creates, delivers, and captures value, whether it be economic, social, cultural, or other forms of value (Osterwalder & Pigneur, 2010). An **NBS business model** describes how an organisation, referred to as the **initiator**, creates, delivers, and captures value in an NBS project.

There are many different conceptualizations in the literature regarding what exactly constitutes a business model. While there is no universally accepted conceptualisation, the one articulated through the Business Model Canvas of Osterwalder & Pigneur (2010) is widely used. There is also a refinement of this canvas for application to NBS projects (McQuaid 2019), which is described in detail in Appendix 1. The Business Model Canvas describes NBS business models in terms of the following 9 components:

- **Key Partnerships:** The network of suppliers and partners that optimise the business model, reduce risk, or acquire resources.
- **Key Activities:** Most important actions that an NBS initiator must take to operate successfully.
- **Value Proposition:** The various ESS derived from an NBS and creating value for a specific Customer Segment.
- **Customer Segment:** Different groups of customers targeted. In the case of NBS, this includes the **grantors** on one hand (i.e., those granting or donating money for the implementation of an NBS) and the **beneficiaries** (i.e., those who directly enjoy the ESS from the NBS).
- **Customer relationship:** The type of relationships an NBS initiator establishes with a specific Customer Segment.
- **Key Resources:** Most important assets required to make an NBS business work (physical, financial, intellectual, or human).
- **Communication, distribution, and sales channels:** How an NBS initiator communicates with and reaches its beneficiary segments to deliver a Value Proposition.
- **Cost Structure:** All costs incurred to operate a business model.
- **Revenue Streams:** The cash an Initiator generates from each beneficiary.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

While a business model is an abstract description of how a business works (i.e., how a business creates, delivers, and captures value), a **business plan** is a description of a concrete business model applied in a specific NBS project. This is presented in a format that helps a grantor or financier decide whether to invest money (grants or finance) in the project. A business plan includes quantitative details on cash flows (costs, revenues, returns, grants, finance) as well as non-monetary impacts (social welfare, natural capital), associated risks and risk mitigation measures, analysis of relevant markets and legal structures, information on the management personnel, among other things. The purpose of a business plan is to provide a clear and compelling argument for why the NBS project should be undertaken, and to help grantors and funders understand the potential implications of investing in the venture or project. Towards this end, business plans need to be tailored to the specific requirements that different types of investors have.

Tasks 3.1 and 3.2 of WP3 focus on describing and analysing business models. One element of Task 3.2 is to develop business plans for specific business models co-developed in the Pilots. As the purpose of our framework and this deliverable is to address the funding and financing of NBS businesses, we specifically concentrate on the economic and financial aspects of the business model. This includes key activities, financial resources, value proposition, cost structure, and revenue streams. This will be instrumental in the development of T3.2 which aims to identify and transfer innovative contractual arrangements (public funding, financing and provisioning instruments). The other more detailed and case-specific aspects of business model development will be expanded in Task 3.3., where the co-development of concrete NBS business models and business plans in the Pilots will be carried out.

2.2.2 The four fundamental transactions of a NBS business model

As the focus of this deliverable is the funding and financing of NBS businesses, we describe the core components of NBS businesses (i.e., activities, the financial resources, the value proposition, the cost structure and the revenue streams) in terms of the economic and financial transactions involved, which are the basic building blocks of any business.

A **transaction** refers to the voluntary exchange of values (i.e., goods, services, money) among participating actors (Williamson 2000). Economic transactions involve the exchange of goods or services for cash, while financial transactions involve the exchange of cash for cash. The NBS business model involves four basic transactions: granting transactions, value capture transactions, financing transactions, and procurement transactions (Figure 2.1). Each type of transaction is described in more detail below.

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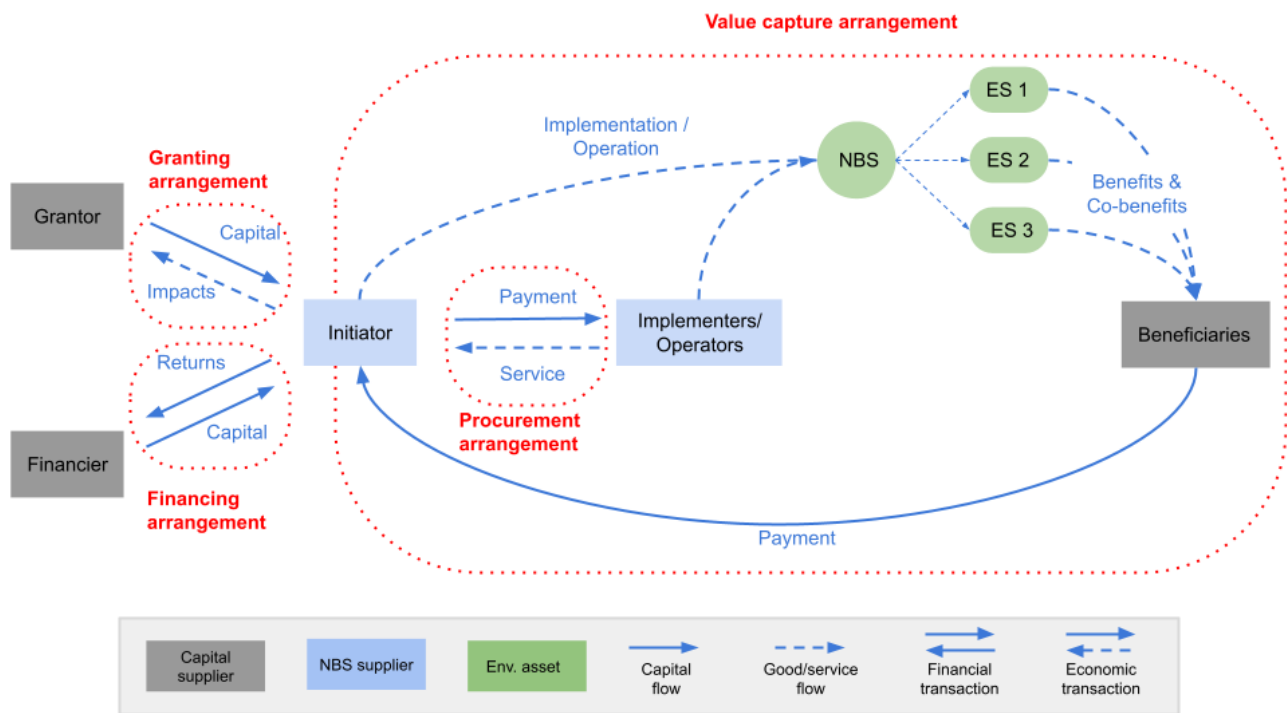


Figure 2.1: Roles of actors, transactions and contractual arrangements involved in NBS projects.

The **granting transaction** refers to a grantor paying for the NBS (through funds, grants, donations, etc.) with the expectation of receiving non-monetary rewards. These rewards can include individual benefits from the NBS, as well as the enhancement of natural capital or social welfare through the NBS. Grantors can be both public and private, including governments, philanthropists, (nature) foundations, private companies, or individuals. The main motivation for a grantor to provide funds is to achieve non-monetary benefits. In the case of a government or philanthropic foundation covering the initial expenses of an NBS project, the outcome might be in terms of social welfare and ESG impacts. Local beneficiaries may choose to (crowd-) fund an NBS project upfront, with the expectation of accessing the benefits generated by the NBS at a later stage.

The **value capture transaction** refers to the beneficiaries of the NBS paying directly or indirectly for the value delivered to them through the ecosystem services of the NBS. Typical methods of capturing NBS values include the sale of products derived from NBS, such as payment for ecosystem services, carbon credits, biodiversity credits, permits, and eco-labels. In addition, public actors may also capture value through tariffs and taxes paid by NBS beneficiaries. For example, levies paid by homeowners who benefit from flood protection provided by ecosystem restoration.

Granting and value capture transactions can be subsumed under the label **funding** as funding means paying for the project or NBS. NBS can be funded either *ex ante* through grants (i.e.,

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

granting transaction) or *ex post* through payments provided by the beneficiaries of the NBS (i.e., value capture transaction).

A **financing transaction** occurs when an investor provides upfront financial capital with the expectation of receiving financial returns, such as interest or dividends. Investors can be both public and private, including commercial investors who provide capital at market rates and impact investors who provide capital at lower rates, such as concessional finance of development banks. To easily differentiate funding transactions from financing transactions, money is exchanged for a good (i.e., the NBS) or service (i.e., ecosystem services provided by the NBS) in a funding transaction. Conversely, **financing** refers to the provision of financial capital by an investor who is interested in making productive use of their capital by securing future monetary returns - interests, dividends etc. Hence, in a financial transaction, money is exchanged for money.

Procurement transactions, also known as provisioning transactions, involve the "outsourcing" of certain stages of NBS delivery to subcontractors. For instance, the initiator often outsources the implementation or operation of a NBS to a subcontractor. Procurement transactions play a crucial role in delivering NBS benefits, as subcontractors can often implement NBS more efficiently.

It is important to note that these four types of transactions are not isolated but are interconnected. Importantly, a value capture transaction is a prerequisite for a financing transaction to occur. A financier will only engage in a financing transaction if the value delivered by the NBS to beneficiaries can be captured (i.e., through a value capture transaction) and is sufficient to pay back the financier with interest. Even if the NBS can generate sufficient revenues, financing is often required to cover the upfront implementation costs. This is because revenue streams can only be generated after the NBS has been implemented. This highlights the issue with NBS finance. Unlocking financing is closely tied to securing funding. Without a clear proposal outlining how future revenue streams will be established to cover project costs (e.g. later stages such as maintenance and operations, it will be impossible to convince financiers to provide the necessary capital for project implementation.

2.2.3 Contractual arrangements governing transactions

Transactions are typically organised through a set of **contractual arrangements** that govern the transactions and define how costs, rewards, risks, and operational responsibilities are distributed among all actors involved. Contractual arrangements, or contracts, are institutional arrangements that are designed to make transactions attractive for the actors involved by establishing various rights and obligations. This reduces uncertainties surrounding the exchange, and by doing so, they reduce transaction costs (Hart and Moore, 2008). Transaction cost refers to all costs involved in establishing and "running" the transaction, including the costs of negotiating and establishing the contract, monitoring compliance with the contract, and enforcing the contract through legal means in the event of non-compliance (Coggan et al. 2010).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The different types of transactions involved in a NBS business model serve different purposes, and effectively managing them requires selecting an appropriate contractual arrangement from a range of options for each type (Figure 2.2).

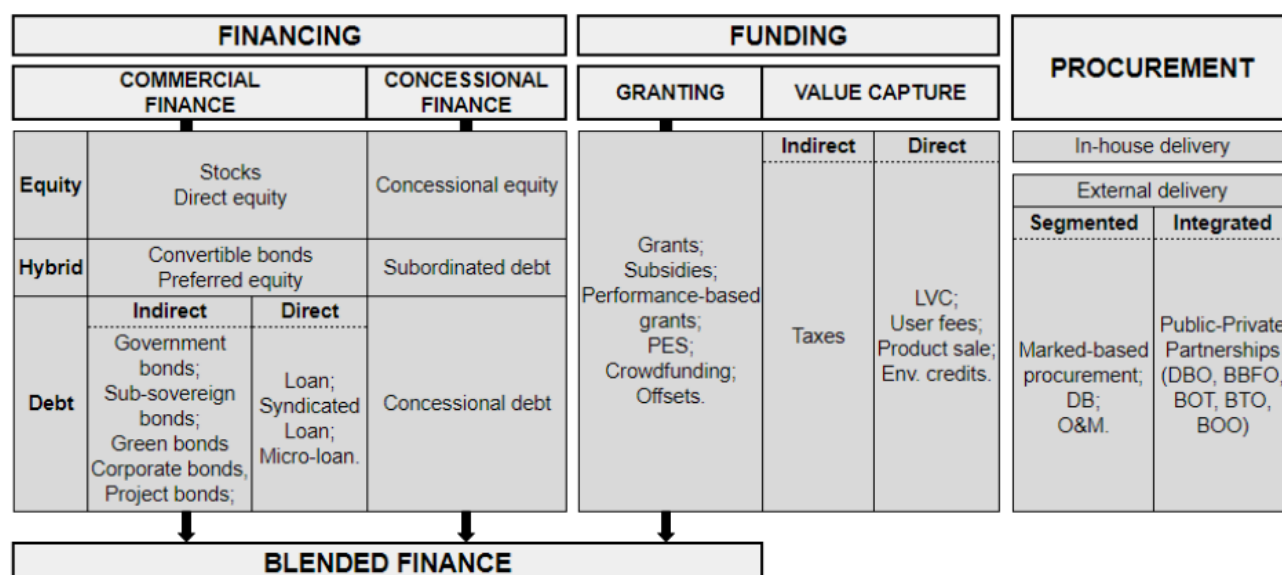


Figure 2.2: Overview of NBS contractual arrangements.

Granting arrangements include any formal or informal arrangement underlying a granting transaction. This may, e.g., specify requirements such as reporting obligations, performance targets and specific uses of the funds provided. See Section 2.3 for a detailed account of these.

Value capture arrangements are contracts that transform the (monetary and non-monetary) values delivered by NBS to beneficiaries into revenue streams captured by the initiator. These include public value capture arrangements such as taxes or levies, which can only be initiated by a public actor (who has the corresponding fiscal authority). Value capture arrangements also include further kinds of contracts such as uses fees, land sale or environmental credits that can also be initiated by a private actor. See Section 2.5 for a detailed account of these.

Financing arrangements, also called financial instruments, are contracts employed for delivering finance. This includes a diverse range of instruments such as loans, equity, climate and resilience bonds. See Section 2.4 for a detailed account of these.

Procurement arrangements define all the contractual relations, roles and responsibilities of parties involved in project delivery. For example, the project may be procured either as an integrated contract, covering all stages of the project implementation (i.e., from planning to operation & maintenance), or more traditionally as separate contracts for different stages. Innovative procurement modes also include setting up new legal entities (i.e., special purpose vehicles or

public private partnerships) for project delivery. See Section 2.6 for a detailed account of procurement arrangements.

2.2.4 Two ideal-typical NBS business models

Two fundamental types of NBS business models can be differentiated from an ideal-typical perspective.

The first type of NBS business model is the **pure granting BM**, in which an NBS initiator seeks grants from public and private grantors to implement NBS. Public grantors as well as private impact investors like nature foundations or philanthropists have a fiduciary duty to promote projects that provide the greatest social welfare. Therefore, it is necessary to show that NBS have significant net-benefits - discounted benefits minus costs. Otherwise, public investments should be directed to alternative measures such as grey measures or alternative projects that would have a higher contribution to social welfare. This public perspective is crucial because the majority of NBS projects in Europe are currently publicly funded. The great opportunity of NBS lies in the numerous benefits and co-benefits they provide. The problem is that economic analysis of nature-based solutions (NBS), such as cost-benefit analysis, often fails to consider all the significant benefits and co-benefits that NBS provide, resulting in an underestimation of their overall economic value.

The second type of NBS business model is the **pure financing BM**, where private financiers aim to generate returns on their investments through actual cash flows. Therefore, it is necessary to show how the economic value of NBS can be “captured” and turned into revenue streams that offer high and secure returns for investors. The private investment perspective is crucial for scaling up NBS beyond the limitations of public funds. NBS that provide high total economic value but cannot generate revenue streams are still important for economic and social welfare, but they may not attract private investments that seek a financial return on investment.

In reality, these two ideal-types are often intertwined in various ways. Public investors are often interested in obtaining a financial return on investments. This is because public funds are limited and the returns can be used to finance additional projects. Similarly, private investors may also be interested in generating social welfare impacts through impact investment either for corporate social responsibility reasons or to comply with emerging financial regulations such as the ones forthcoming in the next years under the Sustainable Finance Workstream of the European Commission - e.g. Taxonomy Regulation.

2.3 Typology of granting arrangements

Granting arrangements refer to contractual arrangements to structure granting transactions, which allow NBS initiators to acquire capital to cover project costs upfront (Figure 2.3).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

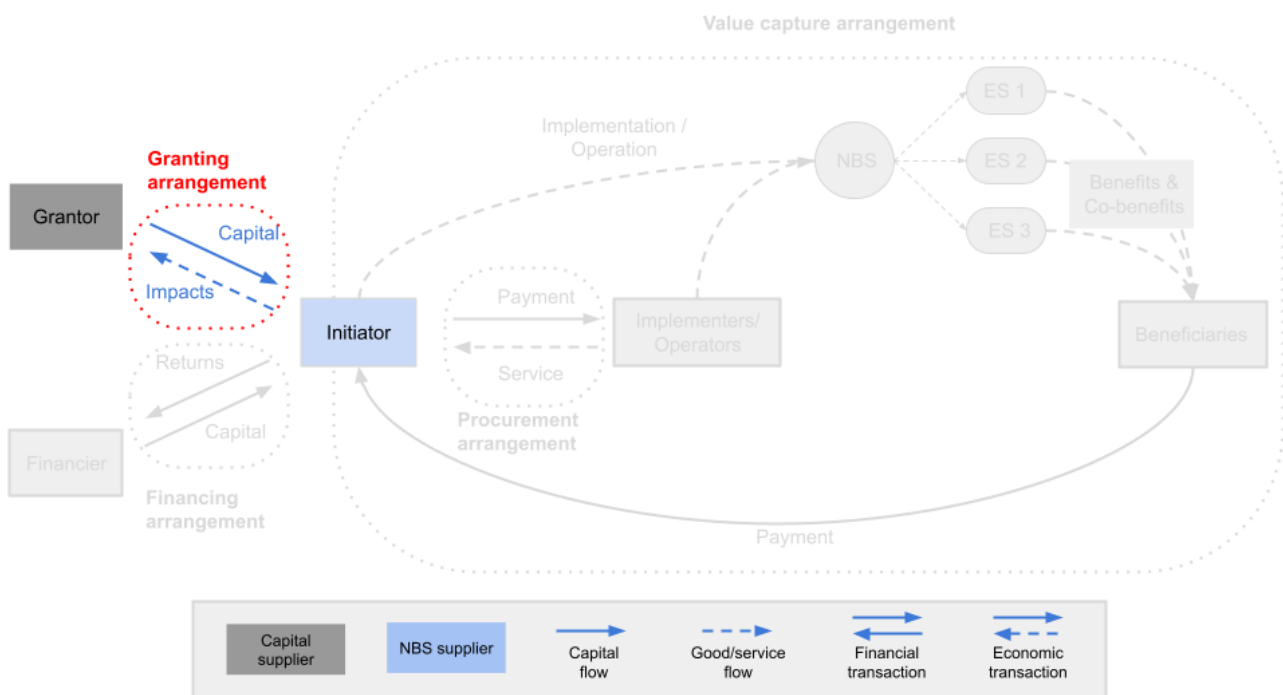


Figure 2.3 Highlight of the granting arrangement within the BMF.

Granting instruments, unlike financing ones, do not generate financial returns for the actor providing capital, as the capital provided is intended to be spent by the initiator without any repayment obligations. The grantor is typically motivated by the impact achieved through the supported activities. In other instances, granting is carried out to comply with local regulations.

The typology provided in this section consists of a reference frame for the categorization of granting instruments (Figure 2.4).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

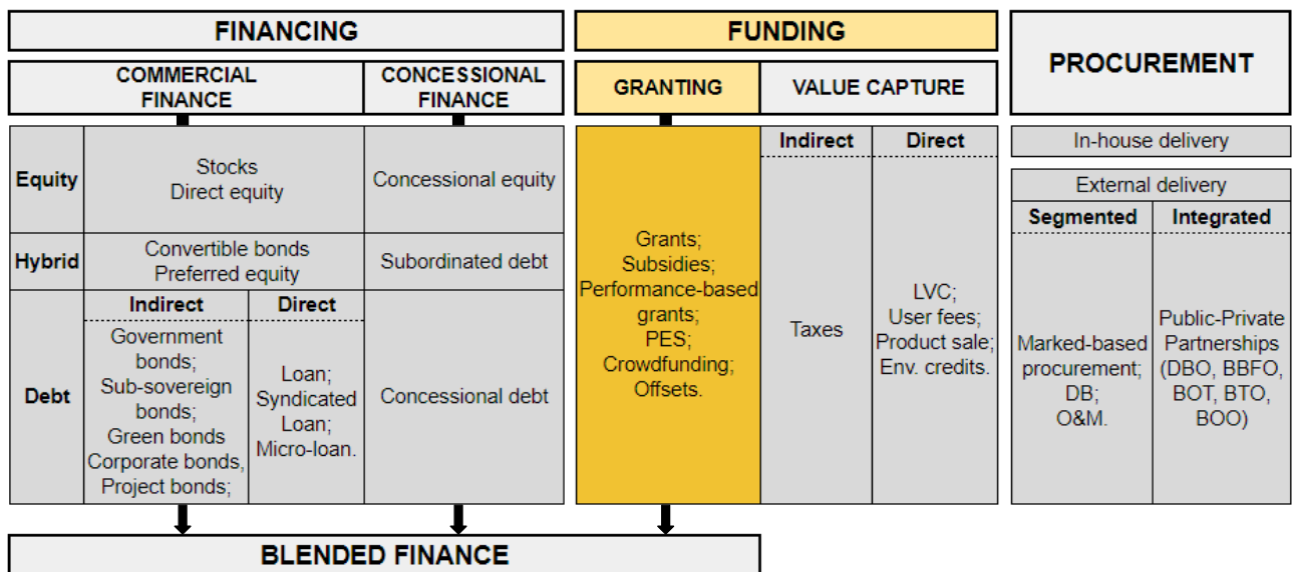


Figure 2.4 Overview of NBS contracting arrangements (highlight on typology for granting arrangements)

Granting for NBS is, for the most part, provided by public entities. Applicable budgets and responsible public authorities can vary from country to country, depending on fiscal policies and under which sector NBS are classified. Granting can also take the form of private philanthropic donations. Although only a small percentage of all philanthropic donations are dedicated to combat climate change, the interest of charities and foundations in this field has been increasing considerably (Roeyer et al. 2021).

Whether from a public entity or a private donor, different granting instruments can be identified:

Grants and subsidies. Grants provide capital without any expectation of repayment. Grants are commonly disbursed from funds that are dedicated to specific policy or philanthropic objectives such as nature conservation and restoration, or established for specific instances such as providing relief following a natural disaster event (Banhalimi-Zakar et al., 2016). Furthermore, grants are accessible only via competition with other project candidates, implying that initiators need to invest financial resources and efforts to build a strong application and, when requested, provide periodic reports once the grant is obtained.

Subsidies are a different category of granting instrument that consist of direct payments or tax rebates provided by the government over an extended period of time to reduce operational or management costs.

Payments for Ecosystem Services (PES). PES are a form of performance-based grants for the conservation and restoration of ecosystem functions, based on the “provider gets” principle in environmental law. As performance-based grants, PES conditions the transfer of capital on the achievement of agreed-upon restoration targets, usually through measurable and verifiable social

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

or environmental metrics (Habbel et al., 2021). PES are useful compensation tools for lost earnings to manage situations where strong trade-offs between environmental conservation and landowner economic interests exist (Wunder and Wertz-Kanounnikoff 2009).

Although most PES are funded by governments under regulatory frameworks for overall nature conservation (Gómez-Baggethun and Muradian 2015), PES are often interpreted broadly, encompassing a range of “business-like” forms of conditional payments (Wunder and Wertz-Kanounnikoff 2009). These are based on the delivery of specific ecosystem services with economic value. In the present framework, this latter category of PES is distinctly categorised as value-capture arrangements.

Blended finance. Grants are sometimes deployed strategically with the objective to improve the risk-return profile for investments in a project, thereby making it more attractive for commercial finance. The practice of combining granting and commercial finance in such a way is known as blended finance. Although many different definitions for this concept have been developed, most agree that the mobilisation of additional finance and the use of these for non-financial-development, positive social or environmental impacts are the two core elements of blended finance (OECD, 2018).

Arrangements for blended finance are typically considered when investment risks are particularly high and an involvement of private investors would otherwise be unrealistic. This is often the case for development finance or pioneering projects, where uncertainty and costs are high, and/or new technology is used (Gregory et al., 2021). Blended finance can also be relevant for the early phases of a project when the majority of risks are not yet settled (EIB, 2020).

NBS projects and other conservation oriented initiatives are overly dependent on public granting and can benefit from the catalytic effect produced by blended finance (Brathwaite et al., 2022; Rode et al., 2019). Despite the effect of commercial finance mobilisation, the use of blended finance does not guarantee better performances. Havemann et al. (2020) notice that investment structures must regard the specificities of the project and its institutional and environmental settings, acknowledging for instance the motivation and incentives of the various stakeholders involved.

Crowdfunding. Crowdfunding provides an example of how granting can also be provided by private individuals or companies. Crowdfunding is an emerging form of funding which involves large networks of small and distributed donors - but also small investors - pledging small amounts of funds through a digital platform (Banhalimi-Zakar et al., 2016). Crowdfunding is a rather novel financing practice, and in recent years its market has been rapidly growing. Due to emerging regulatory frameworks, crowdfunding is expected to eventually overtake venture capital in financial markets in the upcoming decade.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Although crowdfunded initiatives are mostly small-scale, the emergence of niches for green crowdfunding on dedicated platforms might suggest a more substantial role in supporting climate change adaptation in the near future (Nigam et al., 2018).

Offsets. Offsets are another example of grants provided by private individuals or companies. Following the “polluter pays” principle in environmental law, offsets are essentially grants that are issued to offset the environmental and biodiversity impacts of new development projects, either voluntarily or in line with local regulations. Offsets are characterised by different criteria, from weaker standards of sustainability which allow tree plantation to compensate for environmental destruction, to stronger standards requiring the restoration of comparable ecosystems in terms of biodiversity and ecosystem services (Koh et al. 2019).

2.4. Typology of financing arrangements

Financing arrangements are legal agreements that establish a financial asset of one party and a financial liability/equity of the counterpart (Camilleri and Camilleri, 2017). By channelling efficient flows of capital, they allow actors to finance their businesses, and investors to generate income out of their current assets. Within the NBS Business Model, these arrangements are fundamental to meet the costs that arise within the project (Figure 2.5).

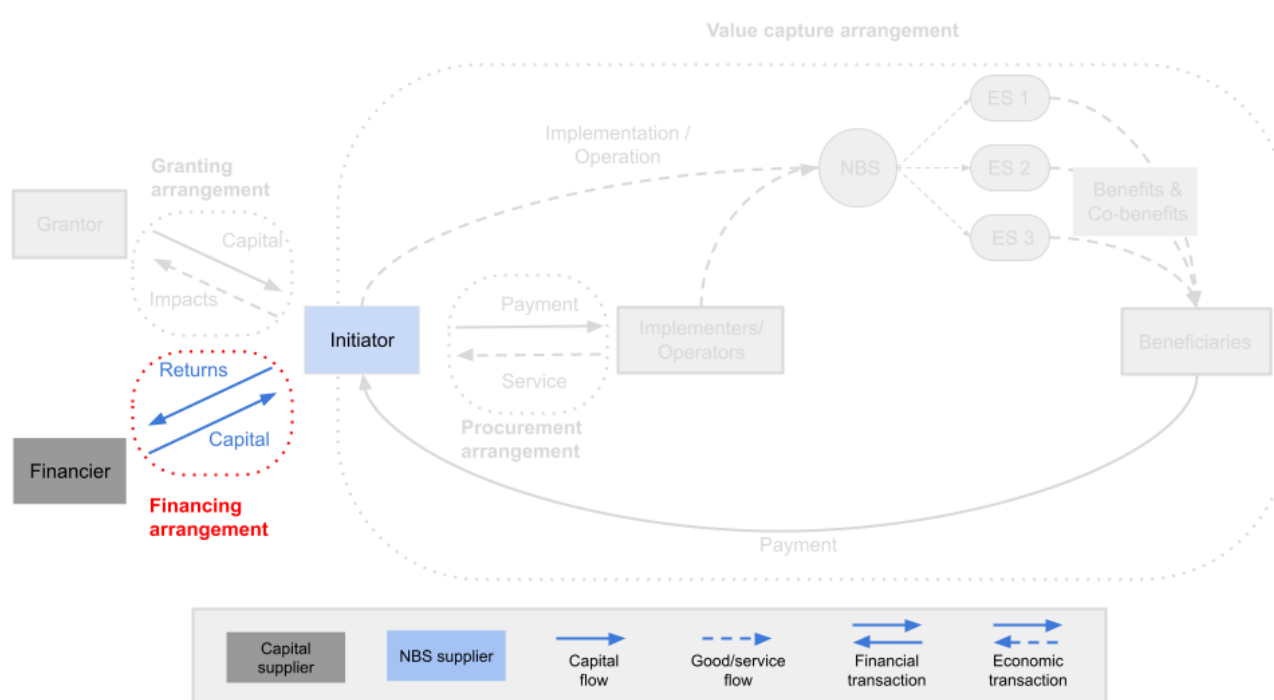


Figure 2.5 Highlight of the funding and financing arrangements within the BMF.

The typology provided in this section consists of a reference frame for the categorization of financing instruments (Figure 2.6). Notice, however, how the different features that ground these

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

typical arrangements can be arranged in a vast range of possible combinations, and that consequently hybrid and intermediated forms of these categories are common practice.

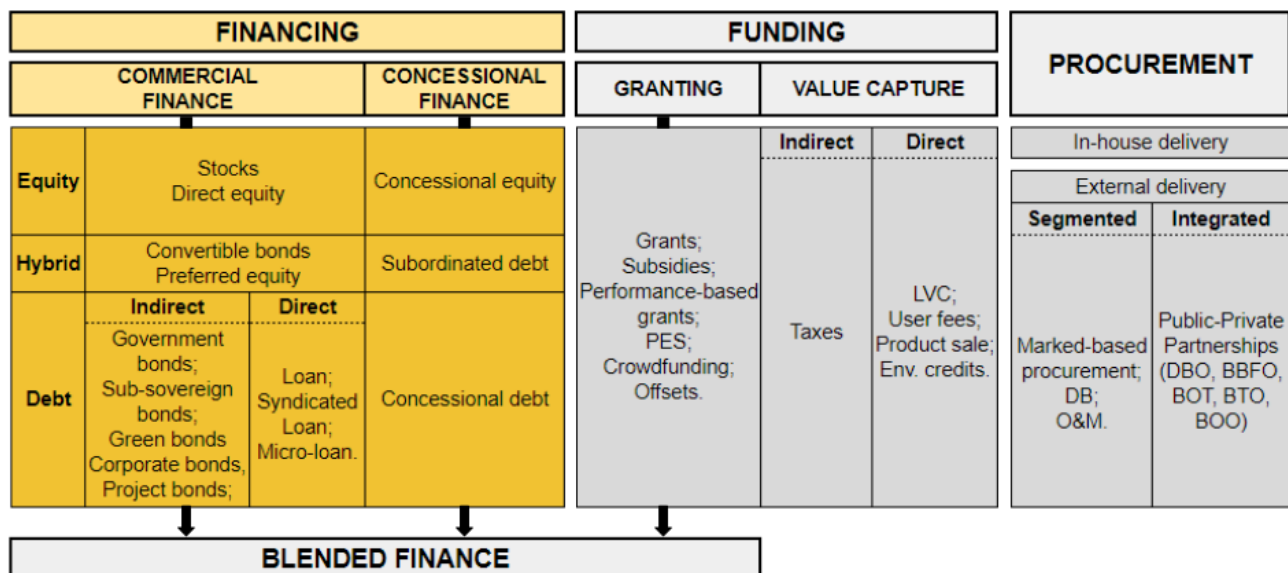


Figure 2.6 Overview of NBS contractual arrangements (highlight on typology for financing arrangements)

The first distinction that we can make to sort financing instruments is one between commercial finance and concessional finance.

Commercial finance refers to the financing under market conditions. Investors allocate part of their capital to finance a project or a business entity, with the aim of generating income at a future date. This process entails a certain degree of risk - e.g. the financed project does not materialise -, which corresponds inversely to the prospects of appreciation generated by the investment.

Concessional finance on the other hand is not driven by the expectation of profit alone. Concessional investors provide capital at below market terms, for example with lower interest rates or longer maturities.. Concessional investors, similarly to grantors, intervene to realise development-relevant projects that have difficulties in accessing sufficient capital on markets, for instance due to the presence of high risks or low returns.

2.4.1. Commercial Finance

Starting with the typology for instruments of commercial finance, we can first of all distinguish equity instruments from debt instruments. **Equity instruments** consist of an injection of permanent capital that corresponds to the sharing of the business' risks and rewards with additional actors. **Debt instruments** refer to the borrowing of capital, with an obligation of repayment with interests at future date (Druce et al., 2016). A third class of instrument is that of

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

hybrid, or mezzanine, instruments, which displays typical characteristics of both equity and debt. Investors purchasing debt instruments generally expect lower returns on their investment - as opposed to an equity investment -, but enjoy overall lower risks (Bisaro and Hinkel, 2018).

A major factor for risk-reduction is the fact that debt instruments have a higher seniority with respect to equities, that is to say that it ranks higher in the order of repayment, which is especially relevant in the event of a default or other forms of financial hardship. The choice of the type of instrument to be employed for the financing of a project depends on various contextual factors. These include those related to the project itself, including its size, risks and costs, the amount and predictability of generated revenue streams, the development stage that must be financed, but also the characteristics and preferences of the actors involved in the financing arrangement, such as the investor's constraints and the creditworthiness of the project sponsor (Druce et al., 2016; Weber and Alfen, 2010).

Equities are the class of instruments with the highest associated risks - being subordinated to all the other instruments - and relatively low level of liquidity, and a corresponding high level of return potential. Equity investors realise profit either through dividend payments or by selling their shares. Equities can be direct - i.e. unlisted equities, equity co-investment - or indirect - i.e. listed equities, stocks -. In general terms, we can define a financing instrument as:

- a. Direct financing instrument when investors are approached directly to set up transactions that are based on a private contractual agreement and that cannot be freely traded or transferred to third parties.
- b. Indirect financial arrangements when investors operate through a regulated environment, i.e. the capital markets. These instruments are therefore highly standardised and regulated, and can be traded with ease (Druce et al., 2016).

Indirect instruments are thus characterised by higher liquidity, as well as a higher degree of accounting transparency, due to their alignment with the standards of regulated markets (Bisaro and Hinkel, 2018).

Direct equity shares. One of the advantages of direct equity shares is that they do not raise obligations for repayment, as investors gain capital from their direct claim on a portion of the business revenues. This means that the risk of performance is prolonged until they resort to sale, and investors will receive capital gain (or loss) after the creditors are paid out. The attractiveness of direct equity financing is that this option does not come with considerable cash flow requirements, and external investors might even bring in valuable expertise to the business management (EIB, 2020). On the other hand, the autonomy of the investee in decision making will decrease, as external investors will also gain voting rights over the direction of the business operations.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Direct equity investments is a risk-absorbing type of investment, well suited to finance the initial stages of a project, when construction risks are not yet settled and high growth strategies are viable. It is common to employ direct equities as a source of venture capital, with the provision of early-stage capital to start-ups, i.e. new and innovative companies or projects that seek validation for the scalability of a business model (Druce et al., 2016). Despite its promising features, equity financing is still a novel instrument in the climate finance landscape, and most investors would rather not engage with the high financial risks connected to it (Habbel et al., 2021).

Stocks (Indirect equity shares). Indirect equity shares, or stocks, just like direct equity shares, grant investors ownership interests, although in a minority position with scarce power of influence over the management (OECD, 2015). Stocks are issued by large companies/corporations, and are traded on regulated exchanges - e.g. stock markets -, thus being subject to their standards and regulations (Bisaro and Hinkel, 2018). Stocks are only accessible to big corporations with a sufficient credit rating (Druce et al., 2016).

Debt instruments allow the investee to borrow capital, to be repaid in full at a specified date in full with interests. Different sources can provide debt, including private lenders, institutional investors, multilateral organisations and governments. The type of lender can influence the nature and characteristics of the debt sourced (Delmon, 2010). Although debt is usually a fixed income instrument, interest rates can also be variable, thus changing throughout the term of the contractual agreement according to predefined interbank rates (EIB, 2020). As opposed to equity financing, debt does require the existence and proving of sufficient revenue streams for the timely repayment of principal and interests. In addition, a security or collateral may be required by the investor. Nevertheless, the predictability of repayments and the maintenance of ownership and control over the direction of the business might make debt an attractive option.

