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Gap analysis of existing financing mechanisms in partner countries to be used for GI investments

Linda Barci, Giuseppe Macaione (ETIFOR|Valuing Nature)

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List of abbreviations

CBD: Convention on Biological Diversity

COP: Conference of the Parties

CSR: Corporate Social Responsibility

ES: Ecosystem Services

GBF: Kunming-Montreal Global Biodiversity Framework

GHGs: Greenhouse gases

GI: Green Infrastructure

NbS: Nature-based Solutions

NWRM: Natural Water Retention Measures

PES: Payment for Ecosystem Services

PPPs: Public-Private Partnerships

UNFCCC: United Nations Framework Convention on Climate Change

A. Executive summary

This document is produced within the framework of the Interreg GreenScape CE project. It provides an overview of financing approaches that can be used to provide Nature-based Solutions (NbS) in the five urban areas involved in the project: Zagreb, the Metropolitan area of Milan, Ptuj, Szegedin, and Warsaw. These pilot areas face unique climate challenges, and utilising nature's potential is an attractive strategy to address negative climate impacts while improving the resilience and liveability of these urban areas. However, to achieve these goals, the proper funding is needed.

This analysis focuses on financing mechanisms from the perspective of city governments and it has been compiled through a literature review. It is intended to provide a basis for a more detailed analysis of financing instruments within *Deliverable 2.1.2 – "Summary report on good practice examples of NBS/GI financing in the CE"*, where relevant case studies will be provided for each.

The deliverable is structured as follows:

Chapter B opens with an overview of the concept of NbS and the estimate of their current finance flows, both from public and private sources. It continues with an outline of the main policies and incentives driving fundings, especially for urban NbS, both at the International level and at a more regional scale, e.g. Europe. It then closes with an overview of the financial barriers that hinder the mainstreaming of NbS and some suggestions to overcome these.

Chapter C, which constitutes the core of the Deliverable, aims to present an overview of financing for urban NbS. It first provides a list of the main investors on the scene and then categorises the main financing instruments. The chapter closes with a catalogue of all financing mechanisms, which are briefly described, and for each of them, strengths and limiting factors are expressed.

Chapter D aims to present the preliminary results of the application of a strategy for selecting NbS that could best improve the resilience of the 5 GreenScape CE pilot cities and consequently arrive at the most suitable funding.

Chapter E summarises the findings and provides recommendations on urgent action needed by public and private actors to use NbS to its full potential in the battle against climate change, biodiversity loss and land degradation.

B. Introduction

1. Nature-based Solutions and the state of their finance

1.1. What are Nature-based Solutions?

In the past few years, the term Nature-based Solution (NbS) has been used to refer to various strategies and approaches that place "nature" as a central element to help solve societal challenges such as climate change, biodiversity loss, water and food security, and others (European Environment Agency, 2021). In this way, several approaches originating from different sectors (e.g., academia, industry, policy) and initially considered different from each other started to be regarded as NbS. The term has now become an umbrella concept encompassing such approaches.

On March 2nd, 2022, The Fifth Session of the United Nations 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"*** (Figure 1).

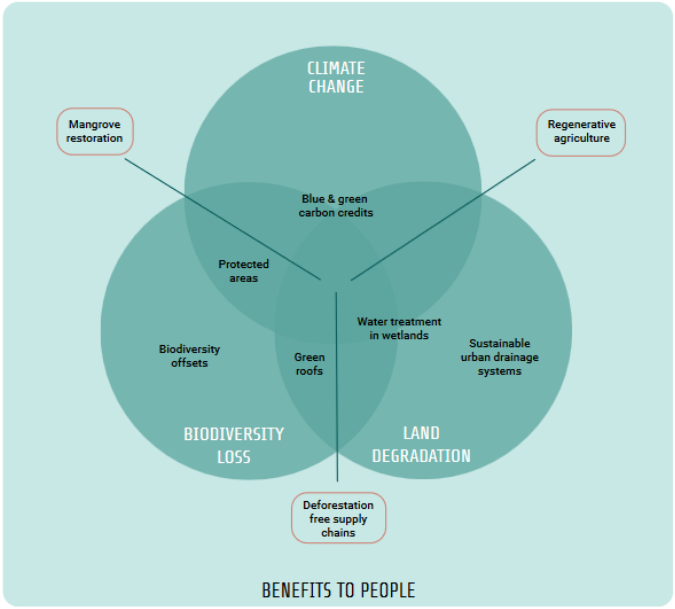

Figure 1: NbS to climate change, biodiversity loss and land degradation, contributing to human wellbeing (Source: UNEP, 2022)

This definition, which is largely based on the one provided by IUCN in 2016, places ecosystems as a central element in providing well-being to humanity and biodiversity benefits but leaves room for interpretation of what is meant by "natural". Moreover, it does not offer a clear route on how to address such societal challenges.

In this sense, the NbS definition has made it possible to group a broad spectrum of actions that, although at first glance seem complementary or even synonymous with each other, are different in terms of the main objectives they pursue, the starting points, and the strategies they use to achieve it. Some of these examples include integrated landscape management strategies for climate change adaptation, green infrastructure options to ensure the provision of certain essential services or ecosystem-based approaches to natural disaster risk reduction.

The main terms that fall within the concept of NBS are (European Environment Agency, 2021).

- Ecosystem approach and ecosystem-based approaches
- Green and blue infrastructure
- Ecosystem-based adaptation
- Ecosystem-based disaster risk reduction
- Natural water retention measures (NWRM)
- Sustainable management and ecosystem-based management

A key aspect of NbS is their multifunctionality, which is the ability of an NbS to perform several functions and provide several benefits within the same spatial area (Brears, 2022).

While NbS is primarily perceived as a cost-effective means to achieve climate, biodiversity, and land restoration targets, a key question is how to scale up the implementation of NbS globally and channel the required levels of investment.

1.2. State of finance for nature

According to UNEP, the current finance flows to NbS are estimated to be US$154 billion annually (UNEP, 2022). Public funds make up 83% of the total, directing US$128 billion per year towards NbS, while the private sector contributes approximately 17% at US$26 billion per year.

Almost half of government finance for NbS (US$128 billion) goes to the protection of biodiversity and landscapes (US$58 billion), followed by sustainable agriculture, forestry and fishing (US$29 billion per year or 23%).

Sustainable supply chain investments are the largest private finance component, channelling about US$ 8 billion per year (5 %), followed by biodiversity offsets at US$6 billion per year and private payments for ecosystem services and impact investments, each contributing US$3 billion per year. Finance flows to carbon markets and from non-governmental organizations (NGOs) and philanthropy are around US$2 billion annually.

The small share of private finance to NbS compared to public funding reflects the relative novelty of investing in natural capital. It suggests that the investment case, i.e. the return to the investor relative to the level of risk, needs to be stronger.

UNEP estimates that annual investment in NbS should reach $542 billion by 2030 to reach the Rio Targets, including limiting global warming to 1.5°C in line with the Paris Agreement (Figure 2). This means that investment into NbS needs to be quickly and drastically scaled (Van Raalte, Dorian, 2023).

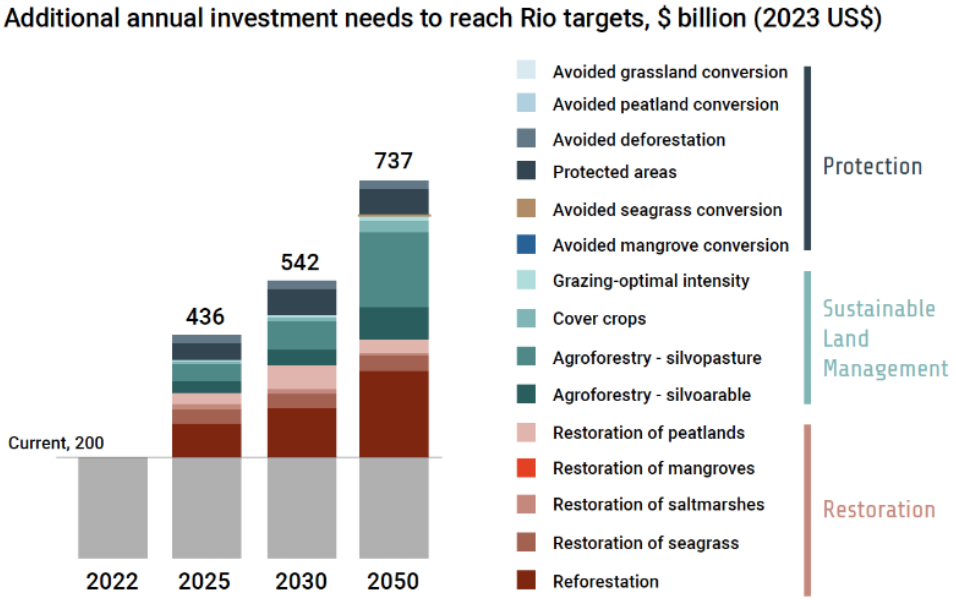

Figure 2: Required NbS investment to reach Rio Targets, including limiting climate change to below 1.5°C, halting biodiversity loss and achieving land degradation neutrality (Source: UNEP, 2023)

An analysis conducted by the European Investment Bank and Bankers without Boundaries on the State of NbS in the EU shows that 1364 NbS projects were identified between 2000 and 2022 and that 76% of these could be classified as 'urban' (Figure 3) (European Investment Bank (EIB) and Bankers without boundaries, 2023).

