



PBL Netherlands Environmental  
Assessment Agency

# ENHANCING URBAN NATURE PROVISION IN THE NETHERLANDS

Background report

**Harriet Bulkeley, Dora Almassy, Anouk Fransen, Sara Maia and Helen Toxopeus**

18-01-2023

PBL

## Colophon

### **Enhancing Urban Nature Provision in the Netherlands**

© PBL Netherlands Environmental Assessment Agency

The Hague, 2023

PBL publication number: 5022

### Corresponding author

[h.a.bulkeley@durham.ac.uk](mailto:h.a.bulkeley@durham.ac.uk)

### Author(s)

Harriet Bulkeley (Durham University; Utrecht University), Dora Almassy (Physi Solutions), Anouk Fransen (Utrecht University), Sara Maia (Physi Solutions) and Helen Toxopeus (Utrecht University)

### Editors

Ton Dassen (PBL), Clara Veerkamp (PBL) and Machteld Schoolenberg (PBL)

### Acknowledgements

We would like to thank to colleagues from the NATURVATION project for their contributions to the underlying research that has informed this background paper. This research has been funded by the European Commission's Horizon 2020 research and innovation programme under grant agreement no. 730243 and participating partners in the NATURVATION project.

### Visualisations

Beeldredactie PBL; Cartography Unit, Department of Geography, Durham University

### Production coordination

This research has been performed by Utrecht University and the Urban Nature Atlas (UNA) team (Physi Solutions), commissioned by PBL Netherlands Environmental Assessment Agency. Parts of this publication may be reproduced, providing the source is stated, in the form:

Bulkeley H, Almassy D, Fransen A, Maia S, and Toxopeus H. (2023). Enhancing Nature Provision in the Netherlands. The Hague: PBL Netherlands Environmental Assessment Agency.

### Accessibility

PBL attaches great importance to the accessibility of its products. Should you encounter any access-related problems when reading them, please contact us at [info@pbl.nl](mailto:info@pbl.nl), stating the title of the publication and the issue you are experiencing.

PBL Netherlands Environmental Assessment Agency is the national institute for strategic policy analysis in the fields of the environment, nature and spatial planning. We contribute to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in all of our studies. We conduct solicited and unsolicited research that is both independent and scientifically sound.

# Content

<b>Colophon</b>	<b>2</b>
Corresponding author	2
Author(s)	2
Editors	2
Acknowledgements	2
Visualisations	2
Production coordination	2
<b>Glossary</b>	<b>4</b>
<b>Executive Summary</b>	<b>5</b>
<b>1 Introduction</b>	<b>10</b>
<b>2 Understanding the Benefits of Urban Nature in Practice</b>	<b>19</b>
2.1 Realising Multiple Benefits	20
2.2 Designing NBS Initiatives for Inclusion and Justice	29
2.3 Addressing the Underlying Causes of Climate Change and Biodiversity Loss	35
2.4 What Factors Enable the Provision of High-Quality NBS Initiatives?	37
2.5 Summary	42
<b>3 Opportunities &amp; Barriers in the Provision of High-Quality Urban Nature</b>	<b>44</b>
3.1 Trade-Offs in Realising Multiple Goals	45
3.2 Fostering Inclusive Urban NBS	49
3.3 Achieving Equitable Outcomes	51
3.4 Addressing Underlying Causes of Climate Change & Biodiversity Loss	55
3.5 Governance and Investment for High-Quality Urban Nature Provision	57
<b>4 Towards Principle-Based Standards for High-Quality Urban Nature Provision</b>	<b>63</b>
4.1 The Rise of Urban Nature Standards	65
4.2 The Problem with Standards	66
4.3 From Prescription to Principles	70
<b>5 Conclusions: Making High-quality Urban Nature Provision Count</b>	<b>75</b>
<b>References</b>	<b>76</b>
<b>Appendices</b>	<b>84</b>
Annex I: Description of NBS Goals and Impacts Assessed	84
Annex II: Business Models of NBS	86
Annex III: Qualitative data	87

# Glossary

**Attribute** – quality or feature inherent to, in this case, high-quality urban nature.

**Goals** – designed outcome or endpoint.

**High-quality Urban Nature Provision** – the increased provision of urban nature generates multiple benefits, fosters inclusion, ensures equity and addresses the underlying drivers of climate change and biodiversity loss.

**Metric-based standard** - measure designed to ensure that policies and interventions realise their designed outcomes, by setting specific quantitative targets which can be measured accordingly using a set of metrics or tools.

**Principle** – Qualitative requirements or stated values which encourage improved performance over time.

**Principle-based standard** - measure designed to ensure that policies and interventions realise their designed outcomes, by identifying qualitative requirements or stated values which encourage improved performance over time while enabling local conditions and priorities to be taken into consideration.

**Safeguards** - measure designed to ensure that policies and interventions realise their designed outcomes, including but not limited to the use of standards.

**Societal challenge** – systemic challenge facing society which requires strategic and holistic response, the focus of which in this report are climate adaptation, biodiversity loss, health and economic development.

**Synergy** - situations in which increased provision of one goal/benefit causes improvement in another (Raymond et al. 2017b).

**Target** – making goals specific through ‘hard’ quantified targets with a timeframe (e.g. 5% increase of urban green spaces by 2050) or ‘soft’ targets which are more generic and less ‘clear-cut’ (e.g. increase green space provision in cities) (Moussa et al., 2021).

**Trade-off** - situations in which one goal/benefit increases and another one decreases.

**Nature Based Solutions (NBS)** - a range of interventions designed to use the properties of nature to address multiple sustainability challenges while at the same time contributing to biodiversity goals.

# Executive Summary

***As governments, businesses and communities turn once more to nature as a means through which to address the challenges they face there is growing recognition that standards are needed to ensure that these initiatives are genuine, fair and effective.***

Enhancing the provision of urban nature has been found to contribute to climate change adaptation, enhance biodiversity, support economic development and improve health and well-being, as well as to support action to improve other urban sustainability goals including water quality, air pollution, climate mitigation, social cohesion and cultural heritage. As cities across the world face complex challenges that require interventions that can address multiple goals simultaneously, there has been a growing interest in using Nature-Based Solutions (NBS) to enhance the provision of urban nature and realise its benefits. As a result, a growing and diverse number of NBS initiatives are emerging across cities worldwide, most often through partnerships from public, private and civil society actors. However, despite growing evidence of the benefits that NBS can bring they remain marginal in most cities with significant barriers to their uptake in terms of both governance and investment.

At the same time as NBS have grown in popularity concerns have been raised that they may not live up to their promise. Some suggest that NBS are simply a form of 'greenwash' that allows governments and business to carry on with existing forms of economic development that lead to climate change and the loss of biodiversity. Others find that while NBS are supposed to deliver multiple benefits, a focus on climate mitigation has led to a concentration on carbon storage and generated plantation-style interventions which may serve to damage biodiversity. There are also concerns that NBS fail to benefit those who need them most. Local communities, and especially indigenous people, can be excluded from both the design and outcomes of NBS, while especially in urban areas research has found that NBS can exacerbate existing inequalities through processes of green gentrification.

***The challenge of enhancing urban nature provision is therefore two-fold. First, cities need encouragement to overcome implementation barriers so that they can realise the benefits of NBS. Second, the promise of NBS – to deliver multiple benefits for society in a way that is genuine, fair and effective – must be kept.***

**Standard setting** offers a key means through which to respond to this dual challenge. First, standards can **support** municipalities and their partners in overcoming the barriers to NBS implementation by providing a level playing field for action, enhancing knowledge about the potential benefits that NBS can provide and enabling monitoring and evaluation. Second, standards can **safeguard** urban nature provision by generating confidence in the reliability and performance of NBS, which is crucial for attracting investment and community support, as well as by insuring that certain threshold criteria are met to counter critiques that NBS lead to greenwashing and gentrification. Finally, standards can **super-charge** action for the provision of urban nature by driving ambition, recognising and rewarding good practice, while also enabling local communities to develop a sense of connection with and stewardship for nature futures.

Sustainability standards come in a wide variety of shapes and sizes. We can distinguish standards in terms of whether they are applied to closed systems – such as a building, a product such as a washing machine or operating process for business or machinery – or to open systems – such as a landscape, supply chain or urban development or infrastructure project. For example, ISO standards tend to be applied to closed systems whereas certification schemes for e.g. forest products or fairtrade are applied to more open systems. We can also distinguish standards in terms of whether they focus on metrics – quantitative measures – or principles – which can take the form of qualitative requirements or stated values. In the sustainability domain, metric-based standards tend to be applied in the case of closed systems (e.g. building energy efficiency ratings) whereas principle-based standards tend to be applied to more open-systems (e.g. the Gold Standard for carbon credits).

Metric-based standards are increasingly used to support the provision of urban nature. The EU Nature Restoration Law will require all urban areas to maintain their urban green space and canopy cover by 2030 and to expand this by 5% by 2050. Some cities are also adopting the voluntary 3-30-300 standard which involves having at least 3 trees in view from every place, no less than a 30% tree canopy in each neighbourhood and no more than 300 metres distance to the nearest public green space. While these metric-based standards can provide a useful baseline, they also carry some significant limitations. First, if poorly designed or applied to the wrong context such standards can either be too complex to use (e.g. because of the burden of data collection or analysis) or too simple to be meaningful (e.g. because they focus on only a few easily quantified variables). Second, metric-based standards often use universal targets that take insufficient account of the diversity of local places, people and values which can limit their credibility and uptake. For example, focusing on the provision of urban green space or trees may be less appropriate in some places than concentrating on enhancing urban blue space or flowering plants. Third, urban nature provision often takes place in contexts where there are multiple actors and issues involved – open systems – such that standards will need to be designed to be deployed through co-governance arrangements where actors may have diverse needs and expectations about their use. At the same time, each actor is likely to already be subject to various mandatory and voluntary requirements so that it is crucial that any new standard can be flexible enough to operate together with existing requirements if they are to be effective and not simply seen as another tick box exercise.

Our review of international evidence and best practice suggests that ***principle-based standards can be more effective in supporting, safeguarding and super-charging the provision of urban nature.*** The most widely recognised standard for NBS, developed by the IUCN, as well as the guidance developed by leading researchers at Oxford University's Nature Based Solutions Initiative and widely endorsed by scientists and policy-makers, have adopted this approach. Research funded by the EU's Horizon Europe programme to investigate the barriers and opportunities for mainstreaming NBS within cities has also identified core principles that are essential for their successful development. In complex, open systems where diverse actors need to work together towards common objectives principle-based standards provide a means through which to identify the key qualities that need to be safeguarded in any one policy area but allow flexibility in how this is undertaken across diverse contexts, allowing for a place-based and people-centred approach. Like metric-based standards, principle-based standards can establish the baseline and key performance indicators that supports action by providing a level playing field, increasing knowledge and generating a shared language for collaboration. Principle-based standards can more readily super-charge action by using 'sliding

scales' of performance which allow those that are able to go further, faster under some principles to do so and be recognised for their success, whilst also requiring minimum levels of achievement.

***Despite the growing use of metric-based standards for urban nature, we suggest that principle-based standards are more suitable for this open-ended policy challenge because of the wide variety of places, people and values involved.***

To date, no common principle-based standard for urban nature provision has been established. Hence, the development of a new mandate for urban nature provision in the Netherlands provides a significant opportunity for national leadership supporting the delivery of urban NBS in line with the evidence base and international best practice. Realising this ambition will not only be vital for cities and communities across the Netherlands, but it can also support the Dutch government in meeting national goals going beyond restoring nature in designated Natura-2000 areas and Nature Network Netherlands ('Natuurnetwerk Nederland'), as well in contributing to international biodiversity policy goals and actions (e.g. EU Restoration Law) as well as those for e.g. climate change and water quality.

Drawing on international research and best practice, we identify four key attributes that are associated with the provision of high-quality urban nature. First, urban NBS that generate multiple benefits, especially on the four core challenges of climate change adaptation, biodiversity loss, economic development and well-being, are regarded as of higher quality. Part of the *raison d'être* for developing NBS is that they can address multiple societal challenges simultaneously, but too often their design and implementation focuses on one goal with the result that opportunities to realise a wider range of benefits for diverse stakeholders and communities is lost. A second attribute of high-quality urban NBS is that they foster the inclusion of local communities, knowledge and places. Urban nature provision which does not take account of the local contexts in which they are implemented can often fall short of their potential, while those which fail to include appropriate stakeholders and communities can lack support and legitimacy. Equally, fostering inclusion can mean that crucial forms of knowledge are taken into account in the design of NBS so that important local values for nature are respected and integrated, generating engagement and stewardship from local communities which is vital for maintaining urban nature provision over time.

A third attribute of high-quality urban NBS is that they ensure equity. This is vital not only because without ensuring that the benefits of urban nature provision reach those most in need there is a danger that the very problems they were designed to address remain unresolved. The benefits and costs of urban nature provision are unevenly distributed and active intervention is required to ensure that they reach those who need them most, including approaches which seek to address existing inequalities as well as those which ensure that new benefits accrue where and to whom they are needed the most. Without ensuring equity there is also the danger that the provision of urban nature will deepen inequalities across cities, leading to widespread distrust and a lack of political support for advancing environmental policy. Finally, with increasing concerns that NBS are being used simply as 'greenwash' for the continuation of 'business as usual' it is critical that the provision of urban nature also explicitly addresses the underlying drivers of climate change and biodiversity loss. If urban nature provision is used in parallel to ongoing policies and actions by those actors involved that undermine goals to reduce climate change or biodiversity loss they will lack credibility and potentially risk losing the investment of the financial sector as well of public trust. At the same time, urban nature provision holds significant promise as a gateway for

addressing the underlying causes of climate change and biodiversity loss that should not be missed – especially in terms of carbon storage, reducing the impact of land use change on biodiversity, creating new forms of sustainable consumption and production, and providing a means through which to embed public values for nature which have been proven to lead to support for wider action.

***Unlocking the potential of urban nature means moving beyond simple indicators of ‘greenness’ and adopting a principles-based standard for high-quality urban nature provision that delivers multiple benefits, is inclusive, equitable and addresses the underlying drivers of climate change and biodiversity loss.***

While urban NBS are already generating significant value for cities and communities, there is considerable potential to increase the quality of this provision and with it the outcomes for people and places. Our analysis of 1000 NBS initiatives across Europe shows that many are already addressing at least three of the core societal challenges of climate change adaptation, biodiversity, health and economic development, and that some are also pursuing a range of other/additional goals, in particular addressing social justice, cohesion and equity, fostering inclusive and effective governance and tackling additional issues needed to get to the heart of biodiversity loss and climate change such as climate mitigation, sustainable consumption and production and public education.

Initiatives which set goals and/or report/expect benefits in relation to three or more of the core challenges were more likely to take place at the micro-scale (district or neighbourhood level) and especially on the meso-scale (regional, metropolitan and urban level) and to involve several types of urban nature (e.g. blue as well as green areas) and in addition to new provision also tended to involve restoring and managing existing nature. These initiatives were also more likely to be government-led or co-governed by public and private actors together. While these initiatives were somewhat more likely to respond to the requirements of regulations or policies - such as spatial planning guidance and environmental regulations - voluntary standards - including planning guidance and building certification schemes - also seem to have a positive influence on successfully delivering high-quality urban NBS. NBS-focused visions, strategies and plans, such as green infrastructure plans, green space and biodiversity strategies, and municipal environmental plans were also more frequently identified in these initiatives. In terms of financing, our analysis suggests that funding provided by local and regional public authorities can potentially act as a stimulus for delivering multiple benefits, while funding provided by the national government may be the most efficient when it is combined with other sources, especially from the private sector.

At the same time, evidence suggests that many initiatives experience trade-offs. Drawing on the sample of 1000 NBS across Europe as well as in-depth analysis of 54 case-studies internationally we find that these trade-offs can emerge between realising benefits for economic, environmental and social goals as well as in the form of trade-offs between being inclusive and/or equitable and realising multiple benefits. NBS initiatives that set multiple goals and report/expect multiple benefits were less likely to be inclusive and involve non-governmental actors, such as NGOs and community groups. Stakeholder involvement was also limited to consultation processes and information dissemination. Taken together, our research suggests that urban nature provision is currently clustered in two distinct forms - initiatives which are able to realise multiple goals but which have only limited forms of inclusion and equity, and those which are smaller in scale (spatial and financial) and realise a more limited range of benefits but are inclusive and seek to ensure



equity in their processes and outcomes. In this research, we therefore also identified the barriers that NBS initiatives encounter and the opportunities they could harness to move towards high-quality urban nature provision. This work demonstrates the potential of implementing a principles-based standard for urban nature provision but also shows that other measures will be needed to support municipalities and their partners to make this vision a reality. These include: creating persuasive visions and supporting cross-sector collaboration and co-governance across public, private and civil society actors; building capacity for experimentation and learning by doing which allow scope for the iterative, adaptive development of urban nature provision; creating mechanisms and intermediaries that can work at the landscape scale to align multiple initiatives; and creating new business models and forms of investment, supported by transparency and accountability mechanisms that reduce the power of vested interests.

***In summary, this background paper shows that simply mandating for the provision of more urban nature will not ensure that the use of NBS fulfils its potential to deliver high-quality outcomes for climate, biodiversity and society. Instead evidence and practice shows that standards for high-quality urban nature are needed to realise this opportunity and ensure that the risks of exclusion, inequality and greenwashing are avoided.***

Crucially any new framework to support the provision of high-quality urban nature must attend to the opportunities for generating synergies and how to avoid trade-offs, while enabling the diverse forms of urban nature needed and ensuring that the multiple actors critical to their implementation can engage. Whilst growing in popularity, there is a significant risk that the adoption of metric-based standards for urban nature provision in any policy mandate will not only fail to generate high quality outcomes to climate, biodiversity and society, but may have unintended negative consequences for places and people. We argue that a principle-based standard that establishes the attributes of high-quality urban nature provision each evaluated across a continuum could support a tailored, flexible approach which allows for meaningful engagement of communities and stakeholders in expressing their values for nature, promotes a learning by doing approach and seeks to drive ambition forwards over time.

# 1 Introduction

In their first joint report, the Intergovernmental Panel on Climate Change (IPCC) and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) concluded that it is no longer possible to treat climate change and the loss of biodiversity as separate problems and that there is now an urgent need to recognise that neither “will be successfully resolved unless both are tackled together” (IPBES and IPCC, 2021). While cities have long been seen as at the front line of both climate mitigation and adaptation (Bulkeley and Betsill, 2003), it has only been more recently that their potential role in addressing the loss of biodiversity has been recognised (Convention of Biological Diversity (CBD), 2020). With the climate and biodiversity crises now requiring joined up responses cities globally face the formidable task of developing approaches which can address these issues simultaneously. Yet it is also, as we set out in this paper, a significant opportunity because addressing these issues can also support cities in responding to a wide range of other societal challenges.

***Creating a new policy mandate for the provision of urban nature in the Netherlands has the potential to enable cities and communities to address the climate and biodiversity crises whilst also contributing to other key societal challenges such as health and economic development.***

Key to unlocking this potential are Nature-Based Solutions (NBS) (Box 1.1). Broadly speaking this umbrella term refers to a range of interventions designed to use the properties of nature to address multiple sustainability challenges while at the same time contributing to biodiversity goals. Since the Paris Climate Summit in 2015 and the growth of commitments to ‘net zero’ there has been an explosion of NBS initiatives internationally, with a particular focus on the renewed conservation, restoration and establishment of (semi-)natural habitats such as forests, mangroves, coastal ecosystems and agroforestry (Seddon et al., 2020; United Nations Environment Programme (UNEP), 2021). There is now growing interest in the potential that NBS offer to support *urban* responses to climate, biodiversity and societal challenges (European Commission (EC), 2015), with initiatives in places as diverse as Mexico City, Melbourne, Phoenix, Lima and Cape Town as well as large-scale efforts in China to develop ‘sponge cities’ in multiple regions to manage water quality and flow (Chan et al., 2018; Cohen-Shacham et al., 2016). Across Europe, significant research and demonstration initiatives have now taken place to establish how NBS can contribute to urban sustainability (Connecting Nature, n.d.; NATURVATION, n.d.; Network Nature, n.d.; Somarakis et al., 2019). Evidence suggests that urban NBS can enable climate adaptation and mitigation, contribute to biodiversity goals, support mental and physical health, enable economic regeneration and the green economy as well as fostering social inclusion (Cortinovis et al., 2022; Kabisch et al., 2017a; Kabisch et al., 2017b; Kiss et al., 2019; Veerkamp et al., 2021).

### **Box 1.1: Defining Nature-Based Solutions**

Nature-based solutions (NBS) have become known as ‘umbrella’ concept which knows multiple overlapping yet different interpretations. The European Commission defines NBS as *“solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions”* (EC, n.d.) while IUCN defines NBS as *“actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”* (Cohen-Shacham et al., 2016, p. 4). More recently, in 2022, the United Nations (UN) Environment Assembly adopted the following NBS definition: *“nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits”* (UNEP, 2022, p. 2).

However, scientists, governments and non-governmental organisations (NGOs) have raised a number of concerns about the design and implementation of NBS. First, globally NBS have tended to be driven primarily by the climate mitigation agenda, often to the detriment of biodiversity or social goals (Fransen and Bulkeley, 2022; Seddon et al., 2021; Tozer et al., 2022). For example, fast growing, monocrop tree plantations could be considered NBS for climate mitigation but can generate harmful impacts on local biodiversity and involve the displacement of economic activities that supported local development. Second, many NBS initiatives are designed by external actors – with little acknowledgement of local knowledge or the engagement of local communities (Turner et al., 2022). This has been particularly striking in terms of the treatment of indigenous people and local communities but has also led to concerns across rural and urban landscapes where NBS are being implemented without harnessing valuable public knowledge and without support (Wachsmuth et al., 2016; Woroniecki et al., 2020). Third, in the urban context specifically, there is growing evidence that NBS can generate inequalities by creating benefits for some at the expense of other, usually more marginalised, actors. This is a critical issue in urban areas where improving urban nature can lead to processes of gentrification, exclusion and even displacement, so that the benefits they can generate in terms for example of health and economic development fail to reach those who need them most (Anguelovski et al., 2018; Triguero-Mas et al., 2022). Finally, critics suggest that NBS are too often used as a means to enable the continuation of business as usual and without tackling the underlying drivers of climate change and biodiversity loss. This is most obvious when it comes to the use of NBS as carbon offsetting schemes without adequate action to reduce GHG emissions, but equally relates to the use of NBS to address biodiversity loss action is not taken on its underlying drivers - land conversion, climate change, urban expansion, unsustainable consumption and production and the ways in which nature is valued amongst the public (IPBES, 2019).

***Without sufficient safeguards in place it is likely that efforts to reap the benefits urban nature can provide for climate, biodiversity and society will be lost.***

Despite their evident potential, these concerns have led to limited progress being made in the design and use of NBS internationally. A milestone was reached when in the UN Environment Assembly adopted a definition of NBS in 2022 (UNEP, 2022), but because of these concerns limited progress has been made across international climate and biodiversity agendas to advance NBS (Dorst et al., 2021; Sarabi et al., 2019). At the national level, an inquiry in the UK recently concluded that there is a significant risk that the roll out of NBS without proper safeguards in place could lead to a situation in which “bold promises on restoring or conserving nature are not fulfilled. Pledges and financing risk being misdirected towards scientifically uncertain, poorly planned initiatives which have few lasting impacts other than to greenwash the activities of polluters” (UK House of Lords Select Committee on Science and Technology, 2021). Across cities internationally communities have been mobilising to resist the implementation of NBS, rejecting the provision of urban nature for fear of its negative social and economic consequences (Anguelovski et al., 2018).

To ensure that we do not waste the potential of NBS due to poor design and implementation leading to the misallocation of their benefits and growing political opposition, a number of organisations have called for the use of ***safeguards in the form of principle-based standards to support the delivery of high-quality NBS***. The IUCN Global Standard for NBS was developed through an extensive process of stakeholder engagement and is intended to be facilitative in terms of driving up the standard of NBS design and implementation globally over time (Angela et al., 2020). It requires that all initiatives meet eight criteria, that NBS: effectively address relevant societal challenges; designed with considerations of scale taken into account; result in a net gain to biodiversity & ecosystem integrity; are economically viable; are based on inclusive, transparent and empowering governance processes; equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits; are managed adaptively, based on evidence; are sustainable and mainstreamed within an appropriate jurisdictional context. Based on extensive international research and in consultation with leading scientific experts, businesses and civil society actors, the Oxford Institute for NBS identified four core principles that should guide the development of these initiatives (Nature-Based Solutions Initiative, n.d.; Seddon et al., 2021): that NBS should never be used as a substitute for the rapid phase-out of fossil fuels; that they should be recognised as relevant across a wide range of ecosystems and should not be focused only on forests; that they must be “implemented with the full engagement and consent of Indigenous peoples and local communities in a way that respects their cultural and ecological rights”; and that they should be explicitly designed to provide measurable benefits for biodiversity (Seddon et al., 2021, p. 1518).

While these principle-based standards are gaining traction internationally, they have not yet been applied to the urban context. Transdisciplinary research involving universities working with local authorities, civil society, practitioners, business, utilities, national government agencies and the European Commission has however identified particular attributes of the design, planning and governance of NBS in urban settings that are critical to their success and in overcoming critiques that they can be too singular, exclusive, inequitable and fail to tackle the underlying drivers of climate change and biodiversity loss.

**Box 1.2: Ten Enablers in Urban Nature-Based Solutions (Naturvation, n.d.)**



**Recognise trade-offs** Making trade-offs visible and being transparent about them is crucial, as projects can be reassessed and improvements can be made.

**Capture synergies** Attaining synergies does not happen overnight, and needs prioritisation from the design phase of NBS to its implementation and aftermath.

**Make space for NBS** In struggling for space in crowded cities, we need to open up space for NBS to allow them to grow.

**Embrace diversity** There is no 'one size fits all' NBS, and therefore NBS need to embrace diverse values, norms, beliefs and knowledge.

**Foster investment** NBS need investment to flourish, and therefore we need to diversify forms of (co-)finance to capture benefits of NBS beyond financial returns.

**Ensure equity** Past and present injustices need to be acknowledged and compensated for in order to create thriving NBS which do not reproduce or exacerbate inequalities.

**Grow collaboration** Designing, implementing and maintaining NBS requires collaboration between diverse actors, including public and private actors, as well as engaging with local communities.

**Unlock creativity** means moving beyond instrumental and technical conceptualisations, including local dynamics of urban nature – how nature is perceived, how it creates a sense of belonging, meaning and identity.

**Nurture intermediaries** In these partnerships, change agents – key individuals or organisations – often play a crucial role functioning as 'glue' holding coalitions of actors together.

**Value Experimentation – 'Seeing is believing'** Enabling iterative experimentation, in which we build upon previous experience and knowledge, could show how cities can organise things differently.

Kabisch et al. (2022, p. 1388) suggest that urban NBS should specifically: “(1) consider the need for a systemic understanding, (2) contribute to benefiting people and biodiversity, (3) contribute to inclusive solutions for the long-term, (4) consider context conditions and (5) foster communication and learning”. Like the findings of the NATURVATION<sup>1</sup> project (Box 1.2), these interconnected principles suggest that there is a strong need to consider how NBS are delivered alongside their intended outcomes. This is not only a political consideration, but also a pragmatic one - without sufficient attention to issues of inclusion and fairness, NBS will not only attract significant opposition but are also less likely to be effective in delivering their intended benefits.

