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Overview of policy instruments enabling restorative nature-based solutions with business case examples

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Executive Summary

Small and medium sized cities in Europe and Latin America share a common challenge in implementing nature-based solutions (NBS). Most land is in private hands. In addition smaller cities are not early adopters of NBS and may be too small to grow a market for private providers of NBS. This begs the question: how can municipalities and the public sector more widely enable NBS in the private sector?

This report begins to answer this question, targeting public sector policy and planners wanting to enable policies for private sector participation in providing NBS. This includes, for example, professionals in national ministries for environment and planning; municipal planners working on strategies for nature-based solutions (e.g. SUDS), and municipal master planners.

Information for the report has been collected through a series of workshops and interviews with planners and businesses within the INTERLACE project. More specifically, the report provides an overview of policy instrument 'proposals' across four categories that could help grown NBS businesses:

- Legislative, regulatory and strategic instruments
- Financial & economic instruments
- Knowledge, communication, innovation instruments
- Agreement-based or cooperative instruments

The report evaluates the emergent policy instrument proposals in terms of their incentive mechanisms for private landowners and business. Similarities and differences as well as policy recommendations by planners and business are also outlined across the six INTERLACE partner cities, as well as indications of some ways forward for policy design and research.

The main body of the report provides the reader with relatively short illustrated sections on different perspectives on policy design for renaturing urban areas. It broadens the methodological scope to look also at policies to both discourage loss of nature, as well as encourage restoration across a rural-to-urban landscape that characterizes all of the cities in the project. Short tabular overviews are provided of policy recommendations by planners and business in each city. The limited number of informants means results must be taken as indicative. Despite this limitation the final sections discuss similarities and differences across cities, and indicate some ways forward for policy design and research. Interview and workshop transcripts, instrument typologies and detailed methodology descriptions can be found in Appendices.

The intended audiences for the report are public sector policy and planners of wanting to enable policies for private sector participation in providing NBS ; e.g. professionals in national ministries for environment and planning ; municipal planners working on strategies for nature-based solutions (e.g. SUDS), and municipal master planners

Key findings include:

The private sector is necessary to scale up nature-based solutions (NBS). Most land is in private hands in most cities. Without the private sector it will not be possible to scale up urban ecosystem service delivery.

Markets for NBS require an enabling public policy mix. Both municipal and business perspectives confirm the need for a mix of enabling policies to generate demand from private landowners and supply from private business.

Small and medium-sized cities have relatively few private businesses offering NBS and face more challenges than large cities in generating market demand for NBS.

An inventory of public policy instruments for private NBS business is useful for further R&D. The report identifies a wide range of policy instrument 'ideas' for enabling NBS in the private sector. The inventory may be used for further development and experimentation to promote NBS in the private sector in cities with little previous NBS activity.

NBS in the private sector requires a policymix covering different profitability contexts. "One size fits all" policy instruments are not likely to trigger NBS adoption in large parts of the urban landscape due to large variations in public and private net benefits of landuse change

Market-based instruments are not a ubiquitous policy recommendation. They are relevant in selected cities and certain natural and peri-urban nature protection settings.

Local city landuse and resource constraints can generate **innovative policy ideas for further testing.**

Policy instruments need to be co-designed with the private sector, including communities, non-profit and business. Successful NBS policy experiments can inspire, but should not be transferred as such, and must be co-designed by local actors to respond to each city's unique context.

Consider removing policy barriers to NBS before adding new instruments to the mix. Identify 'unlevel playing fields' and disincentives to NBS. The removal of disincentives to nature restoration deserves more attention in future research.

Good governance is overlooked as a precondition for NBS markets, including third party auditing and certifying agencies; enforcement of transparent public tendering; enforcement of labour legislation for level playing fields among competing NBS businesses; private contracting that avoids a municipal

'brain drain' and encourages in-house municipal capacity; enable sustainable corporate governance models.

Businesses in the land development sector need a mix of complementary instruments: regulatory, economic, knowledge and cooperative instruments. The specific mix will depend on their situation as early or late adapters of nature-based solutions.

Further research on NBS public policymix design is needed, particularly for secondary cities with 'thin' NBS markets. The analytical framework focusing on public and private economic rationales for NBS had some limitations which could be addressed in future research.

Sculpture: "Jordas Hånd" (The Earth's Hand) by Helene Brudevoll.
Photo: David N. Barton

Resumen ejecutivo

Sobrevista de instrumentos políticos para promover soluciones basadas en la naturaleza con ejemplos de casos de negocio

Las ciudades pequeñas y medianas de Europa y América Latina comparten un reto común a la hora de aplicar soluciones basadas en la naturaleza (SBN). La mayor parte del suelo está en manos privadas. Además, las ciudades más pequeñas no son las primeras en adoptar las soluciones basadas en la naturaleza y pueden ser demasiado pequeñas para crear un mercado de proveedores privados de soluciones basadas en la naturaleza. Esto nos lleva a preguntarnos cómo pueden los ayuntamientos y el sector público facilitar la implantación de estas soluciones en el sector privado.

El presente informe comienza a responder a esta pregunta, dirigiéndose a los responsables políticos y planificadores del sector público que deseen habilitar políticas para la participación del sector privado en el suministro de SBN. Se trata, por ejemplo, de profesionales de ministerios nacionales de medio ambiente y planificación; planificadores municipales que trabajan en estrategias para soluciones basadas en la naturaleza (por ejemplo, SUDS), y planificadores maestros municipales.

La información para el informe se ha recopilado por el proyecto INTERLACE a través de una serie de talleres y entrevistas con planificadores y empresas dentro. Más concretamente, el informe ofrece una visión general de las propuestas de instrumentos políticos en cuatro categorías que podrían contribuir al crecimiento de mercados para SBN:

- Instrumentos legislativos, reglamentarios y estratégicos

- Instrumentos financieros y económicos

- Instrumentos de conocimiento, comunicación e innovación

- Instrumentos basados en acuerdos o en la cooperación

El informe evalúa las propuestas de instrumentos políticos emergentes en función de sus mecanismos de incentivación para los propietarios privados y las empresas. También se esbozan las similitudes y diferencias, así como las recomendaciones políticas de planificadores y empresas en las seis ciudades socias de INTERLACE, y se indican algunas vías para avanzar en el diseño de políticas y la investigación.

El cuerpo principal del informe ofrece al lector secciones ilustradas relativamente breves sobre distintas perspectivas del diseño de políticas para renaturalizar las zonas urbanas. Se amplía el alcance metodológico para examinar también las políticas destinadas tanto a desincentivar la pérdida de naturaleza como a fomentar su restauración en el paisaje rural-urbano que caracteriza a todas las ciudades del proyecto.

Se ofrecen breves cuadros sinópticos de las recomendaciones políticas de los planificadores y las empresas de cada ciudad. El número limitado de informantes significa que los resultados deben tomarse como indicativos. A pesar de esta limitación, en las secciones finales se analizan las similitudes y diferencias entre ciudades y se indican algunas vías para avanzar en el diseño de políticas y la

investigación. Las transcripciones de las entrevistas y los talleres, las tipologías de instrumentos y las descripciones detalladas de la metodología figuran en los apéndices.

Los destinatarios del informe son los responsables de las políticas del sector público y los planificadores que desean facilitar políticas para la participación del sector privado en el suministro de SBN; por ejemplo, profesionales de los ministerios nacionales de medio ambiente y planificación; planificadores municipales que trabajan en estrategias para soluciones basadas en la naturaleza (por ejemplo, SUDS), y planificadores maestros municipales.

Las principales conclusiones son las siguientes:

El sector privado es necesario para ampliar las soluciones basadas en la naturaleza. La mayor parte del suelo está en manos privadas en la mayoría de las ciudades. Sin el sector privado no será posible ampliar la prestación de servicios ecosistémicos urbanos.

Los mercados de soluciones basadas en la naturaleza requieren una combinación de políticas públicas propicias. Tanto la perspectiva municipal como la empresarial confirman la necesidad de una combinación de políticas habilitadoras para generar demanda por parte de los propietarios privados y oferta por parte de las empresas privadas.

Las ciudades pequeñas y medianas cuentan con relativamente pocas empresas privadas que ofrezcan SBN y se **enfrentan a más retos que las grandes ciudades a la hora de generar demanda de SBN en el mercado.**

Un inventario de instrumentos de política pública para el negocio privado de las SBN resulta útil para futuras actividades de investigación y desarrollo. El informe identifica un amplio abanico de "ideas" de instrumentos políticos para facilitar las SBN en el sector privado. El inventario puede utilizarse para seguir desarrollando y experimentando con el fin de promover las SBN en el sector privado en ciudades con poca actividad previa de SBN.

Las SBN en el sector privado requieren una combinación de políticas que abarque diferentes contextos de rentabilidad. No es probable que los instrumentos políticos de "talla única" desencadenen la adopción de las SBN en grandes partes del paisaje urbano, debido a las grandes variaciones en los beneficios netos públicos y privados del cambio de uso del suelo.

Los instrumentos de mercado son aplicables solamente a contextos específicos. Son pertinentes en determinadas ciudades y en ciertos entornos naturales y periurbanos de protección de la naturaleza.

El uso del suelo y **las limitaciones de recursos de las ciudades locales pueden generar ideas políticas innovadoras** que habrá que seguir probando.

Los instrumentos políticos deben diseñarse conjuntamente con el sector privado, incluidas las comunidades, las organizaciones sin ánimo de lucro y las empresas. Los experimentos políticos exitosos en materia de SBN pueden servir de inspiración, pero no deben transferirse como tales, sino que deben ser diseñados conjuntamente por los agentes locales para responder al contexto único de cada ciudad.

Considere la posibilidad de eliminar las barreras políticas a las SBN antes de añadir nuevos instrumentos a la mezcla. Identificar las "condiciones desiguales" y los desincentivos a las ENB. La eliminación de los desincentivos a la restauración de la naturaleza merece más atención en futuras investigaciones.

Se pasa frecuentemente por alto la buena gobernanza como condición previa para los mercados de las SBN, incluidas las agencias de auditoría y certificación de terceros; la aplicación de licitaciones públicas transparentes; la aplicación de la legislación laboral para que haya igualdad de condiciones entre las empresas competidoras de las SBN; una contratación privada que evite la "fuga de cerebros" municipales y fomente la capacidad municipal interna; y que permita modelos de gobernanza empresarial sostenibles.

Las empresas del sector de la promoción inmobiliaria necesitan una combinación de instrumentos complementarios: normativos, económicos, de conocimiento y de cooperación. La combinación específica dependerá de su situación como adaptadores tempranos o tardíos de las soluciones basadas en la naturaleza.

Es necesario seguir investigando sobre el diseño de la combinación de políticas públicas en materia de SNB, especialmente en el caso de las ciudades secundarias con mercados de SNB "poco desarrollados". El marco analítico centrado en los fundamentos económicos públicos y privados de las estrategias basadas en la naturaleza presenta algunas limitaciones que podrían abordarse en futuro.

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Chemnitz: Max Lukas Krombholz (Chemnitz Municipality), Doris Knoblauch (Ecologic)

1. Background: policy mixes enabling nature-based solutions in the private sector

"A policy mix is a combination of policy instruments which has evolved to influence the quantity and quality of biodiversity conservation and ecosystem service provision in public and private sectors." (Ring and Schröter-Schlaack, 2011)) (p.15)

The challenges posed by climate change call for new approaches to sustainable development that consider the complex interactions between climate, economic, social, and ecological systems. One of the main challenges in the emerging field of sustainability transitions is to address these complexities and to improve our understanding of the policies needed for urban transitions. The move towards more resilient territories and urban environments in the face of climate change calls for new approaches to sustainable development that consider complex multi-system interactions outlined above (Dorst et al., 2022).

Scholars and practitioners in fields relevant to urban resilience have begun to call for a policy mix which combines several policy instruments as a means to respond to the above outlined challenges (Rogge and Reichardt, 2016). However, policy mix studies tend to be limited to examining instrument interactions or the policy processes associated with designing such mixes (Kern et al., 2019). Furthermore, the terminology applied in these studies is often ambiguous, particularly regarding the design characteristics of a policy mix (Barton et al., 2017). Policy design characteristics include the combination of different types of policy instruments applied in an urban landscape (Figure 1.1) or more detailed analysis of rules-in-use (Ostrom for each individual instrument.

In the NBS field, there is a diversity of policy instruments aimed at enabling different types of NBS on public and private land in urban areas (Figure 1.1). Furthermore, the efforts to mainstream urban NBS lead to a sectoral breadth and reach of instruments, which varies considerably depending on the scale of intervention (local/national) or the policy action domain (urban health/environmental education, etc.). It is important to continue researching the cumulative effects of different instruments aimed at enabling NBS in urban areas, influencing both the potential for interaction of urban NBS among themselves, as well as their potential for integration and interaction with related policies in other domains and at other levels. Likewise, it is important to investigate the role of coherence in policy objectives in relation to the coherence of instruments on policy impact(van der Jagt et al., 2023).

Finally, the need for policy analysis should go further and encompass the policy mix that allows the provision of NBS by different sectors[1] and not only by the public sector. To support this multi-stakeholder involvement, local administrations need to shift from a top-down approach towards a more inclusive approach - allowing all urban actors to play a role in the way cities are planned built and managed. This shift requires the creation of appropriate structures and processes to collaboratively plan and guide cities towards a sustainable and resilient future. To this end, it is important to continue evaluating the impact of

[1] SBN projects and strategy involves the coordination and integration of a wide range of stakeholders, including academic and research institutions, business and industry representatives, decision makers and regulatory authorities, financial institutions, NGOs, local community groups and citizens. individual.

actions and carrying out cost-benefit analyses of similar policy instruments implemented in different contexts (Mendonça et al., 2021).

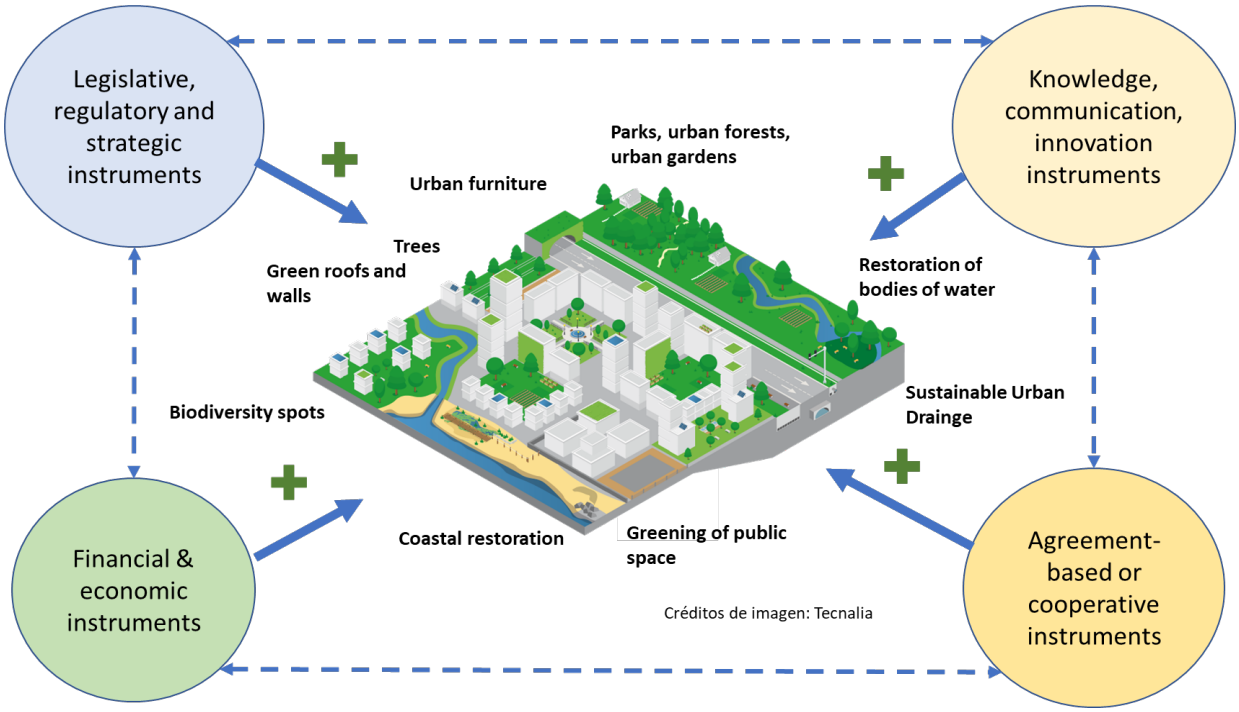


Figure 1.1 A policymix combines to enable appropriate nature-based solutions for different parts of the urban landuse matrix.

Within the different instruments identified as part of the policy mix, this report focuses specifically on policies enabling business cases for nature-based solutions in the private sector. Enabling NBS implementation on private property and developments is key to a nature-based transition as private land often constitutes the largest area in a city. The policy analysis lens of NBS "business cases" is private profitability, as well as public economic feasibility. The default point of departure is often to propose economic and financial instruments (Figure 1.2) that directly address private and public benefits from NBS (Van der Jagt et al, 2023)[2]. However, a policymix analytical lens considers that economic and financial instruments alone cannot create market conditions for the viability of NBS by the private sector. The analysis of other complementary, synergistic or conflicting instrument types (Ring and Barton, 2015) is key to understanding how to enable private companies and professionals in this sector.

According to the EU-funded Naturvation's NATURVATION project's Urban Nature Atlas[3] containing over 1000 global NBS, around 75% of NBS are financed directly through public budgets. However, there are currently various financial instruments aimed at the private sector to promote both the initial financing and the continuity of NBS projects. This mix of financing mechanisms responds to the diversity of NBS and therefore to the greater or lesser technical and governance complexity of each of them, covering both

[2] "For example, the City Deal 'The Values of Green and Blue in the City' served to develop a TEEB (The Economics of Ecosystems & Biodiversity) City tool, and a spin-off spatial planning decision-making tool called the Green-Benefits Planner, enabling the monetization of urban ecosystem services.

[33] https://una.city/

small projects, such as the development of green roofs on buildings, up to large-scale projects, such as coastal adaptations and the planting of sustainable timber forests.

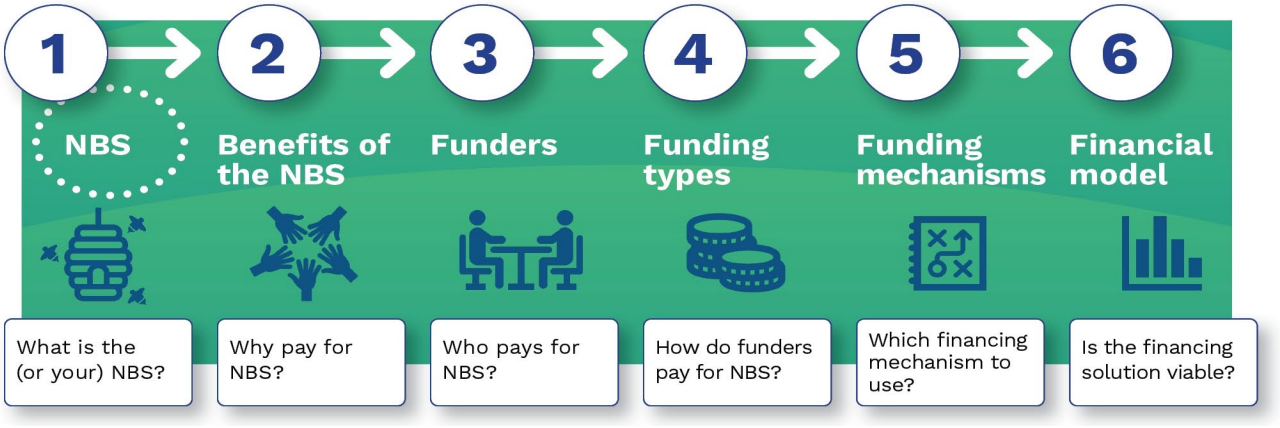


Figure 1.2. Steps for creating an NBS financing solution. Source: Nature4City project

Likewise, the development and evolution of different financial instruments has led to the integration of a wide variety of economic agents, mainly public, but also private or third sector institutions. In order to identify which is the most appropriate instrument for each project or need, the Nature4Cities (N4C) project proposed a support process to determine the optimal solution in each case, understanding the benefits of the NBS that lead to financing, who finances the NBS, the possible types of financing, the options for financing mechanisms and the construction of a business model. Table 1.1 shows a broad list of different financial instruments identified within the research process carried out within the N4C project.

Each of the identified instruments can be adopted in a different way depending on the context and reality of each city, and different forms can be adopted. Each city must find the most appropriate financing solution, taking into account the definition and execution times of the projects. A general limitation of secondary small-medium sized cities of the INTERLACE project relative to capital cities near financial centres may be more difficult access to financing alternatives.

In the following we look beyond market-based and financing instruments to a wider range of proposals that cover the emerging needs of NBS businesses and private land in small and medium cities.

Table 1.1 Market-based and financing instruments

Direct implementation and maintenance of NBS projects through the planning parties' budget					
Innovative use of public budgets: such as pooling funding from different government departments or making use of previously untapped sources such as the public health budget.					
'Green debt': loans accruing interest, which can be from public or private financial institutions, individuals, government, or commercial investors and can be through mechanisms such as green bonds, crowdfunding, and the Natural Capital Financing Facility (NCFF).					
Loans	Concessional financing	Green bonds	Crowdfunding	NCFF[4]	
'Green equity': equity-based instruments, including equity investments and equity-based crowdfunding. Equity finance					
Grant funding and donations: including EU funding; grants from regional and national public bodies; philanthropic contributions; and crowdfunding.					
ESIF[5]	LIFE Program[6]	Horizon 2020	Government grants	Philanthropic contributions	Crowdfunding
Instruments generating revenue: (including value-capture mechanisms), such as revenues from land sales or leases; taxes (aimed at cost-recovery); ecological fiscal transfer (EFT), user fees; developer contributions or charges; betterment levies; voluntary contributions from beneficiaries; sale of development rights and leases; funds linked to offsetting or compensation requirements; and other voluntary schemes that generate revenues.					
Land sales / leases	Taxes	Ecological Transfers	Fiscal	User fee	Developer charges
Promote the implementation of NBS or maintenance of existing NBS to other actors for their contribution.					
Market-based instruments: user charges; taxes (as incentives rather than a cost-recovery mechanism); subsidies; tax rebates; credit-trading systems; offsets for residual impacts on biodiversity/GI; and payments for ecosystem services (PES).					
Reduction of user charges	Taxes	Subsidies	Tax rebates		
Credit trading system	Offset	Payments for Ecosystem services (PES)			
Revolving funds: Investment funds where proceeds from prior investments provide a revolving flow of capital to top up the fund and finance further projects.					
Creating Public-Private Partnerships: PPPs are characterised by long term commitment by private parties, to provide a public asset or service.					
Environmental or Social Impact Bonds: EIB and SIB refer to the same scheme of an outcome-based contract. Private investment is put in upfront to fund the NBS and is then repaid by public bodies on achievement of pre-specified outcomes.					
Developing 'Business Improvement Districts' (BID): Corporations of a defined area join forces to set up their own management body to decide on financing improvements and generate income through diverse instruments.					

[4] Natural Capital Finance Facility (NCFF), EIB
[5] European Structural and Investment Funds (europa.eu)
[6] LIFE (europa.eu)

2. Methods and materials

In order to generate an overview of policy instruments potentially hindering and enabling NBS in the private sector in small to medium cities in the project we prepared three different approaches to getting information; (i) deliberative workshops with municipal stakeholders, (ii) semi-structured in person interviews with NBS businesses and (iii) an online survey of businesses (Figure 2.1).

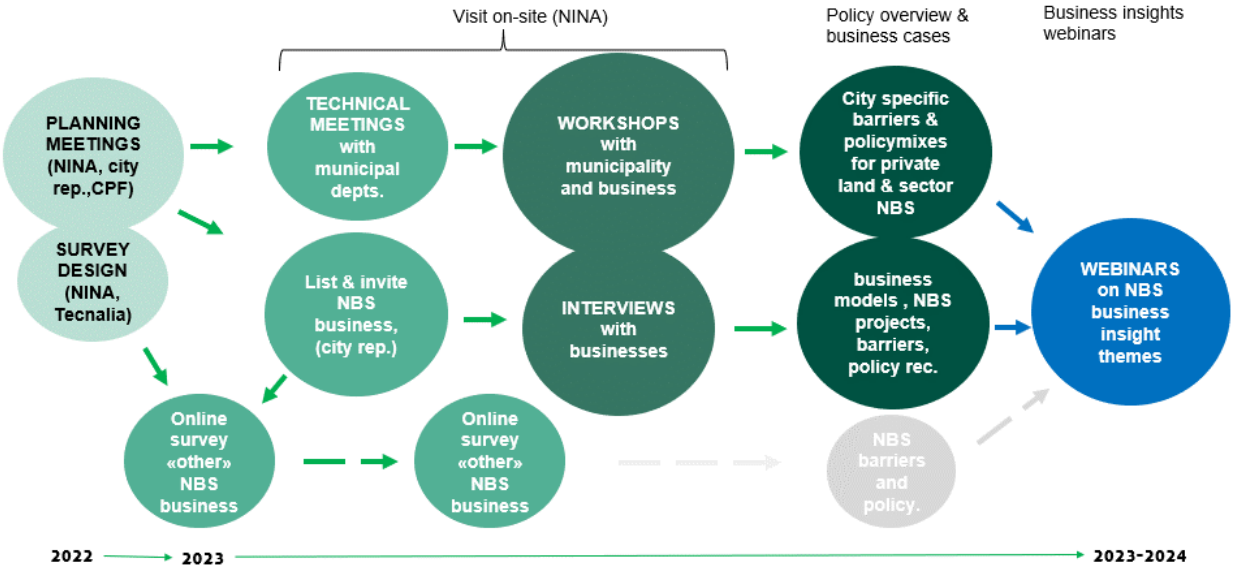


Figure 2.1 Three approaches were initiated to collect stakeholder information on policy barriers to nature-based solutions and enabling instruments. A 'business insights' webinar series has addressed policy issues arising from the analysis.

NINA and Tecnalia developed initial drafts of interview guides and an online survey which were discussed and refined with INTERLACE city focal points[7] in the six cities[8]. City focal points and local research institutions developed lists of NBS businesses for the online survey and in-person interviews, NBS related public and private stakeholders for invitation to workshops. Workshops were co-designed with city focal points and representatives focusing on different NBS policy topics. NINA then conducted in person visits of approximately one week in each city (except for Chemnitz which was held online), to adjust and hold the workshops and conduct in person interviews with business.

The online survey was first launched three weeks prior to the CBIMA workshop. The online survey faced several limitations. After repeated reminders before and after the workshop response rates were still low. The survey faced problems of representation - city focal points and partners generally struggled to identify more than a handful of NBS businesses in their cities that would be relevant for the online survey and workshop participation. With only a handful of NBS suppliers identified prior to visits, this suggested either that 'markets' for NBS were generally lacking in our case study sites and/or that municipal partners had limited collaboration with the private sector. Due to poor NBS business inventories, and initial low survey

[7] City focal points in facilitate communication between researchers in the wider INTERLACE consortium and stakeholders in each city.

[8] CBIMA (Costa Rica), Envigado (Colombia), Portoviejo (Ecuador); Granollers (Spain); Krakow (Poland), Chemnitz (Germany)

response rates, the online survey was discontinued after the CBIMA visit and policy analysis was based on information from workshop and interviews.

Due to limited identification of NBS businesses, workshops participation was dominantly by municipal staff, with a few representatives of NBS business and NGOs. In continuation we therefore refer to 'municipal workshops' and 'business interviews' where there is an expectation that policy recommendations differ. For details about workshop composition in each city see Section 4.

Three in-person interviews of 1-2 hours each were conducted in each city. NBS businesses were selected for their characteristics as exemplars by city focal points. Business interviews were carried out following the same semi-structured interview guide (summarized):

1) Characteristics of the business, including NBS value chain of main products and services
2) Value chain of an example NBS project
3) Policy barriers to capturing value in the example project
4) Proposals for policies to enable NBS business opportunities in future

The business interview provided a common reference for comparison of policy recommendations. However, policy recommendations from interviews cannot be taken to represent any concept of an NBS market in each city. At best the information is a pre-rest for generating policy instrument ideas from the private sector, and complementary information to the deliberations of the workshops.

Successive workshops in cities provided iteration and learning opportunities (Figure 2.2). The co-design and agile approach of INTERLACE meant that each workshop had a different focus on local policy analysis needs, complicating cross-context synthesis and comparison. A common theme was incentives to stimulate NBS demand from owners and developers of private land, whereas the focus on incentives for NBS supply from business varied, generally with more business participation in the workshop in

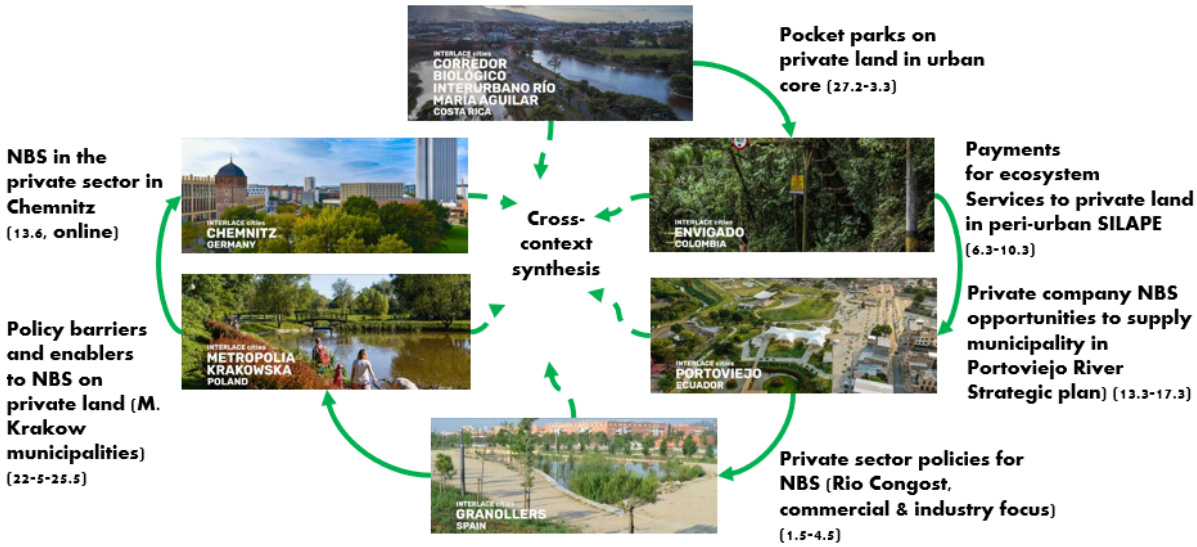


Figure 2.2 City workshops addressed different topics related to NBS policy design depending on local priorities. Sequential workshops from Latin American to European Interlace cities facilitated knowledge transfer. The agile and context adaptive approach poses a challenge for synthesis of cross-context policy findings

Europe compared to Latin America. The Urban Governance Atlas instrument classification and public-private net benefits framework were sufficiently generic and flexible to allow for standardisation and comparison despite this diversity. For details about workshop composition in each city see Section 4.

3. Analytical approaches

This section describes frameworks we used to evaluate policy mixes to foster the implementation nature-based solutions by the private sector on private land. In this chapter we define different analytical concepts used throughout the report including, 'policy for business cases' as the enabling policymix for NBS in the private sector; value chains as a way of identifying barriers to private sector provision of NBS; public goods as challenges for private NBS business models; the rural-urban transect to illustrate the need for landscape specific policymixes for NBS; the ratio of public-to-private net benefits of landuse change as framework for spatial targeting of instrument types to different parts of the urban-rural transect; and the four main policy instrument types that make up the NBS policymix.

3.1.1. Private profitability and the nature-based solution "business case"

Business models describe the rationale of how an organization creates, delivers and **captures value** (Osterwalder and Pigneur, 2010). The logic of a (private sector) business case is that, whenever resources such as money or effort are consumed, they should be in support of a specific (private) business need (Project Management Institute, 2021). The development of business models for NBS can enable private actors to play a meaningful and profitable role for NBS uptake (Croci and Lucchitta, 2020). In this report we use "business case" in a narrow and literal sense of a private business providing NBS on a commercial basis. We analyse NBS businesses from the perspective of public policies that hinder or enable such private feasibility.

We define 'policy for business cases' as a combination of public policy instruments that achieve financial feasibility of nature-based solutions implemented by private business, private non-profit sector, or private households and landowners. Such a policymix may directly incentivize nature-based landuses, or disincentivise "grey" built solutions (Figure 3.1), using direct, indirect or morally based incentives. This has been referred to as carrots, sticks and sermons (Bogdzevič and Kalinauskas, 2021; Clar and Steurer, 2021; Pacheco-Vega, 2020).

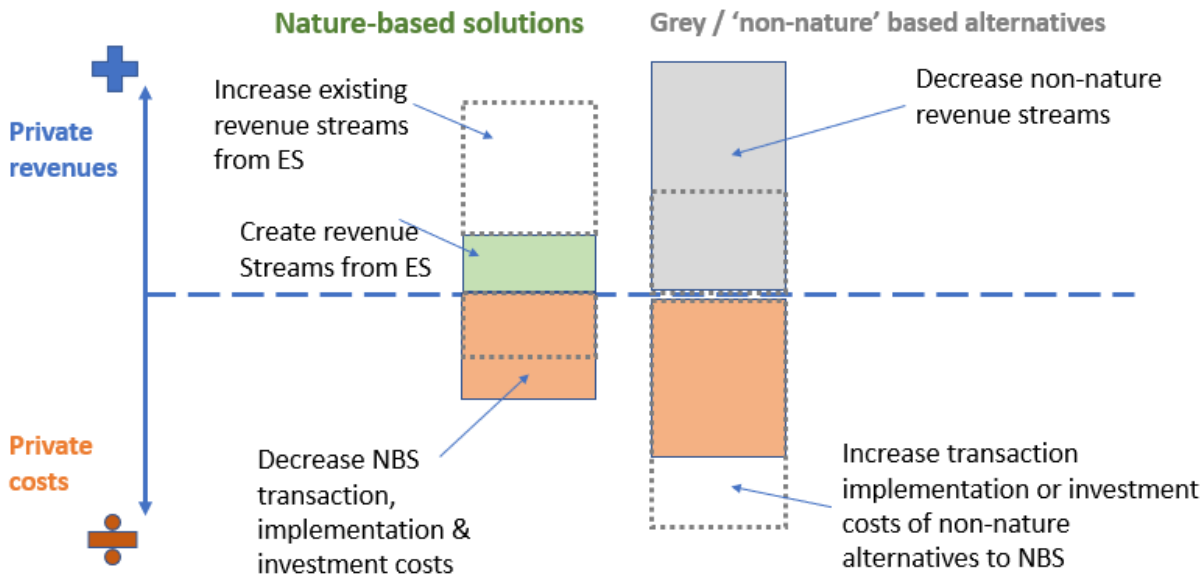


Figure 3.1 The policymix for nature restoration in cities needs to consider instruments that increase revenue and reduce costs of nature-based solutions, as well as policies that increase costs and reduce revenues for the "grey" alternatives.