Loans - Direct debt -, syndicated loans, micro-loans. Direct debts, or loans, are typically provided to borrowers by commercial banks or other financial institutions. The direct contractual relationship underlying loans allows the contractors to tailor the terms of the agreement to best suit their respective investing/business needs (OECD, 2015). Loans are commonly supplied by banking institutions both in the form of balance sheet finance and through a project finance entity (Druce et al., 2016). The arrangements for capital flows based on project finance refers exclusively to one specific project. Thus, lending relies only on cash flow generated within the project itself, and liabilities are limited accordingly, with few possibilities of recourse to the sponsors of the project (OECD, 2015). This limitation is usually materialised through the establishment of a new, ad-hoc entity known as a Special Purpose Vehicle (SPV) (Kleimeier and Megginson, 2000). By contrast, balance sheet financing directly involves the sponsoring companies, which are approached by investors as portfolios of various projects and activities with various degrees of performances and risks. Companies are thus liable for the debt, allowing access to their assets in case of default (OECD, 2015).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Multiple lenders (i.e. a syndicate) can aggregate to jointly issue a single loan, which will thus be called a syndicated loan. Syndicated loans are an effective way for lenders to dilute and share the risk of the borrower's default, while at the same time allowing the borrower to attain an amount of finance for capital-intensive projects that a single lender would not be willing to provide (Habbel et al., 2021). By contrast, when borrowers require small amount of start-up capital and find it difficult to obtain a standard loan from a commercial bank, microfinance institutions can offer micro-loans, with higher interest rates but with no requirements such as a formal credit rating or prohibitive reporting requirements (Druce et al., 2016).

Bonds (Indirect debt). Generally issued for larger transactions and longer time-frames, bonds are the indirect counterpart of loans (Weber and Alfen, 2010). As such, the underlying mechanism of capital borrowing works in a similar way, with the difference that bonds are standardised and highly tradeable. While loans imply a creditworthiness check by the creditor, bonds are rated by credit rating agencies (Bisaro and Hinkel, 2018), and are only issued by organisations with sufficient credit rates and capabilities, such as (sub-)sovereign entities, large corporations, large-scale infrastructure projects and development banks (König et al., 2020). Rates of interests are also generally lower than those attached to commercial finance loans, and fewer conditions limit the financial freedom of the issuer.

Government bonds, municipal bonds and sub-sovereign bonds, i.e. bonds issued by national governments, regional/local governments, and government agencies or development banks, respectively, are among the lowest risk financial instruments, as they are explicitly backed by the sovereign entity (Bisaro and Hinkel, 2018). Given the alignment between the service outcome and source of finance, government bonds are one of the most relevant vehicles for public good and infrastructure investments, including coastal adaptation (OECD, 2015).

Similarly to loans, bonds can also be based on both balance sheet finance and project finance. Corporate bonds are standardised debt instruments that finance the balance sheets of entire corporations. As bonds normally have a longer seniority than loans, they provide corporations that can access public bond markets a reliable and long-term source of finance (OECD, 2015). Whereas the credit-worthiness for corporate bonds is calculated on the base of the overall profile of the issuing corporate entity, project bonds bear credit risks of a single project and are thus less secure investments. Project bonds are most appropriate to finance the later stages of a project, when construction risks have expired and the beginning of actual operations secure positive cash flows (ibid.).

Green bonds and thematic bonds. Additional sub-categories exist for the classification of those bonds that require to use the proceeds that they generate for specific purposes. In general, these thematic bonds aim to address socio ecological challenges by channelling capital into under-resourced development projects - e.g. SDG Bonds addressing sustainable development or Blue bonds for ocean conservation - (König et al., 2020). Among thematic bonds, green bonds are

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

of particular importance for climate-change related investments. The market for green bonds is in rapid expansion, and today these instruments represent the cornerstone of the EU policy strategy for climate neutrality (European Commission, 2020).

With green bonds, while the basic financing structure remains the same as that of traditional bonds, the raised capital must finance projects that produce environmental benefits. In order to make sure that the issuer's pledge meets the investor's expectation, projects financed through a green bond are required to include periodical reporting on the use of the proceeds and to produce clear and measurable impacts (König et al., 2020). These requirements are being increasingly aligned to international standards such as those set by the Climate Bonds Initiative (Climate Bonds Initiative, 2019). Green bonds are fitting instruments for investors such as pension funds and insurances looking for long-term and relatively low-risk sustainability investments (Colgan, 2017), yet the capacity to initiate and aggregate a sufficient amount of green projects under a single financial product of relevant size is currently a major challenge for the expansion of the green bond market and its connection to smaller scale sustainability initiatives (Chiang, 2017). Other prominent evolving issues in the green bond market include the possibility for the introduction of price premiums, which would equal to lower interest rates based on environmental/sustainability gains, and the further development of standards in areas where performance measurements are particularly complex (Colgan, 2017).

Certain subsets of green bonds such as resilience bonds - investing in risk mitigation - , blue bonds - investing in ocean and coastal sustainability projects - and climate bonds - investing in climate change mitigation and adaptation - are emerging as recognized and accepted asset classes, yet their respective markets are still nascent (BNCFF, 2019).

Environmental Impact Bonds, outcome-based finance. While returns on financing is usually either fixed or determined by financial outcomes, the investors' returns in outcome-based financing arrangements will depend on generated non-financial outcomes. An example of outcome-based finance is the Environmental Impact Bond (EIB): on top of the standard repayment of the bond's principal and interest, additional payments are unlocked once the achievement of a certain pre-agreed and measured outcome have been met (König et al., 2020). These second-tier payments may be shared between investors - the risk-taking actors - and those in charge of realising the project and delivering the outcomes, so as to incentivise the latter to improve its performance (EDF, 2018). Outcome-based finance instruments are usually used by investors that are particularly interested in the non-financial impact of their contribution, such as impact investors, donor agencies and philanthropic foundations (Habbel et al., 2021).

Hybrid financing instruments. Commercial finance instruments can also belong to a third class which fits the gap between equity and debt. Hybrid financing instruments, also known as mezzanine, present characteristics of both categories. Mezzanine instruments are most

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

appropriate when it is not possible, or it is too costly, to issue additional debt, and equity holders would rather avoid issuing new shares which would cause an excessive dilution of ownership (Weber and Alfen, 2010). The unique risk/return profile of mezzanine can also be an attracting factor for certain investors. Pension funds, insurance and other institutional investors, for instance, are increasingly looking at hybrid finance as a strategic niche of investment (OECD, 2015).

Subordinated debt, preferred shares, convertible debt. The most common form of hybrid finance is subordinated debt, that is a debt instrument that ranks low on the seniority scale. In other words, the issuer of a subordinated debt accepts to take a junior debt position thus bearing the risk for first losses (Habbel et al., 2021). Preferred shares - applicable to both stocks and direct equities - are another common example of hybrid instruments. Holders of preferred shares have a priority over standard shareholders when dividends are paid out - they are still subordinated to all other debt classes -, but at the same time they do not carry voting rights, which means that issuing preferred equity shares does not dilute ownership (OECD, 2015). Mezzanine finance can also take the form of convertible debt, which is essentially a type of junior debt that compensates for its relatively lower rate of interest with the option, for the investor, to convert the bond/loan into shareholding. The conversion to an equity position can be done at the date of maturity, at any other pre-agreed date or when certain performance targets are achieved (König et al., 2020).

2.4.2. Concessional finance

As previously mentioned, concessional finance differs from commercial finance in that it does not aim exclusively at generating profit out of the investment, as they value and strive for its non-financial impacts. What this means, in practice, is that concessional investors are able to take on outsized risks and provide capital at better terms than those offered by the market (Gregory et al., 2021). Sources of concessional finance can be either public - such as national governments and development banks - or private/philanthropic (EIB, 2020).

Loans are a common means to deliver concessional finance, with the application of better-than-market conditions such as lower/zero interest rates, lower priority of repayment or longer maturity. Equities can also be structured as concessional, for example when the investor agrees to receive less shares than what the investment is actually worth (Gregory et al., 2021).

Similarly to granting, concessional finance can also be a vehicle for blended finance. In fact, most blended finance arrangements are based on concessional debt or equity, followed by funds for technical assistance, guarantees or risk insurance, and less often they utilise grants (Havemann et al., 2020).

2.5 Typology of value capture arrangements

As NBS are designed to deliver multiple co-benefits - adaptation to climate change, halting biodiversity loss, prevention of natural disasters, provision of food and raw materials, opportunities for education and recreation, among others -, in the context of a NBS projects different individuals and groups can be identified as beneficiaries of the particular functions enabled by the implemented measures. The most immediate form of co-benefit is monetary, for example when the restoration of an ecosystem supports the growth of revenues of near-by accommodation facilities by attracting tourists, or when future costs related to the impact of floods are avoided. NBS co-benefits can also be non-monetary, as in biodiversity, reputational gains, wellbeing improvements, collection of scientific knowledge and data. Notice, however, how different stakeholders could value the same NBS co-benefit, or more generally, the same NBS function, in different ways. To some, under certain conditions, the implementation of a NBS could represent a hindrance, or result in additional costs.

After having identified and assessed the benefit created by the project, initiators can capture and monetize part of the value generated by an investment through a process known as value capture (Mayor et al., 2021). The concept of “value capture” has been developed by the public finance and public investment literature, particularly in the field of transport infrastructure (Abelson, 2018; Suzuki et al., 2015). It is a core element of any business model, as it often allows to justify an investment, recovering part or all of its costs - thus alleviating impacts on government balance sheets - and, especially when financiers are involved, to assess the business viability and its potential to generate profits (Figure 2.7). Value capture arrangements can potentially be put in place and structured in such a way as to redistribute costs and benefits associated with an NBS project, thus contributing to the removal of barriers.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

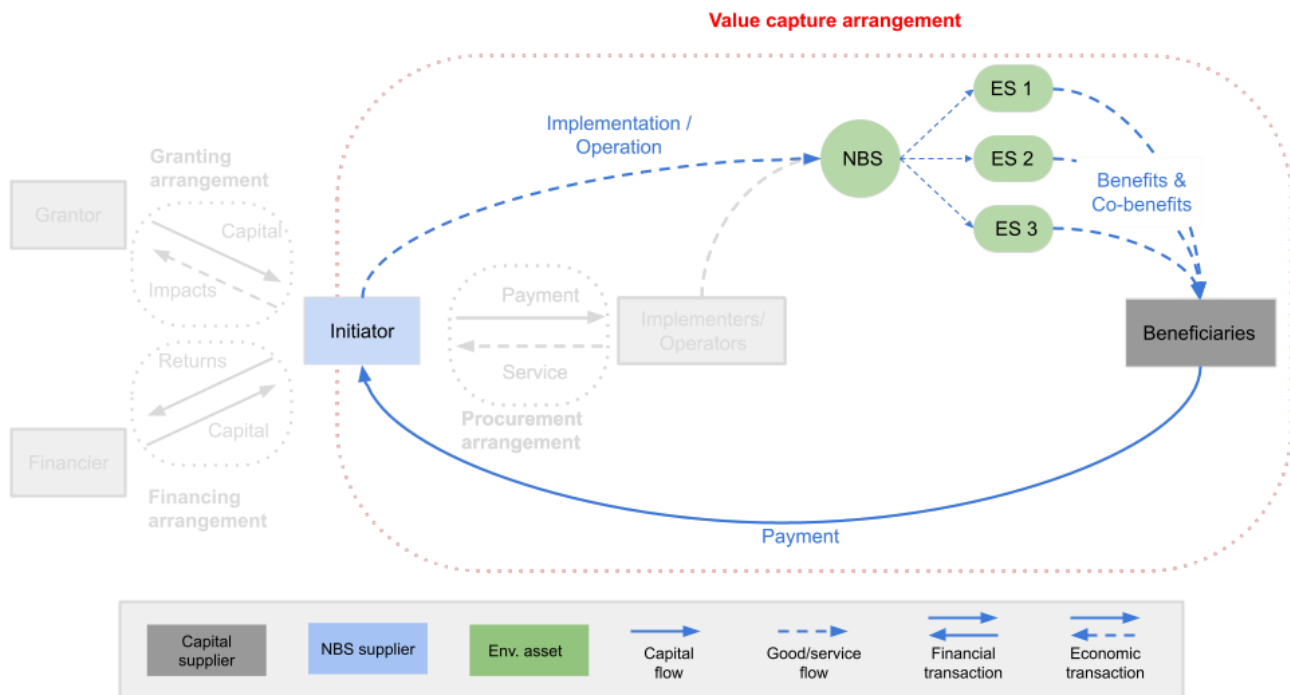


Figure 2.7 Highlight of Value Capture Arrangement within the BMF.

A range of possible instruments are available to determine who is going to pay for a project and how. Costs can be allocated to various groups: public agencies - i.e. tax payers -, development companies, locally circumscribed residents/households, or individual consumers. The typology provided in this section consists of a reference frame for the categorization of value capture instruments (Figure 2.8)

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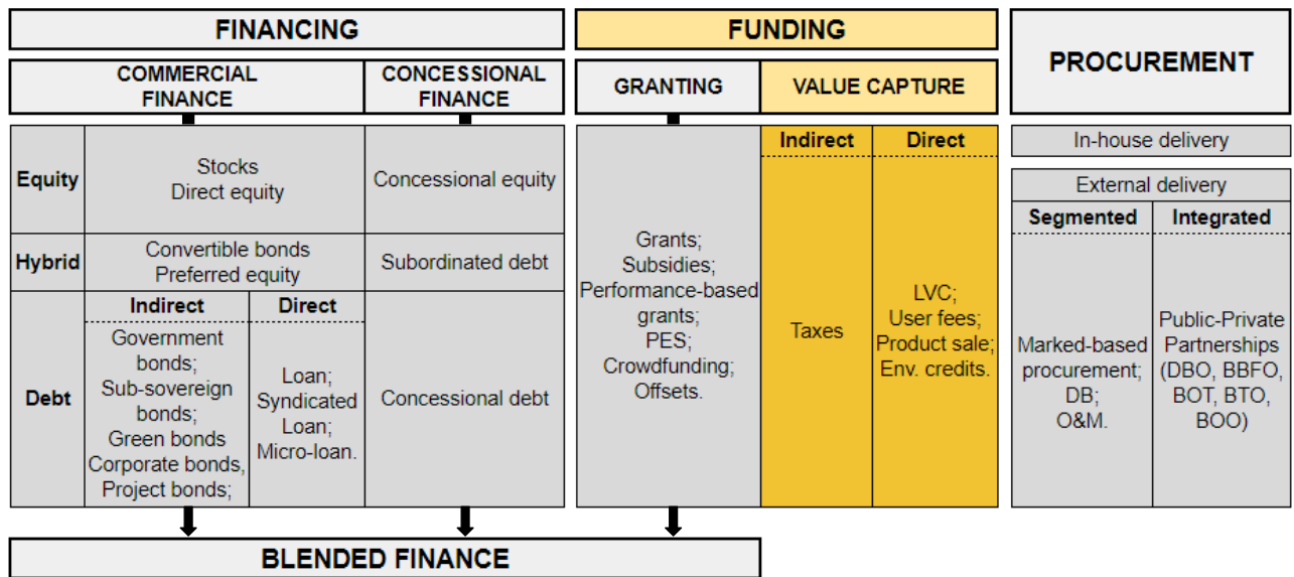


Figure 2.8 Overview of NBS contractual arrangements (highlight on typology of value-capture arrangements)

In order to achieve political support and social acceptance, the choice for the most suitable instrument for revenue generation can be weighted following criteria of efficiency, equity and fairness (Woodruff et al., 2020). Efficiency essentially requires achieving the desired outputs - products and services - with the least amount of costs in terms of resources used (Abelson, 2018). Fairness refers to the degree to which those shouldering the costs of the project correspond to those benefiting from its output, while the equity criterion suggests that the financing contributions should be weighted on the ability to pay.

When trying to identify potential revenue sources and how to tap them, it is important to acknowledge that certain types of economic goods cannot be sold efficiently in a market. This is due to the fact that some good's physical characteristics are problematic for the organisation of economic relationships, and ultimately lead to the emergence of market failures (Altamirano et al., 2021). Following Ostrom and Ostrom (1977) taxonomy, economic goods can be classified according to their level of excludability and subtractability. These qualities are a matter of degree in real economic goods and services, as pure examples are very rare and their classification is highly contested (Coase, 1974).

The character of excludability is essential for products and services to be sold on the market. When exclusion is possible for a good, it means that individuals cannot consume it or derive benefit from it unless the commercial terms set by the supplier, e.g. the payment of a price, are met. For instance, the improvement of air quality generated by a NBS can be considered as a non-excludable good, as in general terms none can be denied to benefit from it.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The attribute of subtractability, also known as finiteness or rivalry of consumption, refers to the extent to which the consumption of a good by some precludes the consumption by others. If subtractability is high, as in the case of fishes that are fished from a pond, the limited amount of supply means the consumption by some decreases the remaining amount available for others. Subtractability can also apply in those cases where it is quality, rather than quantity, to decrease with each marginal consumption.

By crossing the two dimensions, four ideal-types of economic goods are identified, these are (1) public goods, (2) common pool resources, (3) club goods, and (4) private goods (Ostrom and Ostrom, 1977).

Table 2.1: Types of economic goods

	<div>← SUBTRACTABILITY HIGH</div>	<div>SUBTRACTABILITY LOW →</div>
<div>↑ EXCLUSION FEASIBLE</div>	PRIVATE GOODS	CLUB GOODS
<div>↓ EXCLUSION DIFFICULT</div>	COMMON POOL RESOURCES	PUBLIC GOODS

Due to their characteristics, it is difficult to sell public goods on the market, and thus their production and maintenance is usually paid through broad-based fiscal instruments, which are a prerogative of public actors.

Common pool resources (CPRs), due to the difficulty of exclusion, are not allocated efficiently by the market either. As opposed to public goods, CPRs are essentially an aggregation of a finite number of resource units. In such conditions, incentives for their production and preservation are low, which results in a tendency towards overconsumption and resource depletion (Adams and McCormick, 1987).

Private actors can only set up revenue generation instruments when the good’s characteristics allow some degree of excludability. In particular, private goods, whose non-payers can be excluded easily, are usually provided by the private sector through market transactions. Club goods can also be allocated efficiently by private actors by setting up user or membership fees.

The above classification matrix should be considered as a mere starting point for the actual classification of goods and services in real economy situations. Excludability and subtractability are

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

not - entirely - inherent qualities of goods and services, and therefore their classification is contingent on context-specific factors. The level of available technology and institutional capacity - including human and financial capital - and the number of simultaneous users are examples of exogenous factors that might shift the position of a certain good across the matrix.

As NBS deliver a range of services and products by leveraging interconnected natural processes, some of these are often found to be in a trade-off relationship. In other words, under certain circumstances some of the intended co-benefits would not be attainable at the same time/ to the same degree. In a project based on reforestation, for example, the maximisation of the ecosystem's capacity to produce timber can be associated with a contraction of other ecosystem services such as biodiversity and cultural activities (Maier et al., 2021). Trade-offs might also emerge among generated values and costs. As the matrix for economic goods analyses products and services as objects of consumption, the point of view is set on individuals and groups that value these and benefit from their consumption. For a comprehensive assessment of the value generated by a NBS, and the design of a mechanism for value capture, disbenefits and costs associated with the delivery of services and products also need to be accounted for.

2.5.1 Direct value capture

Land value capture (LVC). A strategy for revenue generation can be based on direct value capture or indirect value capture. When an infrastructure investment increases the value of the surrounding assets - land and properties -, owners can capture this new value directly by selling or leasing these appreciated assets, in a process known as Land Value Capture (LVC) (Kok et al., 2021). Public actors have the additional option to charge a one-off payment to developers for the acquisition of development rights. Land sale can be used in conjunction with endowments, whereby a trust would be established with the responsibility to manage the generated revenues, for example for the regular maintenance of the new infrastructure (Mell, 2016).

For large scale infrastructure and development projects on areas of public-private share ownership, strategies of land readjustment or land pooling are also possible. Land readjustment is a process for infrastructure co-financing that involves contributions from both public and private land-owners, based on a redistribution of property rights (van der Krabben and Needham, 2008). Land owners pool together their respective property rights, thus enabling the project developer to improve and reconfigure a larger spatial area in coherence with the features of the public investment. While some assets are reserved to public property, the rest is redistributed proportionally to the original individual contributions (Suzuki et al., 2015). It is important to remark that an appreciable level of awareness of local actors over the added value brought by the development project, as well as solid government capacity, are preconditions for the successful application of any value capture strategy based on land development (Bisaro Hinkel 2018).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Product sale. When the NBS generates excludable services or products, it is possible to capture directly the generated value through market transactions. Products commonly generated by NBS that can be sold on the market include timber, fibres, drinking water, fish and other animal products (Alcamo et al., 2003). A peculiar category of excludable goods that can be produced in restoration projects and sold on the market is that of environmental credits. Environmental credits are a class of asset that act as a unit of accounting for the value of an ecosystem service. Carbon credits (Matzek et al., 2015), biodiversity credits (Holloway, 2004), wetland credits (Koh et al., 2019) and water quality credits (Lentz et al., 2014) are examples of this class of assets. When regulation allows for it, a single project can implement the so-called credit stacking (Li et al., 2022), i.e. the generation of various types of credits through the same restoration activity, provided of course that multiple co-benefits can be identified. In order to create and sell environmental credits, one needs to clearly define the benefit generated through the restoration of an ecosystem, accurately quantify it, and value it in monetary terms.

Notice how the value attributed to a quantified benefit may vary between actors, and for some the mere identification of the benefit might be sufficient. As market-based instruments (MIB) (Gómez-Baggethun and Muradian, 2015), environmental credits only exist where there is a corresponding demand. Regulation regarding the compensation for environmental damages can create and increase the demand for this type of assets (Koh et al., 2019).

User fees. In the case of club goods, it is possible to charge users with fees (Kok et al., 2021). Fees are also applicable to the extraction of common-pool resources, to the extent to which it is possible to somehow limit over-abstraction. Should that not be the case, flat-rate fees are also an option (Altamirano et al., 2021). Fees can also be charged to simply grant access to one area without extracting any resource, as in the case of natural reserves where tourists pay for their visit.

2.5.2 Indirect value capture

In order to ensure reliable revenue streams throughout the lifetime of a NBS project, it is often necessary to identify and involve additional beneficiaries, even when these have been affected only indirectly by the public investment (Mayor et al., 2021). As previously mentioned, public actors have at their disposal various fiscal instruments that can effectively collect revenues even from users of non-excludable goods.

The main fiscal instrument in the hands of governments are taxes. Taxes have the advantage of generating permanent and secure flows of finance, and can also be structured to target beneficiary groups. On the other hand, linking payors to beneficiaries is not always a simple exercise. In case of ambiguity, achieving political support for additional taxes will be a challenge. Another problem is that part of the value created by a public investment is often captured by taxes that are not earmarked to the project budget or to the public budget for restoration, and revenues end up flowing to the general budget, at the same or at higher government level (Suzuki et al., 2015;

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

UNEP, 2021). Broad-based land and/or property taxes are an example of such an issue. Since they are proportional to the total value of each taxed asset, any increase of value resulting from the public investment will be - partially - intercepted.

When earmarking tax revenues is not possible, coastal adaptation must compete with other expenditure items. When beneficiaries are clearly identifiable, for example in the case of coastal protection measures that reduce flooding risks only for residents in the immediate proximity, structures for differential taxation can be applied to land and property taxes, in what is known as a district level tax or special assessment district (Suzuki et al., 2015). A specific geographical area is delimited to identify and tax those that benefit disproportionately from a public investment, either as a one-off payment or on a periodic basis. The precision of the assessment of the increase of value is the main challenge in this type of configuration. When a district level tax is earmarked to repay debt that was raised to finance the project, it is referred to as Tax Increment Financing (TIF). In order to persuade investors of the reliability of future revenue streams generated from the taxation of appreciated assets, TIF usually requires development strategies that are markedly aimed at marketable value-enhancement (Levy and Herst, 2018; Root et al., 2015). TIF, and district level taxation in general, are effective mechanisms to connect payors with beneficiaries, and to disclose the destination of the collected revenues (Suzuki et al., 2015). One should nevertheless be mindful of the risk of concentration of public investment in areas where residents have more resources and are thus more willing to pay for extra taxes and fees (ibid.). Moreover, land and property value taxes rely on the respective markets' development, and projected incremental revenues could be curbed by market turbulence or stagnation (Levy and Herst, 2018). Market fluctuations should be accounted for with multiple rounds of value assessment and flexible rates in order to decouple the financing of land development from land asset bubbles and speculative dynamics (Medda, 2012).

In addition to appreciated land or property value, taxes can also target the value of increased, or simply maintained, economic activity generated by a public investment. In many coastal areas, tourism represents a major industry providing an important avenue for funding public investment (Kok et al., 2021). Tourism-related taxes such as value-added taxes (VAT), income taxes and occupancy taxes are especially important, and in recent years have been increasingly earmarked to support local infrastructures and environmental protection policies (OECD, 2014). Despite this, shouldering additional costs on tourists could push them towards cheaper, nearby locations. In fact, in order to sustain the competitiveness of the tourist sector, EU countries tend to minimise their tax burden, for instance by setting tourism-related VAT rates lower than those for other types of goods (European Commission, 2022a).

2.6 Typology of procurement arrangements

Public procurement is the process that allows public authorities to acquire goods, works or services needed for the delivery of public services and infrastructures (European Commission, 2022b). The EU law sets harmonised rules for public procurement, which apply for tenders whose monetary value exceeds a given threshold (European Commission, 2022c). Smaller tenders are regulated by national laws, which must nevertheless guarantee the application of the general EU principles of transparency, open competition, non-discrimination and effective procedural management (European Parliament and the Council of EU, 2014).

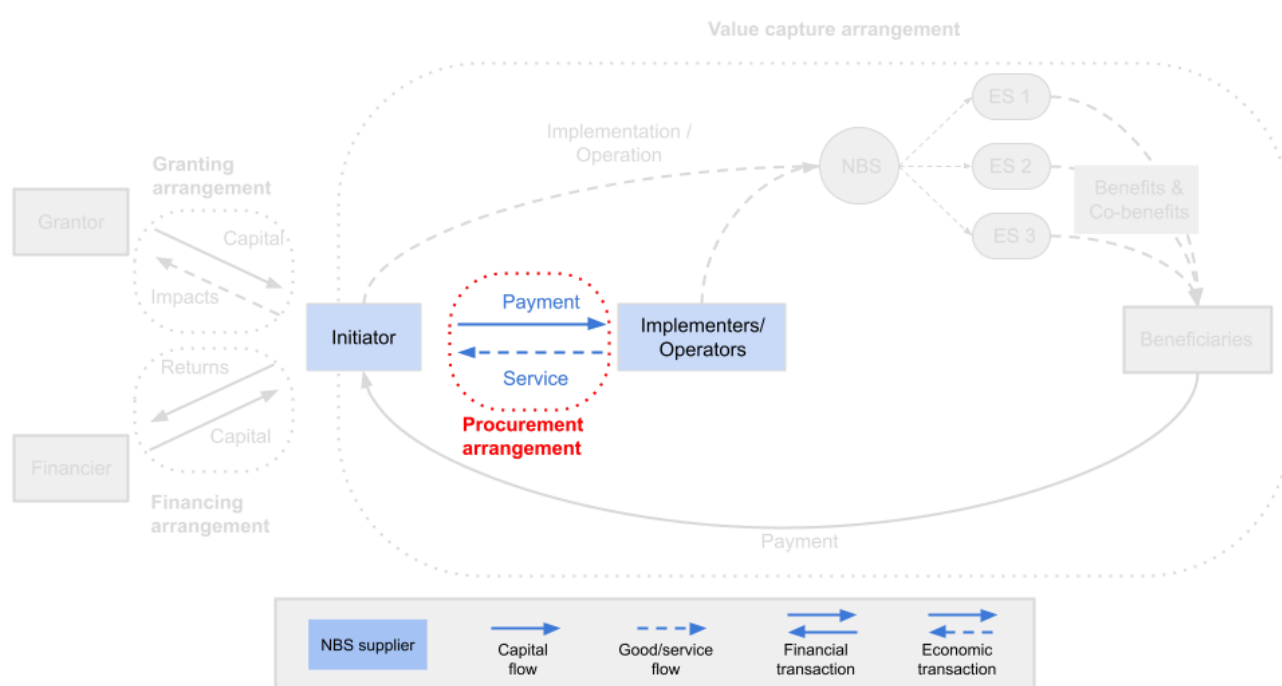


Figure 2.9 Highlight of Procurement Arrangement within the BMF.

Within the NBS Business Model, the initiator can establish procurement arrangements to carry out the activities needed to materialise the envisioned NBS (Figure 2.9). The typology provided in this section consists of a reference frame for the categorization of procurement arrangements (Figure 2.10).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

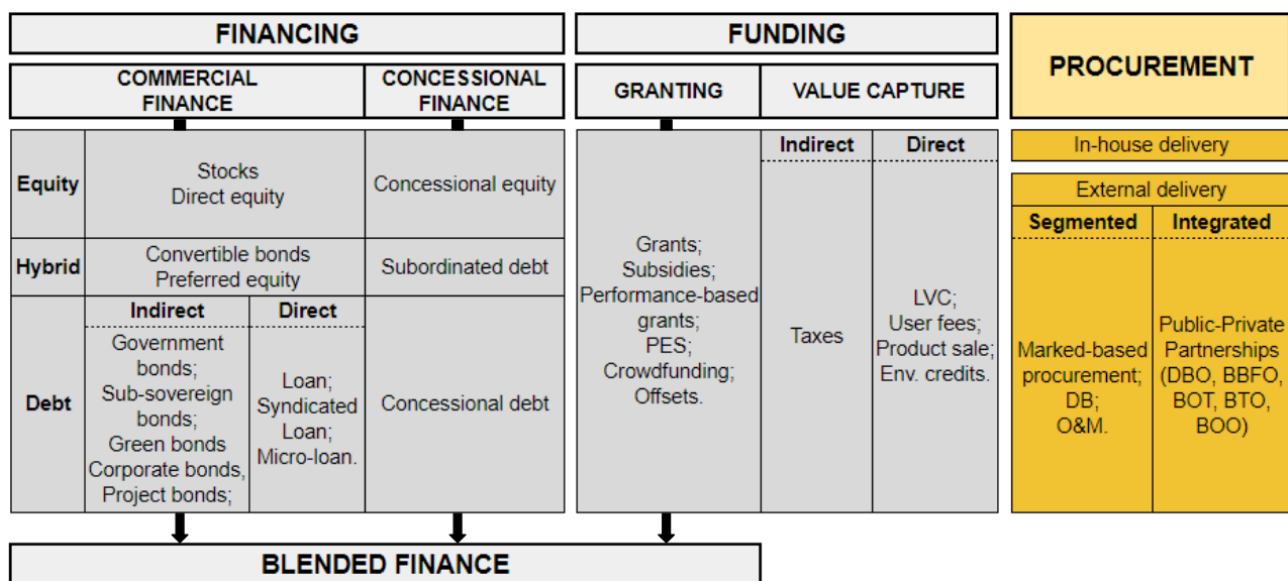


Figure 2.10 Overview of NBS contractual arrangements (highlight on typology of procurement arrangements)

The implementation of a NBS is based on a project that is composed of different project phases, including design, planning, construction, operation and maintenance phases (World Bank Group, 2017). These phases are all characterised by specific types of risks and functions, and can be separately procured by the project initiator. In alternative, the initiator can also opt to deliver these services directly with its own resources, in what we would call the direct, in-house delivery. When delivery is external, i.e. external firms are contracted to deliver a specific phase of the project. An emerging alternative emphasises the potential delivery of ecosystem products and services through the establishment of environmental markets and voluntary marked-based transactions.

Procurement processes are characterised by several aspects that are determined by national procurement laws and practices. Some of the main elements include:

- **Tendering process.** The tendering process is a procedure to invite bids from suppliers for the selection of procurement contractors. The tendering process can be simple or with two stages of selection, and usually consists in the submission of bids in a sealed envelope or through electronic correspondence.
- **Reserve price.** The procurement entity calculates a maximum price that it is willing to pay for the procured goods or services. This can be disclosed ahead of the bidding process or be maintained reserved.
- **Disclosed information.** Besides the reserve price, other information can be disclosed before and after awarding the contract (names and number of tender received, scores of each tenders, price offered by participants, etc.)

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

- **Awarding criteria.** Awarding criteria are either based on lower price or on broader economic advantages. The selection of the most economically advantageous tendering takes into account non-price features that are relevant for the project, and it is typically indicated when the complexity of the service requested is high. On the other hand, for simpler procurements, price could suffice as an awarding criteria.
- **Joint bidding.** Procurement practices might allow multiple suppliers to team up for a single, joint bid, allowing smaller entities to compete with larger players.
- **Subcontracting.** Subcontracting is possible in most jurisdictions, although different rules apply for its regulation.

The level of integration in the procurement of the different phases of a project is a fundamental dimension for the construction of a typology of public procurement arrangements (Miller, 2000). On one end of this scale we find **segmented procurement structures**, for which each stage of the project is procured separately with multiple, self-contained contracts. On the other end of the spectrum, **integrated procurement structures** combine several phases in a single, more complex, contractual arrangement. It follows that, while in the first instance the government will presumably interact with multiple interlocutors, in case of a fully integrated procurement strategy this - direct - engagement will be reduced to few entities, or even a single one.

Under traditional, segmented procurement models, companies don't have a broader interest in the project beyond the respective assigned functions. The government underwrites all risks, from financing to operating performances, and bears the responsibility for the provision of the service connected to the asset (Välilä, 2020). This kind of approach relies on the fact that governments are well-placed to sustain long-term risks inherent to service provisioning, due to the possibility to recoup cost overruns through fiscal instruments.

Longer temporal scales of public service infrastructure projects must nevertheless cope with the necessary tension that arise against rather short term electoral cycles (ibid.). During the last few decades, limited public budgetary resources coupled with important increases in expenditure needs for infrastructures has resulted in an intensification of the shift of responsibilities to private actors, and the extension of their involvement to the whole project life-cycle scope. This tendency is captured by the concept of Public-Private Partnership (PPP), an approach to public procurement that is alternative to the traditional model, and that has long been promoted by multilateral development and economic organisations - the European Commission, the OECD, the World Bank, Asian Development Bank, the International Finance Corporation, ASEAN - (Greve, 2015). By now, PPPs have been applied successfully for decades in both advanced economies (Douglass and Sykes, 2013) and developing countries, although the latter may face additional challenges related to the solidity of their legal and financial institutions (Henckel and McKibbin, 2010).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Public Private Partnerships (PPP). The public procurement literature does not give a precise and comprehensive definition to PPP (Hodge et al., 2010), yet its key elements are clearly identified. PPPs are based on the “bundling of contracts”, i.e. the integration of the various project phases into a single procurement contract (Carpintero and Petersen, 2015). These contracts are long-term - roughly between 20-30 years - and they transfer a considerable amount of risks and responsibilities to the private party, including a major contribution in terms of capital investment (Grimsey and Lewis, 2007). The long term horizon is meant to create incentives for the private party to consider life-cycle costs, (World Bank Group, 2017), for example by investing more for the construction of the asset in order to avoid incurring in additional costs at later stage during operations. In the quadrant framework, PPPs would thus be placed in the fourth quadrant, as financing responsibilities are borne by the private actors and the procurement of the project phases is combined in a single contract. The fact that the various project activities are delegated to a single private contractor does not mean that they will necessarily be provided by the same company. In most cases, once the procurement is awarded to a consortium, the latter will establish secondary contracts with external planning, construction and operator companies (Grimsey and Lewis, 2007).

The whole-life approach manages to balance these costs with whole-life benefits, thus resulting in increased efficiency of service delivery. PPPs also entail regular revenues for the private party over the duration of the contract, either in the form of direct payments from the public sector party (i.e. availability-based approach) , or through the establishment of fees for the users of the facility (Guasch, 2018). Most PPP projects are delivered through a dedicated SPV, a legal entity used in project finance, which encompasses all assets and liabilities related to the project. In some other cases, activities are executed by a jointly owned public-private company, in what is known as an institutional public-private partnership (Carpintero and Petersen, 2015).

While the bundling of procurement contracts in a single PPP arrangement can reduce the overall amount of transaction costs required to manage the relationship between public and private parties (Pietroforte and Miller, 2002), PPPs are complex contractual arrangements that are set up through particularly costly pre-contractual transactions (De Schepper et al., 2015).

While PPPs are often framed as win-win solutions and sometimes met with excessive optimism (Altamirano et al., 2021), designing and monitoring long-term, composite contracts is by all means a challenging task. Depending on the institutional, socio-political and fiscal context (Välilä, 2020), as well as the effects of the cost-saving investments on service quality (Hoppe et al., 2013), the choice for the most appropriate procurement method might fall on more conventional approaches.