***Simply mandating for the provision of more urban nature will not ensure that the use of NBS fulfils its potential to deliver high-quality outcomes for climate, biodiversity and society. Instead evidence and best practice shows that principle-based standards can provide the safeguards needed to realise this opportunity and ensure that the risks of exclusion, inequality and greenwashing are avoided.***

While there is growing uptake by national governments and across the private sector of the IUCN Global Standard and the Oxford Principles, ***to date there has been no development of a standard for the provision of high-quality urban nature.*** The development of a new mandate for urban nature provision in the Netherlands provides a significant opportunity for national leadership supporting the delivery of urban NBS in line with the evidence base and international best practice. As exemplified in the IUCN Global Standard and the Oxford NBS Principles – the two most widely adopted approaches internationally to safeguard NBS – and as evidenced by the independent findings of NATURVATION, Connecting Nature (Kabisch et al. 2022) and other initiatives across Europe focusing on urban NBS, the provision of high-quality urban nature is marked by four attributes that can provide the basis for the development of this approach (Table 1.1):

- They effectively address multiple sustainability challenges, including climate and biodiversity
- They include local communities, knowledge and contexts in design and implementation
- They seek to ensure fair and equitable outcomes
- They support rather than detract from action to address the underlying causes of climate change and biodiversity loss<sup>2</sup>

Evidence suggests that these attributes are often linked. This suggests that developing a set of principles based on these attributes and pursuing them simultaneously can be mutually reinforcing – creating a positive spiral of benefits and momentum to support further ambition for action to

---

<sup>1</sup> NATure-based URban innoVATION was a 4-year project, funded by the European Commission and involving 14 institutions across Europe. It sought to develop a better understanding of what nature-based solutions can achieve in cities, examine how innovation can be fostered in this domain, and contribute to realising the potential of nature-based solutions for responding to urban sustainability challenges by working with communities and stakeholders (Naturvation, n.d.).

<sup>2</sup> Following IPBES (2019), in order to realise transformative change we need to address underlying drivers of biodiversity loss, including land conversion, climate change, urban expansion, unsustainable consumption and production and the ways in which nature is valued amongst the public.

address climate, biodiversity and societal challenges (Figure 1.1; Kabisch et al., 2022; Amorim-Maia et al., 2022; Maia et al., 2020; NatureScot, 2020). For example, where local values and knowledge is harnessed through meaningful processes of participation, NBS can be designed to generate diverse outcomes for multiple beneficiaries, supporting both social needs whilst also ensuring diverse and resilient outcomes for climate and nature (Burbidge et al., 2021; Cousins, 2021; Curran and Hamilton, 2020; Maia et al., 2020; Mattijssen et al., 2017; Shokry et al., 2020; Turner et al., 2022; Wolch et al., 2014). This in turn can support and instil the value of nature amongst diverse communities and led to proactive engagement to protect nature locally and change individual behaviours (Box 1.3)

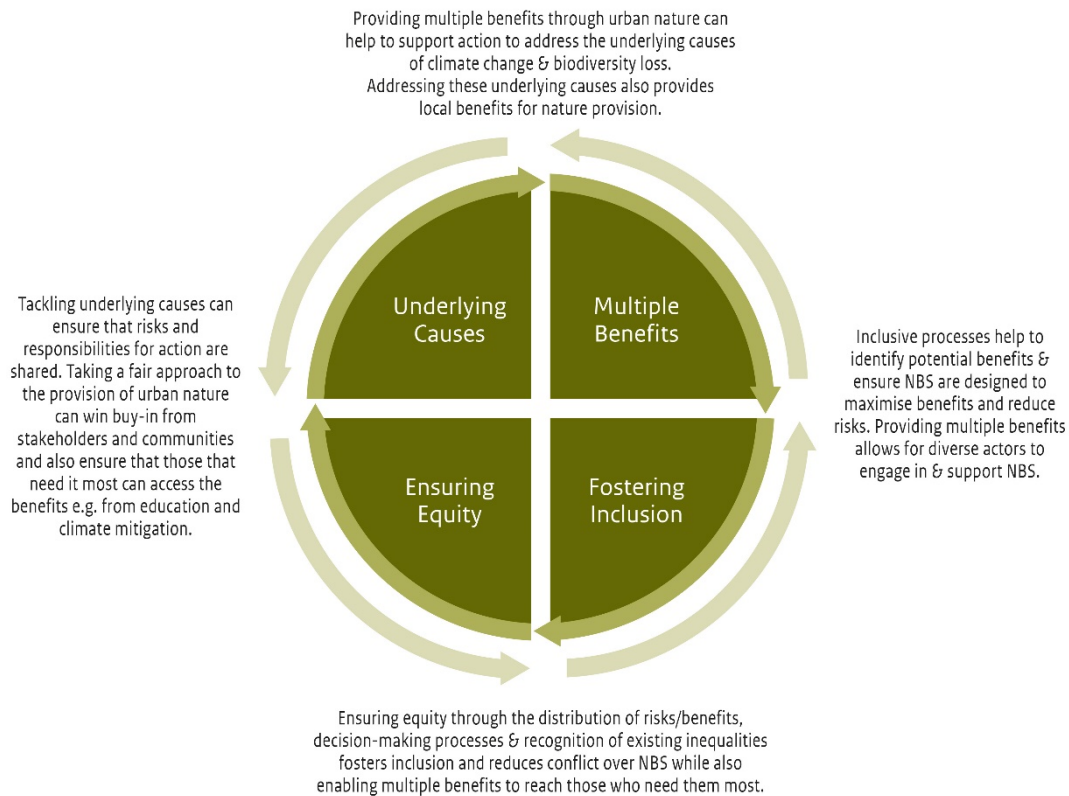
**Table 1.1 Identifying the attributes of high-quality urban nature**

<b>Four key attributes of high-quality NBS</b>	<b>IUCN principles (Angela et al., 2020)</b>	<b>Connecting Nature (Kabisch et al., 2022)</b>	<b>Oxford principles (Seddon et al., 2020)</b>	<b>Naturvation Enablers (Naturvation, n.d.)</b>
<b>(1) Multiple Benefits</b>	Effectively address societal challenges; Designed with considerations of scale; Net gain to biodiversity & ecosystem integrity	Benefitting people and biodiversity	Focus on a wide range of ecosystems and should not be focused only on forests; Measurable benefits for biodiversity	Capture synergies; Recognise trade-offs
<b>(2) Foster Inclusion</b>	Inclusive, transparent and empowering governance processes; Managed adaptively	Inclusive solutions for the long-term; Consider context conditions	Engaging with local and indigenous communities, respecting their rights	Grow collaboration; Embrace diversity
<b>(3) Ensure Equity</b>	Equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits			Ensure equity
<b>(4) Address underlying drivers</b>	They are sustainable, working towards transformative change/climate and biodiversity targets	Systemic understanding	NBS should never be used as a substitute for the rapid phase-out of fossil fuels and must not delay urgent action to decarbonize our economies.	Unlocking creativity; Value experimentation

**Box 1.3: Walkways Wildlife Project in London**

In London, Grow2Know and the Natural History Museum’s Urban Nature Project launched the ‘Prairie Garden’ (Grow2Know, 2021). Together with (young) residents, they plant and maintain a fusion of perennials and grasses which are resilient to changing climate conditions, fostering biodiversity while providing a place for relaxation. At the same time, visitors are able to scan QR codes in the garden, learning more about these species. Enabling local people to proactively engage, learn and influence these gardens could assist in protecting local nature, which could alter individual behaviours.

**Figure 1.1: Interlinked and mutually reinforcing principles.**



At the same time, there are clear trade-offs between pursuing these principles (Kabisch et al., 2022; Maes et al., 2018). A singular focus on maximising (multiple) benefits from urban NBS can lead to a situation in which processes of inclusion are side-lined through a focus on expert knowledge needed to deliver specific climate or biodiversity outcomes, or to the generation of benefits that accumulate to certain groups in society at the expense of others (Anguelovski and Corbera, 2022). The history of urban greening initiatives shows all too clearly that green space tends to at best reproduce and entrench existing inequalities and at worst exacerbate uneven urban development. This in turn means that the full potential of NBS to generate those who need the health, well-being, economic, climate resilience and nature benefits that they bring the most do not have access to them, so that they fail to actually realise their intended outcomes (e.g. in terms of improving the health of urban neighbourhoods or increasing climate resilience) whilst at the same time contributing to the ongoing dynamics that make cities vulnerable to social and environmental crises (Burbidge et al., 2021; Shokry et al., 2020). In so doing, urban NBS can also fail to provide access to nature for those least able to encounter nature outside the city and as a result miss the opportunity to instil and support the value of nature across diverse populations (Figure 1.1)(Anguelovski et al., 2018).

***Unlocking the potential of urban nature means moving beyond simple indicators of ‘greenness’ and adopting an approach which focuses on the provision of high-quality nature that delivers multiple benefits, is inclusive, equitable and tackles the underlying drivers of climate change and biodiversity loss.***



To move this agenda forward, a new policy mandate for urban nature can enable and support the synergies between the different attributes of high-quality urban nature whilst also making the trade-offs visible so that decision-making can be based on a strong understanding of what is at stake. Otherwise there is a risk that while the quantity of urban NBS is increased their impact is either limited or produces (unintentional) negative consequences, particularly for already marginalised or disadvantaged communities and individuals.

Realising this ambition will not only be vital for cities and communities across the Netherlands. Attaining high-quality urban nature can also support the Dutch government in meeting national goals going beyond restoring nature in designated Natura-2000 areas and Nature Network Netherlands ('Natuurnetwerk Nederland'). It can also support the need to meet European policy goals, including the European Green Deal, land take neutrality within the EU soil strategy, extending urban forestry within the EU's Forestry Strategy for 2030 and biodiversity outcomes as set out in the Biodiversity Strategy for 2030, while also attaining a coherent Trans-European Nature Network, where urban nature functions as connector between protected areas (European Environment Agency (EEA), 2020). It will also ensure that in meeting goals for member states for no net loss of green urban spaces by 2030, a 5% increase by 2050 and a minimum of 10% tree canopy cover in European cities, towns and suburbs, and a net gain of green space that is integrated to buildings and infrastructure (EEA, 2021; EC, 2022b; UN Economic Commission for Europe (UNECE), 2021) cities and communities truly benefit. By themselves, such metric-based standards may produce unintended effects that lower the quality of urban nature or generate perverse effects which mean that those who most need the benefits and resilience urban nature can provide are left behind (see Chapter 4).

***Using these four core attributes of high-quality urban nature – that it generates multiple benefits, fosters inclusion, ensures equity and addresses the underlying drivers of climate change and biodiversity loss – in this background paper we analyse how far NBS initiatives currently have these attributes, why this is the case, and how the use of principle-based standards grounded in these attributes can operate as a safeguard to enhance urban nature provision for cities and communities.***

**Chapter 2** analyses the largest dataset of urban NBS internationally, the Urban Nature Atlas (UNA), to identify the extent to which they can deliver multiple benefits, are inclusive of local communities and knowledge, and tackle underlying drivers through mitigating climate change, engaging with sustainable production and consumption, or by seeking to provide education on the value of nature. We also identify the key characteristics of initiatives that deliver high-quality urban nature and the governance and investment factors that have enabled their development. This chapter provides a broad overview of what is needed to deliver high-quality urban nature, particularly in terms of generating multiple benefits. A key finding is that initiatives which are co-governed by public, private and civil society actors tend to generate more benefits than those led by public sector actors alone. At the same time, it finds that there are emerging trade-offs between different principles – for example that initiatives which tend to address multiple sustainability challenges are often large and led by government and private sector actors, with limited engagement with local communities. Smaller scale initiatives, of the type that can be most easily fitted into existing neighbourhoods, are often not designed or implemented with multiple benefits in mind. While NBS initiatives are found to have significant potential for the provision of high-quality urban nature, there is considerable room to improve the outcomes for people and places.

The quantitative analysis undertaken in Chapter 2 usefully describes *what* happens in the provision of high-quality urban nature, but in order to build robust policy that can move this agenda forward it is also important to understand *why* this takes place. To this end, **Chapter 3** provides an in-depth analysis of 54 case-studies undertaken in cities internationally by the NATURVATION project (Kiss et al., 2019) as well as the wider literature (e.g. Blakey, 2021; Dushkova and Haase, 2020; Koh et al., 2021; Seddon et al., 2020; Turner et al., 2022; Xing et al., 2017). This in-depth analysis is based on extensive document analysis and at least 15 interviews for each city, obtained by the NATURVATION project (Kiss et al., 2019). It examines what these case-studies and the insight they provide into the dynamics of NBS implementation on the ground tell us about the trade-offs that emerge in seeking to deliver multiple benefits and how and why synergies can be generated, as well as the ways in which the different principles – for multiple benefits, inclusion, equity and addressing the underlying causes of climate and biodiversity loss – can undermine one another. Advancing the provision of high-quality urban nature will therefore require explicit strategies and ongoing work to ensure that synergies are maximised and trade-offs made visible and reduced. Key issues include how to involve private sector actors – who can be critical in terms of achieving climate and economic outcomes – and communities – which is essential for meeting attributes of inclusion and equity. The enabling factors that can support and sustain NBS that can realise the attributes required for high-quality urban nature provision are identified.

In **Chapter 4** we turn specifically to examine the role that standards can play in safeguarding and supporting the provision of high-quality urban nature. The term standards covers a range of mechanisms, both mandatory and voluntary, used by government and non-state actors, which can be highly detailed technical blueprints through to targets, goals and guidelines. In relation to standards that can enable high-quality urban nature provision, we distinguish between metric-based standards, which operate with specific quantitative targets, and principle-based standards, which identify common objectives to be pursued but enable local conditions and priorities to be taken into consideration. Exploring the ways in which standards can, counter-intuitively, lead to negative outcomes for sustainability we suggest that principle-based standards which allow for diversity and justice to be incorporated into their design and use provide the basis to safeguard, support and drive forward ambition for high-quality urban nature. Rather than focusing on what can be counted, this requires a focus on ‘what counts’ – the quality of urban nature provision – to enable municipalities in the Netherlands to both meet national, European and international policy goals and to improve the quality of life for their communities.

## 2 Understanding the Benefits of Urban Nature in Practice

In this chapter, we focus on how NBS initiatives can contribute to the provision of high-quality urban nature. As set out in the Introduction, the core principles that underpin the provision of high-quality urban nature are that NBS: (1) provide multiple benefits; (2) foster inclusion; (3) ensure equity; and (4) contribute to addressing the underlying causes of climate change and biodiversity loss. Analysing 1000 urban NBS initiatives from the Urban Nature Atlas (UNA), a database created by the NATURVATION project, in this chapter we focus particularly on the first principle - understanding the extent to which NBS generate multiple benefits for four core societal challenges of climate adaptation, biodiversity, health, and economic development – and how these efforts interact with fostering inclusion, ensuring equity and addressing underlying causes. This involved a statistical analysis of the difference between sub-sets of those initiatives which had stated goals for and/or reported/expected impacts in at least three of the core societal challenges when compared to one another and to the UNA dataset of 1000 European initiatives. A multivariate analysis was also performed to test and validate the relevance of the results. In a large sample with diverse data points such as the UNA, even weak correlations produced through this method provide a good indication of association between different variables and specific outcomes (Almassy and Maia, [2022](#)).

In the first part of the chapter (Section 2.1), we compare sub-sets of NBS initiatives from the UNA that either set goals and/or report/expect benefits in relation to three or more of these core challenges and identify patterns in the dataset that point to their core characteristics. The UNA also contains evidence on the kinds of actors involved in NBS initiatives and the forms of community engagement and participation they deploy, which provides insight into the extent to which existing NBS initiatives are fostering inclusion (Section 2.2). Although the dataset has rather limited evidence on which social groups either participate in or benefit from NBS it does allow us to draw some findings concerning the degree to which existing initiatives ensure equity (Section 2.2). By considering the additional benefits that NBS initiatives either seek through goal setting or report/expect we can also analyse the extent to which key underlying causes of climate change and biodiversity loss – particularly climate change mitigation, sustainable consumption and production and education for environmental values – are being addressed through NBS initiatives (Section 2.3). In the final section (Section 2.4), we consider the governance and investment factors that support NBS initiatives which generate multiple benefits and the extent to which these factors also support those initiatives which perform well against the other attributes of high-quality urban nature provision – inclusion, equity and underlying causes - followed by a short summary of the main insights from this quantitative analysis (Section 2.5) before moving towards the in-depth qualitative analysis in Chapter 3.

Figure 2.1. European cities included in the Urban Nature Atlas.



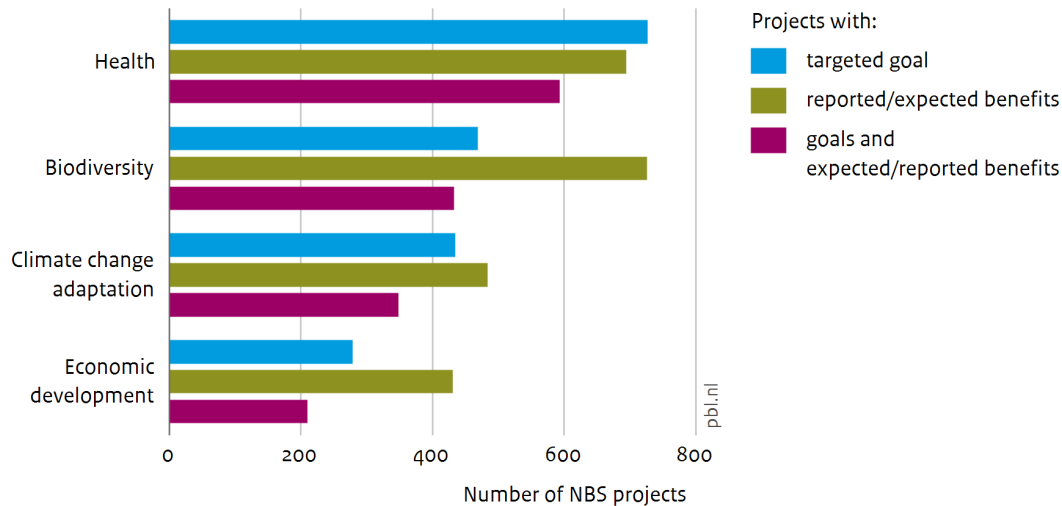
## 2.1 Realising Multiple Benefits

The UNA distinguishes 12 societal challenges relating to the UN Sustainable Development Goals and within each 2-6 sustainability goals that urban NBS have the potential to address (Raymond et al. 2017a; Almassy et al. 2018). For the purposes of this report, we selected those goals and reported/expected benefits relevant to four core societal challenges: climate change adaptation, biodiversity protection; health; and economic development (Annex 1). Our analysis focuses on three categories of NBS initiative from the UNA dataset: (a) those which set multiple goals; (b) those which report/expect multiple benefits; and (c) those which set multiple goals and which report/expect multiple benefits towards these goals.

Our analysis suggests that the most common goals adopted by NBS initiatives are those related to: health (73% of the total number of initiatives), biodiversity (47%), climate change adaptation (44%), and economic development (28%) (Figure 2.2). The most commonly reported/expected benefits are: biodiversity (73% of the total number of initiatives); health (69%); climate change adaptation (48%), and economic development (42%).

Figure 2.2

### Overview of NBS projects addressing relevant sustainability goals and delivering benefits



Source: UNA data

When it comes to the core societal challenges of climate change adaptation, biodiversity, health and economic development on which our analysis focused (Table 2.1), 254 NBS initiatives set goals in related to at least three of these challenges, and 57 addressed all four areas. Interestingly, more initiatives in total reported/expected multiple benefits than set multiple goals: 464 NBS initiatives for at least three challenges, and 134 across all four. Whereas 181 NBS initiatives set goals and reported/expected benefits for at least three challenges, and only 33 initiatives for all four challenges. This suggests that NBS initiatives may not always identify how they can contribute to, or wish to set expectations that they can deliver benefits across multiple goals simultaneously. In this sense, NBS initiatives may currently be under-promising and over-delivering. Below we consider further why this might be the case.

We find that NBS initiatives usually set goals across multiple societal challenges (4.59 challenges on average). Those that address at least three of the core societal challenges aimed to address an even higher number (6.16 - 7.56 challenges on average) and set additional goals (Figure 2.3):

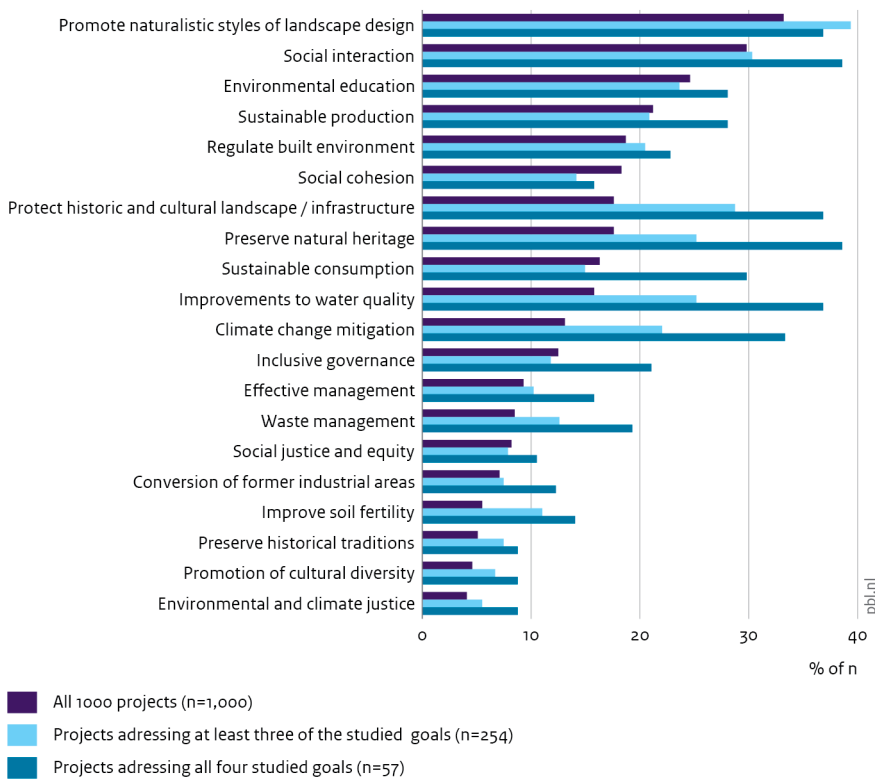
- Promotion of social interaction (39%)
- Preservation of natural heritage (39%)
- Promotion of naturalistic styles of landscape design (37%)
- Protection of historic and cultural landscape / infrastructure (37%)
- Improvements to water quality (37%)
- Climate change mitigation (33%)

**Table 2.1: NBS initiatives goals and benefits.**

Societal Challenges		NBS Initiatives setting multiple goals	NBS Initiatives expecting/ reporting multiple benefits	NBS Initiatives setting multiple goals & expecting/reporting benefits
Climate Change, Biodiversity, Health & Economy		57	134	33
At least 3 challenges	Total	254	464	181
	Climate Change, Biodiversity and Health	151	274	108
	Climate Change, Biodiversity and Economy	65	170	39
	Biodiversity, Health and Economy	103	248	69
	Climate Change, Health and Economy	106	174	64

**Figure 2.3**

**Percentage of projects addressing additional sustainability goals**



Source: UNA data

NBS initiatives which report/expect to generate benefits in at least three of the four core societal challenges also identify a higher-than-average number of additional reported/expected benefits (Table 2.2), including social justice and cohesion and education among others. For example, out of the 1000 initiatives, 60% reported/expected benefits related to improved social justice and cohesion. Among initiatives that set multiple goals, this ratio was higher: 80% of initiatives that established a goal across the societal challenges of climate change adaptation, biodiversity, health and economic development, also reported/expected benefits related to the category of social justice and cohesion.

**Table 2.2. Average number of societal challenges where impacts were reported/expected<sup>3</sup>**

<b>Average number of environmental goals where benefits were reported/expected</b>	
All 1000 initiatives	1,98
Initiatives addressing at least three core societal challenges	2,62
Initiatives addressing all four core societal challenges	2,89
<b>Average number of economic goals where benefits were reported/expected</b>	
All 1000 initiatives	0,69
Initiatives addressing at least three core societal challenges	1,14
Initiatives addressing all four core societal challenges	1,68
<b>Average number of socio-cultural goals where benefit were reported/expected</b>	
All 1000 initiatives	2,63
Initiatives addressing at least three core societal challenges	3,05
Initiatives addressing all four core societal challenges	3,42

---

<sup>3</sup> Based on the work of the EKLIPSE Expert Working Group on Nature-based Solutions to Promote Climate Resilience in Urban Areas<sup>3</sup> and United Nations Sustainable Development Goals (UN SDG), the UNA distinguishes 12 societal challenge areas that NBS have the potential to address. These include (1) environmental goals related to climate action for adaptation, resilience and mitigation (SDG 13, SDG 7), water management (SDG 6), coastal resilience and marine protection (SDG 14), green space, habitats and biodiversity (SDG 15), environmental quality, regeneration, land-use and urban development; (2) social goals focusing on inclusive and effective governance (SDG 16), social justice, cohesion and equity (SDG 10, SDG 5, SDG1), health and well-being (SDG 3) and cultural heritage and diversity; and (3) economic goals, focusing on economic development and decent employment (SDG8) and sustainable consumption and production (SDG12)

**Table 2.3: Linkages between goal-setting and reported/expected benefits of NBS initiatives addressing the studied core challenges**

Challenge areas	A. No. of initiatives setting goals	B. No. of initiatives report/expect impacts	C. No. of initiatives setting goals & report/expect impacts in same areas	Initiatives which report/expect impacts when setting goals (C/A)	Initiatives which set goals when report/expect impacts (C/B)
<b>Climate change, Biodiversity, Health and Economy</b>	57	134	33	57.89%	24.63%
<b>Climate Change, Biodiversity And Health</b>	151	274	108	71.52%	39.42%
<b>Biodiversity, Health and Economy</b>	103	248	69	66.99%	27.82%
<b>Climate Change, Biodiversity and Economy</b>	65	170	39	60.00%	22.94%
<b>Climate Change, Health and Economy</b>	106	174	64	60.38%	36.78%
<b>Climate change adaptation</b>	435	484	348	80.00%	71.90%
<b>Biodiversity</b>	469	726	433	92.32%	59.64%
<b>Health and well-being</b>	727	694	593	81.57%	85.45%
<b>Economic development</b>	279	431	210	75.27%	48.72%

Our analysis suggests that expected/reported benefits across multiple societal challenges are more likely to be associated with initiatives where these goals are also set (Table 2.3). For instance, 57% of those NBS initiatives that set goals relevant to the core challenges of climate change adaptation, biodiversity protection, health and well-being and economic development also reported/expected benefits for all these challenge areas (33 out of 57 initiatives). In practice, however, formal goal-setting does not necessarily precede implementation; therefore, it is not possible to confirm the possible positive influence of goal-setting on future benefit delivery. Moreover, as shown in Table 2.3, initiatives can expect/deliver multiple benefits without associated goals. Out of the 134 initiatives that expected/delivered benefits relevant to all core challenges of climate change adaptation, biodiversity protection, health and well-being and economic development, only 33 had underlying goals (24% in total). This indicates that multiple outcomes occur without goals set in the same challenge areas.

As we explore further in Chapter 3, having a vision and strategy for achieving high-quality NBS is an important factor in the success of initiatives. Yet our finding that many initiatives ‘under promise and over deliver’ should also be noted (Table 2.3). This suggests that many benefits from urban NBS initiatives are not anticipated in advance and only emerge through experimentation and learning by doing. It also suggests that actors may be reluctant to set ambitious goals across multiple areas out of concern for the burden of reporting, monitoring and verification that may accompany such promises. Qualitative research has frequently pointed to this barrier in the development of urban sustainability initiatives (Châles et al., 2022; Grabs, 2021) especially for private sector actors – who are concerned about negative publicity – and for community actors – who have few resources to dedicate to these processes. As we discuss further in this report (Section 4.2), these actors are crucial for achieving high-quality urban nature provision and as such these

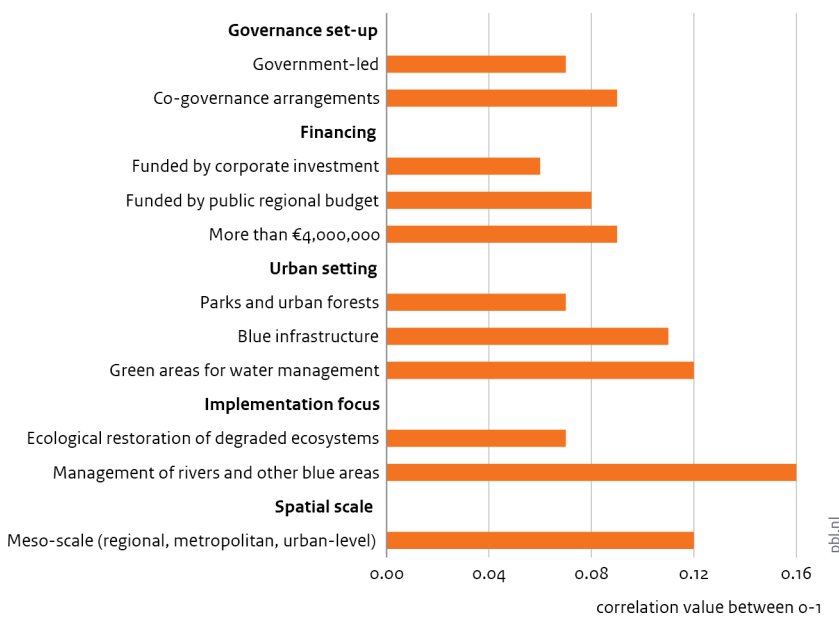


findings suggest that if we are to reap the multiple benefits of urban nature provision any reporting system must be proportionate to ensure their continued involvement.