Policymix analysis should aim for a basic understanding of the different 'incentive mechanisms' that in concert encourage private NBS relative to grey / "non-nature' based landuses and solutions:

+ NBS incentive

- Increasing existing revenue streams, e.g. pricing on-property benefits from nature-based solutions into property sales price ; allowing increased land occupation or higher density or height to developers in exchange for inclusion or investments in NBS.
- Creating NBS revenue streams, e.g. earmarking revenues from stormwater utility fees to a fund for subsidising private NBS implementation.
- Decreasing transaction, implementation and investment costs, e.g. providing « fast track » building permit approval for proposals that exceed blue-green infrastructure design standards

– Grey disincentive

- Decrease revenue streams from non-nature-based alternatives, e.g. introduce a variable stormwater fee that increases with on-property impermeability
- Increase transaction, implementation or investment costs, e.g. charge building permit processing fees that are higher if blue-green design standards are not met

A hypothesis of this study is that positive incentives for grey built solutions in urban development are a barrier to NBS that 'go under the radar' of businesses and managers in the NBS sector. Removing policies that provide a competitive advantage to established grey urban development models is challenging with vested interests leading to policy inertia.

3.1.2. Value chains

The value chain perspective is a standard approach to analysing business models of consumer products and services(Kaplinsky and Morris, 2012). Value chain analysis has been applied previously to NBS (Cioffi et al., 2019). Interviews with businesses use the value chain concept as a common frame of reference for discussing barriers to the business of nature-based solutions. A generic value chain was used (Figure 3.2). A key question to be asked is whether the business identifies any barriers to providing value added in their nature-based products and services offered at any particular point in the value chain?

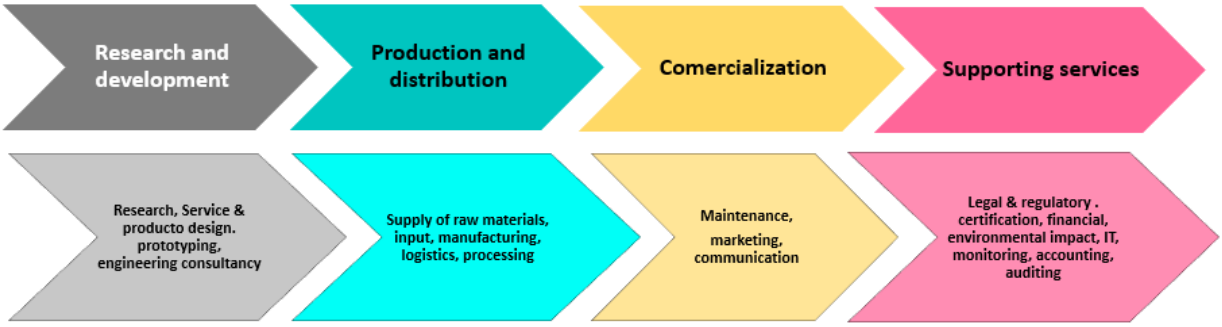


Figure 3.2 In-person interviews with businesses started with understanding which parts of the value chain for nature-based services the company focused on in the INTERLACE cities. Was there any relationship between the business model and their perspectives on policy barriers and enabling instruments? Source: Tecnalia

3.1.3. Public goods in NBS business models

«Business model» and "value chain" language in NBS policy emphasizes the role of private firms, 'customers', commercial feasibility and market-based policy instruments. However, nature-based solutions are mostly not commodifiable, nor privately financially viable. Nature-based solutions face market-failures due to multiple externality problems such as (Toxopeus and Polzin, 2021):

1) Knowledge spillovers of NBS innovations to other firms (investor uncertainty)
2) Infrastructure investment with high up-front costs and long term public good benefits (no short term financial return for private equity)
3) Ecological public goods delivered by NBS (not commodifiable)

The ecosystem services provided by nature-based solutions in cities are often public goods (Kronenberg et al., 2021) and hard to commodify and to make a private profit from.

Figure 3.3 illustrates the notion that regulating ecosystem services, most cultural ecosystem services and non-use values of biodiversity are low or non-rival in use and difficult to exclude others from use.

'Rival in use' means that a unit of the ecosystem service used by someone, cannot be used by someone else. In other words, benefits obtained by one user will 'subtract' from another users potential benefits. This is typically the case for extractive uses and provisioning ecosystem services. It is also the case for some situations with cultural services, such as when visitation to a recreation area becomes congested and each new visitor reduces the enjoyment of people already there. The other dimension of benefits from NBS is the ability to exclude users. If it is very difficult or costly to exclude someone from benefiting from an ecosystem service it is also difficult to charge a price for it, i.e. commodify it. Combining these two dimensions we get different institutional settings where business models for private profit from NBS are more or less difficult, and where "market-basing" policy may be more or less effective to promote NBS in the private sector. In situations with high rivalry in use, and high costs of excluding users we have "common-pool resources" and common-property resource management approaches can be more effective than markets or public regulation (Ostrom, 2005, 1990).

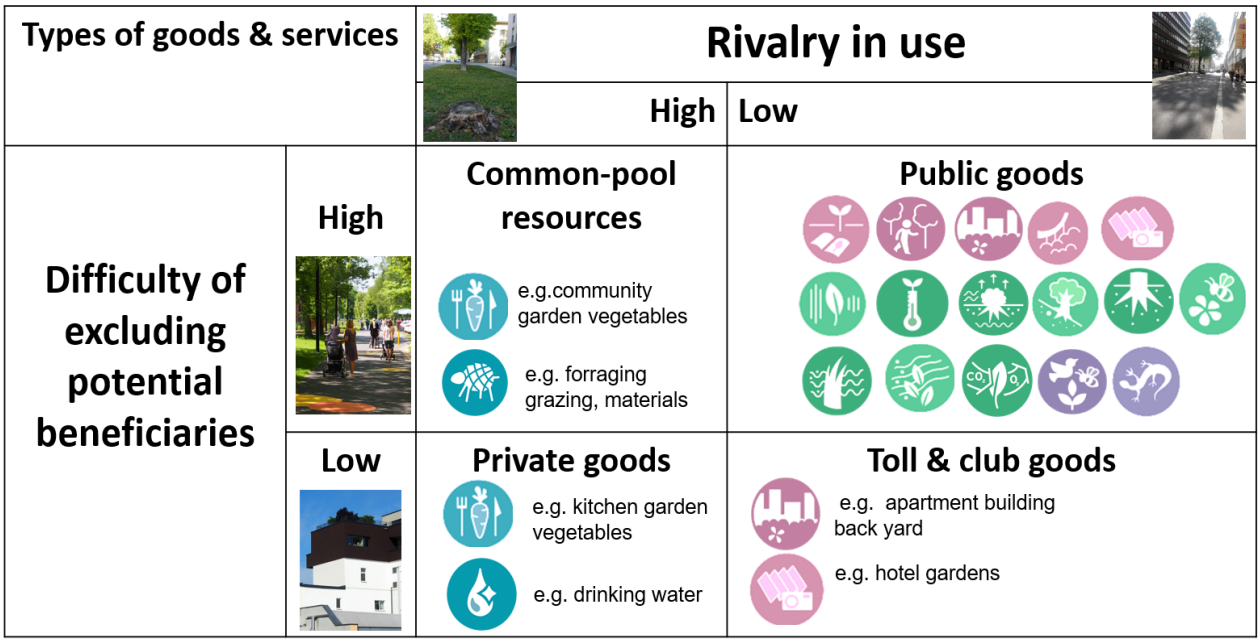


Figure 3.3 The Public goods story of NBS. Policy design for nature-based solutions must recognise the that the majority of ecosystem service benefits are not possible to appropriate and hence difficult to commercialise.

Source: own elaboration based on Ostrom, E., 2010 and icons by Fremtidens Byer Project , Bymiljøetaten, Oslo Kommune

Some amenities of real estate can be made restricted access and commercialised. Other uses may be rival in consumption, but have potentially open access characteristics that make them likely to be community managed common pool resources. Of the range of ecosystem services from green and blue infrastructure, spaces and SUDS only a very few can be appropriated as a basis for privately viable business models. Most nature-based solutions require collective action or an «entrepreneurial state» (Mazzucato, 2011) providing regulation, defining and allocating rights in order to create favourable conditions for private profit.

A hypothesis of this study is that policy instrument recommendations of both businesses and municipal managers tend to overlook the dominance of public goods characteristics of NBS and consequently overemphasise the importance of economic and financial incentives and market-mechanisms.

3.1.4. Rural-urban transect zonation of landuse and policy targeting

In addition to obvious differences between cities in Europe and Latin America, there are differences within cities. INTERLACE cities' policy-design interests and the policy analysis workshops focused on nature-based solutions in different parts of the urban landscape. The concept of rural-urban transect (Figure 3.4) provides a useful visual representation of different urban densities and morphologies which co-

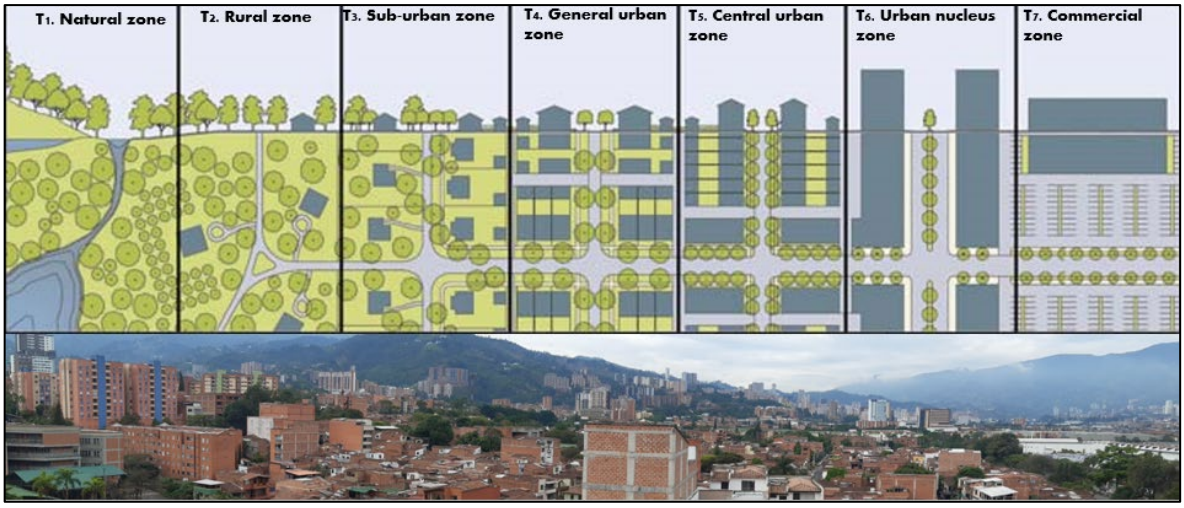


Figure 3.4 The rural-urban transect is an important landscape context for NBS instrument design. Illustration source: transect.org Photo Envigado transect: David N. Barton

determine the space available for NBS, their design, the ecosystem services the can supply and the potential demand in terms of density of potential beneficiaries.

The heterogeneity of landuses across the different parts of the transect complicate standardized, "blanket" or "one-size-fits-all" policy design recommendations. The balance of public and private ecosystem service benefits shifts from the rural zones to the urban core zones. NBS feasibility on private land varies as the opportunity costs for the private land owner of allocating space to ecological functions increases towards the urban core zones. The shift in publicly and privately accessible ecosystem services benefits shifts the ratio of net private-to-net-public benefits of land use change. In the urban core demand for space and real estate values stack the odds against nature-based solutions being financially viable without a supportive regulatory environment (Gomez-Baggethun and Barton, 2013). Very high opportunity costs of non-development is a reason that market-based approaches such as payments for ecosystems services (PES) are not generally observed in urban settings. When used in peri-urban settings for e.g. compensating for watershed protection services for drinking water, PES functions in combination with landuse change regulations and protected areas (e.g.(Porras et al., 2013; Solano, 2010).

3.1.5. Public-private net benefits framework

Research on “business models” for nature-based solutions have used a wide definition of “business” including the values of firms as well as public sector and citizens (e.g. Croci and Lucchitta, 2020). Examples of ”business models” are often privately profitable thanks to different kinds of public direct or indirect incentives. There has been limited effort to distinguish private from public net benefits or to determine in which spatial contexts scarce public funds provide net benefits in terms of publicly accessible ecosystem services (public goods).

The public-private net benefits (PPNB) framework (Pannell, 2008) provides an analytical lens on these two economic dimensions of “business models” and does so in a spatially explicit way. It has not previously been used in an urban setting. We build on work done by the EU FP7 POLICYMIX project (Ring and Barton, 2015) to assess forest conservation, agroforestry and regeneration incentives across forest frontiers. We adapt the approach to an urban setting and NBS policy instruments recommended by businesses and municipalities in the interviews and workshops across the 6 INTERLACE cities.

For a detailed description of Pannell’s framework and our adaptation to nature-based solutions in an urban setting see Appendix 8.1. In summary, we distinguish two typical contexts (i) a situation where the land owners has natural or agricultural landcover and faces a decision of whether to conserve vegetation cover or develop the land, leading to nature loss (left hand side, Fig.2.5), and (ii) a situation of built land where the landowner is considering restoring natural landscape elements and ecological functions. The context on the right-hand side (fig.2.5) is more likely in the rural-sub-urban side of the transect in Figure 2.5, whereas the restoration context is more likely in the urban context. Pannell’s model argues that the decision chosen by the landowner facing private benefits and costs (=net benefits) of landuse change may not be socially optimal because of public net benefits from ecosystem services. Depending on the ratio of public to private net benefit different incentive mechanisms are recommended. Deliberate “no action” or promoting longer term technological change or learning through extension services are also recommended. Different ratios of public-private net-benefits of avoiding development or promoting nature restoration across the urban-rural gradient suggest that policy design has to be specific to the different zones across the transfect.

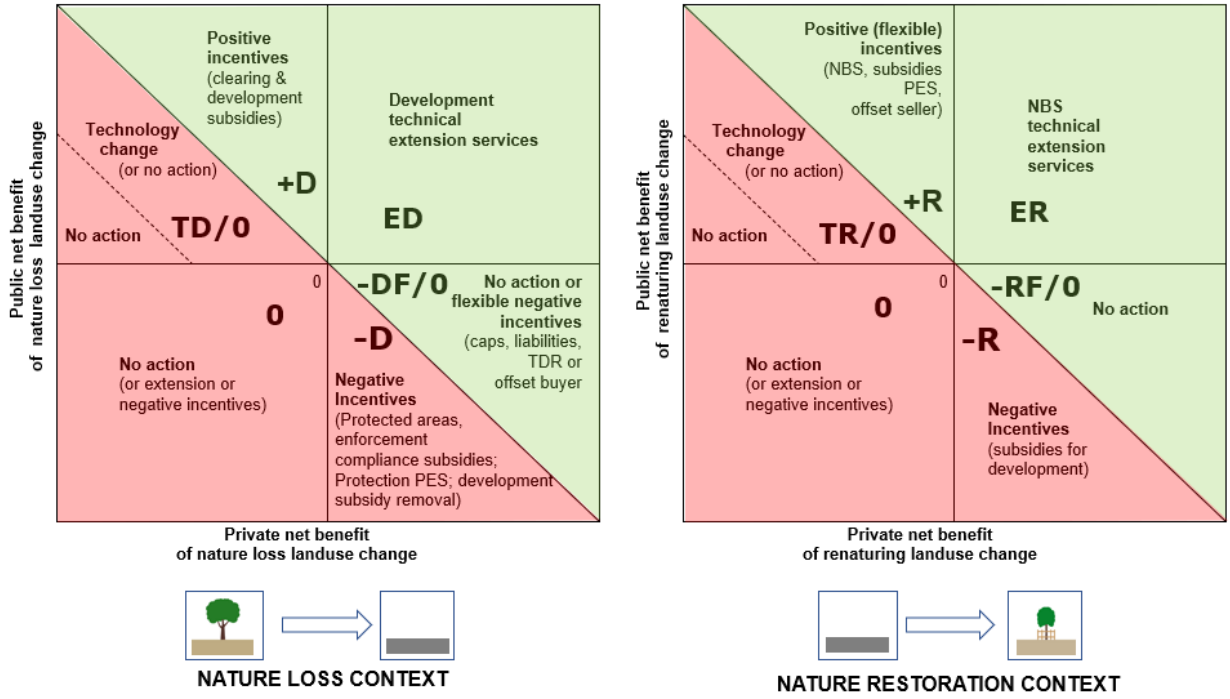


Figure 3.5 Public-private net benefits framework (PPBF) for policy instrument recommendations on private land. Source: based on Pannell, D.J., 2008.

Landuse change situations in red have net negative public+private benefits and should use incentices discouraging privately motivated landuse change, or do noting. Situations in green have net positive public+private benefits and should use policy incentives that encourage private landuse change decisions.

Incentive mechanism labels: (+) incentive encouraging landuse change (positive incentive); (-) incentive discouraging landuse change; D= development incentive; R=Restoration incentive; E=Extension, T=technological change (including governance innovation); 0=deliberate "no action".

Public-private net benefits framework (PPBF) has several strengths, as well as weaknesses in the context of NBS.

PPBF Strengths:

- a common frame of reference for discussing the economic rationale behind the different NBS policy instruments defined by the Urban Governance Atlas or similar instrument typologies
- provides terminology and policy selection rules for economically rational instrument selection
- more informed discussion about the scope for NBS business models with and without public incentives
- explains why policy instrument recommendations must be targeted and context specific –why 'blanket' recommendations covering a whole municipality are likely to fail in significant parts of the landscape
- helps target different policy instruments to different parts of municipal master plans and land use zoning
- can potentially be used to infer current private net benefit ratios of urban land use by evaluating policy instrument uptake across different parts of an urban-rural transect

PPBF Weaknesses:

- The framework is currently a conceptual more than an empirical data-driven analytical approach. It does not consider the information costs of observing private and public net benefits of nature-based solutions. NBS costing and ecosystem services valuation is context specific.

- The framework does not consider dynamics - change in net benefits over time, and path dependency in instrument selection.

- The framework does not specify the agency needed to transform the policymix over time. It does not consider differences in capacity, jurisdictions and competencies of cities in relation to regional or national planning levels that may have competencies that override local government. Also, different types of policy instruments in the framework may be assigned to different sector agencies withhin the municipality or higher levels of government (e.g. extension services, property permitting, taxes and charges, protected areas). This makes it harder to coordinate the choice of instruments in different parts of the urban landscape.

- Pannell's framework considers policy instrument introductions that correct for economically inefficient landuses. It takes the current policymix as given. It does not explicitly consider how existing policy environment is consistent or not with other policy objectives than public economic efficiency.

- Municipal master plans have a broader scope and scale than the spatially targeted individual incentives in Figure 2.5. Master plans have a multisectoral approach and are critical because they enable the allocation of public resources. Usually other municipal policies refer to the master plan and budgeting responds to its objective and metrics. In Latin American context these are called 'development plans' or 'landuse plans' indicating the type of interventions that are allowed in the jurisdiction of a local government.

Despite these limitations, the framework is a thinking tool that opens up for considerations of the removal of existing instruments, as well as introduction of new ones.

3.1.6. Policy instrument typology - Urban Governance Atlas

We use the INTERLACE Urban Governance Atlas[9] typology of policy instruments for nature-based solutions (table 3.1) to classify policy proposals from the municipal workshops and business interviews in the six INTERLACE cities .

A challenge faced in the workshops and interviews is the variation in local policy terminology across Spanish, German, Polish and English translations. Workshop reports and Interviews were first transcribed to English. In order to derive comparable policy instrument lists we then standardized instruments by assigning them to UGA subcategories, with specific English labels. The instrument classification used in coding is provided in Appendix 8.2. In some cases, proposed instruments did not fit easily into the UGA subcategories. We identified these as "other" instruments and their potentially innovative characteristics are analysed in section 5.5.

Types of policy instruments	Subcategories
Legislative, regulatory and strategic instruments	Dedicated strategy, plan or law Overarching/cross sectoral strategy, plan or law Sectorial strategy, plan or law Urban planning mechanisms Standards
Economic and fiscal instruments	Disincentives Payments as rewards/for ecosystem services, subsidies, incentives Financing mechanisms /market-based instruments
Agreement-based or cooperative instruments	Community based agreement with the support of the government Public private community-based agreement Public private business agreement Public- community agreement Private business agreement with the support of the government Joint regional planning between municipalities
Knowledge, communication and innovation instruments	Communication/awareness raising Knowledge and innovation

Table 3.1 Urban Governance Atlas policy instrument categories and subcategories

Source: https://interlace-hub.com/uga-methodology

[9] https://interlace-hub.com/urban-governance-atlas

3.2. Caveats of the comparative analysis

The synthesis and comparison of NBS policy instrument recommendations across the six cities is presented in Tables 5.1.-5.4 for each instrument type. The synthesis table was compiled to find similarities in instruments recommended and policy gaps across these small and medium cities, with the aim of drawing some general conclusions on small-to-medium cities and private sector NBS.

Some limitations of the data sources as presented above should be kept in mind when considering our cross-city comparisons.

- The sample sizes are not sufficient for pairwise comparisons of results from business interviews or workshops between cities. Comparisons are made of the differences across results pooled for all the cities.
- In some interviews there was not a clear differentiation between desired outcomes (.e.g multifunction design of greenspaces) and the policy instruments to enable outcomes.
- Coding of the interviews and workshops into the instrument categories and sub-categories compatible with the Urban Governance Atlas was carried out by the lead author. They have not been validated by second opinion.
- Differences between segments (Europe and Latin America, municipal versus private responses) are identified where the difference in instances was two or greater ‘mentions’ in by workshop part.
- Workshops have been broadly characterized as representing municipal or public viewpoints because the discussion questions were focused on public policy recommendations. However, workshops in Granollers and Chemnitz had a significant participation of private business, albeit responding to the public policy instrument questions.

4. Public-private perspectives on policies for NBS business cases

This chapter collates the NBS policy instrument recommendations from the municipal workshop and the in-person interviews with NBS businesses in each of the INTERLACE cities in Latin America and Europe.

Each sub-section contains a brief description of the NBS and policy instrument focus of each of the six the city workshops that were conducted. Each sub-section contains a table of the policy instruments raised in the discussion by participants in the workshops, compared to the instruments that were raised in the interviews with local NBS companies. Following the subsection for each city there one of the NBS SMEs interviewed in each city is showcased:

City	Showcased company
Corredor Biológico Interurbano Río María Aguilar (CBIMA) Costa Rica	Blackwaters Engineering
Envigado, Colombia	Ingeaguas SAS
Portoviejo, Ecuador	GG+E Arquitectos
Granollers, Catalunya, Spain	Naturalea
Metropolia Krakowska, Poland	Gajda Landscape Architecture
Chemnitz, Germany	Uta Gehrhardt Landschaft

The table comparing policy instruments is extracted from a full matrix comparing policy instruments discussed in workshops and interviews across all six cities (a link to the full instrument matrix. Section 5 provides further a comparative analysis of the instrument matrices.

4.1. Corredor Biológico Interurbano Río María Aguilar (CBIMA) Costa Rica

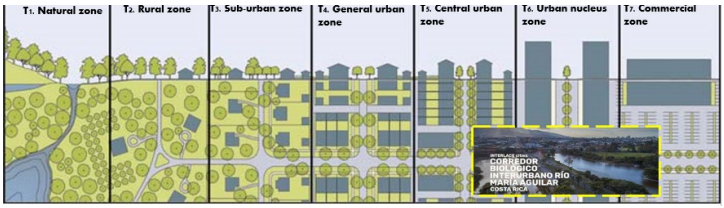


Figure 3.1 The CBIMA workshop addressed pocket parks on private land in urban zones. Illustration adapted transect.org

Vacant lots in San José, Costa Rica. Photos: Erika Calderon

The CBIMA workshop addressed pocket parks on private land in urban zones. Participants were from municipalities in CBIMA, national conservation and housing authorities and the research team. Pocket parks were discussed with respect to two case studies in the urban core of San Jose, across a number of dimensions: (i) community participation, (ii) multiple uses, (iii) park design for ecosystem service provision, (iv) security and vandalism (v) appropriate materials, (vi) funding sources and (vii) policy instrument recommendations. Interviews were conducted with 3 businesses providing NBS in the metropolitan area (see Appendix 9.3.1 summary transcripts). Policy recommendations from municipal workshops and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.1.). See Appendix 9.4.1 for the workshop report.

Table 3.1 Overview of instruments proposed in CBIMA municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	CBIMA municipal	CBIMA business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Regulation plans with NBS norms	1	
Green space type specific regulations	1	
Sectoral/overarching strategy or plan		
Municipal master plans - Land use zoning		1
Urban planning mechanisms		
Public interest expropriation	1	
Minimum blue-green area requirements		1
Minimum ecosystem service performance requirments		1
Standards		
Other		
Simplify NBS permitting procedures		1
Financial & economic instruments		
Disincentives		
Subsidies, incentives in kind		
Reduction NBS input charges, taxes		1
Reduction in municipal utility fees	1	
Reduction property tax	1	1
Increased building utilization intensity permit	1	
Subsidies for NBS inputs		1
Market-based instruments		
Commercial use concessions	1	
Payments for ecosystem services	1	
Financing mechanisms		
Favourable credit for NBS		1
Public procurement - NBS demand creation		1
Other		
Tax on vacant lots & brownfield land	1	
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training in co-benefits NBS		1
Guidance manuals for NBS		1
Knowledge and innovation		
Open source technical standards for NBS	1	1
Public-private NBS laboratories		1
Mapping & Cadastre of protection & restoration sites	1	
Other		
Certification for NBS		1
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Municipal-community stewardship agreement	1	1
Multistakeholder collaboration		
Municipal-private negotiated area development	1	
Joint regional planning/ action		
Cross-municipal collaboration agreements		1
Other		
Other governance		
Enforcement of labour legislation		1

Link to full coding matrix.

4.1.1. Selected business case: Blackwaters Engineering, Costa Rica

Business model. Blackwaters Engineering specializes in nature-based solutions for stormwater management. The company focuses particularly on hydrological science-based design of their installations, using information systems to reduce complex hydrological design problems to decision-support indicators and presentation material that managers and politicians can understand and use. With 3 permanent employees a small company such as Blackwater is still able to execute large projects with success. Through participation in the consortium Consorcio Ingeniería Geoespacial they offer integrated projects, including representation of licenced technologies and components from Atlantis (Australia). The realized project portfolio of the company is their main selling point.

NBS Value chain: Blackwaters services cover all main stages of the value chain for NBS.

Services. Virtual reality capture; digital elevation models and orthophotos; hydrodynamic modelling, design.

Project thumbnails:

Photos: David Borge

Company perspective on enabling policies for NBS business:

Regulation: reform of the hydrological code of Costa Rica; regulation of minimum return periods for SUDS in private property

Economics: reduction in social security surcharges in NBS projects; reductions in property taxes for owners implementing SUDS

Information: awareness raising of policy-makers and planners in municipalities on stormwater management

Cooperation: public-private partnership in NBS labs such as Laboratorio LACCLLIVE in collaboration with Instituto Tecnologico de Costa Rica

Contact: CEO David Borge. davidb@blackswaters.com

4.2. Envigado, Colombia

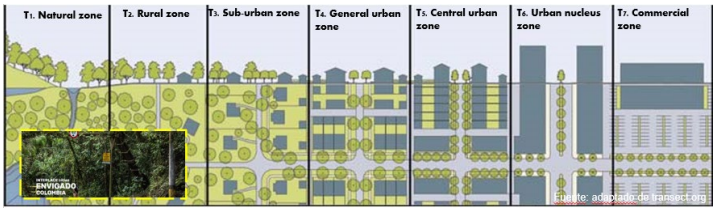


Figure 3.2 The Envigado municipal workshop addressed policies for private land within the system of protected areas in the natural and peri-urban zones. Illustration adapted transect.org

Peri-urban forests in Envigado. Photos: Alcaldia de Envigado

Table 3.2 Policy instruments proposed in Envigado municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Envigado municipal	Envigado business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Regulation plans with NBS norms	1	
Green space type specific regulations	1	
Sectoral/overarching strategy or plan		
System of peri-urban protected areas	1	
Urban planning mechanisms		
Development offset requirement	1	
Standards		
Other		
Financial & economic instruments		
Disincentives		
Subsidies, incentives in kind		
Reduction property tax	1	
Tax on property parcelization	1	
Subsidies for NBS R&D		1
Market-based instruments		
Payments for ecosystem services	1	
Financing mechanisms		
Favourable credit for NBS		1
Earmarking regular budget restoration	1	
Other		
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training in co-benefits NBS	1	
University-business professional training		1
Knowledge and innovation		
Mapping & Cadastre of protection & restoration sites	1	
Ecosystem & biodiversity impact ev. & accounting	1	
Other		
Competitions & Prizes for NBS innovation		1
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Municipal-community stewardship agreement	1	
Multistakeholder collaboration		
Joint regional planning/ action		
Cross-municipal collaboration agreements	1	
Other		
Professional associations & networks for NBS services		1
Other governance		
Enforcement of transparent public tendering		1
Auditing, certifying agency for NBS		1
Reduced private contracting		1

Link to full coding matrix.

The Envigado municipal workshop discussed payments for ecosystem services and complementary policy instruments for promoting forest conservation and wildlife corridors on private land within the SILAPE - Local System of Protected Areas of Envigado. Participants in the workshop included representatives from public institutions at local and regional level; environment and agriculture and planning, agencies in Envigado, the Autonomous Regional Corporations of Corantioquia and Rio Negro and Nare, Corporation MasBosques and Universities in Medellín. SILAPE covers areas of mostly private lands in the natural and peri-urban zones in the slopes and highland around Envigado's urban core. The workshop focused on an assessment of the potential for increased use of Payments for Ecosystem Services (PES) for private forest protection in addition to existing schemes being provided by Corantioquia and Masbosques. The workshop discussed the wider policymix as a prerequisite for PES in enabling protection of nature on private land in the peri-urban areas of Envigado.

Interviews were conducted with 3 SME businesses providing wildlife impact evaluation and mitigation measures, plant nurseries for forest restoration and wastewater recycling technologies in the metropolitan area of Medellín, including Envigado (see Appendix 9.3.2 for a summary of interview transcripts). Policy recommendations from municipal workshops and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.2.). See Appendix 9.4.2 for the workshop report.

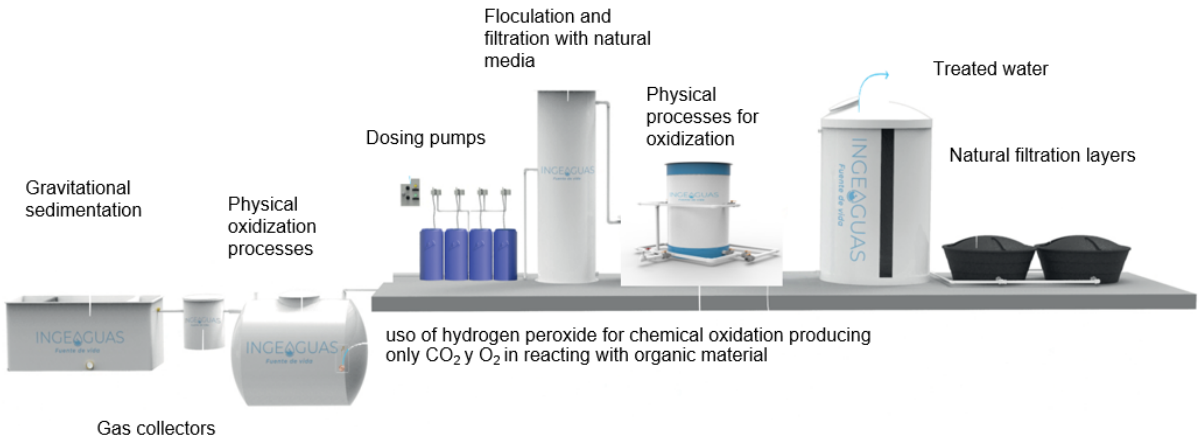
4.2.1. Selected business case: Ingeaguas SAS, Medellín, Colombia

Business model. Ingeaguas SAS was founded in 1981. Based in Medellín, Colombia it currently has grown to 40 full time and 60 part time employees. The company offers a wide range of water and wastewater treatment technologies, including traditional engineering and biotechnologies. Awarded the prize for most innovative company in Medellín 2012. Ingeaguas SAS has a number of patents on treatment technology and manufactures its own treatment plants. Maintenance and rent-to-own contracts are significant contribution to the business.

NBS Value chain: Ingeaguas offers integrated projects covering design, production, installation and maintenance.

Services in NBS. Nature-based technology services include regeneration of microforests to recover natural springs ; capture and treatment of rainwater; recycling and use of water ; use of natural coagulants (moringa, natural fruit as a substitute for aluminium); biotechnologies for wastewater (microorganisms); zeolites as a natural filter for retention of Nitrogen and Amonia; reduced use of chlorine with ozone and ultra violet light for water treatment.

Project thumbnail: ECOPLANTAS Carwash wastewater recycling using biotechnology and



Company perspective on enabling policies for reuse and recycling of water:

Regulations: employee health regulations; reuse and recycling norms.
Economics: tax exemptions for environmental services, reduced wastewater fees, environmental asset recognition in balance sheet.
Information: state-supported research, including matching of SMEs with university labs.
Cooperation: facilitation of tripartite collaboration agreements with municipalities-SMEs-academia.

