



## URBAN NATURE: A SHARED SOLUTION TO THE CLIMATE AND BIODIVERSITY CRISES?



### KEY FINDINGS

- Cities are central to mitigating the effects of climate change and protecting biodiversity; nature-based solutions can play a key role
- In the NATURVATION Urban Nature Atlas, only 14% of the assessed climate nature-based solutions also explicitly target biodiversity goals
- It is critical that in seeking to respond to climate change urban nature-based solutions do not adversely affect biodiversity
- Efforts to mainstream urban nature-based solutions for climate change can seize the opportunity to promote their multi-functionality and contribute to biodiversity goals

### THE NATURVATION PROJECT

NATure-based URban inNOVATION is a 4-year project involving 14 institutions across Europe in the fields of urban development, geography, innovation studies and economics. We are creating a step-change in how we understand and use nature-based solutions for sustainable urbanisation.



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Cities are increasingly being recognised as key arenas for governing and tackling global environmental challenges, including the interlinked climate and biodiversity crises. Yet urban areas have historically exacerbated these issues. Cities are estimated to account for 60-75% of global GHG emissions, when consumption of goods and services produced outside of cities is taken into account, while urban expansion and densification are responsible for degrading, fragmenting, or destroying remaining natural areas. According to the European Environmental Agency's recently published State of Nature report<sup>1</sup>, the majority of Europe's biodiversity continues to decline at an alarming rate and urban sprawl is amongst the greatest threats.

With around 75% of the EU population living in urban areas, cities are critical for moving forward to curbing greenhouse gas emissions, reducing vulnerability to the impacts of climate change, building resilience and protecting biodiversity. Climate nature-based solutions such as (peri)urban forests, green roofs or sustainable urban drainage systems can play a central role in tackling these intertwined challenges. On one hand, natural-climate solutions can help cities adapt to more intense rainfall events, longer dry spells and other impacts of climate change. Concretely, such solutions can diminish the risk of flooding, reduce the urban heat island effect and lower the impact of heatwaves. They can also reduce energy demand and therewith greenhouse gas emissions by: cooling the urban built environment at a building and district level, providing insulation for buildings in cold climates, or managing and using rainwater on-site (thereby reducing the amount of energy needed to convey and treat it elsewhere). Additional climate mitigation benefits come from carbon sequestration and storage, particularly in surrounding peri-urban areas in the case of larger scale wetland and forest restoration. Further potential benefits include curbing biodiversity loss and supporting wider biodiversity goals, such as ensuring that nature's contribution to people can be shared across society.



Recent EU policy developments are showing increasing efforts to jointly address these goals and - in some cases - are calling for action from cities. Most notably, the European Green Deal aims to transform the EU's economy while achieving carbon neutrality and working to preserve and restore ecosystems and biodiversity. The EU Biodiversity Strategy for 2030, as part of the Green Deal, explicitly recognises the interlinkages and highlights the role of urban areas. The Strategy calls on cities of more than 20,000 inhabitants to develop ambitious Urban Greening Plans by the end of 2021, but fails to make explicit links to mitigation and adaptation. Finally, the European Climate Pact<sup>2</sup> launched in December 2020 has a focus area dedicated to supporting the enlargement of urban green areas and planting trees in cities. While this framework provides a solid starting point, it leaves significant potential for an increased mainstreaming of and support for climate nature-based solutions in urban areas and the explicit consideration of biodiversity therein. We suggest that this represents a crucial *opportunity gap* for realising the multiple benefits that nature-based solutions can provide.

This policy brief responds to these needs and takes a critical look at the value and limits of such solutions to deliver on biodiversity goals. The brief asks the question: *How can we realise the added value of urban climate nature-*

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<sup>1</sup> <https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020>

<sup>2</sup> [https://europa.eu/climate-pact/priority-topics/green-areas\\_en](https://europa.eu/climate-pact/priority-topics/green-areas_en)





*based solutions for biodiversity?* Pathways and recommendations for fostering this potential multi-functionality in practice – where desired - are also outlined, focusing in particular on the EU policy framework. Research findings of NATURVATION, not least from case studies documented by the project, provide evidence to underline the discussion.