When it comes to the characteristics of NBS initiatives – their spatial and financial scale, the type of urban nature deployed and the actors involved – our analysis identifies patterns that are associated with those initiatives that seek to realise multiple benefits. In terms of **spatial scale**, we find that initiatives that take place at the micro-scale (district or neighbourhood level) and especially on the meso-scale (regional, metropolitan and urban level) are more likely to set multiple goals and/or report/expect benefits across three or more of the core societal challenges compared to street and building-scale initiatives at the sub-micro scale. A weak positive correlation between multiple benefit delivery and regional or urban-level (meso-scale) implementation was confirmed through multivariate analysis (Figure 2.4). At the same time, a weak negative correlation could be identified with sub-micro-scale implementation.

**Figure 2.4**

**Implementation features of NBS projects with higher likelihood to deliver multiple benefits**



Source: UNA data

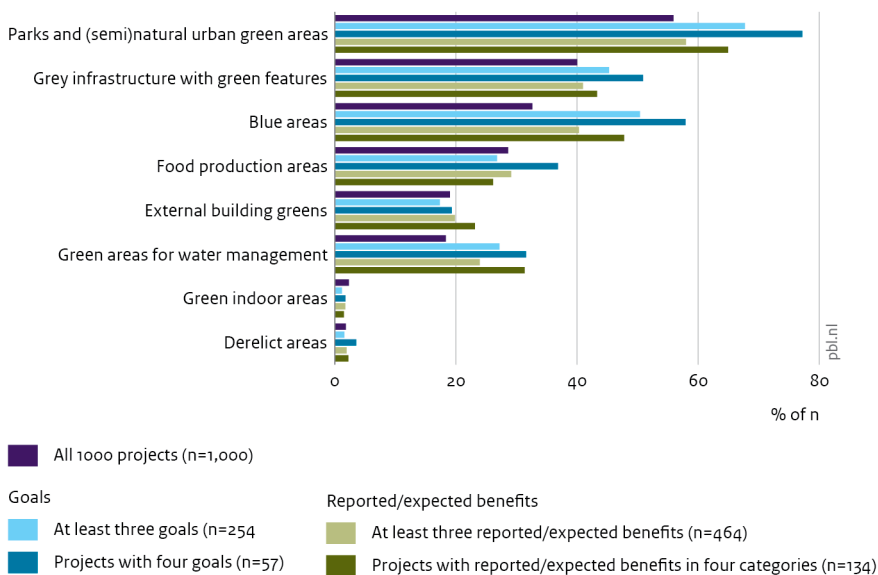
This suggests that street and building scale initiatives are likely to produce benefits that target fewer societal challenges. Mechanisms that can join or align such initiatives towards collectively addressing a wider range of societal issues could enable these forms of NBS to make a more significant contribution to the provision of high-quality nature. Neighbourhood or urban scale intermediary organisations that support and enable individual initiatives to collectively contribute to wider benefits could be a useful form of support (see Chapter 3). Partly reflecting their spatial scale, initiatives that set multiple goals and/or report/expect multiple benefits were also more likely to have a larger budget (Figure 2.4), while initiatives below 500 000 EUR are less likely to either set goals for or expect/report that they are able to deliver across multiple societal challenges, perhaps as a result of limited capacity to monitor and report results.

NBS initiatives that set goals and/or report/expect benefits across multiple challenges commonly involved several **types of urban nature**. They were more likely to take the form of **blue areas, green**

**areas for water management and parks and urban forests** (Figure 2.4 and Figure 2.5). NBS focused on external building green (e.g. roofs and walls) and green/grey infrastructure were less likely to set multiple goals but still demonstrated potential benefits. The prevalence of private sector actors in these types of initiatives may also explain the presence of fewer explicit goals – both because of a narrower focus in terms of delivery/responsibility in relation to the provision of urban development and infrastructure and also because of the noted reluctance of such actors to promise benefits that are difficult to monitor/evaluate (e.g. related to biodiversity and health) and which may take several years to materialise (see Chapter 3). Here there could be a missing opportunity to develop frameworks that encourage and support such actors to be more ambitious in their provision of urban nature, through mechanisms that recognise and reward efforts to design and deliver high-quality urban nature such as certification schemes, awards and endorsement.

**Figure 2.5**

**Share of urban settings and their targeted goals and reported benefits**

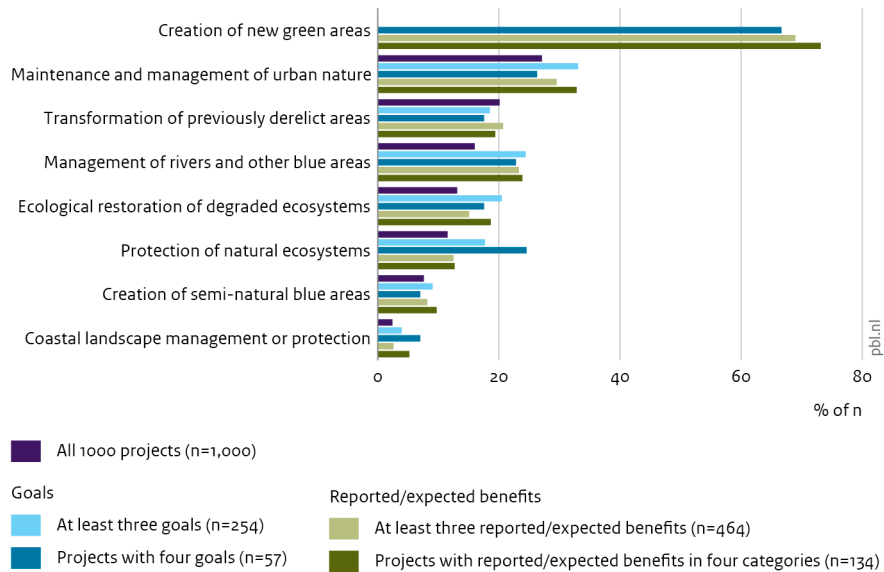


Source: UNA data

Those urban NBS initiatives that set multiple goals and/or report/expect benefits across different societal challenges were more likely to involve several types of urban nature, such as creating new urban nature, maintaining and managing existing green and blue areas, protecting or restoring natural ecosystems (Figure 2.6). The creation of new green spaces is prevalent across the 1000 cases analysed, but those which report/expect multiple benefits were more likely to implement additional actions, including management/maintenance of green-blue spaces and protection and restoration of existing natural area. Although those NBS initiatives that focus only on creating green areas were less likely to set multiple goals they still report/expect multiple benefits, especially in terms of contributing to health and economic development. This suggests that even simple measures can generate multiple benefits. Equally it is important to recognise that many such initiatives are led by community groups who are often reluctant to adopt multiple goals where it leads to onerous reporting requirements for which they have limited resources (Grabs, 2021; see Chapter 4).

**Figure 2.6**

**Comparison of implementation focus of all European projects and projects with multiple goals and benefits**



Source: UNA data

Initiatives which focused on maintaining *existing* urban nature had an above average likelihood to report/expect multiple benefits suggesting that there could be untapped potential in existing urban nature areas which could be repurposed through new NBS initiatives towards addressing multiple societal challenges with the right frameworks and support in place. This is especially true when it comes to biodiversity, with urban NBS initiatives that focus on the restoration and protection of existing nature more likely to set goals for this issue than those that focus on new green and blue urban nature. Those initiatives which concerned blue infrastructure management, including both existing and new blue spaces and green-blue interventions, were more likely to explicitly set goals for climate change adaptation, suggesting that these forms of urban nature are going to be critical for a climate resilient future. The multivariate analysis also confirmed the above, as it suggests that the management of rivers and other blue areas, ecological restoration of degraded ecosystems, protection of natural ecosystems as well as strategy, policy and plan development are those type of interventions that have a higher potential to deliver benefits in the studied sustainability challenge areas (Box 2.1; Figures 2.4, 2.5 & 2.6).

**Box 2.1: Wetland of Repainville Rouen, France**

Previously used as a 10-hectare market gardening site, the restoration of the wetland of Repainville initiated in 2008 is part of a flagship project by the city of Rouen in terms of safeguarding its local biodiversity involving several types of urban nature (UNA, 2021e). Besides having a significant central purpose of protecting and conserving the wetland within the urban park, they also aim to conserve familial and community gardens and support environmental education – contributing to carbon sequestration, local air and soil quality, agricultural economies, recreational activities in natural and biological diverse environments, as well as improving the water quality of the existing ponds and streams.

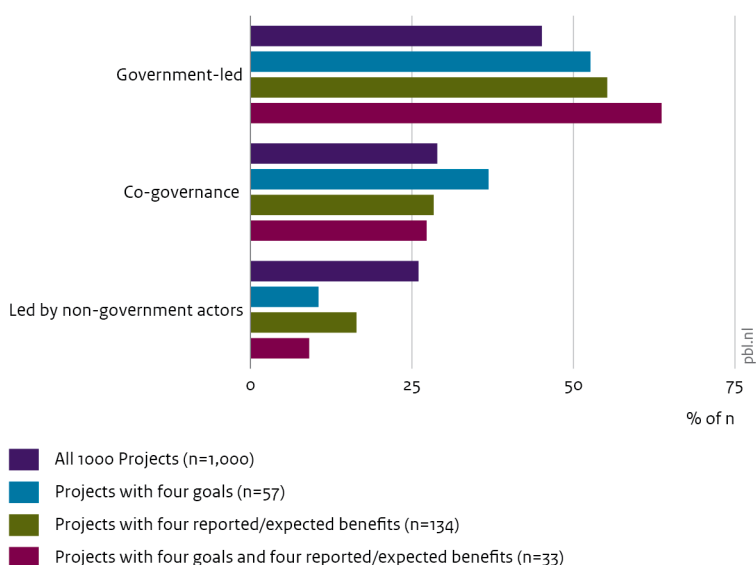
In terms of the **actors involved**, NBS initiatives that either reported/expected benefits or also had goals to address at least three of the core societal challenges are more likely to be government-led or co-governed by public and private actors together than led by private or civil society actors alone (Box 2.2). The multivariate analysis also found that initiatives implemented in co-governance arrangements, especially those initiated by regional and local governments, are somewhat more likely to provide multiple benefits (Figure 2.4 and 2.7).

**Box 2.2: The 100,000 trees Project-- Porto, Portugal**

The co-governed 100,000 Trees Project (FUTURO project) in the Porto Metropolitan Area intends to restore 100 hectares of urban forest with native tree species to enrich biodiversity, store carbon, improve air quality, protect the local soil and contribute to a better quality of life (UNA, 2021d). Several public and private entities actively participate in the FUTURO project, offering institutional support and material and human resources. Citizens and local community groups actively participate through tree planting activities as well as in dissemination of information and education, which in 2018 involved over 14,481 parents, children and teachers. By creating training opportunities and activities for citizens (e.g. volunteering program) the project aims to enhance people's awareness and knowledge about local nature. The project created 174 hectares of green space - including 85% of that space in protected territory - and reported an increase in social interaction. A report from 2018 states that 9,877 tons of carbon are sequestered per year, and that 55 tons of atmospheric pollutants are removed from the atmosphere per year, with 0.67 tons of PM<sub>2.5</sub> removed, decreasing air pollution in the city.

When it comes to their benefits, interestingly those NBS initiatives that are co-governed more frequently report/expect multiple benefits across at least three of the societal challenges and are likely to exceed their initial goals compared to those which are government led (Figure 2.7). While leading fewer initiatives overall, initiatives led by non-state actors also more often out-perform their stated goals than government-led initiatives which tend to report/expect fewer benefits than their initial goals. This suggests that the presence of private and civil society actors is critical not only to the performance of NBS initiatives but in driving higher levels of ambition as initiatives progress. It also reinforces the finding above that such actors may be reluctant, for a range of reasons, to commit 'up front' to a set of goals with which they have limited experience and which may appear challenging to achieve. Any framework designed to support the provision of high-quality urban nature then needs to be designed to ratchet ambition over time as actors learn by doing and build their confidence over time.

### Governance arrangements of UNA projects



Bron: UNA data

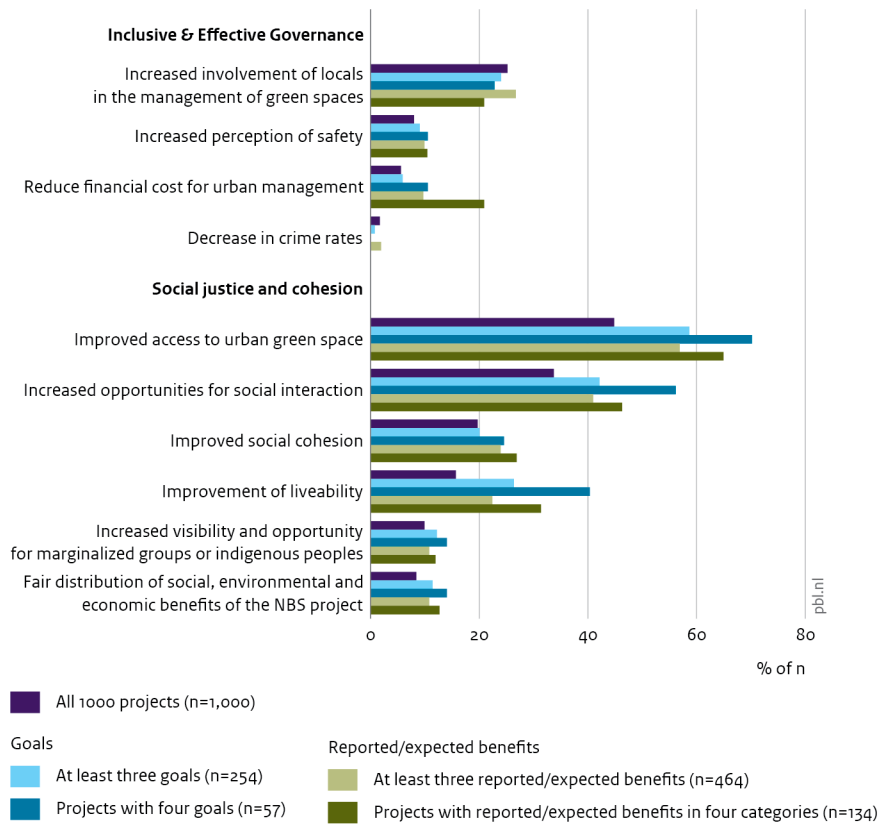
Figure 2.7

## 2.2 Designing NBS Initiatives for Inclusion and Justice

Seeking multiple benefits is a necessary but not sufficient attribute of the provision of high-quality urban nature (Chapter 1). From analysis of the UNA we find that those NBS initiatives which seek to address at least three core societal challenges are also more likely to pursue a range of other goals (Section 2.1) including issues related to social justice, social cohesion and governance (Figure 2.8). In terms of **ensuring equity**, we found that benefits related to improved access to urban green space, improvement of liveability and increased opportunities for social interaction are most commonly reported by initiatives which were likely to be set goals or report/except benefits across the core challenge areas. **With regards to fostering inclusion**, the evidence is more limited, while NBS initiatives that address multiple goals were more economically efficient they tended not to demonstrate a greater involvement of local communities in their governance and management when compared to the overall sample (Figure 2.8).

**Figure 2.8**

**Additional challenge areas, where NBS initiatives are likely to set goals related to inclusion and justice**

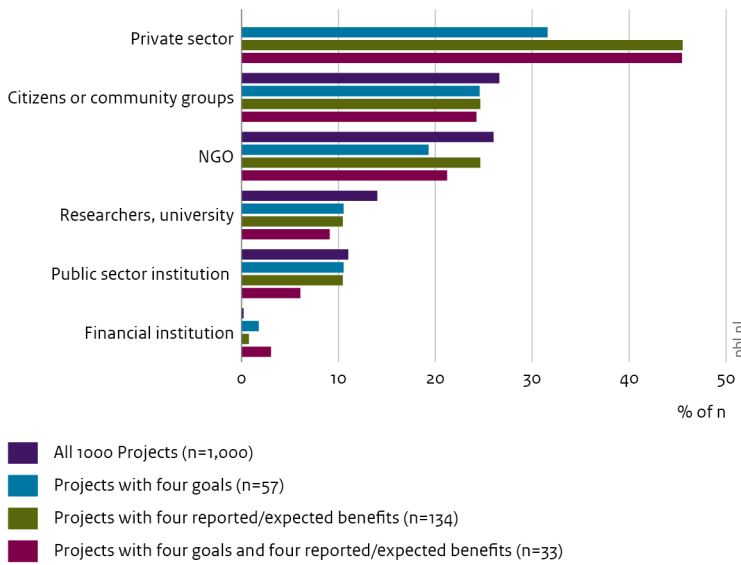


Source: UNA data

Despite the prevalence of co-governance approaches, NBS initiatives which report/expect benefits across at least three of the core societal challenges were less likely to involve non-governmental actors than those from the sample overall. Especially NGOs and citizen groups were less likely to be involved in managing initiatives that set multiple goals and report/expect multiple benefits. The only exceptions are private sector organisations: those initiatives which involve businesses and corporations are likely to report/expect benefits across multiple goals more frequently than those which involve other kinds of non-governmental actor (Figure 2.9).

**Figure 2.9**

**Involvement of non-governmental actors in the UNA project development and management**

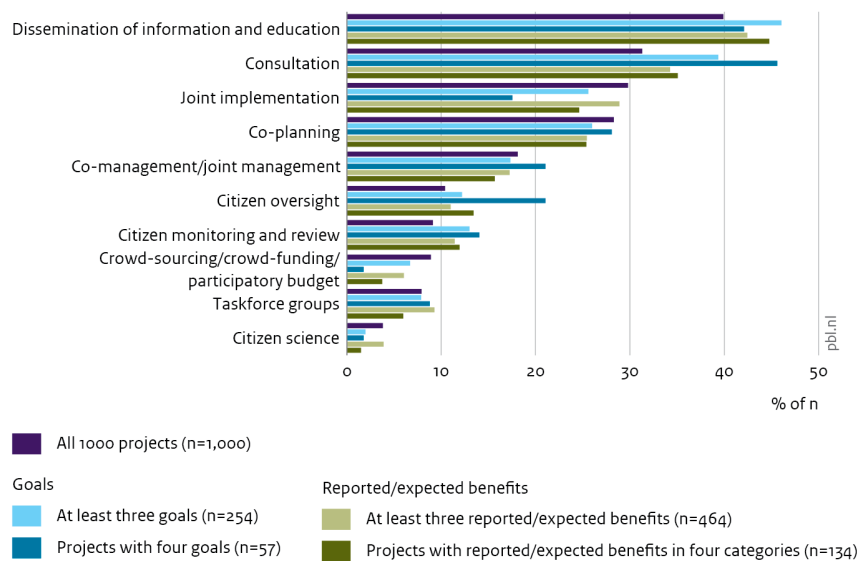


Source: UNA data

This was especially evident when the initiatives focused on climate change adaptation and economic issues. The multivariate analysis also confirmed that where co-governance arrangements involved private actors, EU bodies and multilateral organisations there was an increased prevalence of expected/reported benefits. At the same time, NGOs, citizen groups, and other non-governmental actors seem to initiate and manage initiatives which expect/report multiple benefits less frequently (Figure 2.9).

**Figure 2.10**

**Stakeholder involvement processes of UNA projects**

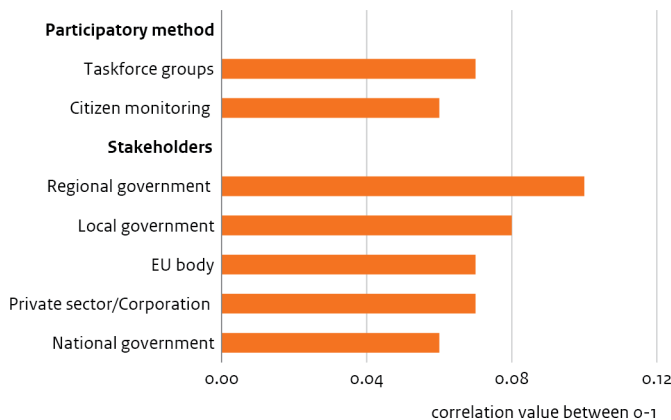


Source: UNA data

In terms of the **processes of stakeholder involvement** the analysis of the 1000 NBS initiatives in the UNA shows that they involved a range of stakeholders through co-planning and joint implementation (30%), consultation processes (31%) and information dissemination (40%). The stakeholders most frequently involved in these forms of engagement were local governments and citizens (79.3%), community groups (65%), private sector organisations (46%), and NGOs (32%). In comparison to the whole sample, NBS initiatives addressing at least three societal challenges in terms of goal setting and/or reported/expected benefits were more likely to focus on consultation and information dissemination and less likely to use innovative forms of stakeholder engagement such as joint implementation or co-production, with the exception of task force groups, citizen oversight and citizen monitoring (Figure 2.10). Although their involvement is primarily related to consultation processes, the results of the multivariate analysis also highlighted the potential importance of citizens involved via citizen monitoring activities to oversee initiative implementation and results (Figure 2.11).

These findings are potentially troubling as they suggest that even though there are stated goals to address social justice and inclusion (as previously shown in Figure 2.8) **in practice there appears to be a trade-off between realising high-quality urban nature provision in terms of addressing multiple goals and those which are inclusive of multiple actors.** One key factor may be the size of initiatives –at present larger (neighbourhood or city-scale) initiatives are more likely to deliver multiple benefits and these initiatives are unlikely to be led by citizen, community or NGO actors while also tending to use more passive forms of participation such as consultation or information dissemination. It suggests both that larger initiatives will need to more explicitly ensure that inclusion is factored into their design and that there is a need for frameworks and mechanisms that can bring together street, building and community scale initiatives that do engage local people in such a way to realise their multiple benefits.

**Figure 2.11**  
**Stakeholder involvement of NBS projects with higher likelihood to deliver multiple benefits across the core challenges**



Source: UNA data



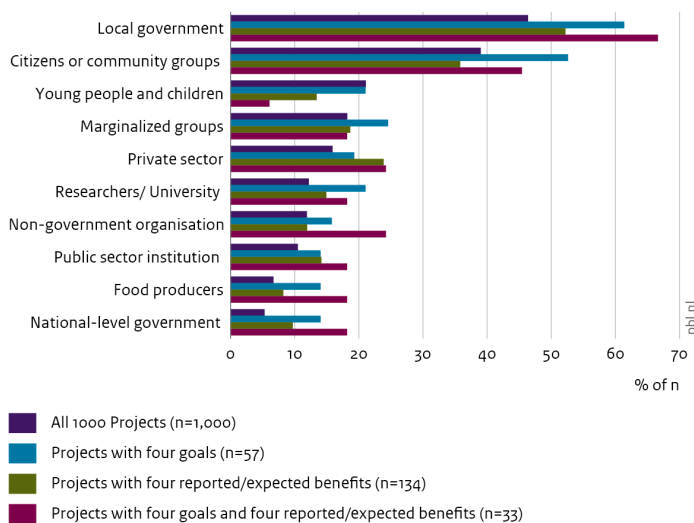
Further, as we discuss in Chapter 3, the key role that private sector organisations play in NBS implementation may pose challenges in terms of the extent to which such initiatives generate changes in urban land values which tend towards exacerbating inequalities that will also need to be explicitly addressed. The potential to work with citizens and communities as a means to provide advice, oversight and monitoring is however promising (Box 2.3), as it could also reduce the reporting burden on key actors – those in the private sector and civil society – who appear to be less likely to set a range of ambitious goals. This in turn suggests that any framework that is developed to support the implementation of high-quality urban nature needs to be **accessible and supportive of the role of citizens and communities in monitoring and evaluation** rather than being overly complex or expert-led.

**Box 2.3: Family Gardens of Montpellier – Montpellier, France**

Since 2004, the city of Montpellier has been creating gardening plot areas for local residents within the city (“Les Jardins Familiaux”) (UNA, 2021C). The gardens facilitate social interaction among gardeners and are practical example of locals managing urban green spaces - providing social cohesion and educational benefits in terms of learning and experimenting with sustainable agriculture, while preserving biodiversity and soil quality and providing access to healthy and affordable food. Moreover, the gardens could improve people’s mental health through re-connecting with nature and enhancing physical health through gardening exercise.

In terms of the **distribution of the benefits of NBS initiatives** those which set goals for all four of the core societal challenges are more likely to seek to involve a higher number of beneficiaries, tending to report that they address all “stakeholder” groups, with a stronger emphasis on local governments, citizens or community groups (e.g. Box 2.4), marginalised groups, young people and researchers/universities. Those initiatives that report/expect benefits across all four challenge areas tend to generate benefits for the private sector and those which set goals and report/expect challenges generate benefits also for NGOs, public sector institutions, food producers and national governments (Figure 2.12).

**Figure 2.12**  
Beneficiary groups of NBS projects



Source: UNA data

#### **Box 2.4: Mill Leat Restoration, Bute Park – Cardiff, United Kingdom**

The Bute Park Restoration project aimed at maximising public access to- and use of Bute Park, while re-flooding the dry original medieval millstream (an open watercourse conducting water to a mill) (UNA, 2021a). By transforming the mill leat into a self-contained, self-regulating and self-circulating system, it reduces the risk of flooding and creates a sustainable water system while providing a new habitat for wildlife. Besides creating a well-managed sustainable water regime, the project contributes to restoring and conserving the historical heritage of the site as well as facilitating opportunities for recreation and education about the role of nature, while supporting biodiversity.



NBS initiatives that identify marginalised groups as key beneficiaries seem to be those with a focus on biodiversity, health and economy related goals, rather than climate change. Where initiatives set goals for these societal challenges and also report/expect benefits in these three areas they also targeted a diverse group of stakeholders but were *less likely to involve marginalised groups*.

***This finding points to a potential challenge – NBS initiatives may identify marginalised groups as key beneficiaries but may not (yet) be able to deliver promised benefits to these groups.*** One implication is that NBS initiatives are getting ‘lost in translation’ and that much more effort will be needed to ensure that intended beneficiaries actually gain from the provision of urban nature. Certainly qualitative evidence supports such an interpretation, given the overwhelming evidence that NBS initiatives are currently not delivering benefits for marginalised groups (e.g. Anguelovski et al., 2018; Triguero-Mas et al., 2022). Our evidence further shows that those initiatives that report/expect benefits across multiple goals are less likely to report NGOs, citizens and community groups as beneficiaries and more likely to identify local government and the private sector as those who stand to gain from their implementation, especially for the latter in initiatives that address climate change.

***A critical issue for the development of a framework to support the provision of high-quality urban nature is then that of ensuring that this does not serve to further entrench urban inequalities such that the benefits of urban nature flow to powerful groups – governments and business – at the expense of communities and citizens.***

## 2.3 Addressing the Underlying Causes of Climate Change and Biodiversity Loss

High-quality urban nature provision has the potential to go beyond meeting sustainability goals for local communities. Evidence suggests that it can also provide a gateway to addressing the underlying causes of climate change and biodiversity loss (Seddon et al. 2019), through for example contributing to climate mitigation (Kabisch et al., 2016), encouraging sustainable consumption and production (Kuhl and Boyle 2021) and in embedding values for nature that support action by individuals and communities that tackle the root causes of these societal challenges. For instance, integrating urban nature into development initiatives demonstrates how urbanisation can support rather than detract from biodiversity efforts – such as repurposing previously industrialised areas into wildlife walkways (Box 2.5).