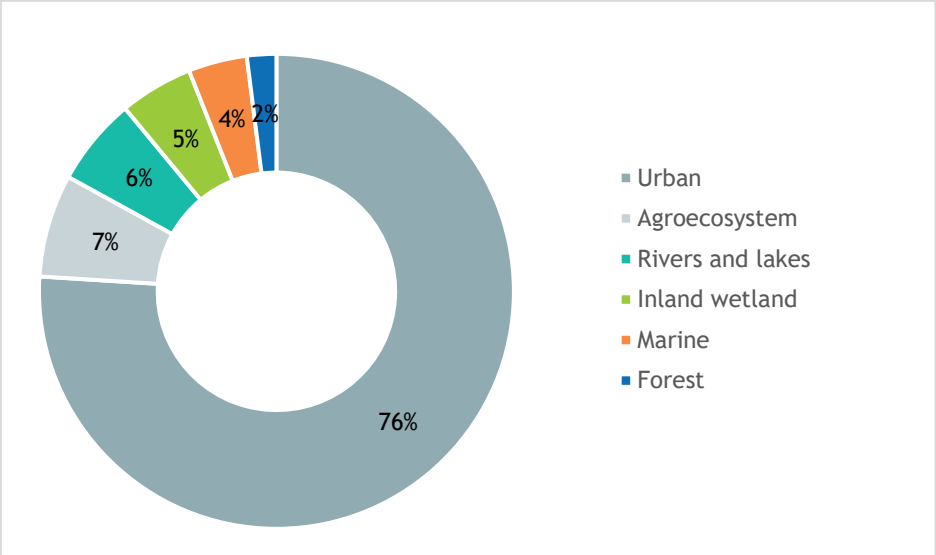

Figure 3: EU NbS by ecosystem between 2000-2022 (Source: Modified by the author from EIB and Bankers without Boundaries, 2023)

2. International and European policies and incentives driving fundings

The global landscape is witnessing a shift in environmental consciousness, resulting in a concerted effort towards restoring and conserving natural ecosystems. International and European policies are emerging as powerful driving forces for funding initiatives aimed at their restoration.

This has been increasingly evident since the COP21 of the Convention on Climate Change with its *Paris Agreement*, which called for making funding consistent with the goal of low emissions and climate-resilient development, and with the latest COP15 of the Convention on Biological Diversity in 2022 with the adoption of the *Kunming-Montreal Global Biodiversity Framework (GBF)*, which sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050.

Furthermore, the European focus on the approach defined as 'adaptation' to climate change, more recently also declined as 'resilience' (also social and economic), has been definitively consolidated in the *Green Deal* documents and its more specific declinations (*Adaptation Strategy, Biodiversity Strategy, etc.*).

Very important in this sense are also the European initiatives on urban regeneration called "*A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives*" and the *New European Bauhaus* - building beautiful, sustainable and inclusive places to live after the pandemic.

Therefore, it is becoming increasingly evident that multilateral agreements, European strategies, regional legislations and investors are converging on nature. From these, a series of incentives have been woven to support and promote, among others, the creation of NbS projects in cities. It is, therefore, useful to recall their essential outlines.

2.1. International policies and treaties

- **The United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement**

The United Nations Framework Convention on Climate Change (UNFCCC), also known as the "*Rio Declaration on Environment and Development*", is the leading international agreement on climate action and was adopted, together with the Convention on Biological Diversity and the United Nations Convention to Combat Desertification, at the Earth Summit in Rio de Janeiro in 1992.

It is precisely in the UNFCCC that the word "adaptation" made its appearance for the first time, in particular in Article 4(b), where countries are urged to put in place regional plans that contain measures to facilitate adaptation to climate change, and in Article 4(e) where reference is made to cooperation between countries on adaptation to the impacts of climate change, resulting in the development of plans to protect the most vulnerable areas.

The UNFCCC is the instrument through which countries cooperate to limit global temperature rise and climate change and address its consequences. The main objective is stabilising greenhouse gas (GHG) emissions at a level that does not endanger the global climate.

In 2015, at the 21st Conference of the Parties (COP21) – the supreme decision-making body of the Convention – of the UNFCCC in Paris, the so-called ***Paris Agreement*** was signed, a milestone in the climate negotiations. The Paris Agreement is a legally binding international treaty on climate change, adopted by 196 Parties, and entered into force on November 2016.

Its overarching goal is to hold the increase in the global average temperature well below 2°C compared to pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C. This agreement is a

milestone in the multilateral climate change process because, for the first time, a binding agreement brings all 196 Parties together to combat climate change and adapt to its effects.

Countries that join the agreement commit Nationally Determined Contributions (NDCs) that outline their efforts to reduce their GHGs and improve resilience to climate impacts.

The EU and its member states have both signed and ratified the Paris Agreement, demonstrating a continued commitment to its execution. In line with this commitment, EU nations have collectively agreed to lead the EU towards becoming the inaugural climate-neutral economy and society by 2050.

In compliance with the agreement's stipulations, the EU submitted its comprehensive long-term emission reduction strategy and updated climate plans by the end of 2020. This commitment involves a substantial promise to decrease EU emissions by a minimum of 55% by 2030, compared to 1990 levels. Furthermore, the EU, together with its member states, revised the EU's climate plans (NDCs) in 2023.

- **The Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework (GBF)**

The Convention on Biological Diversity (CBD) is a multilateral agreement non-binding, that has three main goals: the conservation of biological diversity (biodiversity), the sustainable use of its components and the fair and equitable sharing of benefits arising from genetic resources[1]. The Convention was opened for signature at the Earth Summit in Rio de Janeiro in 1992 and entered into force in December 1993. Basically, it is an international legal instrument for the conservation of biodiversity for the 196 Parties that have signed it, although it is not binding.

Parties to the Convention are committed to developing and implementing national strategies and action plans to achieve these goals. Central to this agreement is the interconnection between biodiversity and human well-being, ensuring responsible and fair use of nature-dependent resources for present and future generations. The CDB key targets by 2030 are:

1. no net loss of areas of high biodiversity importance
2. at least 30% of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration
3. at least 30% of ecologically important habitats are managed through governed systems of protected areas and other effective area-based conservation measures

The CBD's governing body is the Conference of the Parties (COP). This ultimate authority of all governments (or Parties) that have ratified the treaty meets every two years to review progress, set priorities and commit to work plans.

During the COP15, in 2022, the **Kunming-Montreal Global Biodiversity Framework (GBF)** was adopted. This historic Framework, which supports the achievement of the Sustainable Development Goals, sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. Among the Framework's key elements are 4 goals for 2050 and 23 targets for 2030 (Figure 4).

[1] https://www.cbd.int/

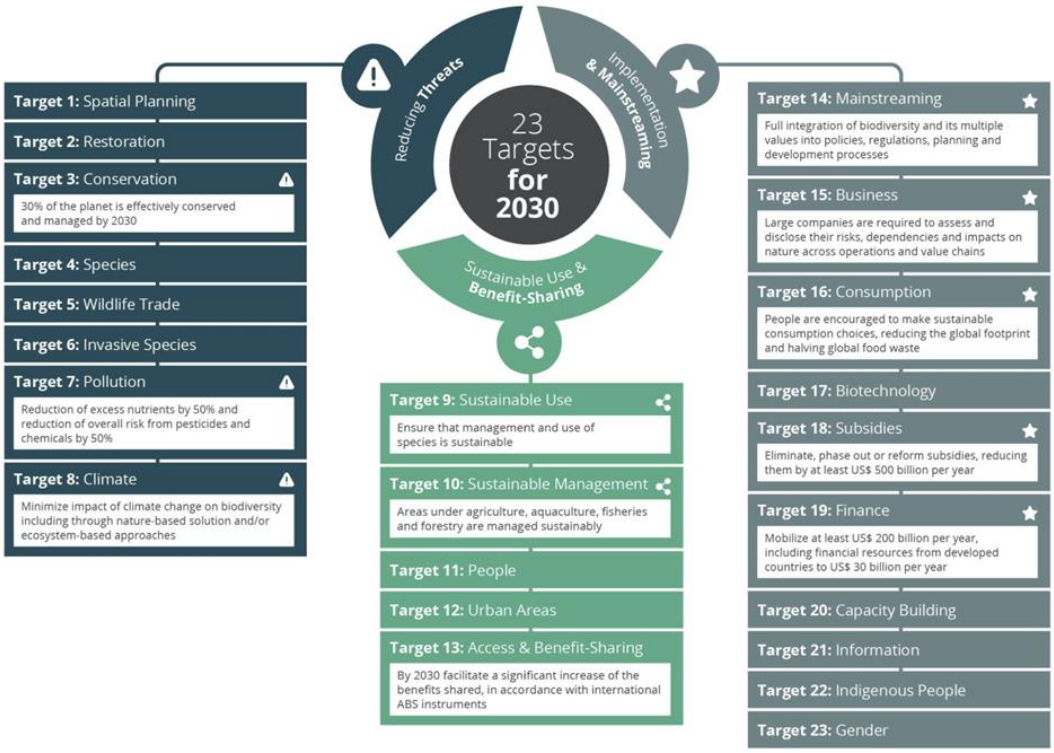

Figure 4: GBF's 23 targets for 2030 (Source: Business for Nature)

Crucial to the funding mechanisms is target 19 which aims to increase the level of financial resources to implement national biodiversity strategies and action plans, by 2030 mobilizing at least 200 billion USD/year, including:

a) Increase developed countries' contribution to developing countries and transition economies of at least 20 billion USD per year by 2025, and 30 billion USD by 2030

b) Increase domestic financial resources facilitated by **national biodiversity finance plans**

c) Leveraging private finance, promoting **blended finance, encouraging the private sector to invest in biodiversity**

d) Stimulating Payments for Ecosystem Services, green bonds, biodiversity offsets and credits

e) Enhancing role of collective actions, including indigenous people, community management and cooperation

In a nutshell, and to simplify the understanding of what has been explained above, we can consider the CBD the equivalent of the UNFCCC but for biodiversity and the GBF as the Paris Climate Agreement-equivalent for nature with targets for a nature-positive future.