Website: https://ingeaguas.co/ **Contact:** info@ingeaguas.co

4.3. Portoviejo, Ecuador

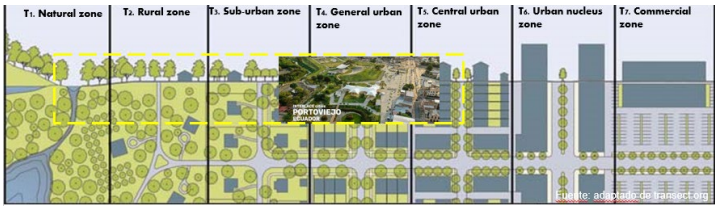


Figure 3.3 The Portoviejo municipal workshop addressed policies for private land within River Strategic Plan. Policy analysis focused on proposals for the urban and peri-urban areas. Illustration adapted transect.org

Portoviejo empty lot in town centre and Parque Las Vegas post-earthquake development. Photos: David N. Barton

The Portoviejo municipal workshop addressed policies for private land within Portoviejo River Strategic Plan. The workshop saw participants mainly from the environment and development department of Portoviejo municipality, environmental and conservation NGOs, a professional association for risk management, development agency and project researchers. The workshop divided into two working groups, one focusing in enabling policies for sustainable agriculture, and the other on nature-based solutions in urban and peri-urban areas. The policy analysis reported here focused on proposals from the group on NBS.

Table 3.3 Policy instruments proposed in Portoviejo municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Portoviejo municipal	Portoviejo business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Regulation plans with NBS norms		1
Sectoral/overarching strategy or plan		
Municipal master plans - Land use zoning		1
Urban planning mechanisms		
Standards		
Other		
Financial & economic instruments		
Disincentives		
Subsidies, incentives in kind		
Reduction property tax		1
Reduction in building permit fee		1
Increased building utilization intensity permit		1
Market-based instruments		
Financing mechanisms		
Public procurement - NBS demand creation	1	
Other		
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training in co-benefits NBS		1
Municipal training planning & building law		1
Knowledge and innovation		
In-house municipal NBS staff		1
Open source technical standards for NBS		1
NBS Extension services	1	
Pilot R&D projects catalogue	1	
Other		
Certification for NBS	1	
Competitions & Prizes for NBS innovation	1	
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Municipal-community stewardship agreement		1
Multistakeholder collaboration		
University-business-municipal R&D projects	1	1
Joint regional planning/ action		
Other		
Professional associations & networks for NBS services	1	1
NBS business cluster	1	
Other governance		
Auditing, certifying agency for NBS		1

Link to full coding matrix.

Interviews were conducted with 3 SME businesses in landscape architecture design of public green spaces, urban renewal and architecture and construction (see Appendix 9.3.3 for original transcripts). NBS businesses interviewed provided services in Portoviejo, the wider Manabi region as well as other Ecuadorean cities.

Policy recommendations from municipal workshops and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.3.). See Appendix 9.4.3 for the workshop report.

4.3.1. Selected Business case: GG+E Arquitectos, Ecuador

Business model. GG+S Arquitectos is a trans-disciplinary landscape architecture and urban design firm committed to study, imagine, and create human environments that positively interact with natural systems; and, by understanding social and psychological needs, strives to create aesthetic and human scale urban environments that nurture the cultural and economic life of communities.

The firm has been commissioned projects at a variety of scales and complexity, including: the preparation of management tools for the sustainable development of cities and regions; master planning of landscapes for tourism, recreation, environmental risk management, mobility, and conservation; and the design and construction of public spaces at a human scale. GG+S was central in supporting the Municipality of Portoviejo to rethink the city after a devastating earthquake in 2016.

NBS Value chain: GG+S Arquitectos provides a trans-disciplinary approach to urban and landscape design of sustainable environments, incorporating the natural sciences, the humanities, and design skills.

Services. Master planning of river corridors, and urban waterfronts, establishing NBS to foster nature tourism, recreation, environmental risk management, and wildlife habitat enhancement. Public realm design, incorporating green infrastructure in places lacking sustainable ways to handle water runoff, protecting existing soil and vegetation, and incorporating new vegetation adapted to local conditions.

Project thumbnails: Las Vegas Park is located at the heart of the Central District of Portoviejo, Ecuador, and is one of 6 parks and reserves contemplated in the Master Plan for the Portoviejo River Corridor. The project widened the river bank, to lessen flooding impacts in neighboring areas, and created a wetland to handle the discharge of hard surfaces. With approximately 10.7 hectares, it quickly became a hub for the celebration of public life, and a place that attracts birdwatchers. It's a symbol of the renaissance that Portoviejo is experiencing after the big earthquake.

Parque Las Vegas aerial photo, 2019. Photo credit: Gobierno Autónomo Descentralizado del Catón Portoviejo

La Tomatera Project, a 1220 hectare is a component of the Portoviejo City Green Belt. It's just 2 kilometers away from downtown, located in the vicinity of the Universidad Técnica de Manabí Campus. While mainly a conservation project, it also harbors a bike park for downhill practitioners; camping sites and trails; and tourist facilities. Green infrastructure was added to control flooding of downstream neighborhoods.

Company perspective on enabling policies for NBS business:

Aerial view of retention pond and wetland that will likely attract migratory birds. Image credit: GG+S Arquitectos

Regulations: To bring about new national legislation and municipal ordinances requiring that public works be combined with NBS.
Economics: Non-refundable credit, and credit at preferential interest rates for NBS projects.
Information: Funding for training programs to develop professional and labor skills in design, construction, and management of NBS.
Cooperation: international agencies and multilateral credit institutions committed to raise awareness at national and local level; international task force to assist countries in need; public engagement in planning and stewardship of public parks.

Website:
Instagram: ggs_arquitectos
Linkedin: GG+S Arquitectos

Contact:
Gustavo González, Principal
Email: paisaje.gg@gmail.com and ggs.paisaje@gmail.com
+593 99 952 9515, +593 99 389 2611

4.4. Granollers, Catalunya, Spain

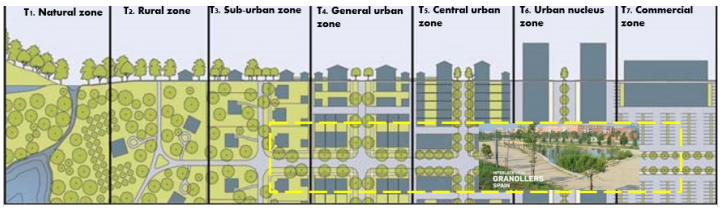


Figure 3.4 The Granollers municipal workshop addressed policies to promote NBS on private land, particularly in industrial development zones along the Congost River

Urban plantings, biomats potential infiltration areas in the urban core in Granollers, artificial wetland and river banks along the Congost River.

Table 3.4 Policy instruments proposed in Granollers municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Granollers municipal	Granollers business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Sectoral/overarching strategy or plan		
Framework regulation		1
Municipal master plans - Land use zoning		1
Urban planning mechanisms		
Minimum condition requirements		1
Minimum blue-green area requirements	1	
Water & sewage requirements	1	
Development offset requirement	1	1
Standards		
Other		
Simplify NBS permitting procedures		1
Financial & economic instruments		
Disincentives		
Fines for regulatory non-compliance		1
Ecosystem service utility charges		1
Subsidies, incentives in kind		
Reduction NBS input charges, taxes	1	
Reduction property tax	1	
Subsidy for NBS implementation	1	
EU co-funding		1
Market-based instruments		
Financing mechanisms		
Earmarking regular budget restoration		1
Other		
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training on sustainable production	1	
Guidance manuals for NBS	1	1
Public environmental campaigns	1	
Knowledge and innovation		
Open source technical standards for NBS		1
NBS Extension services	1	
Public-private NBS laboratories		1
Pilot R&D projects catalogue		1
Other		
Certification for NBS		1
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Multistakeholder collaboration		
Municipal-private negotiated area development	1	
University-business-municipal R&D projects	1	1
Joint regional planning/ action		
Cross-municipal collaboration agreements		1
Other		
Professional associations & networks for NBS services	1	1
Business collaboration events on NBS	1	
Other governance		
Corporate governance - social responsibility		1

Link to full coding matrix.

The Granollers municipal workshop addressed policies to promote NBS on private land, particularly in industrial development zones along the Congost River. Participants in the workshop were from the environment department of the municipality of Granollers, from neighbouring Barberà del Vallès municipality, Consorci Besos Tordera working on wastewater treatment and river restoration at regional level, logistics and urban development and real estate working in the industrial zone of Granollers, and the bioengineering company Naturalea (see business case below). The workshop divided into two groups discussing the same questions regarding barriers to private sector NBS and policy instrument enablers of NBS supply and demand in Granollers.

Interviews were conducted with 3 businesses in bioengineering (see business case below), wastewater treatment and river restoration, and an agroecological farming offset project for a consumer products manufacturer (see Appendix 9.3.4 for original transcripts). Policy recommendations from the municipal workshop and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.4.). See Appendix 9.4.4 for the workshop report.

The study of the implementation of SBN in the private sphere in Granollers meant a reinforcement for the municipal line of work on the creation of green infrastructure and promotion of urban

renaturalisation. The events organised on SBN (interviews, meetings and workshop) visualised opportunities for the development of local SBN with the participation of local and regional private actors. Subsequent to the main study workshop, there were meetings between the City Council and some companies to plan possible future projects. However, there is still a long way to go and more outreach, planning and legal instruments are needed to promote SBNs in the private sector and thus mobilise companies and private landowners in the realisation of NBS projects which are beneficial to their interests, the local community and their immediate natural environment.

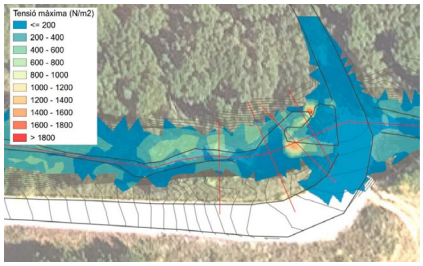
4.4.1. Selected Business case: Naturalea, Catalunya, Spain

Business model. Naturalea specializes in the design and execution of systems for landscape restoration and conservation, urban spaces naturalization, prioritizing Nature-Based Solutions and especially the use of soil and water bioengineering techniques. The company has 26 years experience with thousands of works completed and hundreds of projects drafted. Naturalea carries out public-private R&D collaboration through the Urban River Lab and is organized as a company for the Common Good.

NBS Value chain: Naturalea offers bioengineering services across the value chain of nature-based solutions

Services:

Project drafting



Executive projects for landscape restoration and conservation with design and application of Nature-Based Solutions (NBS) and soil and water bioengineering techniques.

Works

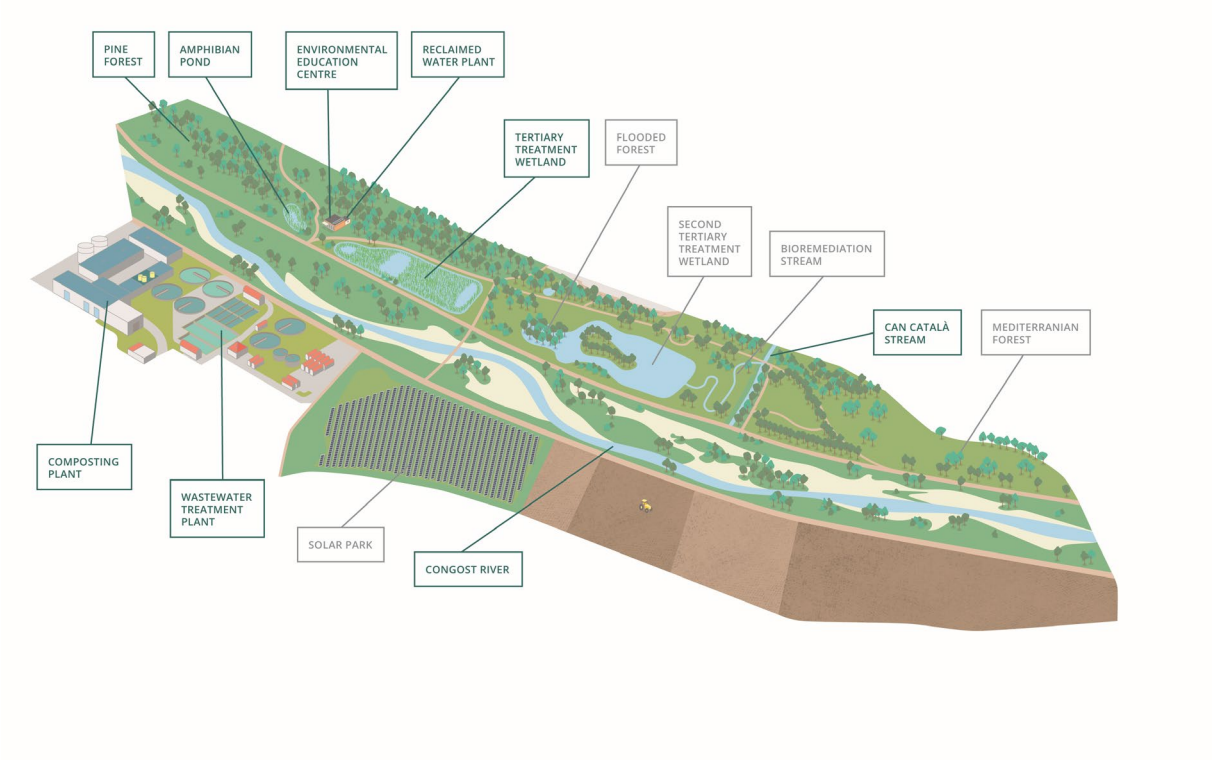
Works for landscape restoration and conservation and urban spaces naturalisation, prioritising the use of Nature-Based Solutions (NBS) and soil and water bioengineering techniques

Research

Participation in several research projects, some of them at the Urban River Lab (URL), an open-air laboratory where we develop strategies to improve river areas.

Project thumbnail: Can Cabanyes is an 8 hectare NBS project facilitated by a development offset for 3000m of public land used for an industrial development of the Zona Franca de Barcelona, offset by 9 hectares of private land transferred to the municipality for restoration. Universidad Politécnica de Catalunya designed and Naturalea constructed the tertiary treatment wetland of the first stage of the restoration (Can Cabanyes 1). Naturalea is the main contractor for green infrastructure of Can Cabanyes 2, including a flooded forest, second tertiary treatment wetland, bioremediation stream and Mediterranean forest restoration. The project is an innovative example of a NBS public-private partnership.

Principle actors: Ayuntamiento de Granollers, Consorcio de la Zona France de Barcelona, Buildingcenter SA. **Important actors:** Naturalea, Segro, Consorci Besós Tordera.



Project Can Cabanyes phase I (green) & phase II (grey). Illustration: Ayntamiento de Granollers.

Company perspective on enabling policies for NBS business:

Regulation: EU Water framework Directive is the origin of the river restoration market in Spain; public procurement criteria must credit cost-effectiveness of bioengineering restoration over high maintenance costs of traditional grey solutions;

Economic and financial: Development offset for river restoration; Public good company - Empresa de bien común https://economiadelbiencomun.org/blog/grupos/nodo-de-empresa/)

Information: Naturalea adopts an open-source marketing strategy, publishing its project technical documentation– https://naturalea.eu/en/technical-documentation/.

Cooperation: Natularea develops bioengineering solutions in collaboration with the public and academic sectors through the Urban River Lab urbanriverlab.com

Company Website: https://naturalea.eu/en/ **Contact:** info@naturalea.eu

4.5. Metropolia Krakowska, Poland

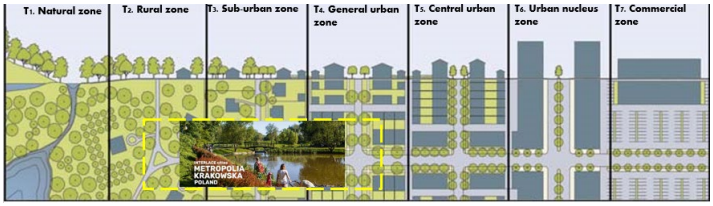


Figure 3.5 The Metropolia Krakowska municipal workshop addressed policies to promote NBS on private land in the peri-urban municipalities around Krakow.

City and residential parks and SUDS in Krakow. Photos: David N. Barton

Table 3.5 Policy instruments proposed in Metropolia Krakowska municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	M.Krakowska municipal	M.Krakowska business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Regulation plans with NBS norms	1	
Sectoral/overarching strategy or plan		
Urban planning mechanisms		
Protected areas	1	
Specific NBS structural requirements	1	
Minimum condition requirements	1	
Minimum blue-green area requirements		1
Minimum ecosystem service performance requirments		1
Standards		
NBS Procurement guidelines		1
Other		
Financial & economic instruments		
Disincentives		
Subsidies, incentives in kind	?	
Subsidy for NBS implementation	1	1
EU co-funding	1	
Market-based instruments		
Financing mechanisms		
Other		
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training in co-benefits NBS	1	
Municipal training planning & building law	1	
Public environmental campaigns	1	
Knowledge and innovation		
NBS Extension services	1	
Pilot R&D projects catalogue	1	
Other		
Competitions & Prizes for NBS innovation	1	1
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Municipal-community stewardship agreement	1	
Multistakeholder collaboration		
Municipal-private negotiated area development		1
University-business-municipal R&D projects	1	
Municipal inter-agency and utility cooperation	1	
Joint regional planning/ action		
Cross-municipal collaboration agreements	1	
Other		
Professional associations & networks for NBS services		1
Other governance		
Enforcement of transparent public tendering		1
Auditing, certifying agency for NBS		1

Link to full coding matrix.

The Metropolia Krakowska municipal workshop addressed policies to promote NBS on private land in the peri-urban municipalities around Krakow city. Participants were from the Metropolia Krakowska central office and 8 member municipalities, as well as the Krakow University of technology, regional government (Voivodeship) and project researchers. The workshop split into three groups according to the dominant landcover in urban-rural transect around Krakow: rural, urban-rural and urban municipalities. The recommended policy instruments for promoting NBS on private land are collated into a single list (Table 3.5). A second workshop was conducted as part of the Climate Forum in which the policy instruments were further assessed in terms of relevant strategic documents, extending the analysis to address blue-green infrastructure on both private and public land.

Interviews were conducted with 3 businesses in the Krakow area specialising in landscape architecture in residential and public green spaces, and green roofs (see Appendix 9.3.5 for original transcripts). Policy recommendations from municipal workshops and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.5.). See Appendix 9.4.5 for the workshop report.

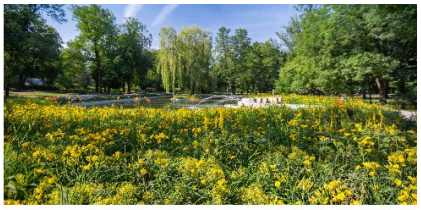
4.5.1. Selected Business case: Gajda Landscape Architecture, Krakow

Business model. Gajda Landscape Architecture - offers comprehensive landscape architecture design services, through multi-disciplinary projects for the development of green areas, public spaces, private spaces and gardens from the concept phase to the executive design. Gajda collaborates in consortia with specialised landscape architecture firms from Poland and internationally (Germany, UK).

NBS Value chain: Gajda Architecture Landscape focuses its services on the development and design phase of the NBS value chain.

Services. Gajda covers all design aspects of historic parks, city parks, river parks, city squares, playgrounds, greenery around office and residential buildings, small architecture elements, fountains. Gajda specializes in formal greenspaces and horticultural design that is ecologically and socially suitable for the location and its users.

Project thumbnails:


RESTORATION OF KRAKOW PARK

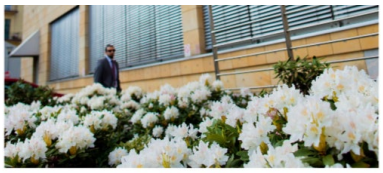

LINEAR PARK RECREATION


SQUARE WITH A FOUNTAIN IN THE POLISH PILOTS PARK


REVITALIZATION OF JORDAN PARK


OFFICE INSPIRATION CENTER – NOWY STYL GROUP


PRIVATE GARDEN IN ZABIERZÓW


LUBICZ OFFICE CENTER


B4B BONARKA FOR BUSINESS | BONARKA CITY CENTER
SITE UNDER CONSTRUCTION

Company perspective on enabling policies for NBS business:

Regulations: minimum green points systems recognising user needs; norms for stormwater collection on site; non-compliance monitoring of minimum green space and certification systems;
Economic: public tender criteria and funding that recognise design as much as implementation
Information: transparent public tendering processes
Cooperation: shorter implementation cycles for parks; more effective public consultation processes

Website: https://gajda-ak.pl/ **Contact:** biuro@gajda-ak.pl

4.6. Chemnitz, Germany

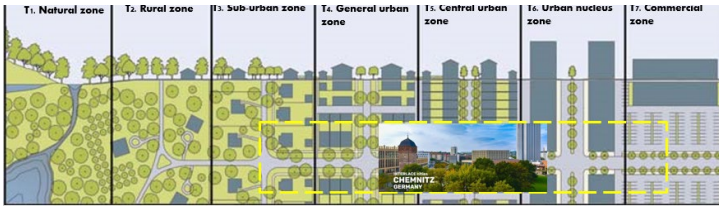


Figure 3.6 The Chemnitz municipal workshop addressed policies to promote NBS in the private sector

Green infrastructure and residential areas, Chemnitz.Photos: David N. Barton

Table 3.6 Policy instruments proposed in Chemnitz municipal workshop and business interviews

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Chemnitz municipal	Chemnitz business
Legislative, regulatory and strategic instruments		
Dedicated strategy or plan		
Regulation plans with NBS norms	1	
Sectoral/overarching strategy or plan		
Urban planning mechanisms		
Specific NBS structural requirements	1	
Minimum blue-green area requirements	1	
Water & sewage requirements	1	
Development offset requirement	1	
Standards		
NBS Procurement guidelines		1
Mandatory monitoring	1	
Other		
Financial & economic instruments		
Disincentives		
Ecosystem service utility charges	1	
Subsidies, incentives in kind		
Subsidy for NBS implementation	1	
Market-based instruments		
Financing mechanisms		
Other		
Obligatory Pricing of maintenance & monitoring	1	
Knowledge, communication, innovation instruments		
Communication & awareness raising		
Education & training in co-benefits NBS	1	1
Guidance manuals for NBS	1	
Knowledge and innovation		
NBS Extension services	1	1
Pilot R&D projects catalogue		1
Other		
Certification for NBS	1	1
Competitions & Prizes for NBS innovation	1	
Agreement-based or cooperative instruments		
Direct engagement of citizens		
Multistakeholder collaboration		
Joint regional planning/ action		
Other		
Other governance		

Link to full coding matrix.

The Chemnitz municipal workshop addressed policies to promote NBS in the private sector. The workshop was the only one to be conducted virtually. Participants were from public authorities including Chemnitz city planning and Chemnitz is Flourishing, architecture, planning and landscape architecture companies. The workshop focused on the questions of barriers to and policy instruments for NBS both in terms of supply from NBS businesses and demand from private land owners and developers. Interviews were conducted with Chemnitiz is Flourishing as public contractor of consultants in flower meadows and a landscape architecture firm (see business case below) (see Appendix 9.3.6 for original transcripts). Policy recommendations from municipal workshop and business interviews were coded across the same instrument categories and tabulated for comparison (Table 3.6.). See Appendix 9.4.6 for the workshop report.

4.6.1. Selected Business case: Uta Gehrhardt Landschaft, Chemnitz, Germany

Business model. Uta Gehrhardt Office for Landscape Architecture was founded in 2018 and currently has 3 employees. The company plans and realises holistic landscape projects of various sizes, especially in an urban context. Their projects focus on functionality and aesthetics with particular attention to the use of materials and plants. The company designs landscapes that are flexible, climate-resilient and adaptable to enable change and growth in the future.

NBS Value chain: Gerhardt provides services across the NBS value chain in development, planning and design and implementation.

Services. As an office for landscape architecture, they develop design concepts for public open spaces, educational facilities, museums and cultural institutions as well as for company sites, former industrial areas and special private residential environments.

Project thumbnail: Wirkbau Chemnitz Roof Garden, Chemnitz

Wirkbau in Chemnitz is a former textile industry site in the city centre which, following extensive redevelopment measures, is now home to over 50 companies with around 1,400 employees, associations and educational institutions as well as artists and creatives. As an important addition to the revitalisation of this old industrial area, a roof garden with an area of 1,500 m² was implemented as a publicly accessible "green lung", which plays an important bioclimatic role for the otherwise densely built-up area.




Photos: Johannes Richter

Photos: Uta Gehrhardt

The design of the roof garden comprises a gently undulating landscape of roof garden substrates planted with trees, flowering shrubs, perennials and flower meadows. A geometric path system guides visitors through the garden at the same level and integrates event spaces and work niches that invite them to linger.

A green roof to improve the urban climate

The Wirkbau roof garden is an important instrument of climate-robust water management. Its paths are constructed with water-permeable surfacing so that excess rainwater can be reduced and drained away

more slowly or evaporate on site, which significantly reduces the burden on the sewer system. At the same time, the green space protects the buildings from overheating and cooling by reducing solar reflection and generating cooling effects through evaporation.

The plants were selected from a nursery in northern Germany, taking into account aspects compatible with the urban climate. By installing cisterns in the underground car park, rainwater can be collected and treated to ensure that the plants can be watered during dry periods. The planting also provides a habitat for birds, insects and small animals and promotes biodiversity in the urban environment.

A retreat with a special quality of stay for everyone

In addition to the ecological aspects, the roof garden of the City of Chemnitz offers special added value. The green space on the roof is open to the public, i.e. it is not only an attractive place for employees of the Wirkbau to recharge their batteries, but also for residents, tourists and other visitors seeking relaxation. The open design of the roof garden allows for a variety of uses depending on the season and lighting conditions: From events with up to 200 people to opportunities for smaller meetings at various seating areas amidst the plant splendour.

Company perspective on enabling policies for NBS business:

Regulations: updated building code requirements for minimum green, including required funding for and control of maintenance
Economic: procurement guidelines that prevent price dumping on nature-based solutions; funding for lighthouse projects
Information: required certification of specialist companies; documentation of effectiveness of NBS;
Cooperation: joint training of public sector managers

Website: https://www.gehrhardt-landschaft.de/ **Contact:** post@gehrhardt-landschaft.de

5. Overview of policy instrument proposals for nature-based solutions in small and medium cities

In this chapter we look across the instrument recommendations provided in the municipal workshops and interviews with private NBS businesses in three Latin American and three European cities of INTERLACE. The section compares policy type preferences in light of the experiences of small-medium cities; whether there are general patterns across the continents, and between public and private sector recommendations. The analysis is at the proof-of-concept level, to develop and demonstrate a novel approach to policymix analysis for nature-base solutions, namely, (i) testing the UGA typology against a private sector NBS lens and (ii) testing the public-private net benefits framework on an NBS context.

Tables 5.1-5.2 in this section compare potential instruments for NBS in each city as discussed by public sector participants in workshops and private NBS company interviewees. Figure 5.1 provides an overview of the analyses summarized in the tables. The columns in organe-blue on the left-hand side compare NBS instrument proposals across cities. The middle columns describe the instruments in terms of whether they are positive/negative incentives for NBS/grey solutions respectively, using the framework presented in Figure 3.1. The columns to the right characterize the instruments in terms of their type in the public-private net-benefits framework discussed in Figure 3.5. This provides a first qualitative analysis of whether the proposed instruments are complementary in terms of the different combinations of public-private benefits expected in different landscape contexts.

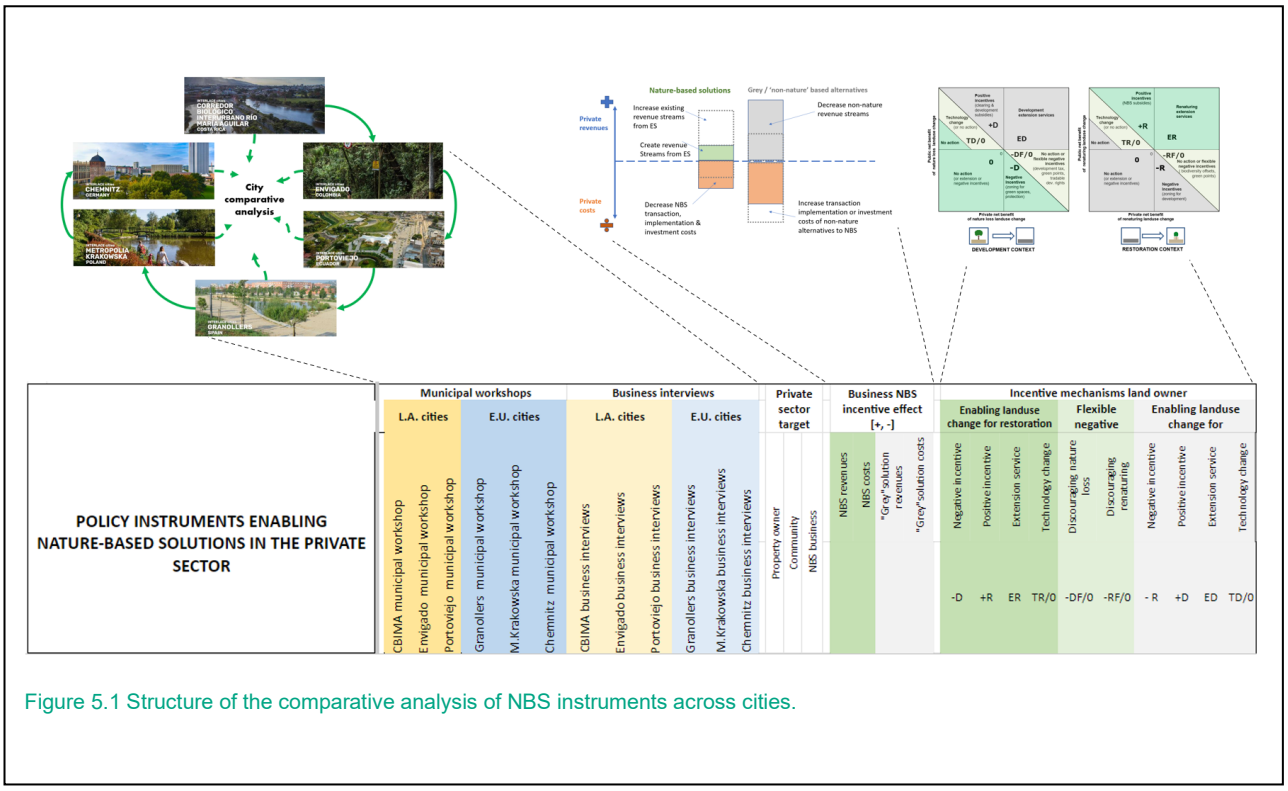


Figure 5.1 Structure of the comparative analysis of NBS instruments across cities.

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Municipal workshops						Business interviews						Private sector target			Business NBS incentive effect [+, -]			Incentive mechanisms land owner									
	L.A. cities			E.U. cities			L.A. cities			E.U. cities									Enabling landuse change for restoration				Flexible negative incentive		Enabling landuse change for development			
	CBIMA municipal workshop	Envigado municipal workshop	Portoviejo municipal workshop	Granollers municipal workshop	M.Krakowska municipal workshop	Chemnitz municipal workshop	CBIMA business interviews	Envigado business interviews	Portoviejo business interviews	Granollers business interviews	M.Krakowska business interviews	Chemnitz business interviews	Property owner	Community	NBS business	NBS revenues	NBS costs	"Grey"solution revenues	"Grey"solution costs	Negative incentive	Positive incentive	Extension service	Technology change	Discouraging nature loss	Discouraging renaturing	Negative incentive	Positive incentive	Extension service	Technology change
																				-D	+R	ER	TR/0	-DF/0	-RF/0	- R	+D	ED	TD/0
Legislative, regulatory and strategic instruments																													
Dedicated strategy or plan																													
Regulation plans with NBS norms	1	1			1	1			1				1		1	1				1									
Green space type specific regulations	1	1											1	1							1								
Sectoral/overarching strategy or plan																													
Framework regulation										1										1									
Municipal master plans - Land use zoning							1		1	1			1								1						1		
System of peri-urban protected areas		1											1							1									
Urban planning mechanisms																													
Protected areas					1								1						1		1								
Public interest expropriation	1												1						1	1									
Specific NBS structural requirements					1	1							1			1					1								
Minimum condition requirements					1					1						1					1								
Minimum blue-green area requirements				1		1	1				1		1			1					1								
Minimum ecosystem service performance requirments							1				1		1			1					1			1					
Water & sewage requirements				1		1							1																
Development offset requirement		1		1		1				1			1			1			1					1					
Standards																													
NBS Procurement guidelines											1	1				1								1					
Mandatory monitoring						1																							
Other																													
Simplify NBS permitting procedures							1			1					1		1				1								

Table 5.1 Overview of Legislative, regulatory and strategic instruments and public-private incentive mechanism characteristics. Link to full coding matrix.

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Municipal workshops: L.A. cities: CBIMA municipal workshop	Municipal workshops: L.A. cities: Envigado municipal workshop	Municipal workshops: L.A. cities: Portoviejo municipal workshop	Municipal workshops: E.U. cities: Granollers municipal workshop	Municipal workshops: E.U. cities: M.Krakowska municipal workshop	Municipal workshops: E.U. cities: Chemnitz municipal workshop	Business interviews: L.A. cities: CBIMA business interviews	Business interviews: L.A. cities: Envigado business interviews	Business interviews: L.A. cities: Portoviejo business interviews	Business interviews: E.U. cities: Granollers business interviews	Business interviews: E.U. cities: M.Krakowska business interviews	Business interviews: E.U. cities: Chemnitz business interviews	Private sector target: Property owner	Private sector target: Community	Private sector target: NBS business	Business NBS incentive effect [+, -]: NBS revenues	Business NBS incentive effect [+, -]: NBS costs	Business NBS incentive effect [+, -]: "Grey"solution revenues	Business NBS incentive effect [+, -]: "Grey"solution costs	Incentive mechanisms land owner: Enabling landuse change for restoration: Negative incentive -D	Enabling landuse change for restoration: Positive incentive +R	Enabling landuse change for restoration: Extension service ER	Enabling landuse change for restoration: Technology change TR/0	Flexible negative incentive: Discouraging nature loss -DF/0	Flexible negative incentive: Discouraging renaturing -RF/0	Enabling landuse change for development: Negative incentive -R	Enabling landuse change for development: Positive incentive +D	Enabling landuse change for development: Extension service ED	Enabling landuse change for development: Technology change TD/0
Financial & economic instruments																												
Disincentives																												
Fines for regulatory non-compliance										1			1					1				1						
Ecosystem service utility charges						1				1			1				1	1				1						
Subsidies, incentives in kind																												
Reduction NBS input charges, taxes				1			1								1		1				1							
Reduction in municipal utility fees	1												1								1							
Reduction property tax	1	1		1			1		1				1				1				1							
Tax on property parcelization		1											1											1				
Reduction in building permit fee									1				1				1											
Increased building utilization intensity permit	1								1				1			1								1		1		
Subsidies for NBS inputs							1								1	1					1							
Subsidies for NBS R&D								1							1		1						1					
Subsidy for NBS implementation				1		1	1					1	1	1		1					1							
EU co-funding					1					1					1	1					1							
Market-based instruments																												
Commercial use concessions	1																				1					1		
Payments for ecosystem services	1	1											1											1				
Financing mechanisms																												
Favourable credit for NBS							1	1							1		1				1							
Earmarking regular budget restoration		1								1					1	1					1							
Public procurement - NBS demand creation			1				1								1	1					1							
Other																												
Tax on vacant lots & brownfield land	1												1							1		?					?	
Obligatory Pricing of maintenance & monitoring						1									1		1							1				

Table 5.2 Overview of Financial & economic instruments and public-private incentive mechanism characteristics. Link to full coding matrix.