### Action on biodiversity and climate change in European cities: evidence from NATURVATION

NATURVATION’s research provides evidence on the active role many cities are already playing in implementing climate nature-based solutions within urban and peri-urban areas. Approximately one third of the 1,000 nature-based solutions included in the Urban Nature Atlas (UNA) target climate change mitigation and/or adaptation. Of these almost 300 projects, 56% set adaptation objectives, 28% set mitigation objectives, and the final 16% set both adaptation and mitigation objectives. The specific objectives and types of these nature-based solutions are summarised in the table below.

Table 1. Attributes of nature-based solutions targeting climate change adaptation and/or mitigation

Climate change adaptation		Climate change mitigation	
Objectives: <ul style="list-style-type: none"> <li>• build resilience</li> <li>• reduce the impacts of climate risks events for urban communities</li> </ul>		Objectives: <ul style="list-style-type: none"> <li>• sequestering storing carbon</li> <li>• reducing energy demand</li> </ul>	
Types of NBS	Specific aim	Types of NBS	Specific aim
increasing the urban vegetation cover	to reduce the urban heat island stress and to cool outdoor spaces	increasing the availability of green urban space (wetlands, tree cover)	to increase carbon storage
implementing sustainable water management and urban drainage schemes	to make space for water and reduce peak flow and run-off during storms and/or floods	installing vertical or horizontal green surfaces	to foster carbon storage and cooling
implementing green walls or roofs and green water management	to make space for water and reduce peak flow and run-off during storms and/or floods	investing in green bikeways as a means to prevent car use	to prevent car use and therewith CO <sub>2</sub> emissions

Yet despite the increasing recognition of the potential to address multiple urban challenges simultaneously, the use of nature-based solutions often remains focused on targeting single issues and fail to account for the multiple benefits that can be generated in practice. While this is the case for multiple sustainability challenges, the Urban Nature Atlas shows that there is currently very limited joining up across the climate and biodiversity agendas with only around 14% of projects aiming to address these challenges together. Within this 14% subgroup (including adaptation and/or mitigation-focused nature-based solutions), 25% of the projects aim to address “habitats and biodiversity restoration” and 31% of the projects target “habitats and biodiversity conservation”. Taking a closer look, it appears that projects targeting mitigation or mitigation and adaptation are more likely to also have biodiversity targets than projects only targeting adaptation. Whether this trend is unique to this data set or more widely observed would require further research.

Urban (pocket) parks and forests are the type of nature-based solution found to most frequently target climate change and biodiversity goals together. These often comprise large physical areas, have a high potential for carbon sequestration and adaptation, and are frequently located in peri-urban areas surrounding the cities. Further types of climate nature-based solutions that also provide benefits to biodiversity include the restoration of green corridors



or brownfields, green roofs, sustainable urban drainage systems, or the renaturalisation of rivers and wetlands. Two case studies from the NATURVATION project have been selected to illustrate how such multi-functional nature-based solutions can be implemented in practice. It should be noted, however, that there are a lack of robust assessments quantifying the biodiversity impacts of urban climate nature-based solutions.

Table 2. Percentage of climate nature-based solutions in the Urban Nature Atlas which also target biodiversity-related objectives

	Habitats and biodiversity restoration	Habitats and biodiversity conservation
Climate nature-based solution projects (representing 14 % of projects in the Urban Nature Atlas)	25%	31%
<b>Subcategories of climate nature-based solutions</b>		
Projects targeting climate change adaptation	23%	30%
Projects targeting climate change mitigation	31%	39%
Projects targeting climate change mitigation and adaptation	31%	45%

The River Alt Restoration Project in Liverpool (UK) aimed to create a new public green space and implement watercourse restoration. The aim was to improve river morphology and water quality, reduce flood risk (i.e. support climate change adaptation) and create new and connected wildlife habitats. Within three years, a mosaic of habitats was created, including extensive riparian planting and marginal wetlands. The river corridor serves to form a new public green space for the community and increase resilience to the effects of climate change. The active engagement of the community in this previously deprived and neglected area was key to the successful implementation of this project.