2.2. European policies and directives

- **European Green Deal**

The European Green Deal is a package of policy initiatives that aims to set the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050[2].

[2] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

It supports the transformation of the EU into a fair and prosperous society with a modern and competitive economy. It underlines the need for a holistic and cross-sectoral approach in which all relevant policy areas contribute to the ultimate climate-related goal. **The package includes initiatives covering the climate, the environment, energy, transport, industry, agriculture and sustainable finance - all of which are strongly interlinked.**

The European Green Deal, through some of its main targets (Raising the EU's climate goals for 2030 and 2050; Building and renovating in an energy and resource-efficient way; Mobilising Industry for a Clean and Circular Economy) influences public and private investments, including those for NbS.

To achieve the targets set by the European Green Deal, the Commission has committed to mobilise at least EUR 1 trillion of sustainable investments over the next decade. 30% of the EU's multiannual budget (2021-2028) and the EU's single NextGenerationEU instrument for recovery from the COVID-19 pandemic has been allocated to green investments. Table 1 shows some of the European GreenDeal strategies and initiatives that incentivise and promote the creation of NbS projects in Europe.

Green Deal Strategies & Initiatives	Description
EU Adaptation Strategy[3]	This strategy sets out how the EU can adapt to the unavoidable impacts of climate change and **become climate resilient by 2050**. It aims to reinforce the adaptive capacity of the EU and the world and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the European Climate Law which writes into law the goal set out in the European Green Deal. The law recognises adaptation as a key component of the long-term global response to climate change and requires Member States and the Union to enhance their adaptive capacity, strengthen resilience and reduce vulnerability to climate change. It also introduces a requirement for the implementation of national strategies. The Strategy aims to build a climate resilient society by improving knowledge of climate impacts and adaptation solutions; by stepping up adaptation planning and climate risk assessments; **by accelerating adaptation action**; and by helping to strengthen climate resilience globally.
EU Biodiversity Strategy for 2030[4]	The goal of the EU Biodiversity Strategy for 2030 is to help recover Europe's biodiversity by 2030. This would bring benefits for people, the climate and the planet. The actions set out in the strategy include: • extending protected land and sea areas in Europe • restoring degraded ecosystems by reducing the use and harmfulness of pesticides • **increasing funding of actions and better monitoring of progress** A key part of the strategy is to promote healthy and vibrant urban ecosystems. This strategy aims to stop the loss of green urban space including tree canopy cover, and then steadily increase them. It also calls upon all cities and towns over 20,000 inhabitants to develop ambitious urban greening plans - to ensure that GI and NbS are systematically integrated into urban planning process.
EU Nature Restoration Law[5]	Approved in February 2024 after a long legislative process, the Nature Restoration Law (NRL) is the EU's most important law for the restoration of damaged natural ecosystems. The law establishes that Member States must restore at least 20% of the EU's land and marine areas by 2030.

[3] https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy_en
[4] https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en
[5] https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en

	This is translated into specific targets, which are legally binding on Member States, such as: - Restoration off 30% of terrestrial, coastal, freshwater and marine ecosystems by 2030, and 90% by 2050. - Reversing the decline of pollinators, such as bees, by 2030 - Increased biodiversity of agricultural and forest ecosystems and restoration of 30% of wetlands by 2030, and 50% by 2050 - **No net loss of urban green spaces and implementation of nature-based solutions** Member States will have the freedom to develop specific national plans on how they intend to achieve these targets.
New European Bauhaus	In October 2020, the Commission also launched the New European Bauhaus initiative which provides a forum where Europeans can come together to share ideas on climate-friendly architecture. the New European Bauhaus inspires a movement to facilitate and steer the transformation of society along three inseparable values: • **sustainability, from climate goals to circularity, zero pollution, and biodiversity** • aesthetics, quality of experience and style beyond functionality • inclusion, from valuing diversity to securing accessibility and affordability In addition to creating a platform for experimentation and connection, the initiative supports positive change also by providing access to EU funding for beautiful, sustainable, and inclusive projects.
A Renovation Wave for Europe - *greening* our buildings, creating jobs, improving lives[6]	Renovating both public and private buildings was singled out in the European Green Deal as a key initiative to drive energy efficiency in the sector and deliver on objectives. To pursue the dual ambition of energy gains and economic growth following the COVID-19 pandemic, the Commission published in 2020 the strategy "A Renovation Wave for Europe" along with an action plan and a document presenting available EU funding[7]. The strategy identifies 3 focus areas: • Tackling energy poverty and worst performing buildings • **Renovation of public buildings** • **Decarbonisation of heating and cooling**

Table 1: European Green Deal Strategies and Initiatives (Source: own elaboration)

- **EU Framework on Sustainable Finance package**

Sustainable finance refers to the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects.

EU has proposed a suite of policy instruments designed to integrate sustainability considerations when making investment decisions in the financial sector (Figure 5).

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662
[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122391413&uri=CELEX:52020SC0550

Several landmark legislative proposals – including the EU Taxonomy Regulation, the Corporate Sustainability Reporting Directive (CSRD) and Sustainable Finance Disclosure Regulation (SFRD) – work together to make the financial sector more sustainable by re-orienting investments towards sustainable technologies and businesses, by financing growth in a sustainable manner over the long-term, and by contributing to the creation of a low-carbon, climate resilient and circular economy.

These initiatives are key to directing financial and capital flows to green investments and moving towards a green transition.

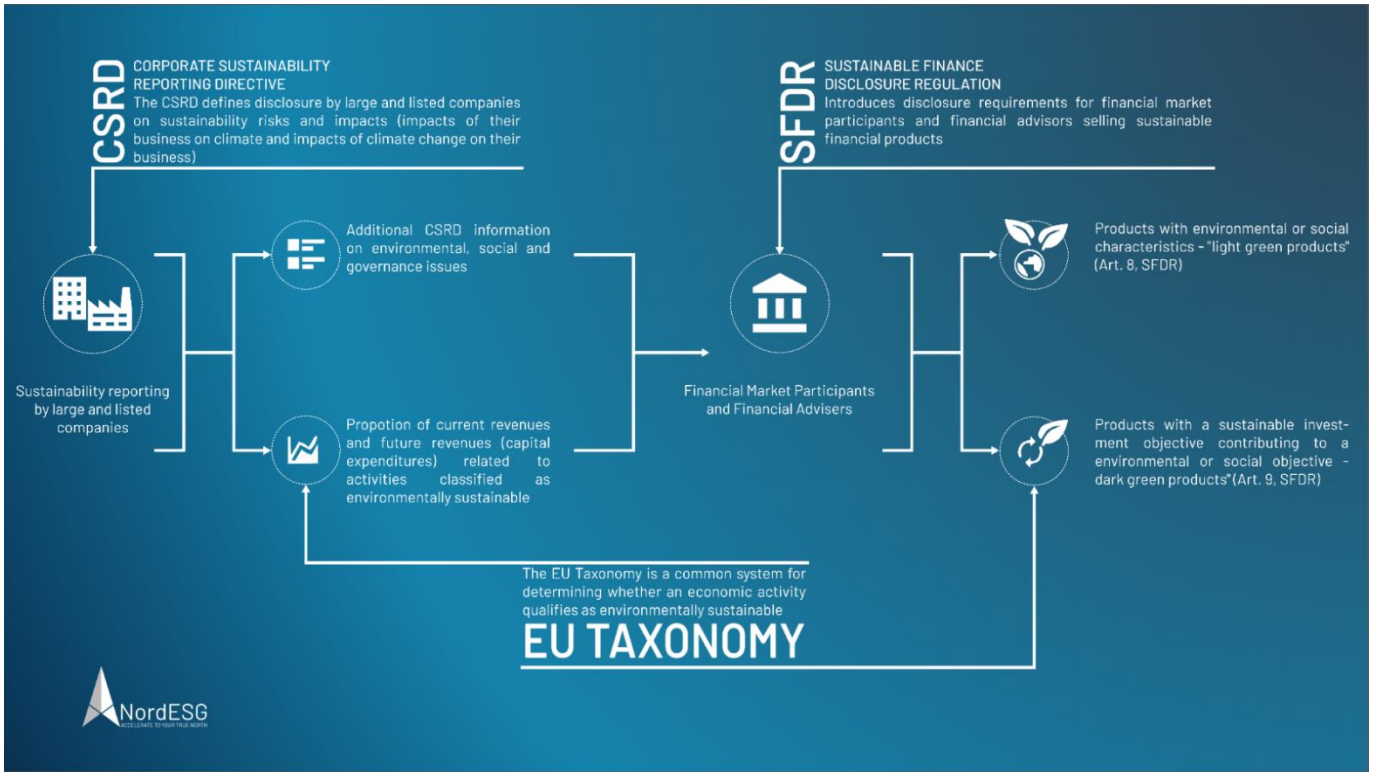

Figure 5: EU Framework on Sustainable Finance package (Source: Nord ESG)

3. Current financing barriers for NbS and how to overcome these

Nature-based Solutions can help tackle climate change and advance urban sustainability by using nature to deliver social, ecological, and economic benefits. However, their success largely depends on implementation for which several barriers exist.

These barriers can be categorized into two types based on the reference system: barriers related to the structural and cultural system, and barriers related to the financial system.

The two reference systems represent two different levels of managing the phenomenon under analysis (NbS), with one incorporating the other (Figure 6). Indeed, the structural and cultural system forms the necessary foundation to make the financial system possible and effective. Therefore, although the focus of the paragraph is on financial barriers, it is necessary to provide also an overview of the cultural barriers, as their presence would make the financial system even more fragile and vulnerable to potential obstacles, emphasizing the critical interconnection between the two systems.