Overview of policy instruments and business cases for enabling restorative NBS

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Municipal workshops: L.A. cities: CBIMA municipal workshop	Municipal workshops: L.A. cities: Envigado municipal workshop	Municipal workshops: L.A. cities: Portoviejo municipal workshop	Municipal workshops: E.U. cities: Granollers municipal workshop	Municipal workshops: E.U. cities: M.Krakowska municipal workshop	Municipal workshops: E.U. cities: Chemnitz municipal workshop	Business interviews: L.A. cities: CBIMA business interviews	Business interviews: L.A. cities: Envigado business interviews	Business interviews: L.A. cities: Portoviejo business interviews	Business interviews: E.U. cities: Granollers business interviews	Business interviews: E.U. cities: M.Krakowska business interviews	Business interviews: E.U. cities: Chemnitz business interviews	Private sector target: Property owner	Private sector target: Community	Private sector target: NBS business	Business NBS incentive effect [+, −]: NBS revenues	Business NBS incentive effect [+, −]: NBS costs	Business NBS incentive effect [+, −]: "Grey"solution revenues	Business NBS incentive effect [+, −]: "Grey"solution costs	Incentive mechanisms land owner: Enabling landuse change for restoration: Negative incentive -D	Enabling landuse change for restoration: Positive incentive +R	Enabling landuse change for restoration: Extension service ER	Enabling landuse change for restoration: Technology change TR/0	Flexible negative incentive: Discouraging nature loss -DF/0	Flexible negative incentive: Discouraging renaturing -RF/0	Enabling landuse change for development: Negative incentive -R	Enabling landuse change for development: Positive incentive +D	Enabling landuse change for development: Extension service ED	Enabling landuse change for development: Technology change TD/0
Knowledge, communication, innovation instruments																													
Communication & awareness raising																													
Education & training in co-benefits NBS		1			1	1	1		1			1			1	1						1	1						
Education & training on sustainable production				1																								1	
Municipal training planning & building law					1				1				1							1									
Guidance manuals for NBS				1		1	1			1					1		1					1						
University-business professional training								1							1							1						
Public environmental campaigns				1	1									1								1						
Knowledge and innovation																													
In-house municipal NBS staff									1						1	1						1							
Open source technical standards for NBS	1						1		1	1					1		1						1						
NBS Extension services			1	1	1	1						1	1		1		1					1						
Public-private NBS laboratories							1			1			1		1	1	1						1						
Pilot R&D projects catalogue			1		1					1		1	1		1	1	1						1						
Mapping & Cadastre of protection & restoration sites	1	1											1									1							
Ecosystem & biodiversity impact ev. & accounting		1																											
Other																													
Certification for NBS			1			1	1			1		1	1		1	1							1						
Competitions & Prizes for NBS innovation			1		1	1		1			1				1	1							1						

Table 5.3 Overview of Knowledge, communication, innovation instruments and public-private incentive mechanism characteristics. Link to full coding matrix.

Overview of policy instruments and business cases for enabling restorative NBS

POLICY INSTRUMENTS ENABLING NATURE-BASED SOLUTIONS IN THE PRIVATE SECTOR	Municipal workshops: L.A. cities: CBIMA municipal workshop	Municipal workshops: L.A. cities: Envigado municipal workshop	Municipal workshops: L.A. cities: Portoviejo municipal workshop	Municipal workshops: E.U. cities: Granollers municipal workshop	Municipal workshops: E.U. cities: M.Krakowska municipal workshop	Municipal workshops: E.U. cities: Chemnitz municipal workshop	Business interviews: L.A. cities: CBIMA business interviews	Business interviews: L.A. cities: Envigado business interviews	Business interviews: L.A. cities: Portoviejo business interviews	Business interviews: E.U. cities: Granollers business interviews	Business interviews: E.U. cities: M.Krakowska business interviews	Business interviews: E.U. cities: Chemnitz business interviews	Private sector target: Property owner	Private sector target: Community	Private sector target: NBS business	Business NBS incentive effect [+, −]: NBS revenues	Business NBS incentive effect [+, −]: NBS costs	Business NBS incentive effect [+, −]: "Grey"solution revenues	Business NBS incentive effect [+, −]: "Grey"solution costs	Incentive mechanisms land owner: Enabling landuse change for restoration: Negative incentive -D	Enabling landuse change for restoration: Positive incentive +R	Enabling landuse change for restoration: Extension service ER	Enabling landuse change for restoration: Technology change TR/0	Flexible negative incentive: Discouraging nature loss -DF/0	Flexible negative incentive: Discouraging renaturing -RF/0	Enabling landuse change for development: Negative incentive -R	Enabling landuse change for development: Positive incentive +D	Enabling landuse change for development: Extension service ED	Enabling landuse change for development: Technology change TD/0
Agreement-based or cooperative instruments																													
Direct engagement of citizens																													
Municipal-community stewardship agreement	1	1			1		1		1					1															
Multistakeholder collaboration													1																
Municipal-private negotiated area development	1			1							1		1		1									1	1				
University-business-municipal R&D projects			1	1	1				1	1					1														
Municipal inter-agency and utility cooperation					1																								
Joint regional planning/ action																													
Cross-municipal collaboration agreements		1			1		1				1						1												
Other																													
Professional associations & networks for NBS services			1	1				1	1	1	1				1														
Business collaboration events on NBS				1											1														
NBS business cluster			1												1														
Other governance																													
Enforcement of labour legislation							1																						
Enforcement of transparent public tendering								1				1			1														
Auditing, certifying agency for NBS								1	1			1																	
Reduced private contracting								1																					
Corporate governance - social responsibility										1					1														

Table 5.4 Overview of Agreement-based or cooperative instruments and public-private incentive mechanism characteristics. Link to full coding matrix.

Note:the public private benefits framework does not identify cooperative institutional arrangements as incentive mechanisms. Further work is needed on extending the framework to non-economic incentive mechanisms

5.1. Shared NBS policymix patterns

The public-private net benefits framework provides a way of summarising policy instrument recommendations from all the six cities in a diagram. Figure 5.2 summarises all the recommendations from Tables 5.1-5.4 showing that all six cities share an emphasis on proposing positive direct incentives. The absence of discussion on removal of instruments that favour "grey" solutions over NBS was another shared characteristic.

Positive direct incentives. Positive incentives for renaturing (+R) are twice as prevalent in discussions as other incentive mechanisms, for example flexible incentives through market-based mechanisms (-DF/0). The relatively more frequent calls for direct economic or in-kind incentives to private NBS business and private landowners supports our assertion that the financial feasibility of NBS is relatively weak without a supportive regulatory environment. Market-based instruments are relatively speaking not a favoured instrument, because they rely on net benefits from NBS being (near) positive for them to have an incentive effect on private business. Different forms of subsidy are mentioned much more frequently in the Latin American cities than the European cities.

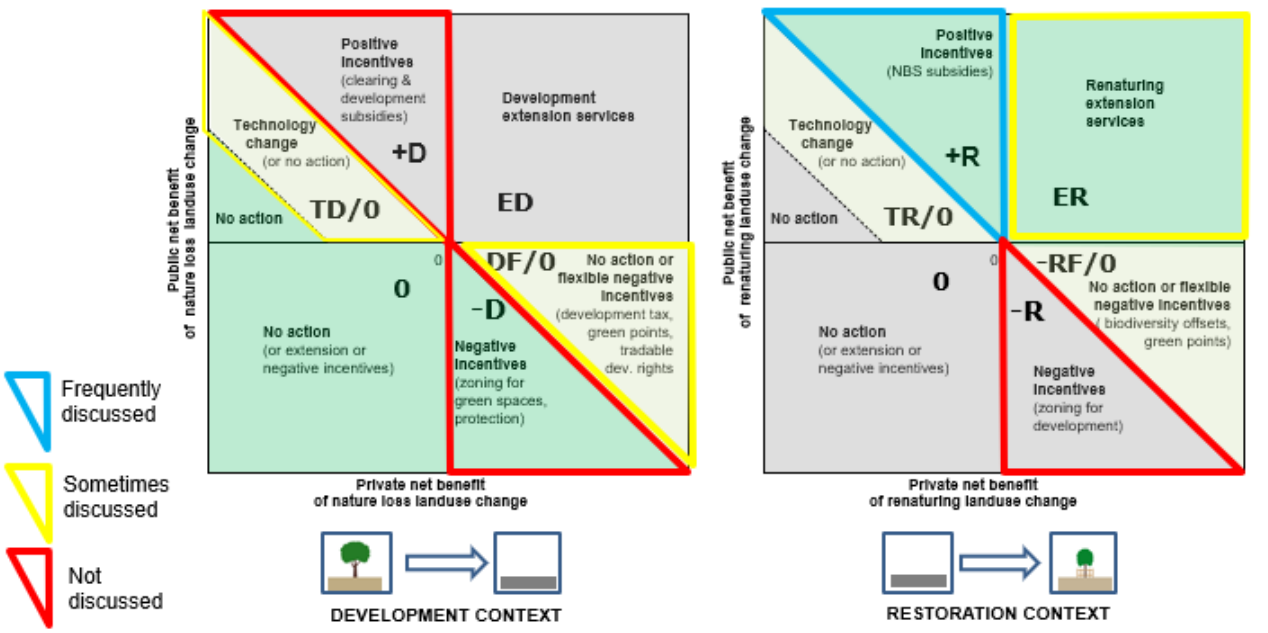


Figure 5.2 The most frequently discussed types of incentives mechanisms are subsidies/direct positive incentives for NBS. Negative incentives for development, removal of positive incentives, and removal of negative incentives for renaturing are not discussed by informants in the study. *Relative frequency of (support for) different incentive mechanisms could be used to infer relative private to public net benefits of NBS.*

Removing policies directly competing with NBS. Looking across the business interview and municipal workshops there was a lack of discussion of possibilities to remove existing policy instruments that promote « grey » urban development. For example, current municipal master plans and land use zoning in regulation plans has traditionally zoned for development (+D), but has the potential to also zone for restoration (+R) of vacant lots and brownfields. Traditional extension services (+ED) to business can

also be redirected towards sustainable production encouraging resource efficiency and land sparing through higher building density / less sprawling development.

Similarly, there was little discussion of policies to increase costs and decrease revenues of « grey » urban development landuses. Permits for increasing plot use intensity are a development incentive (+D) as they increase revenues from "grey" development - Envigado had started to discuss awarding permission to densify against offsetting greenspace on the ground as a flexible in-kind market-based incentive.

5.2. Relative differences between policy focus in Latin American and European project cities

Looking in more detail at Tables 5.1-5.4 revealed some differences in instrument preferences between Latin American and European cities in the project.

Urban planning mechanisms. A wide variety of this subcategory of regulatory instruments are discussed by European municipal informants, but to a much lesser degree by the Latin American cities in the project. This may suggest relatively weaker municipal planning agencies.

Subsidies. These direct incentives are discussed by Latin American municipalities and business, but not by municipal or business informants in the European cities. A policymix hypothesis may be that urban planning mechanisms and subsidies are in some ways redundant - planning/zoning of renaturing creates market conditions for NBS which relieve the need for subsidies to make NBS privately profitable.

Market-based instruments. The instruments mentioned by informants include payments for ecosystem services (PES) in peri-urban areas and commercial use concession for pocket parks. Market-based instruments are an incipient theme in the small and medium cities in INTERLACE. This makes some sense since the size of the city also implies relatively higher transaction costs in setting up a payment scheme in a smaller NBS market. It is an instrument type discussed only by Latin American municipal informants in Costa Rica and Colombia, but not by European municipalities, nor by NBS businesses. In the latter case, this can be explained by PES being an incentive mechanism for land owner forest conservation, which does not directly enable any private NBS business model.

Communication and awareness raising measures. These knowledge and communication instruments were generally discussed more by the European relative to Latin American municipalities, while NBS businesses in Latin America discussed them somewhat more than in Europe. This could be complementary in the sense that NBS education measures discussed by municipalities in Europe mostly refer to transforming attitudes of private property owners to NBS, while NBS businesses refer mainly to the need for awareness raising of municipal technical staff and politicians.

5.3. Relative differences between public and private policy focus across the cities?

There are differences in the focus on specific instruments and on general governance between municipal and business informants.

Specific instruments

Municipal master plans with restoration zoning. The importance of municipal master plans considering zoning for NBS was surprisingly more frequently mentioned in business interviews than in municipal workshops. Zoning requirements for renaturing not surprisingly create a market demand for nature restoration solutions by property developers. Most of the participants in the municipal workshops were municipal technical staff. A hypothesis is that few of them worked at the Master plan and zoning level.

Regulation plans with NBS norms.Complementing the previous point, the importance of regulation plans was discussed more frequently by municipal informants than business. Technical municipal staff participating in the workshops may have be more familar than business with the need for regulation plans (below the strategic level of master plans) to determine the technical design requirements for NBS solutions required of the property owner/developer at the plot level.

NBS extension services. Municipalities emphasise the importance of NBS extension services for private property owners. Few NBS businesses addressed this. Among the many possible reasons that could not be determined with so few interviews, we did not interview any NBS businesses who had provision of NBS extension services for private land owners as a business model. The NBS markets were probably too incipient and small in the INTERLACE cities for this to be relevant. What extension on NBS that was taking place was provided by municipalities and/or non-profit NGOs collaborating with municipalities.

Governance

Businesses identified a number of general governance- related conditions that affect their NBS business viability. These are institutional conditions necessary for a favourable NBS business environment. Municipalities did not identify these issues.

Auditing, certifying agencies. While both municipal and business informants mentioned the need for NBS certification schemes, the absence of certifying and auditing institutions was identified only by business informants.

Enforcement of transparent public tendering. Business informants in Envigado highlighted the lack of transparent public tendering, while in M.Krakowska an informant highlighted the importance of EU procurement policies for increasing national level transparency.

Enforcement of labour legislation. Hiring of informal labour that was not subject to social security payments was seen as an unfair competitive practice among a couple of informants in Latin American cities.

Reduced private contracting. It was suggested that municipalities needed to strengthen in-house capacity. In the short term this may seem as a contradiction that limits contracting of NBS business, but on the longer term more in-house competency for NBS could be expected to create municipal demand.

Corporate governance. Running the business according to social responsibility standards was seen as reinforcing the NBS business model by one business informant.

5.4. Innovative instruments

A number of instruments were mentioned during the business interviews and municipal workshop discussions which are not easily classified even into the wide instrument categories of the Urban Governance Atlas. We use this classification ambiguity as a criterion for identifying potentially innovative instrument types discussed in this section.

Legislative, regulatory and strategic instruments

Simplifying permitting procedures for developments with nature-based solutions (e.g. building permits) and for NBS design solutions themselves was mentioned in business interviews in both CBIMA, Costa Rica and Granollers, Catalunya. The cost savings in reducing work on administrative procedures and time savings are an in-kind direct incentive (+R) which can be particularly important for SME's which usually have relatively limited administrative capacity. In-kind incentives do not directly affect municipal budgets and may be easier to implement politically. They reduce transaction costs and reduce time lags in implementation. A necessary supporting instrument is '**NBS standards'** which are required for municipalities to identify which NBS would qualify for simplified or 'fast-track' permitting.

Financial & economic instruments

Obligatory pricing of maintenance & monitoring. Discussions in the Chemnitz workshop identified the need for 'ecological monitoring' of nature-based solutions, which could include inspection of the completion of works to landscape ecological standards, as well as third party monitoring of the maintenance necessary to mature ecological function and ecosystem service delivery. A pre-requisite for such monitoring is the pricing of third-party verification into urban development contracts. If third party verification is private it should be contracted by the municipality, rather than by the developer themselves.

Either way, the municipality should be enabled to include cost-recovery charges in **building permit fees**, either for in-house staff and/or for administration and subcontracting of an external auditing agency. We place this in the category of an 'innovation' because it is to our knowledge not applied in any other cities in the countries of the INTERLACE project. Despite its seeming simplicity, it relies on having in place the other instruments of '**NBS procurement guidelines',** 'public procurement' criteria that recognize NBS design and maintenance as competition criteria, and availability of technically competent '**auditing and certification agencies';** all to enable transparent and efficient processes of maintenance and monitoring of NBS.

Tax on vacant lots & brownfield land. The instrument proposal arose in the workshop focusing on instruments to enable pocket parks on private land in the CBIMA, San José Metropolitan area in Costa Rica. Private lots that remain closed off and unused represent a situation in which net benefits

of both development and restoration are negative to the private landowner. Abandoned brownfields more generally represent a unique landuse type on a urban-rural gradient; having been at one point developed, then abandoned over urban development cycles they typically have lower biodiversity and ecosystem function than as yet unused peri-urban land with remnant nature. Potential private net benefits of commercial development of vacant lots may be high per m2, but the size and configuration of the plot may not allow for development.

A tax on its unused status is intended to shift its use. However, using the public-private benefits framework we cannot conclude whether such a tax would be an incentive for renaturing or for property development. It depends on what other incentives are in place and the particular site context. The public-private benefits framework illustrates this contextual ambiguity for instrument recommendation (Figure 5.3).

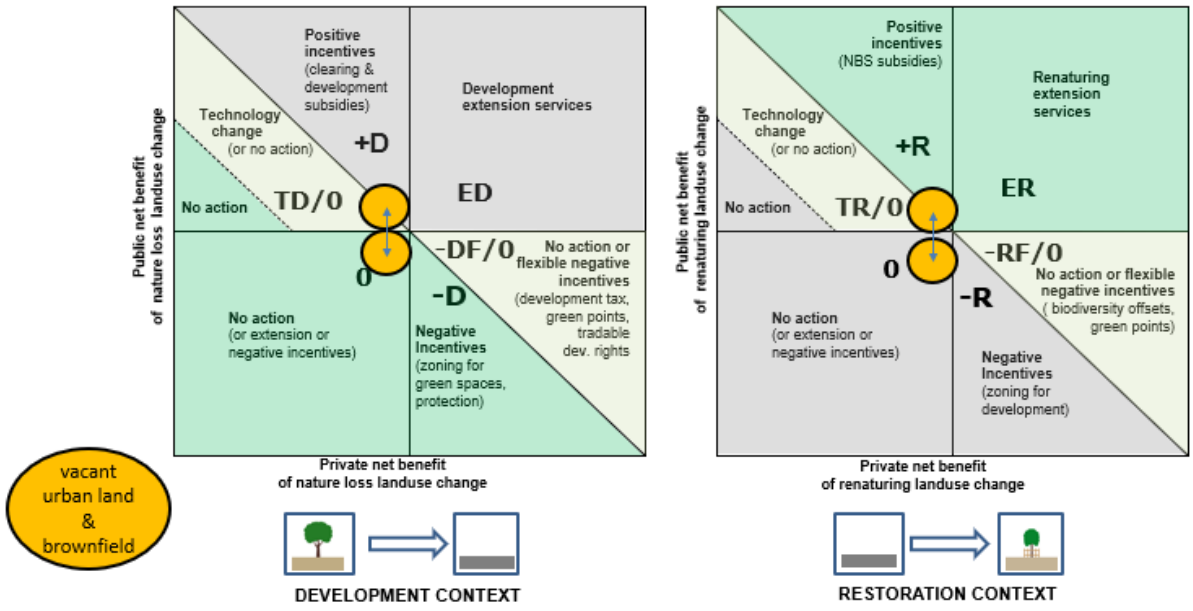


Figure 5.3 Tax on brownfield and vacant land. Using the public-private net benefits framework (PPBF) to consider incentive effects for renaturing or development.

A vacant lot in an urban core is ambiguous with regards to it being situated in development or renaturing dynamic. A vacant lot implies private net benefits are negative. If unpaved and recolonized by vegetation it may have low positive net public benefits from some regulating ecosystem services. If used for e.g. informal site for refuse or criminal activities it may have negative net benefit to the public. The situation of the lot is site specific, implying that a tax may not be an efficient instrument, but rather extension (0) with the property owner and local community, combined with positive incentives either for development (+D) or renaturing (+R). If net private benefits are very negative incentives may not be sufficient, requiring some technological change (TD/TR) – including governance innovation - to change the cost structure for the property owner.

Knowledge, communication, innovation instruments

Certification for nature-based solutions. Both municipal and business interviews in Latin American and European cities in the project identified certification as an instrument promoting NBS. Certification incentivizes NBS because it reduces property owners and developers costs of identifying efficient providers of solutions (transaction costs reduction). In the PPBF framework we chose to classify certification as a 'technological change' incentive mechanism (TR); what could also be termed a 'non-structural' or 'governance' innovation. Certification is conditional on the availability of '**technical standards for NBS' –** when these are open source (e.g. municipal green points system) rather than proprietary (e.g. BREEAM) the potential transaction cost savings to the public are even larger. However, proprietary certification schemes increase the potential for NBS businesses to create a business model around NBS advisory services, since certification limits competition. Thinking dynamically and across a population of smaller and larger businesses, early and late adopters among developers and property owners, NBS certification has a role to play on an 'adoption curve' for NBS (see section 4.6 for further discussion).

Competitions & Prizes for NBS innovation. Municipal workshop discussions and business interviews in Latin American and European cities identified prizes and competitions for NBS design and demonstration projects as a relevant incentive for NBS business development. In a dynamic view of NBS technological change this instrument is a precursor to certification, standardization and minimum requirement norms (see section 4.6 for further discussion).

Agreement-based or cooperative instruments.

Professional associations & networks for NBS services. Again municipal workshop discussions and business interviews in Latin American and European cities identified the need for NBS businesses to organize themselves. This is a self-governance innovation. The aims are multiple, i.a. to provide exchange of know-how and increase private sector technical innovation, to provide visibility to the NBS private sector vis a vis other "grey" sectors; and to be an effective interlocuter and lobbyist vis a vis public authorities developing NBS industry guidelines, standards and regulatory requirements. Small and medium cities in our project are not usually the geographical origin of such associations, but are a potentially important knowledge resource for SMEs where they exist nationally. NBS and sector associations were identified in interviews in Envigado-Medellin (e.g. association of plant nurseries) and Spain (e.g. SUDS network).

6. Extending policymix analysis for NBS

The public-private net benefits framework proposed by Pannell (2008) is a static framework. In this section we explore the question of dynamics in the analysis of policymixes for NBS, particularly policy cycles and policy path dependence (e.g.Davies and Lafortezza, 2019). Policy instruments can be used in complementary roles because different zones and urban morphologies across the urban-rural transect require targeted incentives (see chapter 2). Policy instruments may also be complementary over time in a policy sequence as part of a NBS roadmap or strategy. Policy instruments should also be targeted depending on the adoption stage of landowners and businesses.

6.1. Policy adoption curve and instrument complementarity

Policy instruments can be complementary in targeting different actors at different stages of NBS technology adoption. As NBS technologies such as Sustainable Urban Drainage Systems (SUDS) reach maturity there will be a range of early and late adopters across a 'population' of different sized companies. Figure 6.1 illustrates an adoption curve for increasingly ambitions environmental requirements of NBS over time. The most innovative businesses require incentives that foster experimentation and demonstration through pilot projects - support mechanisms include municipal platforms for expert extension services in NBS design; waving some permitting requirements; design competitions and prizes. An example is the Intermunicipal Climate Neutral architecture programme FutureBuilt[10] in Norway. Once environmental technologies have been demonstrated they may become integrated in building design standards which can be used by early adopters to gain competitive advantage and reduce developer search costs. An example is BREEAM Landuse and Ecology[11]. Such building standards are used in a larger number of projects which also makes them reactive to new higher level policy frameworks and regulations (e.g. EU taxonomy of sustainable activities). At the other end of the NBS adoption spectrum public authorities in charge of landuse planning and regulation (municipal, regional) may introduce minimum performance standards which aim to reach all remaining businesses in the sector; a metaphorical policy tide to 'raise all ships'. Such minimum performance standards will also adapt to the introduction of national or EU level minimum regulatory requirements (e.g. the proposed EU Nature Restoration Law's urban nature restoration targets). Examples of minimum performance standards include different green points systems in Europe (Stange et al., 2022).

Over time innovations will be learned from pilot projects to certification schemes, lowering the implementation costs of NBS, making it possible for local governments, perhaps supported by national minimum standards to raise the minimum performance standards that address the whole sector. Such

[10] https://www.futurebuilt.no/English

[11] https://bregroup.com/insights/building-an-effective-net-zero-strategy-with-breeam/

updating of minimum performance requirements have for example been observed in the Blue-Green Factor Norm[12] implemented by Norwegian municipalities.

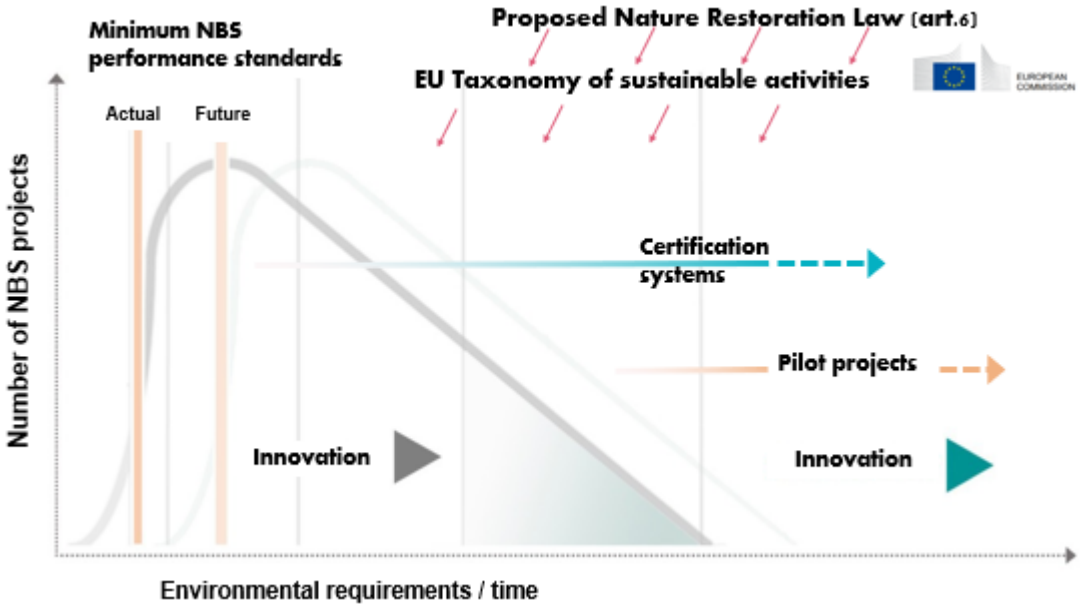


Figure 6.1 NBS Adoption curve. Minimum standards, certifications, innovation pilot projects are complementary policy instruments across a population of businesses at different stages of NBS adoption

Source: based on original by Paul Woodville, HRTB Arkitekter

6.2. Policy sequencing example

The choice of implementing different policy instruments has different effects on socio-technical transitions in general, and particularly on urban transformation, influencing or discouraging adoption among different agents, especially in the private sector. It is essential to consider this relational approach between the need to encourage innovation to achieve a systemic transformation, and the application of different instruments to achieve the adoption of socio-technological transformation (Pakizer et al., 2023). The political instruments to promote NBS (SUDS, green roofs, etc.) require policy sequencing and particular planning, influencing both the "technological push" and "demand pull" mechanisms (Foxon, 2011). "Technology push" policies are especially important during the initial phase of policy sequencing, for example, through economic instruments that reduce the private costs of generating innovation, knowledge, and capabilities (R&D financing, tax reductions, etc.) or that create a favourable financial environment (Edmondson et al., 2019). As technologies mature, policy sequencing moves towards "demand pull" policies to try to induce a more effective transition. For example, the implementation of new regulatory or cooperative instruments allows the reconfiguration of institutional structures. The

[12] https://interlace-hub.com/blue-green-factor-norm

creation of new standards and certification procedures could trigger innovation and favour the creation of a market for alternative socio-technological solutions (Pakizer et al., 2023). This sequence might be

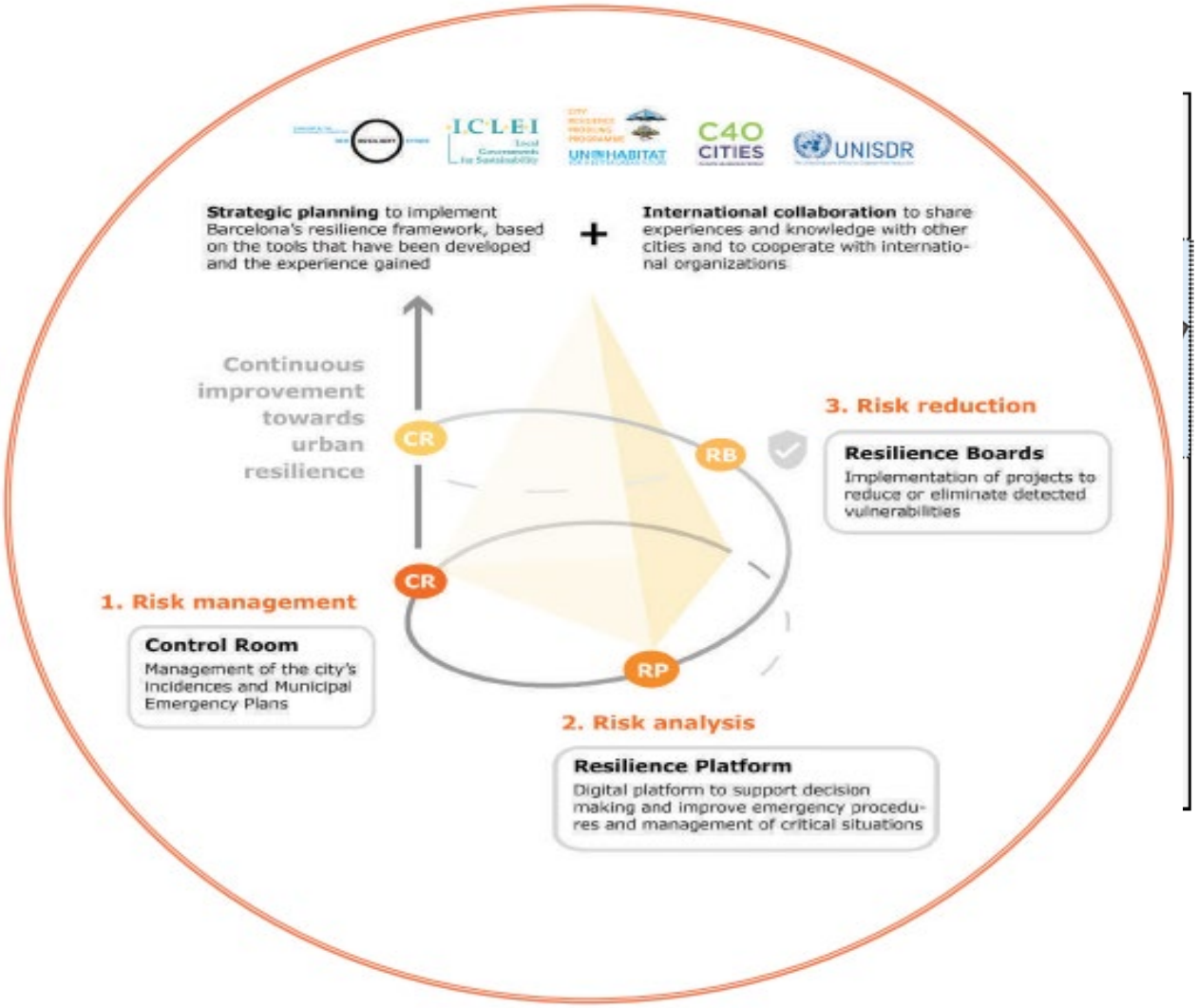


Figure 3. Resilience building process. Source: Barcelona City Council

supported by a series of continuous instruments that promote knowledge, information, training, etc., changing patterns of understanding and meaning (Edmondson et al., 2019).

To illustrate the application of policy sequencing in the field of NBS, a case study is presented below, on the deployment of green roofs in the city of Barcelona. The report "Barcelona: Building a Resilient City" prepared by Barcelona City Council, discusses events that occurred between 2005 and 2008 (mainly related to continued droughts during those years), that lead the city to create the Urban Resilience Department in 2014. In 2016 a government measure was approved enjoying full agreement from all the political parties. The Barcelona urban resilience model rests on three pillars (risk management, risk analysis and risk reduction) and it is conceived as a continuous and comprehensive process. This strategy also brought the consolidation, an urban resilience information and analysis platform and a multidisciplinary resilience board[13] with assessments and evaluation purposes. Furthermore, and to

[13] the Resilience department is responsible for coordinating all stakeholders (72 professionals and 20 organisations)

respond to the Barcelona Climate Commitment acquired within the framework of COP 21 in Paris, the Barcelona Climate Plan 2018-2030 was prepared[14].