Integrated procurement arrangements can be classified according to the model for revenue generation, the ownership of the assets, and which of the phases of the project are bundled in the

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

PPP contract (Table 2.2). Below we list the categories that are most commonly mentioned in the literature.

Table 2.2 Distribution of responsibilities across the main types of procurement contracts (adapted from Yescombe 2010, p. 12)

Public Project				Private Project			
Conventional procurement				PPP			
Contract type	DBB	DB	Franchise/affermage, O&M	DBO	DBFO	BTO, BOT	BOO
Design	Public	Private	Public	Private	Private	Private	Private
Build	Public	Public	Public	Private	Private	Private	Private
Operation	Public	Public	Private	Private	Private	Private	Private
Ownership	Public	Public	Public	Public	Public	Temporarily private	Private
Payor	Public	Public	Users	Public	Public or users	Public or users	Public or users
Payee	n/a	n/a	Private	Private	Private	Private	Private

Design & Build (DB), Design-Bid-Build (DBB). DB contracts are the most common type of traditional public procurement arrangement. They are not considered PPP as they consist of short-term contracts, through which companies are hired to design and build an asset following a set of requirements provided by the commissioning public authority. Upon the completion of the construction works, the government agent will be in charge of operating and maintaining the facility. DBB contracts are structurally similar to DB ones, but public actors design the project themselves, then call a bid for its construction. DB and DBB contracts thus alleviate governments from construction risks without the need to set up complex PPP arrangements, but they do not provide incentives to the private party to consider the long-term performance of the facility (Yescombe, 2010). For this reason, they are best suited for relatively simple and small-scale projects (World Bank Group, 2017).

Operation & Maintenance (O&M), Affermage and Franchise. O&M contracts procure the in-service management of a pre-existing/already-realised infrastructure. They can be considered PPP only when the contract is based on performances, it is long-term and requires considerable capital investment from the private party (World Bank Group, 2017). If the contract establishes a user-pay model for revenue generation, and part of the revenues are transferred to the

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

government, for the recovering of the construction/rehabilitation costs, the arrangement can be called an Affermage or Franchise (Yescombe, 2010).

Design-Build-Operate (DBO). DBO is an extension of a DB contract which combines the procurement for the design, construction, operation and maintenance of a facility. Financing remains direct, i.e. a responsibility of the public party. The main advantages of a DBO contract is that the cost of capital will be lower, and the level of complexity of the contractual arrangement will generally remain low (Yescombe, 2010).

Design-Build-Finance-Operate (DBFO). Also known as DBFOM - the function maintenance is implicit -, DBFO is a form of PPP where the design, construction, operation & maintenance functions are transferred to the private party with a single bundled contract. The contractor company is also responsible to finance all the related costs, and will fully benefit from the operation of the infrastructure and the related revenue streams. The revenue streams that sustain the financing of the project can originate either from a single purchaser (usually a public entity), or be based on tariffs charged to a large number of off-takes, i.e. the users of the service provided (Delmon, 2010). The latter option is generally less attractive, as it entails more complex due diligence processes to account for the multiple variables for the analysis of credit risk and demand profiles. Under a DBFO arrangement, the public authority maintains legal ownership over the asset (Yescombe, 2010). Overall, the level of risk assumed by the private sector is high.

Build-Operate-Transfer (BOT), Build-Transfer-Operate (BTO), Build-Own-Operate (BOO). This category of PPPs are essentially DBFO-like contracts in which the private party eventually acquires ownership over the assets (World Bank Group, 2017). In BOT contracts, the private party has ownership rights for the duration of the contract. Once the contract term ends, ownership is transferred to the public authority. With BTO, this transfer happens when the construction of the asset is completed. In BOOs contract, the transfer of ownership does not happen at all, and the private party can benefit from full legal ownership rights throughout the contract duration and beyond.

Chapter 3. Current financial arrangements in the RESTCOAST pilots

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The REST-COAST project works on hands-on coastal ecosystem restoration in 9 Pilots that represent the main EU regional seas (Baltic, Black, North, Atlantic, and Mediterranean). Besides their geographical location, the pilots differ in terms of scale, type of restoration activity, ESS involved, stage of development (initial planning, construction, maintenance etc.), structure (single project or several projects within a single restoration program) and the involved jurisdictions.

This section describes all nine REST-COAST Pilots from a funding and financing perspective using the NBS Business Model Framework (BMF) as described in Chapter 2. Each Pilot is described in terms of the following subsections: i) Introduction, ii) NBS applied, iii) NBS initiator, iv) granting arrangements, v) financing arrangements, vi) value capture arrangements, vii) procurement arrangements, and viii) consideration for the future work of WP3. In addition, we illustrate these elements for each pilot with a Figure similar to Figure 2.1 showing the framework in Chapter 2.

3.1. Wadden Sea (The Netherlands)

Introduction

The Wadden Sea is a portion of the North Sea that spans across the Dutch and German northern coasts and south western coast of Denmark. The Wadden Sea is the largest unbroken intertidal sand and mudflat ecosystem in the world, with longstanding conservation efforts of the three Wadden Sea States, the support from the Wadden Sea Region and its stakeholders. In 2009, the Dutch and German parts of the Wadden Sea were inscribed on UNESCO's World Heritage List and the Danish part was added in June 2014. Its surface is mostly composed of protected areas due to the diverse hydrological, morphological and ecological characteristics. Current data show that the

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

area is experiencing surface subsidence due to the combined effects of salt and gas extraction and peat oxidation. It is, therefore, more exposed to projected sea level rise and extreme weather events. Public authorities in the Netherlands are concerned about the livability of the area and are occupied with maintaining or preferably increasing the attractiveness of the area. This is challenging because of the occurrence of earthquakes and subsidence. Nature, but also economic activity plays an important role in accomplishing this liveability/attractiveness objective. The region surrounding the estuary accommodates highly productive agricultural lands, and is therefore also of significant economic importance.

Within the estuary, but also upstream along the Eems river, there are significant water quality issues, mostly associated with high turbidity levels. This has a negative impact on the ecology. The turbidity levels result, among other causes, from the intensive navigational use and associated dredging activities in the channels and port areas in combination with the limited space and accommodating habitats to allow for the sediments to settle and be captured.

Figure 3.1 gives an overview of the current NBS provided, the ESS delivered, the actors involved, and the funding and financing arrangements between them. These elements are further detailed in the subsections that follow.

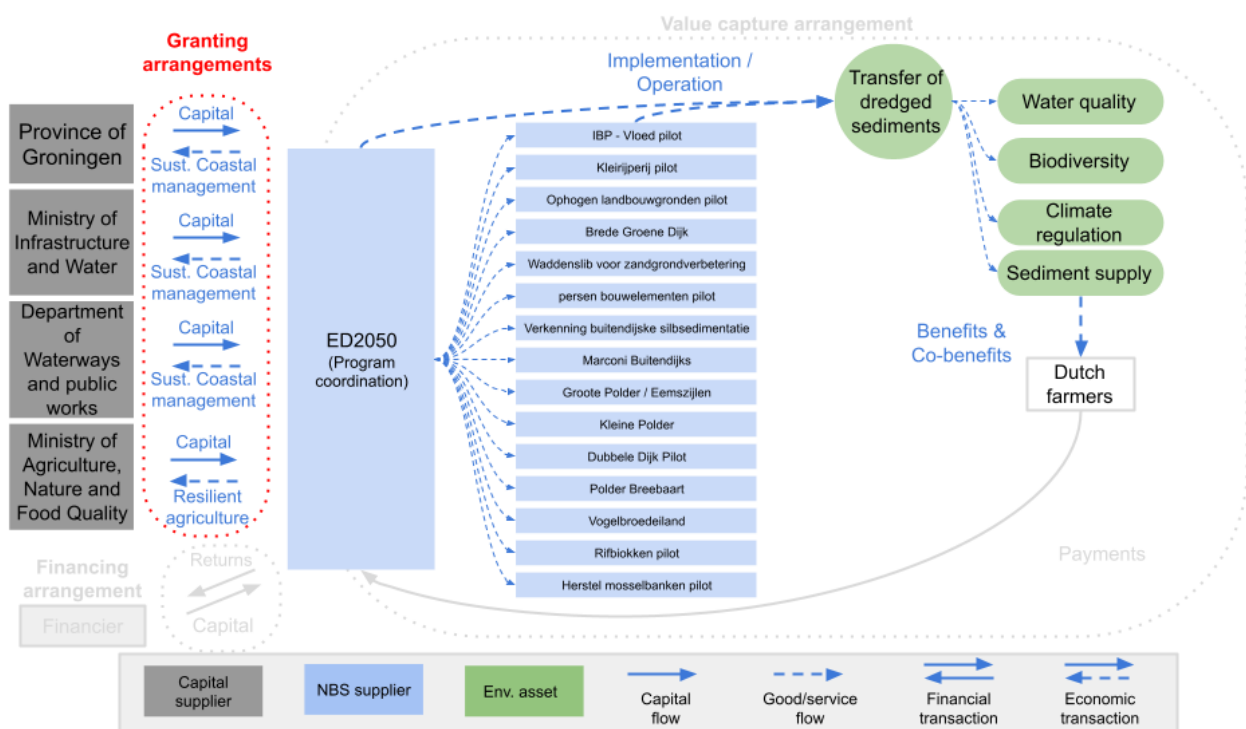


Figure 3.1 Overview of the NBS business model in the Eemsdollard2050 Program. Opportunities for establishing future value capture and financing arrangements are shown in grey.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

NBS applied

An NBS strategy that seems highly effective, which is under further investigation and preparation, is the removal of dredged material and sediment from the estuarine system to be used as a “provisioning service” for building material. Pilot studies have been executed to test the feasibility of using the sediment for construction and/or maintenance of levies and for raising agricultural lands. Raising agricultural land with dredged sediment is being prepared at a larger scale.

These activities are part of REST COAST and are organised under the multi-year Programme for Eems-Dollard 2050 (in short ED2050) (Postma and van Ark 2021) at the Dutch part of the Wadden Sea estuaries. This program focuses on three objectives: reducing turbidity, strengthening natural habitats, and mitigating climate change.

Several (pilot) projects have already been implemented and tested in the area leading to accumulation of knowledge, experience and evidence. Figure 3.2 shows different locations where restoration activities are occurring at varying scales to address different challenges. Pilot clay ripening, the wide green dike, sediment trapping outside the dike, construction of a bird island, and recovery of mussel banks are some of these projects.

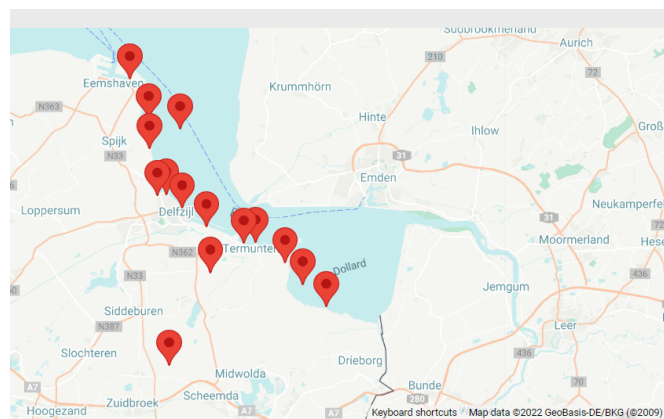


Figure 3.2 Project locations within the Umbrella Program Eemsdollard 2050 (Source: Eemsdollard2050)

NBS initiator

The ED2050 is a long term collaboration between national and regional public authorities, with representatives from local and regional businesses in the program steering committee. These representatives are part of the initiative “A balance between ecology and economy” (E&E) in the Eemsdelta (Eemsdelta 2023). The ED2050 has its own program staff who are responsible for coordinating the project and managing the connection between the different projects.

Granting arrangements

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

For this case, we can distinguish between arrangements at different levels. First, the program ED2050, as a program, requires funding. The program costs - consisting mostly of activities related to coordination and management of the individual pilot projects- are covered by granting arrangements with the Province of Groningen, the Ministry of Infrastructure and Water, the Ministry of Agriculture, Nature and Food Quality, and the Department of Waterways and Public Works.

The second type of arrangement is related to project costs. Projects are funded on a case to case basis. Project costs are covered by granting arrangements with different collaborating and participating partners. Several of the projects receive subsidies from public funds, funds in which both public and private parties contribute, and European funds. Furthermore, especially for the pilot projects, it is common to have a collaboration with research institutes and businesses, often arranged on the basis of subsidies.

Financing arrangements

Currently, no financing arrangements have been established.

Value-capture arrangements

Currently, no value capture arrangements are in place.

Procurement arrangements

Since many of the pilots and projects are research oriented, most collaboration is organised through partnerships. In some cases, such as the construction of the bird island, an engineering company is contracted through segmented procurement, in accordance with public procurement law. In many projects, a consortium called Ecoshape is also present, an example of a collaborative partnership containing 15 parties including engineering consultants, knowledge institutes, contractors and NGO's.

Considerations for future WP3 work

Some of the observed challenges related to funding in this case are the lack of structural granting for projects (the program is committed for several years but project funding is very incidental) and the earmarking of public funds (only meant for a single purpose or objective while NBS serves many objectives).

A clear opportunity for establishing future value capture arrangements is the sediment deposition on agricultural lands. In the Netherlands, the value of such sediment for farmers and their willingness and ability to contribute financially is being explored. Without these sediments, the farmers' land would become unusable in the next 5 to 10 years due to subsidence and sea level rise. One of the farmers near the pilot site - but not related to the ED2050 activities - has already

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

taken matters into his own hands and purchased soil (at market rates) to raise his lands. This demonstrates that there is a market potential and a potential value to be captured. Beneficial reuse of sediment for clay ripening and building levies has led to an anticipated cost reduction in the construction and maintenance of levies and the expected emissions are lower as locally sourced building materials are used.

One aspect to note is that the agricultural lands that are considered to receive sediment are not always farmers' properties. Moreover, in the case of agricultural loans and mortgages, land often serves as a collateral. This implies that a reduction of the value of land - in the case of not taking action against subsidence - is not just a challenge for the farmer and for public authorities, but also for the financial sector managing these assets. The role and responsibilities of the banks when it comes to adaptation to climate change is one for further investigation.

A significant reduction of costs is expected for the port authorities in the region. Dredging costs are expected to increase in the coming years as channels need to be dredged deeper and more material accumulates in the ports. Furthermore, restrictions regarding places where the dredged material is allowed to be deposited are increasing as well as the deposit locations are moving further away from the dredging locations. Deposition nearby may lead to significant cost reductions for the port authorities.

3.2. Catalan coast/Ebro delta (Spain)

Introduction

The Ebro delta is located in the north-western Spanish coast in the region of Catalonia. The area can be characterised as a low-lying, heavily anthropized area with few engineering structures that offer protection from storms and sea level-rise. Land-use in the delta is dominated by agriculture (70% of the surface area is agricultural land), mainly for rice production (95% of agriculture is rice production). Furthermore, wetlands, coastal lagoons, and sandy structures such as beaches and dunes can be found in the Delta. The main economic sectors in the Ebro Delta are agriculture (rice), followed by (eco)tourism - a rapidly growing sector - and salt production. Other economic activities are hunting, fishing and aquaculture, and some industrial activities (although limited). Furthermore, there is a (terrestrial) protected natural park of about 8,000 ha. The natural park emerged in the past as a result of a civil movement against the ongoing environmental degradation.

Water consumption for rice production is high. 90% of freshwater in the basin is used for irrigation. The delta faces a number of interrelated threats. The fresh water flowing through the Ebro river and arriving in the delta has decreased over the last decades. For the first time, in 2023, the agricultural sector has been confronted with water restrictions of up to 50% of their normal water use. Additionally, the delta is dealing with saltwater intrusion. Furthermore, the many alterations

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

in the upstream river system - mainly the construction of dams - have led to a huge reduction in the amount of sediment being transported into the delta. About 1% of sediment that used to arrive in the river mouth still finds its way there. Due to the sediment deficit in the delta, many points along the coast have the highest erosion rates in Europe. Furthermore, deltas are dynamic landscapes with a continuous redistribution of sediment due to erosion and accretion in different areas. To cope with sea level rise and future storm surges the system needs additional sediments.

Figures 3.3 and 3.4 give an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are then further detailed in the subsections that follow.

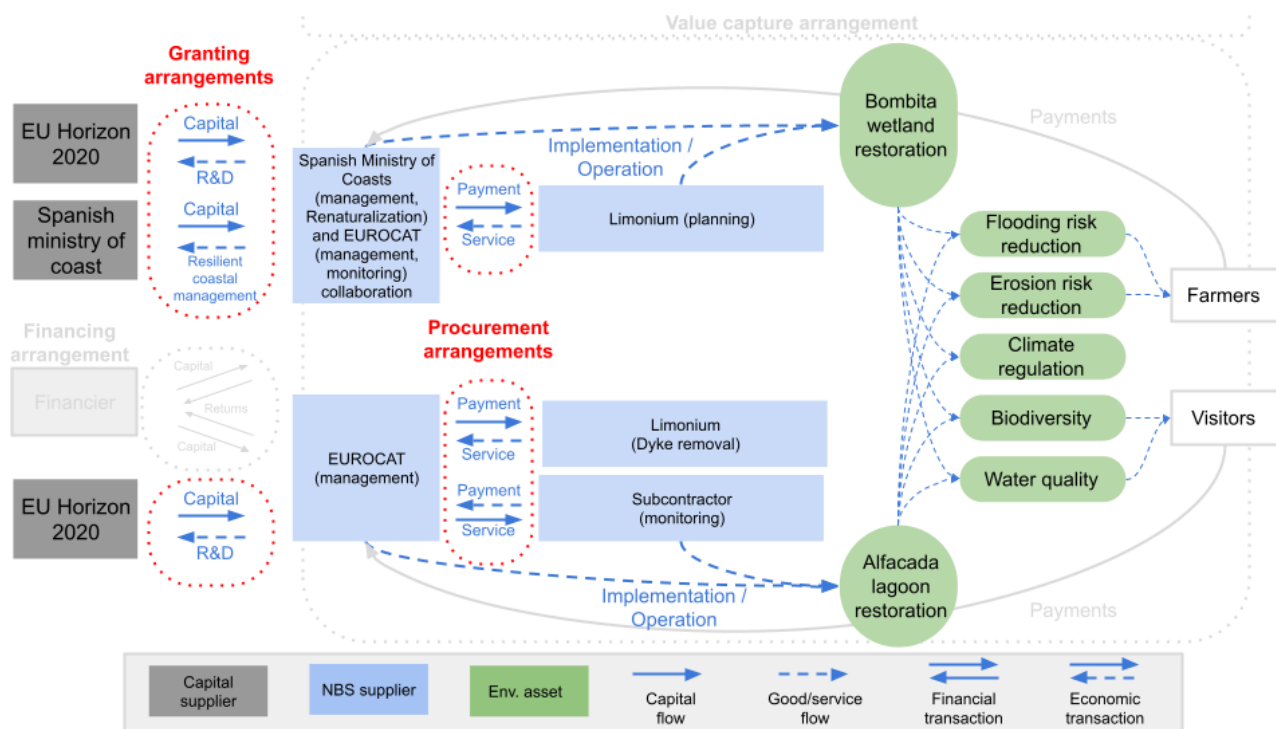


Figure 3.3 Overview of the NBS Business Model in the Ebro Delta Pilot (Bombita wetland restoration and Alfacada lagoon restoration). Opportunities for establishing future value capture and financing arrangements are shown in grey.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

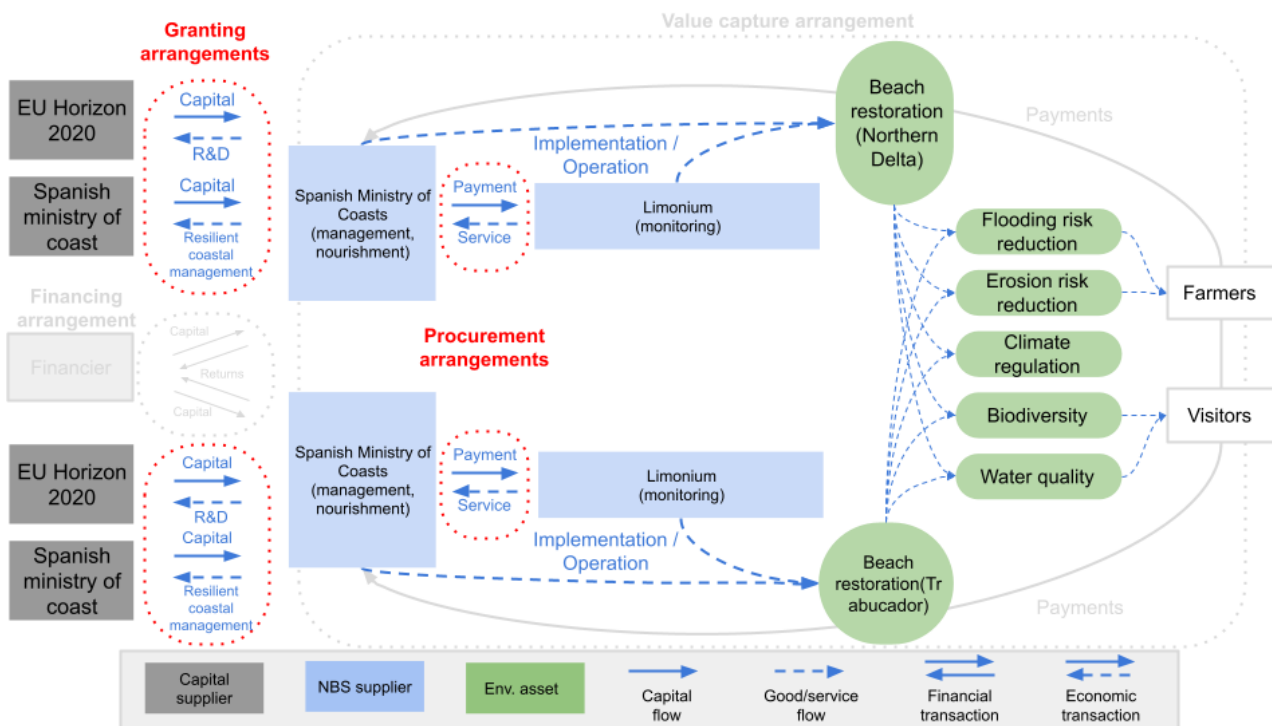


Figure 3.4 Overview of the NBS Business Model in the Ebro Delta Pilot (Beach restoration at the Northern Delta and at the Trabucador barrier). Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

There are several interventions and activities ongoing or planned in the Ebro Delta (Figure 3.5), which have been illustrated and discussed during the core-plat meeting on the 21st of July 2023. Coastal erosion and flood protection is being addressed through beach and dune restoration and wetland restoration. More concretely, Bombita wetlands and Alfacada lagoon are the two restoration sites. At the Bombita site, a renaturalization of abandoned rice fields is ongoing. At the Aflacada lagoon the removal of a 1 km artificial dike is planned. At both sites, there is a monitoring system of the restoration activities in place. Beach nourishment activities are conducted on the northern stretch and on the southern Trabucador barrier, as well as at the river mouth area (at Buda Island). Aside from the nourishments, there is also experimentation with controlled floods taking place upstream in the river, and monitoring for the sediment by-pass pilot.

NBS initiator

Beach nourishment and restoration activities are initiated and managed collaboratively by the Spanish Ministry of Coasts, Laboratori d'Enginyeria Marítima (UPC) and Eurecat. For the experimentation and monitoring of the upstream river (sediment by-pass and controlled floods), the Confederación Hidrográfica del Ebro (CHE) is also involved.

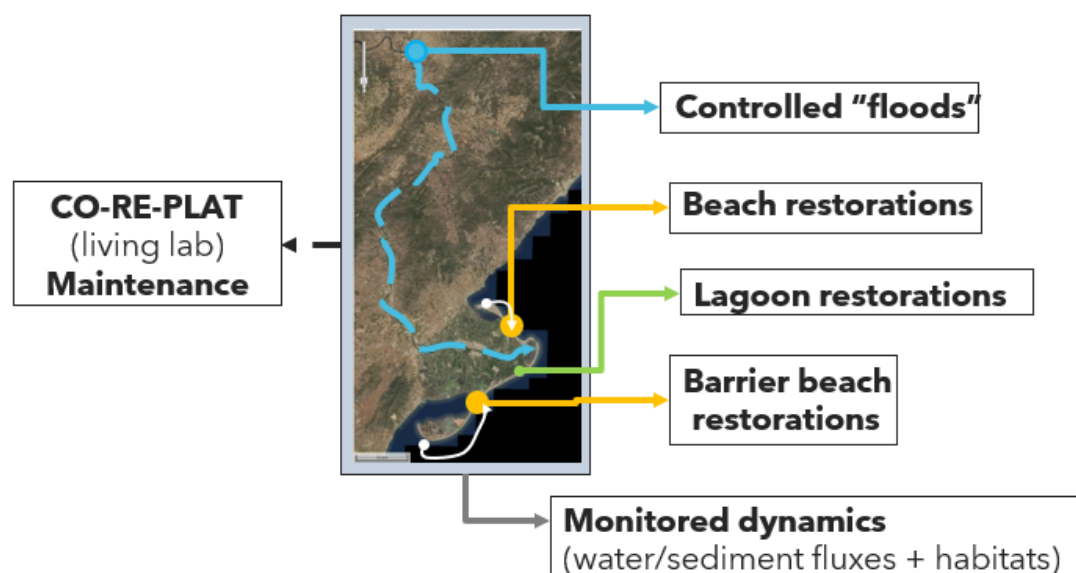


Figure 3.5: NBS interventions planned. Source: CORE-PLAT meeting 21st July 2023 by Eurecat partners

Granting arrangements

Overall, past and ongoing restoration activities are co-funded by the European Union - Horizon 2020 and LIFE programs. Furthermore, the Spanish ministry of coasts and the Confederación Hidrográfica del Ebro provide funding for the projects. Restoration projects in the past have also received funding for the restoration of specific recreational facilities such as the watchtowers for birds and binoculars were funded by the company Swarovski.

Financing arrangements

Currently, no financing arrangements have been established. The entire cost for the restoration is covered by public funding.

Value-capture arrangements

There are no value capture mechanisms in place. Most of the value created by the activities conducted in the Delta, especially for flood protection, are public goods. The responsibility for delivering these values lies with the public sector. However, some of the previous wetland restoration activities have managed to capture value from tourists through entrance fees for some of the information points and birdwatching facilities. Furthermore, the salt pans on the south of the Delta manage to capture some of the value created by the sale of "Bio salt" from the Parque

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Natural del Delta Ebro. To date, these revenues are not captured by the initiator and hence are not redirected towards conservation activities.

Procurement arrangements

Several of the activities are implemented within a collaborative research context or based on longer term contracts with the Spanish Ministry of Coasts. Specifically, some of the monitoring activities of the Alfacada lagoon have been subcontracted to a private party via segmented procurement.

Considerations for future WP3 work

There are several interventions and activities ongoing or planned in the Ebro Delta. Some important developments fall outside of the “RESTCOAST-scope”, but are important from an upscaling perspective, particularly in relation to financial arrangements. Important programs are the project BIORISILMED - a project exploring and promoting a transition towards a bioeconomy and the Green infrastructure plan in the Delta that would accommodate and facilitate the growth of ecotourism through improved navigational accessibility and connecting bike paths.

Regarding the management of the coastal zone, there are two plans that are not (entirely) aligned. These are the Delta Plan (Government of Spain) and the Delta Strategy (Government of Catalonia). The former encompasses the idea of “giving space to the coast” but is not in favour of using a sediment bypass. The Catalan government’s plan aims at re-establishing the coastline of 1984 to give space to rice production by advancing the coastline towards the sea. This plan is supported by locals as this would mean no more (agricultural) land would be lost.

Water footprint compensation and the selling of carbon credits are two mechanisms that are potentially relevant for the wetland and habitat restoration activities in the Ebro Delta. The corporate sector is looking for ways to offset negative environmental impacts or water consumption. This is expected to increase as the ESG reporting frameworks and regulations advance.

Previous storms (such as storm Gloria) have led to valuable insights and data concerning the behaviour of the barrier(s) and the functioning of wetlands as an alternative (to grey infrastructure) flood protection mechanism. The severity of flood events in the regions of the Delta where wetlands and coastal lagoons are present are much lower than where these are missing, and instead, agricultural lands were situated in immediate proximity to the coastline.

3.3. Venice (Italy)

Introduction

The Venice lagoon is located in the northeast coast of Italy, and with its 550 km² it is the largest lagoon of the Mediterranean basin. This transitional area includes the greatest Important Bird Area

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

(IBA) in Italy, a Special Protection Area (SPA), four sites of community importance (SCI) and a World Heritage site. Despite the recognition of the lagoon's unique value, the area is currently experiencing growing asymmetries in the balance of sediment and the degradation of its unique habitats.

Figures 3.6 and 3.7 give an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are then further detailed in the subsections that follow.

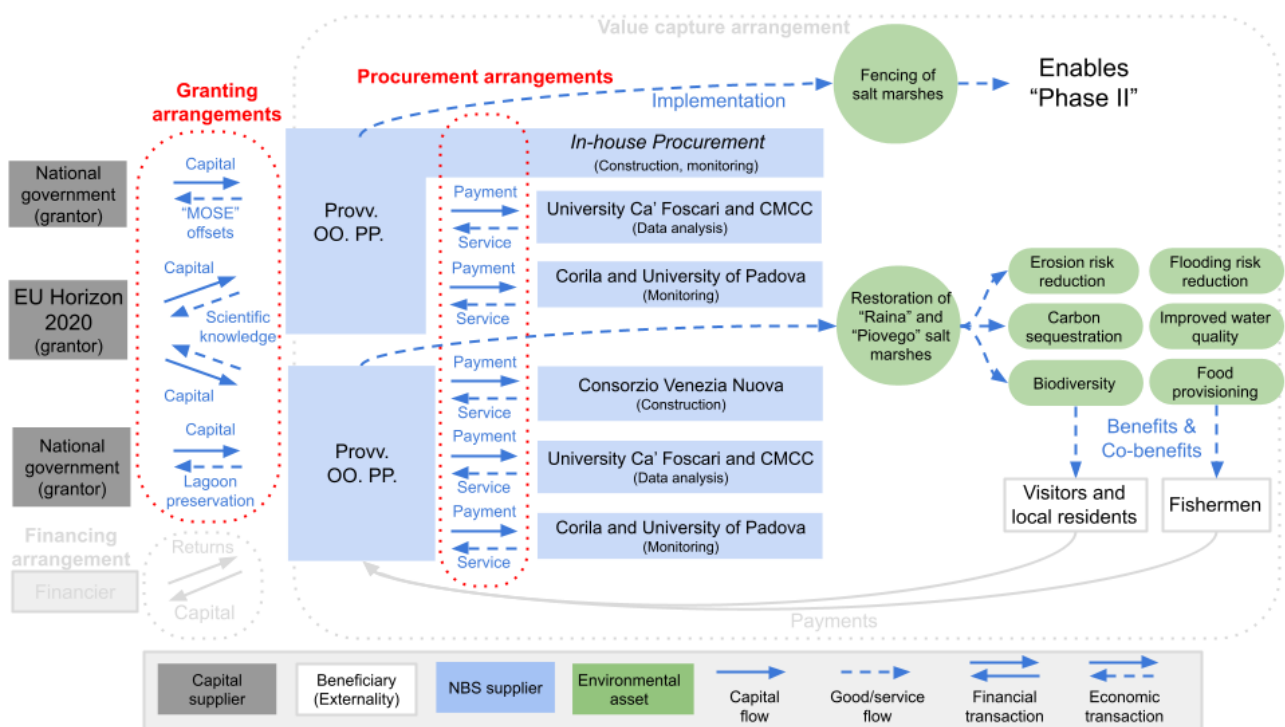


Figure 3.6 Overview of the NBS Business Model in the Venice Pilot (phase I). Opportunities for establishing future value capture and financing arrangements are shown in grey.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

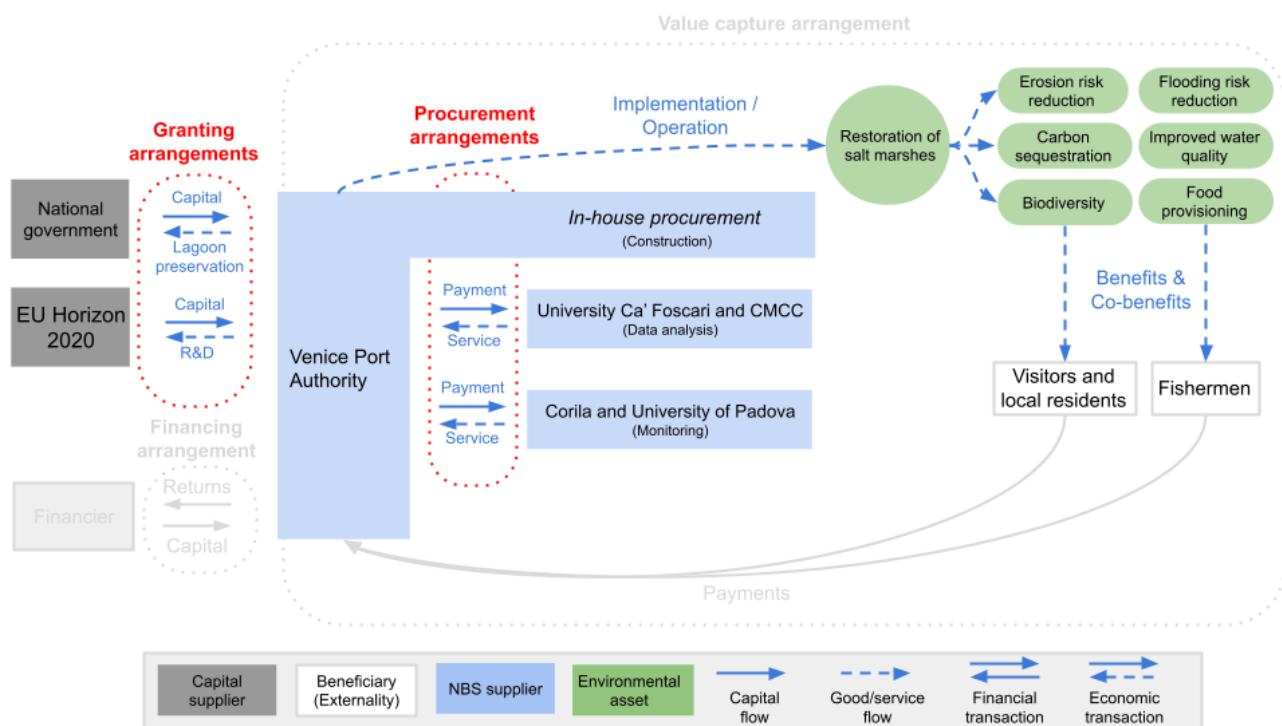


Figure 3.7 Overview of the NBS Business Model in the Venice Pilot (phase II). Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

Starting from 1992, a series of interventions have been implemented to recreate typical habitat, in particular artificial salt marshes and mudflats, and to safeguard the edges of existing ones from the risk of erosion. The pilot project will review past restoration interventions and draw best practices with the overall objective of creating suitability maps for up- and out-scaling of future restoration.

Moreover, maintenance work will be carried out in order to restore the already existing artificial salt marshes in the central lagoon and the ecosystem services they provide. Two main phases can be identified. The first phase (phase I) consists of the contermination of degraded artificial salt marshes, with the objective of setting the ground for upcoming active restorations. The second phase of the works (phase II) will transfer sediments to the salt marshes that have been fenced in phase I in order to improve their morphological status and restore key ecosystem services.

NBS Initiator

The NBS initiator during the phase I of the project is the Provveditorato Interregionale per le Opere Pubbliche per il Veneto, Trentino Alto Adige e Friuli Venezia Giulia (Prov. OO. PP.). In phase II, the NBS initiator is the Port Authority of Venice. Among the 11 salt marshes that have been selected for restoration activities, the “Raina” and “Piovego” saltmarshes will be restored as part of the “Piano Europa” program for the compensation of the environmental impact caused by the

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

construction of the mobile barriers of the “MOSE” system. The budget of both Provv. OO. PP. and the Port Authority of Venice is funded by the Italian Ministry of Infrastructures and Transport.