### **Box 2.5: Port Sunlight River Park – Wirral, United Kingdom**

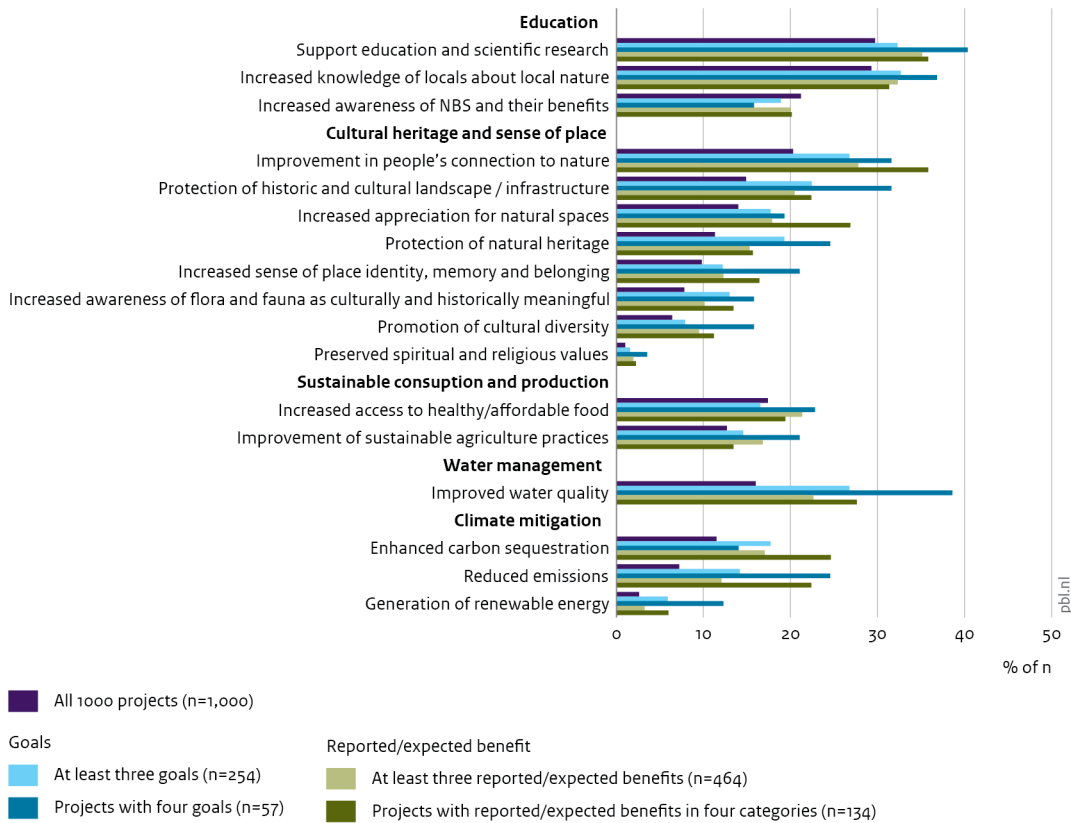
The creation of the Port Sunlight River Park took place on a previously closed landfill site and marsh area that was transformed into a place with interconnected walkways amongst wildlife, wildflowers, woodland and a wetland area (UNA, 2021b). Co-governed by different actors, the project is managed by Autism Together (formerly Wirral Autistic Society) on behalf of the open space management charity the Land Trust aiming to provide an opportunity for a community site that takes local citizens as the primary beneficiaries of the project, while promoting healthy lifestyles. By transforming this landfill site into an attractive waterfront, rich in biodiversity and healthy habitats, this project is benefitting both local communities and economic development of the wider Wirral area and coastline. The project is still ongoing, however intermediate results report that nearly 16,000 trees have been planted with climate resilient species and an increase in the number of bird species has also been recorded (80 bird species). The site is recognised as a valuable green space for the local community and has successfully opened previously inaccessible areas of Liverpool’s historic waterfront.



*Port Sunlight River Park, Wirral*

**Figure 2.13**

**Percentage of projects delivering other benefits  
(besides climate adaptation, biodiversity protection, health and economic development)**



Source: UNA data

Our analysis shows that those initiatives which set goals and/or report/expect benefits across three or more of the core challenges of climate change, biodiversity, health and economic development also were more likely to tackle some of the key areas where intervention is needed to ensure that cities can ensure that their provision of urban nature is transformative (Box 2.6; Figure 2.13).

**Climate change mitigation:** NBS initiatives that set goals and delivered/expected benefits in the areas of climate change adaptation, biodiversity protection, health and economic development, were also more likely to provide climate change mitigation related benefits. These included benefits related to reduced emissions and enhanced carbon sequestration. The analysis suggests that when initiatives delivered benefits across the four core challenges, they were also more likely to have a carbon sequestration benefit (25% of all such NBS initiatives).

**Sustainable Consumption and Production (SCP):** Initiatives setting multiple goals for climate change adaptation, biodiversity protection, health and economic development more frequently identify SCP-related objectives, such as improved access to healthy food and improved agricultural practices. However, NBS initiatives which delivered/expected benefits across multiple challenge areas do not seem to deliver SCP-related benefits more frequently.

**Cultural heritage and sense of place:** Benefits related with this category are more probably delivered by initiatives that set multiple goals or expected/delivered benefits in the core challenge

areas. Within this category, the most commonly found benefits are the protection of historic and cultural landscape, protection of natural heritage and improvement in people's connection to nature.

**Education:** Initiatives that addressed multiple goals and/or delivered benefits across these areas were somewhat more likely to deliver education-related benefits. Such initiatives somewhat more frequently supported education and research activities and increased knowledge about urban nature for local people.

#### **Box 2.6: Agrarian Park of Baix Llobregat – Barcelona, Spain**

Located in the floodplains of the delta and lower valley of the river Llobregat (Spain), the 3500 hectares Agrarian Park of Baix Llobregat (Parc Agrari del Baix Llobregat) is a central part of the metropolitan area of Barcelona (UNA, 2022a). Within the agrarian park they aim to promote sustainable agricultural production while allowing for the preservation of the natural habitat and its biological value. The park also aims to prevent urban expansion, while providing a space for people to enjoy and learn about local environmental protection. Since its establishment, the agrarian park has been recognised as an example of sustainable peri-urban farming, due to its role in preserving cultural heritage, as well as the conservation of natural habitats and local biodiversity. The park acts as a green lung for the Barcelona metropolitan area and supplies the region with seasonal and locally sourced vegetables.

## 2.4 What Factors Enable the Provision of High-Quality NBS Initiatives?

The data collected in the UNA allows us to examine the factors that are associated with high-quality NBS in terms of setting goals and/or reporting/expecting benefits across three or more of the key societal challenges of climate change, biodiversity, health and economic development. In this section we examine specifically **the role of governance** – in terms of policies, standards, incentives, evaluation and transnational co-operation – **and finance** in terms of the level of investment and the kinds of business model deployed.

Most of the 1000 NBS initiatives in the UNA (73%) are associated with **European, national or local policies**, with 59% linked to local level policies (Table 2.4). Those NBS initiatives addressing three or more of the core societal challenges were frequently associated with local policies (Figure 2.14), especially those that set goals for climate change adaptation. Interestingly, while EU policies seemed to be positively associated with those initiatives that set multiple goals this was not the case when it came to reported/expected benefits.

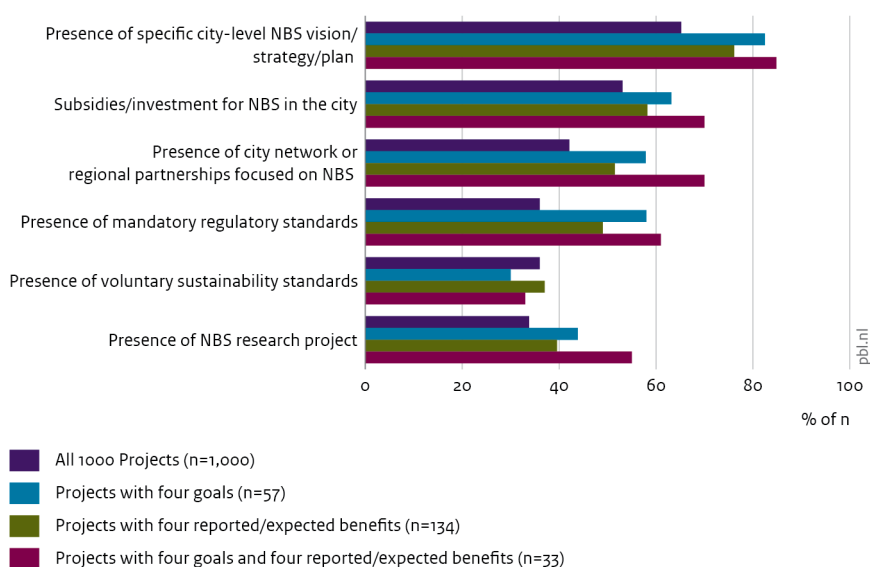
**Table 2.4. NBS Initiatives driven/influenced by policies (across the 1000 UNA initiatives)**

Policy Drivers	Number of initiatives
NBS initiative implemented in response to an EU Directive/Strategy	232
NBS initiative implemented in response to national regulation/strategy/plan	278
NBS initiative implemented in response to local regulation/strategy/plan	589

At the same time it is worth noting that this association with policy is not primarily a matter of regulatory requirement, as only 36% of the overall sample of 1000 NBS initiatives were implemented to ensure compliance with a policy or regulation, equal to those initiatives implemented in accordance with **voluntary sustainability standards** (36%). Initiatives that set multiple goals (and to a lesser extent) reported/expected multiple benefits related to the four key societal challenges were somewhat more likely to respond to the requirements of regulations or policies (Figure 2.14). These mechanisms included **spatial planning guidance, environmental regulations, spatial planning laws or other type of regulations related to buildings or energy.**

**Figure 2.14**

**Key policy mechanisms and instruments supporting the delivery of multiple benefits**



Source: UNA data

Those NBS initiatives associated with compliance with spatial planning laws or environmental regulations were significantly more likely to set goals for and report/expect benefits in relation to three or more of the key societal challenges. In contrast, those initiatives that were associated with voluntary sustainability standards were less likely to set goals for three or more of these societal challenges but much more likely to report/expect benefits across at least three of climate change, biodiversity, health and economic development (Figure 2.14). Of the mix of voluntary standards

identified, planning guidance and building certification schemes were more commonly associated with reported/expected impact across multiple challenges than voluntary environmental standards and corporate sustainability reporting. This strong role for voluntary standards in reported/expected impacts rather than goal-setting mirrors the profile of initiatives that have private sector and civil society actor involvement, pointing to their preference for the use of voluntary approaches and equally to the importance of mandatory approaches for government actors. Designing a framework that can offer an approach to the use of standards that suits both the preference for mandatory approaches amongst (local) government actors whilst also harnessing the potential of voluntary standards to drive action amongst the private sector and civil society is likely to be key to ensuring that they work to successfully deliver high-quality urban NBS.

**Box 2.7: City Park Urban project at Plaine Achille-- Saint-Etienne, France**

The Saint-Etienne Public Development Agency (EPASE) and the town hall of Saint-Etienne have set up an ambitious eco-neighbourhood project to renovate and re-vegetate 13 hectares of public space (e.g. cement removed and replaced by stabilized and fertile soil), enhancing access to nature while fostering biodiversity (UNA, 2021f). The government-led project was financed by EPASE in a partnership between the state, the city of Saint Etienne, the General Council of the Loire and the Rhône-Alpes region. One of the drivers of the project was the commitments of the National Plan on Restoring and Valorising nature in the city, which sets out the need to develop proximate natural spaces in terms of quality and quantity, embed culture and shared governance and enable citizen participation. Additionally, the national plan “Nature in the City” launched in 2010 was also a driver of this project through its commitment to restore multifunctional urban nature.

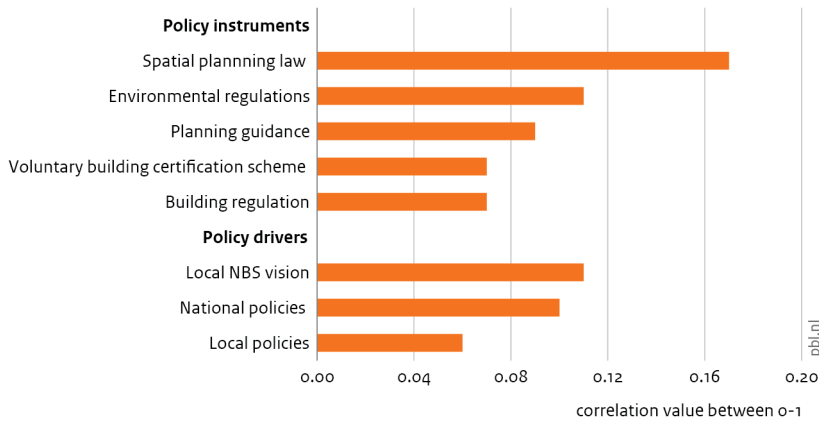
Beyond formal regulatory requirements and voluntary standards a number of other policy mechanisms and instruments are associated with the development of NBS initiatives that deliver multiple benefits (Figure 2.14). We find that **visions, strategies and plans** that specifically focus on NBS play a significant role, associated with 65% of the 1000 initiatives we analysed. They are particularly significant in relation to those initiatives that set goals for and/or report/expect benefits related to studied multiple challenges, with green infrastructure plans, green space strategies, biodiversity strategies, municipal environmental plans and to a lesser extent, general municipal plans, more frequently identified in these initiatives and especially those that focus on climate change and biodiversity. **National or transnational networks and research initiatives** were associated with more than one-third of all the European NBS initiatives and were more prevalent in those addressing multiple goals. **Public subsidies or private investment programs** supported the implementation of over half of the initiatives in the total sample and stands out in those which seek to set goals for climate change, biodiversity and economic challenges (Box 2.7), but a wider range of financial support mechanisms were associated with those initiatives that reported/expected benefits across three or more societal challenge.

A subsequent multivariate analysis also confirmed that relevant national and local strategies and policies are associated with those NBS initiatives that report/expect multiple benefits across the key societal challenges. A moderate correlation can also be identified when cities have a pre-existing vision or strategy in place, these can also positively influence the benefits that are

reported/expected across the core challenge areas. The analysis also confirmed that when initiatives are implemented to ensure regulatory or policy compliance, it also increases the likelihood of reporting/expecting multiple benefits. Among mandatory mechanisms, environmental regulations and spatial planning laws stand out as potentially important measures. In addition, voluntary building certification schemes also seem to have a positive influence on reporting/expecting the delivery of multiple benefits (Figure 2.15).

**Figure 2.15**

**Policy drivers of NBS projects with higher likelihood to deliver multiple benefits**



Source: UNA data

When it comes to **monitoring and reporting** only one-third of the 1000 European NBS initiatives explicitly used a formal monitoring system while a further third reported using impact assessment and various forms of data collection to evaluate their initiatives, with only 11% involving citizens in evaluation processes. Perhaps surprisingly, those initiatives that set goals and/or reported/expected benefits across multiple goals were not more likely to have a formal monitoring system in place but were more likely to record/monitor their impacts and to involve citizens in the process of evaluation.

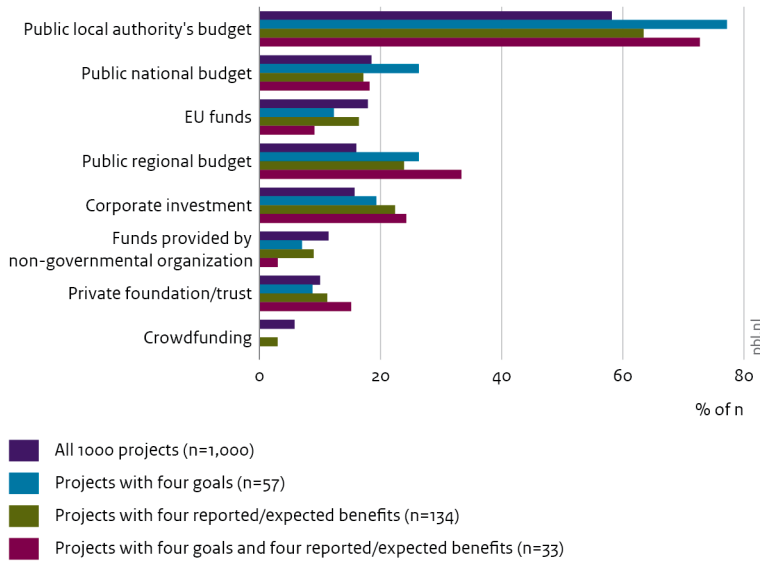
From the total number of the 1000 European initiatives included in the UNA, municipalities or public local authorities are the most prevalent **investment source** for NBS initiatives (58%), with other funding sources including public national budgets (19%), EU funds (18%), public regional budgets (16%) and corporate investment (16%). Investment provided by local, national and regional authorities and private companies was more frequent when initiatives set multiple goals and reported/expected multiple benefits related to the studied challenges of climate adaptation, biodiversity, health and economic development. The multivariate analysis also confirmed that the involvement of local and regional public authorities as financing organisations, represented a potentially relevant stimulus for delivering multiple benefits. Funds provided by national government are more frequently associated with initiatives that set goals in at least three of the core societal challenge areas but less frequently associated with those initiatives that report/expect benefits across these areas (Figure 2.16). However, where initiatives are (also) funded by the private



sector there is a higher level of reported/expected benefits across multiple goals. **This suggests that national government funding may be most effective when it is combined with other sources, especially from the private sector**, though the challenges of bringing public and private finance together remain a significant puzzle (Kiss et al., 2019).

**Figure 2.16**

**Sources of finance for high-quality urban NBS**



Source: UNA data

When it comes to the **type of investment** direct funding or subsidies are most common in the sample of the 1000 initiatives overall (56%), followed closely by earmarked public budgets (51%). Innovative financing sources, such as membership fees, tax exemptions, equity funding, asset-backed funding are the least utilized (1% for all). Those NBS initiatives that either set goals across three or more of studied key societal challenges were more frequently associated with both direct funding and earmarked public budgets than initiatives in general, with earmarked funds especially associated with initiatives that report/expect multiple benefits especially those that address climate change. We find that specific **business models**<sup>4</sup> are more frequently associated with initiatives that set multiple goals and/or report/expect multiple impacts-- urban offsetting and risk reduction models are more common, but local stewardship and green health business models are less frequently associated with these kinds of initiatives. Green densification business models were especially associated with NBS initiatives that expected/reported benefits in three or more of the key sustainability challenges.

<sup>4</sup> See Annex II for an overview of the different business models as defined by Toxopeus (2019)

## 2.5 Summary

NBS have the potential to contribute to the provision of high-quality urban nature. Our analysis demonstrates that **many NBS initiatives across Europe are already addressing at least three of the core societal challenges of climate change adaptation, biodiversity, health and economic development**, while also pursuing a range of other goals in particular social justice as well as inclusive and effective governance and additional issues needed to get to the heart of biodiversity loss and climate change. **At the same time there are emerging trade-offs**. NBS initiatives that address multiple societal challenges seem to be less likely to take an inclusive approach to initiative design and implementation, more often focus on government and business as beneficiaries and less often include citizens, communities and NGOs and may not deliver promised outcomes for marginalised groups. In part this reflects the characteristics of those initiatives that are now addressing multiple goals, which tend to be implemented at larger scales and supported by bigger budgets, the involvement of private sector actors and aligned with European, national and local policy goals. One means of tackling these trade-offs is to support initiatives that work with existing forms of nature, that are smaller in scale, and which take more innovative approaches to the inclusion of citizens and the distribution of their benefits. The design of a future framework for the implementation of high-quality urban nature provision will need to take this into account.

A particularly notable finding from our analysis of the UNA is that **there are a large number of initiatives that under promise and over deliver**. We identify 181 initiatives that report/expect benefits for three or more of the core societal challenges and 283 initiatives that report/expect benefits for four or more of these issues where they did not establish such goals.

While the probability of an initiative reporting/expecting benefits across multiple goals is higher when goals are in place, this finding demonstrates the importance of **learning by doing** within NBS initiatives. In these cases, it may be that **actors are either not sufficiently sure** of the potential outcomes that the initiatives will generate **or are reluctant to commit to goals** which may attract significant critique if they are not met (particularly for those in the private sector) or require onerous reporting (a finding in common with many studies of civil society led sustainability initiatives). This is also evident in the limited use of formal monitoring and reporting systems and the relatively low proportion of initiatives driven by regulatory requirements or voluntary standards, despite our evidence that both mandatory and voluntary instruments are associated with initiatives that report/expect multiple benefits. This suggests that **the development of any framework** designed to support the provision of urban nature **must be sufficiently accessible and flexible** for those actors who have not historically used standardisation approaches. This is important not only because of the principle of fostering inclusion, but also because our analysis suggests that such actors are critical to the delivery of high-quality initiatives that can be transformative both in terms of their process and outcomes for urban places and communities to be.

Another crucial finding from this analysis relates to the **importance of diverse types of urban nature** in delivering high-quality urban nature, especially when it comes to realising multiple benefits. Rather than only being focused on urban green space, we identify **blue areas, green areas for water management and, to a lesser extent, parks and urban forests** as associated with initiatives that set and/or report/expect benefits across three or more of the societal challenges of climate change adaptation, biodiversity, health and economic development. The types of initiatives that have been

more successful in these settings include the management of rivers and other blue areas, ecological restoration of degraded ecosystems, protection of natural ecosystems as well as those which focus on developing visions and strategies that guide NBS implementation. The development of any framework to support high-quality urban nature provision, especially if it intends to deliver on goals for climate change and biodiversity, must ensure that it incorporates blue NBS alongside green interventions.

When it comes to supporting the implementation of urban NBS, we find that **co-governance arrangements are crucial**. Those initiatives implemented through co-governance arrangements, especially those initiated by regional and local governments, are more likely to set goals for at least three of the core societal challenges. Co-governance is also more frequent in initiatives that report/expect multiple benefits, especially where it involves private actors, EU bodies and multilateral organisations. However, we find that NGOs, citizen groups, and other non-governmental actors are less frequently involved in leading or managing those initiatives that report/expect benefits across three or more societal challenge and instead their role is often confined to one of being part of consultation processes though there is some evidence that citizen science is providing one route for more meaningful engagement. At the same time the need to find sources and types of investment that can support NBS implementation points in the opposite direction – towards the greater involvement of the private sector. We find that those initiatives that have leveraged private investment, especially together with governance finance, tend to more frequently report/expect benefits across at least three of the societal challenges of climate change adaptation, biodiversity, health and economic development.

***A crucial task for any framework seeking to support the provision of high-quality urban nature will be to strike the right balance between mobilising the governance and investment capacity of the private sector that is associated with realising multiple benefits from NBS and ensuring that such initiatives are both inclusive and just.***

### 3 Opportunities & Barriers in the Provision of High-Quality Urban Nature

Our analysis of the UNA provides detailed insights into the ways in which NBS initiatives are addressing multiple societal challenges and their potential in terms of fostering inclusion, enabling social justice and addressing the underlying causes of climate change and biodiversity loss. It also demonstrates significant patterns that point towards the ways in which these attributes are linked to one another, as well as associations that indicate the possible factors that are enabling and constraining the development of high-quality urban nature provision. This quantitative analysis usefully describes *what* happens in the provision of high-quality urban nature, but in order to build robust policy that can move this agenda forward it is also important to understand *why* this happens. To explain the potential synergies and trade-offs that arise between the different attributes of high-quality urban nature, in this chapter we draw on the wider literature as well as in-depth qualitative case-study analysis from the NATURVATION project which involved 54 NBS initiatives in 18 cities globally, including over 500 interviews with local authorities, national agencies, business, practitioners, civil society organisations and communities as well as extensive analysis of policy documents and site visits to specific initiatives. This analysis allows us to identify why and how synergies and trade-offs occur between the different attributes of high-quality urban nature and to consider the opportunities and barriers that will face the implementation of principles for urban nature provision in the future.

As we saw in Chapter 2, there are now a number of NBS initiatives across Europe that both set goals for and/or expect/report benefits towards multiple sustainability goals. At the same time, this analysis shows us that ***the majority NBS initiatives do not yet live up to the promise of delivering multiple benefits and that there are only a few initiatives which are also inclusive, equitable and address the underlying causes of climate change and biodiversity loss.*** In the first part of this Chapter, we identify the key trade-offs and synergies that emerge in seeking to generate multiple benefits before then turning to consider the challenges of enabling inclusion (Section 3.2), ensuring equity (Section 3.3) and tackling the underlying causes of climate change and biodiversity loss (Section 3.4). In the final part of the Chapter, we identify the governance and finance barriers and opportunities that face the implementation of NBS initiatives (Section 3.5). We consider how a ‘positive spiral’ can be established so that the principles for the provision of high-quality urban nature become mutually self-reinforcing and a ‘negative spiral’ can be avoided.

## 3.1 Trade-Offs in Realising Multiple Goals

Despite the growing recognition that urban NBS are a crucial means for tackling intertwined sustainability challenges (Dushkova and Haase, 2020) in practice trade-offs often emerge between these goals which need to be carefully considered in order to deliver high-quality urban nature (Chausson et al., 2020; Kabisch et al., 2017a; Raymond et al., 2017a). Such trade-offs are not simply a technical matter, e.g. of improving the design of urban NBS, but instead involve political questions about which issues, values, places and people are given priority as well as extent to which and for whom nature-based interventions actually offer solutions.

**One key trade-off is between economic goals and those for social or environmental outcomes.** In many urban areas, there is significant pressure on land for development and housing as well as requirements to maximise financial returns on investment, which can limit the space given to nature and lead to contestation between different actors as to the purpose of urban nature provision (Kotsila, 2017). A primary focus on economic development and financial returns can compromise social and environmental benefits. NATURVATION research in Munich found that while the city aims to become greener, creating housing for a fast-growing population is prioritised over ecological objectives (Box 3.1).

### Box 3.1: Illustrations from NATURVATION research showing trade-offs between economic goals and social or environmental outcomes



#### Munich

A representative of 'Green City' in Munich argues: "...there have been changes in the regulations that have negatively affected our work; for example a decision from the City Council from last year was to reduce the green area per citizen from 14 m<sup>2</sup> to 7 m<sup>2</sup>, which is 50%. This clearly gives the priority to densification and not to greening" (Interview in Kiss and Wamsler, 2018).

#### Boston

A Waterfront Initiative grantee argues: "Also, even if you go out and you want to go on a ferry ride or something, it costs money, it's expensive....As much as there is so much to do, it is just inaccessible for a lot of people" (Interview in Kim, 2018)



#### Utrecht

The co-founder of 'Food for Good' community garden argues: "The learning exercise is about finding the balance between societal and financial returns. You need a certain turnover, and if entrepreneurial activities are restricted then you need a societal contribution. The government and funds need to fill that gap" (Interview in van der Jagt and Dorst, 2017)

This research also found that even when urban NBS are implemented, conflicts can arise between ensuring economic goals are met and their environmental benefits. For instance, in The Eco-Valley of the Sino-Singapore Tianjin Eco-City, commercial interests are prioritised over ongoing bird conservation efforts (Katona, 2018) while in the Metropolitan Park in Athens, socio-economic activities are reducing its capacity to provide ecological functions (Kotsila, 2018). Economic goals can also override social concerns, especially where new urban developments are built as 'enclaves' that are detached from the existing neighbourhood and either explicitly or implicitly police who can access urban nature, as is the case in Boston (Box 3.1) (Kim, 2018).

Another trade-off arises **between the goals of environmental and social outcomes**. The use of nature for recreation, for example in Munich in the Isar river, can disturb species and ecosystem function (Box 3.2) (Kiss and Wamsler, 2018). In Leipzig’s East Quarter Green Spaces initiative built structures for cultural activities that ‘seal’ the soil which hinders ecological outcomes (Werner et al., 2017). This trade-off between social and ecological returns also occurs between the food production goals and ecological benefits of urban green space, as illustrated in the Community-Based Renaturalisation of Winnipeg (Box 3.2) (Katona, 2018).

