Green market opportunities and business policies for urban nature-based solutions

Deliverable 1.1.2

Work Package	WP1
Dissemination Level	Public
Lead Partner	EBN
Due Date	30.11.18
Submission Date	30.11.18

Deliverable No.	1.1.2
Work Package	1, Task 1.1
Dissemination Level	Public
Author(s)	Marion Perrin, EBN
Date	30.11.18
File Name	Green market opportunities and business policies for urban nature-based solutions
Status	Final
Reviewed by (if applicable)	ECOLOGIC, HWWI, GLA
Suggested citation	Perrin, M (2018). Green market opportunities and business policies for urban nature-based solutions. Deliverable 1.1.2, CLEVER Cities, H2020 grant no. 776604.

This document has been prepared in the framework of the European project Clever Cities. This project has received funding from the European Union's Horizon 2020 innovation action programme under grant agreement no. 776604.

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Executive summary

Nature-based solutions can help overcome urban sustainability challenges by providing services, creating benefits and offering value for different urban actors. However, the development of nature-based solutions is hampered by several barriers that relate to the value proposition, value delivery and value capture of NBS business models and sources of (public/private) finance to tap into. This factsheet, which was drafted as an output of the CLEVER Cities H2020 project, explores such existing barriers as well as potential opportunities for increasing the scale and effectiveness of nature-based solution implementation. The focus is placed on the private sector (i.e. for-profit businesses), which are a key partner to engage with in the process of increasing the uptake of NBS. In particular, their knowledge of markets, management experience, and ability to harness advanced research and development to deliver solutions can be valuable assets in the context of implementing NBS in response to environmental challenges. The deliverable also includes reflections on key outcomes and lessons that can be learned from each of these challenges, which can help support the CLEVER Cities approach.

The information presented was gathered through a desk-based literature review, focusing on scientific and grey literature relating to the valuating of NBS and challenges to financing, business models and delivery at the European level. Reviewed documents include information on the barriers to uptake and implementation of NBS, as well as wider challenges to the delivery of innovative solutions. As much of the scientific NBS literature focuses on technical feasibility and sustainability assessment (with some recent exceptions and reviews), the research also included outputs from other European NBS-focused research projects.

This factsheet is complemented by the CLEVER Cities factsheet ‘Impact-driven financing and investment strategies existing for urban regeneration’ (D1.1.3).

1. Setting the scene

The challenges of rapid and increasing urbanisation combined with climate change mean that cities are facing growing sustainability pressures, with resultant impacts on quality of life, natural resources and the economy. Yet amidst these challenges, opportunities exist to create more resilient, prosperous and healthy cities for urban populations and to prepare cities for future challenges through sustainable solutions inspired by nature. These so-called 'nature-based solutions' (NBS) utilise blue and green elements of natural systems to achieve environmental, social and economic goals.

When looking at market opportunities and potential business policies for fostering the deployment of NBS, a primary entry point is the value of the ecosystem services that they can provide. These services include the provisioning of resources (such as raw materials or water), regulation services (such as of the microclimate or air quality), provisioning of habitat or cultural services (e.g. aesthetic, scientific, educational), and socio-economic services (for example for human health or tourism).

Despite wide recognition of these benefits, however, a significant gap remains between the potential of NBS and their utilization for delivering multifaceted benefits. This is due in part to gaps in long-term private financing as a necessary complement to public financing. While private businesses have strong aptitude to offer innovative solutions to societal challenges and act as a key partner in NBS delivery, an increased awareness of market opportunities and appropriate business models are still lacking as well as the ability to capture value from the services they deliver. Addressing these gaps would help to share associated risks, reduce funding burdens and support innovation associated with NBS, therewith fostering an increased uptake in the long term.

This factsheet aims to address these gaps and contribute to an improved awareness and understanding of appropriate green market opportunities and business models for NBS. To do so, an overview is provided of factors that can foster or hinder the uptake of NBS as well as existing business model archetypes for innovations. Finally, lessons that can be derived for CLEVER Cities are presented. This factsheet is complemented by the CLEVER Cities factsheet 'Impact-driven financing and investment strategies existing for urban regeneration'.