Granting arrangements

The restoration activities in both phase I and II are funded through granting arrangements with the national government (Ministry of Infrastructure and Transport) in an effort to minimise natural and anthropogenic pressures on the lagoon’s ecosystems and avoid habitat degradation and biodiversity and ecosystem services loss. The government’s grant for the restoration of the “Raina” and “Piovego” salt marshes in phase I is part of the mandatory compensation measures required by the European Commission following the infringement procedure 2003/4762 addressing the negative environmental impacts of the “MOSE” system. EU Grants from the Horizon 2020 program are funding part of the monitoring (partly funded by the Provv. OO. PP.) and all data analysis activities for all restoration actions.

Financing arrangements

No financing arrangements are currently in place.

Value capture arrangements

There are currently no value capture arrangements in place. In phase II, however, the Venice Port Authority (NBS initiator) will execute the delivery and deposition of sediments required for the restoration of the artificial salt marshes. These sediments will be sourced from the authority's regular dredging activities which will result in cost savings. The reduction of dredging costs is, therefore, captured by design in the pilot with direct economic benefits to the Venice Port Authority, and through the funding structure, the Ministry of Infrastructure and Transport. Further value-capture arrangements are not in place yet.

Procurement arrangements

In phase I of the pilot, the procurement of restoration activities is done through in-house delivery by the initiator Provv. OO. PP. with the exception of monitoring activities which are procured through a segmented procurement. A similar procurement approach is adopted for phase II, but in this case the initiator adopting in-house delivery is the Consorzio Venezia Nuova.

During the phase I of the pilot, Provv. OO. PP. carries out the contermination and part of the monitoring activities directly with its own resources, i.e., adopting an in-house procurement model. The remaining monitoring activities are delivered by CORILA and the University of Padova, while the University Ca’ Foscari of Venice and CMCC are contracted for the analysis of data and other research activities. With regards to the “Piano Europa” activities (the restoration of “Raina” and “Piovego” salt marshes), Provv. OO. PP. procured the construction works through a procurement contract with Consorzio Venezia Nuova.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

In phase II, the initiator Venice Port Authority executes the on-the-ground construction activities with its own resources, while CORILA, Prov. OO. PP., the University of Padova, the University Ca' Foscari of Venice and CMCC will continue to support the project through monitoring and data analysis activities.

Considerations for future WP3 work

The main economic benefits of restoration have been identified. The restoration and protection of the lagoon ecosystems is expected to increase the biodiversity, in particular in terms of number of bird species and abundance, and also other wildlife species and habitats' improvement. This is expected to benefit local residents, hunters, and tourists by providing various recreational activities. The enhancement of fish provisioning services will directly benefit fishermen's traditional activities. The carbon sequestration, regulation of water quality, erosion and flooding risk reduction services will benefit all the lagoon area, the city of Venice, and local residents. The comprehensive set of ESS delivered by restored salt marshes will be monitored throughout the different phases of the pilot restoration interventions.

The restoration pilot in the Venice Lagoon also presents some challenges in terms of future financing. First, while Venice attracts millions of tourists each year, their focus primarily remains within the city. Promoting visits to restoration sites could be a potential revenue source to support restoration activities. This opportunity is, however, accompanied by concerns about potential impacts of increased boat traffic near the salt marshes' shores. Striking a balance between generating income and preserving the delicate ecosystem poses a significant challenge to the establishment of tourism-based value capture arrangements.

Second, although the funding for near-term restoration activities has been secured, there is currently no detailed upscaling vision for the long-term future of salt marsh restoration in the region. This lack of a strategic vision makes it challenging to formulate investment proposals that align with a broader restoration framework. Without a clear roadmap for future projects, securing additional funds, especially through innovative arrangements and private investments, becomes a complex task.

3.4. Vistula Lagoon (Poland)

Introduction

The Vistula lagoon is located in the Baltic Sea and it is a transboundary basin shared between Poland and Russia. The inlet that connects the lagoon to the open sea is located in Russian territory. This configuration complicates the access to the lagoon for vessels bound for the Polish harbour of Elblag as this is contingent on authorizations that require extensive time and can be withdrawn abruptly. The harmonisation of policies for maritime transport and environmental management is unlikely due to deteriorated diplomatic relations between Russia and EU countries.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Figure 3.8 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are then further detailed in the subsections that follow.

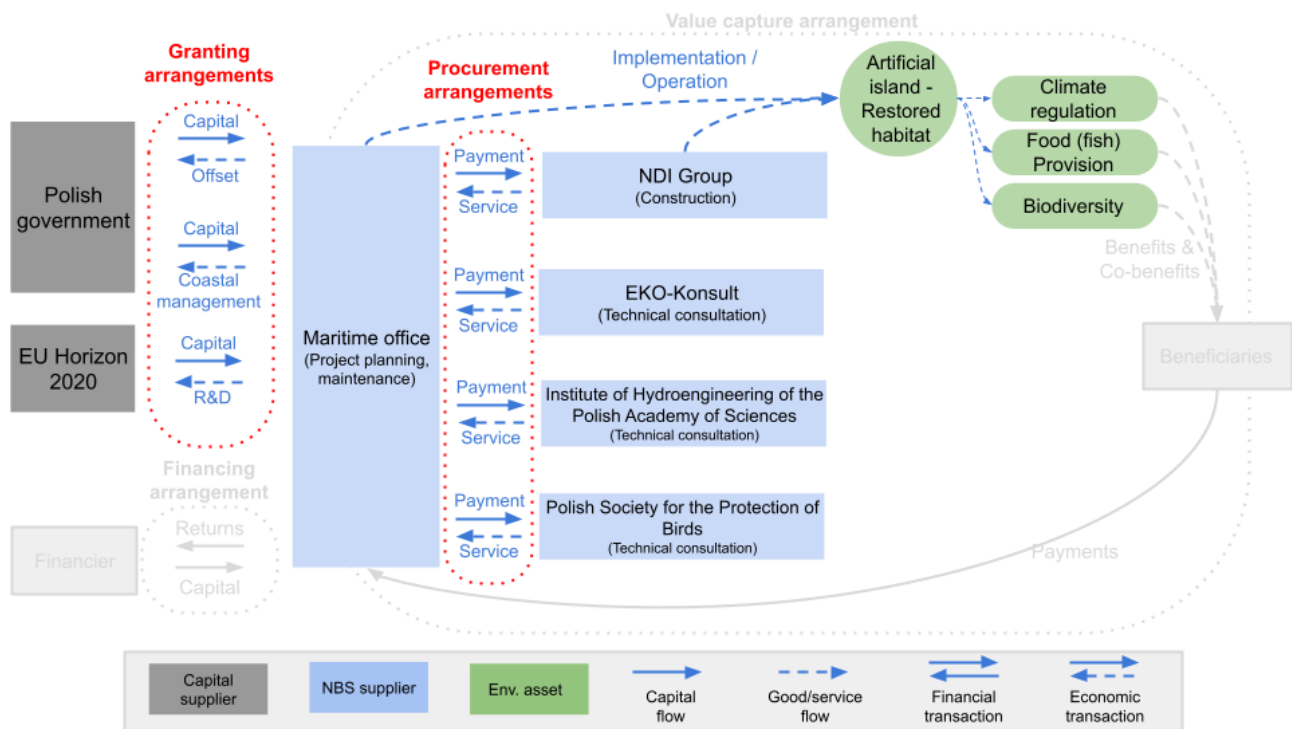


Figure 3.8 Overview of the NBS Business Model in the Vistula Lagoon Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

To solve this issue and boost the economy of Elbląg, the central government of Poland decided to open a channel to gain independent access to the sea. As the lagoon is a Natura 2000 Special Protected Area for birds and habitats, special attention had to be paid for the potential environmental impacts of the project. The infrastructural works of developing the channel would lead to an excess amount of sand and sediment which had to be deposited somewhere. To create a win-win situation this sediment was used for the creation of an artificial island – a bird sanctuary – and became an integral part of the project plan. The island will not be open to visitors and will constitute a safe-haven (sanctuary) for bird species, especially for migratory birds. Predators from land cannot access the island, except during very cold temperatures when the lagoon is frozen. Vegetation on the island is planned to be managed such that the habitat becomes attractive for some bird species and not others (i.e., maintained as a pioneer state grassland). The design of the island allows for future deposition of dredged materials associated with maintaining the navigability of the channel.

NBS initiator

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The initiator of the restoration project is the Maritime Office of Gdynia, the governmental agency responsible for coastal zone management. In particular, the Maritime Office has full jurisdiction in the so-called “technical belt” (shoreline and adjacent areas) where the restoration pilot site is located. The Maritime Office funds its activities through a budget that is approved yearly by the central government.

Granting arrangements

The project as a whole (the construction of the channel + the construction of the islands) has been funded by the Polish central government and transferred to the Maritime Office in Gdynia. This stakeholder is also responsible for operations and maintenance of the channel and the island and also holds the responsibility for compliance with the N2000 regulations in this coastal lagoon. Once the construction of the island is completed, operation and maintenance activities (e.g., periodical mowing of grass) will be carried out and paid for by the Maritime Office with its own resources (i.e. indirectly paid by the central government).

Financing arrangements

Currently, no financing arrangements have been established. The entire cost for the construction of the island is covered by means of government granting.

Value capture arrangements

Together with the Sicily Pilot (Section 3.7), this Pilot is the only one which has a value capture arrangement in place, namely the cost savings resulting from using sediment from the channel dredging activities for filling up the new island. The dredged material is needed to be deposited somewhere in the area, complying with sediment management regulations and alternative options were limited (if any at all). The costs of transport and deposition, and perhaps treatment, elsewhere would likely have exceeded the cost of the current project design. Thus, this value (i.e. the reduction of implementation costs) is captured by the set-up/design of the project, where the main beneficiary is the Maritime Office of Gdynia, and through the funding structure, also the National Government (and indirectly the taxpayers).

A second value creation that is very likely to be captured in the future is due to the created island acting as a bird sanctuary providing nesting grounds. Thus, the project contributes to biodiversity enhancement, targeting specific species and trying to avoid others (cormorants). The enhancement of local biodiversity is expected to benefit the Maritime Office of Gdynia in the long term as part of the broader strategy for environmental, social and economic requalification of the lagoon.

Procurement arrangements

The procurement model adopted in the Vistula Lagoon Pilot consists of a conventional DB contract with a single entity for the construction of the site. Segmented procurement was then used for

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

monitoring and data analysis activities. The O&M will be managed through in-house delivery by the NBS initiator.

The Maritime Office has contracted several actors to realise the planned restoration activities. Construction activities (dredging of the navigation channel, construction of the rim of the island, deposit of sediments) have been delegated to NDI Group, an experienced construction consortium. The Institute of Hydroengineering of the Polish Academy of Sciences was involved to provide terms of reference for the location and configuration of the island. Besides these two, EKO-consult and Polish Society for the Protection of Birds have been consulted on several scientific and technical aspects of restoration. The Maritime Office, nevertheless, contributed directly to several activities with its own staff and resources.

Considerations for future WP3 work

In addition to the cost saving value capturing mechanism already in place, other arrangements were foreseen by the stakeholders for a future stage of the project. These are the potential for carbon storage and the potential contribution to sustainable fish stocks. Both these values are/were uncertain. Regarding the carbon storage potential, knowledge will be developed to compare the carbon storage potential of the island, especially given the intended type of vegetation management, with alternative vegetation management. A preliminary assessment of the impact of the restoration project on carbon sequestration was done and results were unfortunately negative. The extraction of wet sediments and their deposit on dry terrain actually produces CO₂ emissions; the planned restored vegetation has limited capacity of sequestering carbon. Regarding fish stocks, the underwater landscape (and potential reedbeds above the water) expected to develop on the outside of the island ring can serve as an important spawning area. If such values are to be captured in the future, monitoring is essential.

Although there is no funding gap, there are still alternative funding opportunities which could lead to a different distribution of funding than is currently foreseen or creation of additional/alternative values.

- Local tourism predominantly focuses on the lagoon spit, while the inner banks of the lagoon remain sparsely populated, rarely visited, and characterised by limited economic activity. Bird watching or ecotourism could be an added value on the lagoon side. However, the current project arrangements are based on restricted access and do not provide room for value capture through recreation. Furthermore, tourism could potentially be of value with respect to monitoring through citizen science mechanisms.
- The Maritime Office which is responsible for operations and maintenance, lacks fiscal authority and cannot - by itself - create additional financial streams to support its operations through the imposition of a different or additional tax and/or fee structure. The general expectation seems to be that finance for restoration will increase over the long

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

term as a byproduct of the increased economic activity generated by the new channel. Such financial flows face the risk of landing in the “general public budget”. Alternatively, there are ways to earmark parts of these revenue streams.

- Other ecosystem services such as the reduction of wave energy and water quality improvements, and potentially more, have currently not been explored.

It must be noted that local stakeholders from the Maritime Office did not express the need to explore alternative funding sources and financing arrangements. Funding for maintenance is expected to be provided by the national government and alternatives. This would be the most convenient and efficient solution for the Maritime office and the associated objectives. Alternative options would be more complicated and lead to higher transaction costs. Another polish lagoon, the Szczecin lagoon, has been identified as a fitting site for potential upscaling of the project. Three additional islands could be built in case of successful outcomes obtained in the Vistula lagoon.

3.5. Foros Bay (Bulgaria)

Introduction

Foros bay is the most sheltered area against waves of the Bulgarian Black sea. These geographic conditions enable sea grasses and other wave sensitive aquatic species to flourish. While the biodiversity value of the bay is of clear high socio-ecological importance, the highly-populated city of Burgas exerts several anthropogenic pressures on the system, jeopardising habitat diversity and increasing the risk of flooding and coastal erosion. There are several coastal (estuarine) lakes of varying size and saltiness located around the pilot site, some of which are designated as protected areas.

Figure 3.9 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are further detailed in the subsections that follow.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

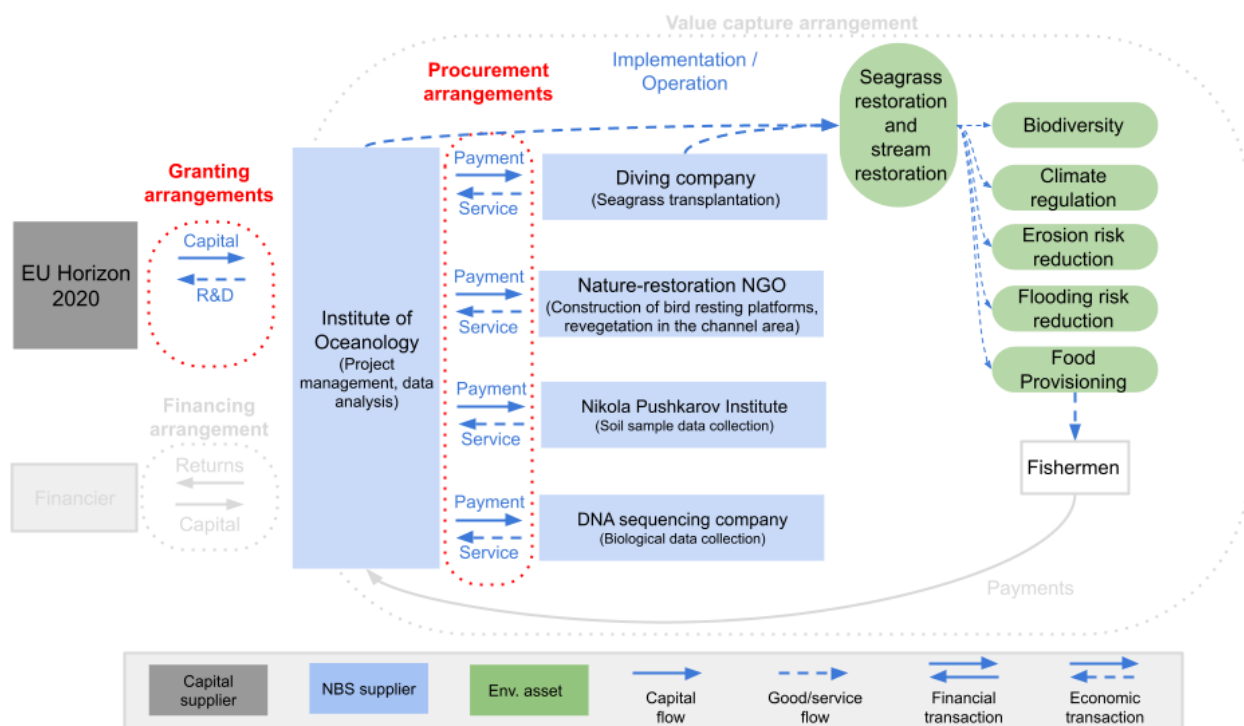


Figure 3.9 Overview of the NBS Business Model in the Foros Bay Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

The pilot project will build on previous restoration efforts by re-establishing the hydrologic connection of the Foros bay with the Vaya lake and the surrounding wetlands, and by armouring the southern canal's bank. Restoration of habitats and regular maintenance of wetland ecosystems will also be carried out. These activities will reduce flooding risks and improve the balance of salinity in the basins. The restoration pilot comprises of two main activities:

1. Transplantation of seagrass to degraded areas of the Bay
2. Restoration of the Burgas-Bay canal to re-establish hydrological connectivity and bird habitats.

The restoration of the Burgas-Bay canal will include the management of invasive vegetation species and the construction of artificial bird resting platforms. This is regarded as a temporary solution and plans for a permanent solution are currently being drafted.

NBS initiator

The NBS initiator of the restoration pilot at Foros Bay is the Institute of Oceanology, Bulgarian Academy of Sciences. In the Pilot, the Institute of Oceanology will supervise and manage the project and evaluate restoration outcomes through the analysis of collected data.

Granting arrangements

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The pilot restoration project is fully funded by EU grants under the Horizon 2020 project REST-COAST. Due to rising inflation rates, the budget allocated for the restoration at Foros Bay might not be sufficient to cover the costs of the activities originally planned. If no additional funding is secured, the objective of the restoration action would probably have to be adjusted, most likely by reducing the size of the area to be restored.

Financing arrangements

Currently, no financing arrangements have been established. The entire upfront costs for the restoration are covered by means of public funding.

Value capture arrangements

There are no value capture arrangements currently in place.

Procurement arrangements

The planned restoration activities have not started yet, but restoration implementation will be obtained through segmented public procurement. The terms of reference for a public procurement procedure to hire subcontractors (NGOs with experience in restoration) for the task of construction of bird resting platforms and vegetation management in the channel area are currently being defined. The public procurement procedure should finish at the end of 2023/beginning of 2024. The terms of reference for a public procurement procedure to hire subcontractors for the task of seagrass transplantation (diving companies) are currently being defined. The public procurement procedure should be completed by May 2024. Once subcontractors will be selected and hired, the practical restoration works are expected to start in Summer 2024. The collection of chemical and biological data from collected samples will be procured by contracting specialised research institutes, while the analysis and interpretation of these will be done by the Institute of Oceanography.

Considerations for future WP3 work

The Institute of Oceanology is pioneering coastal NBS as a sustainable approach to manage coastal societal challenges in Bulgaria. This can be both a challenge, due to the lack of awareness regarding the benefits of restoration, and an opportunity as the pilot has the potential to set an effective precedent and a benchmark for future restoration and coastal management activities.

The restoration activities are expected to contribute to climate change mitigation, erosion risks reduction, flooding risks reduction, biodiversity enhancement, and food (fish) provisioning ESS. Most of these ecosystem benefits will be quantified to demonstrate the multifaceted public value of coastal restoration to the Bulgarian national government which is currently regarded as the most promising source for future additional funding.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The improvements to biodiversity and the related increased fish provisions would provide benefits to the business of local fishermen who are nevertheless sceptical in recognising this link. A reliable quantification of this ESS could increase the support of fishermen towards future restoration activities and open new opportunities for value capturing.

As the pilot relies entirely on REST-COAST grants, the limited duration of the project was also identified as a limiting factor to the full demonstration of restoration benefits and the establishment of additional activities that could add value to the project results.

3.6. Rhone Delta (France)

Introduction

The delta of the river Rhone is located in the southern coast of France. The site for the pilot project was owned by a salt company whose activities required a high level of control on water levels and salinity. In 2008, the salt company decided to sell more than 6500 ha of this land to the French government that now aims to reestablish the original environmental conditions of the delta.

Figure 3.10 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are further detailed in the subsections that follow.

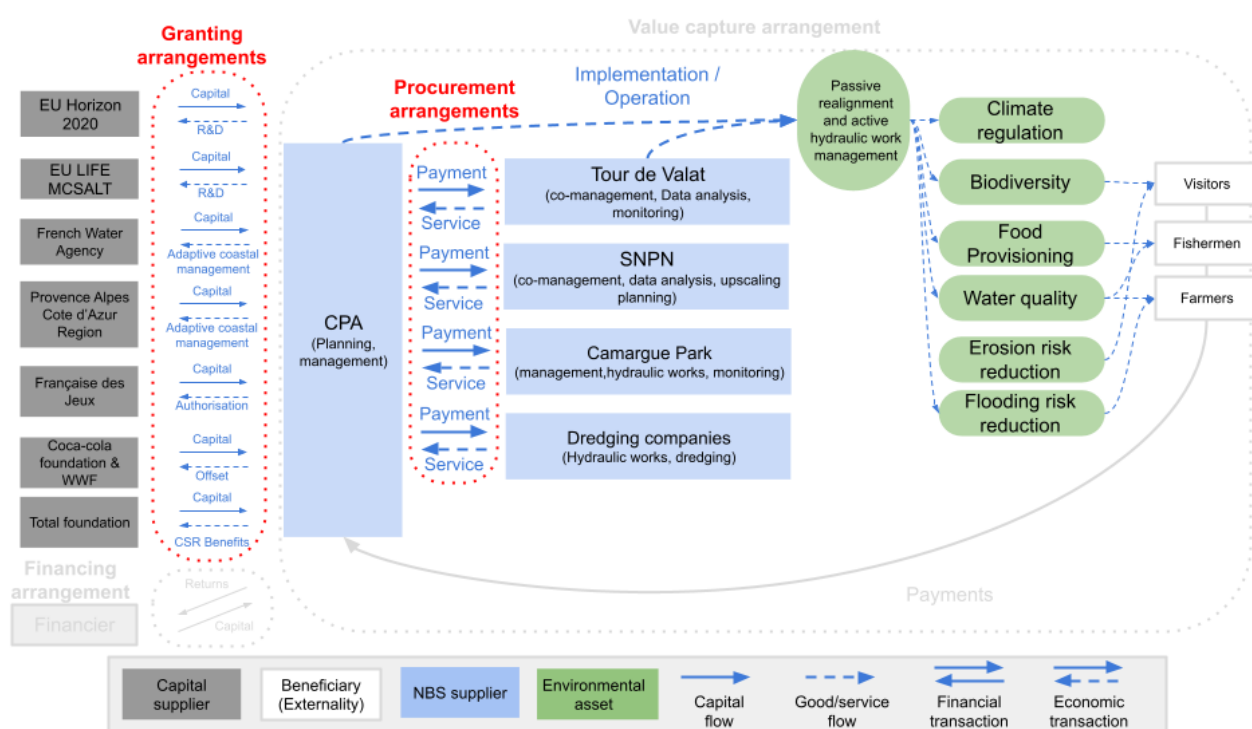


Figure 3.10 Overview of the NBS Business Model in the Rhone Delta Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

NBS applied

Restoration started in 2012 and is still under development. The overall objective is to restore the connection of the central lagoons of the Rhone delta with the surrounding watersheds and the sea. The management strategy focuses on the implementation of adaptive management to sea level rise, the restoration of the natural, gravity-led hydrology - as opposed to the previous use of pumping stations -, the restoration of the Mediterranean coastal ecosystem and the associated species, and the integration of socio-economic issues. The restoration of the hydrologic connectivity and the natural coastal ecosystem will be achieved passively through the elimination of artificial barriers through non-maintenance and will take into account multiple ecological and economic issues.

NBS initiator

The restoration interventions are coordinated by the owner of the site Conservatoire du Littoral (French Coastal Protection Agency, CPA), which is the initiator of this pilot. CPA is a leader in France for initiatives of coastal protection through restoration. CPA does not have operational responsibilities as these are co-managed by the Camargue Regional Natural Park, the Société Nationale de Protection de la Nature (SNPN), and the Tour du Valat research institute.

Granting arrangements

The restoration project has received grants from different sources. The EU is a major grantor in the project. At first, grants were provided under the LIFE+ MCSALT program with co-funding from the French government. These grants were used to implement the initial phases of the passive restoration strategy as well as some active restoration interventions. LIFE+ also funded the construction of artificial islands and nesting ground to support bird habitats. As of today, the EU funds the project through grants under the Horizon 2020 project REST-COAST to test the implementation of adaptive management to Sea Level Rise. The REST-COAST grants are dedicated to the study of the consequences of the passive restoration approach on the restoration of habitats and the performances of the targeted ESS.

With a focus on specific restoration activities, the French Water Agency and the Provence-Alpes-Côte d'Azur supported the project by joining co-granting arrangements. When needed, Tour de Valat and the CPA also used their own budget to fund some of the restoration activities.

The Rhone Delta pilot also received grants from private entities. Coca-Cola foundation, in partnership with WWF, provided grants to the project as a way to offset their impact on local fresh water availability due to the commercial activities of Coca-Cola. Total foundation provided grants as part of its Corporate Social Responsibility strategy. Lastly, Française des Jeux provided grants to

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

acquire the authorization to use flamingos as the main theme of one of their commercial projects. The grants received from Française des Jeux have been used for purchasing hydrosaline volumes and flows monitoring devices and for digitising historical data on Sea Level Rise. The involvement of these private grantors was made possible because of a solid partnership and patronage network developed by Tour de Valat to support ecosystem and habitat restoration.

Financing arrangements

Currently there are no financing arrangements in place at the Rhone Delta pilot.

Value capture arrangements

No value capture arrangements are currently in place

Procurement arrangements

The implementation of restoration in the Rhone Delta Pilot was obtained through segmented public procurement. As mentioned, the NBS initiator CPA is not involved in operational activities. The pilot is effectively co-managed by Tour de Valat, SNPN and the Camargue Regional Natural Park. More specifically, the Camargue Regional Natural Park is responsible for day-to-day management of the site, hydraulic works, long-term monitoring of hydrosaline dynamics, and communication with the public (including the organisation of awareness-raising events). SNPN is in charge of chemical analysis and the planning of the reconnection of the REST-COAST pilot with the central lake area (upscaling phase). Tour de Valat is responsible for the scientific valorisation of the project and shares responsibilities with the Camargue Regional Park for monitoring the hydrosaline dynamics.

Planning activities are carried out by the project's co-managers, and building and some monitoring tasks are delivered by various sub-contracted actors. Through the 11 years long lifetime of the project, hydraulic works and dredging activities have been entrusted to various specialised companies over the years through public procurement processes. The funding model based on (relatively short-term) project-based grants prevented continuity in procurement relations. Several consulting partners have been hired for the management of different restoration aspects, such as downstream dynamics studies, chemical analysis of sediments, among others.

Considerations for future WP3 work

In the Rhone Delta pilot, several ESS and clear linkages with the respective beneficiaries have been identified, offering a potential future value capture:

- Flood risk reduction. The passive realignment strategy resulted in the creation of a buffer area that will absorb much of the impacts from floods and storms, increasing the overall resilience of the area. At the same time, with the removal of the ocean-front dyke, the second order dyke will be more exposed to extreme weather impacts, and will be upgraded

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

by increasing its height. The resulting additional costs for SYMADREM (an inter-regional joint association for the development of dykes in the Rhone delta) will nevertheless be offset by the avoided high costs for the maintenance of the ocean-front dyke.

- Erosion risk reduction. Restoration works will re-establish the natural sedimentation flows, progressively creating new landscapes with high touristic value.
- Water purification. One of the main focuses of the pilot is the analysis of hydrosaline dynamics to demonstrate the improvements to water quality in the Rhone Delta. Reduced salinity levels produce several benefits including the restoration of fish reproductive cycles, soil composition improvements in neighbouring farmlands, restoration of seagrass population, and the restoration of grazing areas that constitute a local tourist attraction.
- Food (fish) provisioning. As mentioned, restoring natural hydrosaline dynamics will enhance fish migration and reproduction on site that will increase the overall fish stock. Local fishermen will benefit from the increased availability of fish. On site, fishing and angling activities are limited to few individuals, but larger fishing businesses operating in the wider coastal area will also benefit from the additional provisioning of fish.
- Biodiversity enhancement. The creation of new landscapes and the restoration of habitat, improved water quality, and increased fish stock will greatly benefit local biodiversity. The Rhone Delta is a famous tourist destination with natural landscapes being a major attraction for visitors. Tourism businesses and tourists will, therefore, benefit from the successful implementation of the pilot.
- Climate mitigation. Carbon sequestration and GHG emissions are being monitored following the same methodology applied in the Arcachon Bay pilot. Performances with regards to this ESS are expected to vary across the vast pilot area and overall results are not yet clear.

The strongest potential for additional value captures appears to lie in the high touristic and recreational value of the site, for which the planned restoration offers great potential for enhancement. The above listed ESS and the benefits they produce already resulted in the emergence of small economic activities such as organised eco-touristic tours, fishing and angling for European Sea Bass, grazing, but these are external to the project and economic value has not been captured yet. These activities evidence the high recreational value of the site that will be enhanced by the pilot's restoration activities. Further recreational activities could develop following current efforts in promoting cycling and hiking activities and the organisation of car parking and public access to the beach. WP3 will attempt at establishing revenue streams through the development of a tailored business model, also considering the deployment of innovative financial instruments.

Despite its strengths, the pilot presents some challenges related to limitations of the adopted financial model and barriers to implementing an alternative based on innovative financial arrangements. The reliance on grants that are delivered through time-limited public investment

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

programs represents a barrier to planning and establishing long term actions, in particular in relation to long-term procurement and employment relationships.

With respect to the definition and proposal of value-capture arrangements and business plans, the project manager highlighted how these would, in principle, conflict with the general conceptualisation of the project. The restoration pilot was conceived as a public intervention to foster environmental and social-economic development in the area as well as a way to decrease public spending on coastal protection. Private investments with a profit motive is not an available option due to the rules of regional parks and the mandates of the NGO co-managing restoration. The establishment of payment mechanisms, user fees, taxes for cost recouping do not seem to be an option either as they go against the narrative supported by the governance bodies. Task 3.3 will need to consider these factors in order to develop financial arrangements that can improve the funding model for restoration upscaling while taking into account regulatory constraints and local values and preferences.

3.7. Sicily (Italy)

Introduction

The restoration activities for the pilot project in Sicily (Italy) take place in the Cuba and Longarini lagoons, located in the South East of the island. The need for restoration emerged due to the very intensive agricultural activities in the region, which generate pressures on the local environment through high water withdrawal rates. Ecological status is further jeopardised by the growing population and by increasing economic activity in the tourism sector. As a result of these anthropogenic pressures, the hydraulic connectivity between lagoons is compromised and several local species and habitats are endangered.

Figure 3.11 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are further detailed in the subsections that follow.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

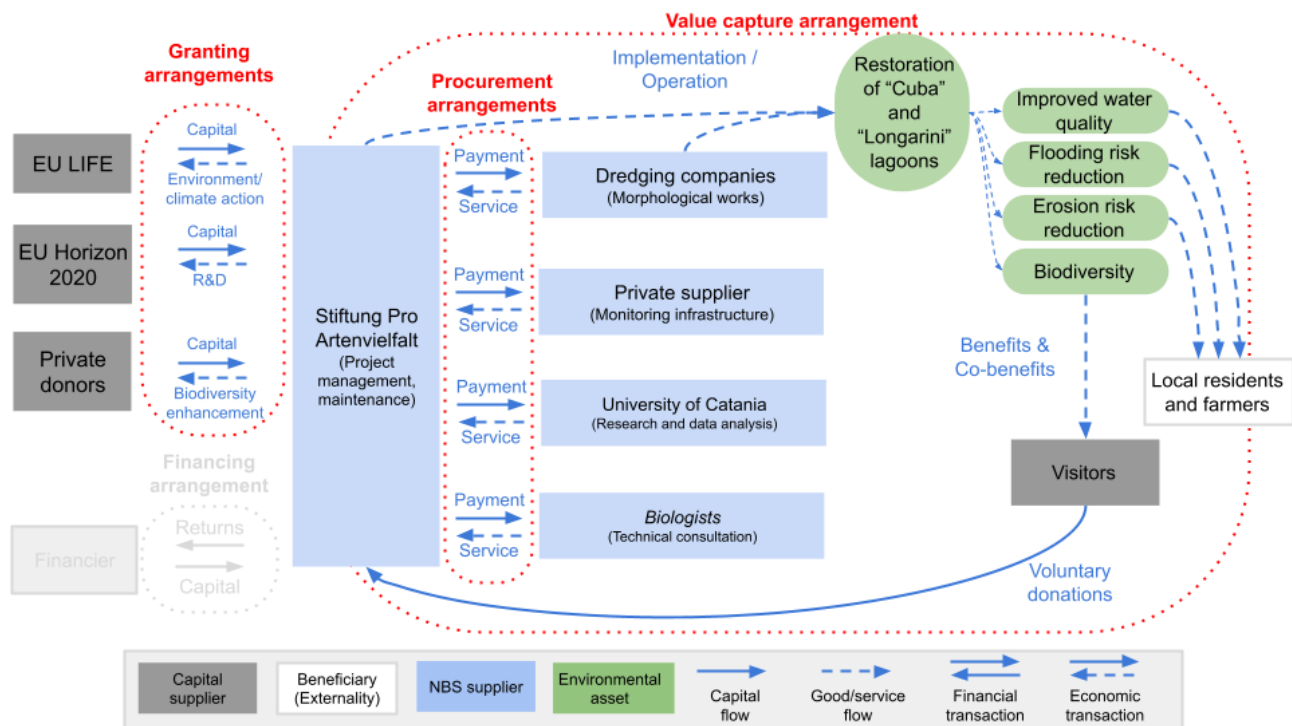


Figure 3.11 Overview of the NBS Business Model in the Sicily Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

Several activities have been initiated in recent years with the overall objective of counteracting habitat degradation, safeguarding endangered species, and improving the ecological status of the area. Specific actions include anti-poaching measures, the removal of alien and invasive species, land use regulation, wildfire prevention, habitat fencing and waste dump removal. The project also seeks to set up incentive schemes to promote biological and eco-sustainable agriculture and sustainable land use change.

NBS initiator

The initiator of the pilot is Stiftung Pro Artenvielfalt, a private NGO based in Germany which operates for the conservation of species at risk.

Granting arrangements

Activities are co-funded by grants provided by the European Union and private donors. EU grants are channelled through the LIFE funding programme and the Horizon 2020 research programme. The LIFE grants (Marble duck PSSO) are used to pay for construction activities such as the creation of artificial islands, ecological niches, and the reintroduction of native species. Horizon 2020 funds are used to cover the costs for gathering and analysis of scientific data. Private donations from

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

supporters of the Foundation for Species Diversity have been used to purchase the land on which the restoration is taking place and to fund operation and maintenance activities.

Financing arrangements

Currently, no financing arrangements have been established. The entire upfront costs for the construction of the island are covered by means of public and philanthropic granting.

Value capture arrangements

Together with the Vistula Lagoon Pilot (Section 3.4), this Pilot is the only one which has a value capture arrangement in place. The current and future ESS generated by the pilot include biodiversity enhancements, water quality improvement, flood risk reduction, and erosion risk reduction. Part of the touristic value attached to these ESS is already captured through voluntary donations by visiting school excursions and ecotourists to the pilot initiator.

Procurement arrangements

In the “Longarini” and “Cuba” lagoons activities are managed by Stiftung Pro Artenvielfalt, which adopted a segmented procurement model to acquire the goods and services needed for restoration. Stiftung pro Artenvielfalt is supported by different actors for the implementation of restoration. Private partners for the implementation of morphological restoration works and the provision of monitoring instruments were contracted through tendering. The University of Catania was contracted to conduct research on restoration methodologies and the analysis of collected data.

Considerations for future WP3 work

In the Sicily pilot, the presence of multiple lagoons in the area with varying degrees of environmental status represents a powerful tool to demonstrate the benefits of restoration. The Vendicari Lagoon is a protected area and provides a benchmark for successfully implemented restoration, while other neighbouring lagoons (e.g. Pantano Baronello, Pantano Morghella), are degraded and provide a representation of a no-intervention scenario.