**Box 3.2: Illustrations from NATURVATION research showing trade-offs between environmental and social outcomes**



**Munich**

The Chair for Strategic landscape planning argues the following regarding the restoration of Isar river:  
*“... there is always a tension between nature conservation and recreation. You cannot entirely resolve that. Maybe they did not expect when they started with the restoration project such success in terms of attracting people to the river. And maybe now the nature conservationists are not always happy with the project, because it became also a recreational area”* (Interview in Kiss and Wamsler, 2018).

**Winnipeg**

A Research Fellow of the University of Winnipeg argues the following regarding the community-based renaturalisation project: *“There are huge tensions between rewilding and nature and food, they not always go together. One of the drivers is local food production, as a lot of areas have a lot of veggie patches, and a lot of these gardens have driven native plants and animals out...”* (Interview in Katona, 2018)



**Trade-offs also emerge between different environmental goals.** NATURVATION research found that the development of NBS initiatives can be accompanied by the removal of natural ecosystems, for example in Tianjin for ‘smart’ eco-district for climate adaptation or in Cape Town for the development of new urban developments with water management (Katona 2018, Tozer, 2018; see also Koh et al., 2021), as well as conflicts between which kinds of ecology are needed for biodiversity goals or for flood management goals, as is the case in Munich (Kiss and Wamsler, 2018). **There are also trade-offs between different visions and (valued) aspects of nature**, such as aesthetics, recreation and cultural heritage, and as to the values attached to urban nature by diverse groups (Werner, 2018; Tozer, 2018) and the perceptions of risk and danger (Kotsila and Barò, 2018). Further tensions can arise in terms of which nature is seen as valuable and for which purposes. For example in Cape Town, invasive species are being removed because of their effect on the water availability in the city while others stress their cultural heritage, while in Newcastle schemes to encourage honey bees might displace native insects (Kiss et al., 2019). In the Square Metre for Butterflies initiative in Edinburgh pollinator-attracting plants were perceived as ‘unkempt’ (Van der Jagt and Dorst, 2018), while in the community-initiated re-naturalisation initiative in Winnipeg, some people kept mowing the naturalised landscape, as they perceived the area as unattractive (see Box 3.3 for further illustrations)(Katona, 2018). These cases demonstrate how priorities over the function and value of nature can conflict, such there is no ready-made definition of what constitutes the ‘best’ urban nature in any one context. Instead, it is critical to undertaken open, transparent processes through which the types of benefits

being sought and the values being recognised are made clear, debate and contestation are encouraged, and final decisions acknowledge the trade-offs being made and the communities that have been both positively and negatively affected by these decisions.

**Box 3.3: Illustrations from NATURVATION research showing trade-offs between different environmental goals and visions of nature**



**Munich**

The Chair for Strategic landscape planning argues the following regarding the restoration of Isar river:  
*'And also for nature conservation, there are some limits what you can do, because still you need to make sure that flood protection is always ascertained. You need to make sure that some of the banks look very natural close to the bridges, but they are also underneath the surface hard concrete structures. Also the dynamics of the river limits such a project'* (Interview in Kiss and Wamsler, 2018).

**Utrecht**

The former project leader at Nature and Environment Federation Utrecht argues the following regarding the Roerplein project: *"There was some resistance at the beginning, like 'it will all be destroyed eventually, what's the use? In five years time it will be a mess'"* (Interview in Van der Jagt and Dorst, 2017).



**Montpellier**

A NGO representative argues the following regarding the Green and Blue Urban Network Project: *"Nature is seen as a risk or a legal issue that you need to apply. A constraining thing. And it's not seen as a liberty part of all. Or something you can enjoy"* (Interview in Werner, 2018)

**Evidence suggests that there are multiple ways in which the trade-offs between benefits can be addressed in order to support the provision of high-quality urban nature. Multi-criteria frameworks** for analysing the outcomes of NBS initiatives can be a valuable tool in supporting this approach as can approaches which focus on **experimentation and learning by doing** which allow scope for iterative, adaptive management (Xie et al., 2020). Our findings in Chapter 2 suggest that many NBS initiatives are already developing approaches which allow for additional benefits to emerge through the process of developing NBS. This also points to the importance of **sustaining high-quality urban nature provision over time** – NBS are not 'fit and forget' interventions often producing their benefits over long periods of time (Calliari et al., 2022) and needing to be flexible to adapt under changing climate and social conditions. The resilience of NBS initiatives is seen to be enhanced by their diversity, financial resources, the rights and ownership that communities have, as well as access to ownership and social acceptance (Turner et al. 2022). This suggests that in order to design and implement NBS initiatives in such a way to support their resilience and enable the trade-offs identified above to be addressed, it will be crucial to have diverse actors involved (van der Jagt et al., 2020; Kiss et al., 2019; Xie et al., 2020). However, as Chapter 2 indicated, NBS initiatives that currently report/expect multiple benefits have not tended to be inclusive in their design. This suggests that there may be some trade-offs involved, as we discuss further below, but also raises questions about the long-term resilience of currently existing best-practice initiatives.

### **Box 3.4: Urban Wilderness Opposed to ‘Manicured’ Greenness – Towards Living Landscapes**

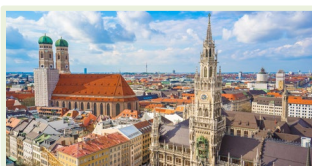
Living Landscapes are centred around the idea to shift from a single NBS to a landscape approach – meeting species’ habitat requirements and creating a network of biologically diverse landscapes (London Wildlife Trust, n.d.). For instance, in Edinburgh Shoreline, nature has been given the “chance to come back and recolonise derelict land”. Intensively maintained landscape features, such as amenity grassland, are transformed to a more biologically rich landscape. This community centred initiative, aims to give 27km coastline back to nature— combining wildlife and cultural heritage in a coastal habitat while reintroducing people with previously unknown history of plant and animal life (NatureScot, n.d.; Scottish government, 2012). They focus on *placemaking*, which is a collaborative, creative approach aiming to meet people’s needs and demands, by organising a range of initiatives such as expert-led community walks, creative workshops and storytelling events (NatureScot, n.d.). Similarly, London Wildlife Trust’s Living Landscapes aims to conserve and restore capital’s wildlife, transforming a heavily polluted river to an ecologically friendly chalk stream (Denton, n.d.).

**Taking a neighbourhood or city-scale approach** can also support the delivery of multiple benefits (Chapter 2). Whilst this approach is often designed from the outset, it is also possible to develop intermediary mechanisms or agencies that act to aggregate or align smaller initiatives, pooling the different benefits that are generated and making them visible (and potentially commercially viable) for other actors. For instance, in Melbourne, the overarching policy framework to create an Urban Forest enables linking a range of small- to large scale initiatives, including parks, wetlands, community gardens, green roofs and river embankments (Kiss et al., 2018). As illustrated by Living Landscapes in Box 3.4, larger initiatives can enable multiple economic, social and environmental goals to be pursued simultaneously.

At the same time, smaller NBS can also deliver multiple benefits, such as the pocket gardens developed at the Roerplein in Utrecht which enhance neighbourhood attractiveness and social cohesion while limiting urban heat (Van der Jagt and Dorst, 2017). Operating at this scale also allows for the use of **multiple settings and forms of urban nature** which lead to multiple benefits (Chapter 2). For instance, in Leidsche Rijn, a sustainable closed-circuit water system was installed, including bioswales, pumping stations, natural wetlands and permeable paving which enables the filtering of stormwater – allowing for enhanced water quality, improving resilience to extreme rainfall events, biodiversity and recreational benefits in this newly built neighbourhood (Van der Jagt and Dorst, 2017). Moreover, Rotterdam’s Waterplan (Rotterdam Weather-Wise) aims to adapt to climate change by installing public green spaces and blue corridors to improve water and air quality as well as biodiversity benefits (O’Donnell et al., 2021). Together, this evidence points to **the potential of taking a landscape approach** when considering the extent to which specific interventions as ‘little dots’ on the map (Munich, Box 3.5) are contributing to high-quality urban nature and to **ensuring that the trade-offs involved within and between interventions are clearly acknowledged**.



### Box 3.5: Illustrations from NATURVATION research showing the potential of taking a landscape approach



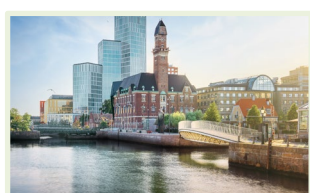
#### Munich

The project manager of Green City argues: *"...It is addressing the dream to have an impact on the whole city. The other projects [of Green City] are little dots on the city map of Munich...."* (Interview in Kiss and Wamsler, 2018).

A senior advisor 'Green environment' argues: *"Before Leidsche Rijn there already had been all kinds of small-scale [sustainable neighbourhood] initiatives elsewhere.[...] In some ways, the Leidsche Rijn neighbourhood is the joint combination of a lot of these small initiatives"* (Interview in Van der Jagt and Dorst, 2017)



#### Utrecht



#### Malmö

An architect of Malmö city argues: *"Small interventions help to create larger momentum..."* (Interview in Kiss, 2017) and the Project Leader of Malmö City argues: *"... (we have to utilize the) momentum from sometimes-criticized pilot projects...when people see in reality, they see they are beautiful, attractive, you can talk about what they deliver... (it is)easier to understand and implement if you can see it"* (Interview in Kiss, 2017)

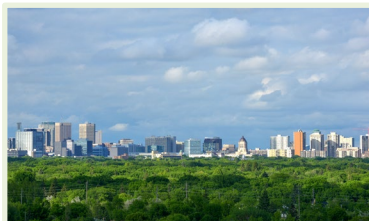
## 3.2 Fostering Inclusive Urban NBS

As set out in the Introduction, the inclusion of local people, knowledge and consideration of place is seen to be a key component of high-quality urban nature provision – both because it helps to ensure that NBS initiatives are supported by key local actors but also because they need to be maintained over time, a process in which local stewardship can be crucial (Tozer et al., 2020). A lack of knowledge diversity, for instance excluding local and indigenous knowledge, is found to negatively affect NBS' resilience and therefore its ability to sustain high-quality NBS over time (Turner et al., 2022). In Mexico City a lack of attention to how indigenous communities could be included from the beginning in the Water Forest Initiative led to significant questions about its validity (Kiss et al., 2019). At the same time, as we saw in Chapter 2, the number of initiatives that prioritise inclusion and which go beyond consultation processes to the deeper and more meaningful involvement of communities is at present rather low. Equally, Chapter 2 demonstrates that including private sector actors can be critical to ensure that NBS initiatives generate multiple benefits, and that those initiatives that were co-governed with either private sector or other non-state actors were more likely to report/predict more benefits than originally anticipated than those which were just led by government actors alone – in this way inclusive co-governance could be a key to those initiatives which 'under promise and over deliver'.

Nonetheless, there are significant challenges facing NBS initiatives when it comes to inclusion, especially when it means involving private sector, civil society and community groups simultaneously so it is critical to identify those factors that can work towards ensuring this principle for high-quality urban nature provision can be achieved. Care needs to be taken to design processes that both account for difference and are accessible, and which do not place an undue burden on communities and individuals with limited time and resources. Nevertheless, research shows that fostering inclusion is key to the delivery of high-quality urban nature.

Findings from NATURVATION and wider literature demonstrate that **accommodating different ways of knowing and valuing nature** is essential in realising its multiple benefits (Anguelovski and Corbera, 2022; Balvanera et al., 2022; Cousins, 2021; Tozer, 2018; Woroniecki et al., 2020). In particular, the inclusion of local values in decision-making processes and the active participation of local communities has been found to build resilience and ensure high-quality urban NBS over time (Turner et al., 2022). Engaging diverse private, public and community-based actors, together evaluating how diverse benefits of urban NBS contribute to objectives beyond a few interests can assist in ensuring that synergies between benefits are identified and pursued. For instance, in Winnipeg, the bottom-up community group Spencer Neighbourhood Association is working together with indigenous groups, building on indigenous knowledge in the creation of urban nature in previously vacant urban spaces – serving multiple NBS goals simultaneously (Box 3.6) (Katona, 2018). At the same time, it is important to make space for contestation over different values of nature and to ensure that the power dynamics involved in some forms of nature being valued over others are revealed through decision-making processes (Blakey, 2021).

**Box 3.6: Illustrations from NATURVATION research and Márkus (2022) showing the necessity of including local people and knowledge**



**Winnipeg**

The Director of Spence Neighbourhood Association argues: *“We are led by the residents, residents are indigenous people. [...] we are so grounded in the people here. We have good engagement, we have good relationships.[...] We talked to the residents, we knocked on every door, surveying what people want to see happening and then we do consultations to narrow down what to do, what’s feasible, and we develop a full plan for the neighbourhood”* (Interview in Katona, 2018)

**Edinburgh**

Within the Little France Park project, the CEO of the Edinburgh and Lothian Greenspace Trust argues: *“I don’t think many solutions will be coming forward from people that come in and experience it. Because it’s still [about] relatively local issues or regional issues possibly”* (Interview in van der Jagt and Dorst, 2018)



**Amsterdam**

Within the Knowledge Mile Park project, a municipality official argues: *“Yeah, that’s also important, because then they could develop kind of feel the feeling of ownership, right. Because their thoughts and their ideas were in it, and then they could see that all this was my idea. And it’s here”* (Interview in Márkus, 2022)



These power dynamics often have deeper roots than any one NBS initiative but can shape the fortunes of efforts to promote urban nature. For instance, in the Liberties Greening Strategy in Dublin, a lack of trust amongst the community regarding NBS was the result of their historical experience with unwanted development in their neighbourhood. Community participation at the level of the neighbourhood, involving (marginalised) communities in multiple stages and **creating spaces for concerns, demands, ideas and needs** can assist in restoring these effects (Kotsila and Barò, 2018). Through bottom-up **co-managing, co-creating approach with local communities as co-owners**, diverse values and needs can be reflected in urban NBS, such as place attachments, sense of belonging and ownership, and cultural heritage (Box 3.7)(WWT, 2022).

In engaging communities in urban NBS design, **principles of transparency, negotiation, inclusiveness and flexibility throughout the NBS design and development process** were found to be essential in order to overcome trade-offs between multiple benefits in Malmö's Ecocity Augustenborg (Kiss, 2017). To support the inclusion of local knowledge, people and place, **intermediary organisations – often operating at a neighbourhood or city scale and who translate interests, values and knowledge between actors – are important**. For instance, the Cape Town Environmental Education Trust functions as crucial intermediary organisation, providing the 'glue' between developers and local communities, while creating spaces for contestation what kinds of nature are realised and for whom (Tozer, 2018). In addition, in Montpellier the semi-public regional organisation has an essential intermediate role in connecting actors in Parc Marianne (Werner, 2018).

#### **Box 3.7: Bolstering Young People's Wellbeing through Engaging with Nature**

In the UK, the 'Our Bright Future' scheme led by the Wildlife Trust actively engages more than 128,000 people aged 11 to 24 in nature projects (Carrington, 2022). Together they restored 3,000 community spaces and 350 nature rich preserves, including former vandalised churchyard which were transformed into wildlife zones with wildflowers and native grasses. Through their practical experience with nature, young participants gained self-confidence, employability and mental health – while feeling increased appreciation for nature and at the same time that they can make a difference in their surroundings.

As this evidence from current research demonstrates, inclusion is not only a 'nice to have' feature of urban nature provision but central to its effectiveness in both the short and long term. At the same time, processes of engagement, participation and co-production can be time consuming and resource intensive. One increasingly prominent approach, as demonstrated in Chapter 2, is the use of **citizen science** as a means of both fostering inclusion, enabling public education and supporting the monitoring of NBS initiatives over time. For instance, through the municipal digital platform Urban Forest Visual in Melbourne and the Barcelona's citizen science Urban Butterfly Monitor Scheme, citizens actively engage with urban nature, whereas in Utrecht people could send photos of their favourite bits of 'accidental' urban nature and stories of residents with these seedlings were shown in the exhibition 'Accidental Greenery, Seedlings of the City' (2021) in Central Museum Utrecht (Kiss et al., 2018; Kotsila, 2017; Toevallig Groen, n.d.). **Creative and design-led approaches**, for example such as that being developed by the National History Museum in London through its Urban Nature initiative can also help to support the inclusion of diverse communities by generating centralised resources and techniques that can be used by multiple community groups, developers and educational institutions across different urban contexts (Natural History Museum, n.d.).

### 3.3 Achieving Equitable Outcomes

Evidence shows that green space is unequally provided across European neighbourhoods including in the Netherlands (De Vries et al., 2020; EEA, 2022a) where lower income neighbourhoods tend to have lower quantity and quality of green space compared to those with a higher socioeconomic status (De Vries et al., 2020). Moreover, qualitative research shows that social and cultural barriers limit the accessibility of existing green space, for example in terms of gender, age or ethnicity (Byrne et al., 2009; Wolch et al., 2014). Increasing the provision of urban green space does not always address this issue and can exacerbate rather than address inequalities (Anguelovski and Corbera, 2022). In particular, research has identified NBS initiatives as associated with the process

of green gentrification whereby the increasing economic value of land that results from urban nature provision serves to price existing residents out of the housing market, urban green space is sometimes provided only for residents of new developments excluding local communities, and/or the benefits of urban nature including for health, well-being and climate resilience flow to those who are already socially and economically advantaged (Anguelovski et al., 2018; Burbidge et al., 2021).

NATURVATION research found these dynamics in play in the Stavros Niarchos Foundation Cultural Center (SNFCC) in Athens, Green Space in Leipzig’s East quarter and East Boston Greenway. In Winnipeg, flood damage control in the city negatively affects upstream neighbourhoods (Katona, 2018) while in Mexico City the water from Xochimilco aquifer gets pumped away to wealthy neighbourhoods (Astbury, 2018). Installing green spaces in Leipzig’s East quarter and East Boston Greenway has resulted in contestations around reinforcing gentrification (Box 3.8) (Kim, 2018; Werner et al., 2017). The exacerbation of inequality through urban nature provision potentially limits their ability to generate multiple benefits. For example, if access to green space is limited to already healthy communities the benefits that this can provide in tackling well-being, obesity, heart disease and so on for those who would gain most means that the benefits are effectively lost. Where NBS initiatives come to be understood as a threat to existing communities and their livelihoods they can experience significant resistance and disruption (Anguelovski et al., 2018), again meaning that the planned benefits from urban nature provision cannot be realised. High levels of social tension and opposition are both damaging for communities and politically challenging to manage, such that over time political support for the provision of urban nature may fade.

**Box 3.8: Illustrations from NATURVATION research showing the necessity to attain equal urban nature outcomes**



**Boston**

A Boston legislator argues regarding the gentrifying East Boston area: *"We've always been the immigrant town. We've always been a gateway community...One of my greatest fears is that we'll lose our identity"* (Interview in Kim, 2018)

**Utrecht**

An user of the community garden Food for Good argues: *"Everyone here is equal, regardless of their background. You work in your own tempo, no one judges you. It is areally good therapy: doing something together, being active and outside, feeling a part of nature"* (Interview in Van Der Jagt and Dorst, 2017).



Moving forward requires that not only that who gains (and loses) from the benefits (and risks) from urban nature provision are explicitly considered, but also that principles of *recognition* are used to identify those groups who have been structurally disadvantaged and excluded from urban nature over time and specific efforts are made to counter-balance and redress historical injustices as well as existing inequalities. This will require ensuring that urban nature provision is not left to market forces and driven primarily by the priorities of economic development to ensure a direct financial return on investment. It also requires an understanding that contested values and visions of urban

nature can be deeply embedded in historical injustices, such as racism, dispossession, exclusion and marginalisation. Revealing these historical and cultural realities and root causes is essential in attaining multiple benefits serving different interests equally (Kotsila and Barò, 2018). For instance, the exclusion of Travellers' is not only taking place within the design and development of the Liberties and Tolka Valley Park NBS initiatives in Dublin, but is deeply embedded in the history of urban development in the city (Kotsila and Barò, 2018). This points to the need for processes of NBS design and development to take account of historical processes of exclusion and how marginalised groups have been made invisible in the city.

One promising starting point is that it is clear that there is no 'one size fits all' urban NBS and working with diversity can be a key means through which to tackle existing inequalities and ensure the multiple benefits of urban nature provision reach those who need them most. Research has found that while large urban parks may generate gentrification (Chen et al., 2021) smaller greenspaces are much less likely to do so (Wolch et al., 2014; Curran and Hamilton, 2020; Bockarjova et al., 2020). In particular smaller-scale NBS, which focus on community needs, cultural identity and place-making, are less likely to contribute to gentrification than parks associated with recreational activities and aesthetics (Maia et al., 2020; Wolch et al., 2014). Moreover, Triguero-Mas et al. (2022) found that newly designated nature preserves, which were meant to foster biodiversity - such as urban forests and biodiversity-rich areas - were not contributing to gentrification across European and North American cases. This suggests that **micro-scale and small neighbourhood NBS initiatives** will be a critical element of high-quality urban nature provision in terms of ensuring equity. At the same time, as discussed above (Section 3.2), such schemes can also support inclusion.

#### **Box 3.9: Embedding Urban NBS in Cultural and Historical Heritage**

NATURVATION research found that embedding urban NBS within its environmental history is an opportunity for realising multiple benefits. In Sofia, the City of Urban Forest and Vrana both connect to Sofia's history, by restoring green corridors and by that means creating its 'own' green heritage, while providing recreational, social and cultural and ecological benefits (Ivanova et al., 2018). In Malmö, restoring trees in their Tree strategy is seen as part of restoring city's cultural history (Kiss, 2017), while in Melbourne installing an Urban Forest assists in building a 'green legacy' (Kiss et al., 2018). With Newcastle's plan to re-establish parks, they also aim to align with the historical Victorian purpose of parks - to enhance the wellbeing and health in the city (Martin et al., 2017).

Nonetheless, such schemes are currently much less likely to report/expect to deliver multiple benefits than larger scale NBS initiatives (Chapter 2), suggesting that **co-ordination and alignment across and between multiple initiatives through intermediaries** can also be a critical mechanism through which to ensure that the different attributes of high-quality urban nature can be delivered together. This focus on the community and neighbourhood level also allows for the **embedding of urban NBS within historical and cultural contexts** which has been found to be crucial for implementing urban NBS (Box 3.9). The Spence Neighbourhood in Winnipeg deals with traumas related to historical colonisation, and combining environmental, economic and especially social objectives has been found to be the 'catalyst' of its successful implementation (Katona, 2018).

In order to ensure equity, past and present injustices need to be acknowledged and compensated for (Castan Broto et al., 2021). Engaging with local communities in its design, implementation and aftermath phase is needed to create urban nature who serves, including marginalised, interests equally.

**Box 3.10: Urban Wetlands for Wellbeing in Bridgwater Blue Heritage, UK**

Wildfowl and Wetlands Trust (WWT)(2022) is working with the local community, the Environment Agency and Sedgemoor District Council to restore and create wetlands in Bridgwater, connecting people to Bridgewater’s maritime history, while providing a range of environmental and social benefits. Bridgwater is prone to flooding and has experienced flooding events in the past, with the last widespread flooding event in 2014. Simultaneously, it is one of the most deprived neighbourhood in the area. With restoring and installing a mosaic of wetlands, this project aims to reduce flood risk, enhance water quality, boost biodiversity, adapt to climate change – while simultaneously providing a range of social and cultural values, including wellbeing, accessibility to nearby nature and connect (deprived) communities with their historical surroundings. By encouraging ownership of the project by local communities, integrating their needs, WWT aims to preserve the wetland and its benefits “long after the project ends”. Ongoing efforts have resulted in a biodiverse wetland (which was previously drained for agricultural usage), a community vision and planting of 1,000 reeds by communities.



*The Bridgwater Blue Heritage project inspires residents to get involved in their local wetlands (Photo credits: Harley Todd / WWT)*

Starting with root causes of unsustainability, including inequality, and embedding urban NBS within social and cultural realities together with local communities enables urban NBS to serve different objectives simultaneously, as shown by the Wildfowl and Wetlands Trust (WWT) (Box 3.10). With their ‘UK’s Creating Urban Wetlands for Wellbeing’ program they take wellbeing and overcoming unequal green space as a crucial starting point, aiming to install NBS in deprived areas. They argue that “the greatest potential to deliver benefits from new wetlands is in places where people lack access to green and blue space and in deprived areas” (WWT, 2022, p. 6). In addition, they draw attention to restoring cultural and historical connection to wetlands, prioritising heritage in restoring and working with nature. This bottom-up approach centres community engagement and improves access to nature. Through an approach which is based on a fundamental recognition of inequalities and past injustice, their work on co-designing, co-creating and co-managing wetlands with local communities ensures that local needs are met and that communities gain a connection with nature while gaining a range of environmental benefits.

## 3.4 Addressing Underlying Causes of Climate Change & Biodiversity Loss

As set out in the Introduction, while the focus of urban NBS is usually the difference they can make to their immediate surroundings and local sustainability international best practice suggests that it is crucial to consider how they can also contribute towards addressing the underlying causes of climate change and biodiversity loss. This is in part to ensure that urban NBS do not contribute to ‘greenwashing’ – which is leading to a widespread lack of trust in NBS initiatives – and also because they provide a significant opportunity through which to tackle four of the key drivers identified within the IPBES report as underpinning biodiversity loss – climate mitigation, land use change, sustainable consumption and production and environmental values (IPBES, 2019). The provision of urban nature has the potential to address these underlying causes through, for example, reducing the amount of energy needed to cool individual buildings and neighbourhoods, providing spaces for nature alongside urban development that reduce the impact of land use change, creating local food networks and providing opportunities for public education, engagement and encounters with nature which are increasingly seen to be vital for embedding values and action for nature protection locally and globally (Box 3.11) (Vitale et al., 2022; Welden et al., 2021; West et al., 2020).

### Box 3.11: Illustrations from NATURVATION research showing ways how urban NBS can address underlying causes of climate change and biodiversity loss

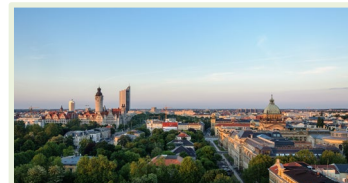


#### Montpellier

A NGO representative argues that we can re-connect people to nature: *“We need for people to experience nature, [...] enjoy it and to understand the way it works”* (Interview in Werner, 2018)

#### Leipzig

In renaturing post-industrial waterscapes, a city representative in Leipzig argues: *“..We have a landscape transformation [...] manifesting in the development from an energy landscape to a leisure and natural landscape”* (Interview in Werner et al., 2017)



#### Melbourne



In the Greening your laneway program, a project officer argues: *“We saw an opportunity to create human-scaled green spaces in these quiet streets in a way that offers heat refuge and flood mitigation. By mapping the potential for greening in the city’s 240 lanes we built momentum effectively to initiate these pilot projects”* (Interview in Kiss et al., 2018)

Integrating the provision of urban nature into development plans and initiatives can ensure that urbanisation supports rather than detracts from the overall efforts to bend the curve on biodiversity loss. For example, in terms of managing the land use change associated with urbanisation the Leidsche Rijn closed-circuit water system in Utrecht shows how we can build new neighbourhoods on the edge of cities while contributing to ecological outcomes (Van der Jagt and Dorst, 2017) while Germany’s Ruhr Valley has multiple demonstrations of how former industrialised areas can be renaturalised (Angelo, 2021). Moreover, repurposing existing concrete urbanism structures, such as taking up roof space or road space for urban nature, creates space for nature.

For instance, in Rotterdam a former railway and the longest roof (1,9 km) of the Netherlands was transformed into a green park, Hofbogen (Hofbogen, n.d.). Urban NBS could contribute to reducing greenhouse emissions, through providing cooling solutions for the urban heat island effect, such as the Melbourne Forest Strategy in Australia enhancing urban green spaces as ‘heat refuge’ places (Box 3.11), and through limiting greenhouse emissions by installing energy efficient housing in the Eco-city in Tianjin (Katona, 2018). Simultaneously, installing green cycle ways in a range of urban NBS, including Boston’s Greenway and Barcelona’s Passeig de Sant Joan, promotes alternative forms of mobility which could potentially reduce the use of the car. In addition, urban gardens could promote alternative production and consumption practices, while providing educational benefits and raising awareness about environmental issues (see Box 3.12).