Figure 6: The dependency of the Financial System on the Structural and Cultural System (Source: own elaboration)

Structural and cultural barriers arise from the challenges associated with the economic valuation and valorization of ecosystem services, leading to market failures. These challenges depend on several factors (see Table 2) including the cultural context, the knowledge of ecosystem services, the key actors responsible for creating and managing the market, as well as supportive regulations and laws.

Conversely, financial barriers arise from the difficulties in securing the necessary financial resources to support NbS. These challenges are influenced by factors such as the attractiveness and stability of the market, risks associated with economic returns, and other interconnected elements.

Structural & cultural barriers	Description
Cultural divide	Problems relating to the "cultural divide" are most evident among smaller municipalities, i.e. a lack of specific skills with respect to NBS. This problem is less noticeable in larger cities. Professionals who should deal with the proposal and development of this kind of intervention should have multidisciplinary and transversal skills (engineering, urban planning, ecology,

	natural sciences, among those most frequently mentioned). Furthermore, the "engineering" vision adopted by technicians often does not allow for the consideration of broader aspects related to sustainability and impact, such as the provision of ecosystem services and their possible trade-offs. In this sense, there is a need to facilitate the knowledge dialogue (also by encouraging the transition between academia and project implementers).
Cultural barriers emerging from citizens	Cultural barriers also emerge from citizens, as a lack of knowledge of the impacts of these solutions and a lack of clear communication of the benefits is often reflected in a resistance to accept these kinds of interventions and a reluctance to pay a potential tax increase
Grey infrastructure default	Public authorities have extensive experience and expertise in these projects, leading to a tendency to favour them. Overcoming this challenge involves not only finding technical experts but also educating municipalities about the cost-effectiveness and additional benefits of nature-based projects (Urban20, 2020).
Information gaps	Limited, asymmetrical, or absent data on climate change and environmental risks lead to uninformed decisions. Projects struggle to gather relevant performance information for informed investment decisions, resulting in 'information failure.' (European Investment Bank (EIB) and Bankers without boundaries, 2023).
Impact assessment issues	A well-known problem is also the difficulty of measuring and monetizing the impacts generated by NbS, also to highlight the potential effectiveness and efficiency compared to traditional grey solutions. In this way, companies fail to account for the benefits and obtain additional financing resources.
Place-based complexity	The complexity of NbS projects varies significantly based on the local context, such as differing land ownership and regulations. This localized nature makes direct replication challenging, hindering the scalability of investments in NBS in Europe (European Investment Bank (EIB) and Bankers without boundaries, 2023).
Undervaluing natural capital	Being unable to account for all the costs and benefits of natural capital is one of the biggest challenges for the economic support of NBS projects. Neglecting the externalities linked to environmental degradation leads to underestimating biodiversity risks, influencing misguided policy and investment choices (Brears, 2022)

Financial barriers	Description
Input costs	In Europe, input factors for NbS projects, like labour and land, are generally expensive. The high cost of land and its opportunity cost further inhibits potential investments (European Investment Bank (EIB) and Bankers without boundaries, 2023).
Maintenance costs	As NbS are long projects, it's important to consider the costs of their maintenance to ensure they continue to provide benefits effectively.
Low returns	Investors might perceive that NbS projects generate inadequate returns - such as debt repayments or income streams - compared to established technologies. The perception may be that NbS is more expensive to manage or maintain (Brears, 2022).
Short-termism	Investors favour short-term profits, which conflicts with long-term NbS projects requiring substantial upfront capital and offering long-term returns. The extended timeframes and uncertain natural world risks create a higher risk profile, discouraging many investors. Moreover, the need to intervene in emergency or in a fast way, following a post intervention action rather than a preventive one, leads to a preference for interventions capable of producing immediate impacts.
Perceived higher risk	Limited historical cost-benefit data for NbS, unlike the extensive data available for grey infrastructure, increases the perceived risk associated with NbS projects in economic analysis (Brears, 2022).

Limited financial advisory support	The sector lacks adequate access to financial advisory assistance for municipalities and urban project promoters.
Grant dependency	In Europe, the dominance of grant funding in the NbS market creates challenges. This dominance limits the project pipeline for other kind of investors (e.g., commercial investors) excludes different types of repayable investors, and hinders the construction of an efficient project pipeline (Fi compass, 2020).
High transaction costs	Research and administration costs in developing and financing small-scale NBS projects can significantly hinder project implementation when transaction costs are high.
Municipal borrowing constraints	Municipal budget constraints and national restrictions on indebtedness hinder urban project implementation. Public financing shortages push for private and citizen investments, sometimes becoming obligatory. Citizen groups' unequal benefit from public goods can reduce willingness to pay taxes, impacting public funding availability (Fi compass, 2020).

Table 2: Main financing barriers for NbS (Source: own elaboration)

3.1. Role of governments in removing barriers to financing NbS

According to Brears, Governments can play a significant role in removing barriers to financing NbS by:

- *Facilitating the scaling up of NbS*: NbS projects are usually new and unfamiliar to private investors. Major investors are usually not attracted to small projects requiring modest amounts of funding. Governments can facilitate the scaling up of NbS by:
    - Demonstrating mechanisms that can aggregate and sell the ecosystem services from NbS projects.
    - Creating a pipeline of NbS projects that can be efficiently aggregated into a portfolio or fund.
    - Providing incentives to encourage large-scale NbS projects through tax and other pricing mechanisms.
- *Providing certainty*: Governments can:
    - Develop a reliable pipeline of investment ready NbS projects, which provides the necessary certainty and confidence for buyers, sellers, and investors.
    - Develop transparent standards for defining and measuring the multiple benefits delivered by NbS (ES). They can also ensure long-term monitoring and evaluating is incorporated into NbS projects.
- *Providing liquidity*: Governments can provide the liquidity necessary for efficient NbS project delivery by:
    - Stating who is committed or obliged to contribute to environmental targets and over what period.
    - Committing public funding for a defined period to de-risk private investment in NbS.
    - Implementing efficient mechanisms for setting the price of ES and reducing transaction costs

C. Overview of financing for urban Nature-based Solutions

4. Main categories of investors

The landscape of investors for NbS is diverse, and it includes a variety of entities, ranging from the public, private, and quasi-private sectors (Van Raalte, Dorian, 2023).

Although there is some overlap, investors can be grouped based on similar attributes (such as ownership, sources of funding, mandate, etc.) into the following categories: governments and municipalities, water authorities and flood managers, development agencies and multi-donor funds, Multilateral Development Banks (MDBs) and Development Finance Institutions (DFIs), foundations and non-governmental organizations (NGOs), impact investors, commercial investors, and businesses.

While categorisation is helpful to draw general conclusions, investors within categories may differ significantly and entities may have multiple strategies with different mandates and profit/impact motives. Table 3 provides a summary of the main categories of NbS investors.

Types of investors	Description and examples	Sector	Profit motive
Governments **Municipalities**	Various governmental bodies and organizations across levels responsible for governing and providing public services to citizens	Public sector	Low
Water authorities **Flood managers**	Water authorities and flood managers may invest in NbS projects to comply with obligations under the Water Framework Directive (WFD) and Floods Directive.	Public/Quasi-public sector	Low
Development Agencies **Multi-Donor Funds**	Entities with pooled resources from multiple countries to support development initiatives and projects in various regions or sectors E.g.: Green Climate Fund (GCF), Global Environment Facility (GEF)	Public/Quasi-public sector	Low to medium
Multilateral Development Bank **Development Financial Institutions**	MDBs are internationally chartered financial institutions, supported by multiple countries, aimed at fostering economic development in less affluent nations, whereas DFIs are governmental or quasi-governmental entities that invest in low- and middle-income countries.	Public/Quasi-public sector	Varies but typically medium
Foundations, Philanthropists, NGOs	Private/third sector non-profit entities that work towards addressing social and humanitarian issues through charitable activities and projects	Private/ Third Sector	Low
Impact Investors	Private sector organisations or individuals that seeks to invest in projects or companies with the intention of generating positive social or environmental impacts alongside financial return	Private sector	Varies from low to high
Commercial Investors	Private sector entities such as private equity and venture capital firms, institutional investors, financial institutions, and asset managers that invest capital in businesses and projects for potential financial returns	Private sector	High
Businesses	Private sector entities involved in various industries and sectors, providing goods and services to customers	Private sector	High

Table 3: Different categories of NbS investors. (Source: modified by the author from Van Raalte et al., 2023)

5. Main categories of financing instruments

Actors who seek funding sources for NbS should consider options and instruments that fit their needs and the specific context of their respective activities. Different instruments, sources, and financial considerations must be applied to guarantee enough support throughout the NbS project, including the planning, implementation, and long-term operation and maintenance of NbS (Brears, 2022). Three general cost categories need addressing to ensure the success of NBS:

- ***Initial investment costs***: these costs refer to the initial feasibility investments of an NBS project, which generally include research and development for the design of the NbS project, human capacity development and coordination, construction material and specialised equipment. Initial investment costs are usually the highest during the development phase of an NBS measure. To cover these costs, an external finance source that is either grant-based or expects a return on investment through the value generated by the measure is required.
- ***Implementation-related costs:*** These are the ongoing expenses incurred to support the coordination and facilitation of the NbS throughout its lifetime. These include human resources, equipment, and communication costs, as well as administrative costs, such as financial oversight and managing and monitoring. In this phase, funding sources usually include Corporate Social Responsibility (CSR) commitments from private companies, private foundation and philanthropy resources, allocations from government budget items, or investments from local banks.
- ***Self-sustaining costs*:** this phase covers the project's long-term running costs (e.g., maintenance). In this phase, project services are more mature and ready to generate revenue (e.g., commodity supply chains, recreational services, avoided costs of disasters). Funding sources mainly comprise market mechanisms such as new commodity markets, ecotourism fees, or payments for ecosystem services (PES).