2. Methodological approach

The information presented was gathered through a desk-based literature review, focusing on scientific and grey literature relating to the valuating of NBS and challenges to financing, business models and delivery at the European level. Reviewed documents include information on the barriers to uptake and implementation of NBS, as well as wider challenges to the delivery of innovative solutions. As much of the scientific NBS literature focuses on technical feasibility and sustainability assessment (with some recent exceptions and reviews), the research also included outputs from other European NBS-focused research projects. A core information source was a literature review conducted within the Horizon 2020 project NATURVATION, which reviewed innovation, urban studies and sustainable business model literature and applied these to NBS in order to learn various lessons at the European level (Toxopeus, H and Polzin, F, 2017). The NATURVATION product also included global reviews of innovation in financing, governance

and partnership models for NBS in urban areas (e.g. Kabisch, N. et al, 2017) as well as included examples of business policies and green market opportunities. The present factsheet applies the gathered knowledge to the CLEVER Cities context in order to explain challenges, opportunities and lessons learned which can help support the CLEVER Cities approach and the work being conducted by the case study cities. A full reference list is provided at the end of this factsheet.

3. Business policies and models hindering NBS uptake and implementation

Engaging businesses in the process of mainstreaming NBS is critical to ensuring widespread uptake and the full unlocking of their potential to deliver ecosystem services. The private sector has a unique knowledge of markets, management experience and ability to harness advanced research – all which can be viewed as strengths to facilitating NBS delivery. On the other hand, integrating NBS into the way businesses operate can also help to save them money and add value to commercial and private property. NBS can also provide a commercial opportunity for a wide range of business both in relation to the provision of services to plan, design and manage NBS, or as a potential investment opportunity for banks, insurance companies, etc. By contributing to a growing green economy, increased business activity will also result in an increased contribution to city tax revenues.

Engaging the private sector in delivery of NBS can also highlight the economic value of such solutions, and in turn create visibility for the case for investment and promoting uptake (Kabisch et al. 2014). The private sector is currently the largest source of climate finance and working with businesses to delivery NBS could help to leverage further contributions as well as lead to broader changes in business practices as expectations, responsibilities and norms change.

However, a broad range of perceived and concrete barriers exist to the implementation and up-scaling of NBS. These barriers can be clustered into the following categories: (1) the difficulty in capturing value, thus preventing NBS being considered when a business case is being constructed; (2) lack of understanding and lack of confidence (due to lacking evidence) of long-term benefits; and (3) uncertainty created by the disconnect between short-term actions and long-term goals as well as discontinuity between short-term actions and long-term plans. Understanding these barriers and the interconnected factors that reinforce them is essential both in order to gather evidence and knowledge to overcome perceived barriers, and to identify opportunities to address actual barriers.

3.1. The difficulty to capture value

Successful nature-based urban solutions face key challenges to obtain long-term (private) financing due to the current inability to capture value from their delivery of ecosystem services, i.e. the lack of a successful business model. This is a real challenge since assessing and communicating the value created by urban NBS would help clarifying the benefits which are delivered to support decision-making. NBS and the ecosystem services generated therein create value that is difficult to appropriate for a private company. This difficulty is linked to:

- the public nature of the payoffs produced (traditionally the area of government);
- the absence of a clear accounting framework for ecosystem services and non-monetary values: how do you make a complete 'set' of values that are important if some are not in monetary terms, and how do you assess trade-offs between them? For example, how do you include the time citizens put into implementing and maintaining NBS, and how to include ethical values in a meaningful way? One way could be aggregation of monetary values on the one hand, and non-monetary exclusion criteria on the other. How to assess trade-offs between different types of value is a related challenge.
- disconnect of central stakeholders to deal with these complex innovations and resulting difficulty in designing public-private cooperation with well-aligned incentives between all stakeholders (academic, business, government). NBS have many more different stakeholders who benefit from different types of value than i.e. renewable energy, grey infrastructure and real estate projects. This dispersion of value across stakeholders makes it difficult to coordinate 'value capture' for financiers.
- valuation customs of private investors such as the tendency to discount/depreciate assets whereas sustainable infrastructural assets should instead be maintained/renewed;
- volatility of value. It varies in time, context and between stakeholders and social groups. How do we deal with this when valuing NBS? e.g. after a flood people value risk mitigation of NBS more than 5 years later when the flood is forgotten. The societal importance of topics changes over time (i.e. climate change versus biodiversity). Most assessment methods value nature at one point in time and do not examine such dynamics.
- the focus in most assessments is on advantages of NBS and not on problems and disadvantages (e.g. badly maintained nature in cities may worsen social problems).
- some technologies are still in an innovation stage, which increases perceived uncertainty of investment value (such as green roofs).
- and uncertainty with respect to public-private contracting and commitments. This is related to the insecurity of public policy and changing regulations. Both substantially increase the uncertainty/risk of the project and gradually rise in relation to the duration of the project.