**Box 3.12: Attaining Synergies in Greening Urban (Kinder) Gardens**

Urban kindergartens, intercultural community gardens and school garden projects provide an opportunity for attaining multiple benefits of urban NBS, while requiring few resources. They can become places of promoting social equity, inclusion, wellbeing, community bonding, serving educational purposes, as well as building a ‘sense of belonging’, while being impactful in terms of ecological objectives (e.g. biodiversity) (Dushkova and Haase, 2020). A range of projects in Leipzig, Gyor, Winnipeg, Barcelona’s Pla Buits garden, Utrecht’s Food for Good and Municipal Urban Gardens in Athens are contributing to multiple social and environmental goals. The ‘Openness, Adaptation, Sensitisation, Innovation and Social Ties’ (OASIS) programme transformed ten school grounds in Paris into ‘green oases’. These ‘green oases’ contribute to adapting to increasing temperatures, while teaching children about nature and gardening, being accessible for school pupils as well as for local communities (EEA, 2022b).

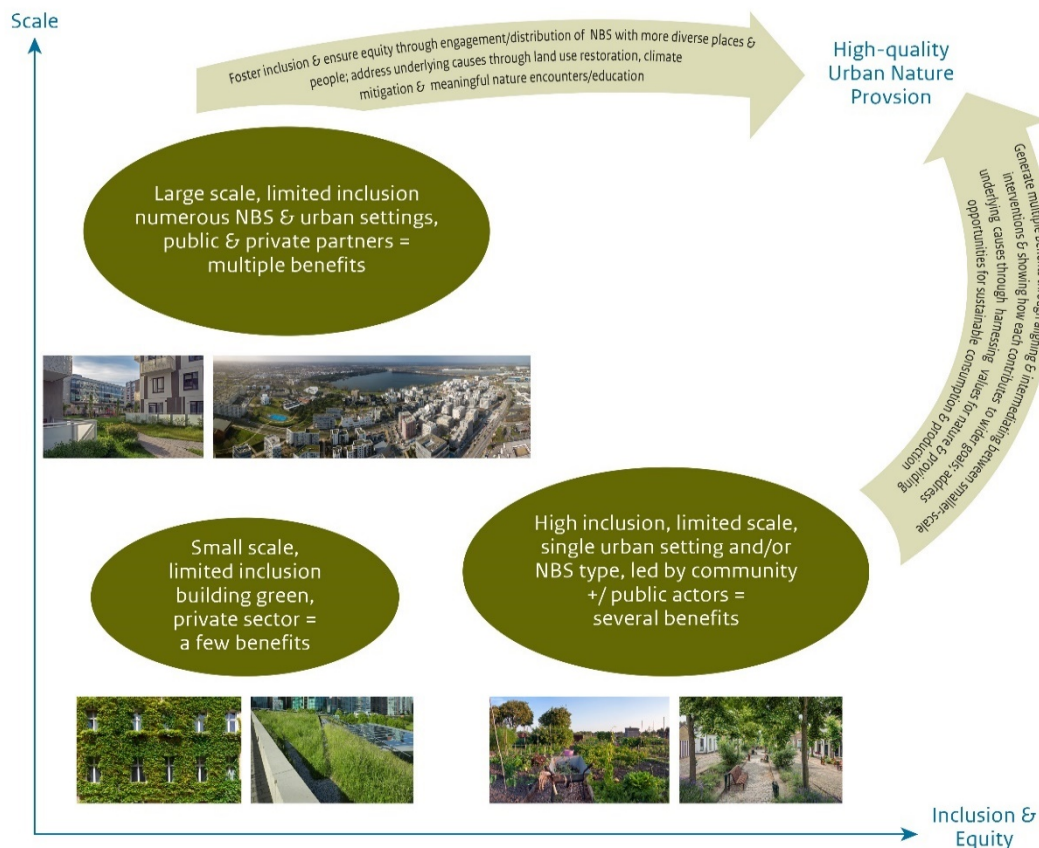
Perhaps most importantly, urban NBS could enable the public to experience and re-connect with nature, finding a sense of belonging in urban nature. Being in nature has a range of proven health and wellbeing benefits, and spending time in nature prompts new values of nature and consequently could alter people’s views and actions concerning nature more broadly (Abson et al., 2017; Carrington, 2021; Kabisch et al., 2017b; Welden et al., 2021; West et al., 2020). A range of urban NBS initiatives aim explicitly to re-connect people with nature - combining nature and human wellbeing - such as urban wetlands for wellbeing (Box 3.10). In the John Muir Pollinator Way in Edinburgh, providing access to and connecting deprived neighbourhoods and youths with nature fosters people’s connection with nature (Van der Jagt and Dorst, 2018). In addition, Food for Good is a community garden initiative in Utrecht, providing a place for vulnerable people to connect with nature – while contributing to social cohesion, empowerment, biodiversity and neighbourhood aesthetics (Van der Jagt and Dorst, 2017). ***These intangible place-making and wellbeing outcomes of urban nature are often overlooked yet provide a vital means through which to foster positive human-nature interactions, altering people’s perspectives and attitudes to more nature friendly behaviours.*** Moving towards high-quality urban nature requires installing urban green spaces where humans and nature thrive, contributing to addressing the underlying causes of climate change and biodiversity loss. As new frameworks are developed to support the implementation of urban nature it is therefore critical that the important role that it can play in supporting transformative change for climate and biodiversity is not overlooked.



## 3.5 Governance and Investment for High-Quality Urban Nature Provision

Our analysis suggests that the four key attributes of high-quality urban nature – that it generates multiple benefits, fosters inclusion, ensures equity and addresses the underlying causes of climate change and biodiversity loss – are relatively rarely found together. While some pioneering projects can be identified within the UNA (Chapter 2) for the most part there are a number of trade-offs and synergies are only weakly realised in practice (Figure 3.1). This suggests that there is a great deal of potential that has yet to be fully exploited. Indeed, as the analysis of the UNA in Chapter 2 revealed, NBS initiatives frequently under-promise and over deliver, suggesting that to date it has been primarily through ‘learning by doing’ that high-quality urban nature provision has been realised. This in turn suggests that the development of a framework to drive ambition and action has significant promise.

**Figure 3.1: Towards High-quality Urban Nature Provision**



Looking across our findings, we can identify three clusters of urban NBS defined primarily by the trade-off between generating multiple benefits and enabling inclusive & equitable approaches. One set – focused on micro-scale, building green projects and often led by the private sector can generate significant benefits but for a limited number of goals. While these projects are important in their own right, significant coordination activities will be needed to realise their benefit at the urban scale and they have limited potential to involve diverse actors and communities. A second

set is more promising – street or neighbourhood projects which are often designed with and by communities and seek explicitly to realise goals for social inclusion and justice, but where benefits are currently limited to a few areas and their potential at the urban or landscape scale has yet to be realised. Here action to align and aggregate initiatives and further tap into their potential capacity to address the underlying causes of climate change and biodiversity will be needed. A third cluster of initiatives are those which are significant in terms of their scale, investment and stakeholders involved, which take place across multiple urban settings and are able to deliver multiple benefits but where considerations of inclusion and equity have yet to take centre stage. Here more explicit focus on these issues at the design stage and throughout the processes of developing and maintaining urban nature provision can potentially yield high quality outcomes. In the rest of this section, we consider insights from case-study analysis that point to the potential for governance and investment to help close the gap between the current provision of urban nature and realising its high-quality potential.

How, why, by and for whom urban nature provision is governed plays a crucial role in shaping its success or otherwise. Due to its multifunctional character, roles and responsibilities concerning urban nature are often distributed over different government departments and private actors. **Conflicting responsibilities, goals and requirements** as well as **institutional rigidity, administrative and legislative hurdles** pose institutional challenges to attaining high-quality urban nature provision (Box 3.13) (Katona, 2017; Kiss, 2017; Kiss et al., 2018; Kiss et al., 2019; Kiss and Wamsler, 2018). NBS' multifunctionality is constrained by fragmented 'monofunctional' governance processes and governance silos, as well as a lack of clear ownership (Kiss et al., 2018; Ivanova et al., 2018). For instance, the compartmentalisation of departments in Gyor results in an inability to attain synergies across education, biodiversity, water management, public space use, transport, food or air quality (Katona, 2017). **Building integrated narratives and visions** can provide an important means through which to overcome institutionally fragmented processes, responsibilities and ownership and to work across competing ideas and interests concerning what and for whom urban nature provision is for. This requires also involving a plurality of actors collaborating beyond silos (NatureScot, 2020) and generating opportunities for **cross-departmental cooperation and interdisciplinary learning**. For instance, in Munich urban NBS are addressed in a relatively integrated manner, partly due to their organisational structure allowing for multi-disciplinary collaboration between departments. Moreover, through formal to informal experiments – from community gardens to living laboratories - novel coalitions can be formed, while also allowing developing context specific knowledge about the local needs of communities and private actors to be developed. For instance, the community garden 'Food for good' in Utrecht is involved in a collaborative 'learning exercise' together with the municipality, showcasing the value and benefits of these kinds of bottom-up initiatives beyond policy silos – including social cohesion, health and wellbeing (Van Der Jagt and Dorst, 2017).

**Box 3.13: Illustrations from NATURVATION research showing the necessity of cross-departmental cooperation and interdisciplinary learning**



**Malmö**

An environmental scientist argues the following regarding Malmö's Tree Strategy: "... you have a real estate office in the municipality and of course they have goals. We have environmental goals. They have economical goals ... because the municipality owns its own land and land is ... good money and they have certain goals ... if you need to sell land ... you need to meet a certain monetary target ... and of course if you have ecosystems or green areas (which) ... are very attracted to build upon, well that's a conflict..." (Interview in Kiss, 2017)

**Munich**

The Chair for Strategic landscape planning argues the following regarding the restoration of River Isar: "It has certainly been an innovation in terms of the internal cooperation of the local authorities, that different departments came together in a working group. In those terms, this was an icebreaker..." (Interview in Kiss and Wamsler, 2018)



As we found in Chapter 2, the presence of **supportive national and local policies** is associated with fostering multiple benefits. Installing shared knowledge platforms to grow collaboration, accompanied by more open, informal and spontaneous forms of cooperation involving marginalised voices - such as the intermediary Spencer Neighbourhood Association in Winnipeg - could assist in generating partnerships for thriving urban NBS (Katona, 2018; Xie et al., 2020). As previously discussed in Chapter 2, urban NBS which include a diverse set of stakeholders such as through co-governance approaches are more likely to attain multiple NBS benefits (see also Dushkova and Haase, 2020). At the same time, it is vital that these approaches go beyond the involvement of the usual suspects and include a wide range of actors, interests and values to foster inclusion and ensure equity (Anguelovski and Corbera, 2022). **Creating intermediaries** – organisations or processes that work between existing actors and initiatives functions and enable spaces for dialogue and contestation over different priorities as well as generating space for debating how costs and benefits can be shared equally over space and time – can be a highly effective intervention. Intermediary organisations in Cape Town, Montpellier and Winnipeg function as 'glue' between the involved actors, while including marginalised voices, providing not only 'vehicles' for contestation but also for equal and just urban nature outcomes (Katona, 2018; Tozer, 2018; Werner, 2018).

In most of the 54 case-studies examined within the NATURVATION project, local authorities are the key actors in terms of initiating, implementing and financing NBS. As enabling and supporting actors, they assist in funding, providing land and management in their partnerships with NGOs, private and civil actors (De Jongh, 2021). **Municipalities therefore have a key role** in co-governance and co-finance arrangements. Moreover, our analysis suggests that local municipalities are crucial for delivering multifunctional outcomes for urban nature (Chapter 2). Yet our analysis of the UNA also shows that a focus on the multiple benefits of urban nature can neglect efforts to ensure inclusive and equitable urban nature provision. This raises questions about how we can ensure inclusive processes as well as equitable, multifunctional outcomes addressing underlying drivers. Opportunities arise in bringing inclusive processes and attaining multiple goals together through citizens-led monitoring (e.g. phone-based collection tools), simultaneously allowing people to reconnect with nature (WWT, 2022; Xing et al., 2017). For instance, in Scotland the public engages

with improving environmental knowledge within the Environmental Indicators Framework through citizen science (Scottish government, 2012). This requires a governance process that is accessible and flexible, recognising the value of multiple stakeholders and ensuring they are effectively recognised in the design, implementation and ongoing work of maintaining urban nature.

Alongside enabling governance conditions, the provision of high-quality urban nature needs financial investment to flourish. Yet, the benefits of urban nature go beyond those which can be directly measured in financial terms and involve a range of social, cultural and environmental returns. These non-quantifiable and non-monetary returns can hinder the uptake of urban NBS, as shown in Melbourne, Mexico City, Malmö City and Munich and Utrecht (Box 3.14). For instance, in the Urban Forestry Strategy in Melbourne, challenges were encountered in making NBS into a ‘business case’, “*due to the multiple, but hard-to-measure, benefits*” constraining the involvement of private actors (Kiss et al., 2018, p. 16). Here, private developers were hesitant to risk cost overruns by implementing green infrastructure rather than traditional approaches with which they were more familiar. Installing valuation methods and accounting frameworks that capture all NBS benefits, including those that cannot be counted or captured under economic frameworks, could be a way to overcome this barrier (Toxopeus and Polzin, 2021). These methods can for example show how NBS provide non-monetary or reducing-risk benefits through which they outperform business as usual approaches and can assist in **the design of alternative business models** that can generate interest in investment. For instance, the UK Green Building Council includes a range of non-financial benefits of NBS in their value framework, underlining how NBS are a financial opportunity worth investing in (UKGBC, 2022).

**Box 3.14: Illustrations from NATURVATION research showing the need for alternative business models**



**Utrecht**

The co-founder of Food for Good argues regarding its non-quantifiable NBS benefits: “*You just don’t have numbers on it; what would you compare it with? That makes it [valuation] really hard. Especially the social benefits. Kilograms of vegetables are measurable, but how someone’s feelings have improved? That’s very subjective*” (Interview in Van der Jagt and Dorst, 2017)

**Mexico**

The chief resilience officer in the Water Fund project argues: “*when you start to put in money, if you don’t have the data, you can’t compete against something [such as a conventional engineering project] that is totally structured and in the end the one who decides is a financier and you can explain all the benefits but [they’ll say] ‘quantify them for me’*” (Interview in Astbury, 2018)



**Malmö**



An environmental specialist argues the following regarding the Tree Strategy: “*I think that’s also a challenge that there is no microeconomic model that visualizes the long-term benefits... that puts numbers on ... in the long term when I have... urban heat islands and trees to reduce temperature in the future, shading. ... what is the economic benefit of that? Having trees there, which costs me. Tomorrow if I need to plant trees it costs me x crowns, but in the future, I will save so much because less people will die ... and there’s no micro economic model that will quantify that and help my decision-making now*” (Interview in Kiss, 2017)

The vast majority of urban nature provision is funded through public actors and this is likely to be the case over at least the medium term, given that urban nature provision produce significant

public goods. **European, federal and municipal funding schemes** are found to be essential in supporting urban NBS (Chapter 2; Werner et al., 2017). Here, direct funding or subsidies are more likely to enable multiple NBS benefits than designated public budgets (Chapter 2). In Munich, for the state to pay for small water courses, citizens must have direct benefits from the development, which results in requirements for meeting multi-purpose outcomes, such as enhancing ecology, recreation and water quality (Kiss and Wamsler, 2018).

Beyond the design of business models, in order to **foster investment from the private sector**, engaging with landowners, asset holders and financial actors is crucial (Chapter 2). For instance, the Dutch private damage insurance firm Interpolis started a discounted green roofs program, enabling the uptake of green roofs - lowering firm's costs of roof repairs, fostering its reputation while contributing to ecological outcomes (Interpolis, n.d.). Providing the knowledge and expertise needed for multifunctional NBS is essential, while considering and debating what a 'good' return could involve beyond financial means. Besides these voluntary possibilities, public actors could also create legal requirements for including urban NBS in urban development or infrastructure initiatives. In addition, diversifying forms of finance in **co-financing partnerships** can help to produce a range of financial, social and environmental outcomes and also promote the implementation and longevity of such initiatives (Kiss et al., 2019).

Yet it is also important to recognise that when private actors are involved in urban NBS this often comes at the expense of environmental and social outcomes - principles of accountability, justice, democracy and transparency are often compromised, as found in Newcastle Parks, Hellenikon in Athens, Urban forest in Sofia, and Little France Park in Edinburgh (Kiss et al., 2019; Toxopeus et al., 2020). An overarching '*profit-driven 'raison d'etre'*' hinders generating and distributing multiple urban NBS benefits equally, and therefore balancing economically productive urban NBS with other social and environmental goals is needed in order to limit trade-offs. **Integrating principles of transparency, accountability and democracy** throughout the urban NBS design (start, middle, decision-making process) assists in prioritising the needs and demands of a broad public instead of a few powerful financial actors (Toxopeus et al., 2020). Moreover, **multi-criteria assessments** or legal requirements to attain multiple benefits could ensure economically, socially and environmentally favourable outcomes, as well as **installing legal requirements** that place covenants on how land should be used over the long term (see Box 3.15). In Montpellier, when land is sold, basic requirements in terms of environmental, social and cultural objectives should be met, ensuring that multiple objectives and thereby high-quality NBS are attained. Moving forward requires developing these legal requirements to ensure economically, socially and environmentally favourable outcomes.

**Box 3.15: Balancing Objectives through Land-use Standards in Montpellier, France**

In France, metropolitan regions are the designated level for sustainable urban development plans (Werner, 2018). These metropolitan regions are governed by a council who has the responsibility for a range of urban development objectives, such as water management and biodiversity. Interestingly, within the Montpellier Méditerranée Métropole, they implemented in 2006 a 'territorial coherence scheme' (Schéma de Cohérence Territoriale (SCOT)). Within this scheme, the planning objectives for certain land are set for the next 20 years, being designated for urban, natural or agricultural purposes. This SCOT provides a binding overarching framework for all municipalities within the metropolitan planning scale documents, including plans regarding urban travel, local habitat, climate, air and energy. For instance, in developing Parc Marianne Eco-district, development plans had to comply with pre-set requirements, such as environmental and social sustainability criteria, which enabled its multifunctional outcomes (Werner, 2018). This public policy thus provides the framework in which private actors can operate independently, while enabling public actors to exert control regarding primary land use objectives. Installing these kinds of standards on land transaction poses an interesting pathway for integrating social and environmental objectives in these policy instruments, limiting trade-offs and ensuring multiple benefits of urban NBS.

## 4 Towards Principle-Based Standards for High-Quality Urban Nature Provision

As the previous chapters in this background paper have shown, the provision of high-quality urban nature holds significant promise. Some initiatives are already realising this potential – we have identified a number of NBS initiatives across diverse urban contexts in Europe and beyond that are able to realise multiple benefits, foster inclusion, ensure equity and also address some of the underlying drivers of climate change and biodiversity loss. At the same time, **significant trade-offs and challenges remain in providing urban nature that can meet these goals and initiatives that do so remain in the minority**. As governments at national and local levels across the world look to establish NBS as part of their response to sustainability challenges and in order to fulfil their international obligations under the Paris Agreement of the UNFCCC and the new targets to be agreed this year for the Convention on Biodiversity, it is critical to bring in safeguards that prevent them becoming either a form of greenwash or a means through which already advantaged actors and communities gain at the expense of others (EC, 2022a; Chapter 1).

***International best practice suggests that adopting core principles can be a vital means through which to safeguard the quality of NBS. To date such principles have not been fully developed or applied for the provision of urban nature.***

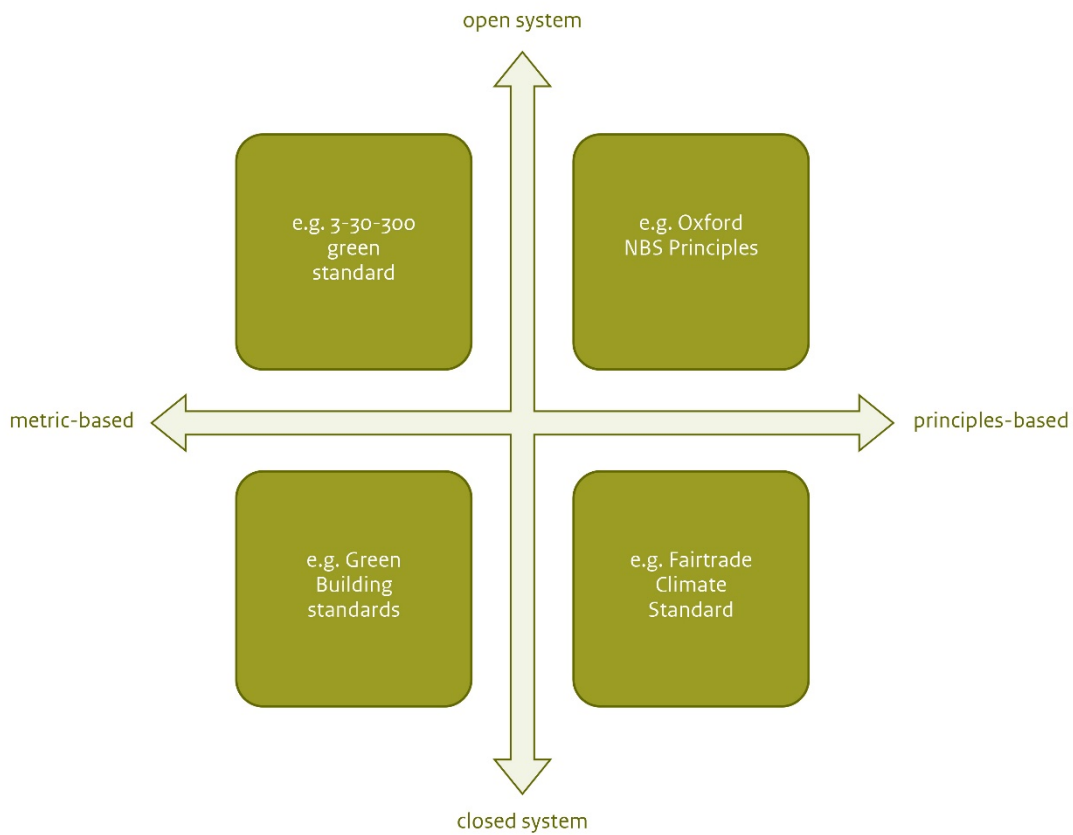
The development of a new mandate for urban nature provision in the Netherlands provides an important opportunity to advance this agenda. The use of standards is common across environmental policy, ranging from highly technical, mandatory standards for e.g. building compliance with energy efficiency requirements through to voluntary guidance for e.g. the use of carbon offsets. As well as being designed as either voluntary or mandatory policy instruments, standards are used by a range of organisations from government authorities through to businesses, civil society organisations and self-organised community groups to govern their own actions. For example, the C40 network<sup>5</sup> of cities requires members to undertake mandatory reporting of greenhouse gas (GHG) emissions to specified standards, while organisations or businesses working on sustainability also require certain reporting and disclosure processes (e.g. Task force on Climate-related Financial Disclosures (TCFD), n.d.)

Both mandatory and voluntary standards can differ significantly in how they operate (Figure 4.1). On the one hand, they can be applied to specific, closed systems – such as a building or product – or to more ‘open’ systems such as a supply chain or landscape. There is also a spectrum in terms of the basis which are used to determine standards. At one end of this spectrum, standards can be highly detailed, technical instruments – regulatory standards for water quality and voluntary

---

<sup>5</sup> C40 is a global collaborative network of nearly 100 world-leading cities aiming to tackle the climate crisis by halving its member cities’ emissions, while fostering equity and building resilience (C40, n.d.)

building standards for sustainability tend to be of this kind where targets are clearly specified and the indicators and reporting requirements also set out in detail. At the other end of this spectrum, standards seek to establish the core principles that should be adhered to but purposefully seek to be open in how these principles should be realised in any one context – these kinds of standards are often used where trade-offs need to be accommodated and where the success of initiatives depends on community buy-in and consideration of specific contexts and dynamics. Measures such as the Gold Standard for carbon offsetting introduced in the 2000s to encourage companies to ensure off-setting initiatives met wider sustainability goals, as well as the recent IUCN Global Standard for NBS and the Oxford Principles for NBS are towards this end of the spectrum.



In this Chapter, we examine the role that standards could play in supporting the provision of high-quality urban nature in the Netherlands. We consider the kinds of standards that are currently being developed for urban nature provision and suggest that while providing momentum these will not be sufficient to safeguard their quality (Section 4.1). We then turn to elaborate on more detail why it is that standards can often have a detrimental effect on sustainability – this may seem counterintuitive, but the tensions between being sufficiently comprehensive and useable often lead standards to fail, while too much of a focus on readily available quantitative data can lead to core objectives which are less easy to capture being neglected (Section 4.2). This analysis shows that the design of a standard is crucial. Finally, we explore how taking a principles-based approach to standard setting could support the ambition to provide high-quality nature for urban places and people across the Netherlands and what this might mean in practice (Section 4.3 & 4.4).



## 4.1 The Rise of Urban Nature Standards

A range of voluntary and mandatory regulatory tools are available to policy-makers in order to reassure high-quality urban nature – from mandatory regulations, spatial planning guidance and laws towards voluntary environmental standards, corporate social responsibility strategies, building certification schemes and voluntary planning guidelines (Box 4.1). As we saw in Chapter 2, some NBS initiatives are already making use of these mechanisms as a means of both safeguarding the extent of urban nature provision and seeking to drive progress through fostering ambition and aspiration.

### **Box 4.1: The Role of Standards**

Standards and norms have become particularly important policy instruments in providing reassurance on quality (Flynn and Hacking, 2019). They function as regulatory tools and can be broadly defined as ‘shared conventions below which it would not be appropriate or wise to drop’ (Cass and Shove, 2018, p. 272; Grubbauer and Dimitrova, 2022). A key feature of standards is that they create a common understanding of urban nature practices among a range of actors (Flynn and Hacking, 2019). For instance, principle-based standards developed by IUCN, Oxford Institute, Connecting Nature and the NATURVATION project are creating a common understanding what is needed to attain high-quality NBS (Chapter 1). By sharing this knowledge, these standards can foster learning and creative processes, have an informative, integrative and discursive function, enabling coordination between a range of actors involved in urban nature (Gritsenkoa and Roe, 2019; Grubbauer and Dimitrova, 2022). Moreover, it is argued, that through these standards, we can enable the measurement of progress and accordingly the tracking of urban nature uptake. In addition, these standards can foster transparency and accountability in urban nature, which can ensure high-quality NBS.

At the same time, policy-makers at all levels – from the Convention on Biodiversity through to local authorities – are increasingly turning to quantitative targets for urban nature in response to the growing evidence that demonstrates their potential value for climate change, biodiversity, economic development and health. The current draft of the CBD Global Biodiversity Framework, due to be agreed in Montreal in December 2022, contains an explicit target for the provision of green space in Target 12 which states that signatories should “increase the area of, access to, and benefits from green and blue spaces, for human health and well-being in urban areas and other densely populated areas” (2021, p. 7). The EU’s proposed Nature Restoration Law would require all urban areas to maintain their urban green space and canopy cover by 2030, which is challenging under economic pressures and changing climate conditions, and to expand this by 5% by 2050 (EC, 2022b). In 2017, over a 100 US Mayors together with civil society organisations agreed on the aspirational target that all people should be able to walk to a park within 10 minutes, whilst cities elsewhere are adopting goals to ‘increase urban green space provision’ (10-Minute Walk, n.d.). In the Netherlands, there have been recent calls to install a National Green Norm (*‘Nationale Groennorm’*) (Schouten, 2021) – so that everyone should have access to green space within 350 metres (Goossen, 2022).

There is also growing interest in the so-called 3-30-300 rule amongst municipalities (e.g. Zwolle, Utrecht). This provides a simple overall guidance based on evidence of the benefits that urban trees

and urban green space can provide such that the standard is to have at least 3 trees in view from every place, no less than a 30% tree canopy in each neighbourhood and no more than 300 metres distance to the nearest public green space (Konijnendijk, 2022; Figure 4.2).