With this systemic vision, the city has also drawn up the Barcelona Green Infrastructure and Biodiversity Plan (2013) detailing the local strategies to implement the EU Biodiversity Strategy to 2020 by means of the Aichi targets for 2011-2020. The plan covered the period from 2013 to 2020 and sets out to preserve and enhance the natural heritage of the city and to ensure that nature in the city is not limited to isolated spots but is rather joined to forge a GI network which serves environmental and social functions. Over the years, the plan has been complemented by further dedicated instruments for sustainable urban planning, including its update in the Barcelona Nature Plan 2030, some of these are:

- Barcelona Tree Master Plan 2017-37[15]
- Green-Infrastructure Impetus Plan (2017)[16]
- Citizen Council for Sustainability[17],
- Network: For a More Sustainable Barcelona[18]
- Environmental data maps[19]

Under the umbrella of the Green Infrastructure Promotion Plan, the City Council promotes actions to activate roofs and interior backyards in existing and new buildings to maximize social, environmental and energy efficiency, turning them into living green roofs. In this regard, the city council promotes various actions:

- **Research and innovation actions:** the city has established a close and long-term collaboration with Academia to provide science-based evidence and external funding and expertise to implement, test different adaptation and greening measures. Thus, the city of Barcelona is and has been an active collaborator in several EU-funded projects such as OpenNESS (2013-2017), Naturvation (2017-2021) or GreenLULUs (2016-2022). Additionally, the Barcelona Urban Environmental Justice and Sustainability Laboratory plays an important role in providing evidence on green gentrification trends, amongst other city analyses.
- **Providing technical guidance and support** for practitioners and citizens:
    - Green roofs and walls in Barcelona: study of existing ones, potential and implementation strategies[20] (Agència d'Ecologia Urbana de Barcelona, Environment Department, Rueda, 2010), the purpose of this study is to analyze and evaluate the potential of surfaces in public spaces and publicly owned buildings in the city of Barcelona that may be susceptible to transformation as green walls and roofs. In addition, the aim is to identify examples of private ownership that also represent potential spaces for regreening.

[14] plan_clima_juny_ok.pdf (barcelona.cat)
[15] Pla-director-arbrat-barcelona-ENG.pdf
[16] Green-Infrastructure Impetus Plan | Urban Planning, Ecological Transition, Urban Services and Housing (barcelona.cat)
[17] CitizenCommitmentSustainability.pdf (barcelona.cat)
[18] Network: For a More Sustainable Barcelona | Urban Planning, Ecological Transition, Urban Services and Housing
[19] Environmental data maps | Urban Planning, Ecological Transition, Urban Services and Housing (barcelona.cat)
[20] BCNROC. Repositori Obert de Coneixement de l'Ajuntament de Barcelona: Cobertes i murs verds a Barcelona : estudi sobre les existents, el potencial i les estratègies d'implantació

- *Guide to living roof terraces and green roofs*[21] (Gerència d'Ecologia Urbana, Contreras & Castillo, 2015) the guide explains both social and technical aspects of living roofs and green covers, including the process to follow to implement it. There is also technical information for each type of green roof.

- Promoting **measures of direct or indirect financing**:
  - Barcelona City Council, through the Municipal Urban Landscape Institute, has developed two Green Roof Competitions in private residential buildings, to award 10 projects in each call, for which 75% of the estimated budget is financed (up to €100,000). This initiative thus seeks to promote the installation of green spaces in private buildings, with the aim of improving thermal and acoustic insulation, conservation and waterproofing of buildings, improving air quality and promoting the creation of neighborhood spaces for their enjoyment. community, thus helping to build a more resilient city in the face of the climate crisis. Furthermore, among the proposals presented, 50 are chosen to receive a subsidy of up to 1,500 euros to carry out the preliminary technical work.
  - Financial aid to promote the protection and improvement of the Urban Landscape in the city of Barcelona. Rehabilitation actions for green walls, green roofs and naturalization (2019-2023). The purpose of these rules is the regulation of calls for the granting of subsidies through public competition, for the execution of rehabilitation and restoration works and projects to improve the urban landscape. Specifically, eligible actions include: naturalization of walls, roofs, terraces, block inner green areas and free building spaces, restoration of gardens of historical landscape interest and use of materials with a low ecological footprint and/or works with environmental quality marks, amongst others. Grants may be requested with a subsidy of 50% of the total cost of the project (up to €60,000), for roof landscaping projects.

- **Information and assessment tools**: enabling an online interactive map with geolocation with existing green roofs.

Flexibility is important considering that policy combinations and their components develop incrementally over time and co-evolve with sociotechnical transition (Howlett, 2019). The multilevel nature of urban transformation policies affects the sequencing of policies. Policy transitions require iterative refinements of the policy instruments that are implemented, through procedures that encourage learning and updating. The policy adoption curve mean that a mix of minimum regulatory requirements, voluntary certification and financial incentives can exist side by side to enable transformation across a wide range of private actors.

[21] https://bcnroc.ajuntament.barcelona.cat/jspui/handle

7. Developing policymixes for private sector NBS in small and medium-sized cities

In this section we synthesize some potential policy recommendations from the different city business interviews and municipal workshops. The material in this section should be treated rather as hypotheses that have been validated for further research, than as policy guidance. Generalizing findings from our study is limited by our small samples and exploratory methodology. The wide variation in the cities studied in this project also make generalization a risky undertaking.

7.1. Synthesis of findings: policy instruments for NBS in the private sector

The private sector is necessary to scale up NBS. Most land is in private hands in most cities. Without the private sector it will not be possible to scale up urban ecosystem service delivery.

NBS markets requires an enabling public policy mix that is not limited to economic and financial instruments. Both municipal and business perspectives confirm the need for a mix of enabling policies to generate demand from private landowners and supply from private business.

Small and medium cities have relatively few private NBS businesses and face more challenges than large cities in generating market demand for NBS.

The inventory of public policy instruments for private NBS business in this report may be useful for further R&D. The report identifies a wide range of policy instrument 'ideas' for enabling NBS in the private sector. The inventory may be used for further development and experimentation to promote NBS in the private sector in cities with little previous NBS activity.

NBS in the private sector requires a policymix covering different profitability contexts. "One size fits all" policy instruments are likely to fail to trigger NBS adoption in large parts of the urban landscape due to large variations in public and private net benefits landuse change

Market-based instruments are not a ubiquitous policy recommendation. They are relevant in selected cities and certain natural and peri-urban nature protection settings.

Local city landuse and resource constraints can generate **innovative policy ideas for further testing.** Examples from small and medium cities include:

- Simplifying permitting procedures, NBS standards
- Obligatory Pricing of maintenance & monitoring.
- Certification for nature-based solutions.
- Competitions & Prizes for NBS innovation
- Professional associations & networks for NBS services

Co-design policy instruments with the private sector, including communities, non-profit and business. Successful NBS policy experiments can inspire, but should not be transferred as such, and must be co-designed by local actors for the city context.

Consider removing policy barriers to NBS before adding new instruments to the mix. Identify 'unlevel playing fields' and disincentives to NBS. Few of our informants identified removal of positive incentives for "grey" technological solutions in order to favour NBS. The removal of disincentives to nature restoration deserves more attention in future research.

Good governance is overlooked as a precondition for NBS markets. Out informants identified a number of necessary conditions, including:

- Third party auditing and certifying agencies.
- Enforcement of transparent public tendering.
- Enforcement of labour legislation for level playing fields.
- Reduced private contracting to avoid a municipal 'brain drain' and encourage in house policy development.
- Enable sustainable corporate governance models.

Businesses in the land development sector need a mix of complementary instruments: regulatory, economic, knowledge and cooperative instruments depending on their situation as early or late adapters of nature-based solutions.

Further research on NBS public policymix design is needed, particularly for secondary cities with 'thin' NBS markets. The analytical framework focusing on public and private economic rationales for NBS had some limitations which could be addressed in future research:

Policymix design for nature-based solutions must recognize dynamics, of legacy policies and path-dependence in policy development. More research is needed on how to follow up EU and national level regulatory policy frameworks with an enabling policymix at the municipal level.

Indirect incentive effects of agreement-based and cooperative instruments. Governance based instruments tend to provide indirect incentives through altering "transaction cost" and "learning and adoption rates" . Other disciplinary approaches will need to complement the economic focus of the private-public net benefits framework, for example:

- Institutional analysis and design (e.g. Mincey et al., 2013)
- Stewardship (e.g. Andersson et al., 2014; Langemeyer et al., 2018)
- Social-ecological-technological systems (SETS)(McPhearson et al., 2022)

The **urban governance atlas instrument typology** provided an operational framework for comparing policy mixes across the different cities. Future developments could consider coding for incentive mechanisms and complementary instruments.

7.2. A roadmap for private sector nature-based solution in small and medium-sized cities?

Given the findings that context-adapted policy mixes are needed to enable nature-based solutions in cities, the above question posed as the title of this section is rhetorical. There is no single policy roadmap that can be provided to a given city. The final words of this report are therefore kept more generic and intended to be indicative.

Throughout this report we have framed the analysis as policymixes for nature-based solutions. NBS sits at the intersection of a number of policy agendas (Figure 7.1) which are potential allies in mobilising action for renaturing cities: circular economy, sustainable activities, ecosystem services, bioengineering and sustainable urban drainage systems are perhaps the most important. Small and medium cities should seek policy support in national level guidances within these fields. That will provide the widest possible range of options to consider in co-designing locally adapted policies with stakeholders.

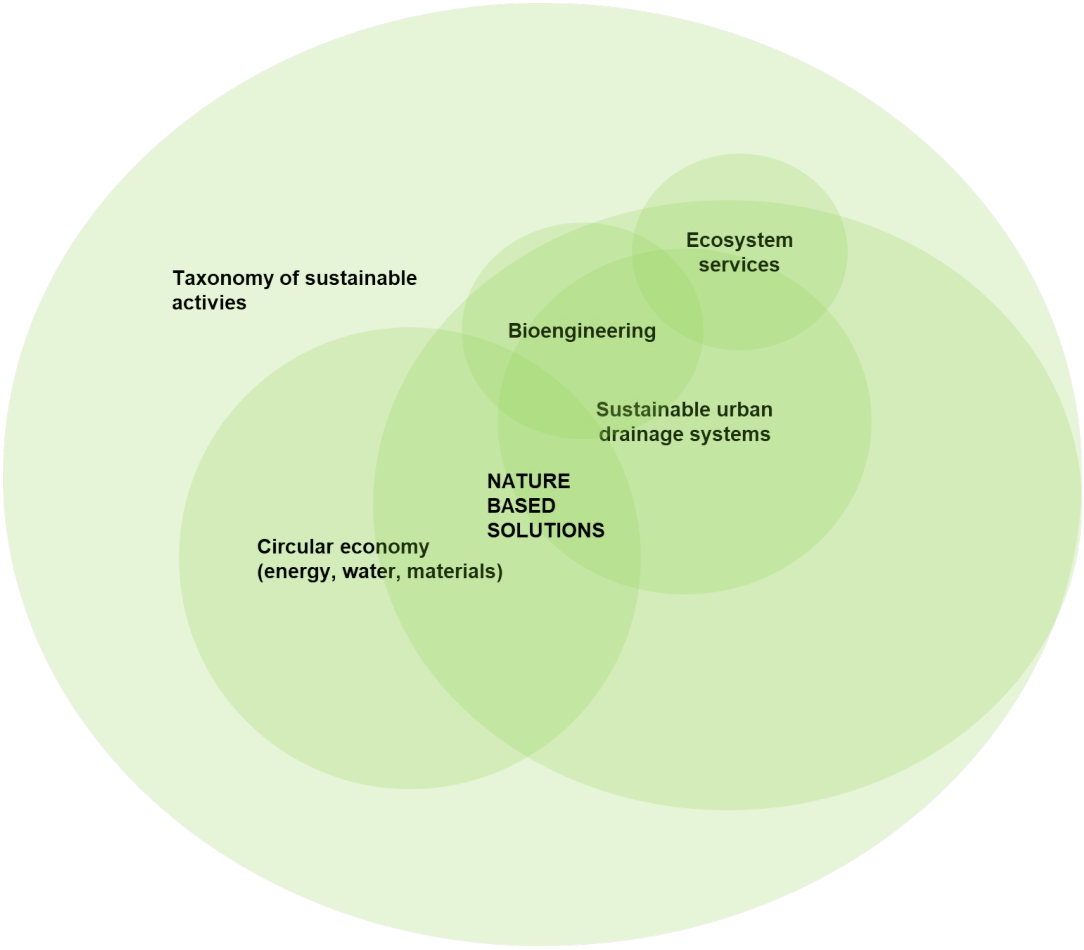


Figure 7.1 Dynamic, overlapping public sector policy missions are allies in promoting SMEs opportunities to grow NBS business

Small and medium cities have a smaller demand and tax base. Although policy instruments to date have been dominated by financing mechanisms, this may not be a path open to smaller cities, unless national and international funding can be accessed. These cities must be more creative in combining non-monetary incentives.

Any policymix analysis should start with an analysis of potential policy barriers to the renaturing of cities. The Urban Governance Atlas typology proved a useful framework for this discussion (Figure 7.2).

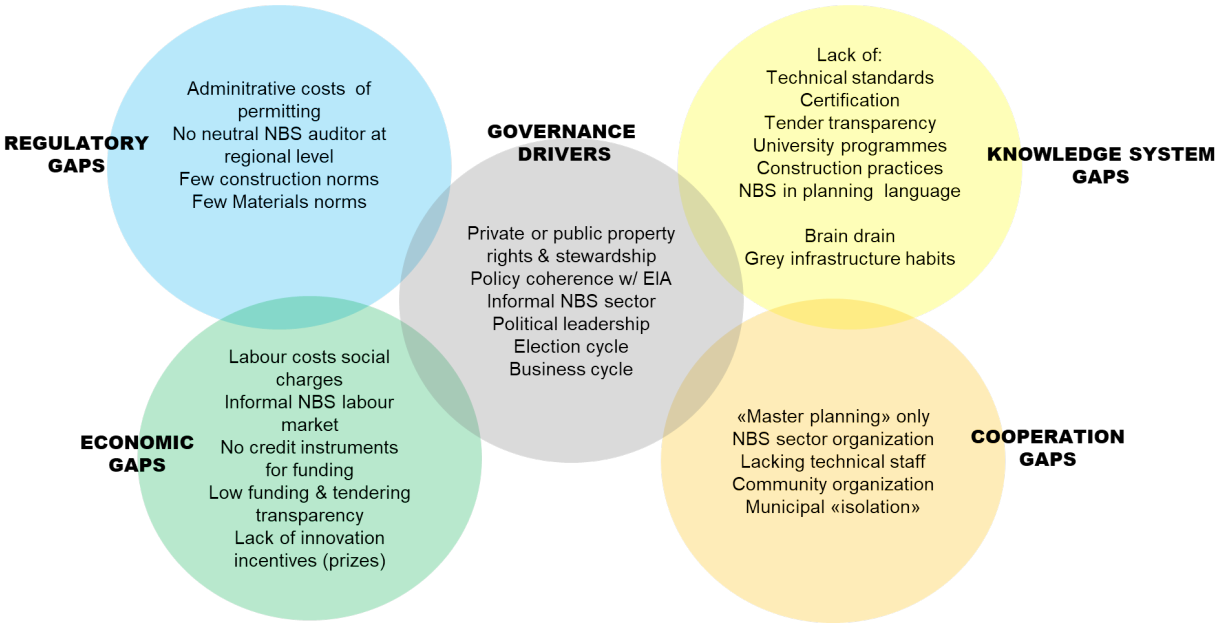


Figure 7.2 Examples of barriers to small NBS businesses in INTERLACE small and medium cities in Central and Latin America

Consultations with planners and business in our six case study cities revealed a lack of incentives. Our discussions uncovered an unexpected number of governance issues inhibiting renaturing that reduce the effectiveness of any direct incentives for NBS that might introduced on top of otherwise weak institutional foundations. In developing a roadmap for a city from the bottom-up policy mix analysis should be ample enough to review underlying governance drivers of “grey” development.

We started the report by arguing that NBS policy analysis to date has been excessively focused on market-based and financial instruments. The commonly used language of NBS “business models” – encompassing not only firms, but also public and community values - certainly encourages a commercial framing of a policy enabling problem which largely deals with public goods.

A road map must start by regulating the rights to use, appropriate or damage those public goods by the private sector (Figure 7.3). Framework regulations for environmental performance that are standardized at the national level to create transparent product and service definitions will help create a level playing field for NBS providers. Translation is also needed into national planning laws and municipally developed norms for the performance of blue-green infrastructure in regulation plans and

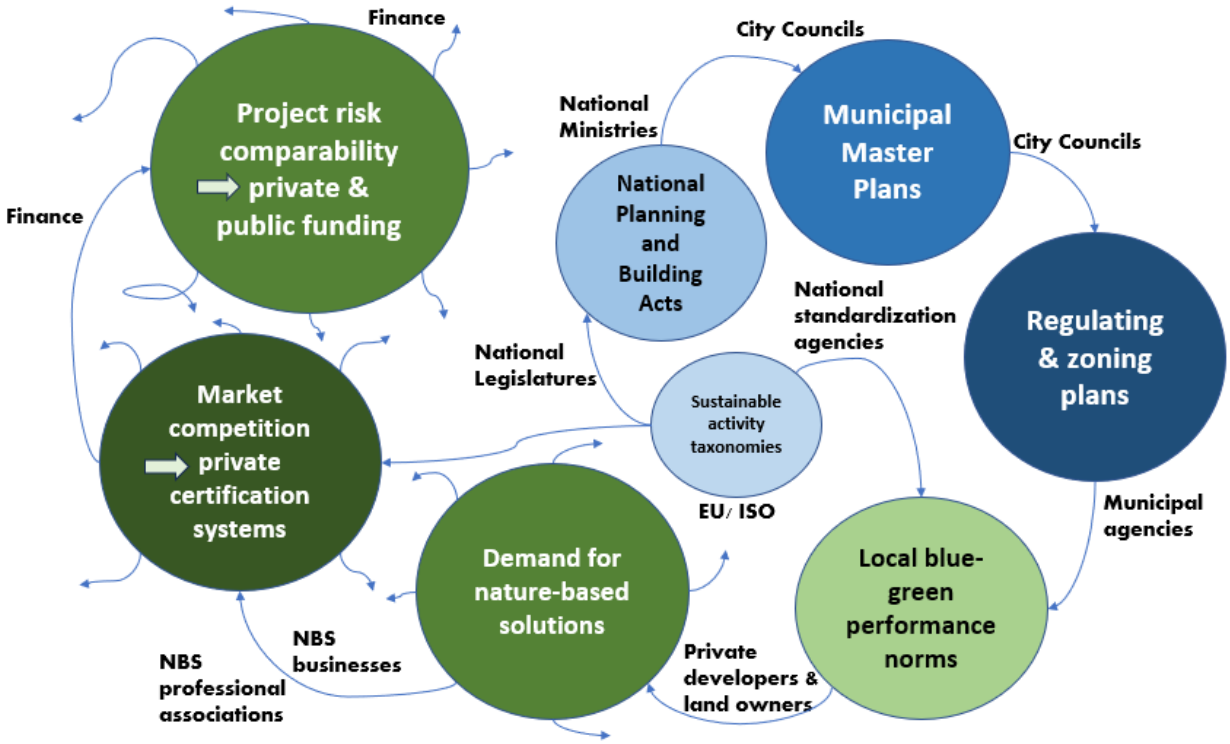
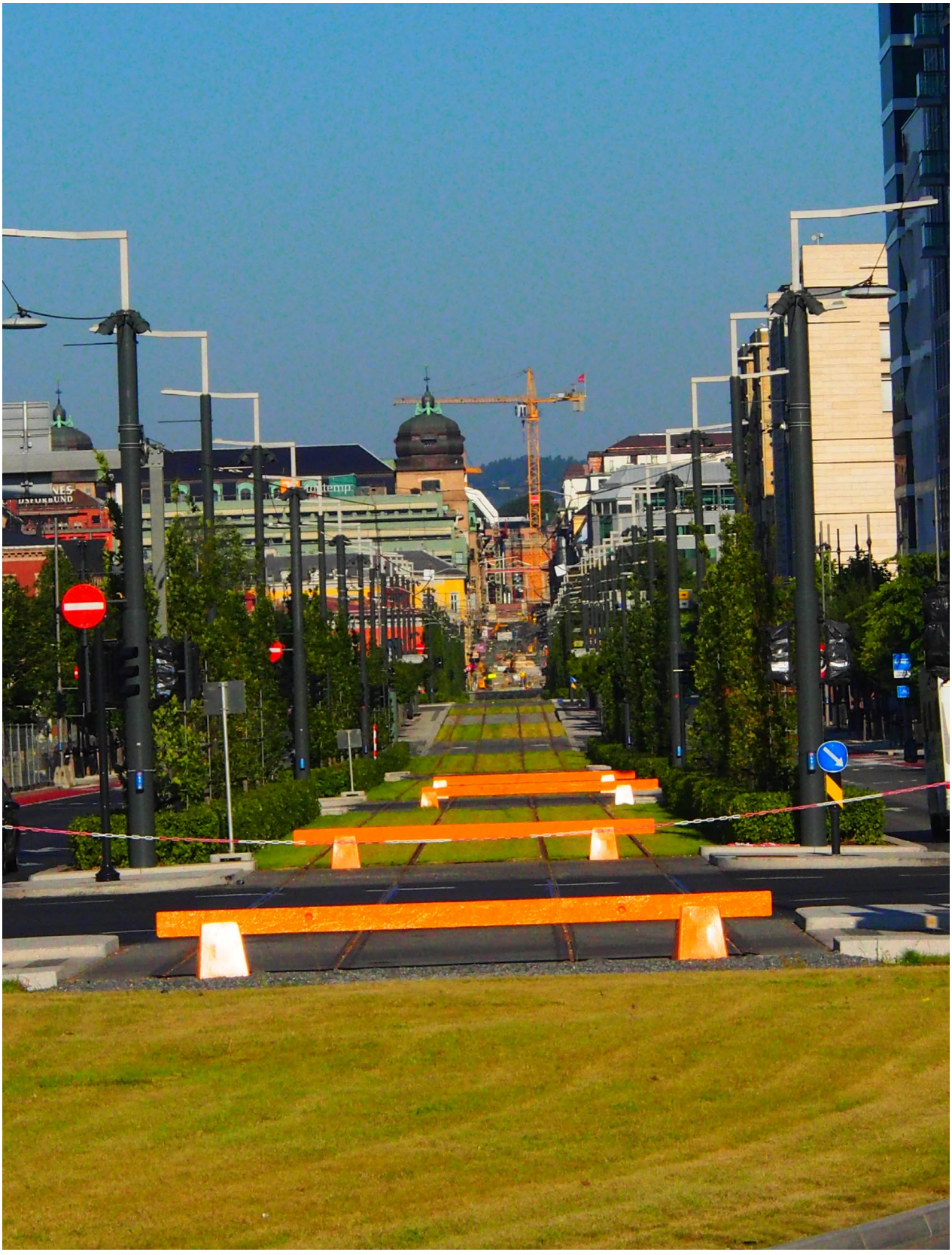


Figure 7.3 NBS market creation driven by 'polycentric' public regulatory initiatives

property permitting. At this level demand by landowners and managers is generated. This should in turn generate a dynamic for privately sponsored certification schemes which further increases competition and reduces search costs among property developers for NBS providers. With standards, norms and certification of NBS in real estate markets, investors have tools to compare nature risk and environmental liabilities across assets. This should in time facilitate private financing of investment prospects that meet higher standards. The dynamics of private demand, market-creation and financing are uncertain. Despite this uncertainty, this reports' basic premise is that none of these market-based transformations will take place without a 'polycentric' (Ostrom, 2010) mutually reinforcing public regulatory instruments that protect, conserve and restore urban nature.



Barriers on the track to nature-based solutions. Photo: David N. Barton

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9. Appendices

9.1. Detailed framework for policymix analysis of instruments for nature-based solutions in a rural-urban policyscape

In most cities the majority of land is in private onwership. Multiple instruments are needed to enable landuse change in favour of NBS on private land in urban settings. Classifying the different landscape contexts in which policy instruments can be used to encourage NBS can help authorities design policy mixes that cover more private land in different situations in the urban zone.

For classification of NBS enabling instruments we have based our typology on a framework originally developed by Pannell (2008). - Public Benefits, Private Benefits, and Policy Mechanism Choice for Land-Use Change for Environmental Benefits Land Economics 84, 225–240.

Pannel's proposal was "a framework for recommending alternative policy mechanisms for seeking changes in management of private lands". Although its application has been considered originally for conservation and stewardship policies on private land,we broaden its use in two ways:

1) for natural – artificial landuse changes more broadly including changes between rural-urban landuse
2) contexts of avoiding nature loss, as well as renaturing

We test how this broader framing can be adapted to consider nature-based solutions in a urban-rural transect (Duany et al., 2014). First we present the core of Pannel's original framework, and then discuss its adaptation to NBS.

Table 7.1 Generic instrument classification of the public-private net benefits framework

Incentive type	**Specific policy mechanism**
Positive incentives	Financial or regulatory instruments[A] to encourage change
Negative incentives	Financial or regulatory instruments[A] to inhibit change.
Extension	Technology transfer, education, communication, demonstrations, support for community network
Technology development	Mechanisms that alter the benefits of land management options, such as strategic R&D, participatory R&D with landholders, provision of infrastructure to support a new management option, and training to enhance the performance of existing technologies.
No action	Informed inaction

[A] Financial or regulatory instruments include polluter-pays mechanisms (command and control, pollution tax, offsets) beneficiary-pays mechanisms (subsidies, conservation auctions and tenders), and mechanisms that can work in either way depending on how they are implemented (define and enforce property rights, such as through tradable permits). Source: (Pannell, 2008)

The framework is based on a series of rules for selecting policy mechanisms (Pannell, 2009, 2008), which we can exemplify for nature-based solutions in cities (Table 7.2).

Table 7.2 Policy mechanism selection rules in the public-private net benefits framework

Policy mechanism selection rule	**Nature-based solution policy rule examples**
1. Do not use positive incentives for land-use change unless public net benefits of change are positive *2. Do not use positive incentives if landholders would adopt land-use changes without those incentives.*	Subsidies to developers for green roofs are not efficient if they are not publicly accessible and the cost can be recouped in the real estate sales price.
3. Do not use positive incentives if private net costs outweigh public net benefits	Do not subsidise green walls only observable by residents.
4. Do not use extension unless the change being advocated would generate positive private net benefits. In other words, the practice should be sufficiently attractive to landholders for it to be 'adoptable' once the extension program ceases.	Provide urban gardening extension service until shareholders grow enough produce and derive enough leisure to maintain the garden without external support.
5. Do not use extension where a change would generate negative net public benefits	Do not subsidise plantings with ecosystem disservices, e.g. dense tree cover in street canyons; do not provide planning support to developers for densification clearing vegetation
6. If private net benefits outweigh public net costs, the land-use changes should be accepted if they occur, implying no action. Alternatively, if it is not known whether private net benefits are sufficient to outweigh public net costs, a relatively flexible negative incentive instrument may be used to communicate the public net costs to land managers (e.g. a pollution tax), leaving the ultimate decision to the land managers. Inflexible negative incentives, such as command and control, should not be used in this case.	In dense urban environments private land value may exceed the value of ecosystem services per m2 of developed land. Development should be accepted. A flexible negative incentive – such as a minimum blue-green points norm, or a stormwater run-off fee, communicates the externalities to the landowner.
7. If public net costs outweigh private net benefits, use negative incentives to discourage uptake of the land use	Loss of open green space unique to a large population would entail large costs to the public through loss of amenities which could exceed property development value; it should be regulated as public park land. Red list species remnant habitats should be protected.
8. If public net benefits and private net benefits from a set of land-use changes are both negative, and landholders accurately perceive this, then no action is necessary. Adverse practices are unlikely to be adopted. If there is concern that landholders have misperceptions about the relevant land uses, adoption of environmentally adverse	Protection of private urban trees may not be necessary in urban heat island contexts because they provide large direct private shading and cooling benefits. Further north, regulating services of trees may not be known and could be enabled by awareness raising, as well as felling permits being required.

practices could be discouraged by extension, or more strongly by negative incentives	

Source: based on (Pannell, 2008)

In the simplest model it is assumed that private landholders will adopt nature-based solutions with positive net benefits to them (private benefits), provided they are able to learn about NBS. In the simple mapping above learning costs are assumed to be zero (it takes them no own time or resources to adopt NBS technologies).

With this instrument classification Pannell develops a conceptual mapping of recommended instrument types to different combinations of net private and net public benefits from landuse change (Figure 7.1).

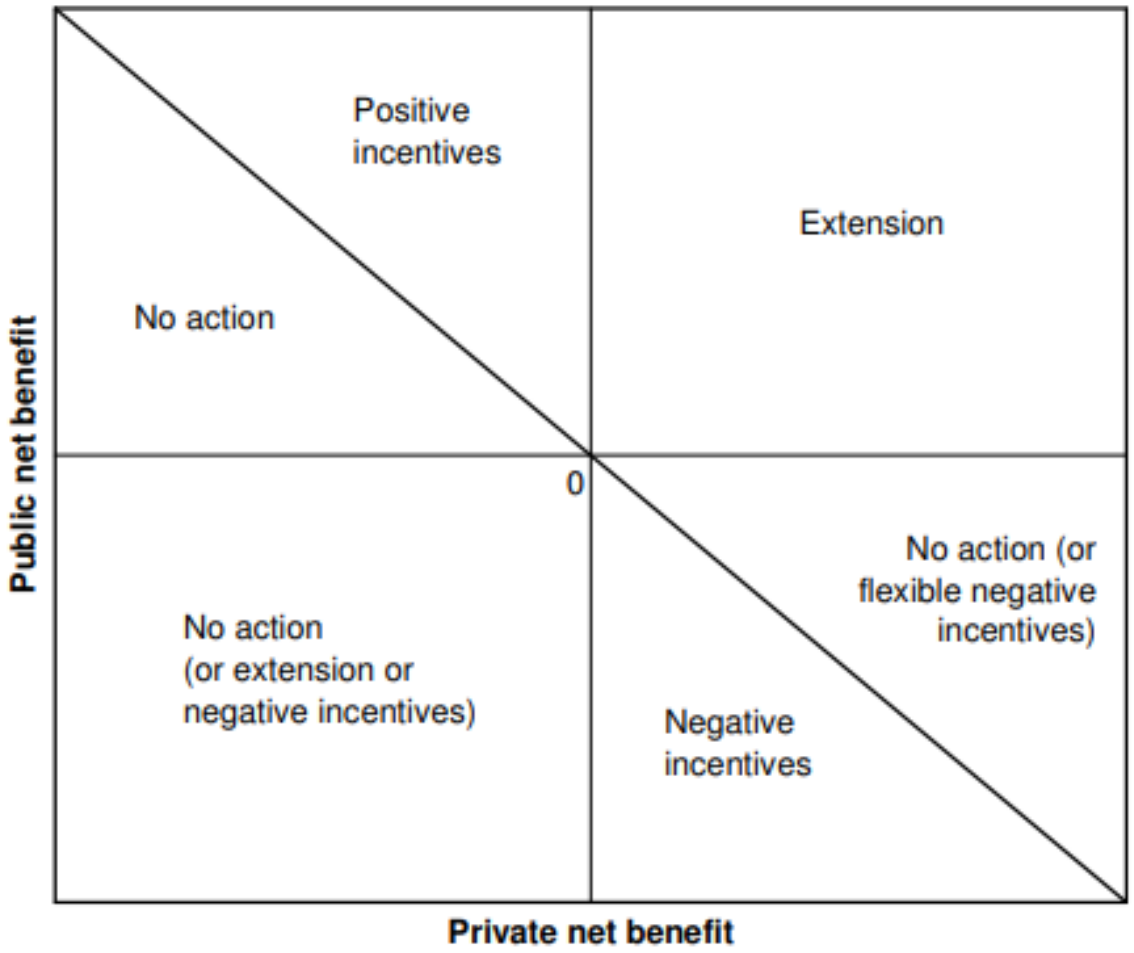


Figure 7.1 The generic public-private net benefits framework

Source: Pannell (2008)

Net benefits on the horizontal and vertical axes refer to a landuse change. If there is no landuse change there is no movement from origo (0), and no need for an instrument. The need to instruments arises to promote or avoid nature-based solutions and competing "grey" land uses depending on their relative private to public net benefits.

This general instrument typology can be applied to enabling change toward nature-based solutions or towards “grey” or artificial alternatives, depending on the ratio of private to public net benefits. The reason to also classify instruments enabling grey solutions is to extend the policymix analysis to considering removal of nature-harmful policies, to the extent that they have negative net social benefits.

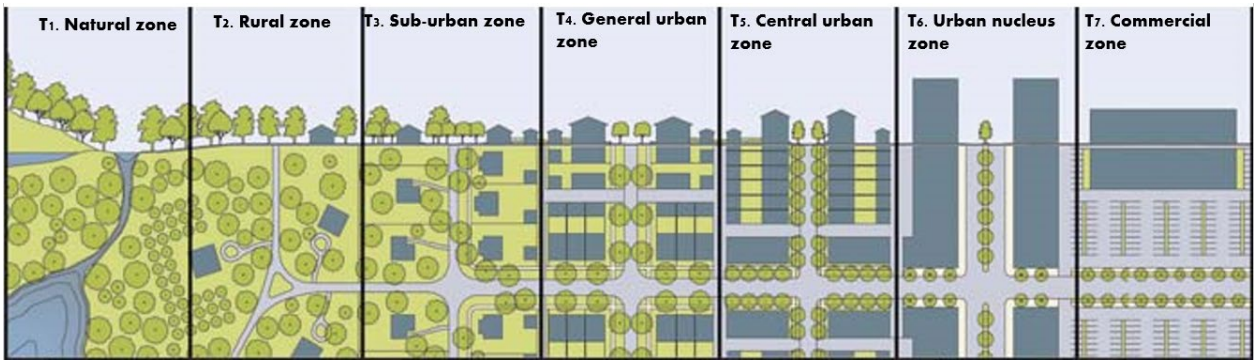


Figure 7.2 The rural-urban transect as the context for evaluating NBS on private land with the public-private net-benefit framework.