3.2. Lack of understanding

The potential to explore and exploit commercial opportunities is consequently affected by a general lack of understanding. This includes knowledge gaps in relation to the value of NBS, cooperative arrangements and expectations of different stakeholders in NBS, tools or innovations to support specific NBS interventions or performance monitoring and measuring.

The "fear of the unknowns" considers both uncertainties and risks of implementing NBS in cities, as well as the resulting changes this may induce in city planning. Because of their characteristics, NBS must be handled differently to other approaches and require new protocols for implementation and maintenance - for example, for successful delivery of green roof or a change in maintenance regimes to support biodiversity'; these factors are perceived as an operational unknown. Even though a number of urban planners are aware of the benefits urban green areas provide, as shown by the increasing number of green infrastructure strategies being developed, some investors, policy makers and/or residents may not be as

aware or might even have the perception that green installations on roofs and walls are harmful, e.g., are "dirty and host insects," creating additional perception hurdles.

For private businesses, the major problem is a lack of long-term evidence regarding costs versus benefits (thus preventing a willingness for companies to readily invest and 'risk take') as well as a lack of a clear return on investment in commercial terms for many NBS. The result is a general hesitation from private businesses to move beyond grey solutions. A reduced risk framework is therefore needed to increase their willingness to invest.

There is also a lack of awareness of which forms or types of NBS are most cost-effective in particular circumstances. The multifunctional nature of many NBS can be a problem in this respect. Businesses operate or invest based on relatively linear logic models, whereas can NBS provide multiple benefits many of which are not of direct interest to the private sector investor. The lack of examples of proven, long-term success of NBS should also be mentioned. NBS are still quite novel and many businesses will not invest in novel approaches; only entrepreneurs or venture capitalists with a particular focus on environmental or ethical investing might be willing to take the risks

3.3. Uncertainty created by the disconnect between short-term actions and long term goals

Another barrier concerns the uncertainty created by the disconnect between short-term actions and long-term goals. Responding to changes in public policy, for example, often require businesses to have sufficient time for long-term planning and the design of new approaches for implementing and maintaining NBS. Business also require some certainty about the long-term direction of policy to ensure that, for example, supply chains are established to provide suitable products or services, or sub-contractors are upskilled to enable installation or maintenance of new approaches to NBS. The UK Green Roof Market assessment provides a good overview of how the market is driven by certainty in policy (particularly policy in London) which enables a diversity of suppliers and contractors to occupy the market space[1].

This is contrary to the commonly short-term action and decision-making cycles utilised within city administrations. In some cases, responsibilities for the maintenance of the project remains unspecified, which poses a risk to the continuity of delivering the desired socioeconomic and environmental benefits in the long term. Even in cities where long-term policy plans undergo adaptive monitoring for taking up new innovative solutions, scientifically validated options and knowledge are often not available at the time that the policy windows are receptive to new ideas. In a comprehensive comparison of green infrastructure planning and implementation in a number of European cities, frameworks for green infrastructure policies generally concern long-term visions that may have to be modified when policy objectives change during new political cycles. Overall, these factors result in a disconnect between policy receptiveness and ready-to-apply scientific results and concepts.

In parallel, there is also discontinuity between short-term actions and how they relate or build up to long-term plans and goals. A number of projects researching NBS more generally and looking specifically at implementation aspects only exist for a certain (short) time; there is, however, the need for long-term

[1] https://www.nfrc.co.uk/article/2017/07/27/the-uk-green-roof-market---first-assessment

projects, particularly regarding solutions about how to address implementation and maintenance after the project and related funding end. This is mirrored in the activities working to develop long-term ecological research into long-term socioecological research. The suggested focus is not only to take into account in researching the design and early-stage implementation of NBS, but also to enable a monitoring of the impacts they have in terms of human-environment relationships over time.