<table>
<tr><th colspan="2">Main categories of financing instruments</th></tr>
<tr><th>“Traditional” financing instruments</th><th>“Innovative” financing instruments</th></tr>
<tr><td>Grants (EU fundings es. LIFE, Horizon Europe, Interreg; regional and public fundings)</td><td rowspan="2">Innovative market-based instruments: Payment for Ecosystem Services (PES); Biodiversity offsets; Voluntary carbon markets; Public - Private Partnerships (PPPs); Ecotourism</td></tr>
<tr><td>Donations and crowdfunding</td></tr>
<tr><td>Public finance instruments</td><td rowspan="3">Other innovative instruments: Regulation and planning standards; Exploitation of existing regulatory requirements</td></tr>
<tr><td>Debt financing instruments</td></tr>
<tr><td>Equity investments</td></tr>
</table>

Table 4: Main categories of financing instruments for urban NbS (Source: own elaboration)

As shown in Table 4, there is a wide range of financing instruments available from public, private and blended financial sources to scale up and mainstream NBS, including:

- Grants (from public and private organizations): a grant is a transfer of funds to support the development of a project, enterprise, or program, which does not involve a financial return to the granting organization. Grantmakers or the organizations that provide grant funding could be governmental, private, or philanthropic. This type of funding is usually made by organizations whose objectives are not measured only in financial terms but address social and environmental goals. A grant application usually consists of a proposal explaining how the funds will be used in detail. The

transfer of funds from the grant organization to the grantee is generally done in advance (Besacier et al., 2021). Examples of known donors for NBS projects in Europe include **LIFE, Horizon Europe and Interreg programmes**.

- **Donations and crowdfunding:** donations are one of the simplest but most prevalent mechanisms for funding NBS projects. Donations can come primarily from philanthropic organizations, as well as through crowdfunding, a community-based, typically online initiative where people interested in supporting a project, make a small individual donation that is collected in a pooled fund (Tobin-de la Puente, J. and Mitchell, 2021).
- **Public finance instruments:** these instruments include various government mechanisms, such as taxes, subsidies, charges, and tradable permits. These instruments aim to create an economic incentive for consumers and producers of a good or service to change environmentally damaging behaviour. Fundraising through these instruments can be used to carry out ecosystem restoration projects, sustainable agricultural management practices, and deforestation prevention programs (Brears, 2022).
- **Debt financing instruments**: this financial instrument provides access to capital to develop projects to cover the delay between expenses incurred and product sales in exchange for a loan repayment plus interest. Loans are typically granted by traditional investors such as commercial banks, development banks, or microfinance institutions (Besacier et al., 2021). There are various types of loans (e.g., short, medium, and long-term), which typically vary in interest rates and repayment arrangements. Some of them are listed here. Green bonds are used to fund green projects that generate environmental benefits. Environmental impact bonds (EIB) are a form of debt financing, with part of the return to investors dependent on the achievement of environmental outcomes of the financed projects. Green loans support economic activities that conserve or restore the natural environment or mitigate or adapt to climate change. Green microfinance involves providing loans to individuals or groups whose work directly supports environmental solutions to degradation and pollution.
- **Equity investments:** this type of instrument applies mainly to companies (e.g., nature-based) rather than to projects since it consists of an investor purchasing shares in a company. The investor capitalizes on the company in exchange for a return in the form of dividends linked to the company's growth in value. This way, the company can finance its operations or incur the initial investment and operating costs. As a subset of this type of instrument, green equity is mainly carried out by investment funds called impact investors, which seek financial returns and social and environmental returns. Since this type of investment has a higher risk than other financial decisions, the rate of return is expected to be higher than the interest rate of commercial banks (Tobin-de la Puente, J. and Mitchell, 2021).
- **Innovative market-based instruments:** a range of instruments that use markets or price mechanisms can be used to create incentives for private parties to invest in NBS and/or to ensure a more efficient allocation of resources. Some examples of innovative market-based instruments are provided below:
    - **Payment for Ecosystem Services (PES):** these mechanisms aim to connect providers of a service that is not traditionally traded in the market (Ecosystem Service, ES), such as water quality, erosion prevention, or the aesthetic value of a landscape, with potential consumers interested in conserving these services, such as public institutions, water utilities, or private companies. At a minimum, PES schemes require two actors: buyers (beneficiaries) of ES and sellers (providers) who affect ES supply. PES makes the consumer pays the supplier for implementing sustainable agro-environmental practices or conserving ecosystems that provide the ES of interest, which typically involves an opportunity cost for the supplier, who could use his land for commercial purposes. Payments can be in cash or in-kind and made

directly between the consumer and supplier or, in some cases, through an intermediary. These types of schemes are a promising source of financing for NBS and GI projects or those that promote regulating ecosystem services (World Bank, 2019).

- **Biodiversity offsets**: biodiversity offsets refer to actions that compensate for the residual, unavoidable harm to biodiversity caused by development projects – whether from public or private sector – with the goal to achieve no net loss of biodiversity (Brears, 2022). For example, this is achieved by enhancing biodiversity in another location by securing or setting aside land or water areas for conservation, improving the management of habitats or species, and other defined conservation activities. Biodiversity offsets are used in various public large-scale infrastructure projects and private sector industrial projects, such as transport (roads that pass through natural habitats, large ports, and airports), electrical power (all types of utility-scale generation that can affect natural habitats and biodiversity), etc. Biodiversity offsets can be implemented voluntarily or due to regulatory policies.
- **Voluntary carbon markets:** carbon markets are institutions or systems where parties exchange interests in carbon for compliance or voluntary purposes. Interests in carbon are either emission permits or credits. Voluntary carbon markets generate credits (or offset credits) that enable businesses, governments, non-profit organisations, universities, municipalities, and individuals to offset emissions outside a regulatory regime. Both permits and offset credits are exchanged by sellers and buyers in a carbon market; the purchaser of the offset credit can "retire" it to claim the underlying reduction towards their own GHG reduction goals. Carbon offset credits sold on the voluntary carbon market can be certified by a range of certification standards that ensure that carbon offset projects and their resulting credits are credible.

  Offset credits are mainly generated from forestry, agriculture, and blue carbon offset projects. Biological sequestration projects usually involve activities that increase sequestration or preserve an area's existing sequestration ability that is under threat. In addition, offset credits can be generated from renewable energy projects, including the utilisation of biomass fuels and energy efficiency projects, including offset projects that upgrade to more efficient machines and support more energy-efficient buildings
- **Public-private partnerships (PPPs)**: PPPs allow governments to attract private sector engagement, intellectual capital, and investments to accelerate green investments and technologies. Through a partnership, it is assumed that the public and private sectors can benefit from combining their knowledge expertise, finances, and other resources to deliver collective goods more efficiently. The main reasons for PPPs include limited financial resources and capabilities of the public sector, increasing demand for public service infrastructure, and the need to improve the quality of public services and reduce delivery costs. In the context of NBS and GI, PPPs can be applied in many ways. For instance, PPPs can be used to implement GI, enhancing the efficiency of large infrastructure investments. These financing models generate interesting synergies, such as making an investment more attractive for the private sector by reducing its risk due to the guarantee of public financing or promoting the use of public funds for innovative activities and market creation, derived from close collaboration with the private sector.
- **Ecotourism:** ecotourism is a market mechanism becoming increasingly relevant as a business model for nature-based initiatives. This type of responsible tourism involves enjoying natural or semi-natural areas in a way that supports conservation and minimizes the impact on local communities. Because the main asset of ecotourism is nature, a portion of the revenue from tourism packages or entrance fees is earmarked to manage natural capital

and recreational ecosystem services (Tobin-de la Puente, J. and Mitchell, 2021). Typically, ecotourism comprises activities such as agro-ecotourism, which generates incentives for farmers to manage their agricultural land sustainably; wildlife-based tourism, which encourages local communities, tourism companies, or public authorities to maintain the good quality of the ecosystems visited; and community-based tourism, which provides for the association of local communities and the conservation of their traditions and customs.

It is important to mention that the categories of financing instruments presented above should not be seen as mutually exclusive. NbS projects often need to rely on several of them to be sustained over time. This combination of multiple public and private sources of financing is known as ***blended finance*** and is playing an increasingly important role in financing innovative nature-based projects. Blended finance approaches for NbS and GI can significantly increase the flow of capital to support these types of initiatives in the future.

6. Catalogue of financing instruments for urban NbS

Table 5 provides an overview of the financing instruments that can be used to deliver NbS in urban areas. It is intended to provide a basis for GreenScape pilot cities and presents viable mechanisms for financing NbS to address the challenges highlighted by the project partners.

This catalogue focuses on financing mechanisms from the perspective of city governments.

The following categorisation of financing mechanisms starts from the premise that a municipality has two main options for increasing NBS in the city (Trinomics, IUCN, 2019):

1) **Implement NBS projects or maintain existing NbS directly** (especially on municipality-owned land); in this situation, the municipality pays for the intervention, either through funds it already has or by obtaining loans and revenues to finance the project.
2) **Encourage other actors** (e.g., residents, utilities, businesses) to implement NbS (especially on their private property) or contribute to maintaining existing NbS in the public domain; in this case, the local authorities provide incentives to other stakeholders or stimulate private finance by other means.