Source: transect.org

NBS policymix analysis should consider policies to enable protection of ecological functions in rural landscape being developed towards peri-urban uses, as well as renaturing of urban and commercial zones. The spatial distribution of policy instruments across this landscape gradient can be called a “NBS policyscape”

Armed with these concepts we develop the public-private net benefits (PPNB) framework for the case of nature-based solutions and competing “grey” private land uses (Figure 7.3 & Table 7.3))

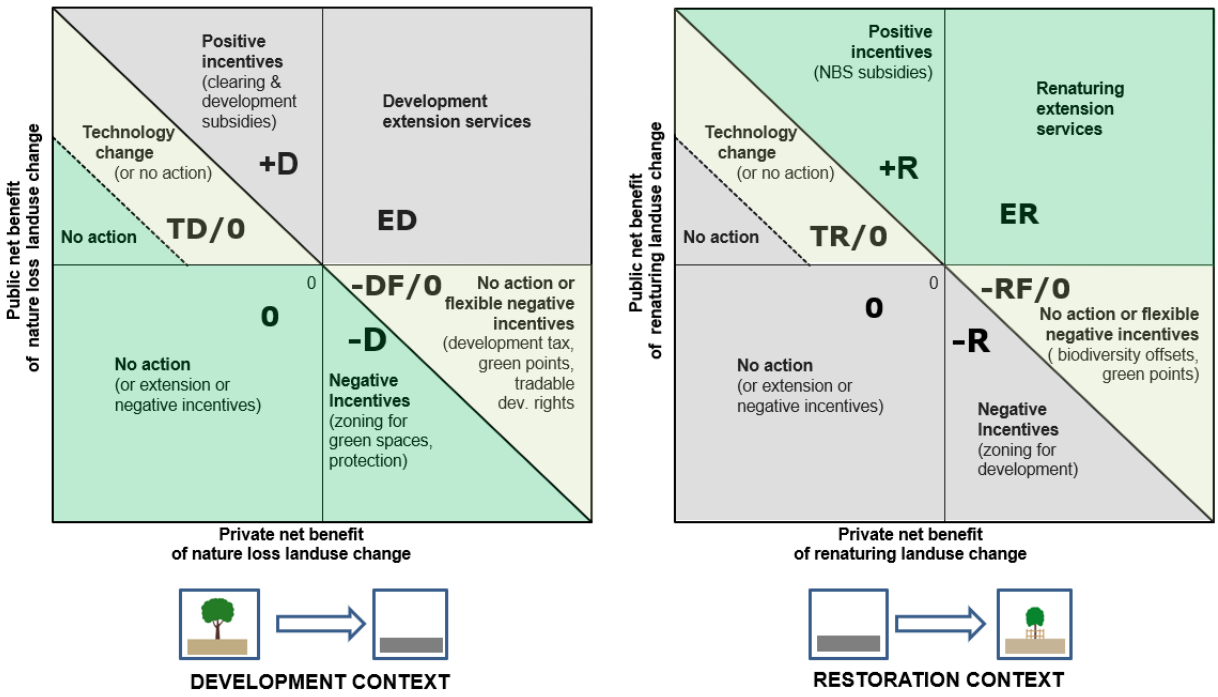


Figure 7.3 The public-private net benefits framework (PPNB) developed for evaluating a policymix for nature-based solutions in a rural-urban gradient

Source: own elaboration

Table 7.3 Classification of instruments in the public-private net benefits framework with NBS related examples

Appropriate Context (Label)	Incentive mechanism type	Urban Governance Atlas policy instrument examples
Incentive mechanisms enabling landuse change for nature-based solutions		
-D	**Negative Incentives** discouraging development relative to nature loss	e.g. Zoning for green spaces, protected areas
+R	**Positive incentives** enabling renaturing	e.g. Subsidies for nature-based solutions
ER	**Extension services** for renaturing	e.g. Information building capacities to realise nature-based solutions
TR/0	R&D **Technology change** for renaturing	e.g. generating new opportunities for NBS projects that were previously too costly or not beneficial enough to be worth pursuing

		privately reducing the financial costs borne by municipalities who are applying NBS subsidy mechanisms
Flexible incentives enabling either nature-based or artificial solutions		
-DF/0	**Flexible negative incentives** discouraging nature loss to development	e.g. Development taxes that penalise densification; stormwater runoff fees for impermeable surfaces, green points for protecting existing vegetation (opportunity costs). Tradeable development rights (sale foregoing development for protection), restoration offset (restoration, sale of credit)*
-RF/0	**Flexible negative incentives** discouraging renaturing	e.g. Tradeable development right (purchase for development), restoration offset (purchase of restoration credit to compensate for development)*
*tradable development rights and biodiversity offsets are a mix of incentives enabling development on one plot compensated against protection or restoration on other land. The negative incentive applies to the purpose of the instrument in the development versus renaturing change contexts. The net effect of tradable rights and offsets depends on enforcement of the offsetting rule (partial loss, no net loss, positive net gain)		
Incentive mechanisms enabling landuse change for artificial solutions		
-R	**Negative incentives** discouraging renaturing	Building standards that do not recognise nature-based solutions.
+D	**Positive incentives encouraging** development over nature loss	e.g. Zoning for development and densification of land Property tax reductions for densification
ED	**Extension services** for land development	e.g. Information building capacities to support realising developments
TD/0	R&D **Technology change** for urban development	Increasing profitability of development Increasing cost-effectiveness of artificial solutions substituting for ecosystem services
Other parameters determining landuse change in the Panell model		
	Learning costs and adoption time lags	Extension reducing learning costs and time lags to adoption of nature-based solutions
	Transaction costs	e.g. building permitting time to approval leading to idle capital and equipment costs; administration costs
	Interest rates	e.g. low interest rates often lead to debt financed property development pressure
	Input prices	e.g. higher prices for building materials slows development, and may affect input-intensive technical solutions more than low input green solutions; bioengineering solutions may also require less maintenance

Classification of actual and proposed policy instruments for enabling NBS in the INTERLACE Cities

Definitions and examples of instrument types from business interviews and municipal workshops

The following generalises the instrument examples provided in the interviews with businesses and multi-stakeholder workshops from the six INTERLACE cities detailed in Supplement 7.3 (business interviews) and 7.4 (workshops).

The following assumptions were made to reduce the information from the interviews to generic instrument categories that could be classified according to the public-private net-benefits framework.

9.1.1. Legislative, regulatory and strategic instruments

Dedicated strategy or plan

- Regulation plans with NBS norms
    - Development plans
    - Minimum requirements – multiple (above)
    - Quantified, measurable requirements/recommendations for provisions in the LZP regarding BGI (M Krakowska)
    - Requirements/norms for business collaboration in providing NBS - unspecified (Granollers)
    - Urban development contracts specifying how what is to be implemented and when (Chemnitz)
- NBS type specific regulation
    - Regulation for pocket parks (CBIMA)
    - Forest Landcover change prohibition – soil protection (Engivado)
    - Protection of water course riparian buffer area

Sectoral/overarching strategy or plan

- EU Framework legislation
- Municipal master plans
    - Land use zoning plans
        - Vulnerability
    - River basin
- System of peri-urban protected areas
- Framework strategies for SUDS – non-structural SUDS instrument

Urban planning mechanisms

- Protected areas (M.Krakowska)
- Expropriation in public interest (CBIMA)
- Minimum ecosystem condition requirements
    - EU Framework legislation, e.g. WFD

    - Minimum Restoration requirements
- Minimum blue-green area requirements
    - Green points norms
    - Blue-green factor norms (e.g. Granollers)
- Minimum ecosystem service performance requirements
    - Minimum stormwater run-off requirements
    - Minimum flood management requirements
- System of peri-urban protected areas (Envigado)
- Water and sewage requirements
    - Sewage separation from CSOs
    - Water and sewage reuse (Granollers)
- Specific NBS structural requirements
    - green fences; (M. Krakowska)
    - biologically active driveways and parking spaces(M. Krakowska)
    - a green belt next to crops on a slope(M. Krakowska)
    - public space next to multi-family housing, (M. Krakowska)
    - flower meadows, (M. Krakowska)
    - native soil in a biologically active area; (M. Krakowska)
    - Continuity of greenery + tall trees(M. Krakowska)
    - Regulatory design requirements (e.g. gravel gardens)
- Development offset requirement
    - Intervention compensation regulation (Chemnitz)
    - EIA compensation measures (Envigado)

Standards

- NBS procurement guidelines
- Monitoring requirement,including pricing into contracts
    - Completion
    - Ecological monitoring (Chemnitz)

Other

- Simplify administrative permitting procedures
    - phytosanitary for plant material permiting too long
    - municipal-private collaboration exemptions

9.1.2. Financial & economic instruments

Disincentives

- Fines for non-compliance
    - EU fines to Municipalities for non-compliance
- Ecosystem utility service charges
    - Stormwater run-off fee
    - Tax on impermeable land

- Tax on vacant lots (CBIMA)
    - This instrument on its own will not necessarily promote renaturing. Depends on other incentives.

Subsidies, incentives in kind

- Reduction in charges on inputs
  - Reduce administrative fees for obtaining SUDS/NBS building permits
  - Reduce labour, social security charges
- Reduction in municipal utility fees
  - Reduced water charges for NBS (Granollers)
  - Reduction in electricity charges (Granollers)
- Tax reduction for NBS measures
  - in the local Property Tax (IBI or municipal rates). (Granollers)
- Subsidies for NBS actions
  - Subsidies for NBS actions focused on SMEs (Granollers)
    - projects that provide benefits to urban greenery, water cycle or local agriculture
  - for NBS inputs (e.g. fertilizer)
  - for NBS R&D
  - for NBS implementation

Market-based instruments

- Payments for ecosystem services
  - Including peri-urban protection zoning ; Opportunity costs may be too high to work on its own (CBIMA, Envigado)
- Commercial use concessions

Financing mechanisms

- EU reconstruction funds
  - – NextGeneration
  - EU and non-governmental co-financing for local governments for investments in the field of BGI;
- Favourable Credit for NBS
  - Low interest « green » loans
  - Credit availability
- Public procurement – purchase guarantees – demand creation
  - Public procurement, based on a SBN project bank (Portoviejo)

- Earmarking municipal funds restoration
  - Regular funds (Engivado, 1%)
  - Stormwater fees

Other

- Obligatory pricing of maintenance & monitoring into NBS contracts

9.1.3. Knowledge, communication, innovation instruments

Communication & awareness raising

- Education & training in co-benefits and multi-functionality of NBS
  - municipal staff ¨
  - politicians
  - residents (M.Krakowska)
  - local press (M.Krakowska)

    - environmentall eduction in schools
    - business – attracting professionals through good working conditions.(Chemnitz)
    -
- Education & training on sustainable production
- Municipal training on national legal framework for planning and building
    - awareness of municipal rights to reject development proposals on environmental grounds
- Public environmental campaigns (M.Krakowska, Granollers)

Knowledge and innovation

- Open Source Technical standards for NBS
    - National SUDS guidelines
    - Municipal, importance
    - By NBS type, e.g.
        - Tree species
        - Green roofs
        - Pocket parks
    - Open source publication to increase market share
    - Building codes with NBS

- Guidance manuals for NBS
    - National
    - Municipal
    - Funding guideline for green innovations promoting actors collaboration. -> Allotments are funded, but not citizenship (Chemnitz)

  Pilot R&D NBS innovation projects
    - Model investments; (M.Krakowska)
    - A catalog of solutions at the metropolitan level;(M.Krakowska)
    - Low/no maintenance cost technologies
- NBS extension services
    - Create a communication platform to inform public of norms, projectsv(M.Krakowska)
    - Workshops for the maintenance of building greenery (Chemnitz)
- Laboratories for NBS technology
- In-house municipal NBS specialists, reduce subcontracting
- Mapping , inventorying, Cadastre of protection and restoriation sites
    - Ecological corridors (Envigado)
    - vacant lots and brownfields (CBIMA)
    - monitoring of landuse change*
    - Multi criteria GIS spatial prioritization of sites with highest potential ecosystem service delivery
- Ecosystetm & biodiversity acocunting and impact evaluation
    - Wildlife roadkill in the peri-urban areas (Envigado)
    - ‘Monioring of landuse change

Other

- Certification for NBS
  - Structures
  - Projects
  - Business – public goods business
  - Open source
  - Corporate Social Resonsibility reporting
- Prizes for NBS innovation
  - Competitions among residents promoting BGI (residents, investors); *(innovation instrument)*

9.1.4. Agreement-based or cooperative instruments

Direct engagement of citizens

- Municipal-Local community stewardship agreement public open space
  - Local community consultation (M Krakowska)
  - Social network (CBIMA)
  - Adopt a pocket park campaigns (CBIMA)
  - Public-private agreements for park maintenance (CBIMA)
  - Local development associations (CBIMA)
  - Participatory biodiversity monitoring (Envigado)

Multistakeholder collaboration

- Municipal-private Negotiated area development
  - Public-private agreements ceding land to municipality (CBIMA), in exchange for development opportunity
- University-business professional training
  - placements, traineeship programmes
- University -business - municipal project collaboration
  - International R&D projects
    - Foreign aid funding for NBS and green economy projects (GIZ, IDB, UNDP)
    - EU
  - Join construction (and funding) of shared NBS services by several actors

Joint regional planning/ action

- Cross-municipal collaboration agreements
  - National supported
  - Coordination of administrative procedures, reduction transaction costs
  - Watershed confederations
  - Regional peri-urban, (Mesa del Sur for ecological corridors (Envigado)

Other

- Professional sector associations & networks for NBS services
  - Architects
  - Horticulture
  - SUDS national networks
  - Public goods company network
  - Municipal NBS staff
  - NBS business cluster

Other Governance – rules-in-use

- Enforcement of employment legislation - equal playing field
- Enforcement of public tendering
- Auditing, certifying agency for NBS,
  - Construction
  - Maintenance
- Reduced private contracting by municipal
- Transparent tendering processes
- Corporate governance - Public goods companies

9.2. Business Interview policy instrument summaries by city

Anonymised - Summary Transcripts of Business Interviews in INTERLACE cities

The following tables represent summary transcripts of questions regarding policy barriers and enabling instruments for NBS from the in-person interviews with businesses in the 6 INTERLACE cities. In accordance with the interview protocol the responses have been anonymized – the individual business cannot be identified. The association of barriers and policy enablers by city has been kept for purposes of the qualitative policy instrument analysis.

Number of in-person business interviews

The interviews were aimed at small-medium private enterprises providing nature-based solutions (e.g. SUDS, public parks desig) in each city. Interviews were selected based on recommendations by the INTERLACE city-focal points. The selection procedures and number of interviews does not represent the population of SMEs in each city. The analysis therefore only represents examples of barriers and policy instruments from each city – not an exhaustive list.

CBIMA, Costa Rica	3
Envigado, Clombia	3
Portoviejo, Ecuador	3
Granollers, Spain	3
M.Krakowska, Poland	3
Chemnitz, Germany	2
Total	17

An initial classification of barrier and instruments types is classified into issues related to regulatory, economic, knowledge and innovation or cooperation based instruments. This initial typology forms the basis for further synthesis to produce the NBS instrument overview in the main body of the report.

- policy barriers to NBS
- policy instruments enabling NBS

Anonymized SME interview responses to barriers and policy mixes for NBS

9.2.1. San Jose metropolitan area /CBIMA, Costa Rica

Policy related Barriers	**Regulatory** • Strict phytosanitation administration procedures • Administrative costs of obtaining permits - Excessive public permit requirements **Economic and financial** • Labour / social security charges • Social security costs; lacking control of coverage of all staff among competitors • small companies, informal hiring • Lacking input subsidies from government to mitigate price increases in fertilizer **Knowledge and innovation** • National MINAE manual for NBS too general = lack of technical standards • Lacking uptake of scientific-technical knowledge. Many technical studies at municipal level not implemented • Public nurseries – poor condition of plants – poor public management methods • Lacking availability of accurate corporate accounting data on profitability of NBS; **Cooperation** • Lacking management of irrigation canal; lacking collaborationbetween neighbours • Lacking NBS sector organization – lacking political visibility of NBS sector **Property rights & stewardship & goverance (nexus regulatory-cooperation)** • Common property resources – tragedy of commons. Socio-cultural barriers are not necessarily to do with policy - local community view of public “no mans” open space; • Lacking stewardship. Vandalism of public open spaces. • Policy cycle. Four year local govt. political cycles hinder long term planning needed also across municipal administrative borders. **Natural risks** • Seasonal cycles of business – specific for plant nurseries

Overview of policy instruments and business cases for enabling restorative NBS

Enabling policymix	
Regulatory	Downscale (national) strategy to local government level Obligatory requirements for NBS, rather than voluntary National reform the hydrological code Landuse management plans with regulations Municipal minimum requirements for return period run-off retention of new build property development Simplify building permitting for properties with NBS Reduce phytosanitary permit requirements for plant material in NBS
Economic	Reductions in social charges for NBS project implementation (PES precedent) Reductions in municipal property taxes for property owners implementing NBS Green low interest loans for NBS projects – Low commercial interest rates on loans for SMEs, without collateral, based on expected incomes. Municipal procurement of plant materials; demand creation
Knowledge, communication, innovation	NBS benefits communication; transfer ecosystem services rhetoric from forests to cities Co-benefits communication. Connect NBS to pandemic preparedness and health benefits Multi-functional use. Accompany physical works with transformation in cultural uses of the open space (families, habitat) Measures to raising awareness among municipal politicians Downscale national strategic “manuals“ to technical standards/guidelines at municipal level National building standardisation and certification of NBS structures
Cooperation	National lab for materials and structural models needed for NBS Further private – public cooperations labs in research and design of NBS

	National government support for collaboration across municipalities in the same watershed (CBIMA) Joint municipal-private projects reduces need for construction permits Municipal delegation of stewardship to local community appropriation of open space. Common-property resource management. Collaboration with municipality in waste collection and management (synergistic policy) Social media mobilization for community participation (community rep).

9.2.2. Envigado, Medellin, Colombia

Policy related Barriers	**Regulatory** • Differences in compensation norms for trees across neighbouring municipalities • Lack of integration of norms and requirements (e.g. mitigation requirements for fauna bridges, not integrated with environmental feasibility analysis; wildlife mapping) • Environmental regulation is quite advanced and provides a direct incentive for the companies business model, but it is too "timid". **Economic and financial** • Lack of Municipal Auditors to guarantee transparency in public works tenders. • Weak auditing rules for public projects. Urban regreening projects are individually too small for third party auditing to be required, but in sum the budgets would exceed auditing thresholds (as you would in larger infrastructure projects). (Tierra Negra) • Lack of municipal funding. currently urban reforestation is very slow for lack of up front funding. **Knowledge and innovation** • lack of research and awareness of native species • Lacking appropriate certification for NBS or demand for certified products • The ISO 14001 certification not adapted to NBS business models • Lack of environmental awareness/education in the public • Lack of permanent municipal staff in environmental issues • Lack of awareness / urban childrens' contact with nature, especially the richest families • lack of awareness about wildlife/habitat in the context of restoration **Cooperation** • Lack of International cooperation projects for knowledge sharing **Governance, Property rights & stewardship norms (nexus regulatory-cooperation)** • Lack of legal formalisation operations of some potential clients • the major problem is the lack of transparency in public works tenders for planting projects • lack of accountability in the use of public funds earmarked for reforestation and environmental compensation projects • lack of transparency in the distribution of public funds
Enabling policymix	

Overview of policy instruments and business cases for enabling restorative NBS

Regulatory	• non-profit regulator/certifier of reforestation projects such as the Jardín Botánico of Envigado • Auditing: impartial technical assistance and control to all municipalities in the Metropoitan Area
Economic	• Incentives for companies treating the wastewater, reusing water; protecting watersheds. • Incentives for technical innovation - planting Moringa as an innovative input • credit instruments for upfront financing of municipal urban reforestation projects • subsidies for NBS research innovation • Prizes for technological innovation
Knowledge, communication, innovation	• Professional placements with company of researchers • Research on habitat connectivity for restoration measures • Environmental education of children
Cooperation	• Collaboration between business – universities - municipalities • Sector association of plant nurseries: Colviveros promotion of legalization of companies in the sector

9.2.3. Portoviejo, Ecuador

Policy related Barriers	**Regulatory** - Master Planning scale is too macro for NBS (1:5000) - Lacking locally /validated prepared development plans resulting in possible imposition from national level - Lacking standards for buildings integrating NBS - Lacking norms for building materials – requirements at the building level - Lack of regulations requiring NBS at the local level, however in the Constitution nature is a subject of rights and obliges the GADs to create public policies that allow them to protect nature and there is a demand for the protection of water sources. **Economic and financial** - lacking labour market for planners with NBS knowledge - lack of (knowledge about) financial incentives for funding (pilot) projects among small businesses and concerned citizens - lack of economic incentives - lack of public projects that could require the use of NBS to create economic development opportunities in this area. **Knowledge and innovation** - main limitation is lack of NBS knowledge about the potential of working with nature among politicians who manage cities and regions - lack of interest by private developers – no demand - lack of recognition, prizes. The Habitat award of the Ministry of Environment and housing where Portoviejo has been recognized, does not specify the use of NBS as a requirement. - lack of capacities in universities to train students in NBS sciences - lack of communication of public sector to citizens, and local companies working in the design and construction of urban components of the city (streets, squares, parks, infrastructure). - planning not recognizing nature-based solutions: urban planning turning its back on the river; rivers covered or used as waste dumping sites; There is no local knowledge and data to inform and educate citizens on these issues. - lacking assessment of risk /vulnerability of properties; plans are at macro scale, risk event records are not yet fully centralised - lacking capacity of technical personnel - lacking socialization of building standards in communities (regarding construction practices) - brain drain of planners and architects abroad with awareness of NBS (e.g. USA); 10% of trained architects leave the profession per year

	- public sector rhetoric prioritizes road and building infrastructure. There is a habit of cost-overrun in concrete construction which means that the infrastructures built are monopolised by certain builders who have not evolved in their practices. - NBS is not in planning language; "ecosystem services" referred to in smaller projects, but not in large municipal projects. Ecosystem services in urban areas are not understood by municipal technicians. They do not associate parks or urban trees with ecosystems; they see these infrastructures as ornamental. **Cooperation** - a large share of what happens in a city is controlled by the private sector; municipal public planners - lacking organization of citizens - silos; municipal isolation, working alone; not using knowledge of other professions. There are several public consultancies but within them there is no consideration of the transfer to the municipal technicians, products are developed which are not used afterwards. - only Ecuadorean public institutions can implement international funds **Other Governance** - municipalities don't have staff to formulate funding proposals, nor SBN projects - city master plan says what is needed, but not how to do it; requires a professional in-house staff to implement and specific ordinances that make the plan feasible. - lacking/change in political leadership at municipal level; internally the directorates in charge of city projects change a lot in the span of the 4 years of local government, weakening the projects. - limited visibility of SME – limited capacity to grow while simultaneously having to carry out consulting - lacking integration of policies with local community stewardship ○ citizens' ad honorem initiatives are not supported by the government
Enabling policymix	
Regulatory	- master plan of what NBS is needed at different scales, territorial, sectoral, neighbourhood - in-house municipal staff to design implementation of what is needed - ready development plans prepared for window of opportunity - zoning by vulnerability: designation of properties with high seismic vulnerability index as open spaces - planning need to be implemented through property building regulations to be at 1:1000 to integrate NBS in construction design; a specific technical standard should also be created, which can be included in the city's architectural and tree standards. - regulation of tree species planting - building regulations (NEC) on energy efficiency need to be implemented; e.g. regulates how to construct green roofs - auditing / control of construction and monitoring of NBS practices - Put master plan and norms etc. in municipal regulation plans

	- National Land Use Law is adequate, but needs implementation in municipal regulation plans - strengthen the Portoviejo ordinances for hills which can also be a basis for a river specific ordinance.
Economic	- municipal incentives for property developers for NBS - e.g. property tax exemption for 3 years; 40% reduction in planning permit fee (Cristian Romero) - incentives to increase profits – granting higher utilization rates with more floors in exchange for improvements - prizes for innovation
Knowledge, communication, innovation	- Public authority technical personnel need to be aware of the available national legal framework, and above all to take into consideration that with the new law the mayors are legally and criminally responsible for every territorial development action and that it is their obligation to apply the law at scales - international agencies and multilateral credit institutions helping to raise awareness; international cooperation should work in a joint and coordinated manner so as not to duplicate work - networking - knowledge exchange with international projects (e.g. INTERLACE) wit urban labs - integration of vulnerability indices with NBS/GI planning - awareness raising about "intangible" regulating ecosystem services and disservices of NBS - collaboration with university in the city, state universities and ministries
Cooperation	- more collaboration with associations of architects, planners, landscape architects, geographers and biologists - cooperation of municipal governments with other sectors of society, communities, architects; and other cities to create technical exchanges as they do on water issues with FONAG in Quito. - international cooperation at local, national and international level; under projects included in the annual programme of projects that the municipality has in order for the cooperation investment to be effective and with quality standards that allow for the improvement of local practices.
Governance	- Civic use of parks by citizens; occupation of space and stewardship (e.g. cine de la orilla)

9.2.4. Granollers, Catalunya, Spain

Policy related barriers*	**Regulatory**
	• SUDS have not been implemented because they were obligatory
	• Phased requirements. In Sevilla (i) 2 years of recommended implementation ('fomentación') with technical support (ii) now obligatory through regulation of the run-off allowed to connect to the system. Also working in Valencia
	• Standardisation can slow implementation of SUDS since they may not be in the catalogue of accepted measures.
	• Lack of standardization of SUDS
	• Why publish guidelines in one municipality if they already exist in others? >> Lack of locally approved guidelines as a political signal.
	• Lack of NBS typology - language for the municipality
	• Missing consolidation of national legislation on SUDS at local level
	• Difficulty to insert SUDS in a standardized price list
	• Implementation of SUDS have all been in provincial capitals. Granollers is ahead of the curve.
	• Has the EU Directive been approved? Spanish decree 2012 on CSO >> Technical norms to be complied with by 2019 were too complex for calculating; with too short deadlines (2019) for municipalities for them to be feasible. Now they are implementing something simpler with longer deadlines. (BGM)
	• Generation gap in awareness – e.g. riverine forests
	• Not a lack of legislation.
	  ○ Bureaucracy – lack of agility; slow response on proposals. Plan for 2022 not approved. 1.5 years delay.
	  ○ Lack of funding to implement strategies;
	• Lack of legal clarity on who is responsible for river bank maintenance within cities; some municipalities cannot afford it
	Economic and financial
	• Benefits of SUDS are not privately proportional to costs for implementing party - "public goods"; implications in the water cycle of the city.
	• Public goods. Dispersed benefits; concentrated up front costs with planning; implementation does not have to be more expensive than grey infrastructure if planning has been adequate. Promoters will not perceive benefits, and they are different to monetize.
	• Restoration is very expensive and complex; actions are more demonstrational than large scale
	• Lack of funding to scale pilot river restoration measures to larger areas beyond demonstration projects.
	• Riparian maintenance service to municipalities. Lacking charge for service

	• Fragmented financing. Subsidy amounts from regional government for NBS are too small compared to project total costs, and transaction costs of obtaining and reporting . Lack of execution of funds. • Public procurement process does not favour restoration effectiveness over cost of measures. Open to anyone, also non-local companies. • Quality of solutions offered by competitors not clear in criteria. Preference in some cases to work directly with private clients who can choose their suppliers. • High cost of proposals ○ E.g. "restoration of river" project requested, versus CV with micro-restorations • Social impacts of large scale nature restoration measures; imply displacement of people • High maintenance costs. Low maintenance technology – bioengineering **Knowledge and innovation** • Lack of standards. Difficulty for professionals to leave their disciplinary "comfort zone" and collaborate • SUDS are well known at the technical level in municipal staff, but not in the population yet. • Lack of familiary. Trust in managing street run-off in sustainable drainage systems • Innovation in SUDS can be difficult because of standardization of maintenance • Lack of NBS professionals for replication • Guarantees for bioengineering by company – but standards don't exist yet in Spain. Bioengineering calculations based on traditional engineering documentation. • Project types for development beyond commercial interest: "Mas allá del encargo" **Cooperation** - Fragmented restoration implementation by municipality (Consorci) **Other Governance?** - Value systems of clients. Value coherence between public sector and public good dimensions of NBS; although private companies are quickly gaining environmental awareness
Enabling Policymix	
Regulatory	• EU WFD legislation is the origin of river restoration NBS market • Legislative context: 2023-julio-guia-drenaje-nilsa.pdf • *Confederación del Jucar: control of quantity and quality (design criteria table for outflows from industrial development areas, e.g. treatment of run-off; even if there is no legislation at national level, or the EU regulation has not been approved. Confederation is already imposing requirements that they see coming at national and EU level. • In Spain - policies are labelled non structural SUDS (comparable to the Norwegian steps model) • Restoration quality standards e.g. with endemic species (market for seeds; e.g. Switzerland); avoiding exotic species.

	• Restoration quality standards • Exemptions. Development of instrument: possibility of bypassing municipal standard regulations to promote innovation projects. -
Economic	• EU reconstruction funds. "Fondos de recuperción" NextGenerationEU. • EU research programmes. E.g. Biodiversa calls on renaturing the city. • Fines. The EU directive will be a challenge for many municipalities, imposing fines for delayed implementation of run-off control. Spain is already paying fines for not complying with waste water treatment requirements. • Funds for monitoring treated water quality. • Ordinary municipal budget allocation, e.g. Granollers "conservation of natural goods – "bienes naturales". • Funds set aside from wastewater user fees. Earmarked Budget allocation to river restoration. • Development offset for river restoration ▪ Reorganization of the industrial zone. Green area compensation project (20%) requirement with industrial development zone. Bioengineering not necessarily more expensive than a playground green space as compensation (e.g. concrete maintenance; pump maintenance) ▪ Corporate social responsibility: Emerging options of compensation by industries of their ecological footprint using NBS. • Public good company - Empresa de bien común (Naturalea) ▪ "Safety fund" to cover downturns; ▪ Bi-annual meeting on Internal research proposals; vote on best proposals ▪ Internal training
Knowledge, communication, innovation	• National SUDS guidelines. SUDS regulation template ("ordenanza tipo")) • Local Guidelines example: 2023-julio-guia-drenaje-nilsa.pdf • Mainstreaming of SUDS in public works, ex. Artículos - Revista de Obras Públicas (revistadeobraspublicas.com) (BGM) • Pilot projects – 2008 - LIFE Project – Aquaval >> demonstrate that SUDS work in • EU innovation projects. E.g. energy saving through rainwater collection. • National SUDS network https://redsuds.es/ ; Linkedin network; biannual meetings on SUDS; ○ Jornadas SUDS • Communication– environmental education - with local communities • "Fun" community engagement in restoration works • Replication of experiences • Open source market strategy – how can it be a competitive advantage? 100% variable of a very small or 10% secure of a market expansion through sharing methods;

	○ Open source company certification. La Matriz del Bien Común - Economía del Bien Común (economiadelbiencomun.org) ○ Open source technical documentation and publication of projects on website • https://naturalea.eu/en/technical-documentation/ - explanation of failures as well as successes • Urban River Lab – experiments with morphologies and plant communities Sharing of documentation templates • Training courses in bioengineering calculation
Cooperation	• Master Plan for Madrid Nuevo Norte with SUDS. Collaboration pilot SUDS between consortium Madrid Nuevo Norte and Madrid municipality (permeable pavement and bioretention; 1 year monitoring of water quality) (BGM) • The Master Plan for River Areas in the Besòs basin (River areas - Besòs Tordera Consortium (besos-tordera.cat)) • Use funds from ordinary budget for river nature restoration. • Multi-institutional collaboration. Projecto Can Cabanyes 2 example of collaboration property developer, municipal river basin consortium Naturalea, university, public museum, recreation. • Cofunding; funds for restoration; allocate users fees for waste water treatment to river restoration projects. • Building trust through open source;
Governance	• Watershed confederations • SUDS Transition roadmap Rueda de la transición • Corporate governance. Open source certification. Common good economy balance/accounting. Inicio - Economía del Bien Común (economiadelbiencomun.org); La Matriz del Bien Común - Economía del Bien Común (economiadelbiencomun.org)

*Used value chain question for barriers to companies; policymix for authorities.

9.2.5. Metropolia Krakowska, Poland

Policy related barriers	**Regulatory** • Inefficient biologically active area/minimum green area compliance. Developer lobby for compliance with minimum green space on roofs where it is not used by humans and may offers poor ecological benefits. Ecologically very poor and high in water consumption in their current implementation. Green walls very expensive; poor solution – high maintenance (irrigation, 30% annual replacement rate) – climbers need no maintenance, long lifetime. • Abuse of exceptions in requirements for minimum green area in developments • Little trust - under communism learned how to managed in spite of many regulations • Lack of control and monitoring of works. Regulation of biologically active area (good written law), but poor control of implementation of works. Inspectors have little knowledge and funds to control resources, e.g. developers who build temporary green roofs; • Greenwashing buildings with green roofs have very poor PR due to poor implementation; tool for developers to maximise their floor space within a "minimum biologically active area" requirement **Economic and financial** • Public tender criteria. Too limited funding for design relative to implementation scoring criteria in public tenders; companies have to subsidise design phase; no possibility to change the market, rather than complain about tender criteria. Design funding only a few % of contract. Relative to interior design and design in architecture. • Decreasing funding for park maintenance in favour of unknown political priorities **Knowledge and innovation** • Lack of landscape designers during design phase • Certification schemes lacking ecological design principles. Certification is no guarantee of blue-green space quality; open to manipulation (e.g. 1000m2 of native plants not connected to other nature • Too much emphasis on installation "wow effect", too little maintenance. Projects are not maintained and don't function • Lack of belief in NBS technologies in private sector, e.g. "green roofs leak" • Certification ahead of ecological function. LEAD, BREEAM – many buildings certified – many solutions used which are not needed and don't give any real improvement; only used to achieve higher certification • Traditional green versus NBS. Traditional park landscapes, with too many trees, too few meadows. Innovation to cut 20-30% trees in a park. **Cooperation** • Public-private cooperation difficult with Communist past. Fear of corruption.

	• Long implementation cycle for parks. For ex. Karkowski Park design to construction took 15 years. Irdana Park designed 20 years ago still not completed. • Public consultations excessive; discussion at every level with public administration ecologists – species conservation protests;
Enabling policymix	
Regulatory	• Maximum stormwater runoff requirements on plot • Green points system. Weighting to reflect human needs. Need green, but not on roof. – e.g. Munich city regulation - biological area must be at the human level. Green for the people. Trees-shade, meadow-plants-insects • Decrease obligatory regulations - need for more trust • 'Biologically active area' requirement. Ordinance of the Minister of Infrastructure and Construction (dated November 14, 2017, effective from January 1, 2018) • Control of works and compliance monitoring of the biologically active surface
Economic	• Transparent tendering processes promoted by the EU in Poland, but not equal across Europe. Much improved in the last 20 years; https://redflags.integritywatch.eu/ • Subsidies for green roofs. E.g. MyWater. Small subsidy, initially only for water retention, then expanded to green roofs. https://livingarchitecturemonitor.com/articles/national-and-local-regulations-and-programs-are-stimulating-the-green-roof-industry-in-poland-fa22 • Prizes for using nature-based solutions - useful in marketing and PR of developer selling housing - connect to regulations- Awards work better than certification.
Knowledge, communication, innovation	• Exchange of ideas – socialization . Small annual conferences for public administration staff;
Cooperation	• Collaboration between designers-activists • Negotiated area development. Shift from private sector demanding infrastructure from public authorities in developments, to public sector requiring co-funding of parks, schools etc.