Such metric-based standards are attractive because of their intuitive simplicity and communicative power, and because they work with and seek to support commonly held aspirations for improving urban life. Yet metric-based standards come with significant limitations that may make them unsuitable for supporting the provision of high-quality urban nature. First, the focus on quantity can mean that the quality of e.g. urban green space provided is poor. Second, while those who design such standards recognise that they may not be suitable for every neighbourhood or community the neglect of the importance of place and people and the importance of inclusive decision-making processes to ensure (at the very least) buy-in for urban nature provision should not be under-estimated. Third, especially where city-wide metric standards are taken up (e.g. in terms of the amount of green space in a city overall) there is a strong likelihood that this will exacerbate rather than address inequalities (Koh et al., 2021). Finally, where such metric-based standards are used for urban nature provision they rarely consider how such schemes can address the underlying causes of climate change and biodiversity loss, potentially losing a significant opportunity for action in these two crucial areas.

***Whilst growing in popularity, there is a significant risk that the adoption of metric-based standards for urban nature provision in any policy mandate will not only fail to generate high-quality outcomes but may have unintended negative consequences for places and people.***

In the next section we elaborate on this potentially counter-intuitive finding from our analysis of the role of standards in supporting and safeguarding urban NBS before then turning to consider how principle-based standards may offer a means to advance the provision of high-quality urban nature.

## 4.2 The Problem with Standards

While using mandatory and voluntary standards is becoming increasingly popular across government and non-state actors, there is growing evidence that they can have unintended negative consequences for realising the stated ambitions of sustainability governance. Here we

identify three key issues, related primarily to the use of metric-based standards, that may face their adoption to support high-quality urban nature provision.

***First, if poorly designed or applied to the wrong context standards can either be too complex to use or too simple to be meaningful.*** Where standards are highly technical, comprehensive or complex they encounter challenges of data collection, analysis and verification. In relatively simple systems (e.g. individual buildings or small urban developments) and where those responsible for reporting have direct access to data such specialised metric-based standards can be used effectively. However, in extended, open systems where those charged with reporting (e.g. local authorities) do not own or have access to all of the data needed to complete reporting requirements (e.g. because it is privately held or difficult/resource intensive to measure) metric-based standards with a high level of complexity are rarely adopted. The data required for measuring these practices can put a burden on local communities, governments and other stakeholders implementing these standards. A drive to increase the precision of data can be one response but this has been found to be at the expense of actual NBS development on the ground (Pauly, 2021; Goldstein, 2022). Further, sporadic monitoring or significant challenge in attributability renders it hard to attain measurable impacts of NBS such that evaluations are found to be ‘only sporadic and partial’ (Kiss et al., 2019, p. 25; see also Chapter 2).

On the other hand, when overly simplified standards are used there is a risk that it is only those most clearly ‘countable’ benefits (e.g. amount of green space, carbon sequestration) that will be evaluated. For example, in most of the 54 NATURVATION case studies, social and environmental benefits were difficult to quantify both because it is a highly time- and resource-consuming endeavour and because such benefits are not always recognised as important (Kiss et al., 2019). For instance, NBS in Melbourne were evaluated based on mostly quantitative criteria, leaving qualitative data as ‘anecdotal’, ‘intangible’ or less ‘useful’ or ‘valid’ (Kiss et al., 2018). Likewise, in the municipal urban gardens in Athens, ‘productive greenness’ is prioritised following a set of success criteria defined by the EU, leaving social inclusion and health benefits ‘uncounted’ (Kotsila, 2018). Unlike carbon sequestration or easily quantifiable targets for renewable energy generation, urban nature will always be localised, immobile and unique, and therefore less easily to capture in a set of quantitative and qualitative indicators (Grubbauer and Dimitrova, 2022). This focus on quantitative criteria, or what can be easily counted, risks downplaying NBS’ wider social, environmental and cultural effects which cannot be so easily measured, which in turn shapes decision-making over the strategic development of urban nature provision and how resources are prioritised so that such benefits are side-lined. The example of the EU taxonomy framework demonstrates how what is/not included in standards matters for the ways in which practice develops over time (Box 4.2).

#### **Box 4.2: What's in and What's out of the EU Taxonomy Framework?**

The recently introduced EU Taxonomy, a classification system to mobilise private investments towards sustainable activities, could be an interesting instrument to foster investment and diminish financial barriers for urban NBS (Papari et al., *forthcoming*). This framework includes mandatory regulations and voluntary use practices through which we gain insight whether activities by business or financial institutions are serving one of the six defined environmental objectives (e.g. biodiversity, climate adaptation/mitigation). Yet, by only including wetlands, green areas for water management, green walls, facades, roofs and botanical gardens as designated NBS, this instrument tends to overlook other innovative and urban NBS - such as urban green spaces and community gardens – limiting their potential to attract finance. Moreover, as it requires investments to only serve one of the six defined environmental objectives, combined with its overly focus on climate mitigation and adaptation, it lacks providing incentives to attain multiple NBS outcomes. Urban NBS that do not fall within these four NBS categories and those who produce multifunctional outcomes are overlooked within the ET framework – limiting its capacity in reducing financial barriers for these kinds of urban NBS. By requiring investments to go beyond attaining just one objective, the EU Taxonomy instrument could assist in enabling multifunctional outcomes.

Source: Papari et al. *forthcoming*

Overall, the complexity of many standards, a lack of accurate data, the challenge of counting 'intangible' benefits, as well as a lack of sharing experiences of standards that work in practice are now recognised as barriers to their use for urban nature provision and as having a detrimental impact on the extent to which NBS initiatives are able to realise their potential (NatureScot, 2020).

**It is critical that the development of any mandate for urban nature provision includes useable and meaningful standards**, rather than either overly-complex or simple systems which generate a burden on monitoring and reporting or which are unable to capture the multiple benefits of urban nature.

**Second, metric-based standards can rely on universalised targets and take insufficient account of diversity.**

In short, the purpose of such approaches is to **standardise**, i.e. make things the same (Bulkeley, 2015). This can lead to: (a) a lack of appreciation of context; (b) a lack of inclusion of local knowledge, desires and needs; and (c) a focus on a small range of NBS initiatives that comply, reducing the diversity of nature and places. Metric-based standards tend to neglect the embeddedness of urban nature within local contexts, realities and collective imaginations (Balvanera et al., 2022). Top-down prescribed standardisation practices risk downplaying a range of social and cultural values, including place-making, place attachments, wellbeing, cultural heritage of places and other context-specific, 'hard to quantify', characteristics (Grubbauer and Dimitrova, 2022; Johnson, 2022), overruling local knowledge, desires and needs.

This not only means that such metric-based standards may fail to foster inclusive urban nature provision, but also that they may miss accounting for the existence and subsequent distribution of important benefits and in turn miss a consideration of their equity implications. In their drive to promote a uniform provision of urban nature, metric-based standards that focus on simple targets for particular forms of nature (e.g. canopy coverage, green space provision, number of trees) may potentially overlook more experimental approaches (e.g. pocket parks, ecological corridors, living labs) as well as those which combine multiple kinds of urban setting or nature provision (e.g.

combined green and blue solutions), both of which our analysis suggests are important in delivering multiple benefits (Chapter 2). For example, with its focus on the provision of trees, the 3-30-300 standard may serve to exclude other valuable forms of urban nature – swales, wildflower planting along street verges, green walls, or, critically, blue areas which were found to be a critical element in generating multiple benefits for sustainability (Chapter 2). Furthermore, where such a standard does not either suit the local context (e.g. dense urban neighbourhoods) or account for historical or cultural values for nature, it may simply be ignored. There is then a significant risk that the rollout of metric-based standards, especially those that focus on the quantity of urban nature provision, will produce increasingly uniform urban environments (Box 4.3) whereas, as our analysis shows (Chapter 2), high-quality urban nature provision is found where a diversity of urban NBS initiatives, settings, benefits, values and people are combined.

**Third, the use of standards in contexts where multiple challenges and actors are involved raises considerable governance challenges.** There is now an increasingly complex web of standards applied to urban settings – from building envelopes to water bodies, street surfaces to urban planning – and any

#### **Box 4.3: Towards Standardisation? Garden Cities in China**

China's urban development regime aims to replicate and scale-up best practices to other cities, being 'practicable, replicable and scalable'. A crucial means to attain this goal is a range of specific standards the Ministry of Housing and Urban-Rural Development sets: the 'Garden City', 'Ecological Garden City' and 'Eco-city' standard. The initial 'Garden City' standard originates from 1997, including 12 indicators regarding for instance its ecological environment and green infrastructure, including requirements in terms of minimum green space ratio (35%) and green space per capita (8 m<sup>2</sup>), whereas the extended 'Ecological Garden City' standard (2005) included new indicators such as species index and residents' degree of satisfaction with their direct environment. As illustration, the Integrated Green and Blue Infrastructure in the Wuqing District, has attained this 'Garden City' label through integrating green infrastructure in the sub-urban district in the north of the city. Simultaneously, the district follows a range of other standards from different levels of government, including accessibility of green spaces within a certain distance and green belts alongside the roads. While these standards provide guidance to policy-makers for attaining 'garden' cities, rolling out these metrics risks creating uniform 'standardised' cities with poor biodiversity outcomes. For instance, uniform manicured lawns with one tree species as 'green' infrastructure in the Wuqing District in Tianjin, points to these significant risks in 'standardisation' (Katona, 2018). A Senior Urban Development Expert expressed the following concerns regarding its manufactured greenness: *"We call these green infrastructure projects plantations, because that's how they look like. Trees in rows. These plantations, that they call forests, are not so functional in terms of water absorption, because the top soil, which is most important for the sponge effect, is not healthy, not diverse, and not really functional"* (Interview in Katona, 2018).

new mandatory standard will need to be accommodated within the existing landscape of urban governance without causing undue burdens or conflicts. Where new regulatory standards are introduced for businesses, landowners or householders negotiations can be protracted and conflictual. Where the burden of compliance is too high, actors tend to avoid activities that may require them to adopt mandatory standards. Voluntary standards have proven success in the urban context when they are also accompanied by reward and recognition (Zusman et al., 2017). They can also have traction where issues of reputation are involved – for example there has been widespread uptake of certification schemes across the business sector related for example to forest products,

carbon offsetting and farming. Yet if the use of voluntary standards is to be more than a tick box exercise, third-party monitoring and verification is often required. This can be costly and raises questions about which actors are/not able to access such services and with what consequences (Grabs, 2021). Moreover, government actors are often reluctant to adopt voluntary standards if they cannot readily comply, and community actors can be over-burdened with monitoring and reporting requirements. For instance, recent analysis suggests that the requirements of the IUCN standard for NBS may be too high and may be burdensome or impractical for decision-makers (Châles et al., 2022).

This analysis suggests that for both mandatory and voluntary standards, **where the burden or risk of engagement is too high actors seek to avoid their use, potentially leading to the unintended outcome of driving down the standard of, in this case, urban nature provision**. As co-governance is a crucial part of the successful provision of high-quality urban nature, the development of standards will need to be done in such a manner as to engage not only local authorities who may be directly responsible for their implementation, but also the range of private, civil society and community actors with whom they will need to work on the delivery, monitoring and reporting of NBS initiatives. It also points to the potential importance of introducing flexibility for actors to choose their own priorities and approaches within a framework that sets safeguards by requiring minimum thresholds are attained, as well as developing an approach that is designed to recognise and reward both ambition and progress as a means of overcoming the governance challenges associated with the use of standards (Zusman et al., 2017).

### 4.3 From Prescription to Principles

While there is growing interest in their use, standards are often too complex and costly in terms of resources, designed to be used as a one-size-fits-all prescription, and implemented without consideration for the needs of diverse actors in their implementation. These issues are commonly associated with metric-based standards, where quantifiable goals, targets and indicators are developed and implemented in a top-down manner with limited flexibility or capacity to adapt across contexts or over time. There are however alternative ways to implement standards, giving space to social and cultural realities while ensuring that threshold criteria for performance are met which could be developed to support the provision of high-quality urban nature in the Netherlands.

First and foremost, rather than imposing prescribed top-down ideas about what form urban nature should take, standards can be used as an approach to encourage the use of local 'know-how' and socially embedded processes (Grubbauer and Dimitrova, 2022). Here, **commonly agreed upon principles** could be used to ensure that urban nature provision meets the key attributes of delivering multiple benefits, fostering inclusion, enabling equity and contributing to transformative change. For instance, the Friends of Ecosystem-based Adaptation (FEBA, 2017) show how we can require a minimal performance of nature without perverse outcomes. They developed a quality standard based on five criteria and twenty attributes with initiatives encouraged to reach **a minimum threshold** according to an evaluation continuum of NBS quality (from very weak to very strong). This enables practitioners to include qualitative indicators such as the inclusion of local and indigenous knowledge and the minimum baseline enables flexibility to tailor these requirements to specific local contexts. They found from experience of adopting these guidelines in diverse contexts that it enables stakeholders to 'course-correct' and enhance measures along the way to ensure the expected outcomes were met. In addition, NatureScot (n.d.) enables the NBS initiatives to 'place-correct' by embedding its 'Place Principle' throughout their 'placemaking' urban nature guidelines,

requiring a local-led and place-based participatory approach (Box 4.4). Here, within a framework of core minimum criteria that must be met, the relevant actors in specific communities decide who has the responsibility and capacity to design, implement and manage urban nature.

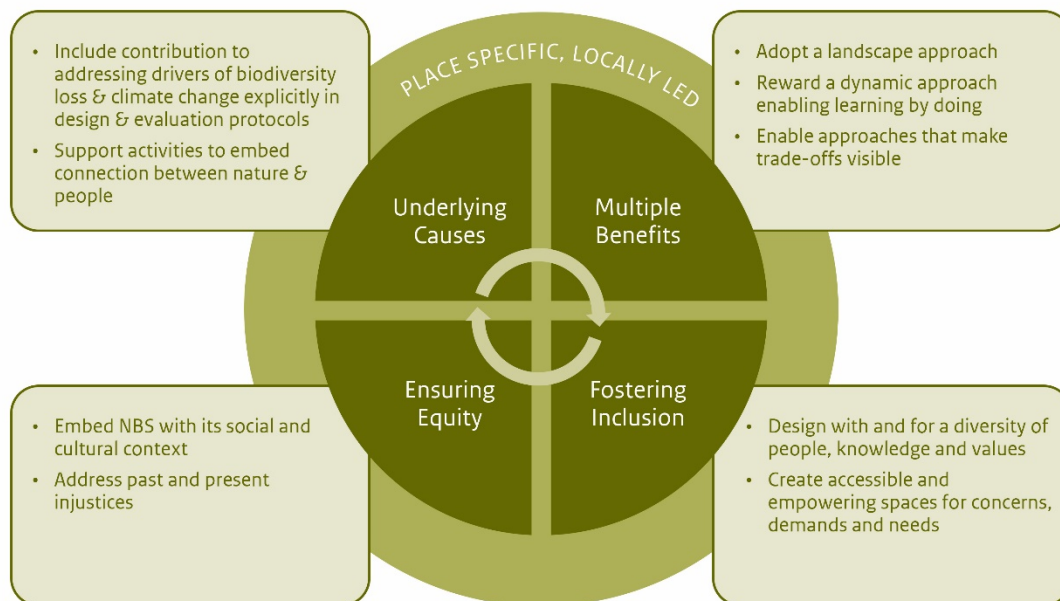
**Box 4.4: Place Principle - Glasgow's Pilot Raingarden**

The Scottish Government (2019) developed the 'Place Principle' in order to encourage collaboration and community involvement, which is embedded by NatureScot throughout their 'placemaking' urban nature cases. This principle requests that those who are responsible for providing services or are looking after these nature assets, will be designing, implementing and managing urban nature in collaboration with local communities. This integrated, collaborative and participative approach enables a place-based, shared understanding of place, which fosters adaptivity and flexibility. To illustrate, as part of the aim to install 10,000 raingardens in Scotland, in Glasgow they facilitated a pilot raingarden, working together with local communities to create raingarden designs reducing flooding events (NatureScot, n.d.). Building on this place principle, they recently updated their Place Standard with a climate lens, which enables people to understand how climate change may affect their local area (Our Place, n.d.). Embedding this place-based principle in urban nature enables the inclusion of local dynamics – how nature is perceived, how it creates a sense of belonging, meaning and identity. Moving forward requires integrating such a local-led and place-based principle within urban nature guiding principles, creating urban NBS where nature and people thrive.

In both of these cases – which have been demonstrated to work in the very different contexts of rural sub-Saharan Africa and urban Scotland – the use of standards is not only based on the use of principles rather than metrics but also recognises the importance of inclusive decision-making processes in generating both buy-in and the long-term stewardship needed for NBS initiatives to thrive (NatureScot, 2020; FEBA, 2017). In particular, each recognises that it is important to design such processes to address the limited capacities of some and historical reasons why some are excluded from decision processes and specifically seeking their voices. Equally by using minimum thresholds and an evaluation approach based on a continuum, including 'sliding scales' of performance, these principle-based standards account for the diverse conditions and starting points that NBS initiatives come from and also provide a mechanism through which to encourage improved performance over time. They also allow for actors to determine which of the core principles or qualities they wish to prioritise over time, while at the same time requiring that minimum safeguards are met providing flexibility which may encourage more actors to engage with and use standards for urban nature provision (Figure 4.3) (FEBA, 2017) and potentially drive ambition. Such an approach also enables standards to encourage space for diversity and tailoring urban nature to local demands and needs (Blakey, 2021).

***A principle-based standard that establishes the attributes of high-quality urban nature provision each evaluated across a continuum could support a tailored, flexible approach which allows for meaningful engagement of communities and stakeholders in expressing their values for nature, promotes a learning by doing approach and seeks to drive ambition forwards over time.***

**Figure 4.3: Action points to support the implementation of a principle-based standard**



**Second, standards need to consider not only which benefits the provision of urban nature should focus on but also how, by and for whom these are generated.** As Chapter 3 sets out, principles of inclusion and justice are not only ‘nice to have’ attributes of the provision of urban nature but also critical in ensuring that benefits are delivered and NBS initiatives are sustained over time. This means that considerations of justice need to be embedded within any such principle-based standard (Anguelovski and Corbera, 2022; Foley et al., 2018). At the same time, evidence suggests that such principles can fail to assist policy-makers in decision-making (Siders, 2022). Different worldviews, personal values and varied interpretations of justice shapes what decision-makers consider ‘just’, and unconscious views on justice by decision-makers may result in trade-offs. Previous suggested solutions such as ensuring diversity in participatory processes and fostering the equitable distribution of urban nature, risk being “too high-level to resolve practical dilemmas” faced by policy makers (Siders, 2022, p. 281). This remains a key challenge for ensuring high-quality urban nature provision and there is no straightforward solution to attain just outcomes. It is however possible to ensure that multiple dimensions of justice – from recognition of structural exclusion and historical inequalities, through to the design of fair procedures and acknowledging the diverse beneficiaries of NBS initiatives and how these will change over time and space – are included in any framework designed to support urban nature provision. This requires acknowledging that justice is not a ‘static’ universal outcome to be attained and involves varying interpretations what is considered just by local stakeholders **requiring continuous renegotiation with the stakeholders and communities involved** (Wijsman and Berbés-Blázquez, 2022). There will be no single blueprint that can be used to solve the unequal and unjust outcomes of urban nature provision, yet developing a set of criteria as ‘guiding star’ which enables ‘a menu of solutions’ rather than a prescribed recipe has been shown to be useful (Anguelovski and Corbera 2022; Siders, 2022).



**Third, any principle-based standard which seeks to support urban nature provision will need to be accessible to the range of stakeholders across government, the private sector and civil society who are engaged in the (co)governance of urban nature.** As discussed in Chapter 2, voluntary standards are less often associated with initiatives that report/expect multiple impacts reflecting their limited use by government bodies who tend to lead such initiatives and yet at the same time such standards are more widely taken up by private and civil society actors who play a significant role in those initiatives that ‘under promise and over deliver’. Mandatory standards are more effective and more widely taken up by government actors, but may risk reducing the participation of the wide variety of actors needed to ensure successful, high-quality urban nature provision due to the large burdens required in terms of reporting on under-resourced actors and concerns amongst those in the private sector about being bound to goals whose outcomes are often out of their direct control and where adverse publicity could be significant. There is evidence that some mandatory standards have achieved the requisite buy-in from these stakeholders, such as the Biodiversity Net Gain instrument in the UK (Box 4.5) which sets minimum thresholds for new housing and infrastructure development (Moussa et al., 2021). At the same time, there is a risk that the use of mandatory standards will result in the prioritisation of quantity rather than quality when it comes to urban nature provision. Here, governments can use their competencies, especially in agenda-setting, negotiation and enforcement stages of decision-making to support minimum performance principles and operate as “catalyst, coordinator and supporter of diverse regulatory activities” (Abbott and Snidal, 2008, p. 49).

**Box 4.5: Delivering Biodiversity Net Gain thresholds in Cator Park, Kidbrooke Village**

Biodiversity Net Gain (BNG) requires that developments have a net positive impact on biodiversity, by restoring ecosystems or via offsetting, and minimising any negative impacts. In order to attain this classification, developments must go beyond 10% of the pre-development biodiversity threshold value (UKGBC, 2021; UKGBC, 2022). Setting such a threshold and opening up the space for local actors to fill these requirements – specified to their local context, demands and needs - provides an interesting pathway for opening up possibilities for setting principles without prescribing urban nature actions. In Cator Park, in Kidbrooke Village BNG was attained by installing 55 hectares of grassland, meadows and wetlands. This was obtained in partnership with the Royal Borough of Greenwich, Berkeley Group, London Wildlife Trust and HTA Design, resulting in a rich mosaic of habitats, attaining a BNG of 200%. While BNG involves caveats – including that it’s primarily a habitat metric which does not ensure biodiversity gains – fostering these kinds of threshold standards could be a promising, alternative pathway in delivering high-quality NBS.

Above all, working with a set of principles for high-quality urban nature provision, in contrast to prescriptive rule-based approaches which seek to determine a one-size fits all recipe for urban nature, can allow for experimentation and learning by doing. Our analysis suggests that while setting goals and having visions and plans in place is crucial for ensuring multiple benefits are realised from urban nature, there are a significant number of initiatives that exceed their initial expectations as they build capacity, establish trust, and generate learning with and through local places and communities. This creative, iterative approach is key to ensuring that urban nature fulfils its potential not only to address key societal challenges, but also to ensure inclusion and equity and to be able to be resilient to changing environmental, social, economic and political conditions over

time (Turner et al., 2022). Urban transformation as an ongoing process of contestation and struggle – requiring an ongoing, reflexive approach to governing change (Stripple and Bulkeley, 2019).

## 5 Conclusions: Making High-quality Urban Nature Provision Count

Enhancing the provision of urban nature presents a considerable opportunity to address a number of critical societal challenges. As this background paper has set out, there is now a body of evidence that demonstrates that urban nature can generate multiple benefits through which to address the key societal challenges of climate change adaptation, biodiversity, health and economic development. NBS initiatives that meet multiple sustainability goals are necessary but not sufficient for realising high-quality urban nature – such interventions must also be **inclusive** and **just**. It also provides the potential for fostering inclusion and ensuring equity within urban communities and can contribute towards the transformative change needed to address the underlying causes of climate change and biodiversity loss. Yet ensuring that urban nature provision leads to these outcomes is a challenging task and one that is not likely to be met through a framework that focuses on a one-size fits all standard.

At the heart of this challenge is the question of how we should make urban nature count. On the one hand, according to the dictionary definitions, making something count can simply be a matter of calculation or computation. It would be possible to introduce a framework, norm or standard for urban nature in the Netherlands that simply sought to count the amount and type of urban nature and regard that as sufficient. **Yet our analysis suggests that this way of counting urban nature is likely to miss the potential it affords to address a series of societal challenges synergistically and at the same time is likely to generate exclusion, entrench inequalities and neglect the underlying causes of climate change and biodiversity loss.**

Instead, we argue that **making urban nature provision count means**, as the dictionary also suggests, **that it is held in esteem and treated with consideration**, that we ‘count in’ urban nature as something to be included in our reckoning of urban futures and we ‘count on’ urban nature as that which we depend and rely on for our well-being and prosperity.

**Moving forward then requires that we focus not so much on what can be counted – the numbers of trees, the distance from green space – but what counts – the quality of urban nature provision.**

# References

- Abbott KW and Snidal D. (2008). The governance triangle: Regulatory standards institutions and the shadow of the state. In *The Politics of Global Regulation* (pp. 1-49). Princeton University Press, Princeton.
- Almassy D, Pinter L, Rocha S, Naumann S, Davis M, Abhold K and Bulkeley H. (2018). *Urban Nature Atlas: A Database of Nature-Based Solutions Across 100 European Cities*. Available online: [https://naturvation.eu/sites/default/files/result/files/urban\\_nature\\_atlas\\_a\\_database\\_of\\_nature-based\\_solutions\\_across\\_100\\_european\\_cities.pdf](https://naturvation.eu/sites/default/files/result/files/urban_nature_atlas_a_database_of_nature-based_solutions_across_100_european_cities.pdf).
- Almassy D and Maia S (2022). *Understanding of the Multiple Benefits of Urban Nature in Practice: Insights from the Urban Nature Atlas*. Available online: [https://una.city/sites/default/files/Analysis%20report\\_27Oct.pdf](https://una.city/sites/default/files/Analysis%20report_27Oct.pdf)
- Amorim-Maia AT, Anguelovski I, Chu E and Connolly J. (2022). Intersectional climate justice: A conceptual pathway for bridging adaptation planning, transformative action, and social equity, *Urban Climate*, 41: 101053.
- Angela A, Cohen-Shacham E, Dalton J, Edwards S, Hessenberger D, Maginnis S, ... and Vasseur L. (2020). *IUCN Global Standard for Nature-Based Solutions: a user-friendly framework for the verification, design and scaling up of NbS*. IUCN: Gland, Switzerland.
- Angelo H. (2021). *How green became good: urbanized nature and the making of cities and citizens*. University of Chicago Press, Chicago.
- Anguelovski I and Corbera E. (2022). Integrating justice in Nature-Based Solutions to avoid nature-enabled dispossession, *Ambio*: 1-9.
- Anguelovski I, Irazábal-Zurita C and Connolly JJ. (2018). Grabbed urban landscapes: Socio-spatial tensions in green infrastructure planning in Medellín, *International journal of urban and regional research*, 43(1): 133-156.
- Balvanera U, Pascual C, Michael B, Baptiste and González-Jiménez, D. (2022). *Methodological Assessment Report on the Diverse Values and Valuation of Nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat, Bonn, Germany.
- Blakey J. (2021). Accounting for elephants: The (post) politics of carbon omissions, *Geoforum*, 121: 1-11.
- Bockarjova M, Botzen WJW, Van Schie MH and Koetse MJ. (2020). Property price effects of green interventions in cities: A meta-analysis and implications for gentrification, *Environmental science & policy*, 112: 293-304.
- Bulkeley H. and Betsill M. (2003). *Cities and Climate Change: Urban sustainability and global environmental governance*. Routledge, London.
- Bulkeley H. (2015). *Accomplishing climate governance*. Cambridge University Press, Cambridge.
- Burbidge M, Smith Larsen T, Feder S and Yan S. (2021). Don't blame it on the sunshine! An exploration of the spatial distribution of heat injustice across districts in Antwerp, Belgium, *Local Environment*: 1-17.
- Byrne J, Wolch J and Zhang J. (2009). Planning for environmental justice in an urban national park, *Journal of Environmental Planning and Management*, 52(3): 365-392.
- C4o (n.d.). About C4o. Available online: <https://www.c4o.org/about-c4o/>

- Calliari E, Castellari S, Davis M, Linnerooth-Bayer J, Martin J, Mysiak J ... and Zandersen M. (2022). Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks, *Climate Risk Management*: 100450.
- Carrington D. (2021). Woodland walks save UK £185m a year in mental health costs, report finds. Available online: <https://www.theguardian.com/environment/2021/dec/04/woodland-walks-save-uk-185m-a-year-in-mental-health-costs-report-finds>
- Carrington D. (2022). Young people's mental health bolstered by nature initiatives, report says. Available online: <https://www.theguardian.com/environment/2022/oct/20/young-people-mental-health-nature-uk>
- Cass N and Shove E. (2018). Standards? Whose standards?, *Architectural science review*, 61(5): 272-279.
- Convention on Biological Diversity (CBD) (2020). *Updated zero draft of the post-2020 Global Biodiversity Framework*. Available online: <https://www.cbd.int/article/zero-draft-update-august-2020>
- Convention on Biological Diversity (CBD)(2021). *First draft of the post-2020 Global Biodiversity Framework*. Available online: <https://www.cbd.int/doc/c/g14a/eca3/24ad42235033f031badf61b1/wg2020-03-03-en.pdf>
- Châles F, Bellanger M, Bailly D, Dutra LX and Pendleton L. (2022). Using standards for coastal nature-based solutions in climate commitments: applying the IUCN Global Standard to the case of Pacific Small Island Developing States, *Nature-Based Solutions*: 100034.
- Chan FKS, Griffiths JA, Higgitt D, Xu S, Zhu F, Tang YT ... and Thorne CR. (2018). "Sponge City" in China—a breakthrough of planning and flood risk management in the urban context, *Land use policy*, 76: 772-778.
- Chausson A, Turner B, Seddon D, Chabaneix N, Girardin CA, Kapos V ... and Seddon N. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation, *Global Change Biology*, 26(11): 6134-6155.
- Chen Y, Xu Z, Byrne J, Xu T, Wang S and Wu J. (2021). Can smaller parks limit green gentrification? Insights from Hangzhou, China, *Urban Forestry & Urban Greening*, 59: 127009.
- Cohen-Shacham E, Walters G, Janzen C and Maginnis S. (2016). *Nature-based solutions to address global societal challenges*. IUCN, Gland, Switzerland.
- Connecting Nature (n.d.). Connecting Nature initiative. Available online: <https://connectingnature.eu/>
- Cortinovis C, Olsson P, Boke-Olén N and Hedlund K. (2022). Scaling up nature-based solutions for climate-change adaptation: Potential and benefits in three European cities, *Urban Forestry & Urban Greening*, 67: 127450.
- Cousins JJ. (2021). Justice in nature-based solutions: Research and pathways, *Ecological Economics*, 180: 106874.
- Curran W and Hamilton T. (2020). Nature-based solutions in hiding: Goslings and greening in the still-industrial city, *Socio-Ecological Practice Research*, 2(4): 321-327.
- Denton P. (n.d.). Rewilding cities for resilience. Available online: <https://www.arup.com/perspectives/rewilding-cities-for-resilience>
- Dorst H, Van Der Jagt A, Runhaar H and Raven R. (2021). Structural conditions for the wider uptake of urban nature-based solutions—A conceptual framework, *Cities*, 116: 103283.
- Dushkova D and Haase D. (2020). Not simply green: Nature-based solutions as a concept and practical approach for sustainability studies and planning agendas in cities, *Land*, 9(1): 19.