The high touristic value of the Lagoons represents a strong asset for the potential future implementation of further value capture arrangements. Currently, visitors are invited to voluntarily donate to the manager of the site (Stiftung Pro Artenvielfalt) and these could possibly be integrated with user fees (e.g. targeting birdwatchers, for the general access to the site or for specific events), such as the one already implemented in the benchmark site Vendicari Lagoon. As the availability of funds is currently highly dependent on donors, the main goal of Task 3.3 of WP3 could be to support existing donation flows with new value-capture mechanisms for revenue generation as a way to achieve higher financial sustainability.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

As the pilot sits on a key juncture of the Eurasian main bird migratory route, the biodiversity value is particularly relevant due to the presence of iconic bird species such as flamingos. The Rhone Delta Pilot, the other REST-COAST pilot characterised by habitats for flamingos, managed to use this peculiar feature to generate additional revenue streams by establishing partnerships with commercial companies (Française des Jeux) and by creating a digital platform for a donation-based adoption campaign. These and other value-capture models could be considered for implementation in the Sicily pilot.

In addition to tourism-based value-capture mechanisms, other opportunities exist too. In particular, reduction of erosion and flooding risks and improvement in water quality are expected to increase the resilience of local farmers and residents and will be quantified and monitored throughout the duration of the project. These could also represent a promising starting point for Task 3.3. One potential challenge might be that the initiator, Stiftung pro Artenvielfalt, as a non-profit organisation, is not interested in implementing revenue-generating value capture mechanisms, especially if these are meant for third-party profit.

3.8. Arcachon (France)

Introduction

The Arcachon Bay pilot is focused on restoring *Zostera noltii* seagrass meadows in the Arcachon Bay situated at the Atlantic Coast of France. Arcachon Bay faces challenges due to urbanisation, with 70-80% of the coastline being developed, leading to issues such as soil sealing and alterations in water and sediment circulation. Additionally, the presence of various man-made structures such as protective barriers for expanding cities disrupts natural flow patterns in the bay. Another concern is the significant oyster farming industry in the area that provides local employment and economic value but negatively impacts water quality and *Zostera* recovery by affecting water circulation and suitable habitat areas. Furthermore, Arcachon bay is vulnerable to coastal flooding events. The government's awareness of this risk is high following extreme storm events that occurred in 2009 and 2010. Another issue is the increasing need of dredging the navigation channels in the bay, in particular those granting access to the harbour that have been linked to the decline in seagrass population.

Figure 3.12 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are then further detailed in the subsections that follow.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

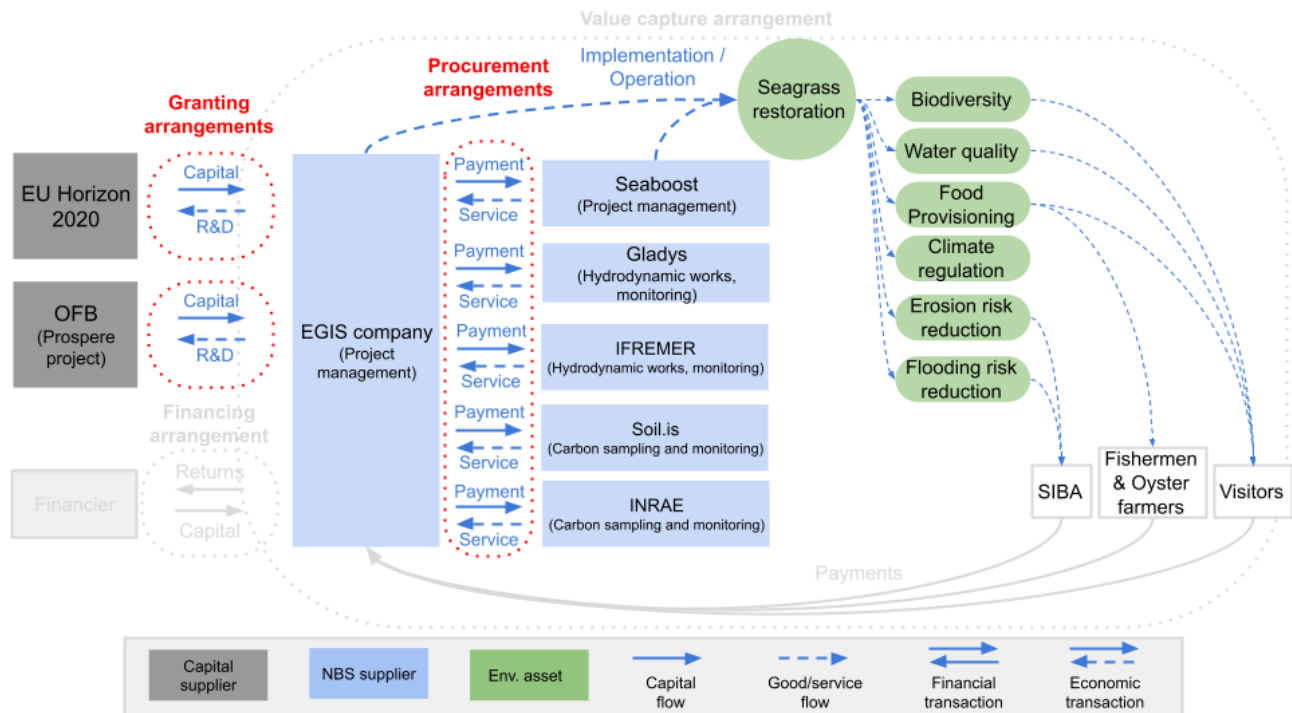


Figure 3.12 Overview of the NBS Business Model in the Arcachon Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

The restoration strategy involves controlling hydrodynamics and is divided into three phases. The first phase involves a small-scale experiment to fine-tune their Roseliere modules. The second phase aims to support *Zostera* recovery on a 1-hectare scale and the final phase involves large-scale restoration across the entire basin. The restoration foreseen within the context of REST-COAST has been aligned with compatible interventions under the Prospere project, another seagrass restoration project jointly delivered by Seaboost and PNMB, the local MPA Manager.

NBS initiator

The NBS initiator for the Arcachon Bay pilot is the EGIS company, although most of the activities are managed by its subsidiary Seaboost, which is specialised on ecological restoration.

Granting arrangements

The restoration activities that are part of the REST-COAST project are entirely funded through grants from the EU Horizon 2020 programme, while the Prospere project is funded through grants from the French Biodiversity Agency (OFP). The complementarity between REST-COAST and its above-mentioned sister project Prospere allowed it to exploit synergies, share resources and achieve greater efficiency.

Financing arrangements

Currently, no financing arrangements have been established.

Value-capture arrangements

No value capture arrangements are currently present.

Procurement arrangements

The EGIS company, the initiator of the pilot, adopted a segmented procurement model for the implementation of restoration in Arcachon Bay. Its subsidiary company Seaboost manages the Pilot and carries out much of the hands-on restoration. Gladys and IFREMER have been contracted for the implementation of hydrodynamic works, modelling and monitoring, while two other companies, Soil.is and INRAE, are in charge of the analysis of sediment samples for carbon sequestration measurements.

Considerations for future WP3 work

In the Arcachon Bay pilot, many of the benefits generated by the restoration activities have been identified along with clear links to the beneficiaries. One opportunity for value capture results from a more healthy seagrass bed, which would help decrease flooding and erosion risks and mitigate surplus sediment depositions inside the navigation channels. These benefits would result in considerable cost savings for the Arcachon Basin Intercommunal Syndicate (SIBA), which is responsible for coastal erosion and defences as well as channel dredging. SIBA is highly interested in these ESS and, should these be demonstrated, would likely be willing to financially support the future proposals for restoration upscaling.

Other ESS delivered by the restoration activities have the potential to lead to additional value-capture arrangements as well as revenue streams. This includes carbon sequestration and storage. The Pilot is already dedicating considerable efforts to demonstrate the positive effect of restored seagrass in terms of carbon (also considering GHG emissions). Should the demonstrated contribution to climate mitigation be of a sufficient size to offset transaction costs, the Arcachon could apply for the issuance of carbon credits through the French public registry “Bas Carbon”.

Other opportunities for value capture are associated with the fishing and tourism sectors. Planned restoration would benefit local fishermen and oyster farmers thanks to the increased fish provisioning and the improved quality of water. One challenge is, however, the difficult quantification of these ESS. These ESS have also been linked to additional recreational activities for tourists and local residents (e.g. angling, bathing). In comparison to climate change mitigation and flood and erosion risk reduction, it is considered more difficult to capture these created values as the lack of data and the turbidity of the water challenges the quantification of these ESS.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Biodiversity credit is also emerging as an opportunity for value capture. A regulatory framework is currently being developed by a dedicated French Governmental unit with modalities and methodologies yet to be defined. These opportunities will be further explored in Task 3.2 and Task 3.3.

One constraint in capturing the values of these ESS is that the Pilot is in marine protected areas (MPA) that restricts available options to generate revenues and profit for private actors. In addition, NBS initiator and other actors involved in implementing restoration are not involved in the governance structures for the management of the MPA and have limited influence over decision-making. This includes, for instance, the establishment of public value capture instruments such as tourism taxes earmarked for restoration. Similarly to other restoration pilots, the Arcachon Bay pilot expressed concerns over rising costs for restoration due to higher inflation rates.

3.9. Nahal Dalia (Israel)

Introduction

Since the 1980s, the biodiversity and ecosystem processes in Nahal Dalia (Israel) have been degrading. The main cause of environmental degradation are the alterations in the water regime and the interruption of river to sea connectivity due to the establishment of a stream dam. Effluent discharges in the natural reserve by local fisheries contributed to water pollution, thus worsening an already dire situation.

Figure 3.13 gives an overview of the current NBS provided, the ESS delivered, the actors involved and the funding and financing arrangements between them. These elements are then further detailed in the subsections that follow.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

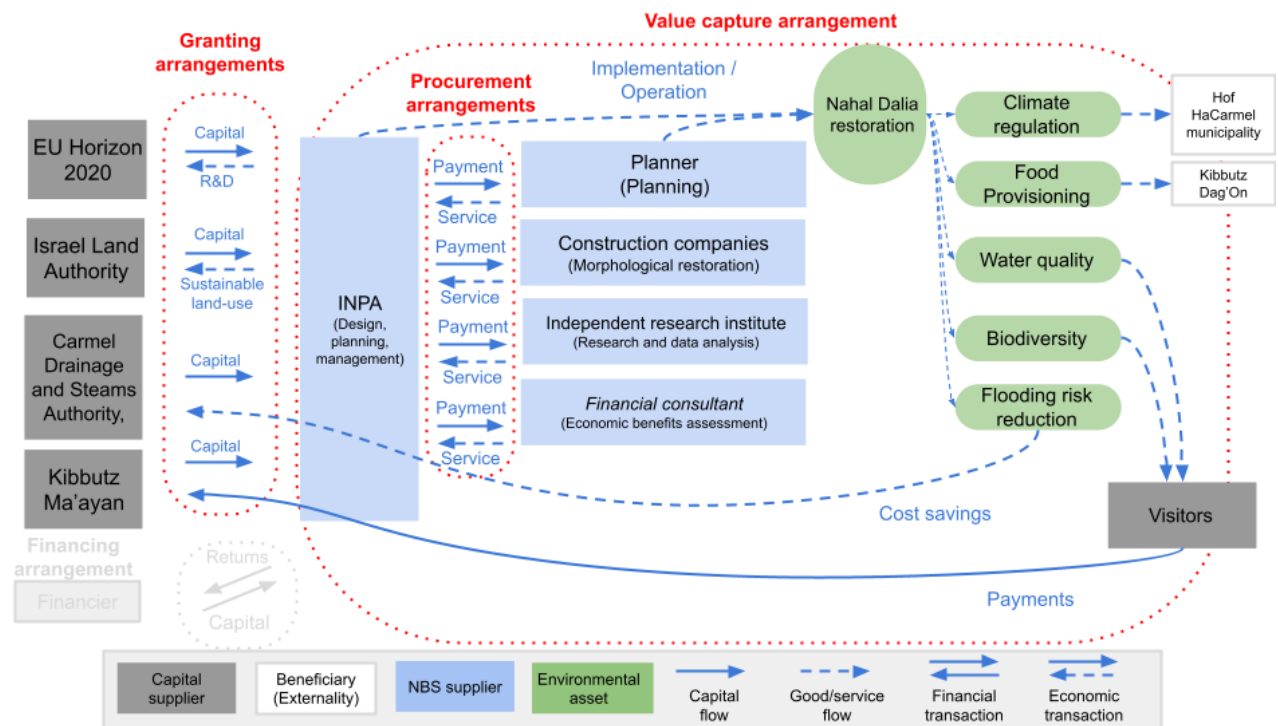


Figure 3.13 Overview of the NBS Business Model in the Nahal Dalia Pilot. Opportunities for establishing future value capture and financing arrangements are shown in grey.

NBS applied

The proposed set of NBS currently consists of several complementary and alternative interventions including:

1. Dam removal and restoration of water flows;
2. Moving the western dam upstream (alternative to 1, but less preferable as it generates only partial connectivity);
3. Water source development (restoring groundwater to nature) - Southern Dipla;
4. Water source development (flood retention/run off) - the Northern Dipla as a floodplain;
5. Stream Bank restoration;
6. Fishpond effluents treatment and reduced water abstraction;
7. Conversion and rewilding low profitable fishponds - extensive (alternative to 6);
8. Macrophytes and sea grass rejuvenation.

The set of NBS interventions can be aggregated into clusters and proposed as potential consecutive steps. For example, the removal of the dam would require the construction of an alternative artificial water reservoir to sustain the operations of the contiguous fishponds.

NBS initiator

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The project is managed by the Israel Natural Parks Authority (INPA), whose mandate is to preserve natural reserves in the country with a specific focus on wetlands. INPA carried out the design and planning of the intervention and it is now responsible for the management of the project.

Granting arrangements

The general budget of INPA is funded and approved by the National Government and part of it is used to fund the restoration pilot. The remaining capital dedicated to the pilot is provided to INPA through granting arrangements with different organisations. The Israel Land Authority provides grants to INPA through its open-areas fund. The Israel Land Authority is a governmental organisation that manages most of the land in Israel, provides services for the transfer of residential and land rights, rezoning, issuance of permits for building improvements, and leases land to agricultural businesses. Additional grants are provided by the Carmel Drainage and Steams Authority, a regional governmental organisation in charge of the rehabilitation of water streams and for the control of floods. As the INPA's slots for applications to the Israel Land Authority's open-areas fund are limited and fully allocated, the Carmel Drainage and Streams Authority allowed the INPA to use some of its available slots to vehicle additional capital from the fund to the project.

The Nahal Dalia pilot also receives grants from the EU through the Horizon 2020 Rest-coast project, which are used for various activities including monitoring, planning, morphological interventions and project management.

Although a formal arrangement is not in place yet, there is an informal agreement with the Kibbutz Ma'ayan Tzvi to financially support the restoration activities. The Kibbutz Ma'ayan Tzvi is a local cooperative focused on agricultural activities and owns the right of using the land of the pilot site for a period of 99 years. Ma'ayan Tzvi is looking for alternative types of activities/solutions driving an improvement/requalification of the land for self-sustainability and profitability purposes.

Financing arrangements

Currently, no financing arrangement has been established nor planned.

Value-capture arrangements

No value capture arrangements are currently in place.

Procurement arrangements

The NBS initiator INPA executes some of the activities on its own (in-house procurement model), but a considerable share of the restoration activities are carried out through subcontracting with different professionals (segmented procurement). These include companies for project planning, construction companies that in different phases of the project realise geomorphological

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

restoration, as well as independent research institutes responsible for monitoring activities. Ma'ayan Tzvi, INPA and the Carmel Drainage and Streams Authority are currently evaluating the possibility to jointly hire a financial consultant for the estimation of the economic benefits that the Kibbutz could derive from the restoration of the area.

Considerations for future WP3 work

In the Nahal Dalia pilot, many of the economic benefits generated by restoration have been identified along with clear links to the beneficiaries. Moreover, the pilot site owner Kibbutz Ma'ayan Tzvi is well positioned to secure the majority of these economic benefits. These are clear favourable conditions to upscale the funding of the project, especially if innovative financial instruments are considered.

These opportunities include water purification as a key ESS due to its multiple benefits and economic value. Increased water quality will make the destination more attractive to tourists and enable biodiversity enhancements and increased fish provisions. The Kibbutz Ma'ayan Tzvi owns a hospitality activity connected to the pilot site that will directly benefit from any increase of touristic value in the area. Water purification will also improve fish provisioning ESS, thus benefiting the local fish ponds run by the Kibbutz Dag'on under a renting contract with the Kibbutz Ma'ayan Tzvi, as well as the neighbouring farmers who rely on local water resources for irrigation purposes.

Another opportunity is the Pilots contribution to flood risk reduction that limits or avoids damages to the fishpond infrastructures and local roads and railways in the event of flooding. The Carmel Drainage and Steams Authority, who funds the pilot through grants, has a strong interest in improving such ESS as it is liable for flooding damages suffered by local stakeholders, and would therefore reduce future costs if flood risks are reduced.

The INPA (initiator) and the Hof HaCarmel municipality are interested in the Improvements to biodiversity and climate regulation as they contribute to their commitments to pursue habitat restoration and climate actions.

Further actors that could be potentially interested in supporting financially the project in the future have also been identified: a local desalination plant could be interested in sponsoring restoration as a way to comply with regulatory standards for environmental impacts. Additionally, a semiconductor company operating in the region recently pledged emission reduction goals and would be interested in acquiring carbon credits from local projects. The Hof HaCarmel municipality is also seen as a potential future partner as it somehow benefits from the project but hasn't been involved yet, at least financially.

In terms of challenges, while the site is owned by the Kibbutz Ma'ayan Tzvi, the fishponds are operated by the Kibbutz Dag'On. The fishpond's activities are to some extent in conflict with the

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

restoration plan, especially with its most ambitious objectives. The implementation of the truly resilient and sustainable management strategy which was envisioned by the pilot initiator may require offering satisfactory alternative sources of revenues to compensate for any forgone income.

3.10. Synthesis of findings across the Pilots

In this chapter, we have described the different financial arrangements in place in the nine REST-COAST Pilots using the NBS Business Model Framework (BMF) as developed in Chapter 2. Table 3.1 comparatively presents the granting, financing, value capture and procurement arrangements currently found or envisaged to be developed in the REST-COAST Pilots. A couple of points are worth noting.

Table 3.1 Overview of current and some envisaged/planned granting, financing, value capture and procurement arrangements in the REST-COAST Pilots.

	Main ESS provided by the NBS*	Granting		Financing arrangements	Value capture arrangements (ESS*)	Procurement arrangements
		Public	Private			
Wadden Sea	RF, RE, WP, FP	EU/National-local government co-granting	Indirect contribution to public funds	-	-	Segmented procurement
Ebro Delta	RF, RE, WP, CR	EU, National government granting, Confederación Hidrográfica del Ebro	-	-	-	Segmented procurement
Venice	RE, WP, FP	EU, Ministry of transports	-	-	-	In-house procurement, segmented procurement for monitoring activities
Vistula Lagoon	RF, FP, CR	EU, National government	-	-	Cost reduction (SM)	DB procurement for construction; Segmented procurement for monitoring activities; in-house delivery for O&M
Foros Bay	RF, RE, WP, FP	EU/National government granting	-	-	-	Segmented procurement
Rhone Delta	RF, RE, WP, FP, CR	EU, French water agency, Regional government granting	Coca-cola, Total, Française des Jeux	-	-	Segmented procurement
Sicily	RF, RE, WP, FP, CR	EU	Stiftung pro Arternvielfalt	-	Visitors' voluntary donations (WP, RE, BD)	Segmented procurement

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Arcachon	RF, RE, WP, FP, CR	EU, French biodiversity office granting	-	-	-	Segmented procurement
Nahal Dalia	RF, FP, WP, CR	EU, Local drainage authority, national land authority granting	Kibbutz Ma'ayan Tzvi	-	-	Segmented procurement

* **Abbreviations Ecosystem Services:** **FP:** Food (fish) provisioning; **CR:** Climate change regulation; **WP:** Water purification; **RF:** Reduction of coastal flooding risk; **RE:** Reduction of coastal erosion risk; **BD:** biodiversity, **SM:** Sediment management.

Pilots differ in terms of the phase of development and implementation they are in. In some pilots, such as the Nahal Dalia and Foros Bay pilots, the implementation of restoration activities has not fully developed yet. In others, such as the Vistula Lagoon and the Rhone Delta pilots, restoration strategies and measures are well defined and already being implemented. This means that the co-development of NBS business models planned in Task 3.3 of WP3 needs to cater for different needs of the Pilots in terms of both facilitating incorporation of innovative business models to support early-stage implementation as well as also structuring up- and out-scaling strategies for the most advanced Pilots.

Lack of funding does not represent a barrier to near-term restoration implementation and pilot projects. Through the Horizon 2020 grants (REST-COAST project) and other granting arrangements, funds for planned restoration in the next few years are secured for all Pilots. Some pilots (Arcachon, Foros Bay) have highlighted how rising inflation rates are increasing the costs of restoration resulting in a possible downsizing of initial ambitions. Given the transnational character of this issue, this will likely affect, to varying degrees, all Pilots.

Additional finance is needed for restoration upscaling. In the context of future restoration plans, and more specifically concerning restoration upscaling plans, some pilots have well-defined objectives and approaches. This clarity has enabled them to identify potential obstacles, particularly in terms of governance. In other cases, such as in Venice and Vistula Lagoon, future developments have not been delineated yet. From a WP3 perspective, this can represent a gap for future work, in particular for the development of tailored business plans. In addition, implementing restoration activities on a larger scale will imply, in several cases, dealing with tensions in spatial planning issues. For example, in the Wadden Sea and the Ebro case, coastal protection requires space, which is currently not sufficient available, as this is used for agricultural practices. Hence, decisions regarding spatial planning are of significant importance for future NBS business models.

The findings across the REST-COAST Pilots confirm what is prominently said in the literature, namely that NBS projects mainly rely on grants from the public sector. Public granting is generally

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

limited in size and only available for relatively short funding cycles. This has been pointed out on several occasions as a barrier to the planning of long-term actions and to a more efficient structuring of procurement. Some of the pilots (Rhone Delta, Nahal Dalia, Sicily, Wadden Sea) have received grants from private actors. Moreover, Pilots have already underscored the difficulties in obtaining supplementary funds and funds for monitoring that are crucial for sustaining and broadening restoration efforts within the existing business models based purely on granting.

Currently, ***none of the REST-COAST pilots have established financing arrangements, nor value-capture arrangements capable of enabling the former.*** Only two Pilots, the Vistula Lagoon and Sicily, have value capture arrangements in place generating cost savings in the former case and some tourism revenues in the later case.

The ***generated values and the associated public and private beneficiaries have been, for the most part, identified.*** This is an important first step as this is a prerequisite for capturing value (i.e. converting value into revenue streams) that in turn is a prerequisite for attracting finance. While values delivered and associated beneficiaries have been identified, there is generally a lack of quantification of the values delivered. Quantitative translation of these values and in particular, resulting potential revenue streams, will be necessary for extending the current business models and deriving business plans as envisaged in Task 3.3 of WP3.

In terms of the ***future potential for value capture, most Pilots rely on a small set of values related mainly to tourism, carbon sequestration, and the use of sediment.*** This is not surprising as these are those values most easy to quantify and capture, hence these lend themselves most easily to the development of business models that attract external finance. Conversely, other values such as the increase in fish stock (e.g. in Rhone Delta, Arcachon Bay, Vistula Lagoon, among others) are much more difficult to quantify. Furthermore, NBS interventions are often planned with a narrow focus on specific issues, implying that other potential benefits are often overlooked. In all cases, it seems that broadening the types of ESS and values considered in developing business models for NBS constitutes an opportunity to attract more funding and finance to NBS.

At the same time, ***broadening the types of ESS and values considered in developing business models for NBS is also a challenge*** because a wider array of actors and beneficiaries need to be brought together and contractual arrangements distributing costs, benefits and risks need to be found. This is further exacerbated through inherent trade-offs between the different ESS NBS deliver leading to associated conflicts of interests among the beneficiaries of different ESS involved. This highlights the need for NBS project development to engage with all beneficiaries and all other stakeholders as well as for appropriate governance structures that help to mitigate such conflicts. This highlights the importance of WP5 of REST-COAST focusing on governance.

A related ***challenge is to motivate stakeholders and in particular, beneficiaries, to move from pure public funding of NBS to raise additional resources through value capture and private***

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

finance. As we have seen, e.g. in the cases of the Vistula Lagoon and Foros Bay, stakeholders have been traditionally reliant on public grants to fund restoration efforts, and they tend to perceive alternative business models based on beneficiary payments as either abstract or as more resource-intensive. On the other hand, in the Rhone Delta and Sicily pilots the preference for continued reliance on public funding is due to a belief that this best reflects the public good-oriented nature of restoration projects.

A special role in the diversity of values associated with coastal NBS is taken by sediment and this is also something that makes coastal NBS different from those in other domains such as urban, agriculture and forest. Coasts and associated rivers are dynamic places in that large amounts of sediment are mobilised, transported and deposited both naturally (through erosion and accretion) and artificially (through dredging, dumping and nourishment). Hence, an array of different positive and negative values are attached to benefits and disbenefits of coastal sediment with generally large trade-offs being involved. In these contexts, sediment-based NBS together with associated funding and financing arrangements have the potential to redistribute sediment in such a way that conflicts of interests are mitigated. For example, a sediment that needs to be dredged in order to keep shipping routes and harbours deep enough can be used to restore salt marshes and mud-flats that would otherwise drown with sea-level rise.

Regarding procurement, all Pilots follow rather conventional practices for public procurement. Most Pilots implement restoration through segmented procurement models with separate contracts with different entities for each type of restoration activity. In some cases, when the NBS initiator had sufficient resources in terms of budget, capacity and experience in restoration projects, in-house delivery of certain implementation activities was also used (Venice, Vistula Lagoon). In some instances, the reliance on grants tied to relatively short-term funding cycles was the cause of further segmentation of procurement, since many of the projects are “pilots” where knowledge development, experimentation and evidence building is targeted, most of the work is conducted outside the regular public procurement policies and carried out in project partnerships and collaborative agreements.

Chapter 4 Supply side of NBS finance

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4.1. Sustainability in investment strategies

As previously mentioned, NBS and the restoration of coastal ecosystems are planned in such a way to provide multiple benefits, including mitigation and adaptation to climate change, improving the resilience and ecological status of ecosystems, supporting the economy and livelihoods of local communities. As such, they are closely related to the concept of sustainability. Sustainability, in economics, is understood as the avoidance of depletion of natural resources, in such a way as to maintain their availability to future generations as well as the overall ecological balance. This definition is often expanded to also include social and economic resources. NBS can be characterised and proposed as sustainable investments through a range of environmental indicators (e.g. carbon sequestration, water quality, biodiversity), social indicators (e.g. participation of local communities, new employment opportunities, public health and wellbeing), economic indicators (e.g. cost-effectiveness, return on investment, projected revenues), and governance indicators (e.g. stakeholder engagement, transparency). Multiple sources confirm the growth of the market for sustainable investments and demonstrate the growing demand and supply for investment products that incorporate environmental, social and governance (ESG) data into their investment decisions (Forum Nachhaltige Geldanlagen e. V., 2022; Micilotta, 2018). Nevertheless it should be mentioned that according to the Dasgupta Review, it is difficult to estimate the concrete size of assets related to ESG due to a lack of consistent definitions. They find that global estimates range from US\$3 trillion to US\$31 trillion (HM Treasury, 2021).

4.1.1 Financial and non-financial returns

Sustainable investors aim for achieving viable financial returns while incurring appropriate levels of risks. The industry association Eurosif states that next to benefitting society, the main aim of sustainable investments is “to better capture long term returns for investors.” (Sakuma-Keck, 2021, p. 11). Also various scholars find that pecuniary factors are important drivers for sustainable investments (Gutsche et al., 2020; Riedl and Smeets, 2017; Weber, 2014).

There are various studies analysing the relationship between financial and ESG performance. Friede et al. (2015) succeeded in aggregating findings from more than 2000 empirical studies,

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

covering all relevant review studies on sustainability and financial performance published until the end of 2014 and concluded that 90% of the studies find a non-negative relationship between ESG factors and financial performance and that the majority (47,9% in vote-count studies and 62,6% in meta-analyses) of the studies even yield positive findings. The findings support that by incorporating sustainability considerations in investment decision making, sustainable investors are able to achieve sufficient financial returns and may even achieve additional financial returns compared to conventional investors. Or in the words of Friede et al, the “the business case for ESG investing is empirically very well founded” (Friede et al., 2015, p. 210).

There is multiple academic research demonstrating that also non pecuniary factors are drivers of sustainable investments and that consequently the utility function of investors is shaped by both, financial as well as non-financial return (Bollen, 2007; Gutsche et al., 2020; Nishino et al., 2014).

Scholars expect that this non-financial return is driven by a positive emotional effect that can be achieved through investments in line with moral values and pro social preferences (Gutsche et al., 2020; Hafenstein and Bassen, 2016; Riedl and Smeets, 2017). Hafenstein and Bassen summarise academic literature and find that there are sustainable investors “who do not want to generate profit by investing in companies that behave unethically or immorally” other sustainable investors on the other hand derive their positive feelings from “supporting a `good` thing, acting in a socially responsible manner or contributing to social change” (Hafenstein and Bassen, 2016, pp. 2–3). Empirical studies confirm that individual psychological factors and social values - e.g. solidarity, perception of long-term profitability, environmental values and political preferences , sense of appropriateness - play a role in financial decision-making (DeBondt et al., 2010), particularly in the context of sustainable investments (Riedl and Smeets, 2017). Notice how there may be trade-offs between different types of financial and non-financial benefits, and the willingness to forego financial returns in exchange of more incisive environmental and social impact varies between investors and types of investors - individual investors, philanthropists, institutional investors, financial institutions -. Delsen and Lehr (2019) argue that in post-industrial societies, where socio-economic growth has developed for a long period of time, individuals attribute increasing importance to post-material values, i.e. the fulfilment of non-material needs, which then results in stronger preferences for green investments.

4.1.2 Classification and impact

Academic scholars report great heterogeneity not only within the strategic dimension of sustainable investments, but also when it comes to general classifications of sustainable investments (Busch et al., 2021; Sandberg et al., 2009). Figure 4.1 showcases the different sustainable investment strategies that are applied and used by Eurosif to categorise the market (Micilotta, 2018).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

ESG integration	The systematic and explicit inclusion by investment managers of environmental, social and governance factors into financial analysis.
Corporate engagement & shareholder action	Employing shareholder power to influence corporate behaviour, including through direct corporate engagement (i.e., communicating with senior management and/or boards of companies), filing or co-filing shareholder proposals, and proxy voting that is guided by comprehensive ESG guidelines.
Norms-based screening	Screening of investments against minimum standards of business or issuer practice based on international norms such as those issued by the UN, ILO, OECD and NGOs (e.g. Transparency International).
Negative/exclusionary screening	The exclusion from a fund or portfolio of certain sectors, companies, countries or other issuers based on activities considered not investable. Exclusion criteria (based on norms and values) can refer, for example, to product categories (e.g., weapons, tobacco), company practices (e.g., animal testing, violation of human rights, corruption) or controversies.
Best-in-class/positive screening	Investment in sectors, companies or projects selected for positive ESG performance relative to industry peers, and that achieve a rating above a defined threshold.
Sustainability themed/thematic investing	Investing in themes or assets specifically contributing to sustainable solutions - environmental and social - (e.g., sustainable agriculture, green buildings, lower carbon tilted portfolio, gender equity, diversity).
Impact investing and community investing	Impact investing Investing to achieve positive, social and environmental impacts - requires measuring and reporting against these impacts, demonstrating the intentionality of investor and underlying asset/investee, and demonstrating the investor contribution. Community investing Where capital is specifically directed to traditionally underserved individuals or communities, as well as financing that is provided to businesses with a clear social or environmental purpose. Some community investing is impact investing, but community investing is broader and considers other forms of investing and targeted lending activities.

Figure 4.1 Main approaches to sustainable investment and their related definitions (GSIA, 2019).

Academic scholars as well as sustainable investors associations however increasingly mention the importance of the actual contribution of sustainable investments to a more sustainable economy, regardless of the used investment strategy (Busch et al., 2021; Kölbel et al., 2020; Sakuma-Keck, 2021).

Busch et al. note that this reorientation of sustainable investment to the actual impact of investments is a significant change, a shift in the sustainable finance landscape "from the business case of sustainability to the sustainability case of business." (Busch et al., 2021, p. 32).

Therefore, recently, Busch et al. (2022), in collaboration with Eurosif, published a white paper on the development of a new classification system for sustainable investments. They place the ambition of sustainable investment to actively support the transition towards a more just and sustainable economy at the centre of the sustainable investment classification. Such a transition-focused classification for sustainable investments and the consequent shift towards actual real world-impact of sustainable investments is emphasised to be fundamental to express the full potential of capital markets in supporting the transition to a net-zero emission economy (Busch et al., 2022; Sakuma-Keck, 2021). Scholars emphasise that when evaluating the impact of investors, i.e. their contribution to a more sustainable economy, it is important to distinguish between the investor's impact and the company's impact in the real economy (Busch et al., 2021; Kölbel et al., 2020).

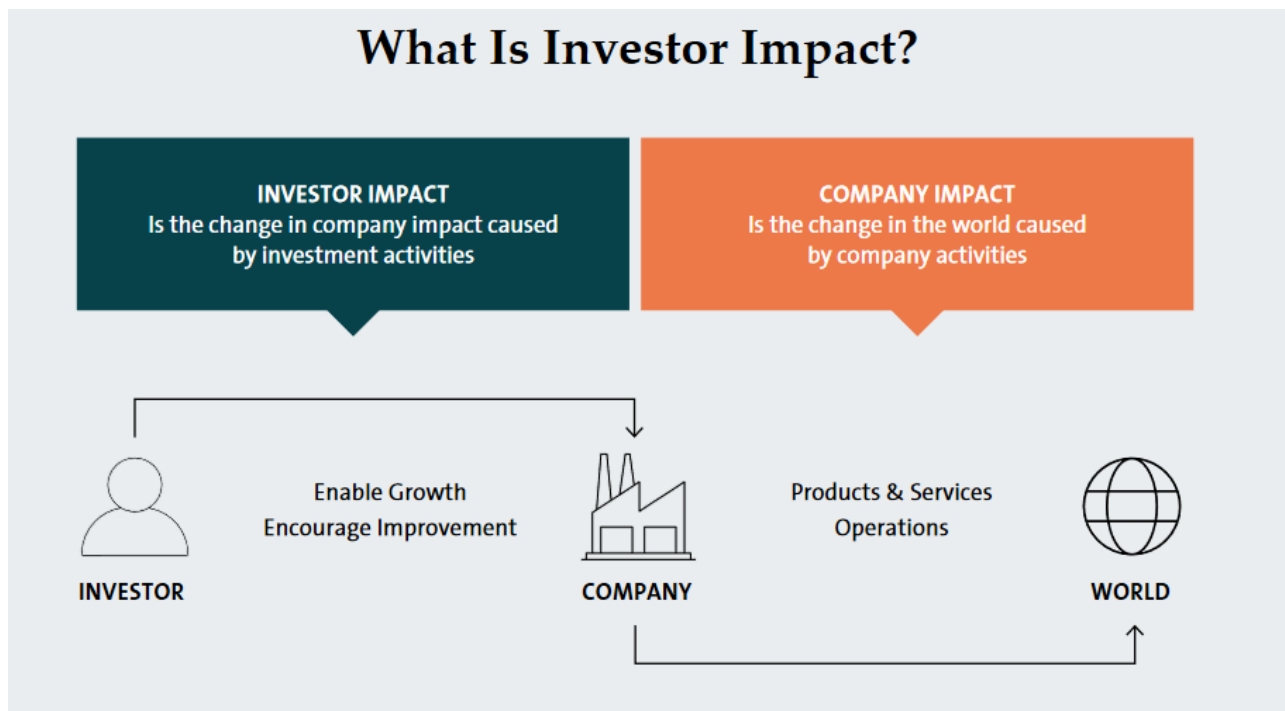


Figure 4.2 Distinction between the impacts of investors and companies (Heeb and Kölbel, 2020).

Figure 4.2 shows the distinction between the real economy, which actually interacts with the environment, and the financial sector, which influences entrepreneurial activity in the real economy. Accordingly, when talking about investor impact, we really need to determine what changes the investment activity has caused in the way the company interacts with the environment. Consequently, scholars emphasise the need for a transformative nature of sustainable investments in order to legitimately claim to achieve sustainability impacts.