9.2.6. Chemnitz, Germany

Policy-related Barriers	**Regulatory** • Lack of greening norms in building plans • Difficulty convincing investors, entrenched views **Economic and financial** • Lacking funding for maintenance **Knowledge and innovation** • prevent price dumping, do not have to choose the cheapest)
Enabling policymix	
Regulatory	• Update building code
Economic	• Funding programs for NBS ○ Funding for subcontracting biodiversity experts • Procurement guidelines giving equal weight to quality as to price • Certification of specialist companies
Knowledge, communication, innovation	• Changing public perceptions of NBS aesthetics: un-managed flower meadows on municipal land • Public consultation ; • Technical extension to private owners on management of flower meadows • Political belief in findings. Education about NBS, thematic workshops (building department heads with planners and investors) • Demonstration / lighthouse projects • Knowledge/Management practices of subcontractos
Cooperation	• Promoting flower meadows on land managed by other municipal agencies, e.g sports (Naturstadt Chemnitz) • Jointly sponsored workshops

9.3. Workshop Reports on policy instruments for NBS in the private sector

Edited workshop reports

9.3.1. Workshop CBIMA, Costa Rica

Greening of the city: The case of Pocket Parks

Summary of recommendations policymix enabling pocket parks on private land

The following table summarises the workshop policy instrument recommendations for enabling pocket parks on private land in CBIMA.

Legislative, regulatory, strategic instruments	**Knowledge, communication, innovation instruments**
• Regulation Plan – • Municipal Building Code • Commercial use concessions • Regulation for pocket parks • Pocket park typology	• Community consultation (live, virtual) • Adopt a pocket park campaigns • Social networks and fora • Cadastre inventory of pocket park potential • Multi criteria GIS spatial prioritization
Economic and financial instruments	**Instruments based on agreements and cooperation**
• Municipal utility discounts • Business sponsorship • Expropriation • Building permits - higher density concession • Tax on disused land • Payments for urban ecosystem services	• Public-private agreements for park maintenance • Public-private agreements ceding land to municipality • Local development associations • Agreements Roads Authority sidewalks • Foreign aid funding for NBS and green economy projects (GIZ, IDB, UNDP)

Resumen y Sistematización del Taller
Reverdecimiento en la ciudad: El caso de los parques de Bolsillo

Fecha: 2 de marzo de 2023
Lugar: Barrio

Agenda:

Hora	Actividad	A cargo de
8:30 a.m. a 9:00 a.m.	Desayuno	
9:00 a.m.	Bienvenida e introducción al taller	**Marcela Gutiérrez**, UNA
9:10 a.m. a 9:30 a.m.	**Presentación conceptual:** Parques de Bolsillo	**Erika Calderón**, INVU **Emperatriz Odeñana**, Municipalidad de San José
9:30 a.m. a 10:15 a.m.	**Presentación:** Instrumentos costarricenses que favorecen la implementación de SBN en terrenos privados	**José Manuel Retana**, Municipalidad de Curridabat **Miguel Luna**, Municipalidad de Montes de Oca **Daniela Harb**, Municipalidad de San José
10:15 a.m. a 10:30 a.m.	Preguntas y comentarios	Todas las personas participantes
10:30 a.m. a 10:40 a.m.	Receso	
10:40 a.m. a 11:40 a.m.	**Presentación:** Reverdecimiento de Oslo, Noruega gracias a la implementación de SNB	**David Barton**, NINA
11:40 a.m. a 11:50 a.m.	Preguntas y comentarios	Participantes en general
12:00 m.d. a 1:00 p.m.	Almuerzo	
1:00 p.m. a 1:20 p.m.	**Presentación:** Barreras y oportunidades en su implementación de SBN	**David Barton**, NINA
1:20 p.m. a 1:30 p.m.	**Presentación:** Propuesta mapas Parques de Bolsillo	**Kimberly Mondragón**, UNA
1:30 p.m. a 2:30 p.m. 30 minutos de discusión por tema	**Conformación de grupos de trabajo para discusión:** 1. Conceptualización Parque de Bolsillo 2. Identificación de instrumentos de política sobre SBN	Todas las personas participantes
2:30 p.m. a 3:00 p.m.	Discusión y reporte de trabajo grupal	Todas las personas participantes
3:00 p.m. a 3:15 p.m.	Resumen del trabajo del día	**David Barton**, NINA
3:15 p.m. a 3:30 p.m.	Cierre del taller	**Erika Calderón**, INVU
3:30 p.m. a 4:00 p.m.	Café	

Trabajo en grupos:

Se dividió al auditorio en cuatro equipos de trabajo para analizar dos temas, por un lado, la conceptualización de lo que se espera que sean los parques de bolsillo en nuestro país, y adicionalmente, se trabajó en la identificación de instrumentos de política sobre soluciones basadas en la naturaleza y las barreras existentes para su implementación.

Integración de los grupos de trabajo:

Grupo 1

- Jenaro Campos
- Jetty Picado
- Daniela Harb
- Francisco Chavarría
- Samantha Montoya

Grupo 2

- Freddy, SINAC
- Miguel Luna, Muni Montes de Oca
- Josselyn Umaña, Muni Montes de Oca
- Keily Mena, Muni Alajuelita
- Karla Fernandez, Muni Alajuelita
- Luis Fernando Cambronero, Muni Alajuelita

Grupo 3

- Natalia Gamboa Alpízar
- Emperatriz Ordeñana Ayerdis
- Gloria Muñoz González
- Erika Calderón Jiménez

Grupo 4

- Sofia Richmond Blanco
- Ana Lobo Calderón
- Marcela Vega Ruiz
- Mariana Rojas Fernández

Grupo 5

- José Manuel Retana
- Tirsa Aguirre

En relación con el primer tema, se preguntó: Especifique los elementos que se deben de tomar en cuenta a la hora de conceptualizar un parque de bolsillo en CBIMA

Para el análisis se aportaron los siguientes criterios y se obtuvieron las siguientes respuestas:

1. **Participación de vecinos en el diseño**

Grupo 1: Indican que se debe conocer el carácter de la comunidad y la población beneficiada. También comentan que consideran importante que exista un diseño participativo para que se de apropiación. Ejecución también participativa, por ejemplo: a la hora de realizar una plantación.

Grupo 2: Comentan sobre la importancia de la participación de vecinos en el diseño, para generar apropiación, responsabilidad, comités comunitarios, acciones de mercadeo y exposición de marca para padrinos del parque.

2. Múltiples tipos de usuarios

Grupo 1: Proponen realizar un programa de concientización comunitaria previo a la implementación del proyecto, además de centros educativos y comercio.

Grupo 2: Estiman que deben existir múltiples tipos de usuarios, parques inteligentes, red de WIFI limitada, accesibilidad, aceras permeables, cumplirse con la Ley N° 7600, pasos peatonales, urbanismo táctico, usuarios de bus y tren (mapas, horarios, estaciones de paradas) pizarras informativas.

Grupo 3: En el caso se San José, que fue donde se ubicaron los casos analizados, se comentó que si bien tienen muchos parques públicos, cerca de 478, aun así, hay lugares con alta densidad poblacional y que no cuentan con espacios de este tipo. Por lo que, este es un criterio relevante.

Grupo 4: En relación con los usuarios, se habla de la importancia de que los parques de bolsillo sean amigables con las personas adultas mayores y niñez, población en condición de calle y en general que sean sitios inclusivos, cumplimento de ley para fácil acceso.

3. Diseño para servicios ecosistémicos

Grupo 1: Se debe mapear la presencia de otras áreas verdes cercanas al sitio que se proponga a intervenir. También expresan que el diseño de servicios ecosistémico no deben de interferir con la seguridad o favorecer el vandalismo. Por ejemplo: materiales de bajo costo, no re-vendibles en el mercado negro y de bajo mantenimiento.

Grupo 2: Comentan sobre el Diseño para servicios ecosistémicos espacial, conectividad biológica, plantas que soporten el alto tránsito, y la captura de CO2, pintura relajante en murales, mallas naturales (paredes vivas) como caña india, pringo de oro.

Grupo 3: Se dice que la idea es convertir en sitios en desuso en lugares más caminables y seguros. Son sitios propicios para realizar murales y paredes verdes, general conectividad biológica, mitigación de islas de calor y convertir de esta forma a los parques de bolsillo como unos oasis dentro de la ciudad.

Se habla de la importancia de tratar de fijar carbono en estos sitios.

Grupo 4: Comentan sobre la relevancia de tomar en cuenta que le gustaría a la población, el tiempo que va a invertir en ese espacio, personas usuarias, y como analizaron el caso de la propiedad en avenida segunda, se habla además, sobre el hecho de que la cercanía a museos puede haber turismo internacional.

Hacer una matriz de origen – destino y generar acuerdos y contratos para tener claridad con los dueños de las propiedades privadas.

Si son terrenos que cuentan con servicios y comercio pero no vivienda debe de otorgar un espacio donde descansar que sea una opción de regeneración verde; que aporten sombra, paredes verdes, información de educación ambiental, recolección de agua de lluvia, controlar inundaciones, polvo y basura. Regeneración hidrológica.

Identificación o concepto cultural que permita disfrutar visualmente de algún tipo de educación cultural, alguna historia costarricense. Creando una conexión con los museos (ofrecer información).

4. Seguridad y vandalismo

Grupo 1: Realizar un estudio de perspectiva sobre la seguridad situacional, según su entorno.

Grupo 2: Para dotar de seguridad y evitar el vandalismo se pueden apoyar en la iluminación, colocar botón de pánico, videovigilancia, interés del dueño, interés privado (para el caso del terreno en las cercanías de la NUMAR).

Grupo 3: La seguridad se logra incorporando más gente, es decir aprovechar a los que ya están alrededor y generación de emprendimientos

Los parques propuestos deben ser sitios de encuentro comunitario, donde las personas pueden aprovechar para conocerse, hablar, descansar, hacer negocios, entre otros.

Grupo 4: Estiman que no es adecuado espacios cerrados (brinda cierta seguridad el que se aun espacio cerrado) y que existe falta integración de ese espacio con el entorno.

5. Materiales apropiados

Grupo 1: Comentan que el diseño depende de los años a utilizarse, un lugar de paso y por ende los materiales a utilizarse. Por ejemplo: banca sin respaldar. Se habla de la importancia de no utilizar materiales que se puedan revender.

Grupo 2: Materiales apropiados que eviten el vandalismo, como lo son la madera plástica, bambú, madera teca curada, mobiliario de larga duración.

Grupo 4: Materiales resilientes SBN y duraderos y de poco mantenimiento.

6. Fuentes de recursos y financiamiento

Grupo 1: Definir su temporalidad o permanencia según negociaciones o incentivos fiscales con persona o empresa propietaria.

Como fuentes de financiamiento se habla de DINADECO, Asociación de Desarrollo Integral de Barrio Cuba, Municipalidad de San José y el sector comercial circundante (se permite donar 5% de su Renta; Leonisa o Numar y Empresarios de Buses).

Se podría trabajar con programa PROPAN del Ministerio de Trabajo.

Grupo 2: Apuestan por los convenios tripartitos, integrados por: Gobierno Local, empresa privada, comunidad.

Grupo 3: Los incentivos para esos espacios privados pueden ser con la exoneración del pago de los servicios e impuestos territoriales, comparándolo con el alcance y beneficios que va a generar a la población durante el tiempo que dure el parque de bolsillo.

Se habla de que conviene que sean sitios de dimensiones pequeñas para que la inversión en el espacio no sea costosa.

Grupo 5: Se dice que en el caso de Curridabat no se podría hacer por ser terrenos privados y en esos criterios no interviene la municipalidad. El Gobierno Local podría facilitar el conocimiento para que manejen los espacios.

7. Otros conceptos

Grupo 1: Comentan que es necesario de previo hacer el estudio de quien es la persona o empresa propietaria del bien a intervenir y si se han pagado tributos.

Uno de los fines debe ser dotar de accesibilidad a la ciudad y no se debería excluir que hayan otras actividades en el terreno.

También hablan sobre la posibilidad de realizar un convenio con el MOPT que permita trabajar en remanentes viales y se debe definir el rol de mantenimiento a la Municipalidad o al barrio organizado, trabajo comunitario, etc.

Grupo 2: Comentan sobre el diseño de paradas verdes para autobús, área adecuada para mascotas (basureros de desechos).

Grupo 3: Permite tener base para implementar eventualmente otras figuras como la expropiación o la compra directa. Se puede llegar a materializar como un convenio público privado o un convenio de cooperación entre entes públicos.

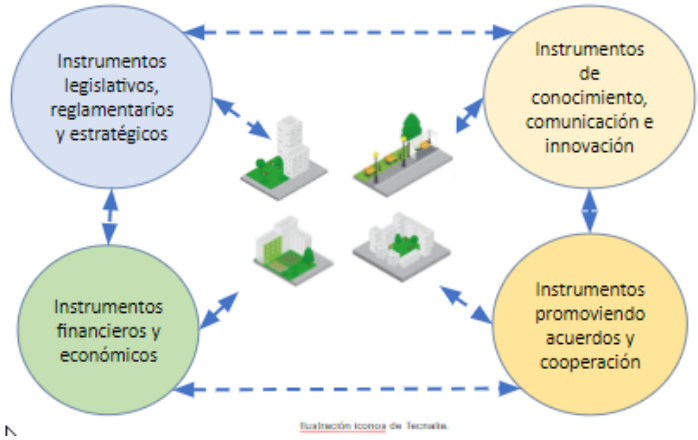
Se sugiere que la administración sea municipal y se sugiere que sean elementos de infraestructura no permanente para trasladar en caso de que el propietario lo requiera

Como requisito podría considerarse que sea un área de paso, otros criterios pueden ser la eliminación de botaderos clandestinos y darle prioridad a los sitios sin espacios públicos verdes o con escasos espacios de este tipo.

Instrumentos de política sobre soluciones basadas en la naturaleza

? Cuáles instrumentos de política pueden promover parques bolsillo en CBIMA?

El siguiente cuadro resume barreras y instrumentos para los 5 grupos.



Instrumentos	Propuestas por los grupos de trabajo Barrio Cuba*
Legislativos, reglamentarios estratégicos	• Reglamentos de Desarrollo Urbano, • **Plan Regulador** • Plan de Trama Verde • Reglamento de Parques de bolsillo • Código Municipal • Convenio de uso (uso de suelo) establecer años de uso (contrato) • Reglamento de incentivos tributarios en base a la Ley • Expropiación
Económicos y financieros	• Padrinos comerciales • a exoneración del pago de los servicios e impuestos territoriales
Conocimiento	• Participación, consultas sociales

Comunicación Inovación	● Participación comunitaria, Iglesias, fundaciones. ● Programas de adopción de parques (ejemplo: adopte una carretera) ● Reuniones de consulta presenciales y virtuales. ● Creación de foros por medio de QR. ● Redes sociales, formularios.
Acuerdos y cooperación	● Alianzas publico privadas ● Convenios con MOPT, paso peatonal para empresa como Leonisa. ● Convenio Específicos con Bienes Inmuebles ● Proyectos de financiamiento externo internacional (GIZ, TEVU) ● Cooperación BID

*Los instrumentos **en negrilla** fueron propuestos por 2 grupos o más.

Instrumentos	**Propuestas por los grupos de trabajo Avenida Segunda**
Legislativos, reglamentarios estratégicos	● Definir claramente las tipologías que pueden existir en terrenos públicos y privados. ● Ley de comercio al aire libre dar permiso a los que tiene patentes para que puedan equipar bancas mesas en espacio publicos ● (No se pueden hacer convenios porque es propiedad privada.) ● (Las municipalidades no pueden promover los parques del bolsillo porque el propietario tiene deberes (mantener el espacio limpio, cerrado,etc)) >> necesidad de un **código para parques de bolsillo** ● **permisos de uso a través de reglamentos de comercio**
Económicos y financieros	● Cesión de derechos de edificación (más pisos) ● Impuesto al suelo vacante / Cobro Municipal por lotes o terrenos ociosos ● Pago de servicios ecosistémicos urbano. ● **reducción de impuesto** sobre el suelo a cambio de mejoras
Conocimiento Comunicación Inovación	● Catastro ● Instrumentos de inventario para conocer cantidad de propiedades privadas que estas ociosas ● Cruce de información geoespacial para ver usos, propietarios etc.
Acuerdos y cooperación	● asociaciones de desarrollo ● Acuerdo de privados.mantenimiento al espacio. ● Hacer una sesión de espacio a la municipalidad

*Los instrumentos **en negrilla** fueron propuestos por 2 grupos o más.

9.3.2. Workshop Envigado, Colombia

Summary of recommendations for policymix enabling NBS on private land in the peri-urban area of Envigado.

The following table summarises the workshop discussions on policy instrument recommendations for enaling forest conservation on private land in peri-urban areas of Envigado. The instrument list is an interpretation by David N. Barton, NINA, of the Relatoría from the meeting and a review of SILAPE related policy and planning documents to complement the information in the minutes.

Legislative, regulatory, strategic barriers	**Knowledge, communication, innovation barriers**	**Economic and financial barriers**	**Barriers to agreements and cooperation**
• Lacking control of actions under PES for soil protection	• **Insufficient field presence of municipality** to monitor land use change and compliance with SILAPE conservation area requirements	• Low interest by farmers in accessing available municipal property tax PES • Relatively low property tax rebate compared to land values and total tax rate • **High opportunity return to construction and renting of housing** • Inheritance options and property fragmentation	• Differences in municipal conservation and land use policies

Overview of policy instruments and business cases for enabling restorative NBS

Legislative, regulatory, strategic instruments	Knowledge, communication, innovation instruments	Economic and financial instruments	Instruments based on agreements and cooperation
• Sistema Local de Areas Protegidas de Envigado - SILAPE (2016)# • Landcover change prohibition - suelos de protección (2019)# • EIA compensation measures# • Protection of watercourse buffer areas# • Urban development plan – mitigation measures* • Green norm for construction*	• Mapping of ecological corridors# • Mapping of wildlife roadkill # • Environmental education # • Investment in better monitoring of landuse change*	• Hydrological PES: Masbosque BancO2agua # • Municipal property tax exemption: PES (1) forest soil protection, (2) agricultural soil protection # • Tax on property parcelization # • Keep >1% of municipal income for hydrological PES within the municipality* (not Corantioquia/ MasBosques)	• Mesa del Sur – inter-municipal conservation network* • Participatory monitoring of biodiversity #

Actual instrument in place (#), potential new instrument (*)

<inserted pdf of original workshop report>

9.3.3. Workshop Portoviejo, Ecuador

Summary of minutes

Summary of recommendations for policymix enabling NBS in the private sector

The following table summarises the workshop findings from group 2 “smart green” on policy instrument recommendations for enabling private sector urban NBS.

Legislative, regulatory, strategic barriers	**Knowledge, communication, innovation barriers**	**Economic and financial barriers**	**Barriers to agreements and cooperation**
• Lack of norms for protection and restoration of ecosystems for private sector • Environmental objectives not articulated in land use planning • **Existing national norms not translated into local regulation and implementation guidelines**	• lack of public knowledge about NBS. • Lack of interest by private sector, and low investment. • **Academic research on NBS is not geared to solving municipal problems, and does not target the private sector.** • Communication not regarded as a governance instrument • Lacking environmental media channels	• Lacking financial instruments at national level	• ck of public knowledge about NBS. • Lack of interest by private sector, and low investment. • **Academic research on NBS is not geared to solving municipal problems, and does not target the private sector.** • Communication not regarded as a governance instrument

			• Lacking environmental media channels
Legislative, regulatory, strategic instruments	**Knowledge, communication, innovation instruments**	**Economic and financial instruments**	**Instruments based on agreements and cooperation**
• Regulations that facilitate economic incentives	• **NBS Project bank, with targeted projects** • Corporate Social Resonsibility reporting • Create a communication platform to inform public of norms, projects	• **Public procurement, based on a SBN project bank** • NBS business cluster • NBS Prizes • Certification schemes	• Collaboration with universities geared towards nature-based solutions for the private sector

Memoria Técnica

Evento: Taller Inversión Privada en Soluciones Basadas en la Naturaleza
Taller: Identificación de oportunidades y retos para la inversión en SBN.
Fecha: Jueves 16 de Marzo
Lugar: Asociación de Municipalidades del Ecuador (AME) Auditorio
Ciudad: Portoviejo, Manabí.
Participantes:
Interlace: Eco. David Barton. NINA
YES Innovation: Grace Yépez y Nicolás Salmon
Organizadores: Liliana Rendón, Luis Ochoa
Asistentes:
Williams Castro – Manavision
Deniseé Garcia – IGHTHION
Leonardo Linzán – GADM PORTOVIEJO
Marco Santos – COMARVFC
Boris Vera – Asociación de Profesionales de Gestión de Riesgos
Ana Rousseaud – GIZ
Erik Gamelos – GIZ
Gabriel Menzona - GADM PORTOVIEJO
Janeth Alarcón - GADM PORTOVIEJO
María Cedeño - GADM PORTOVIEJO
Irene Cedeño - GADM PORTOVIEJO
Angélica García – GADM PORTOVIEJO
Oscar Muñoz - GADM PORTOVIEJO
Carlos Sanches – EL DIARIO
Cristina Cedeño - GADM PORTOVIEJO
Luis Ochoa - GADM PORTOVIEJO
Ricardo Muñoz – INSTITUTO TECNOLOGICO PAULO EMILIO MACIAS
Vanessa Loor – Asociación de Profesionales en Gestión de Riesgos
Grace Yepez – YES INNOVATION
Nicolas Salmon – YES INNOVATION

Overview of policy instruments and business cases for enabling restorative NBS

Rubén Daza – CIAM
Pamela Cobo – CIAM
Malina Saltos - GADM PORTOVIEJO
Michael Garretty – Fundación Rio Verde
Felix Vaca Jaime - GADM PORTOVIEJO
David Barton – NINA
Doménica Vázquez - GADM PORTOVIEJO
Nelson Bravo - GADM PORTOVIEJO
Miguel Estevez - GADM PORTOVIEJO
José Palay – UTM
Ligia Vera - GADM PORTOVIEJO
José Alberto Salazar - GADM PORTOVIEJO
Favio Ruilova – INIAP
Liliana Rendón - GADM PORTOVIEJO

Resumen:

El día jueves 23 de Marzo, se llevó a cabo el Taller “Inversión Privada en Soluciones Basadas en la Naturaleza”, para dar a conocer las oportunidades de inversión en restauración ambiental, y cómo articularlas al “Plan Especial Corredor del Río Portoviejo”.

El taller estuvo estructurado en dos partes; la primera, en formato de conferencias acerca de los conceptos básicos de las “Soluciones Basadas en la Naturaleza”, y las acciones que se llevan a cabo por el Municipio de Portoviejo; la segunda, un espacio participativo donde se respondieron de manera dinámica dos preguntas para generar debate: “¿Qué barreras se identifican para invertir en SBN?; y ¿Qué incentivos o estrategias favorecerían a las SBN?. A manera de reflexión del taller,

Para la selección de invitados, se tuvo en cuenta los actores que podrían interrelacionarse como los colegios de profesionales, cámaras de producción y asociaciones de profesionales en materia de ambiente. Finalmente, se contó con la presencia especial de David Barton por el Instituto Noruego de Investigación Ambiental, quien presentó ejemplos concretos de articulación entre la Planificación Urbana y las SBN.

Introducción y bienvenida al Taller Inversión privada en SBN, para Portoviejo.

Felix Jaime Subdirector, de Planificación Urbanística y Territorial del GAD Municipal de Portoviejo

La ciudad enfrenta importantes retos ambientales por la degradación del ecosistema y que actualmente, se realizan grandes esfuerzos para mitigar los riesgos por inundaciones y deslizamiento a los que está expuesta la población más vulnerable. También enfatizó en la oportunidad del encuentro, para desarrollar mecanismos que incentiven la inversión en "Soluciones Basadas en la Naturaleza", por parte del sector privado; y para ofrecer en un futuro cercano bienes o servicios que contribuyan en materia ambiental.

- **CORREDOR DEL RÍO PORTOVIEJO**

En su intervención comentó que el río Portoviejo atraviesa a toda la ciudad de Portoviejo, actualmente existe actividad agrícola en sus orillas, lo cual desata un sin número de afectaciones como la deforestación y estrangulamiento del cauce del río. La deforestación también se da por la presión inmobiliaria, incrementando los asentamientos humanos en riesgo por inundación. Además, comentó que las descargas clandestinas y la acumulación de sedimentos son unas de las causantes de la poca vinculación del río con la ciudad.

PLANIFICACIÓN URBANA

El PLAN ESPECIAL CORREDOR DEL RIO pretende intervenir una longitud de 44km. Regenerando el ecosistema del río Portoviejo repotenciando el espacio público incrementando así el Índice Verde Urbano (IVU).

ACCIONES

Actualmente se encuentra en elaboración el PLAN ESPECIAL CORREDOR DEL RIO, que es la suma del El Plan del Corredor Río Portoviejo (2015) y el Plan Maestro Río Portoviejo (2017) que presentan una visión de cómo el Río pasa por la ciudad. Un parque corredor acompaña al río, reduciendo inundaciones y sumando calidad de vida para la ciudad de Portoviejo.

Se está gestionando los parques en el Corredor del Río, que buscan integrar de manera continua y fluida la vida social y comercial de Portoviejo con su río. Además de reducir el riesgo de inundaciones, la propuesta provee nuevas oportunidades recreacionales, aumenta la seguridad a peatones y ciclistas, y mejora la experiencia comercial y residencial adyacente al río.

También comentó que mediante la Articulación de la Cooperación Internacional GIZ y la conformación de 5 municipalidades de la provincia de Manabí, se ha iniciado el proceso para el establecimiento de la "Mancomunidad"; que busca la generación de políticas para recuperar y reconstruir el ecosistema del Río Portoviejo. Desde su inicio hasta su desembocadura.

Por otra parte también se ha desarrollado el proyecto de Sistema de Alerta Temprana para prevenir posibles catástrofes materiales y humanas, fruto de las inundaciones por las crecidas del río Portoviejo.

De acuerdo a lo expuesto por Felix Jaime el parque Las Vegas es el referente actual y comprobado de que la aplicación de SBN mitigan un sin número de problemáticas dentro de la ciudad. El Parque fue diseñado para retener el aumento del caudal de agua del río en sus playas inundables.

Parque "Las Vegas II"

Ubicado a 150 metros del Parque Central, es un sitio privilegiado para el acceso de la población, que completará la regeneración urbana del meandro del Río. Hace algunos años era un sitio baldío, desprovisto de cualquier tipo de infraestructura o servicios a la población.

Aprovechando la cercanía al centro de la ciudad, en la parte Norte del parque, se propone un desarrollo urbanístico inmobiliario, con la construcción de edificios que pueden albergar un conjunto de servicios como hoteles, departamentos, oficinas, servicios públicos y comercio. Dispuestas alrededor de una plaza multifuncional, estas construcciones que consolidan la cuadra entre las calles Ricaurte, Chile y Quiroga, propician una oportunidad para el desarrollo económico y turístico de la ciudad y, a su vez, conforman una transición desde la urbe consolidada hacia el corredor ecológico del Río Portoviejo.

- **EJEMPLOS INSPIRADORES SOBRE SBN EN EL SECTOR PRIVADO**

David Barton, Economista Ambiental

En su intervención comentó que su tarea dentro Interlace es evidenciar cuales son las combinaciones de instrumentos políticos que pueden promover las Soluciones Basadas en la naturaleza en predios privados en el casco urbano o periurbano en las 6 ciudades participantes, las cuales son: Portoviejo, Envigado, Corredor Biológico Interurbano Río Maía Aguilar, Granollers, Krakowska y Chemnitz.

Barton comentó que los grupos de instrumentos que se pueden promover como municipalidad son: los legislativos, reglamentarios y estratégicos como la planificación urbana; los financieros y económicos; los que generan conocimiento y facilitan la comunicación e innovación; y los que son basados en acuerdos o en cooperación.

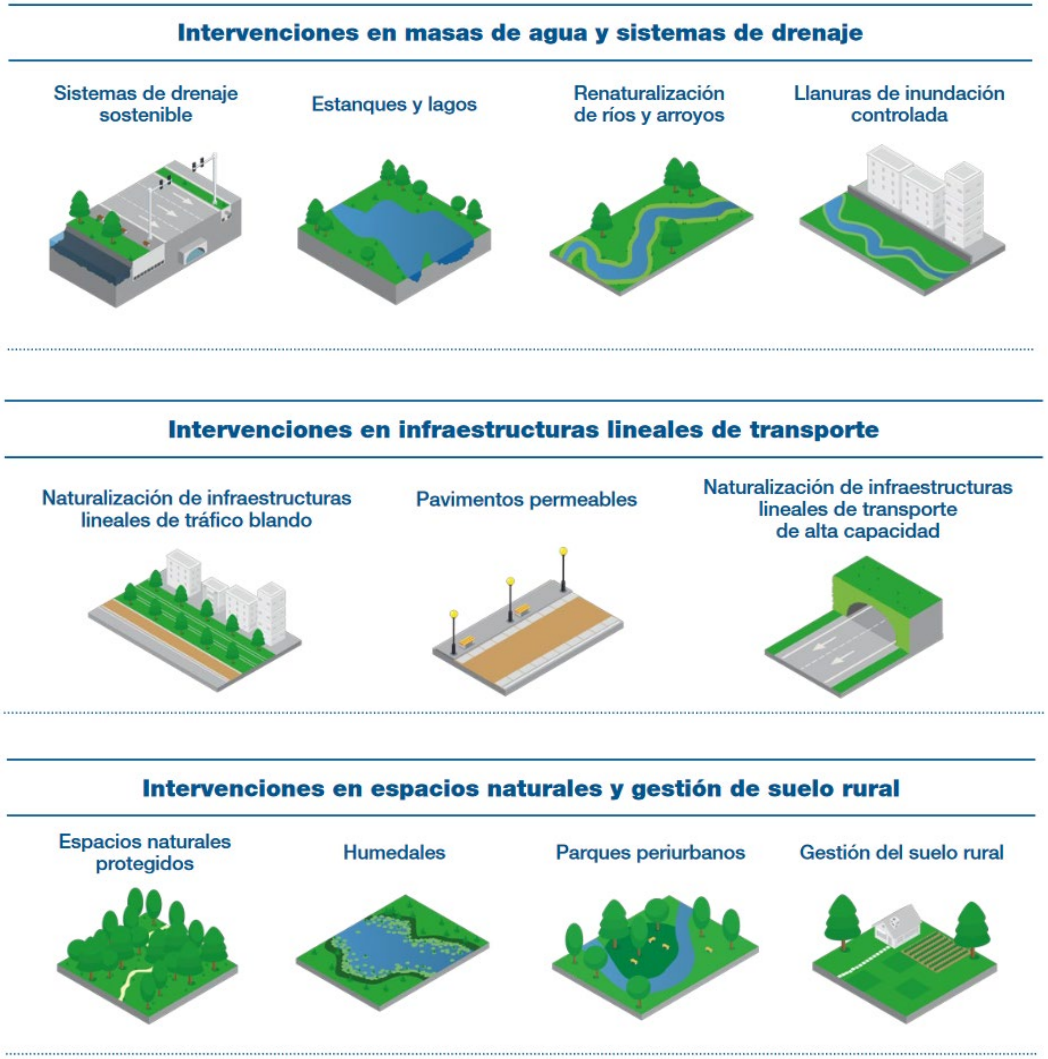
David también hizo referencia al reto que atraviesa el proyecto, ya que cada ciudad esta trabajando en diferentes zonas de la parte urbana o peri urbana y los instrumentos o SBN que se pueden aplicar son muy diferentes.

Barton en su intervención explicó de forma genérica, qué son las SBN en el caso urbano, y concluyó que es hacer a la ciudad más permeable, con texturas de infraestructura verde y azul.

"Las SBN son todas las acciones que se apoyan en los ecosistemas y los servicios que estos proveen, para responder a diversos desafíos de la sociedad como el cambio climático, la seguridad alimentaria o el riesgo de desastres" UICN.

Ejemplos de intervenciones de SBN en el espacio público (Fuente: Tecnalia)

Overview of policy instruments and business cases for enabling restorative NBS



Ejemplos de empresas que invierten en SBN con un fin de restauración ambiental:

Blackwaters Engineering – Costa Rica

Empresa especializada en soluciones basadas en la naturaleza para manejo de escorrentía, basadas en diseños fundamentados en avanzados metodologías de levantamiento de datos, modelaje, diseño Blackwaters ofrece 15 tipos de soluciones basadas en la naturaleza para manejo de escorrentía, entre esos : control de inundación, obras de mitigación de escorrentía, Techos verdes.

Parque H: Parque de lluvia Belén, Costa Rica

Se encuentra en Cariari, en la municipalidad de Belén, Costa Rica. El Parque H fue contratado por el Departamento de Urbanismo, Municipalidad de Belén en una licitación pública en 2021.

El proyecto Parque H resuelve las necesidades de manejo de escorrentía por el proyecto condominios residencial y disminuye la escorrentía a la cuenca del Río Virilla, también aseguró Barton que provee habitat para vida silvestre en área urbana.

Recomendaciones sobre instrumentos para apoyar el sector SBN en Costa Rica.