- European Commission (EC) (2015). *Towards an EU research and innovation policy agenda for nature-based solutions & re-naturing cities*. Final Report of the Horizon 2020 Expert Group on Nature-Based Solutions and Re-Naturing Cities
- European Commission (EC) (2022a). *The vital role of nature-based solutions in a nature positive economy*. Derived from <https://connectingnature.eu/spotlight/vital-role-nature-based-solutions-nature-positive-economy>
- European Commission (EC) (2022b). Green Deal: pioneering proposals to restore Europe's nature by 2050 and halve pesticide use by 2030. Available online: [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_3746](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_3746)
- European Commission (EC)(n.d.). Nature-based solutions. Available online: [https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions\\_en](https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en)
- European Environment Agency (EEA) (2020). *Building a coherent Trans-European Nature Network*. Available online: <https://www.eea.europa.eu/publications/building-a-coherent-trans-european>
- European Environment Agency (EEA). (2021). *Nature-Based Solutions in Europe: Policy, Knowledge and Practice for Climate Change Adaptation and Disaster Risk Reduction*. Available online: [https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/nature-based-solutions-europe-european-environment-agency-report-2021-04-15\\_en](https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/nature-based-solutions-europe-european-environment-agency-report-2021-04-15_en)
- European Environment Agency (EEA) (2022a). *How green are European cities? Green space key to well-being – but access varies*. Available online: <https://www.eea.europa.eu/highlights/how-green-are-european-cities>
- European Environment Agency (EEA)(2022b). Oasis school grounds programme in Paris, France. Available online: <https://www.eea.europa.eu/publications/who-benefits-from-nature-in/oasis-school-grounds-programme-in>
- Flynn A and Hacking N. (2019). Setting standards for a circular economy: a challenge too far for neoliberal environmental governance?, *Journal of Cleaner Production*, 212: 1256-1267.
- Foley P, Okyere DA and Mather C. (2018). Alternative environmentalities: recasting the assessment of Canada's first Marine Stewardship Council-certified fishery in social terms, *Ecology and Society*: 23(3).
- Fransen A and Bulkeley H. (2022). Transnational Governing at the Climate-Biodiversity Frontier, Paper presented at the Nordic Environmental Social Science Conference, 7–9 June 2022, Gothenburg.
- Friends of Ecosystem-based Adaptation (FEBA) (2017). *Making Ecosystem-based Adaptation Effective: A Framework for Defining Qualification Criteria and Quality Standards*. Available online: <https://www.iied.org/go4167>
- Goldstein JE. (2022). More data, more problems? Incompatible uncertainty in Indonesia's climate change mitigation initiatives, *Geoforum*, 132: 195-204.
- Grabs J. (2021). Signaling Southern sustainability: When do actors use private or public regulatory authority to market tropical commodities?, *Journal of Environmental Management*, 285: 112053.
- Gritsenko D and Roe M. (2019). Quality standards in polycentric systems: A case of shipping, *Geoforum*, 103: 138-147.
- Grow2Know (2021). Walkways Wildlife. Available online: <https://grow2know.org.uk/walkways-wildlife/>

- Grubbauer M and Dimitrova V. (2022). Exceptional architecture, learning processes, and the contradictory performativity of norms and standards, *European Planning Studies*, 30(1): 121-140.
- Hofbogen (n.d.). Luchtpark. Available online: <https://www.hofbogen.nl/luchtpark/>
- Interpolis (n.d.). Groene daken. Available online: <https://www.interpolis.nl/slimme-oplossingen/groene-daken>
- IPBES and IPCC (2021). *Tackling Biodiversity & Climate Crises Together and Their Combined Social Impacts. Global Experts Identify Key Options for Solutions First-Ever Collaboration between IPBES and IPCC Selected Scientists*. Available online: <https://www.un.org/sustainabledevelopment/blog/2021/06/tackling-biodiversity-climate-crises-together-and-their-combined-social-impacts/>
- IPBES (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat, Bonn, Germany.
- van der Jagt A, Toxopeus H, Tozer L, Dorst H, Runhaar H and Bulkeley H. (2020). *Greening European Cities: Accelerating the uptake of urban nature-based solutions*. NATURVATION Deliverable 5.8.
- Johnson A. (2022). The Roundtable on Sustainable Palm Oil (RSPO) and transnational hybrid governance in Ecuador's palm oil industry, *World Development*, 149: 105710.
- Kabisch N, Frantzeskaki N, Pauleit S, Artmann ... and Bonn A. (2016). Nature-Based Solutions to Climate Change Mitigation and Adaptation in Urban Areas –Perspectives on Indicators, Knowledge Gaps, Opportunities and Barriers for Action, *Ecology and Society* 21 (2): 39.
- Kabisch N, Korn H, Stadler J and Bonn A. (2017a). *Nature-based solutions to climate change adaptation in urban areas: Linkages between science, policy and practice*. Springer Nature, Cham, Switzerland
- Kabisch N, van den Bosch M and Laforteza R. (2017b). The health benefits of nature-based solutions to urbanization challenges for children and the elderly–A systematic review, *Environmental research*, 159: 362-373.
- Kabisch N, Frantzeskaki N and Hansen R. (2022). Principles for urban nature-based solutions, *Ambio*, 51(6): 1388-1401.
- Kiss B, Sekulova F and Kotsila P. (2019). *International Comparison of Nature-Based Solutions*. Naturvation Project Report.
- Koh SY, Zhao Y and Shin HB. (2021). Moving the mountain and greening the sea: the micropolitics of speculative green urbanism at Forest City, Iskandar Malaysia, *Urban Geography*: 1-27.
- Konijnendijk CC. (2022). Evidence-based guidelines for greener, healthier, more resilient neighbourhoods: Introducing the 3–30–300 rule, *Journal of Forestry Research*: 1-10.
- Kuhl L and Boyle A. (2021). Kuhl, Laura and Boyle, Alaina, *Nature-Based Solutions, Market Resilience, and Food Sovereignty*. Available online: <https://ssrn.com/abstract=3843416>.
- London Wildlife Trust (n.d.). London's Living Landscapes. Available online: <https://www.wildlondon.org.uk/londons-living-landscapes>
- Maes MJ, Jones KE, Toledano MB and Milligan B. (2019). Mapping synergies and trade-offs between urban ecosystems and the sustainable development goals, *Environmental science & policy*, 93: 181-188.
- Maia ATA, Calcagni F, Connolly JJT, Anguelovski I and Langemeyer J. (2020). Hidden drivers of social injustice: uncovering unequal cultural ecosystem services behind green gentrification, *Environmental Science & Policy*, 112: 254-263.

- Márkus B. (2022). *Exploring co-governance arrangements of urban nature-based solutions. An explorative multiple case study approach in the Netherlands* (Master thesis).
- Mattijssen TJM, Van der Jagt APN, Buijs AE, Elands BHM, Erlwein S and Laforteza R. (2017). The long-term prospects of citizens managing urban green space: From place making to place-keeping?, *Urban Forestry & Urban Greening*, 26: 78-84.
- Moussa T, Kotb A and Helfaya A. (2021). An empirical investigation of UK environmental targets disclosure: The role of environmental governance and performance, *European Accounting Review*: 1-35.
- Natural History Museum (n.d.). Urban Nature Project. Available online: <https://www.nhm.ac.uk/about-us/urban-nature-project.html>
- Nature-Based Solutions Initiative (n.d.). Nature-Based Solutions Guidelines. Available online: <https://nbsguidelines.info/>
- NatureScot (2020). *Delivering urban Nature-based Solutions in Scotland at scale: Growing Regenerative Cities report*. Available online: <https://darkmatterlabs.org/Urban-Nature-based-Solutions-in-Scotland-at-Scale-Toward-a-regenerativ>
- NatureScot (n.d.). Placemaking and Green Infrastructure | NatureScot. Available online: <https://www.nature.scot/professional-advice/placemaking-and-green-infrastructure>
- NATURVATION (n.d.). NATURVATION project. Available online: <https://naturvation.eu/>
- Network Nature (n.d.). Network Nature initiative. Available online: <https://networknature.eu/>
- O'Donnell EC, Netusil NR, Chan FK, Dolman NJ and Gosling SN. (2021). International perceptions of urban blue-Green infrastructure: a comparison across four cities, *Water*, 13(4): 544.
- Our Place (2022). New! - Place Standard with a Climate Lens. Available online: <https://www.ourplace.scot/Place-Standard-Climate>
- Pauly J. (2021). *Germany's Climate Governmentality. How Mechanisms of Governmentality and Discipline Govern Carbon Conduct*. Institut für Politikwissenschaft and Universität Bremen, Bremen.
- Papari C, Toxopeus H, Polzin F, Bulkeley H and Menguzzo E. (forthcoming). Can the EU Taxonomy help upscale investments into urban nature-based solutions?
- Raymond CM, Frantzeskaki N, Kabisch N, Berry P, Breil M, Nita MR ... and Calfapietra C. (2017a). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas, *Environmental Science & Policy*, 77: 15-24.
- Raymond CM, Breil M, Nita MR, Kabisch N, de Bel M, Enzi V, ... and Berry P. (2017b). *An impact evaluation framework to support planning and evaluation of nature-based solutions initiatives. Report prepared by the EKLIPSE Expert Working Group on Nature-Based Solutions to Promote Climate Resilience in Urban Areas*. Centre for Ecology and Hydrology.
- Sarabi SE, Han QL, Romme AG, de Vries B and Wendling L. (2019). Key enablers of and barriers to the uptake and implementation of nature-based solutions in urban settings: A review, *Resources*, 8(3): 121.
- Schouten C. (2021). 'Kamerbrief met reactie op initiatiefnota 'Groen in de stad''. Available online: <https://www.rijksoverheid.nl/documenten/kamerstukken/2021/05/28/kamerbrief-met-reactie-op-initiatiefnota-groen-in-de-stad>
- Scottish Government (2012). *Making the most of communities' natural assets: green infrastructure An information note for Community Planning Partnerships on applying an ecosystems approach*. Available online: <https://www.gov.scot/publications/making-communities-natural-assets-green-infrastructure/pages/1/>



- Scottish Government (2019). Place Principle. Available online: <https://www.gov.scot/publications/place-principle-introduction/>
- Seddon N, Sengupta S, Hauler I and Rizvi AR. (2019). *Nature-Based Solutions in Nationally Determined Contributions: Synthesis and Recommendations for Enhancing Climate Ambition and Action by 2020*. Available online: <https://portals.iucn.org/library/node/48525>.
- Seddon N, Chausson A, Berry P, Girardin CA, Smith A and Turner B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges, *Philosophical Transactions of the Royal Society B*, 375(1794): 20190120.
- Seddon N, Smith A, Smith P, Key I, Chausson A, Girardin C ... and Turner B. (2021). Getting the message right on nature-based solutions to climate change, *Global change biology*, 27(8): 1518-1546.
- Shokry G, Connolly JJ and Anguelovski I. (2020). Understanding climate gentrification and shifting landscapes of protection and vulnerability in green resilient Philadelphia, *Urban Climate*, 31: 100539.
- Siders AR. (2022). The administrator's dilemma: Closing the gap between climate adaptation justice in theory and practice, *Environmental Science & Policy*, 137: 280-289.
- Somarakis G, Stagakis S and Chrysoulakis N. (Eds.). (2019). *Think nature Nature-Based Solutions Handbook*. Think Nature project funded by the EU Horizon 2020 research and innovation programme.
- Stripple J and Bulkeley H. (2019). Towards a material politics of socio-technical transitions: Navigating decarbonisation pathways in Malmö, *Political geography*, 72: 52-63.
- Task Force on Climate-related Financial Disclosures (TCFD)(n.d.). Task Force on Climate-related Financial Disclosures. Available online: <https://www.fsb-tcfd.org/>
- Toevallig Groen (n.d.). 'Toevallig Groen, Zaailingen in de stad'. Available from: [www.toevalliggroen.nl](http://www.toevalliggroen.nl)
- Toxopeus H, Kotsila P, Conde M, Katona A, van der Jagt AP and Polzin F. (2020). How 'just' is hybrid governance of urban nature-based solutions?, *Cities*, 105: 102839.
- Toxopeus H and Polzin F. (2021). Reviewing financing barriers and strategies for urban nature-based solutions, *Journal of Environmental Management*, 289: 112371.
- Tozer L, Hörschelmann K, Anguelovski I, Bulkeley H and Lazova Y. (2020). Whose city? Whose nature? Towards inclusive nature-based solution governance, *Cities*, 107: 102892.
- Tozer L, Bulkeley H and Xie L. (2022). Transnational Governance and the Urban Politics of Nature-Based Solutions for Climate Change, *Global Environmental Politics*: 1-23.
- Triguero-Mas M, Anguelovski I, Connolly JJ, Martin N, Matheneys A, Cole H, Pérez-del-Pulgar C, Garcia-Lamarca M, Shokry G and Argüelles L. (2022). Exploring green gentrification in 28 Global North cities: the role of urban parks and other types of green space, *Environmental Research Letters*, 17(10): 104035.
- Turner T, Devisscher T, Chabaneix N, Woroniecki S, Messier C and Seddon S. (2022). The Role of Nature-Based Solutions in Supporting Social-Ecological Resilience for Climate Change Adaptation, *Annual Review of Environment and Resources*, 47.
- United Nations Economic Commission for Europe (UNECE) (2021). *Sustainable Urban and Peri-urban Forestry An Integrative and Inclusive Nature-Based Solution for Green Recovery and Sustainable, Healthy and Resilient Cities Policy Brief*. Available online: [https://unece.org/sites/default/files/2022-02/Urban%20forest%20policy%20brief\\_final\\_o.pdf](https://unece.org/sites/default/files/2022-02/Urban%20forest%20policy%20brief_final_o.pdf)

- United Nations Environment Programme (UNEP) (2021). *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions: A working paper for the G20*. Available online: <https://www.unep.org/pt-br/node/29766>
- United Nations Environment Programme (UNEP) (2022). *Resolution adopted by the United Nations Environment Assembly on 2 March 2022*. Derived on 27 September 2022, from <https://wedocs.unep.org/handle/20.500.11822/39752?show=full>
- UK Green Building Council (UKGBC)(2021). *Principles for delivering urban Nature-based Solutions*. Available online: <https://www.ukgbc.org/ukgbc-work/principles-for-delivering-urban-nature-based-solutions/>
- UK Green Building Council UKGBC (2022). *The value of urban Nature-Based Solutions*. Available online: <https://www.ukgbc.org/ukgbc-work/the-value-of-urban-nature-based-solutions/>
- UK House of Lords Select Committee on Science and Technology (2021). *Letter from Lord Patel to Rt Hon Alok Sharma, COP26 President, Nature-based Solutions at COP26 October 2021*. Available online: <https://committees.parliament.uk/publications/7506/documents/79045/default/>
- Urban Nature Atlas (2021a). Mill Leat Restoration, Bute Park. Derived from <https://una.city/nbs/cardiff/mill-leat-restoration-bute-park>
- Urban Nature Atlas (2021b). Port Sunlight River Park. Derived from <https://una.city/nbs/wirral/port-sunlight-river-park>
- Urban Nature Atlas (2021c). Family gardens of Montpellier. Derived from <https://una.city/nbs/montpellier/family-gardens-montpellier>
- Urban Nature Atlas (2021d). The 100,000 trees initiative. Derived from <https://una.city/nbs/porto/100000-trees-initiative>
- Urban Nature Atlas (2021e). Wetland of Repainville. Derived from <https://una.city/nbs/rouen/wetland-repainville>
- Urban Nature Atlas (2021f). City-Park Urban initiative at Plaine Achille. Derived from <https://una.city/nbs/saint-etienne/city-park-urban-initiative-plaine-achille>
- Urban Nature Atlas (2022a). Agrarian Park of Baix Llobregat. Derived from <https://una.city/nbs/barcelona/agrarian-park-baix-llobregat>
- Urban Nature Atlas (2022b). Hellenikon Metropolitan Park. Derived from <https://una.city/nbs/athens/hellenikon-metropolitan-park>
- Veerkamp CJ, Schipper AM, Hedlund K, Lazarova T, Nordin A and Hanson HI. (2021). A review of studies assessing ecosystem services provided by urban green and blue infrastructure, *Ecosystem Services*, 52: 101367.
- Vitale V, Martin L, White MP, Elliott LR, Wyles KJ, Browning MH ... and Fleming LE. (2022). Mechanisms underlying childhood exposure to blue spaces and adult subjective well-being: An 18-country analysis, *Journal of Environmental Psychology*: 101876.
- De Vries S, Buijs AE and Snep RP. (2020). Environmental justice in The Netherlands: Presence and quality of greenspace differ by socioeconomic status of Neighbourhoods, *Sustainability*, 12(15): 5889.
- Wachsmuth D, Cohen DA and Angelo H. (2016). Expand the frontiers of urban sustainability, *Nature*, 536(7617): 391-393.
- Welden EA, Chausson A and Melanidis MS. (2021). Leveraging Nature-based Solutions for transformation: Reconnecting people and nature, *People and Nature*, 3(5): 966-977.

- West S, Haider LJ, Stålhammar S and Woroniecki S. (2020). A relational turn for sustainability science? Relational thinking, leverage points and transformations, *Ecosystems and People*, 16(1): 304-325.
- Wildfowl and Wetlands Trust (WWT)(2022). *Creating Urban Wetlands for Wellbeing A Route Map*. Available online: <https://www.wwt.org.uk/uploads/documents/2022-06-08/wwt-creating-urban-wetlands-for-wellbeing.pdf>
- Wijsman K and Berbés-Blázquez M. (2022). What do we mean by justice in sustainability pathways? Commitments, dilemmas, and translations from theory to practice in nature-based solutions, *Environmental Science & Policy*, 136: 377-386.
- Wolch JR, Byrne J and Newell JP. (2014). Urban green space, public health, and environmental justice: The challenge of making cities ‘just green enough’, *Landscape and urban planning*, 125: 234-244.
- Woroniecki S, Wendo H, Brink E, Islar M, Krause T, Vargas AM and Mahmoud Y. (2020). Nature unsettled: How knowledge and power shape ‘nature-based’ approaches to societal challenges, *Global Environmental Change*, 65: 102132.
- Xie L, Bulkeley B, van der Jagt A, Toxopeus H, Tozer L, Pearl-Martinez R, Dorst H and Runhaar H. (2020). *Pathways for Systemic Integration of Nature-based Solutions*. NATURVATION Deliverable 5.10.
- Xing Y, Jones P and Donnison I. (2017). Characterisation of nature-based solutions for the built environment, *Sustainability*, 9(1): 149.
- Zusman E, Lee SY, Akahoshi K and Jaeger A. (2017). Recognizing and rewarding urban co-benefits. In *Urbanization and Climate Co-Benefits: Implementation of win-win interventions in cities* (pp. 221-234). Routledge, New York.
- 10-minute Walk (n.d.). Prioritizing Parks for People – 10-minute Walk Mayor’s Roundtable. Available online: <https://10minutewalk.org/>

# Appendices

## Annex I: Description of NBS Goals and Impacts Assessed

Challenge areas	Goals	Impacts
<b>Climate Change Adaptation</b>	Climate change adaptation Flood protection Storm and rainfall water management and storage Coastal protection	Increased protection against sea level rise Lowered local temperature Strengthened capacity to address climate hazards/natural disasters Increased protection against flooding Improved stormwater management Reduced risk of damages by drought Enhanced protection and restoration of coastal and marine ecosystems Enhanced protection and restoration of freshwater ecosystems
<b>Biodiversity protection</b>	Biodiversity conservation Biodiversity restoration Marine and biodiversity protection	Enhanced protection and restoration of coastal and marine ecosystems Enhanced protection and restoration of freshwater ecosystems Increase in protected green space areas Increased conservation or restoration of ecosystems Increased ecological connectivity across regeneration sites and scales Reduced biodiversity loss Increased number of species present Increased protection of threatened species Improved prevention or control of invasive alien species Enhanced support of pollination Increased spread of native/heirloom/open-pollinated seed Prevent or control invasive alien species
<b>Health</b>	Enabling physical activity Improving mental health Improving physical health Creation of opportunities for relaxation & recreation Air qual improvement Noise reduction	Improved physical health Improved mental health Gain in activities for recreation and exercise Improved air quality Reduced noise exposure
<b>Economic development</b>	Economic development: agriculture Economic development: industry Economic development: service sectors Tourism support Real estate development Employment / job creation	Increase in GDP Increase of jobs More sustainable tourism Increased property prices Stimulate development in deprived areas Reduce financial cost for urban management Increase in agricultural production (for profit or not) Attraction of business and investment Generation of income from NBS Increased market share for green economies
<b>Social issues</b>	Inclusive governance Environmental education Social justice and equity Environmental and climate justice	Increased opportunities for social interaction Improved social cohesion Fair distribution of social, environmental and economic benefits of the NBS initiative

---

Social cohesion	Improvement of liveability
Social interaction	Improved access to urban green space
Preserve natural heritage	Increased visibility and opportunity for marginalized groups or indigenous peoples
Protect the area's historic and cultural landscape / infrastructure	Promotion of cultural diversity
Promotion of cultural diversity	Improvement in people's connection to nature
Preserve historical traditions	Protection of natural heritage
	Protection of historic and cultural landscape / infrastructure
	Preserved spiritual and religious values
	Increased sense of place identity, memory and belonging
	Increased awareness of flora and fauna as culturally and historically meaningful
	Increased appreciation for natural spaces

---

## Annex II: Business Models of NBS

<b>Business Model</b>	<b>Concept</b>
<b>Risk-reduction</b>	Upfront investments into NBS are made to lower future costs from extreme weather events such as droughts, storms and floods.
<b>Green densification</b>	Integrates NBS into urban real estate development. The costs of creating and maintaining these NBS become an embedded part of a larger business case of 'sustainable urban living', captured through real estate value and economic growth.
<b>Local stewardship</b>	Local NBS plots and trees are valued by citizens and businesses who are willing to protect and support nature in their neighbourhood based on the direct value and sense of identity and meaning that they derive from it.
<b>Green health</b>	The therapeutic, health and wellbeing value of urban NBS is recognized and used as a driver to finance urban NBS.
<b>Urban offsetting</b>	A 'no net loss' approach incentivizes or requires offset investments into urban NBS that are lost because of real estate and Infrastructure development within the city.
<b>Vacant space</b>	The government steps back and provides space for local initiatives and (social) entrepreneurship in (sometimes temporarily) unused urban public space.
<b>Green education</b>	Urban NBS are set up and managed to support environmental education and allow young, urban citizens to engage with food and nature.
<b>Green heritage</b>	Builds on cultural values and a sense of identity to sustain and develop urban NBS. The green spaces that support cultural heritage can lead to different types of value creation (tourism, education, cultural healing).

Source: as defined by Toxopeus (2019)<sup>6</sup>

<sup>6</sup> Source: Toxopeus, H.S. (2019) Taking Action for Urban Nature: Business Model Catalogue, NATURVATION Guide

## Annex III: Qualitative data

Naturvation working papers used (all unpublished manuscripts):

- Astbury J. (2018). Case Study Working Paper – Mexico City, Mexico. NATURVATION Milestone 4.3.
- Ivanova S, Lazova Y, Werner A and Hoerschelmann K. (2018) Case Study Working Paper – Sofia, Bulgaria. NATURVATION Milestone 4.3.
- van der Jagt A and Dorst H. (2017). Case Study Working Paper – Utrecht, Netherlands. NATURVATION Milestone 4.2.
- van der Jagt A and Dorst H. (2018). Case Study Working Paper – Edinburgh, UK. NATURVATION Milestone 4.3.
- De Jongh C. (2021). Governance and finance dynamics of the NATURVATION case studies. NATURVATION Milestone 4.
- Katona A. (2017). Case Study Working Paper – Győr, Hungary. NATURVATION Milestone 4.2.
- Katona A. (2018). Case Study Working Paper – Tianjin, China. NATURVATION Milestone 4.3.
- Katona A. (2018). Case Study Working Paper – Winnipeg, Canada. NATURVATION Milestone 4.3.
- Kim E. (2018). Case Study Working Paper – Boston, USA. NATURVATION Milestone 4.3.
- Kiss B. (2017). Case Study Working Paper – Malmö, Sweden. NATURVATION Milestone 4.2.
- Kiss B, McCormick K and Wamsler Ch. (2018). Case Study Working Paper – Melbourne, Australia. NATURVATION Milestone 4.3.
- Kiss B and Wamsler Ch. (2018). Case Study Working Paper – Munich, Germany. NATURVATION Milestone 4.3.
- Kotsila P. (2017). Case Study Working Paper – Barcelona, Spain. NATURVATION Milestone 4.2.
- Kotsila P. (2018). Case Study Working Paper – Athens, Greece. NATURVATION Milestone 4.3.
- Kotsila P and Barò F. (2018). Case Study Working Paper – Dublin, Ireland. NATURVATION Milestone 4.3.
- Martin Ch, Bulkeley H and Luque-Ayala A. (2017). Case Study Working Paper – Newcastle upon Tyne, UK. NATURVATION Milestone 4.2.
- Tozer L. (2018). Case Study Working Paper – Cape Town, South Africa. NATURVATION Milestone 4.3.
- Werner A. (2018). Case Study Working Paper – Montpellier, France. NATURVATION Milestone 4.3.
- Werner A, Lazova Y and Hoerschelmann K. (2017). Case Study Working Paper – Leipzig, Germany. NATURVATION Milestone 4.2