The following catalogue follows the categorisation presented in Chapter 2.2, and each financing mechanism gives a brief description, as well as strengths and limiting factors.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
GRANTS **(from public and private organizations)**	**European Structural and Investment Funds (ESIF)**	**European Structural and Investment Funds (ESIF):** As one of the largest investment instruments under the EU budget, the ESI Funds support the territorial, economic and social cohesion of Europe's regions, as well as their resilience and recovery from the crisis faced in the past years. it presents several opportunities to finance GI projects, including in urban areas. They comprise of: **EUROPEAN REGIONAL DEVELOPMENT FUND** It's designed to strengthen economic, social and territorial cohesion in the European Union. It includes **Interreg** for transnational projects. **EUROPEAN AGRICULTURAL FUND FOR RURAL DEVELOPMENT** It finances the CAP's contribution to the EU's rural development objectives: improving the competitiveness of agriculture, encouraging sustainable management of natural resources and climate action, and achieving a balanced territorial development of rural economies and communities. **COHESION FUND** It provides support to Member States with a gross national income (GNI) per capita below 90% EU-27 average to strengthen the economic, social and territorial cohesion of the EU. The Cohesion Fund supports investments in the field of environment and trans-European networks in the area if transport infrastructure (TEN-T). For the 2021-2027 period Within ESIF, the Cohesion Fund and the European Regional Development Fund are most suitable for urban GI.	*Regional Development*: ERDF supports the development of EU regions, improving competitiveness, sustainable resource management, and territorial development. *EU-Wide Funding:* Provides financial assistance to a wide range of projects in various EU regions. *Supports Rural Development*: EAFRD contributes to improving the competitiveness of agriculture, sustainable resource management, and climate action in rural areas. *Balanced Territorial Development*: Aims to achieve balanced territorial development of rural economies and communities. *Support for Cohesion*: Strengthens economic, social, and territorial cohesion in EU Member States with lower GNI per capita. *Climate Contribution*: A significant portion of the fund allocation (37%) is expected to contribute to climate objectives, promoting sustainability.	*Budget Constraints*: Funding availability may be limited by the EU's overall budget, potentially leading to competition for resources. *Bureaucratic Procedures*: Accessing ERDF funding may involve complex administrative procedures and criteria. *Agricultural Focus*: The fund primarily targets agricultural objectives, which may not fully address all rural development needs. *Limited Recipient Countries*: The fund is available to a limited number of EU Member States, potentially leaving out regions with similar development needs.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
GRANTS **(from public and private organizations)**	**European Fund for Strategic Investments**	It's the core of the investment plan for Europe, aimed at boosting long-term economic growth and competitiveness in the European Union. The fund aims to help use public funding, to mobilise private investment for a wide range projects carried out in the EU. The projects cover areas such as infrastructure, research and innovation, education, health, information and communications technology and other areas.	*Boosts Investment*: Supports strategic investments that can promote economic growth and job creation in the European Union. *Leverages Private Investment*: Attracts private sector investments by providing guarantees and financing to reduce risks.	*Funding Allocation*: Availability of funds may be limited, and competition for funding can be high, potentially leaving some projects unfunded. *Economic and Political Uncertainty*: The success of investments can be influenced by economic and political conditions in the EU.
	Biodiversa+ **(European Biodiversity Partnership)**	Biodiversa+ is the European Biodiversity Partnership supporting research on biodiversity with an impact for society and policy. It was jointly developed by BiodivERsA and the European Commission as part of the EU Biodiversity Strategy 2030, and will contribute to the ambition that "by 2030, nature in Europe is back on a path of recovery, and that by 2050 people are living in harmony with Nature". It aims at a global budget of >800 Mio € by combining in-cash and in-kind resources from its Partners, and including 165 Mio € by the European Commission over 7 years.	*Research Collaboration:* Facilitates collaboration among European countries and research funding agencies to address biodiversity challenges. *Significant Research Funding*: Involves major research funding agencies, providing substantial financial support for biodiversity research.	*Complex Collaboration:* Coordinating research efforts across multiple countries and agencies can be complex and may lead to administrative challenges. *Limited Focus:* Primarily focuses on biodiversity research, potentially leaving out other areas of environmental concern.
	European - LIFE & Horizon Europe	Horizon Europe: the EU Framework Programme for Research and Innovation can support NBS projects with an innovation or research component. The specific opportunities are determined by EU biennial work programmes and specific calls for proposals. LIFE Programme: provides co-funding for projects in the area of the environment (including nature and biodiversity) and climate change adaptation and mitigation. The specific opportunities are determined by EU multi-annual work programmes and annual calls for proposals.	High potential budget, and numerous successful case studies to draw from.	*Competition*: The program is highly competitive, and not all research proposals receive funding. *Complex Proposal Process*: Applying for Horizon Europe funding can be administratively complex and time-consuming. *Funding Constraints*: Limited funding is available, potentially leading to competition for support.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
GRANTS **(from public and private organizations)**	**National and regional government grants**	Local authorities may access grants for environmental projects - including GI - provided by upper levels of government	*Alignment with Local Priorities:* Grants can be tailored to address specific regional and national priorities. Direct support from government entities offers a stable funding source for a specific region, along with a comprehensive understanding of the unique environmental characteristics of the locality.	*Budget Dependency*: Availability of grants may depend on regional or national government budgets, which can fluctuate. *Inequitable Distribution:* Some regions or projects may receive more funding than others, leading to disparities.
DONATIONS AND CROWD-FUNDING	**Philanthropic contributions**	Donations are one of the simplest but most prevalent mechanisms for funding NBS projects. GI projects have traditionally relied on charitable contributions from foundations, citizens, private sector donors, etc.	*Donor Support*: Attracts contributions from individuals, foundations, and organizations interested in supporting specific causes or initiatives. *Flexible Funding:* Philanthropic contributions can be used for various projects and areas of interest. Furthermore, philanthropic organizations can often make funding decisions swiftly, leading to faster disbursement of funds and timely implementation of projects.	*Volatility:* Dependence on philanthropic contributions can result in financial instability if donor interest wanes. *Donor Preferences:* Funding may be contingent on donor priorities, potentially limiting the scope of supported projects.
	Crowd-funding	Crowdfunding consists in raising funds for a project through the voluntary donation of small amount from a large number of individuals. This instrument is suitable especially for supporting small-scale projects that are not necessarily suitable for other financing instruments.	*Community Support:* Crowdfunding allows individuals and communities to directly contribute to projects they believe in. *Diverse Funding Sources:* Crowdfunding attracts funds from a broad range of contributors.	*Funding Uncertainty*: The success of crowdfunding campaigns is uncertain and can depend on public interest and engagement. *Administrative Overhead:* Managing crowdfunding campaigns involves administrative work and potential fees.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
PUBLIC FINANCE INSTRUMENTS	**Innovative use of public budget**	The creation, improvement and maintenance of NBS and GI are often funded from local authorities' own budgets. However, budgets specifically for nature and green space are usually insufficient to cover these costs. A partial solution is for local authorities to find creative ways of channelling funding from other relevant government departments. For example, cities could pool fundings from different departments within the city administration to deliver GI projects with cross-sectoral benefits. **PUBLIC HEALTH BUDGETS** Given the growing evidence base on the benefits of nature to physical and mental health, public budgets are one of the most promising options. Local authorities could work with the public health services to develop a funding model in which direct capital investments are made into sites that are subsequently used in health programmes involving outdoor activities. See "green prescribings". **POLICE BUDGETS** Another source worth exploring, given emerging evidence that well-designed, well-maintained green infrastructure can help reduce crime. Some of the funding for urban green space maintenance and improvements could thus come from policing budgets **EDUCATION BUDGETS** In densely populated urban areas, school grounds are often an important oasis of green for citizens and wildlife alike. Collaborating with departments of education to use funding grants for the development of NBS in school grounds presents win-win opportunities for students, society and the environment.	*Healthcare benefits:* Supports healthcare systems and services, promoting public well-being. *Government Responsibility:* This strategy ensures that governments fulfill their duty to provide essential services (healthcare, security, education). *Cross-sectoral benefits:* Using a mix of budgets ensures that several aspects are taken into account and thus multi-benefits are achieved.	*Health sector:* To tap into public health budgets, there is a need to convince health sector stakeholders of the link between nature-based activities and health outcomes. Although the evidence base is growing, further research is needed to quantify this link. Health budgets are often also quite limited. *Security sector:* Similarly, if funding contributions from the police sector are to be sought, there is a need to raise awareness among police officials of the crime reduction benefits of investing in urban green spaces. *Education sector:* Considerable investment in communication is also required to convince educational facilities of the benefits of NBS.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
PUBLIC FINANCE INSTRUMENTS	**Grey infrastructure taxes/charges**	Charges on the use of grey infrastructure can act as an incentive to reduce use by implementing green infrastructure. In the same way, taxes on grey infrastructure can act as an incentive to replace this solution with NBS/GI alternatives.	*Incentivizing Green Alternatives*: Taxes on "grey" infrastructure or activities detrimental to green infrastructure can encourage the adoption of more sustainable alternatives. *Reducing Pressure on GI*: Taxes can motivate actions that reduce pressure on green infrastructure and promote its preservation.	*Potential Resistance*: Users may resist paying additional charges, especially if the transition to green infrastructure involves higher costs or inconveniences. *Equity Concerns*: User charges need to be carefully designed to ensure they don't disproportionately affect certain groups, such as low-income households. *Policy Complexity*: Implementing and enforcing tax-based incentives can be administratively complex and require clear regulations.
	Subsidies	Governments can provide a subsidy to cover (part of) the costs of installing GI on private property. This can leverage off the private benefits to landowners from green infrastructure assets, to stimulate additional investments and increase public benefits.	*Cost Assistance:* Government subsidies can help cover the costs of installing green infrastructure on private property, making it more financially feasible. *Private Benefits*: Leveraging private landowners' benefits from green infrastructure can drive widespread adoption.	*Budgetary Constraints*: Subsidies rely on available government funding, which may be limited and subject to budget constraints. *Administrative Overhead*: Managing subsidy programs can involve administrative complexity.
	Land sales/leases	Government-owned land can provide upfront capital from land sales or leases. The revenues can then be used to develop GI projects. This solution can be used in conjunction with a trust/endowment whereby an organisation is entrusted with the management of revenues from the land sales, creating in this way a specific fund.	*Revenue Generation:* Generates income for public entities through land sales and leases. *Resource Utilization*: Promotes the efficient use of public land resources.	*Loss of Ownership:* Selling or leasing land may lead to the loss of public ownership or control over these resources. *Land Speculation*: Selling or leasing land can lead to issues related to land speculation and potential misuse.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
PUBLIC FINANCE INSTRUMENTS	**User fees**	Charging a fee for the use of green spaces such as sports pitches, renting parks for private events, or introducing a park entrance fee can raise revenues for their maintenance. This logic applies the "user-pays principle": it allows users of specific services or facilities to contribute to their maintenance. However, introducing mandatory fees for sites which were previously open access is likely to be unpopular with residents. An alternative would be to introduce voluntary fees or donations, following e.g. the model of most museums in the UK where entrance is free, but visitors are encouraged to make donations.	*Resource Allocation*: This strategy encourages efficient use of resources and services.	*Affordability:* User fees can pose affordability issues for some individuals, potentially limiting access to essential services. *Collection Costs:* Collecting user fees can involve administrative expenses. *Exclusion:* Charging a fee for the use of green spaces may also make certain sites ineligible for public grants.
	Developers contributions/ charges	Developers and governments share responsibility for providing infrastructures. Developers may contribute to infrastructures by: - the payment of money - providing land - constructing infrastructure on behalf of public authorities (referred to as 'works-in-kind'). These are referred to as 'infrastructure contributions' and are delivered through a planning scheme amendment, a planning permit, or a building permit. one-off compulsory charges paid by property developers as a condition of receiving development approval or as a condition of rezoning prior to development.	*Infrastructure Financing*: Developers contribute to infrastructure costs associated with new developments. *Resource Recovery:* Recovers some of the expenses related to public infrastructure expansion.	*Impact on Developers*: Developers may face increased costs, which can affect the feasibility of projects. *Incentive Structure:* The use of developer charges may influence development patterns and densities.
	Betterment levies	This strategy consists in payments by landowners or beneficiaries in an area to capture a portion of the land value gains or improvements resulting from public projects. This is applicable only when investments lead to a land value gain for new and existing properties in a defined area.	*Local Development Funding*: Levies fund improvements in local areas, directly benefiting communities. *Community Investment:* Supports local initiatives and community development.	*Benefit monitoring*: The 'amount of value uplift' attributable to the project must be measured to determine the level of the levy. *Gentrification risk:* There is a risk of gentrification if the instrument leads to poorer individuals being priced out of a neighbourhood.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
PUBLIC FINANCE INSTRUMENTS	**Sale of development rights and leases**	Commercial opportunities can be integrated with the project/infrastructure being delivered. For example, revenues for the creation of a new park could be raised partly by leasing certain areas to vendors or similar.	Gaining access to new markets, decreasing risks across portfolios. Gaining access to a broader/more diverse pool of investors.	*Commercialization constraint*: This strategy is only applicable when the project creates opportunities to commercialise the use of government land or other assets
DEBT FINANCING INSTRUMENTS	**Green city bonds**	Green city bonds fund green projects and assets that make cities low-carbon and climate-resilient. They can be issued by any bond issuing entity, including municipalities, utilities, public–private partnerships, and private companies to build GI, such as habitat restoration and flood mitigation. They are essentially a type of loan. The bond issuer (debtor) borrows a fixed amount of capital from investors (creditors) over a defined period of time (the "maturity" of the bond), repays the capital when the bond matures, and pays an agreed-upon amount of interest.	*Capital Raising*: Green bonds provide a means to raise consistent capital, which can be used to fund environmentally friendly projects and initiatives. *Interest Payments*: Investors receive interest payments, making green bonds an attractive option for those seeking both environmental impact and financial returns. *Market Growth*: Green bonds have seen significant growth in recent years, indicating increasing interest in environmentally responsible investments.	*Greenwashing Risks*: Ensuring the projects funded by green bonds genuinely have a positive environmental impact can be challenging, as there is a risk of "greenwashing." *Complexity:* The issuance of bonds can be administratively complex, and not all organizations or projects may have the capacity to utilize this financing mechanism.
	Green loans	Green loans are a special financing instrument that supports green projects. Specifically, green loans are any loan instrument made available exclusively to finance or refinance new and/or existing eligible green projects in whole or in part. They have 3 main features: - Revenues are allocated exclusively to green projects - Revenues are tracked and managed reliably - Transparency is ensured by reporting about financing	The revenues of green loans can be used in various NbS and GI projects and provide a range of benefits, including: - a positive impact on reputation and credibility - meeting regulatory and policy targets/commitments - gaining access to new markets, decreasing risks across portfolios - gaining access to a broader/more diverse pool of investors	*Interest Costs*: Loans come with interest costs, which can add to the overall project expenses. *Debt Obligations:* Borrowing through loans results in debt obligations that need to be managed, impacting future budgets.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
EQUITY INVESTMENTS	**Equity Finance**	Within the context of NbS, equity finance involves securing funding through the sale of ownership shares or equity in initiatives or projects that implement nature-based approaches to address environmental or sustainability challenges.	*Ownership-Based Funding*: Secures funding through the sale of ownership shares in nature-based initiatives, allowing investors to have a stake in projects. *Alignment with NbS*: Supports the implementation of nature-based approaches to address environmental and sustainability challenges.	*Ownership Implications*: Selling equity shares may involve sharing ownership and decision-making with investors, potentially affecting project control. *Limited Applicability:* Not all projects or initiatives may be suitable for equity finance, as it requires investors willing to purchase shares.
INNOVATIVE MARKET-BASED INSTRUMENTS	**Payment for Ecosystem Services (PES)**	PES schemes aim to connect providers of a service that is not traditionally traded in the market (Ecosystem Service, ES), such as water quality, erosion prevention, or the aesthetic value of a landscape, with potential consumers interested in conserving these services, such as public institutions, water utilities, or private companies. At a minimum, PES schemes require 2 actors: buyers (beneficiaries) of ES and sellers (providers) who affect ES supply. PES makes the consumer pay the supplier for implementing sustainable agro-environmental practices or conserving ecosystems that provide the ES of interest, which typically involves an opportunity cost for the supplier, who could use his land for commercial purposes. PES agreements are typically voluntary and rely on mutually agreed rules.	*Ecosystem Services Provision*: PES schemes incentivize landowners or managers to provide ecosystem services, contributing to environmental benefits. *Voluntary Transactions*: PES agreements are typically voluntary and rely on mutually agreed rules, promoting cooperation.	*Complex Arrangements*: Establishing PES agreements can be complex and may require negotiations among multiple stakeholders. *Enforcement and Monitoring*: Ensuring that ecosystem services are delivered as agreed can be challenging and may require monitoring.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
INNOVATIVE MARKET-BASED INSTRUMENTS	**Offsets**	Actors such as companies whose activities impact ecosystems can be required by new regulations and directives to 'offset' or compensate for their residual negative impacts on ecosystems by creating or improving ecosystems elsewhere. This can involve creating or enhancing GI in other locations or contributing to a fund managed by public authorities or conservation organizations which finance GI initiatives. **BIODIVERSITY OFFSETS** As a more specific category, **biodiversity offsets** refer to "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts caused by development projects - whether from the public or private sector - after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss (NNL) and preferably a net gain of biodiversity on the ground". An extension of offsets is when a credit-trading market is created in which "the credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced before, and without ex-ante links to, the debits they compensate for, and stored over time."	*Regulatory Compliance*: Developers and other actors are required to offset their negative impacts on green infrastructure, ensuring environmental protection. *Funding for GI*: Compensation payments or contributions to funds can be used to finance green infrastructure projects.	*Costs for Developers*: Compliance with offset requirements may add costs for developers, potentially affecting project feasibility. *Fund Management:* Effective management and allocation of offset funds are crucial to ensuring they are used for intended purposes.