3.4. How can these challenges best be addressed to encourage business uptake of NBS?

There are several solutions discussed in the literature (Claus & Rousseau, 2012; Koppenjan & Enserink, 2009; Warner & Hefetz, 2008) for coping with the outlined challenges, relating to both the business model and finance sides. Firstly, financing should take place within diverse groups of (public and private) financiers in order to balance incentives and improve the ability to value different types of payoff. Secondly, innovation in accounting and valuation/monetisation methodology (i.e. natural capital accounting) can allow for the integration of NBS value delivery and benefits into the decision-making processes of governments, businesses, investors and citizens. Citizens' willingness to pay (such as for urban trees, green roofs or urban agriculture) could be captured using innovative business models and financing arrangements. Bottom-up self-organisation can sometimes sustain NBS (like community agriculture) and novel methods of financing such as 'crowdfunding' can often provide sufficient funds. Furthermore, other technological and financial innovations (such as 'Social Impact Bonds' or blockchain-based funding arrangements) can facilitate collective bottom-up and public-private funding as well as offering potential for remote monitoring of natural assets which can improve contractual commitments. These potential solutions are outlined in more detail in the following chapters.

4. Green market opportunities and supporting business policies to foster NBS uptake

The business community should play a significant role in NBS mainstreaming as they possess the necessary resources for up-scaling NBS, and many opportunities exist for their involvement within the global green market. As is the case in many markets, there is no single solution to fostering the uptake of NBS, but rather a range of potential instruments that could be adapted to respond to local circumstances.

Revealing the economic value of NBS is essential in order to demonstrate green market opportunities and identify relevant business policies which include NBS as a component. By assessing the economic benefits of e.g. quality of life, job creation, health improvements, and climate resilience through methodologies such as natural capital accounting and ecosystem services valuation, the case for investment can be made more compelling.

Green market opportunities that could appeal to private investment include the provision of a high-quality business environment, for example to attract a skilled labor force, increasing return on investment such as through livability and property values, as well as efficient use of land and space saving strategies which optimise quality and multi-functionality of NBS.

This chapter will provide an overview of the various instruments, policies and opportunities put in place in order to facilitate or streamline permitting of NBS.

4.1. Subsidies

New subsidy regimes providing public payments to the private sector for public goods are steadily appearing - such as the proposal to change the agricultural subsidy regime in the UK to shift from production subsidy to an environmental and climate adaptation subsidy.

The Green Alliance report[2] demonstrates that, to save the government unnecessary spending and keep water bills down, the UK's new farm subsidy scheme, aimed at environmental restoration, should be better aligned with companies' environmental spending. This new farm support scheme should also be designed to allow public and private co-investment.

In other domains such as buildings, facades and roofs the private benefits in themselves tend to be insufficient to stimulate investment, and public subsidies, such as tax cuts for storm water (some regions in Germany) can stimulate private investment. Some studies have found that such subsidies can be effective in increasing the returns on investment and to trigger larger scale green roof adoption (Carter & Keeler, 2008; Claus & Rousseau, 2012).

4.2. Natural capital accounting

New approaches to accounting such as natural capital accounting reveals the wider economic value of implementing NBS. Businesses that are ahead of the curve with respect to policy or future regulation may see the sense in using such approaches to support investment decisions. This economic valuation of benefits can stimulate investment in construction and management as well as preventing loss of existing assets.

Natural capital accounting is an emerging way of presenting information about the value of the environment, recognizing the wider value to society and the environment. The goal is to incorporate this information in formal accounts that would be recognised by those involved in financial and management decisions.

4.3. Long term financing

As we have already stated, businesses are always apprehensive about returns from investments in green projects. That's why they need new investment opportunities through public-private partnerships where the return is via innovative financial instruments such as Green Bonds.

A green bond[3] is functionally a debt instrument, like any other bond. It offers fixed return, and a promise to use the proceeds to finance or re-finance, in part or fully, new or existing sustainable projects. The bond is voluntary and may be issued by a financial institution, the government or even a company to raise funds for a defined period. The issuer has to ensure that the proceeds are invested in green projects, such as renewable energy, energy efficiency, projects leading to reduced carbon emissions, etc. It is a win-win

[2] https://www.green-alliance.org.uk/From_blue_to_green.php
[3] (www.investopedia.com/terms/g/green-bond.asp

situation for both the bond issuer and the investor, as they can contribute toward a sustainable future on one hand and showcase themselves as a responsible organisation/institution/individual on the other. Trends reflect that Green bonds are not only becoming an attractive financing option but also attracting project developers to raise capital for their projects, assets and other activities to showcase their responsible approach toward business.