Instrumentos legislativos, reglamentarios y estratégicos	**Instrumentos financieros y económicos?**	**Instrumentos de conocimiento, comunicación e innovación**	**Instrumentos basados en acuerdos o en cooperación**
Reforma del Código hidrológico de Costa Rica.	Reducción de cargos sociales para proyectos de Soluciones basadas en la Naturaleza.	Medidas para concientización de políticos y planificadores sobre manejo de escorrentía municipales.	Colaboración privado-público en investigación y desarrollo de soluciones basadas en la naturaleza.
Reglamento municipal de mínimo período de ritorno requerido para obras de drenaje sostenible (SuDS) en propiedad privada	Reducción en impuestos de propiedad para dueños implementado obras de drenaje sostenible		

Ingeaguas Fuente de Vida- Colombia

La empresa tiene más de 20 servicios entre esos, sistemas de tratamiento para la recirculación y reúso de aguas residuales, consultoría y trámites ambientales, alquiler de equipos

Ecoplantas - Tratamiento de aguas de lavado de vehículos para recirculación y reúso

Es una aalternativa tecnológica a humedales con procesos de tratamiento basados en insumos y procesos naturales con uso mínimo de químicos como procesos físicos de oxidación con aire sedimentación gravitacional, dispositivos hidráulicos para propiciar los procesos de tratamiento: flujos hidráulicos tipo serpentín, circulares y torbellino , también el uso de peróxido de hidrógeno como oxidante químico produce CO2 y O2 en su reacción con la materia orgánica de la mano de la biotecnología para realizar la degradación de la materia orgánica todo esto pasa por lechos filtrantes naturales como son las gravas de canto rodado (provenientes de quebradas), la arena sílice, la zeolita (aluminosilicato) y el carbón activado de cáscara de coco

Recomendaciones sobre instrumentos para incentivar tecnología de reúso y recirculación de aguas

Instrumentos legislativos, reglamentarios y estratégicos	**Instrumentos financieros y económicos?**	**Instrumentos de conocimiento, comunicación e innovación**	**Instrumentos basados en acuerdos o en cooperación**
Norma en Salud Ocupacional de los operarios encargados del lavado	Exenciones tributarias y beneficios ambientales	Programas de investigación apoyados por el estado, con emparejamiento con PMEs para promover innovaciones comerciales en SbN	Facilitar acuerdos de colaboración tripartitas municipalidad-universidad-PMEs.
Norma de reúso y recirculación	Cobro por costos de uso de infraestructura pública/municipal		

TALLER: INVERSIÓN PRIVADA EN SBN | Portoviejo, 16 marzo del 2023

GRUPO 1: Desarrollo de la actividad agrícola		
INSTRUMENTOS	**BARRERAS**	**INSTRUMENTOS/INCENTIVOS**
Instrumentos legislativos, reglamentario y estratégicos	- La política intersectorial no está alineada a la actividad productiva sostenible, representa una barrera para incentivar la actividad agroecológica. - No se cuenta con instrumentos normativos para desarrolla las inversiones en el sector.	- Revisar y modificar la normativa para generar opciones en la reglamentación.
Instrumentos Financieros y Económicos	- No se encuentra instrumentalizado las políticas que orientan a la producción limpia. - No existen incentivos tributarios.	- Crear incentivos tributarios. - Crear los mecanismos para el seguro agrícola. - Establecer mecanismos para incrementar un valor agregado a los productos agroecológicos. - Establecer mecanismos adecuados en toda la cadena productiva que permitan incorporar NBS.

		- Reducir la tasa de pago en la transferencia de riesgos "Pólizas de riesgos"
Instrumentos basados en acuerdos o en cooperación	- El sector productivo no cuenta con una estructura asociativa, lo que dificulta la obtención de beneficios financieros, entre otros.	- Creación de una agenda de investigación productiva, que permita la coordinación y articulación entre los actores claves. - Crear nuevos centros de acopios. - Promover la asociatividad del sector.
Instrumentos de conocimiento, comunicación e innovación	- No existen capacitaciones en nuevas técnicas para el mejoramiento de actividades productivas. - Existen pocas líneas de investigación; y falta de acceso a la información. - No existen capacidades locales construidas.	- Establecer estrategia de educa comunicacional. - Desarrollar las capacidades locales, sobre producción sostenible y aplicación de las buenas prácticas agrícolas. - Promover proyectos pilotos destinados al desarrollo de actividades sostenibles.
IDEA GENERAL PARA IMPLEMENTAR SBN: **FINANCIAMIENTO E INCENTIVOS TRIBUTARIOS A NIVEL CANTONAL.**		

MESA 2.
SMARTGREEN
CONSULTORA
ENFOQUE: Municipal
PARTICIPANTES: Funcionarios municipales

GRUPO 2: SMARTGREEN		
INSTRUMENTOS	**BARRERAS**	**INSTRUMENTOS/INCENTIVOS**
Instrumentos legislativos, reglamentario y estratégicos	No existe una ordenanza o normativa que incentive la actividad de "protección o regeneración de ecosistemas", por parte de la empresa privada. Los componentes en materia ambiental no están articulados, con las estrategias de planificación del territorio. Los criterios con los que se construyen los instrumentos de planificación y ordenamiento del suelo urbano, son urbanísticos y no ambientales. Por ende, existen vacíos o falta de articulación entre los . Por ejemplo, existen normas nacionales, pero no reglamentos locales o guías de aplicación locales. La barrera protaganista, en materia de fomentar la inversión en materia ambiental, es la política multisectorial. Ya que, los gobiernos actuan y solicitan financiamiento, según sus competencias articuladas al estado central.	El desarrollo de una norma que contenga los siguientes aspectos: - Banco de Proyectos SBN, con la problemática debidamente delimitada. El banco de proyectos, puede ser organizado como un modelo de gestión integral. - Contratación de obras públicas: Incluir un rubro destinado la solucionar una problemática definida del Bando de Proyectos SBN. - Reglamentos para la aplicación de incentivos económicos.

	En continuo cambio de política, en materia ambiental, representa una barrera para la sostenibilidad de los proyetos a largo plazo. Ya que, las distintas visiones de los "Actores tomadores de decisiones" priorizan los sectores a desarrollar. -	
Instrumentos Financieros y Económicos	Las inversiones para el fomento a la regeneración de ecosistemas, no es prioridad desde el estado nacional. Por lo que, no existen instrumentos financieros o económicos para desarrollar el mercado.	- Premios y certificaciones a las empresas que inviertan en la Recuperación ecosistémica. - Por ejemplo, un clúster de Emprendedores o empresas.
Instrumentos basados en acuerdos o en cooperación	Se presentan barreras por discontinuidad, y consecuentemente la pérdida de garantía de los acuerdos de cooperación internacional. Los proyectos, no logran permear las barrearas políticas, y no logran solventar los riesgos.	Los convenios a realizar con la universidad, pueden ser estructurados para generar información continua, enfocada a las SBN, y el sector privado. De parte de los gobierno local, se debe garantizar el desarrollo de los instrumentos, en el tiempo; para el cumplimiento de los objetivos. Las empresas privadas, tienen en su componente de cumplimiento, un rubro de "Responsabilidad Social"; el cual
Instrumentos de conocimiento, comunicación e innovación	Falta de conocimiento de la normativa y sus objetivos por parte de la población. Por ende, el sector privado presenta bajo interés para invertir en SBN, o cualquiera de sus campos de producción. La producción del conocimiento en el sector académico, no está articulado o vinculado a dar soluciones a los problemas en materia ambiental de la ciudad. Las pocas investigaciones que se han hecho,	Desarrollar instrumentos de comunicación y difusión de: normativas, ordenanzas y proyectos; en materia ambiental. En la producción de conocimiento se debería trabajar junro a la academia para delimitar las problemáticas y dar temas de

	son puntuales y no continúan progresivamente. Los resultados de las investigaciones actuales no están enfocadas a la inversión privada Desde el sector público, no se observa a la "comunicación" como un instrumento de gobernanza. Por ende, en materia ambiental, no se cuenta con canales de difusión especializados, para aproximar los problemas, las acciones y el conocimiento hacia la ciudadanía.	investigación para construir conocimiento específico, para la posterior toma de decisiones.
IDEA GENERAL PARA IMPLEMENTAR SBN: **NORMATIVA QUE PROMUEVA PROYECTOS SBN, Y REGULE SUS INCENTIVOS**		

9.3.4. Workshop Granollers

Workshop INTERLACE T3.5 - Granollers 4the May 2023

Participants: Naturalea, Segro, Staci Logistics Spain, Consorci Besós Tordera, Ayuntamiento de Barberà del Vallès, Ayuntamiento Granollers, ICTA-UA

Summary of recommendations policymix enabling NBS in the private sector

The following table summarises the workshop policy instrument recommendations for enabling private sector NBS.

Legislative, regulatory, strategic instruments	**Knowledge, communication, innovation instruments**
· EU Directive on treating wastewater · Flexible criteria for permitting of industrial development sites · Requirements/norms for business collaboration in providing NBS	· Awareness raising about sustainable production processes and NBS · Public recognition of private efforts · Guidance on best practices · Joint collaboration events between businesses · Technical support for NBS implementation
Economic and financial instruments	**Instruments based on agreements and cooperation**
· Subsidies for NBS actions focused on SMEs · Reduction in the water fee for NBS actions · Reduction in electricity price for NBS actions · Tax reduction for NBS measures ·	· Public-private-academic cooperation to document NBS effectiveness · Join construction (and funding) of shared NBS services by several actors · Co-sponsored environmental campaigns · Formal Association of businesses promoting NBS ·

Notas del taller INTERLACE T3.5 Granollers - discusiones de grupo 04-05-2023

Grupo: #1

1. Cuáles son las principales barreras para soluciones basadas en la naturaleza en sector privado en Granollers? 20minutos

Barreras legislativos, reglamentarios o estratégicos?	**Barreras de conocimiento, comunicación o innovación?**
- Dificultad normativa/legislativa para desarrollar proyectos cooperativos. - Normativa rígida que dificulta implantar proyectos novedosos - Las tramitaciones con la administración requieren largos periodos de tiempo	- Malos hábitos adquiridos que dificultan la implantación de mejoras. - Desconocimiento de opciones disponibles en el caso de querer implantar SbN - En el caso de querer implantar SbN, no existen muchas empresas locales expertas o especializadas en este tipo de proyectos
Barreras financieras o económicas?	**Barreras en acuerdos o en cooperación**
- No existen beneficios que la empresa pueda aprovechar, ya sean de carácter económico o de apoyo técnico, y que sirvan como gancho para motivar este tipo de proyectos. - Si que existe un coste de inversión de implantación SbN, pero se tiene que tener en cuenta también el coste del mantenimiento de esta infraestructura. - A las pequeñas empresas les cuesta más asumir el coste de nuevos proyectos si no reciben beneficio a corto plazo.	- Falta concienciación de la importancia de las SbN. -Falta de iniciativa cooperativa. Cuesta mucho que empresas que comparten objetivos y necesidades trabajen de manera conjunta optimizando recursos

1. **Teniendo en cuenta estas barreras, cuáles son los instrumentos/incentivos que pueden apoyar la demanda y oferta de SbN en el sector privado en Granollers? 20 minutos**

Instrumentos legislativos, reglamentarios y estratégicos	**Instrumentos de conocimiento, comunicación e innovación**
- Agrupar todas las asociaciones de empresarios en una única asociación para ser más eficientes. - Mejorar la gestión del polígono industrial. - Modificar o crear normativa que agilice la colaboración entre empresas	- Transmitir buenas prácticas a las empresas - Promover la divulgación y la formación a las empresas sobre qué son las SbN y como se pueden aplicar en cada actividad particular. - Favorecer proyectos de colaboración entre empresas (jardinería, team building…) -Aprovechar subproductos de determinadas actividades empresariales para realizar acciones conjuntas que beneficien al todo el polígono.
Instrumentos económicos y financieros	**Instrumentos basados en acuerdos o en cooperación**
- Aplicación de bonificaciones en impuestos - Creación de ayudas económicas para incentivar nuevos proyectos. - Acompañamiento técnico en el caso de querer implantar SbN.	- Que la administración considere a las empresas como partner y trabajar conjuntamente, con un objetivo común. - Creación de servicios comunes en los polígonos industriales.

Otras barreras: Jerarquía generacional. A menudo las empresas dirigidas por personas de mayor edad son más reticentes a aplicar proyectos innovadores.

Otras propuestas de política:

Preguntas sin respuesta:

Propuesta a corto plazo: Listar todos los proyectos públicos de SbN en los cuales se podría participar desde el sector privado empresarial .

Propuesta a largo plazo: Modificar la normativa actual o crear nueva normativa que fomente y agilice la implantación de SbN.

Grupo: #2

2. **Cuáles son las principales barreras para soluciones basadas en la naturaleza en sector privado en Granollers? 20minutos**

Barreras legislativos, reglamentarios o estratégicos?	**Barreras de conocimiento, comunicación o innovación?**
- No existe una normativa estricta, pero en algunos ayuntamientos hay técnicos que promueven soluciones específicas, e.g. techos verdes, de forma demasiado estricta que no se adapta a las realidades de la empresa. - Las soluciones temporales acaban traspasando la responsabilidad última del mantenimiento al sector público - ¿cómo conseguimos que el mantenimiento sea responsabilidad del sector privado?	- Desconfianza y confusión que genera la falta de mecanismos para controlar las certificaciones - posible greenwashing. - Más recursos para explicar, difundir socialmente, las actuaciones sostenibles. - Hace falta más investigación, evidencia (cuantificada) sobre los efectos positivos de las SbN para justificarlas en comparación de las soluciones más tradicionales. - Falta de conocimiento de los trabajadores, empresarios sobre como impulsar las SbN.
Barreras financieras o económicas?	**Barreras en acuerdos o en cooperación**
- Bioingeniería es más cara, mantenimiento económico de equipo que lo mantenga. Pero reconocimiento de los beneficios sociales i ecológicos que se generan. - Costes elevados de determinadas acciones, e.g. impermeabilización de un espacio. El mantenimiento no es más caro que mantener un espacio verde. - Empresas pequeñas disponen de menos recursos económicos, capacidades para promover las SbN – SbN parece la opción para las empresas grandes. - Existencia de otras opciones que aporten el mismo objetivo de forma más eficiente, e.g. opciones ambientales de instalar placas solares. - Exigencias elevadas desde el sector público que dificulte que las empresas Régimen de propiedad – si la infraestructura es alquilada no se permiten algunas acciones, no sale a cuenta económicamente. - Posibles problemas de infiltraciones.	

3. **Teniendo en cuenta estas barreras, cuáles son los instrumentos/incentivos que pueden apoyar la demanda y oferta de SbN en el sector privado en Granollers? 20 minutos**

Instrumentos legislativos, reglamentarios y estratégicos	**Instrumentos de conocimiento, comunicación e innovación**
- Criterios urbanísticos flexibles en los nuevos procesos urbanísticos, e.g. nuevos polígonos industriales. - Nuevas normas para un tratamiento más eficiente de las aguas residuales urbanas	- Dar a conocer a los clientes los procesos productivos sostenibles. - Reconocimiento por parte de la administración pública a la ciudadanía de actuaciones privadas.
Instrumentos económicos y financieros	**Instrumentos basados en acuerdos o en cooperación**
- Clientes piden tener en cuenta los aspectos ambientales. - Bonificación por actuaciones SbN. - Subvención directa de actuaciones, sobretodo a empresas pequeñas. - Incentivos en la reducción del canon de agua. - Reducción de la factura eléctrica.	- Fomentar la cooperación entre sector público, privado y científico para generar evidencia, facilitar los procesos de implementación. - Construcción conjunta de SbN entre distintos agentes: construcción de una lacuna de laminación conjunta entre distintas empresas. - Organización conjunta de actuaciones ambientales: limpieza de un bosque, que genere publicidad y concienciación ambiental.

Otras barreras: barreras respecto infraestructuras: incapacidad de poder almacenar la cantidad de agua que se capta en grandes superficies.

Otras propuestas de política:

Preguntas sin respuesta:

Propuesta a corto plazo: hacer entender a la gente que las SbN son imprescindibles: más investigación, dar a conocer los resultados y la evidencia a través de campañas comunicativas y canales de comunicación ya existentes (webs, redes sociales propias...).

Identificación de las acciones prioritarias de forma participada entre la administración pública y sector privado y establecer las colaboraciones necesarias para implementarlas. Posterior comunicación pública de los beneficios generados.

Propuesta a largo plazo: establecimiento de una legislación que exija la implementación de SbN de forma flexible para asegurar que se puede desarrollar por parte del sector privado.

9.3.5. Workshop Metropolia Krakowska

Workshop INTERLACE T3.5 & follow-up

What are the policy barriers to increasing implementation of NBS on private land in municipalities of Metropolia Krakowska?

Workshop T3.5 29.05.2023, Krakow Center for Climate Education

Participating institutions:

Representatives of the following municipalities:

Kraków
Zielonki
Igołomia-Wawrzeńczyce
Skawina
Biskupice
Zabierzów
Niepołomice
Mogilany
Office of the Krakow Metropolis Association:
Agnieszka Arabas – Coordinator of the Team for Environment and Spatial Management
Karolina Baron – Climate Specialist in the Team for Environment and Spatial Management
Natalia Sierpińska - Spatial Planning Specialist in the the Team for Environment and Spatial Management
Sendzimir Foundation:
Tomasz Bergier - Vice-President
Agnieszka Czachowska – Foundation expert
Maciej Kozłowski – Project assistant
Representatives of other institutions:
Cracow University of Technology
Marshal's Office of the Małopolska Voivodeship
Special Guest - Expert: David Barton from the Norwegian Institute for Nature Research (NINA)

Introduction

The discussion during the meeting concerned the details of the process of implementing inspiring nature-based solutions.

The workshop part was devoted to trying to answer two main questions:

1. What formal barriers hinder the implementation of NBS on private land in the municipalities of the Krakow Metropolis?

2. What regulations can promote NBS on private land in the municipalities of the Krakow Metropolis?

Workshop participants, divided into urban, urban-rural and rural groups, considered real possibilities of implementing regulations and instruments in their commune.

The meeting participants are employees of municipal departments related to the environment and spatial planning, but also representatives of science, non-governmental organizations and supra-local authorities.

Rural Communes	
Legislative, regulatory **barriers**	• Lack of relevant regulations at the national level *(no regulations governing landuse on private property)*
Financial & economic **barriers**	• Insufficient funds in the municipal budget
Barriers to knowledge, communication, innovation instruments	• No promotion of BGI solutions by the commune • Lack of local community awareness of the benefits of BGI solutions • The laziness and comfort of society • Fear of imposing new orders (top-down legal regulations) • Lack of residents' involvement and willingness to do additional activities in everyday life
Barriers to public-private agreement & cooperation	
Urban-Rural Communes	
Legislative, regulatory **barriers**	• Inconsistent provisions in local plans regarding BGI (*e.g. multiple zonation plans* • No provisions in the local plans regarding BGI • Too liberal provisions on nature protection

	• No ownership regulations; *(gaps in the property register/cadastre since the WWII – many cases Jewish)*
Financial & economic **barriers**	• No surcharges or tax reductions for implementing BGI *(e.g. such as Skawina surcharge stormwater; Krakow subsidy for rainbarrel)*
Barriers to knowledge, communication, innovation instruments Legislative, regulatory **barriers**	• Insufficient neighbourly communication • Treating greenery as a secondary issue (especially by developers) • Insufficient education of residents in the field of BGI
Barriers to public-private agreement & cooperation	• Lack of consistent standards for the application of solutions • Lack of cooperation from developers *(municipal officers need to feel the need to cooperate; regulations should come from the national law)* • Lack of cooperation/common policy between authorities • Tendency to close/separate between neighbours *(each property has its own fence or wall- problem for connectivity of green infrastructure* • Neighborly competition *(*
Municipal Communes	
Legislative, regulatory **barriers**	• Lack of space in the city for BGI solutions • No available solution catalogues with technical conditions/requirements *(technical standards for NBS; maintenance requirements; costs)* • Insufficient legal regulations • Polish Water Law (issues of water law permits and BGI) *(complicated to get permission from Polish Water to build e.g. large retention basins, but not in the case of NBS)*
Financial & economic **barriers**	• No subsidies for BGI solutions • High costs of BGI investments

	• Insufficient top-down financial support, lack of incentives • Cost of BGI investments
Barriers to knowledge, communication, innovation instruments Legislative, regulatory **barriers**	• Insufficient awareness of residents about the benefits of using BGI solutions • Insufficient knowledge of investors about BGI • Lack of awareness of the problems of not using BGI • Concerns about using NBS solutions (*people dont know what e.g. raingardens are – terminology sounds ridiculuous, problems with branding; people think of disservices;* • Lack of awareness of the profitability of implementing BGI *(NBS brings new ideas – does not have to be large infrastructure)*
Barriers to public-private agreement & cooperation	• Insufficient experience and knowledge of investment contractors about BGI • Lack of incentives for cooperation between owners of neighboring plots

What policy instruments that can promote NBS on private land in municipalities of Metropolia Krakowska?

Rural Communes
• EU and non-governmental co-financing for local governments for investments in the field of BGI; *(economic and financial)* • Pilot projects;*(innovation instrument?)* • A catalog of potential solutions at the metropolitan level; *(knowledge instrument)* • Competitions among residents promoting BGI (residents, investors); *(innovation instrument)* • Increasing the awareness of residents; *(knowledge instrument)* • Building ecological awareness and attitude; *(knowledge instrument)* • Subsidies and tax reliefs (commune-inhabitant); *(economic instrument)* • Establishment of flower meadows, reduced amount of mowing continues; • Entries in the local spatial development plan: *(regulatory instrument)*

– Verification of development conditions in terms of NBS; – green fences; – Obligation to manage rainwater; – Provisions obliging developers to maintain % of greenery (e.g. Kocmyrzów-Luborzyca minimum 30%,Liszki - depending on the plot between 25 and 50%; – The obligation to maintain high greenery on private plots / planting; – Implementation of biologically active driveways and parking spaces.
Urban-Rural Communes
• Introduction of tax cuts/subsidies; *(economic instrument)* • Introduction of standards in the field of greenery around the house, retention of greenery in multi-family buildings; *(regulatory instrument)* • Proposing solutions that do not require effort during the period of use; *(all instrument)* • Introduction of provisions in local spatial development plans (eg a green belt next to crops on a slope, public space next to multi-family housing, flower meadows, water retention, introduction of protective areas); *(regulatory instrument)* • Encouraging involvement of residents in work on green areas; *(knowledge instrument)* • Introduction of comprehensive ecological extension services for property owners;*(knowledge instrument)* • Cooperation with entrepreneurs in the field of green areas; *(knowledge, innovaiton, agreement instruments)* • Participation with residents of housing estates;*(knowledge, innovaiton, agreement instruments)* • Providing NBS education; *(knowledge instruments)* • Education in the local press; *(knowledge instruments)* • Ecological campaigns: we plant forests, sow meadows, etc. *(knowledge instruments)*
Municipal Communes
• Greater education among municipal officials; *(knowledge instruments)* • Use of demonstrative examples, eg a rain barrel; *(knowledge and innovation instruments)* • More information campaigns to raise awareness of the local community; *(knowledge instruments)* • Cooperation between municipal companies and agencies; *(cooperative instruments)* • Guides/good practices on how to implement provisions in planning documents regarding BGI; *(knowledge instruments)* • Introduction of provisions in the LZP (eg in Gdynia); *(regulatory instruments)* • Quantified, measurable requirements/recommendations for provisions in the LZP regarding BGI *(regulatory instruments)* • Requirement of native soil in a biologically active area; *(regulatory instruments)* • community gardens; *(not a policy)*

- Pocket gardens/green walls; *(not a policy)*
- Drainage rain gardens in containers; *(not a policy)*
- Continuity of greenery + tall trees; *(regulatory instrument)*

Conclusions of T3.5 workshop

Further analysis of the outcomes will be conducted in follow up meetings. This includes developing standards for blue-green infrastructure; continue with proposed solutions that are inexpensive or require funding that is easily available. Examples of what is possible; barriers; solutions; division of groups in municipal types.

Further analysis of the results from the workshop were carried out by the Climate Forum in terms of policy arenas where recommendations could be implemented (see end of this document).

Climate Forum workshop 21.09.2023, Office of the Krakow Metropolis Association

NBS in local policy documents.

Participating institutions:

Representatives of the following municipalities:
Kraków
Liszki
Niepołomice
Skawina
Wielka Wieś
Zabierzów
Świątniki Górne
Krakow Metropolis Association:
Agnieszka Arabas – Coordinator of the Team for Environment and Spatial Management
Karolina Baron – Climate Specialist in the Team for Environment and Spatial Management
Presenter: Tomasz Bergier – expert in the field of blue-green infrastructure

Introduction

The aim of the workshop was to jointly identify documents in which municipalities can include content about NBS.

The meeting participants are employees of municipal departments related to the environment and spatial planning.

The participants developed proposals for provisions for the municipality's strategic documents, which can have a metropolitan character. In the next step (probably at the beginning of the

following year), this work will be carried forward on the implementation form of the indicated recommendations. Legal and technical analyzes and inter-sectoral discussions will be conducted.

Outcomes

1**. In which strategic documents of the municipality can we implement elements fostering the development of blue-green infrastructure?**

a. Municipal development strategy;
b. Local Plans for Spatial Development (MPZP);
c. Climate change adaptation plan;
d. Environmental protection programs;
e. Standards for maintenance of greenery in the municipality (and a greenery development plan)
f. Study of Conditions and Directions for Spatial Development (SUiKZP);
g. Stormwater management standards (on municipal and private land);
h. Environmental decisions;
i. Plan for the development of the water and sewage network;

2. **What can be covered in the documents by municipal and private investment?**
a. Private land:
i. Minimum ratio of biologically active area (including at least 10-20% of native soil);
ii. All rainwater managed within the boundaries of the plot;
iii. Green roofs - provisions with min. requirements, e.g. soil layer thickness;
iv. Sealed area ratio to the plot area;
v. Lower frequency of lawn mowing;
vi. Minimum area of land that performs a protective function (e.g., noise);
vii. Number of high and low plantings;
viii. Spreading of earthen embankments with the planting of greenery (min 4 m height);
ix. Recommendations of retention water management;

b. Public land:
i. Guidelines in the Local Spatial Development Plan - Regulation Plan (MPZP) for tree removal;
ii. Green bus stops - minimum recommendations;
iii. Green parking lots - minimum recommendations;
iv. Vines at water bodies;
v. Structural soils and percolating substrate;
vi. School yards and playgrounds above the retention basin - multipurpose infrastructure;
vii. Guidelines for schools to implement NBS (like rain gardens);
viii. Public buildings as good practice (e.g. green walls, rain gardens);
ix. Trees, etc., as shading infrastructure on streets, parking lots, and squares;
x. Use of dry streams;
xi. NBS as the necessary infrastructure for retention of water from roads;
xii. The design of rainwater barrels for historic buildings under the care of the conservator;

9.3.6. Workshop Chemnitz

Invited Institutions: Umweltzentrum - Chemnitz is flourishing, DDB Dachbegrünung, Contreebution, Ibb Ingeneurbüro, Jacob + Bilz, BuGG, Chemnitz City planning department

Summary of recommendations policymix enabling NBS in the private sector

The following table summarises the workshop policy instrument recommendations for enabling private sector NBS.

Enabling policymix	
Legislative, regulatory and strategic instruments	• Regulatory design requirements (e.g. gravel gardens) • Urban development contracts specifying how what is to be implemented and when • Separated sewage system ,combined with NBS • Required ecological construction monitoring • Intervention compensation regulation • "Blue-green factor -> Private sector/companies not yet convinced of GBI/NBS. => "also rely on intrinsic motivation!"
Financial and economic instruments	• Pricing of monitoring in construction projects, because it is obligatory • Low-threshold subsidies for NBS in residential areas • Tax/levy on developed area, earmarking to eco-fund for maintenance and preservation (e.g. "Hamburg: ""Grüner Cent) • Stormwater run-off fee • Certificate system for NBS / NBS companies • Architecture award for NBS
Knowledge creation, communication and innovation tools	• Environmental education, communication to sterngthen Intrinsic and extrinsic motivation • Workshops for the maintenance of building greenery
Instruments based on agreements or cooperation	• Cooperation in topics with common intersection -> bind workforce -> good working conditions. • Funding guideline for green innovations promoting actors collaboration. -> Allotments are funded, but not citizenship.

Workshop abridged transcript of barrier and policy instrument discussion questions:

Q1: What are the barriers to implementation of NBS by private companies or on private land?

Legislative, regulatory, and strategic tools.

- Plants/trees, NBS need long-term planning and maintenance => long-term perspective often comes up short in planning
- "DIN 1829; RASLP4 ->binding law; How to enforce it?"
- Technical framework often not given to implement NBS (e.g. statics, monument protection vs. roof green or facade green) or areas that cannot be used due to underground lines
- Environmental construction supervision
- short-term planning instead of long-term perspective leads to more follow-up costs
- Stormwater facility user fee is too low to be a subsidy
- Sponge city economically best/more incentive (water discharge is too cheap!)ser
- Necessity to include the maintenance cost in planning plans
- Lacking standards for NBS (test)
- Stormwater is needed to keep sewers clean.
- check and control -> penalties
- Good approach!
- "no follow-up control; what are the steps after notification".
- Technical conditions hinder the implementation of NBS (pipes, roof stability, keeping sewers clean)

Financial and economic instruments

- Financing only up to completion maintenance, no money for development maintenance -> Smaller communities can't handle it financially/personally (follow-up costs) -> Only low-maintenance common greenery
- Subsidy programs for building greenery => due to subsidies, implementation has increased in certain neighborhoods (BuGG)
- long-term financing
- "Penalties" actually demanded and used (e.g. if roots of trees are injured with excavator) -> Why is this so? -> Yes, is not/far too little punished. Personnel difficulties, little knowledge about it -> Conflicts of interest: not all see NBS as necessary. Therefore sometimes no acceptance from politics -> "fear" of taking it to the end, actually enforcement in court."
- sunk costs aren't taking into consideration
- Subsidies only reach those who are already convinced.
- "Implement DIN 1829!" and RASPL4 -> Why is that? -> Yes, is not/far too little punished. Personnel difficulties, little knowledge about it -> Conflicts of interest: not all see NBS as necessary. Therefore sometimes no acceptance from politics -> "fear" of taking it to the end, actually enforcement in court."
- Costs of maintenance are not desired/wanted -> smaller volume for actual project.
- Funding programs only include implementation and completion maintenance, but no eUnerhat maintenance.
- Funding programs for maintenance care would have to come -> Is a result of not valuing nature. Budget depends on prioritization

Instruments for creating knowledge, communication and innovation

- Good example from Chemnitz: Communication about trees in the market place was successful!
- Internal common understanding of the importance of green in the city
- Integrate existing know-how (binding)
- There is no glory in prevention.

- Indirect coercion through possible imitation by other municipalities or neighboring municipalities
- feedback from municipality to funding agency (bottom-up)
- Communication with citizens (open, well-structured)
- Conflicts of interest due to lack of acceptance -> necessity is missing
- Manicure instead of going to the substance => only postpones problem and increases follow-up costs!
- Actions must be visible ->next legislative period
- "Difficult to explain to people that it is necessary. ("Fighting" against windmills) -> communication externally and internally."
- People often bring examples of what they have seen somewhere and then want to implement themselves. Chemnitz actually very open.

Instruments based on agreements or cooperation

- Cooperation between different actors difficult.
- Particular interests are not yet brought together => work past each other => planning errors -> securing long-term care to develop potential completely.
- It can help, if some start (If the neighbor has it, one would like to do it too) -> role model effect and illustration in practice, examples implemented, which one cannot imagine otherwise
- intercommunal cooperation on regulations/demands
- Argument from private people often that it is too expensive. -> Too little happens voluntarily. More mandatory approaches: City worries about scaring away investors. -> Nationwide regulation would be good!

Q2: What are the tools to encourage implementation of NBS by private companies or on private land?

Legislative, regulatory and strategic instruments

- Chemnitz has a good starting situation ->suffering pressure is not great, but will
- Statutes (e.g. gravel gardens
- Urban development contracts => specify how what is to be implemented and when
- GBI/NBS already arrived at city administration level/politics.
- Newly built areas are partly: no longer connected to the sewage system => do not discharge at all or only at a reduced rate, partly NBS have to be implemented (newly built areas in Berlin).
- Some ideas also fail due to technical circumstances
- in the course of urban land use planning
- Obligation for ecological construction monitoring => pricing in construction projects, because it is obligatory => less resources from the city itself for control / monitoring -> also to protect breeding times, etc.
- Intervention compensation regulation
- The way is the right one, only to be pursued/implemented more intensively.
- Chemnitz could advocate for education at the state level
- "blue-green factor -> Would be good example for water-sensitive urban development -> Would be just good opportunity window in Chemnitz! -> Already being addressed right now. But "path dependency" is also there, new approaches need to be "tinkered in." -> Technically feasible, would facilitate many things! -> GBI/NBS has already arrived at the city administration/political level. -> Private sector/companies not yet convinced of GBI/NBS. => "also rely on intrinsic motivation!"

- Minimum effort & maximum profit: investors often come (only) with minimum offers => city should not buckle,negotiate well.

Financial and economic instruments

- Interests of building owners often diverse => complicates cooperation -> How to approach owners? To implement things? -> easier with cooperatives and WEGs
- Expand existing regularities/ sources of income and make greater use of them.
- Larger cities have it easier, because larger budget and more personnel => more difficult for smaller and medium-sized cities -> Chemnitz is not sooo small, regional center. -> But the public suffering pressure in Chemnitz is not yet big enough.
- Low-threshold subsidies for NBS, in residential areas
- Minimum effort & maximum profit: investors often come (only) with minimum offers => city should not buckle and negotiate well. -> Is also a matter of negotiation! -> Discuss through & remain steadfast!
- "Hamburg: ""Grüner Cent"" or something like that: tax/levy on developed area, goes into eco-fund for maintenance and preservation <-> Or example from NL: fee on "water run-off".
- Certificate system for NBS / NBS companies
- Architecture award for NBS
-

Knowledge creation, communication and innovation tools.

- Private/companies are not yet convinced of GBI/NBS. => also focus on intrinsic motivation!
- Intrinsic and extrinsic motivation must be strengthened -> environmental education, communication
- Environmental education/communication: there are savings on this! -> Financing for such offers difficult. How about certification or prize money for NBS? - > For new construction or existing projects?
- Good public relations from the municipality
- Workshops for the maintenance of building greenery
- Understanding is there, only the financing is missing
- Is also much a matter of negotiation!
- Education about state level -> children's education roof and facade greening
- Larger cities have it easier, because larger budget and more personnel => more difficult for smaller and medium-sized cities -> Chemnitz is but not sooo small, regional already center. -> But the public pressure in Chemnitz is not yet big enough.
- "blue-green factor -> Would be good example for water-sensitive urban development -> Would be just good opportunity window in Chemnitz! -> Already being addressed right now. But "path dependency' is also there, new approaches need to be tinkered in first. -> Technically feasible, would facilitate many things! -> GBI/NBS has already arrived at the city administration/political level. -> Private sector/companies not yet convinced of GBI/NBS. => also rely on intrinsic motivation!"

Instruments based on agreements or cooperation

- Discuss through & stand firm!
- Funding guideline for green innovations where different actors could collaborate. -> Allotments are funded, but not citizenship.
- Cooperation in topics with common intersection -> bind workforce -> good working conditions.
- Location factor attracts for the individual but possibly not for the general public

- Larger cities have it easier, because larger budget and more personnel => more difficult for smaller and medium-sized cities -> Chemnitz is however not sooo small, regionally already center. -> But the public pressure in Chemnitz is not yet big enough.

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Project Partners

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