The potential of NbS to contribute to achieving net-zero targets and SDGs, as well as their increasing perception as a means to diversify and transform businesses, is highlighted by several scholars (Kooijman et al., 2021; Seddon et al., 2020a, 2020b). What remains to be seen is whether the recent growth in investor interest in sustainable and green financial products is matched by - or could lead to - a comparable increase in financial flows towards NBS projects.

4.2 Market review for NBS

Global climate finance sources have been constantly increasing in recent years. The CPI's 2021 global landscape of climate finance illustrates how, despite recent rapid growth rates, the current supply for climate finance is far below the level required to meet the international climate objectives for 2030 and to avoid the worst consequences of climate change (CPI, 2021). Moreover, most of the finance mobilised for the fight against climate change is currently directed towards

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

mitigation projects, while the support for adaptation efforts is rather marginal (Figure 4.3).

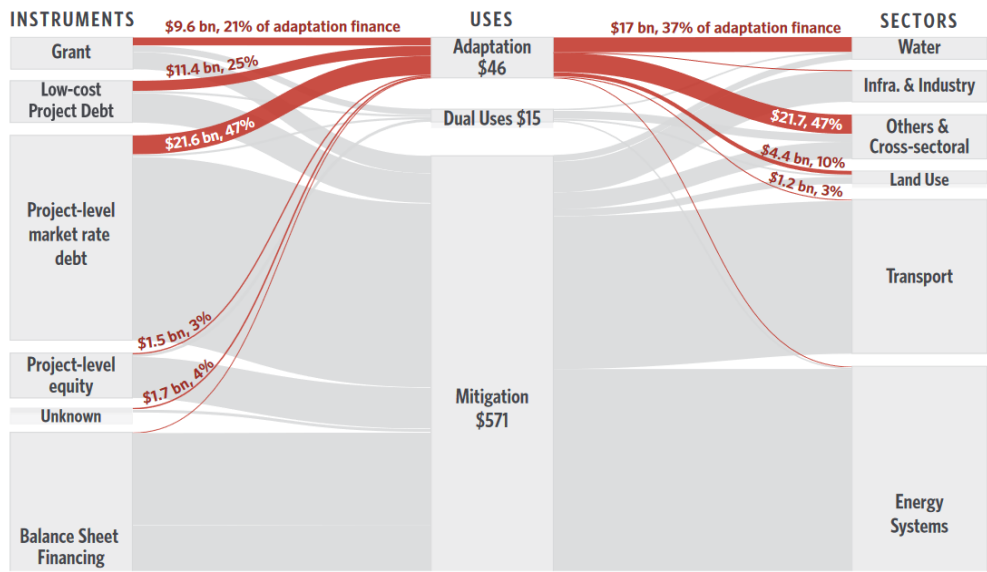


Figure 4.3 Adaptation finance by source and instrument (CPI 2021).

The financing of climate change adaptation is smaller - 7% of total climate finance -, grows slower - 53% increase between 2017 and 2019 -, and is more reliant on the public sector when compared to mitigation finance (Figure 4.4).

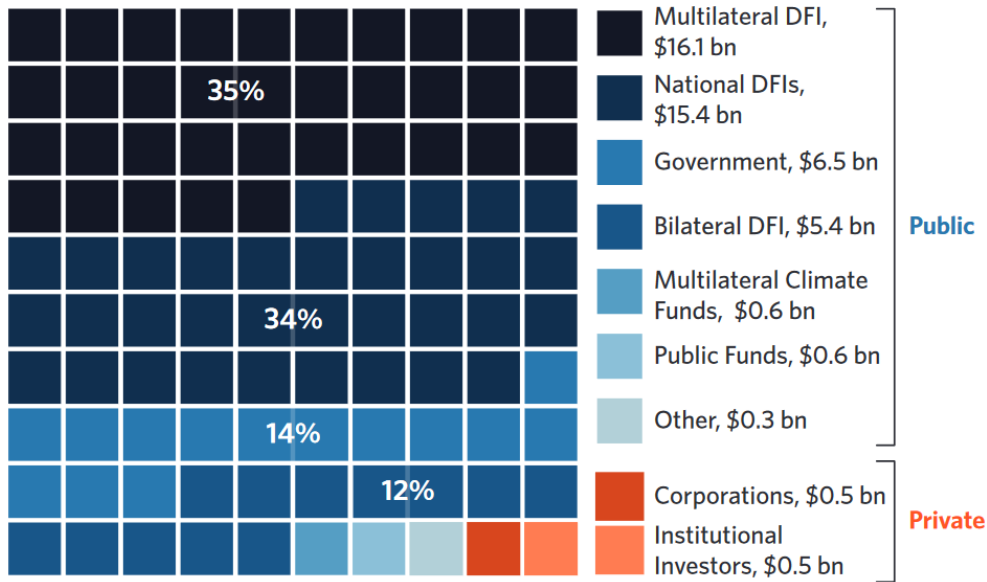


Figure 4.4 Sources for adaptation finance (CPI 2021).

The same can be said for the subcategory of NBS finance, which is almost exclusively supported by public funders (UNEP, 2021). Swann et al. (2021) estimates global international public granting for

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

NBS adaptation to be as low as 0.6-1.4% of total climate finance flows - 1.5-3.4% of total public climate finance flows and 9% of adaptation finance -. The contributions of the private sector to adaptation NBS are mostly in the form of investments for the sustainability of the supply chains and for environmental offsets, less often they consist in philanthropic and impact investment initiatives (UNEP, 2021). These figures are approximative as current datasets on NBS and adaptation investments are not sufficiently granular to precisely assess current levels of investment (Swann et al., 2021). Adaptation measures are often embedded in larger interventions or integrated into wider development scopes (Ward and Caldwell, 2016), and therefore often labelled under other related categories (Tall et al., 2021). The tracking of private investments in NBS faces additional barriers, as transparency in accounting is limited by voluntary reporting schemes, confidentiality-based constraints and lack of impact metrics (CPI, 2021; Tall et al., 2021).

As recent financial commitments and efforts by the public sector only amounted to insufficient rates of growth in adaptation finance, unlocking the participation of the private sector in this sense would be a firm step towards closing the finance gap. According to the World Bank Group (2021) a precondition for this to happen is the establishment of supporting frameworks of policies and incentives. Adaptation bonds and other labelled financial instruments are already being issued by corporations - in particular in the real-estate and forestry/paper industries - (Tuhkanen, 2020).

4.2.1 Supply of finance from supranational funds and multilateral development banks

The European Structural and Investment Funds (ESIF) are the main investment instrument of the EU and provide several opportunities for the granting of NBS projects. The European Regional Development Fund (ERDF) - which includes Interreg for transnational projects - and the Cohesion Fund (CF) are particularly suitable, as a considerable portion of their total investments are earmarked for the development of sustainability-, climate- and resilience-focused projects. Projects are eligible for ESIF funds only when they meet a set of criteria and they are in line with the hosting member state's operational programme investment priorities. Moreover, these grants require co-funding, which means that projects cannot be funded entirely by the EU funds. The ESIF also includes the European Agricultural Fund for Rural Development (EAFRD) and the Just Transition Fund (JTF), which respectively support investments in rural development - including sustainable management of natural resources and climate action - and in the green transition of member states.

The EU also provides grants for NBS projects through the co-funding Program for the Environment and Climate Action (LIFE) and, for those with a research or innovative component, the Horizon Europe programme.

Multilateral development banks (MDB) are supranational institutions that provide development aid and cooperation, including those for climate and restoration projects, through impact development debt and equities, grants and other financial instruments. They often support

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

economic and social progress in developing countries, but development and cohesion within Europe is also targeted.

The largest MDB in Europe is the European Investment Bank, an autonomous body within the EU institutional framework which finances investments for climate action and environment, essential infrastructure, communications in Europe and in developing countries. The EIB is one of the most important public-sector institutions lending in the PPP sector, and its InvestEU - previously known as Natural Capital Financing Facility - program supports a variety of biodiversity and nature-based adaptation projects (EIB, 2022). Another major MDB operating in Europe is the European Bank for Reconstruction and Development (EBRD), which aims to become a majority green bank by 2025. In a recent statement signed at COP26 in Glasgow, the EBRD and the EIB pledged to “step up nature financing and efforts to mobilise or leverage private finance for investments in nature” and “to support countries to secure high ambition for implementing nature-based solutions” (World Bank Group et al., 2021, p. 5). Grants funded through the European Economic Area (EEA) by Iceland, Liechtenstein and Norway are also available for environment, energy, climate change and low carbon economy projects in eastern European countries, while several financial instruments supporting climate action and environmental sustainability across Europe are issued by the EIF with a focus on innovation and entrepreneurship. NBS projects can also be financed through global funds for climate adaptation such as the Green Climate Fund and the Global Environment Facility.

4.2.2. Supply of finance from the private sector

The interest of companies for sustainable investment is surging as major private sector players are more and more interested in developing and implementing sustainable business models. Despite the emergence of such trends and the clear prospect of growth opportunities for sustainable businesses ahead of the global transition to a net zero economy, the involvement of corporate investors in adaptation finance is still an emerging phenomenon.

With regards to NBS investment in particular, this is even more so the case, for reasons that have been already discussed. Nevertheless, broad private-sectors initiatives supporting environmental protection and investments in natural capital are increasingly common (e.g. Business for Nature, AgWater Challenge, Act4nature). This is reflected in actual corporate NBS investments, which consists mainly in investments for sustainable supply chain and offsets, to a lesser degree in impact investments (UNEP, 2021). Funding reforestation and other carbon-offsetting projects are among the most prevalent ESG measures of high carbon emitting companies in sectors such as aviation and oil/gas production. Water utilities frequently issue green and other sustainability-linked bonds to reduce risk and improve their supply chain cost-benefit profile, including through freshwater NBS (GPC, 2021). Companies with high water footprints - food and beverage, power generation, mining etc. - are exposed to water scarcity risks and have offset the impact of their water consumption through restoration of natural river flows and hydrologic connectedness. Real estate

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

and forestry - including paper - companies can also be considered as potential suppliers of finance for NBS, as most of corporate adaptation-related green bonds are issued within these sectors (Tuhkanen, 2020).

Institutional investors such as pension funds, insurance companies and investment firms are increasingly aligning their portfolios towards net zero targets and, due to their long-term, real-asset-oriented investment strategies, recognize growing opportunities in large-scale NBS projects with long-term lifecycles. Although philanthropic foundations have only dedicated marginal attention to climate objectives in comparison to other social challenges, in recent years their granting has increased consistently (Roeyer et al., 2021). Despite the primacy of granting for climate mitigation, hands-on conservation approaches to biodiversity and ecosystem conservation are also widely supported by the foundations' environmental programs (EFC, 2021).

New means to deliver finance to NBS projects are brought by numerous European crowdfunding platforms specialised in sustainability- and climate-related investments. Although currently the focus is on small scale projects in the renewable energy sector, the growth of the crowdfunding market, coupled with past successful implementations of this type of instrument for civic engagement in NBS granting (Sedlitzky and Franz, 2019) , suggest a future growth in relevance of this type for NBS projects (Nigam et al., 2018). Among the most active EU-based green crowdfunding platforms we find Greencrowd (Netherlands), Bettervest (Germany), Oneplanetcrowd (Netherlands), Lendosphere (France), ZonnepanelenDelen (Netherlands), Durzaam Investeren (Netherlands), Lumo (France), GreenXmoney (Germany), Abundance (UK) and Rockets Green (Austria).

Chapter 5. Review of available frameworks and guidelines for developing funding and financing arrangements for NBS

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5.1 Introduction

Analysing or identifying the financial arrangements of an NbS project, that has already been implemented, is one thing. Co-designing and co-developing the funding and financing arrangements in order for an NbS to be implemented is another. Numerous frameworks, guidelines and reports have been developed over the recent years to provide different actors and stakeholders with guidance on how to co-develop funding and financing arrangements for NbS projects, or other types of infrastructural adaptation or mitigation projects. Overall, such guidelines touch upon different types of funding and finance that could be available, how and when to approach different financiers, under which conditions finance can be provided, and what steps should be taken to design an appropriate financing strategy. Furthermore, barriers and enabling conditions are also extensively addressed in these documents as well as lessons learned.

One core aspect of WP3 is the co-development of funding and financing arrangements for the (upscaling of the) Pilots in REST-COAST. For this purpose, it is important to also take stock of what has already been developed in terms of approaches and what has already been tested (lessons learned). We intend to take guidance from the methodological frameworks and guidelines that have been developed in order to avoid repetition of work and to make use of the knowledge already developed. This knowledge is supplementary to the practical and methodological experience already present within the WP3 team and the other REST-COAST project partners. Co-developing financial arrangements for NbS, especially at scale, is still a matter of exploring and pioneering.

Thus, this chapter is primarily a review of guidelines, not a review of instruments or tools, and is meant to provide a foundation for the possible and essential steps to take for the collaborative development of fit for purpose business models, financing strategies and business plans in the Pilot cases. This review is not meant to be exhaustive, but rather it is meant to cover a range of different documents, within different domains and from different (corporate) authors. This chapter will firstly discuss the methodological approach taken for this review activity, followed by an

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

analysis and discussion of some of the document characteristics. Next, a cross-comparison between the reviewed documents leads to the identification of a number of building blocks and guiding principles.

5.2 Methodology

A selection of 15 relevant documents has been extensively reviewed. As previously indicated, the review is not meant to be exhaustive, but rather an exploration covering a broad range of different documents. Within the Grant Agreement reference was made to a range of frameworks that have been developed in recent years that provide important input for this, namely the i) FFWS developed in NAIAD, ii) the green business model guidelines and typologies developed in GREENWIN, iii) the IUCN work on financing NbS, iv) the EIB guide, and v) the MEdPan work for Marine Protected Areas. These initial documents were considered to be a solid starting point as they were identified as important state of the art by scientific experts and expert practitioners in the field. After the initial stock taking it was decided to expand the number of documents to include more variety to allow for:

- Cross sectoral learning of the experiences in developing financing strategies for adaptation and mitigation measures (more broadly than ecosystem restoration/NbS)
- Considerations of a broader set of potential interventions – including policy interventions – to achieve the desired (funding for) restoration outcomes and the interactions between policy and structural interventions
- Learning from the existing experiences outside of the coastal zone – such as urban and forestry
- A diverse range of authors/commissioners - including public and private/financial sector documents.

Summarising, the documents have been selected with the objective to capture a broad range of different perspectives, experiences and recommendations. A combination of strategies was used to expand the selection of documents reviewed, namely a search on google and scopus using combinations of a number of keywords:

- guidelines/frameworks,
- funding/financing,
- strategies/arrangements,
- nature/NbS/ ecosystem restoration, and
- coastal/estuarine.

Further, a backward snowballing approach (going through the references of documents already selected) and further recommendations from experts. The majority of documents reviewed here

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

are practitioners documents (grey literature) as these are the documents that capture the dimension of interest in this review, namely the process/approach of financing NBS. Some documents have a scientific basis or have an associated publication in a scientific journal. After these 15 documents we saw a certain degree of saturation in the analysis in terms of what is needed as building blocks / steps to develop a finance strategy. Table 5.1 presents the reviewed documents in relation to the search criteria

Table 5.1 Descriptives of the sample of reviewed documents, based on the selection criteria

Document characteristics	Number of documents from sample
Domain: NBS, biodiversity, ecosystem restoration and conservation / Climate adaptation, mitigation and resilience (not focussed on NbS)	10 / 5
Focus on Coastal zones /Non-coastal zones	3 / 12
Also considering policy interventions (alongside structural/engineering interventions)	8
Commissioned by public sector /financial sector / NGO / Jointly (two or more sectors)	8/3/1/3

The final list of documents considered in this review is presented in table 5.2., including the document number and abbreviation to be further used throughout this chapter, the publication date, the domain of application, the (corporate) authors, and the funding sources that were identified. Appendix 1 contains a short summary of each reviewed document and an important quote and visual from the document, capturing the essence of the documents in relation to this review.

Table 5.2 Overview of reviewed documents, ordered by year of publication

Doc#	Abbreviation	Title	Published	Domain of application	Authors (Corporate)	Commissioned /Funded by
1	FCC	Financing nature-based solutions for Coastal protection – <i>A practical review of blended finance approaches with carbon credits from blue carbon sources</i>	2022	Nature-based solutions for coastal protection	Eiselin et al. (IUCN & Wolfs Company)	Netherlands Enterprise Agency
2	FFWS	Handbook for the Implementation of Nature-based Solutions for Water Security. - <i>Guidelines for designing an implementation and financing arrangement</i>	2021	Nature Based Solutions for Water security	Altamirano et al. (Deltares)	European Union - Horizon 2020

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

3	EPI	Enabling private investment in climate adaptation & resilience – <i>Current status, barriers to investment and Blueprint for Action</i>	2021	Climate Adaptation and Resilience	Tall et al., (World Bank Group (WBG) & Global facility for disaster risk reduction and recovery (GFDRR))	See corporate authors
4	LBIN	The Little Book of investing in Nature – A simple guide to financing life on earth	2021	Financing biodiversity conservation	Tobin-de la Puente, J. and Mitchell, A.W. (Global Canopy)	Global Canopy, supported by Agence Française de Développement, Cornell Atkinson Center for Sustainability, Credit Suisse, IDH - the sustainable trade initiative, Mirova, UNDP BIOFIN, WWF, and the German Federal Ministry for Environment, Nature Conservation and Nuclear Safety
5	SFN	State of Finance for Nature – <i>Tripling investments in nature-based solutions by 2030</i>	2021	Public and Private Investment in Nature based solutions	United Nations Environment Program (UNEP)	UNEP, Federal Ministry for Economic Cooperation and Development (Germany), Ministry of the Environment, Climate and Sustainable Development (Luxembourg)
6	UFF	Why ‘blended finance’ could help transitions to sustainable landscapes: <i>Lessons from the Unlocking Forest Finance project</i>	2019	Forest Finance	Rode et al.	International Climate Initiative (IKI)
7	NbS-BMC	Nature-Based Solutions Business Model Canvas Guidebook	2019	Business models of Nature-based solutions	Siobhan McQuaid, Trinity College Dublin & Horizon Nua	European Union - Horizon 2020 program
8	IN	Investing in Nature: <i>Financing conservation and Nature-based solutions</i>	2019	Nature conservation and Nature-based solutions	European Investment Bank (EIB)	European Commission, EIB
9	GBM	A short guide to developing green business models	2018	Business models for Green businesses	Antal, I. and Burrows, B. (The Ground_up centre)	European Union - Horizon 2020 program
10	Lit-rev	Mobilizing private finance for coastal adaptation: A literature review	2017	Public and private investment in coastal adaptation	Bisaro, A. and Hinkel, J., (Global Climate Forum (GCF))	European Union - Horizon 2020 program
11	CC	Capitalizing conservation - <i>How conservation organisations can engage with investors to mobilize capital</i>	2017	Investments in conservation, and sustainability more	Clarmondial AG	WWF
12	CFin	Conservation Finance – <i>From Niche to Mainstream: The Building of an Institutional Asset Class</i>	2016	Conservation finance	Credit Suisse AG and McKinsey Center for Business and Environment	See corporate authors

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

13	ESO	Acting on Ecosystem Service Opportunities - <i>Guidelines for identifying, selecting and planning economic instruments to conserve ecosystems and enhance local livelihoods</i>	2015	Conservation and sustainable development	Rode, J. and Wittmer, H. (Helmholtz. Centre for Environmental Research GmbH)	European Union, Thai Government, German Government
14	FS	Keep it Fresh or Salty - <i>An introductory guide to financing wetland carbon programs and projects</i>	2014	Wetland carbon conservation and restoration	Herr et al. (IUCN, Conservation International, Wetlands International)	Sustainable Peatlands for People and Climate project, financed by Norad, contributions from the GEF Blue Forest project, Blue Carbon Initiative
15	CCF	Catalyzing Climate Finance - A Guidebook on Policy and Financing Options to Support Green, Low-Emission and Climate-Resilient Development	2011	clean energy, mitigation and adaptation technologies	UNDP	See corporate authors

This review of guidelines is organised through two objectives. The first objective is to develop a further understanding of the types of documents that have been developed. This first objective tackles questions like *who are the main stakeholders addressed, what specific challenge is being addressed or discussed, and how is the information presented*. This first objective can be thought of as generating a deeper understanding of the typology and characteristics of the documents reviewed. For WP3 it is of importance to understand what has already been developed and for who, in order to avoid repetition of work, to make use of the knowledge already developed, and to contribute to the field by adding to the existing body of work.

The second objective, essentially the main objective, is to derive a set of *building blocks* from the documents reviewed that form the foundation for the further work in WP3. As there are several different approaches and steps defined in the different documents, this activity aims to synthesise this information through a cross comparison. These building blocks capture the different elements - such as the type of data needed, or the activities and analyses that should be conducted - discussed in the reviewed documents which are needed to create a financing strategy for the pilot projects in REST-COAST (WP3, Task 3.3).

The first focal point of the review is to generate a deeper understanding about the characteristics of the documents and what they contain. As mentioned in the introduction, the first objective of the review is to generate a deeper understanding of the typology and characteristics. To achieve this the following questions are addressed:

- *Who are the main stakeholders (target audience) addressed?*
- *What are the specific challenges or objectives being addressed?*
- *How is the information presented?*

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

After starting the review targeting the above questions, new insights lead to an additional question, namely *How do these different documents relate to one another (or not)?* This question was derived from the fact that all the documents address the challenge of developing financial arrangements for NbS, yet, all the documents approach this in a different way. In other words, this additional question is about understanding the “bigger picture” and therefore reveals the connection between the project level challenges - “financing green” - and the institutional conditions leading to an enabling environment - “greening finance”. As this is mostly subject for further work (Task 3.4) this question is not extensively addressed here but it can rather be seen as an initial pragmatic exploration.

The second focal point of this review is to generate an understanding, based on synthesising the different documents, around what is necessary to obtain or do to develop a financing strategy. This information can be relevant for different projects, including the NBS pilots in RESTCOAST. Thus, whilst the first objective mostly considered the typology or form of documents, this second objective is more specifically targeting the content that needs to be addressed to develop a financing strategy. This is done based on a systematic identification of the methodological steps and/or activities that were identified and presented in the different documents. Similar steps from different documents were then clustered and aggregated into building blocks.

5.3 Results: Document Typologies

In this section the results of the first part of the review are presented. At the end of the section a summarising table (Table 5.3) can be found presenting all the findings that are addressed and discussed per (sub)question here.

Who are the main stakeholders (target audience) addressed?

Most of the documents contain an explicit mentioning of the target audience addressed by the authors. Logically, this is strongly connected to the objectives of the document considered. Figure 5.1 shows the range of different audiences that have been targeted by the reviewed documents. They have been categorised into six groups, namely public sector, financial sector, corporate sector, not for profit sector, NbS “implementers” and academia. There is some overlap between these categories but for clarity of the visual they have only been mentioned once. Noticeable is that several of the documents target a combination of different, cross-sectoral, stakeholders simultaneously, signalling that different sectors play a role and signalling the need to collaborate across the sectors in addressing the challenge of financing NbS.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

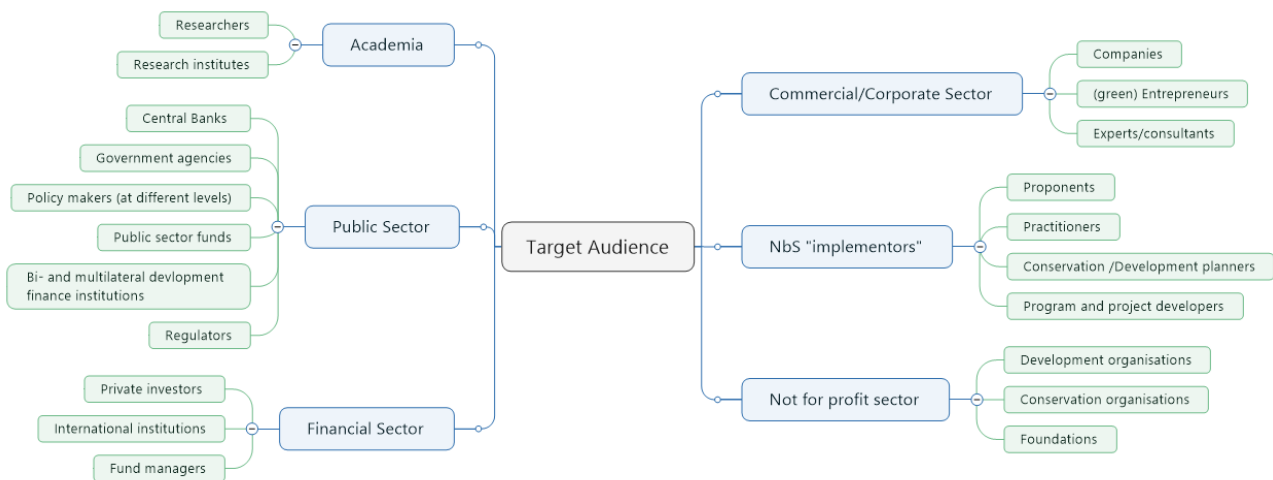


Figure 5.1 Overview of main target audiences in the reviewed documents

What are the specific challenges or objectives being addressed?

Most of the documents also explicitly describe their objectives. From all the objectives we have identified three overarching objectives, and some specific underlying goals. This is presented in figure 5.2 The overarching objectives, which capture the objectives of all the different guidelines, are i) to boost or upscale the implementation of restoration activities or NbS, ii) to unlock other sources of finance to contribute to these activities, and iii) to set in motion cross sectoral and transdisciplinary approaches.

These objectives also implicitly identify the current assumptions or gaps that need to be addressed to enable progress in addressing the challenge of financing NbS. For example, the objective to align private and public stakeholder interests implies that their interests are currently not aligned. Several of these objectives also signal a capacity building need. A learning process is needed to accomplish several of the objectives in order for the stakeholders involved to understand the different fields, processes, sectors and interests involved in addressing the challenge of financing NbS.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

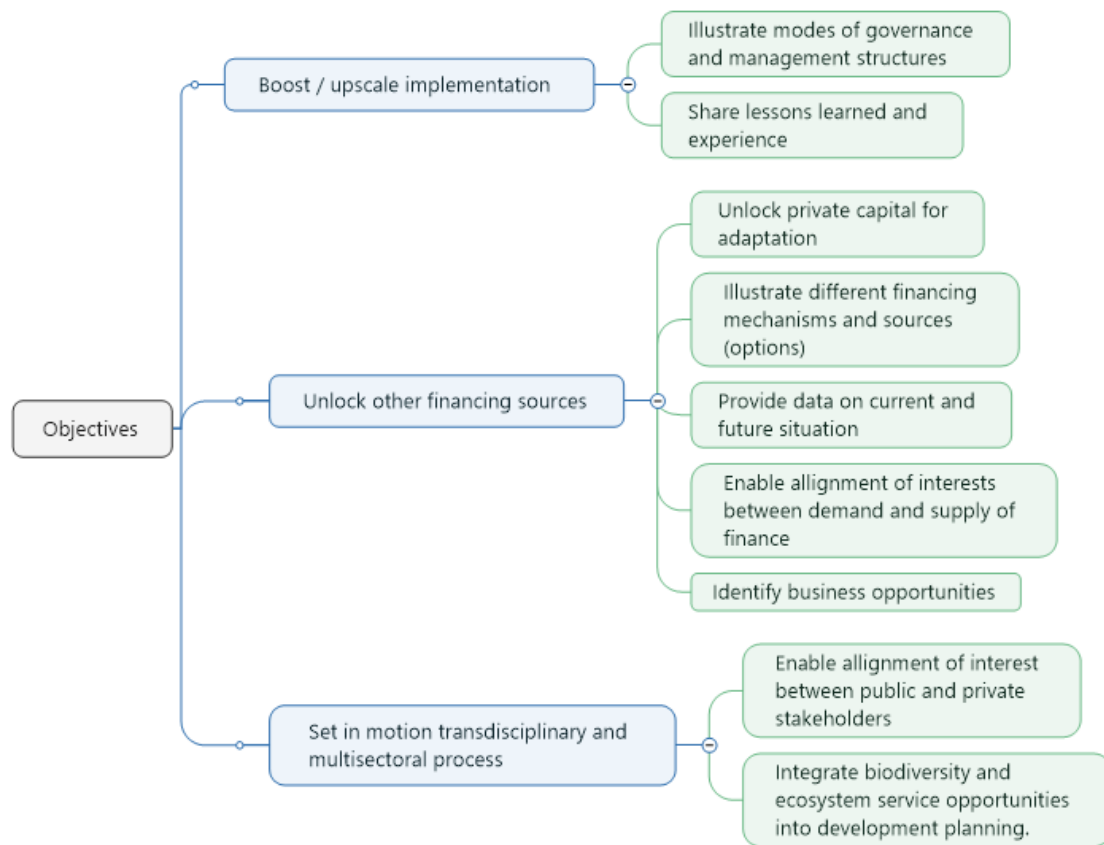


Figure 5.2 Overview of different overarching objectives in the reviewed documents

How is the information presented?

Overall, four categories of content types can be clearly identified in the reviewed documents (Figure 5.3). These are **process guidelines** - also referred to as stepwise approach, blueprint, guiding framework - , illustrating or explaining the **financial landscape**, presenting **analytical frameworks** or diagrams that illustrate some of the identified structures or range of options, and almost all documents present and discuss **examples and experiences**. Some documents contain all of the above and others only a selection.

Within the process guidelines we have further identified variations in the “entry points” taken by the authors of the documents. These are the policy or program level, the project level, or specifically for an ecosystem service of interest or a business opportunity. Within the sections about the financial landscape, a further separation can be made into documents that are dedicated to presenting and analysing (current) financial flows, and documents that tend to focus on presenting the variety of options and instruments one can choose from, including the range of public and private sources as well as other types of policy instruments that could be used.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

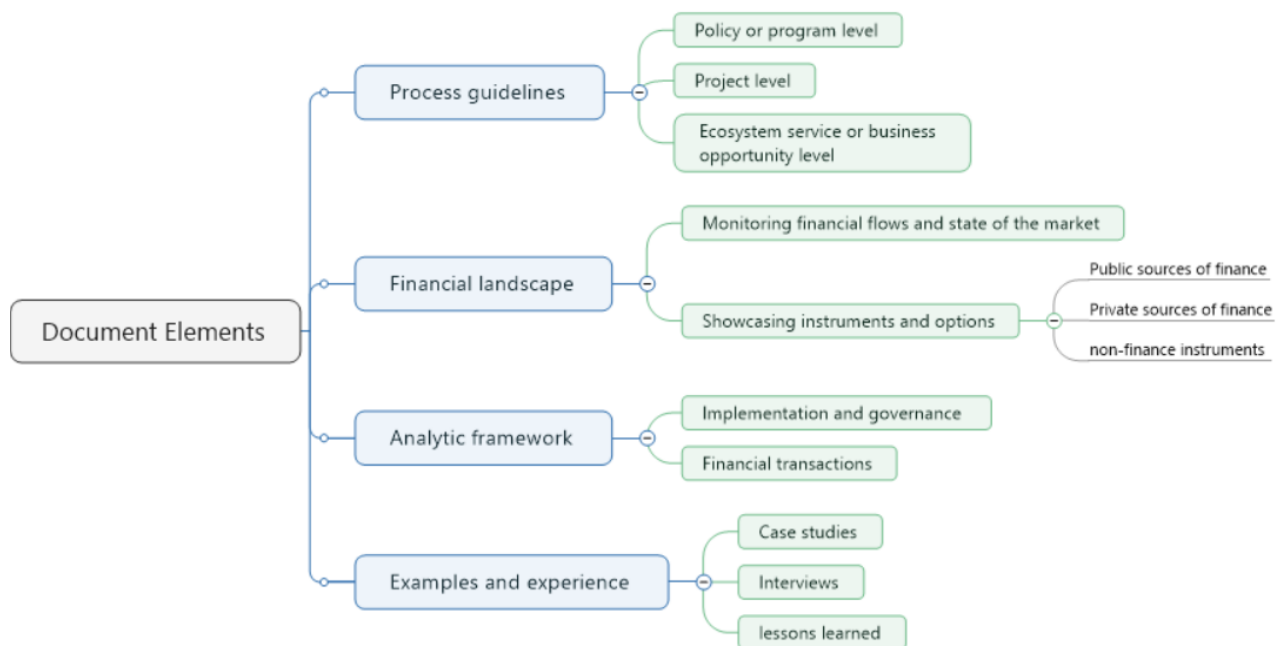


Figure 5.3 Overview of different content types presented in the reviewed documents

How do these different documents relate to one another (or not)?

All of the reviewed documents are about the same topic, namely increasing and finding (the appropriate) finance for the project or objective concerned. Yet, all of the documents are different, in more ways than the domain of application and the target audiences. So (how) do they relate to one another? And how do they align? Figure 5.4 shows a simple conceptual diagram that illustrates the different dimensions and entry points that relate to the challenge of finding finance for NBS.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

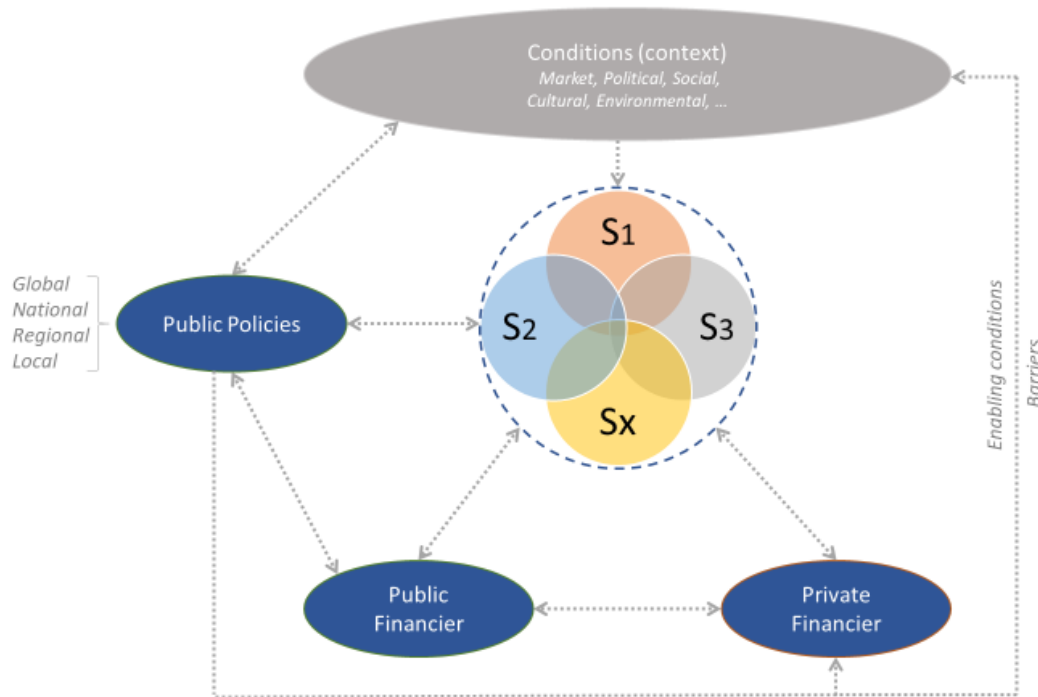


Figure 5.4 Conceptual Framework. S represents stakeholders 1, 2, 3, ..., x. These may vary per project and over time.

The centre of the diagram represents the **project setting**, in which (combinations of) different stakeholders are involved in the initiation of a NBS, ecosystem restoration activities, or another type of “green” (business) project. These can be for example the community, an NGO, a public actor, an entrepreneur, ...etc. It is possible that there is just a single stakeholder involved or that there is a collaboration between two or more stakeholders. The **initiative** and or/ **responsibility**, and the costs and the benefits, may lie with different stakeholders. This can vary from project to project and may also vary over time throughout the lifecycle of the project/intervention. There is no standard structure, making this the first point by which the documents vary between them.

Depending on the starting-point in this project setting - which stakeholder initiates, who is responsible, what is the initiative or project about, what is the spatial and temporal scale - there are many different routes and procedures for implementation. Think of a small entrepreneur wanting to start up an educational and touristic art centre inside a natural park which is managed by an NGO. Or another situation when a water authority is initiating the construction of nature-friendly shorelines. In both cases different **procedures** exist, such as public procurement, permit applications, environmental impact assessment, and these can vary per country and per region. Thus, the existing **public policies** influence the project setting.

The project setting also encompasses the **values** that are expected to be generated by the project, such as revenues, cost savings, carbon sequestering, protection of endangered species, etc.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Agreements are made between the stakeholders concerning the distribution of the generated values. These values are the basis for the so-called funding model, in other words, who ultimately pays for which part of the project and the values delivered.