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
INNOVATIVE MARKET-BASED INSTRUMENTS	**Credit-trading systems**	Originally designed for pollution control, these systems facilitate the exchange of emission rights for specific pollutants. Credit-trading systems organise the exchange of rights to emit a particular pollutant into a receptor environment. The regulating authority establishes an aggregate pollution target and distributes among potential polluters a number of permits (credits) corresponding to the target set. Each economic agent is only allowed to emit a quantity corresponding to its permit holding. Trading emerges when agents with relatively high emissions will seek to buy additional permits, while lower cost abaters will be motivated to sell some of their permits. In the context of GI, **similar mechanisms are emerging to meet stormwater management goals** and could potentially be applied in other areas.	*Pollution Control*: Credit-trading systems can efficiently organize and incentivize pollution control, including stormwater management through green infrastructure. *Flexibility*: These systems offer flexibility and market-driven mechanisms to achieve environmental goals.	*Complex Design*: Establishing and managing credit-trading systems can be complex, requiring careful design and oversight. *Market Uncertainty:* The effectiveness of such systems may depend on the stability and performance of the trading market.
	Ecotourism	Ecotourism is a market mechanism becoming increasingly relevant as a business model for nature-based initiatives. This type of responsible tourism involves enjoying natural or semi-natural areas to support conservation and minimise the impact on local communities. Because the main asset of ecotourism is nature, a portion of the revenue from tourism packages or entrance fees is earmarked to manage natural capital and recreational ecosystem services correctly.		