4.4. Public-private partnerships

Increasing the uptake of nature-based solutions requires greater collaboration amongst different policy areas, sectors and stakeholders. Public-private partnerships are collaborative arrangements which are important for implementing sustainability agendas as they could help to harness the full multifunctional value of NBS. This type of collaboration can create and catalyse synergies by pooling resources, skills, knowledge and institutional capacities sharing the financial burden. This can support delivery of NBS particularly where a NBS is too costly or complex for one party to bear, or to overcome the risk of an innovative NBS over typical options (Kabisch et al. 2014).

There has been a tendency lately towards a more intensive leverage of public funds with private finance through public-private partnerships (PPPs). For instance, the Europe 2020 strategy highlights the importance of PPPs. According to the strategy, leveraging financial means by combining private and public finance and creating innovative instruments to finance the needed investments is one of the key aspects Europe must pursue in order to accomplish its objectives for Europe 2020.

There are many good examples of PPSs that drive investment in NBS to address ecological and environmental issues such as Greener Grangetown, which is about better managing rainwater in Wales[4] and Twenty 4 Twenty, which is an initiative aiming at delivering sustainable drainage such as rain gardens, swales and permeable paving in London[5].

4.5. Sustainable business models for NBS

The existing literature on NBS (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2016; Stubbs & Cocklin, 2008) contains sustainable business model archetypes for most of the types of NBS. The sustainable business model archetypes therefore seem to be quite applicable to NBS and helps us understand the different types of value propositions, delivery and capture approaches that could be provided and that drive private sector investment decisions. They seem indeed to be able to capture the 'private' business model better than the 'public' business model (i.e. delivering the rationale why governments should engage in certain types of NBS).

4.6. Other supporting business policies

Further business policies that can support the ability to optimise the potential of these innovations and facilitate investment and take up of market opportunities include, e.g.:

[4] www.greenergrangetown.wordpress.com/about
[5] www. corporate.thameswater.co.uk/About-us/Investing-in-our-network/Twenty-4-twenty

- Information sharing and facilitating access to best practice examples, e.g. through online platforms showcasing lessons learnt and highlighting evidence and value of NBS. This can be a multiplying factor in mainstreaming NBS into urban planning. Information should be targeted to businesses and be easily accessible in order to encourage take up adapted to local solutions.
- Creation of cross-sector financing, planning and decision-making processes can enhance performance and speed of delivery. NBS often cross many sectoral areas of interest (for example between those working with water management, agriculture, forestry, urban planning, ecological protection, etc.) and stakeholders have different perspectives and priorities for any proposed NBS. Administrations could encourage knowledge sharing or form part of working groups within and between existing networks, so they could help mutual learning processes. This would apply to cooperation both between organisations, as well as within organisations at different levels of decision making.

5. Lessons learned for the CLEVER Cities approach

- Barriers to the commercial exploitation of urban nature-based solutions mostly lie in the socio-economic and political spheres, rather than being biophysical barriers.
- It is important to keep in mind that the level of finance and business models needed for different types of NBS varies. Interventions can come in a range of forms, including technical, social and organisation innovations or market opportunities, as well as for specific types of NBS (e.g. street trees or sustainable urban drainage systems).
- Accounting for the multifunctional value of NBS, including non-monetary values, is necessary in order to capture indirect benefits holistically. The great challenge of green economy is to integrate into economic calculations and price systems the natural assets that economics has not previously taken into account.
- There is a need to forge new networks and develop trans-disciplinary and inclusive partnerships and governance approaches in order to foster the uptake of nature-based solution.
- The differences in financing strategies seem to vary along with the extent to which private value can be captured from the NBS approach, as well as with the scale (investment amount and longevity) of the investment.
- Multidisciplinary and inclusive partnerships can foster the uptake of NBS in response to climate-related challenges. They can create and catalyse synergies between different parts of society by pooling together resources skills and knowledge.

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