It is possible that within the project setting the project can be implemented and that no finance from outside sources is needed. External (outside of the project setting) finance to provide the **upfront capital** is not always necessary. An entrepreneur can use own personal savings, or a public actor may make use of the domestic or earmarked budgets from existing policies (given the project aligns with that scope). However, most of the time a source of finance is required that can provide the necessary upfront capital. This source of **finance** can be from the public sector or from the private sector, or a combination of both. The nature of the project and the funding model of the project (who will ultimately pay for the project and what values are created) determine what sources of finance can be suitable.

Back to the question, how do all the guidelines relate? Some of the guidelines target the whole scope of the conceptual model whilst others zoom in on a specific part. For example, document number 3 (Green-win) addresses the financing possibilities of a specific stakeholder, in this case an entrepreneur and discusses how the entrepreneur can analyse and develop their own business model in the context of the project, given the external conditions (such as market demand, political stability, etc) and presents the range of financing possibilities that can then be aligned with the nature and funding model of the project.

Document number 5 (UNDP) focusses on the context and the public policies. This document is all about understanding and removing the existing barriers for involvement of private sector finance. It is thus not so much focused on the individual project setting but about creating the conditions under which all project settings can access the appropriate finance and increase the amount of private finance. So, the “external conditions” that are presented as given conditions in the guidelines in one document (e.g. document number 3) are the conditions that are being targeted or addressed in the guidelines of another document (e.g. document number 5).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Table 5.3 Summarising table of the target audiences, main objectives, and document types

#	Abbreviation	Target Audience	Main objectives	Document type
1	FCC	Dutch companies, international financial institutions, governments and private investors.	Boost the implementation of coastal NbS through increased market understanding and project preparation	Review of the financing landscape for NbS and guidelines to develop a business model
2	FFWS	Proponents of Nature-based Solutions (NbS) in general and stakeholders involved in a water security planning process	Aims to set in motion a multisectoral and transdisciplinary process that bridges the strategic adaptive planning and investment planning To design an implementation arrangement with the highest potential to ensure sustainability in service delivery in the long term.	Stepped approach with templates and examples for designing an implementation and financing arrangement for NbS and hybrid project (portfolios)
3	EPI	The public sector: Government agencies, Policy makers, Bilateral and multilateral development finance institutions, Central banks, Regulators, Public sector funds, Development organisations	How to unlock and enable private capital to (co-)finance national and local adaptation priorities.	Deep dive into state of private sector involvement followed by a blueprint for action to increase private sector involvement
4	LBIN	Governments, NGOs, the private sector and others	Identify and compare the different existing and future options for financing conservation.	Framework that organises biodiversity financing mechanisms into categories and an overview of the different mechanisms
5	SFN	Decision-makers	Provides up-to-date information about public and private sector finance that is channelled to activities and assets that can be considered NbS and to present estimates of the future needs. Help decision-makers assess how on track the world is to meet international commitments	Presents data on the state of finance into NbS and presents case studies of opportunities for public and private investment
6	UFF	Academics and practitioners	Presents and discusses practical experience and results of applying methodology to different case	Sharing of experience and lessons learned.
7	NbS-BMC	NbS initiators in cities	Help the initiating stakeholders to better communicate, plan, identify partners and explore finance for NbS	Guidebook supporting the use of the NBS Business Model Canvas (tool).
8	IN	Entrepreneurs, conservation organisations or foundations, corporations, financial institution, fund managers, cities or municipality	Help the initiating stakeholders to become eligible for commercial sources of financing by identifying the values generated that lead to a sustainable financial structure.	Guide to identify business models and explanation of financial support options, with specific attention for the Natural Capital Financing Facility
9	GBM	Green entrepreneurs and researchers and organisations that support entrepreneurs starting a green business	Align interests of potential financiers with the entrepreneurs and their green business models.	Guiding framework and basic descriptions of different types of financiers and their interest
10	Lit-rev	Academics and practitioners	Identify promising arrangements to overcome the barriers	literature based overview of investment barriers (public and private) into coastal adaptation and theoretical approach to

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

11	CC	Conservation organisations, investors willing to allocate capital in a way that yields positive environmental and social impacts alongside of financial returns (responsible investing)	To accelerate conservation activities by increasing the level of investment activities in the conservation space. To share experiences and lessons learnt. To guide the identification of the most appropriate investment structures, advisors and service providers	Practical framework for evaluating opportunities, showcasing of real world examples, discusses different roles organisations can play in mobilizing capital
12	CFin	Primarily targeted at mainstream investors. Also conservation project developers.	To identify product structures that have the potential to establish conservation finance in main- stream investment market	Analysis of characteristics of typical conservation / restoration projects and investor preferences and try to match these.
13	ESO	Conservation and (resource)development planners and practitioners	Assist in incorporating economic and development concerns into conservation management and to integrate biodiversity and ecosystem service opportunities into development planning.	Stepped approach with templates and examples to help in identifying, selecting and planning economic instruments to conserve ecosystems
14	FS	Program and project developers in developing countries working on wetland conservation and restoration.	Distinguishes between and identifies projects and national or subnational programs to help find those funds or financial mechanisms that best suit the type of activities intended	Generic guidance to identify different funds and finance mechanisms for wetland conservation and restoration projects, specifically focusing on the benefits related to carbon.
15	CCF	Public development practitioner (national and sub-national level) and experts involved in assisting governments in catalysing finance	To enable countries to assess the level and nature of assistance they will require to catalyse climate capital based on their unique set of national, regional and local circumstances. And to assist low-income countries to create conditions that enable public and private investment flows to address environmental and development challenges	Guidebook that focuses on a review of policy and financing instruments and mechanisms that can be combined to contribute to climate mitigation and adaptation objectives

5.4 Results: Building blocks

Based on the review of the different frameworks and guidelines a number of fundamental building blocks have been identified. These building blocks can be seen as a synthesis of the common elements mentioned and discussed in the different guidelines. Furthermore, the building blocks identified and discussed below, show a high degree of overlap with the NBS business model framework introduced in chapter 2. These building blocks will be used - as steps to take - for the analysis and development of the financial strategies for the RESTCOAST pilot projects (Task 3.3) and can be seen as a road map. With this objective in mind, the building blocks are formulated from “project entry level” in which the contextual conditions (either enabling conditions or barriers) are primarily considered as exogenous. One may recognize that some of the (sequencing of) the building blocks are similar to the processes used in Integrated Water Resource Management (IWRM) or Integrated Coastal zone Management (ICZM).

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The following sub paragraphs discuss each building block briefly, followed by an overview table illustrating in which of the documents they have been addressed (extensively). The objective is not a full detailed description of each building block but to present the identified synergies between the reviewed documents and to outline the generic process. The building blocks could be mis-interpreted as being part of a linear process. This is not the case. There is an orderly logic, but, iterations and revisiting different building blocks is an essential part of the process. Furthermore, iterations can contain extra modelling activities or feasibility studies. These are not placed as separate building blocks, but the information collected should contribute towards the building blocks mentioned.

Table 5.4 Generic building blocks and working principles for developing a financing strategy derived from the 15 reviewed documents

Building Block		FCC	FFW S	EPI	LBIN	SFN	UFF	NbS- BMC	IN	GBM	Lit-re v	CC	Cfin	ESO	Fresh	CCF
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Strategic (societal) objective(s)	Challenges and problems (and data required)	X	X	X								X		X	X	
	Goals/Vision	X	X	X				X								
	Cross sectoral		X	X	X	X		X						X		
Situational analysis / analysis of (enabling) conditions	Stakeholder Identification and engagement		X			X	X	X	X	X		X		X		
	Social and cultural context		X				X	X			X			X		
	Environmental / Ecological context	X	X	X	X		X			X			X	X	X	
	Institutional (incl political and legal) context	X	X	X	X	X	X		X		X	X	X	X	X	X
	Economic context and market conditions		X	X				X		X	X	X	X	X		
	Financial landscape / context		X	X	X	X		X	X		X	X	X	X	X	X
Solution space possible interventions	Technical interventions	X	X		X	X						X			X	X
	Policy interventions		X	X	X	X					X	X	X	X		X
	(portfolio of) Measures	X	X		X		X		X			X			X	X
	Alignment and synergies			X	X	X	X					X		X	X	X
Funding model	Identification of (ecosystem) goods and services	X	X	X			X	X	X	X				X	X	

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

who will ultimately pay?	Identify output characteristics		X		X						X	X		X	
	Establish trade-offs and hierarchy		X		X	X		X		X					
	Identify and quantify (distribution of) costs and benefits	X	X	X	X	X	X	X	X	X	X		X		
	Business as usual	X	X				X		X			X		X	X
	The 3T's - Taxes, tariffs, Transfers		X		X			X				X		X	X
	Funding gap analysis	X	X	X						X		X			
Financing model: who will provide the required (up-front) money and how?	Type(s) of finance and prioritisation	X		X	X		X	X	X	X	X	X	X	X	X
	Aligning instruments and conditions			X	X		X		X	X	X	X	X	X	
	Application and documentation				X		X	X		X		X	X	X	
	Catalysing (blending) potential	X	X	X	X		X						X		X
	Risk assessment and mitigation	X	X	X	X			X		X		X	X		
Governance arrangements	(public) Procurement, agreements and structures		X	X				X			X	X			X
	Intermediaries, and support facilities			X					X	X		X		X	
	Monitoring, Evaluation, reporting		X	X	X			X				X		X	
	Other (non) financial inputs		X					X							
	Documentation, applications and procedures								X					X	X
Working Principles	Collaborative approach	X	X	X	X	X	X					X		X	
	Lifecycle approach	X	X				X	X	X			X		X	X
	Systems approach		X	X		X									X
	Interdisciplinary approach		X	X	X		X							X	
	Robustness (scenario-based)			X						X		X	X		
	Adaptivity	X	X				X							X	

5.4.1. Strategic (Societal) objective(s)

This building block is about developing a generic, common understanding within the NBS project team of the **aims** of the project. What **issue(s)** or threat(s) need(s) to be being tackled or what is the opportunity considered? This will be refined along the way, when a deeper understanding of the ecological, technical and social-economic system has been developed, but a starting point is required to initiate the process. A generic aim can be as broad as “protection of biodiversity” or “decrease flood risk” which can later be further detailed in more specific objectives such as a specific type of species under threat, a certain ecosystem, or, a specific flood prone zone. Socio-economic objectives, such as livelihood objectives can be part of this generic aim and different (related) problems can be identified. If possible given the level of available knowledge a separation between short and long term challenges and aims is useful. This building block is also important to create an initial understanding of the required expertise to proceed in the situational analysis.

5.4.2. Situational analysis

This building block is about analysing and understanding the project context. A number of different “contexts” have been identified. Analysing the stakeholder context is about understanding the playing field and the players. Who are the (key) stakeholders, their attitudes, potential conflicts, and existing structure in relation to the issue(s) or opportunities of the project.

The **social and cultural context** analysis addresses the cultural characteristics of the population (such as ethnicity, language, religion), education levels and systems, community involvement, attitudes towards conservation, perceptions of the environment, and potentially specific knowledge about the local (use of) natural resources.

Analysing the **environmental context** has the purpose of understanding the conditions of the area of interest, such as land-use changes, habitat and (threatened) species types, hydrological and geological conditions, hotspots or sensitive areas, and air and water quality. Also, understanding the forces putting the system under pressure, such as pollution or urbanisation. Also important to understand the current conservation activities and measures already in place.

Next is analysing the **institutional context** (including political and legal) leading to an understanding of the distributions of responsibilities and authorities, what are the national and local policy objectives influencing the challenge addressed, how are land tenures and resource and property rights distributed (formally and informally) how is environmental protection governed, and according to which regulatory frameworks?

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

The **economic context** addresses amongst others the state of the infrastructure and related development plans, sources of income and main economic activities in the area, wealth, income and employment across the population in the area.

Based on the review, a **financial context analysis** is an important addition to this list. In some cases this is addressed as part of one of the other “contexts, but as the focus is on developing a financial strategy, it is mentioned here as a separate item. This analysis includes for example, whether there are important public and private investments ongoing or planned, if there are payment schemes (such as PES), tax reductions, subsidies, or markets (carbon credits) already set up, and also whether there are existing policies or schemes (perversely) affecting the desired outcomes.

5.4.3. Solution space

Define and assess possible measures and/or business opportunities that can tackle the challenges (or opportunities) to be addressed. These can include technical approaches (both ecological and traditional engineering approaches) and policy approaches such as market incentives and regulatory instruments. An important element that is being addressed in several guidelines is the realignment of policies and interventions to contribute to the common objective. This includes addressing and repurposing existing measures or subsidies that are putting the natural asset at risk. Furthermore, identifying “win-win” situations such as job creation objectives with restoration activities is often mentioned.

5.4.4. The funding model - *who ultimately pays?*

This building block is about identifying who will ultimately pay for the measures or interventions. Several documents address this without using the term “funding model”. It is about understanding the values and the costs, and how these can be (re) distributed. This means on the one side an understanding of the types and magnitudes of **benefits** and/or negative effects of the intervention over the lifecycle, and the distribution of these among the different stakeholders. In most cases this will involve looking into the goods and (ecosystem) services provided. This also asks for a comparison between the current situation (**business as usual**) and the situation with the suggested interventions. The other side of the question is to generate an understanding of the expected life cycle **costs** that need to be covered. From there, it can be assessed how the costs of intervention compare to the (financial) benefits of interventions and whether there is a funding gap or not. It is also important to acknowledge and assess the **uncertainties** and risks involved in the project and the potential interventions, specifically in relation to the service provision for which ultimately someone is expected to pay.

The generic categories for funding (who ultimately pays) are the “**3T’s**”: taxes (earmarked or generic), tariffs (or user fees), and transfers. This reasoning can be applied to public initiatives (where the goods and services are mostly public) but also to business opportunities where

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

users/consumers are charged for the produced goods and services. In developing the funding model, the concepts of “the **economic typology** of goods and services” (public goods, private goods, club goods, and common resources) introduced in the FFWS (document # 2) and “the **economic principles**” (steward earns, beneficiary pays, polluter pays) introduced in ESO (Document # 13) are important foundations for this building block. The results from the different components of the situational analysis are important input for investigating and determining the funding model and as such can be considered as barriers or enabling conditions for different strategies.

5.4.5. The financing model - *who provides the upfront capital needed?*

This building block addresses the question of who will provide the up-front money needed to construct or implement the project and how (using what instrument) will the money be provided. The options available for financing and the activities in this building block depend on what the funding model looks like.

If the funding model is mostly based on taxes, which is common when the main services and goods derived from the project are “public goods” then often finance is provided from public or concessional sources. If the consumers of the services and goods can be charged (user fees) then commercial finance can potentially become available. Besides from the economic typology, the expected project output is also an important factor to consider. Thus the expected returns and outcomes of the project (**risk-return profile**) determine for a large part what financing sources could be tapped into. Some financing sources provide money for a specific purpose through a specific mechanism. A distinction can be made between performance based “return” and non-performance based “return” where return relates to what is expected by the financier in return for the money provided.

Thus, different financing sources have different characteristics. This building block is about understanding if the characteristics of the project (as the two examples mentioned above) are or can be aligned with the characteristics (or requirements) of the different sources of finance. Furthermore, the different sources of finance also have their distinct application procedures.

5.4.6. Governance arrangements

Depending on the outcomes of the previous building blocks and the project characteristics this building block addresses the choices to be made in how the infrastructure and the goods and services it delivers can best be managed (given the contextual conditions). The options to consider can be placed on a continuum with full public ownership and management (state intervention) on one end of the spectrum and full market/private ownership and management on the other end of the spectrum. In between are for example public private partnership and special purpose vehicles, (public) procurement and lease agreements. When considering the entire value chain

arrangements with for example intermediaries, distribution facilities, and technical support facilities also play a role in this building block.

5.4.7. Working principles

This last building block is more related to the process and the attitudes of the people involved than the content of the activities. Throughout the different documents specific types of attitudes, key success factors or guiding principles are identified. These are described as essential in the process for developing a financing strategy. From the review we have captured 6 working principles.

- Collaborative approach: Involving (all) stakeholders & effective communication throughout the process
- Lifecycle approach: Addressing the building blocks considering the entire lifecycle of the project/measure
- Systems approach: Consider not only one system, or objective, or only one sector, but break the silos for more impact and a stronger strategic and economic case
- Interdisciplinary approach: Integrating a range of knowledge and expertise
- Robustness: Decision making under uncertainty and working with scenarios
- Adaptivity: Taking a flexible, adaptive approach

Glossary

Blended finance: Strategic use of concessional finance means that improves the risk-return profile for investments in a project, and consequently attracts additional commercial finance.

Bond: Standardised and tradable debt security under which the issuer owes the holder a debt.

(NBS) Business Model: a description of actors, their roles and contractual arrangements between all actors involved in a (NBS) project in qualitative terms.

(NBS) Business Plan: Plan that applies a business model to a specific (NBS) project, including quantitative information (e.g. detailed cash flows, non-monetary outputs, risks, risk-mitigating measures etc.).

Club good: Type of economic good characterised by excludability and non-subtractability. As a consequence, these goods are available to everyone but scarce, and therefore susceptible to overexploitation.

Co-benefit: Positive benefits that derive from NBS projects.

Commercial finance: Provision of finance at market rates.

Common Pool Resource (CPR): Type of economic good characterised by subtractability and non-excludability.

Concessional finance: Provision of finance at below market rates, typically provided by large financial institutions such as (multilateral) development banks, funds, national governments.

Contract: Agreement between two or more parties that establishes mutual obligations that are enforceable by law.

Crowdfunding: Funding of a project by pooling (small) donations from a large number of people, typically through a digital platform.

Debt: Amount of money borrowed by a debtor from a creditor. The debtor commits to repay the debt, usually with interests, after an agreed period of time.

District Level Tax: Taxation structure to fund a project, which identifies and tax those that disproportionately benefit from a public investment, either as a one-off payment or on a periodic basis.

Ecosystem Restoration: Process of facilitating the recovery of an ecosystem that has been degraded or destroyed.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Equity: Type of investment that consists in the purchase of a share of a company, which provides claims on future income streams and voting rights to the investor.

Excludability: Degree to which a good, service or resource can be limited to only payors. A High level of excludability allows the prevention of free consumption of a good.

Fee: A payment made in exchange for a service.

Financier: A legal person that provides finance for a project to make a productive use of its own financial capital.

Financing: Provision of financial capital that is needed to meet a project's upfront costs.

Funder: A legal person that provides funding for a project, mainly because of an interest in realising specific impacts through the project implementation.

Funding: Payment of costs that arise from a project. A project can be funded upfront through granting or, when part of the capital is provided through a financing arrangement, *ex post*, thanks to the establishment of revenue streams that will allow the repayment of financiers.

Grant: Funding instrument that provides capital to a project to facilitate an objective of interest to the issuer.

Granting: Provision of capital to pay upfront for project costs. Capital provided through granting does not need to be paid back.

Green Bond: Standardised and tradable debt security whose proceeds are designated to finance the conservation of natural resources, the transition to a carbon-free economy and other environmentally sustainable projects.

Land readjustment: Process for infrastructure co-financing that involves financial contributions from both public and private land-owners and a redistribution of property rights.

Land Value Capture: Selling or leasing of land whose value had increased as a result of a project's implementation, as a way to monetize the value created by the project itself.

Loan: Debt security typically provided to borrowers by commercial banks or other financial institutions based on a direct contractual relationship, which makes it a non-standardised and non-tradable instrument.

Mezzanine: Hybrid of debt and equity financing instruments that present characteristics of both classes.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Nature-based Solution: Use of natural features and processes to address societal challenges in a sustainable and resilient way.

Outcome-based Finance: Provision of finance that entails different scenarios for the repayment of the investors, depending on the project's generated outcomes.

Outscaling: Replicate an approach that has been tested and demonstrated in a pilot project, with the ultimate objective of broadening the impact of an intervention.

Philanthropic investment: Financing or funding initiative by the private sector for the promotion of welfare and other public goods.

Private Investor: Person or company that invests its own capital into a project, with the goal of achieving returns on the investment in the future.

Private Good: Type of economic good characterised by excludability and subtractability. As a consequence, private goods need to be purchased to be consumed.

Procurement: Purchasing of works and services needed for the implementation of a project.

Public-Private Partnership (PPP): Long-term contractual arrangement between a government and private companies for the purpose of implementing a project or a service that is conventionally provided by the public sector (e.g. infrastructures, public services etc.).

Public Good: Type of economic good characterised by non-excludability and non-subtractability. As a consequence, public goods are available to all members of a society and are paid for collectively by taxpayers.

Public Investor: Public entity that invests a portion of its budget into a project, with the goal of achieving social welfare or other objectives of public interest.

Share: Unit of equity ownership in a company. They provide a means for the equal distribution of the company's residual profit (dividends).

Special Assessment District: See "District Level Tax".

Subtractability: The degree to which the consumption of a good by one consumer prevents or reduces the ability of consumption by other consumers.

Tax: Compulsory contribution to state revenues imposed by a governmental organisation.

Tax Increment Financing (TIF): Type of public financing that uses anticipated new tax revenues generated by a project to stimulate private investments.

REST-COAST D3.1 Framework for developing funding and financing arrangements for coastal restoration

Upscaling: Expand an approach that has been tested and demonstrated in a pilot project to a larger scale, with the ultimate objective of broadening the impact of an intervention.

Value capture: Process that allows the recovery of project costs through the monetisation of part of the generated value.

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Appendix 1 Summary of the guidance documents reviewed for Chapter 5

This section provides quotes, summaries and visuals of the guidance documents reviewed for (Chapter 5)

1. Financing nature-based solutions for coastal protection – A practical review of blended finance approaches with carbon credits from blue carbon sources

Quote (pg3)

“Voluntary and compliance emission trading frameworks have opened the market for blue carbon projects through the approval of the first blue carbon conservation methodology in 2020. This creates a new opportunity to scale up finance for coastal protection projects that conserve and restore blue carbon ecosystems through the sale of carbon credits.”

Summary

This document starts by positioning nature-based solutions as beneficial solutions (starting point of the document) due to their social, environmental and economic benefits. Next the authors explain that lack of finance is currently one barrier limiting the implementation of NbS. Carbon emission trading schemes are novel, and are seen as an opportunity to increase and diversify financial flows towards NbS. The document reviews the financing landscape for NbS, including the risks associated with setting up NbS projects and the identification of investors (through blended finance). The document also provides practical guidelines for developing a business model for NbS.

The authors identify a number of barriers that could hinder the implementation of NbS and also access to finance. Amongst these are a lack of common understanding of the concept of NbS, need to understand the multiple co-benefits and their monetary value and an underdeveloped market for ecosystem services. Furthermore they identify a number of barriers specific to blended finance, namely the project scale, the risk profiles, lack of standardized metrics, difficult legal frameworks, political instability, procurement challenges, and lack of evidence base. The authors also suggest ways to deal with these barriers.

The guidelines present four steps to develop the financial structure of a NbS project. The first step is the technical design, which includes the identification of the problem to be solved by NbS, the goals, the success factors and potential interventions. The second step is the context analysis and the social cost benefit analysis (SCBA) including the study of the ecological, socio-economic, and governance context of the NbS and to conduct the SCBA to assess the feasibility of the NbS. The third step is called the Financing strategy, in which the financing mechanisms are prioritized based on the previous step and combinations of different financing sources are considered. The fourth step is the risk assessment and mitigation, where risk assessment relates specifically to the risks in the financial strategy. Alongside these four steps an adaptive management and stakeholder engagement approach is recommended throughout the entire process.

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Visual

Four steps in designing the financial structure of a NbS project and potential guides and toolkits to support the development of a NbS project

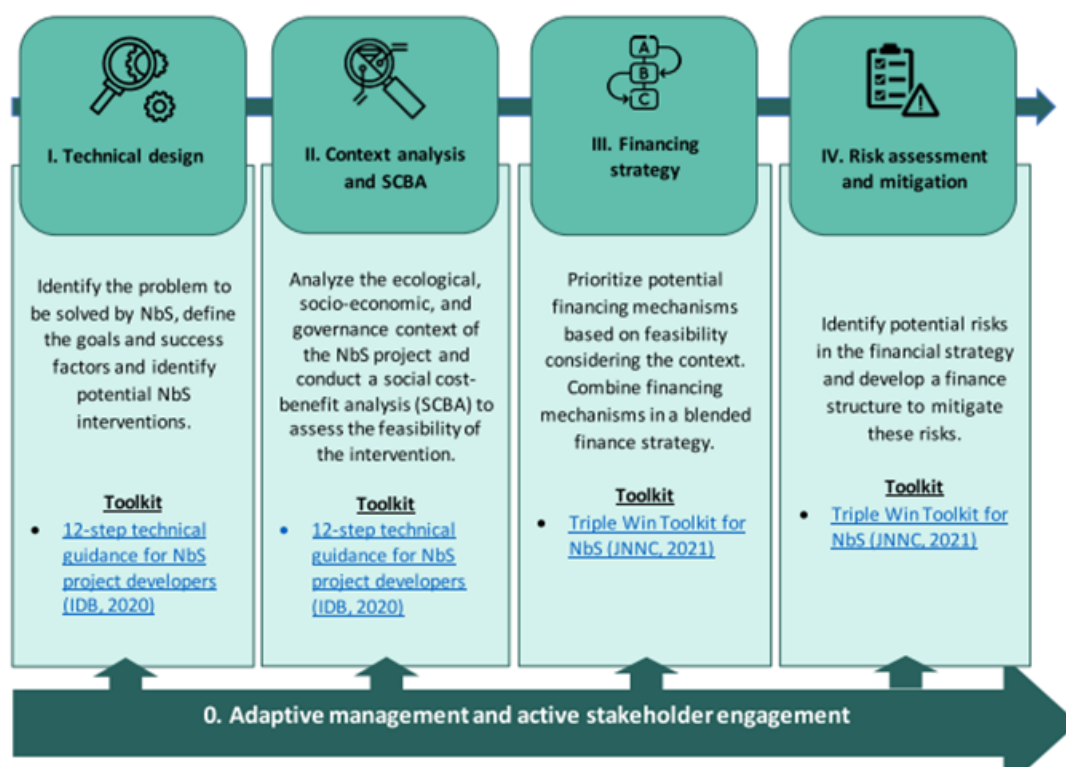


Figure 10 Four steps in designing the financial structure of a NbS project and potential guides and toolkits to support the development of a NbS project

2. Handbook for the Implementation of Nature -based Solutions for Water Security. - *Guidelines for designing an implementation and financing arrangement*

Quote (pg4)

"NBS emerge as important pillars of new models of economic growth that enable a win-win between economy and environment while helping us mitigate water risks. Unfortunately, the implementation of NbS at scale remains limited. In most cases, NbS are still being implemented as pilot projects of limited size and following parallel processes from mainstream procurement practices. This is what we call the implementation gap."

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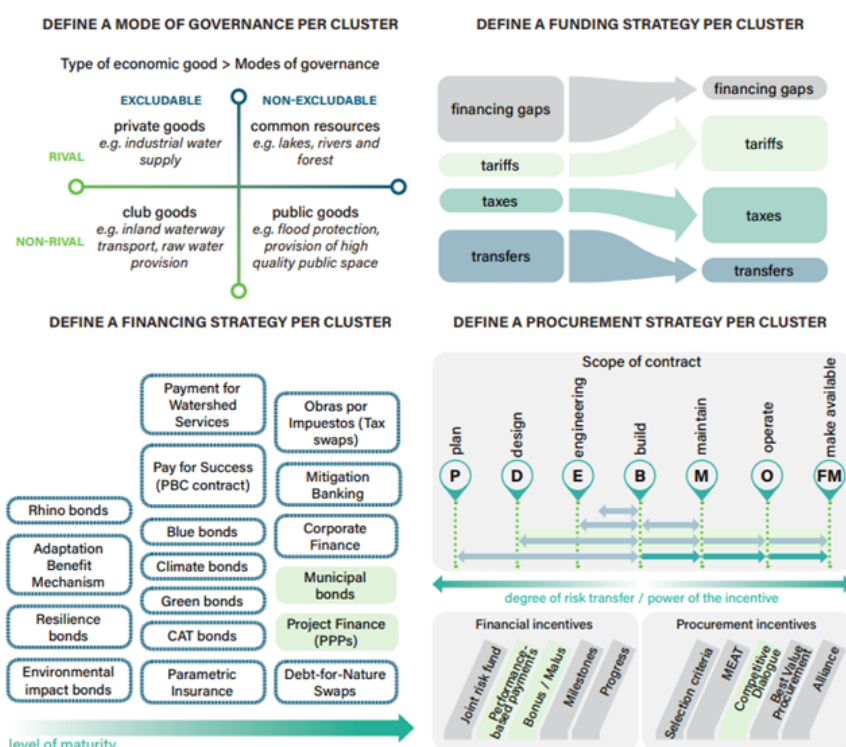
Summary

This framework presents an approach targeting to bridge the implementation gap by connecting the project delivery community (in the field of water resource management and watershed conservation) to the finance community. The level and type of data collected and presented by initiators and developers of NbS currently does not match with the information that is required by investors, specifically regarding project risks, costs, and expected benefits. To connect these worlds, a transdisciplinary and multisectoral collaborative approach is required, including early and active participation of private sector stakeholders. The audience targeted in the document are proponents of NBS.

The framework is based on several guiding questions to enable the development of the five business cases (fig) and subsequently a tailor-made implementation arrangement which includes the choice in mode of governance, the funding model, the financing strategy and the procurement strategy (fig). The authors pay specific attention to a number of elements that seem essential for NbS, namely i) assessing the entire lifecycle of the project/infrastructure, ii) assessing the levels of services provided and required (including the typology of these services and their different values for different stakeholders), iii) exploring possibilities to combine green (nbs) with grey (traditional) infrastructure, iv) making use of performance based contracts that allow for stacking of multiple benefits and v) the institutional setting providing enabling conditions or barriers. The framework is rooted in System analysis, collaborative modelling techniques and New Institutional Economics.

Visual

The design of an implementation arrangement involves four decisions:



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3. Enabling private investment in climate adaptation & resilience – *Current status, barriers to investment and Blueprint for Action*

Quote (pg5) “... although public finance for adaptation has increased, it will not suffice. Private sector investment is critical to closing the adaptation finance gap. Much remains to be learned, however, about how to unlock and enable private capital to help finance national and local adaptation priorities. There is growing knowledge of how the private sector is building its own climate resilience, but far less about its role in meeting broader adaptation financing needs.”

Summary

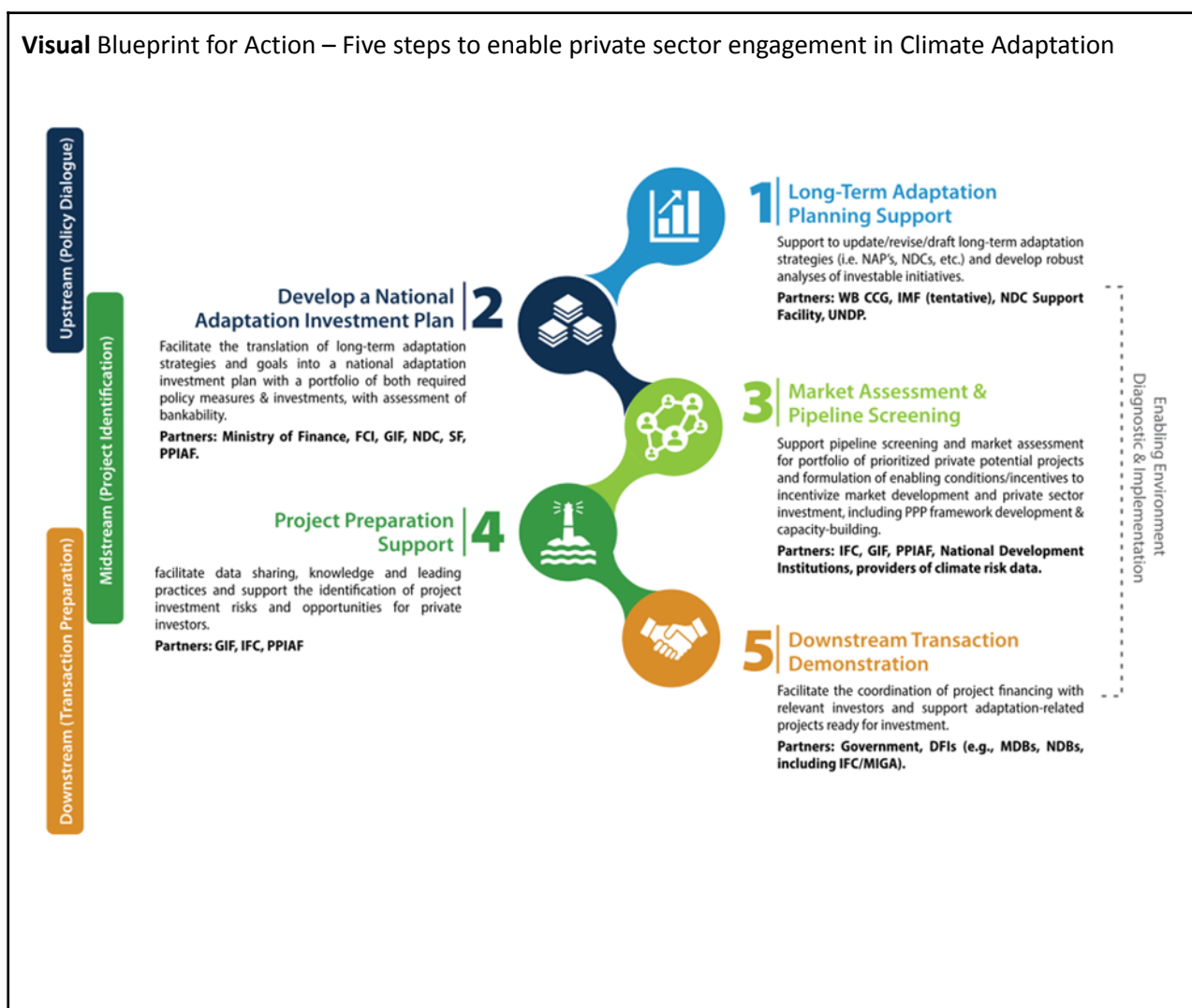
This report firstly dives into the current state of private sector investment into climate adaptation and resilience by addressing both the magnitude of private sector investment as well as the barriers for (increased) private sector investment. The authors report that, concerning the role of the private sector, there is growing knowledge about how to increase its own climate resilience (recognizing the risks of climate change and making supply chains more resilient) and there is a growing market of selling goods and services to support adaptation and resilience. However, far less is known about the role of the private sector in meeting broader adaptation financing needs.

Next the authors lay out a “blueprint for action” to help the public sector and their development partners with practical steps and tools for shaping policies, market signals, incentives, and metrics. The blueprint is based on the assumption that successful adaptation investment springs from a solid national adaptation plan or strategy. The blueprint (Figure 2.2) should help overcome the main barriers for private sector investment into climate adaptation. These are i) lack of country-level climate related data to guide investment decision making ii) limited clarity on government capital investment goals and/or where private investment is needed and iii) low perceived and/or actual returns on investments due to inability to capture environmental and social benefits. Different entry points for action are suggested varying in upstream (policy dialogue) midstream (project identification) and downstream (transaction preparation).

The main target audience is the public sector including government agencies, policy makers, bilateral and multilateral development finance institutions, central banks, regulators, public sector funds, and development organizations. The authors suggest the report may also be of interest to the private sector including impact investors, pension funds, and firms already engaged or interested in financing adaptation and resilience as these are potential partners.

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Visual Blueprint for Action – Five steps to enable private sector engagement in Climate Adaptation



4. The Little Book of investing in Nature – A simple guide to financing life on earth

Quote (pg

"Biodiversity finance is about leveraging and effectively managing economic incentives, policies, and capital to achieve the long-term well-being of nature and our society" (UNDP 2018). The goal of biodiversity finance is to create economic incentives within both public and private financial sources to preserve the world's biodiversity and stock of natural capital and subsequently guarantee a sustainable flow of ecosystem services for the future."

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Summary

In this document, the authors introduce a framework that organizes biodiversity financing mechanisms into 5 categories, namely i) revenue generation - identify the mechanisms that generate revenue for biodiversity conservation; ii) better delivery - deliver results for biodiversity through improved efficiency, greater alignment of incentives and better resource management iii) Expenditure realignment - reduce investments that have a negative impact on biodiversity and redirect these flows; iv) avoidance of future expenditures - prevent future costs through strategic investment today; and v) catalyze - enhance measures or enabling conditions that can result in new or scaled-up biodiversity finance. The authors expect a comprehensive financing plan to consist of options from more than one category.