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
INNOVATIVE MARKET-BASED INSTRUMENTS	**Public-Private Partnerships (PPP)**	PPPs allow governments to attract private sector engagement, intellectual capital, and investments to accelerate green investments and technologies. Through a partnership, it is assumed that the **public and private sectors can benefit from combining their knowledge, expertise, finances,** and other resources to deliver collective goods more efficiently. The main reasons for PPPs include limited financial resources and capabilities of the public sector, increasing demand for public service infrastructure, and the need to improve the quality of public services and reduce delivery costs. In the context of NBS and GI, PPPs can be applied in many ways. For instance, PPPs can be used to implement GI, enhancing the efficiency of significant infrastructure investments. These financing models generate interesting synergies, such as making an investment more attractive for the private sector by reducing its risk due to the guarantee of public financing or promoting the use of public funds for innovative activities and market creation, derived from close collaboration with the private sector.	*Efficiency and Expertise:* PPPs allow for the involvement of private sector expertise and efficiency in the management of public assets or services. *Risk Sharing:* The private party bears significant risks, which can lead to better risk management and allocation. *Long-term Commitment*: PPPs often involve long-term contracts, ensuring the continuity and sustainability of green infrastructure projects.	*Complex Contracting:* Establishing and managing PPP contracts can be complex and require robust legal and administrative frameworks. *Private Interest:* Balancing the public interest and the profit motive of private entities can be challenging. *Long-Term Commitment*: PPPs are typically long-term agreements, which may limit the government's flexibility in the future.
OTHER INNOVATIVE INSTRUMENTS	**Exploiting existing regulatory requirements**	**Some entities with environmental obligations can take advantage of these requirements to invest in alternative NbS.** Authorities, particularly in the **water management sector**, face regulatory standards that require significant investments, usually in high-cost, energy-intensive solutions such as wastewater treatment plants. Alternative green infrastructure can instead be implemented to meet environmental regulations by alternative means.	A prerequisite for this type of project is an existing regulatory or legislative requirement leading to significant expenditure, that can be redirected to nature-based investments that meet the original requirement, as well as broader green infrastructure goals.	

CATEGORY OF INSTRUMENTS	TYPE OF INSTRUMENTS	DESCRIPTION	STRENGHTS	LIMITING FACTORS
OTHER INNOVATIVE INSTRUMENTS	**Community Asset Transfer**	Local authorities may transfer to community organisations the management or ownership (usually via long leasehold) of public land or buildings. In the UK, the transfer can be made at less than market value, if it promotes economic, social or environmental well-being (Drayson, 2014).	*Community Engagement:* This instrument fosters community involvement and empowerment, which can lead to more localized and community-specific green infrastructure solutions. *Economic, Social, and Environmental Benefits*: The transfer of land or buildings at less than market value promotes economic, social, and environmental well-being within communities.	*Asset Valuation*: Determining the market value of assets for transfer can be subjective and may lead to disputes. *Resource Requirements:* Administrative and legal resources are needed to facilitate the transfer process.
	Regulation and planning standards	Although not a financing instrument as such, local authorities can apply regulatory and planning instruments to mandate GI implementation by private stakeholders, such as grey infrastructure developers and homeowners. For example, development planning regulations may require that new residential neighbourhoods incorporate a certain percentage of green space.	Introduction of the instrument requires regulatory change. If the same standards apply across all regulated entities, irrespective of their cost of meeting the standards, the instrument might not achieve cost-effectiveness. *Cost Savings*: Entities with existing environmental obligations can potentially reduce costs by implementing green infrastructure alternatives that are more cost-effective and energy-efficient than traditional solutions.	*Resistance to Change*: Entities may resist transitioning to green infrastructure due to the initial investment and changes in established practices. *Monitoring and Compliance:* Ensuring compliance with environmental regulations and measuring the effectiveness of green alternatives can be challenging.
	InvestEU Portal	The InvestEU Portal brings together investors and project promoters on a single EU-wide platform, by providing an easily accessible and user-friendly database of investment opportunities available within the EU.	*Investment Platform*: Provides a centralized platform for investors and project promoters, making it easier to find and connect with investment opportunities. *EU-Wide Access*: Offers access to a wide range of investment opportunities within the EU, promoting economic growth and development.	*Dependence on User Adoption:* The success of the platform depends on its adoption by investors and project promoters. *Competing Investment Opportunities*: Investors may face competition for the same investment opportunities, potentially affecting the availability of projects.

Table 5: GreenScape CE catalogue of financing instruments for urban NbS (Source: own elaboration)

D. Results

As already mentioned, in the context of the GreenScape CE project there are five cities severely affected by climate change. The aim of the project is to address these territorial challenges by creating the preconditions for the systematic and holistic introduction of NbS in these five urban areas.

Within this frame, efforts were made to formulate a strategy for selecting NbS that could best improve the resilience of these cities and consequently arrive at the most suitable funding. The rationale of this methodology can be summarised in Figure 7 and consists of 3 main parts:

1. **Prioritization of urban challenges**: pilot cities compiled a questionnaire that served as a platform for identifying and prioritizing their key environmental concerns. For each city, 3-4 main challenges were identified. Results of this questionnaire are included in *D.1.1.1. Typology and criteria for planning CCI/GI/NBS on the local level*.
2. **Selection of best NbS**: a first attempt was made to identify NbS that have the potential to best address the challenges prioritized by the cities. The selection was made from the list of 17 NbS available in *D.1.1.1. Typology and criteria for planning CCI/GI/NBS on the local level*. Since NbS have the potential to provide multiple benefits, NbS that maximise co-benefits were preferred in the selection.
3. **Selection of the most suitable financing instruments for the selected NbS**: the selection of the most suitable financing instruments will be based on the list of financial instruments available in Chapter 2.3.

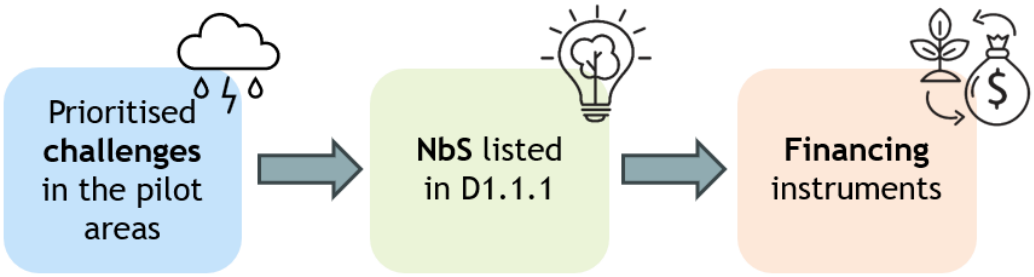

Figure 7: Methodology to select best NbS and their financing (Source: own elaboration)

Table 6 provides preliminary results obtained from the application of this methodology. It outlines the five cities involved in the project, along with their respective 3-4 prioritized environmental challenges and the corresponding NbS identified to address these challenges. It is important to note that these findings are subject to validation with project partners.

Pilot cities	Challenges	NbS identified
Zagreb, Croatia	• Urban heat islands • Air pollution • Green space deprivation	• Green facades and living walls • Detention basins • Urban Forestation • Street trees • Green roofs
Warsaw, Poland	• Air pollution • Green space deprivation • Habitat fragmentation	• Green facades and living walls • Detention basins • Urban Forestation

		• Retention ponds and constructed wetlands • Green barriers
Metropolitan area of Milan, Italy	• Flood management • Green space deprivation • Urban heat islands and heatwaves	• Urban Forestation • Detention basins • Green roofs • Permeable pavements • Bioswales
Ptuj, Slovenia	• Air pollution • Flood management • Green space deprivation	• Urban Forestation • Green facades and living walls • Detention basins • Bioretention systems and rain gardens • Retention ponds and constructed wetlands
Szeged, Hungary	• Urban heat Island and heatwaves • Air pollution • Flash floods and droughts	• Detention basins • Urban Forestation • Retention ponds and constructed wetlands • Bioretention systems and rain gardens • Street trees

Table 6: Preliminary results of the application of the strategy for the selection of nbs and fundings

E. Conclusions

Societal challenges can lead to sudden and, in some cases, irreversible environmental changes that negatively impact human development. The conventional approach to addressing these challenges has typically relied on engineered solutions (also called *Grey Infrastructure*) designed and managed to be simple to implement, easy to replicate, and with predictable results.

An alternative approach is NbS, which uses ecosystems and their services to address societal challenges sustainably. This alternative approach is seen as a distinct choice from man-made infrastructures, which require significant investments in materials and energy.

NbS is considered an umbrella term. Its application can take many forms, from GI in urban areas to the protection and restoration of forests. NbS can transform environmental and social challenges into innovative opportunities, turning natural capital into a source of green growth and sustainable development.

Despite knowledge of the many benefits of NbS, a critical obstacle to their widespread adoption is the lack of knowledge about their financing, in particular who should pay for an NbS and how it can be financed.

The result is a gap between current investments in NbS and what is needed to meet the various climate change, biodiversity and land degradation targets. However, to bridge this gap, several “traditional” and “innovative” financial instruments and approaches are available to implement and mainstream NbS at various scales and in different contexts, as it has been shown in this Deliverable. In particular, public, private and mixed financing instruments are available to develop NbS in urban ecosystems, involving multiple actors and in jurisdictions with different climates and income levels.

The GreenScape CE project is centered around five CE pilot cities, each facing distinct climate challenges that demand innovative NbS. These pilot cities, comprising Zagreb, the Metropolitan area of Milan, Ptuj, Szegedin, and Warsaw, have collectively embarked on a mission to tackle their environmental concerns through the implementation of NbS. In order to do so, fundings are needed.

This deliverable of the GreenScape CE project aimed to give an overview of the funding available for urban NbS and in fact represents a first proposal of possible NbS funding for the 5 pilot areas. This is a list that should not be seen as final, but rather as a starting point for discussion.

The deliverable is intended to provide a basis for a more detailed analysis of financing instruments within *Deliverable 2.1.2 – “Summary report on good practice examples of NBS/GI financing in the CE”*, where relevant case studies will be provided for each.

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