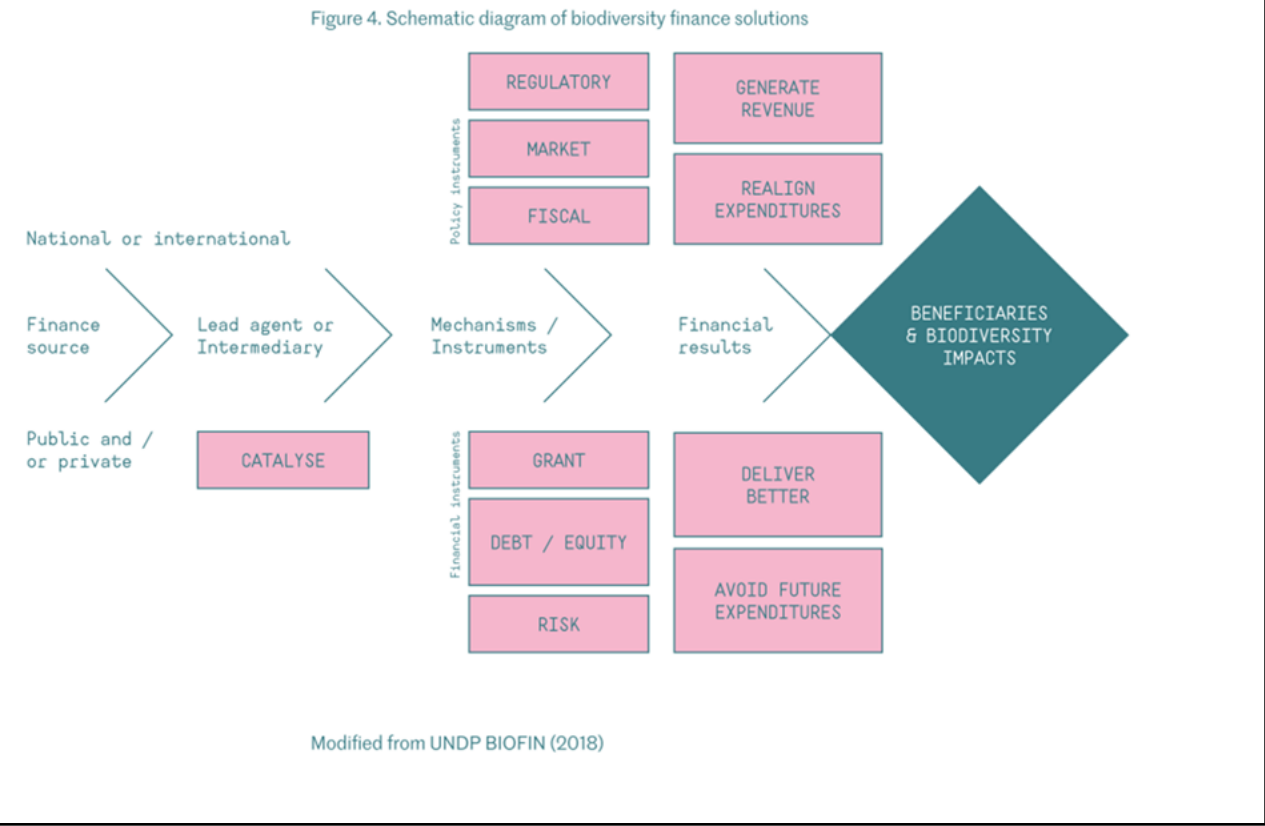
To build up to the framework the authors firstly discuss the terminology surrounding biodiversity, and dive into the current scale, types and needs of biodiversity finance and the overall progress on the Aichi biodiversity targets. Biodiversity conservation finance has been dominated by the public sector, covering over 80% of the available financial resources for conservation efforts. Given the size of the global biodiversity funding gap (which the authors extensively explore) this will not be sufficient and governments, producers and consumers are being called to (collaborative) action to create a more sustainable relationship with nature. Businesses and financial institutions have a large part to play; on the one side they are dependent on biodiversity and ecosystem services for their own business models. On the other side they are also a huge driver of the negative trends seen, due to their operations and investments.

The aim of the document is to help governments, NGOs, the private sector and others identify and compare existing and future options for financing conservation in a clear and consistent way and with that navigate through the landscape.

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Visual

Schematic Diagram of biodiversity finance solutions



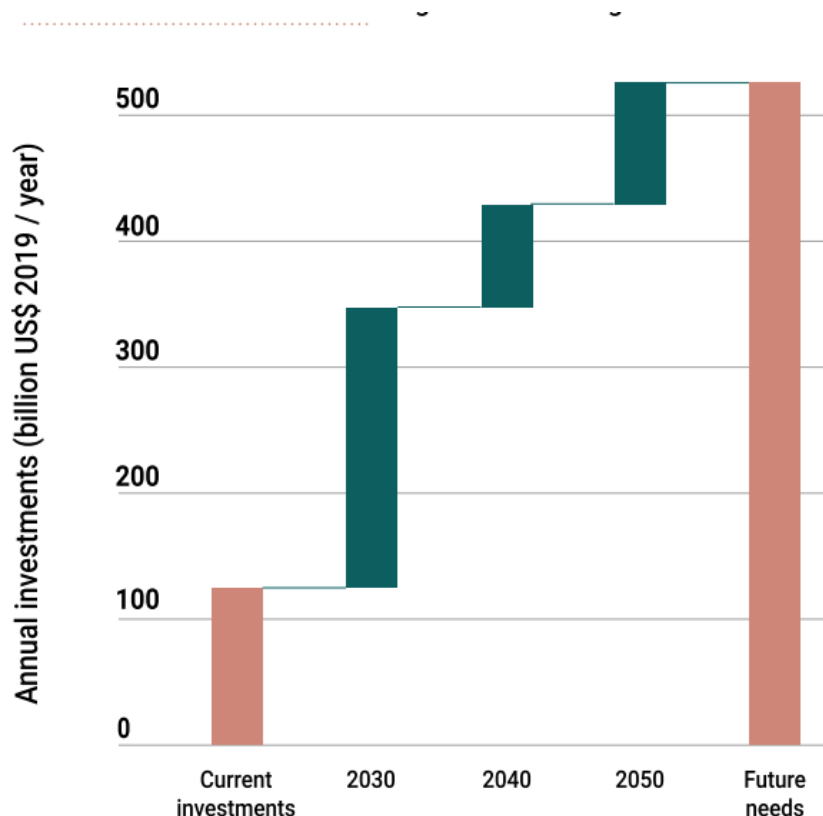
5. State of Finance for Nature – Tripling investments in nature-based solutions by 2030

“Among the structural barriers and systemic rigidities that hamper this transition, finance is fundamental. Mainstream financial products and underlying assets accelerate natural resource depletion and magnify environmental degradation”

This document reports on the types of capital flowing into NbS-relevant sectors and illustrates how these current figures relate to what is needed to meet objectives of international agreements (biodiversity, climate change, and land degradation targets). The authors show that investments in NbS should triple by 2030 and increase four-fold by 2050. Furthermore, in doing so, the authors identify a number of key challenges, such as the lack of consistent and standardised data and reporting that should be addressed and would allow for much better compatibility and thus more informed decision making. The role of the public sector is critical, where they should be creating opportunities and setting enabling conditions for investment in nature.

Future investment needs charting an accelerating rate over time

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Note: These figures are taken from the Model of Agricultural Production and its Impacts on the Environment (MAGPIE v4.1), which was used to estimate investment need for forest-based NbS (which includes reforestation and afforestation cost estimates), and taken from separately estimated figures for silvopasture (planting trees on agricultural land), mangrove restoration and peatland conservation and restoration.
Source: Vivid Economics.

6. Why 'blended finance' could help transitions to sustainable landscapes: Lessons from the Unlocking Forest Finance project

"The UFF experience shows that unlocking finance to conserve tropical forests and stimulating a transition towards sustainable land use at landscape scale requires combining at least three different perspectives: a landscape (here: regional) transition perspective, a farm-level perspective, and the perspective of financial investors. Designing financial mechanisms requires a detailed understanding of each perspective as well as their interactions."

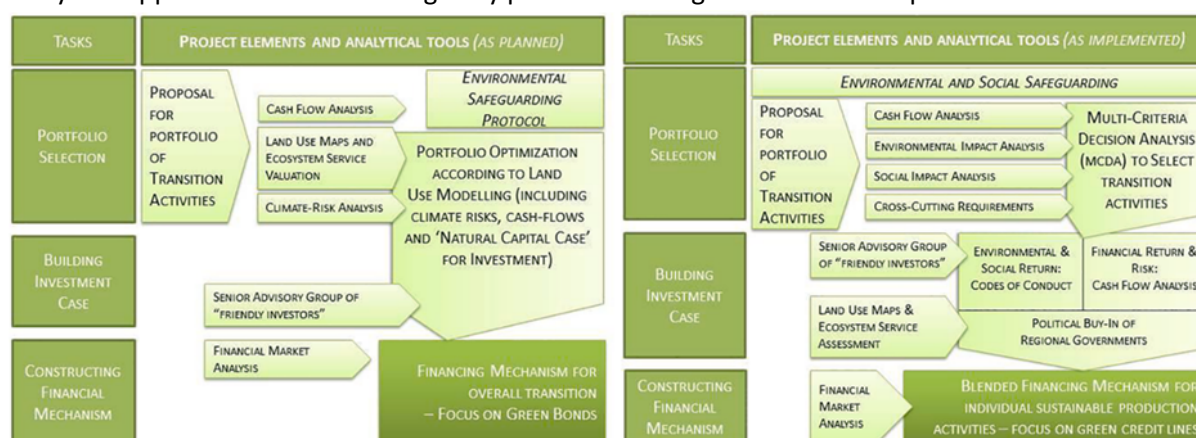
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Between 2013 and 2018 the Unlocking Forest Finance (UFF) project has worked on developing finance mechanisms for a transition to sustainable landscapes in three regions of the Amazon. This publication describes the project, the approach, the cases, and the findings. Specifically the paper addresses how and why the project team deviated from their initial approach and extracts lessons and recommendations from this.

These changes in approach were driven by, amongst others, the complexity of the modelling and required data (e.g. integrating ecosystem service modelling into the cash-flow analysis, the required data granularity, and isolating expected effects of different investment activities) the interactions between different impact scales (e.g. farm level vs landscape level), and stakeholder preferences being different than initially assumed (e.g. an implicit assumption was that investors were willing to accept lower interest rates in return for social and environmental impact, and investors were interested to participate in selecting measures that are of their interest).

The paper is published in Ecosystem Services, “an international, interdisciplinary journal that deals with the science, policy and practice of Ecosystem Services ...”.

Analytical approach of UFF. Left: originally planned and Right: how it was implemented



7. Nature-Based Solutions Business Model Canvas Guidebook

“A business model is quite simply the story of your NBS project. ‘Business model’ is a common term used by enterprises worldwide to explain how the different elements of an enterprise work together to deliver value to a customer and how enterprises make money from this value proposition”

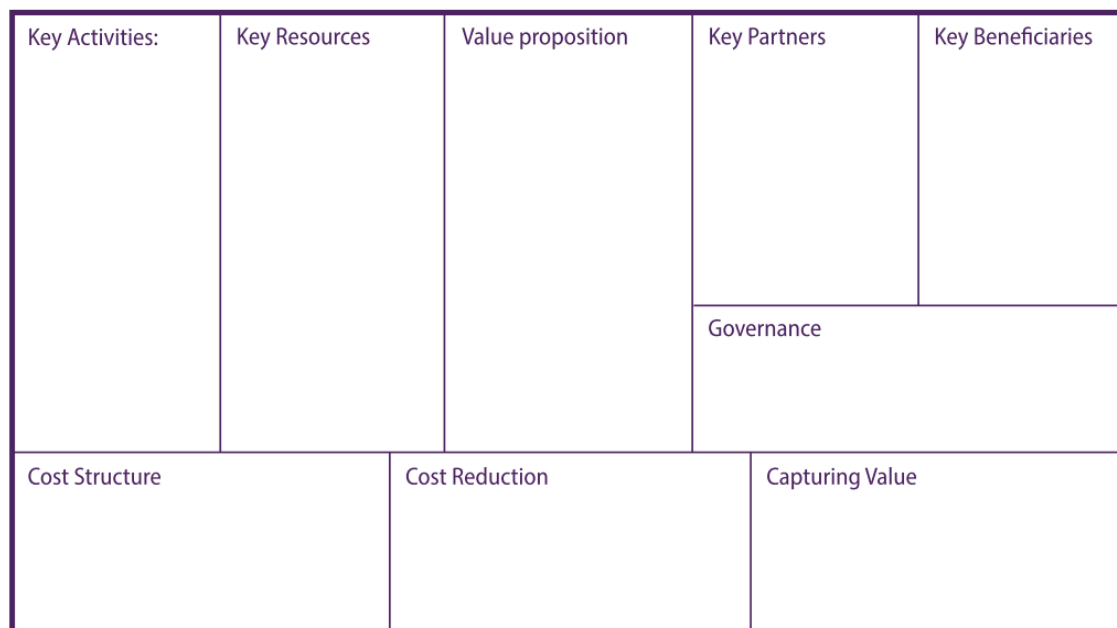
This document is a guidebook that supports initiations (in cities) to use the NBS business model canvas which can help in communication, identifying partners, looking for sources of finance, and to plan the NbS initiative. The NbS business model canvas has been adapted from the regular business model canvas in several ways, namely

- i) Value also reflects environmental and social, next to economic value;
- ii) Customer segments has been changed to key beneficiaries to include more explicitly direct and indirect users;

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- iii; Key partners and key beneficiaries are positioned at the same level as they often overlap
- iv) Governance is added because it is often complex and needs to be considered early on;
- v) Cost reduction is added as it reflects specific characteristics of nbs enabling a variety of types of cost reductions.

The NbS business model canvas



8. Investing in Nature: Financing conservation and Nature-based solutions

“Even if you haven’t previously considered taking up a loan from a bank or going to an external investor for equity (e.g. if you have only worked with grants so far), you may find that with the right amount of preparation and risk-mitigation you could become eligible for commercial sources of financing.”

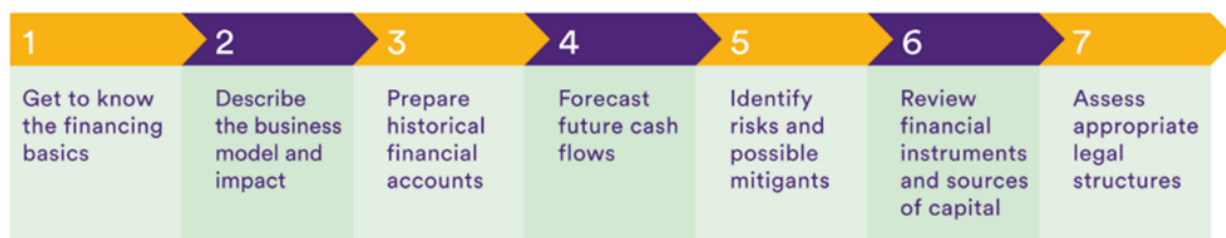
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This document is a step by step guide to design an optimal financial structure for conservation projects and **nature-based solutions (NBS)**. The authors explicitly distinguish between projects where nature is at the core of the business (e.g. ecotourism) and where it is not (e.g. a property developer wanting to build green walls). Both types can benefit from following the presented steps and are seen as eligible for **commercial** (or **blended**) sources of finance.

The 7 steps in this guide are intended to firstly enable the identification of cost-saving and revenue-generating opportunities that could be provided by the project or business and with that develop a sustainable financial structure. Secondly, the guide also taps into ways to access different types of financial support, the pro's and con's of different sources, and the role of the European Investment Bank's dedicated Natural Capital Financing Facility. The guide attempts to bridge the assumed gap between on one side businesses that are looking for finance to scale-up projects that benefit natural capital and biodiversity and on the other side banks and other investors who struggle to develop a **pipeline of investable projects** that enhance natural capital and biodiversity.

The guide is written to target a range of different stakeholders: entrepreneurs looking to tap into NBS; conservation organisations or foundations looking for a more commercial **business model** to become less dependent on **concessional finance**; corporations searching for ways to offset negative environmental impact of their operations; **financial institutions** that want to contribute to conservation and nature-based solutions; **fund managers** raising capital for conservation or biodiversity projects in Europe; cities or municipalities wanting to increase their positive impact on the environment and become more resilient to climate change.

The seven step guide to financing conservation and nature-based solutions projects



9. A short guide to developing green business models

“Green Business Model describes how an enterprise, alongside or through its primary business activity, creates, delivers and captures environmental, economic and social value or benefit.”

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This document provides guidance in the process of elaborating a business plan to be presented to potential partners and investors. More specifically, it zooms in on “green businesses” defined by the authors as *“Green Business Model describes how an enterprise, alongside or through its primary business activity, creates, delivers and captures environmental, economic and social value or benefit.”*

The authors present an adjusted Business Model Canvas by adding an additional element (namely “Green Impact”) as a guiding framework. The document was developed based on the premise that green entrepreneurs are currently not able to access the appropriate finance. The guidance document intends to aligning the interests of potential financiers (in terms of risk profile, business maturity, expected impact, and investment quantities) with the entrepreneurs and their green business models (Figure 2.3).

The target audience is green entrepreneurs and researchers as well as organisations that support entrepreneurs starting a green business

Sources of finance organised according to level of maturity

Existence	Survival	Success	Take-off	Maturity		
National and sub-national initiatives						
Banks						
			Venture Capital			
			Private Equity			
Business angels						
Family offices						
Crowd-funding						
Peer-to-peer lending						
Non-refundable grants						
Microfinance						
Self-financing						

10. Mobilising private finance for coastal adaptation: A literature review

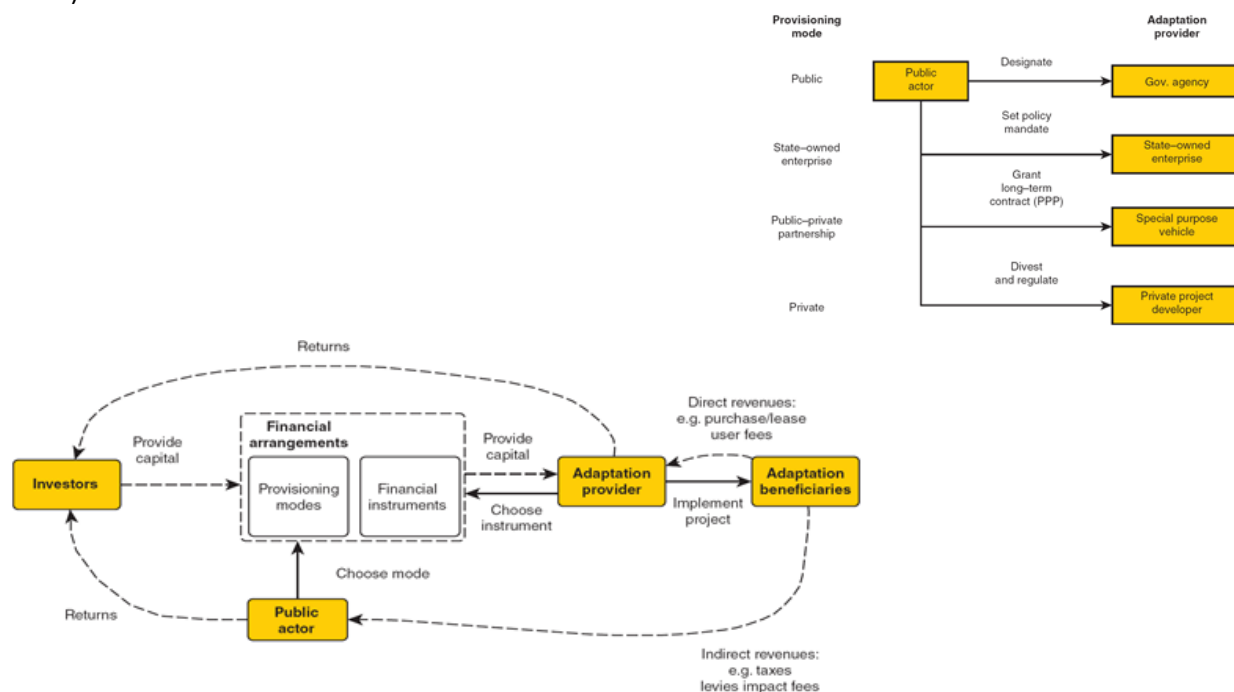
“This article has analysed which financial arrangements are promising, both from a theoretical and empirical perspective, to align public actor and private investor interests in coastal adaptation projects in order to overcome prevailing barriers ...”

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This publication concerns a literature and case study review of financial arrangements for coastal adaptation projects. In doing so the document addresses the questions what promotes private investment and how can public and private interests be aligned? The authors consider adaptation projects as collectively providing flood risk reduction, with long time horizons, high upfront investment costs and benefits that are non-excludable. The review looks firstly into barriers to financing coastal adaptation projects for both public and private actors. They identify factors related to the political economy of coastal adaptation projects for public actors (such as public criticism about high project preparation costs and low public risk perception) and for private actors country risks (uncertainty in institutional environment) and the risk of being liable for large-scale damages.

Following, the authors explore the relationships between the different stakeholders involved (investors, public actors, adaptation providers and adaptation beneficiary) in coastal adaptation projects and present a typology of different provisioning modes and a range of financing instruments that could be used under different provisioning modes and that could align the public and private investors interests. The authors assume that revenue generation (direct or indirect) is a necessary characteristic to attract private capital. They find amongst others that private provisioning occurs when returns are high, and that PPP's attract dredging and/or construction companies when the operational costs are high.

Left: Coastal adaptation provisioning modes. The public actor chooses a provisioning mode and adaptation provider. Right: Financing arrangements in terms of responsibilities (drawn-through arrows) and possible financial flows (dashed arrows) between key actors involved in coastal adaptation (yellow boxes)



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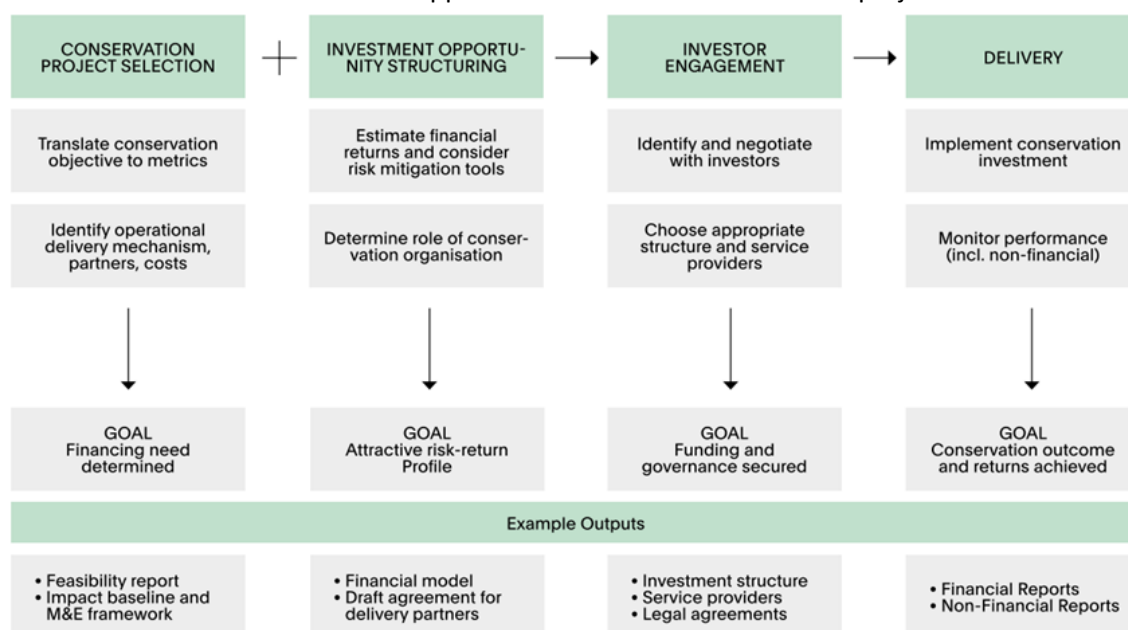
11. Capitalising conservation - How conservation organisations can engage with investors to mobilise capital

“Although certain investment structures may receive significant media attention, it is essential that a financing instrument is chosen to best suit specific underlying conditions. The local environment, stakeholders, the required time horizon, as well as investors’ needs, must be considered in structuring investments that are sustainable and scalable. Scalability remains a key challenge that will require new approaches, for example at landscape or jurisdictional levels, and track record.”

Implementing conservation activities requires financial resources, and conservation organisations are exploring ways to attract the private sector to participate/contribute. This document reports on the experiences and practices so far. It provides a practical framework that helps conceptualizing investment opportunities. It can be used to evaluate opportunities and to showcase examples of conservation finance. Furthermore the document identifies different stakeholders and their (potential) responsibilities and roles within this field to mobilize effective delivery of conservation investments.

The authors identify both the financial and the non-financial outcomes of conservation investments to be essential and need to be communicated transparently.

Framework to structure investment opportunities based on conservation projects



12. Conservation Finance – From Niche to Mainstream: The Building of an Institutional Asset Class

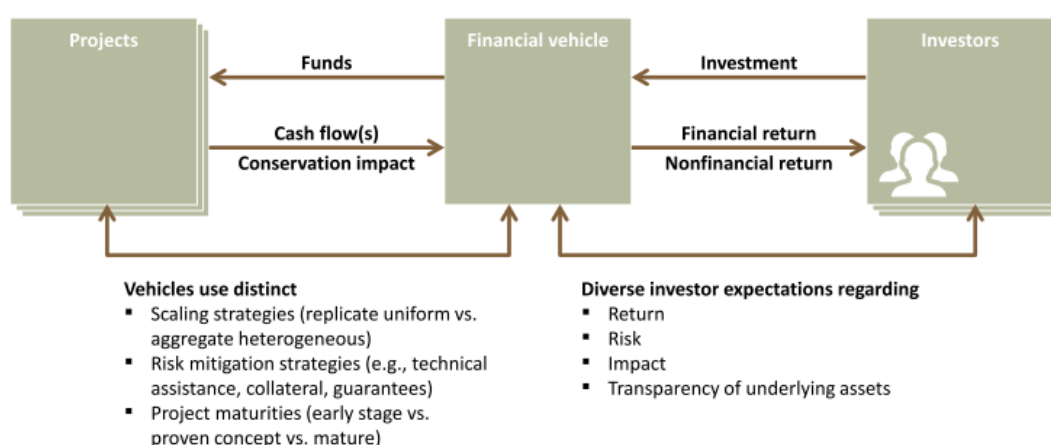
“This report is primarily targeted at mainstream investors who are interested in learning more about investment structures that provide a market-rate return and a positive conservation impact. The report

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should also help conservation project developers better understand the possible funding options provided to them by the private investment sector. It is targeted at those who are willing to take the plunge into the “financialization” of conservation finance projects in order to try to tap into those deeper capital pools. “

This report identifies financial product structures that satisfy both conservation project needs/characteristics as well as investor needs/characteristics. The report focuses on investment mechanisms that activate at least one type of cashflow generated by the sustainable management of the ecosystem. Furthermore the document discusses the need to create a “conservation finance asset class” by matching conservation finance project strategies with the right vehicles and funds.

Demand and supply side of conservation finance



13. Acting on Ecosystem Service Opportunities - Guidelines for identifying, selecting and planning economic instruments to conserve ecosystems and enhance local livelihoods

“Many conservation practitioners hope that economic valuation studies will help them make the case for nature conservation and initiate positive change. But in most circumstances, the benefits and costs of changes accrue to different parties in very different ways, so that the revelation of ecosystem service values does not in itself change the behaviour of individuals, corporations or communities.”

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The document presents a step by step framework to help conservation and development planners and practitioners (the target audience) to identify economic instruments that can promote pro-conservation behaviour in a specific setting. As can be seen in Figure 2.4, it does so in seven steps over three project stages (preparation, situational analysis, and planning for implementation). The document is practice oriented providing several templates, tips and examples for going through the different steps.

Practical efforts to implement economic instruments in nature projects face considerable risks of failing, either because the measures chosen are not adopted by the stakeholders or because they do not have the expected positive effect. The framework therefore starts with the screening for opportunities rather broadly, in particular not initially restricting only considering the instrument payments for ecosystem services (PES). PES receives a lot of focus, but PES does not cover the range of economic instruments, and is not always the most appropriate approach.

The concept of 'ecosystem service opportunities' (which is broader than PES) builds on, and brings together, general economic principles and an ecosystem services perspective. The four economic principles utilized are 'Steward Earns' (which ESS providers could be rewarded for their efforts?), 'Beneficiary Pays' (which ESS beneficiaries could contribute to the provision of ecosystem services), 'Polluter Pays' (which ESS degraders can be held liable for damage, so that they reduce or stop harmful activities or at least compensate for them?), and 'Innovation' (what are new ways for people to tap into business opportunities from ecosystem services and biodiversity?)

The seven step framework for identifying and planning economic instruments for conservation and for sustainable development

Stage 1: Preparation

Step 1 explains the preparation for the process.



Step 1. Getting organised. In order to initiate the assessment process, the team has to get organised. This involves clarifying the objective and scope of the assessment, identifying its technical and logistical requirements, and planning how it will be undertaken.

Stage 2: Understanding the situation and identifying opportunities

Steps 2–4 describe a stakeholder-inclusive assessment process to analyse the context and issues in order to understand the situation, and to identify the opportunities for using economic instruments.



Step 2. Scoping the context and stakeholders. Once the team is ready to start, a solid understanding of the assessment context is required. This involves characterising the stakeholders, the socioeconomic and biophysical situation, and the current threats to ecosystems.



Step 3. Weighing up ecosystem service benefits and costs. Next, the economic analysis of the situation commences. This involves understanding who influences the supply of ecosystem services and who benefits from them, and how the costs and benefits of ecosystem conservation are distributed.



Step 4. Identifying opportunities and instruments. Based on gaps and imbalances in the provision and distribution of ecosystem services, the team needs to identify opportunities and select suitable economic instruments to enhance or redistribute the benefits of ecosystem services.

Stage 3: Designing and planning the instrument

Steps 5–7 deal with the participative design and planning process of the economic instrument. They clarify what exactly is to be implemented, how, and by whom.



Step 5. Sketching out the instrument. Having chosen a suitable economic instrument, the team now specifies its structure and main components. This involves determining the key actors, their roles and motivations, and clarifying the broader requirements and supporting conditions and analyses.



Step 6. Agreeing on the instrument. This involves presenting a convincing model of how the instrument would work, clarifying institutional and administrative modalities and confirming feasibility and acceptance of the design.



Step 7. Planning for implementation. Finally, the pathway towards actual implementation can be laid out. This involves formulating an action plan and a monitoring scheme, preparing and signing necessary formal agreements, and handing over to the implementing partners.

14. Keep it Fresh or Salty - An introductory guide to financing wetland carbon programs and projects

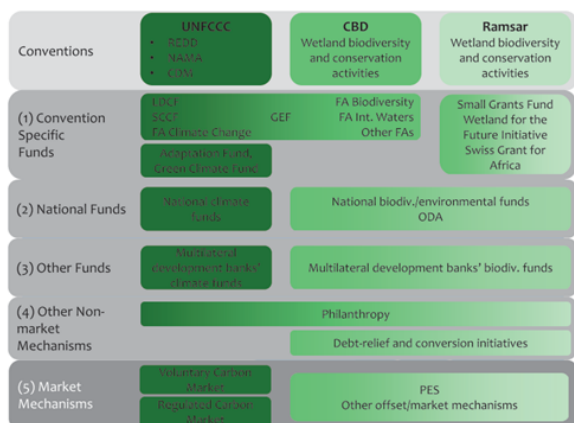
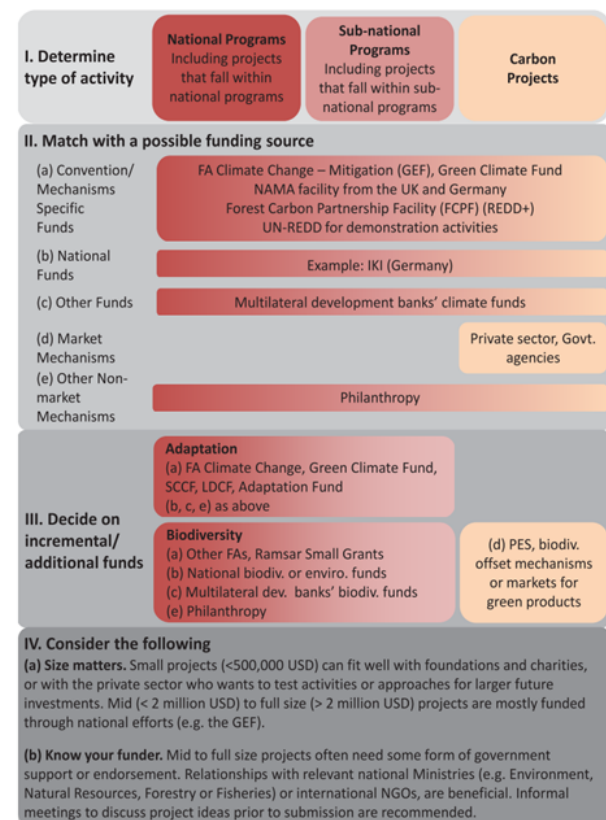
“Wetland carbon activities can be initiated as independent projects or as components of larger national or sub-national programs to combat climate change. Although to some extent an artificial construct, the distinction this report makes between projects and national or sub-national programs should help the reader find those funds or financial mechanisms that best suit the type of activities he/she intends to initiate. Due to inevitable overlap between projects and programs, multiple funding options could be explored.”

This document presents a guidance to identify different funds and finance mechanisms for wetland (include peatlands and coastal wetland systems such as mangroves, tidal saltmarshes and seagrass meadows) conservation and restoration projects, specifically focusing on the benefits related to carbon. The document is intended for program and project developers in developing countries working on wetland conservation and restoration.

The authors argue specifically that mitigation activities that lead to Greenhouse Gases (GHG) reductions need to be able to measure the result they delivery (result-based mitigation activities). Whether or not the results are measurable (verifiable) will define for a large part what funding model and financing sources could be tapped into. This also applies for other services provided by the activities, other than GHG reductions. The authors firstly present a strategy for identifying carbon financing opportunities by understanding the type and scale of the intended activities in relation to the (sub)(inter) national context (fig). This is followed by the identification and clustering of other potential sources of finance (so non-carbon financing sources) which are elaborately discussed in the document.

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Left: Elements to consider when starting to look for wetland carbon finance. right: overview of the main climate and biodiversity related finance mechanisms relevant for wetland carbon projects and programs



15. Catalyzing Climate Finance - A Guidebook on Policy and Financing Options to Support Green, Low-Emission and Climate-Resilient Development

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“It would be misleading to think of investors as wealthy institutions or individuals sitting on large piles of money and looking for places to invest. Most of the wealth accumulated globally is deposited in pension and insurance funds and must cover the cost of expected future payouts. Because of these future liabilities, fund managers are generally obliged to invest in very low-risk assets. ... the objective of climate-investment policies is to create conditions for attractive investment risk/reward profiles, adapted to different types of investors, either through reducing risks (stable policy context, guarantee instruments, etc.) or increasing rewards (premium prices, tax credits, etc.)”

This document is part of a series of manuals and toolkits to support climate change adaptation and mitigation. It focuses on the review of policy and financing options to catalyze capital toward green, low-emission and climate-resilient development. The main audience is the public development practitioner, both at national and sub-national levels, as well as domestic and international experts involved in assisting governments in catalyzing finance for climate investment and sustainable development.

The document takes a deep dive into different types of policies categorized into i) capacity and information based instruments (such as awareness campaigns) , ii) regulatory instruments (such as standards and mandatory labelling), and iii) market based instruments including fiscal incentives (such as carbon tax) , early market development instruments (such as R&D grants), equity- and debt-based instruments (such as agricultural insurance) and trading instruments (such as fishing quota’s). The authors propose a policy analysis framework to determine an appropriate policy mix based on eight criteria reflecting both the views expressed by the business community (policies need to be loud, long, legal and light) and the taxpayer’s perspective (environmental effectiveness, cost effectiveness, political feasibility including distributional effects, and institutional feasibility).

The document builds up to a four step methodology to assist developing countries to identify and implement an optimal mix of public policies and financing instruments to create enabling conditions for public and private investment to address pressing environmental problems.

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Four-step methodology to catalyze climate finance toward green, low-emission, climate-resilient development in line with national priorities.