The 100,000 trees project in the Porto Metropolitan Area, Portugal sought to create and maintain urban forests throughout the region. The collaborative project brings various organisations and citizens together to restore 100 hectares of urban forest. By using native tree species, the project aims to sequester carbon, improve air quality, and protect the soil as well as enrich local biodiversity and contribute to human health and well-being.

### **How critical is it to set biodiversity objectives for urban climate nature-based solutions?**

Climate nature-based solutions differ in their ambition and objective setting regarding direct and indirect contributions to biodiversity objectives. While some of these solutions rely on ecosystem protection or restoration and have a high ambition for directly contributing to biodiversity goals, other climate-driven solutions bring trade-offs and can threaten biodiversity through its removal or reduction. This would include, for example, conversion of a biodiverse meadow to a monoculture tree plantation using non-native species or converting an intact wetland into an urban green park. Yet other projects can be considered as ‘not harming’ biodiversity, i.e. making no significant direct impact. This would include, for example, removing paved river embankments and replacing them with permeable grass surfaces.

In such discussions, it should be considered that all climate solutions which create, restore or preserve nature where it would otherwise not exist still contribute directly to biodiversity goals to some extent, even if failing to realise the full potential of biodiversity benefits. This pertains to, for example, concrete replaced with green roofs, renaturation of river banks or sustainable urban drainage systems.

Beyond providing space for biodiversity in cities, natural climate solutions have an important role to play in addressing the indirect drivers of biodiversity loss. Urban river restoration, for example, can reduce pollutants and plastic waste and contribute to reducing plastic waste in the ocean and enhancing marine biodiversity. District-wide sustainable urban drainage systems which can be introduced to manage rainwater on-site can, as a second example, also save energy costs for thermal management of buildings and prevent local flooding. In doing so, such solutions





can mediate runoff surface water from e.g. former industrial sites to nearby rivers and thereby reduce pollutants reaching downstream waterbodies. Ultimately, addressing these underlying drivers serves to protect and enhance local biodiversity in all neighboring terrestrial and aquatic ecosystems.

Contributions to climate change mitigation also ultimately help to curb biodiversity loss. Despite their small land coverage, cities are responsible for as much as 75% of global GHG emissions, with around 35% of global GHG emissions generated within city borders. Decreasing emissions with nature-based solutions that reduce energy use at building and district level (e.g. green facades and roofs, sustainable urban drainage systems) or promote sustainable mobility (green corridors) helps to slow climate change and allows ecosystems to thrive outside of cities

Climate solutions likewise bring different values in terms of nature's wider contributions to people. More specifically, they ensure connection with nature for society and contribute to mental and physical well-being, which is critically important in the urban domain. Urban nature further supports the development of society's views and values towards the natural world and biodiversity, thereby shaping behaviours such as waste reduction and consumption choices. These actions in turn further indirectly support biodiversity protection.

These variations and the consideration of both direct and indirect benefits to biodiversity invite the questions: Should urban climate nature-based solutions be obliged to explicitly contribute to biodiversity conservation? Or is "doing no harm" sufficient? Given that such solutions are already contributing to biodiversity goals, albeit often without explicitly recognising this, we suggest that the inclusion of biodiversity objectives should not be seen as mandatory. However, it remains critical that all nature-based solutions avoid adversely effecting biodiversity and aim to contribute to addressing the indirect and direct drivers of biodiversity loss where possible.



In this way, climate nature-based solutions should be seen as one piece of a larger landscape of nature-based solutions targeting diverse societal challenges. The mix of solutions can together address the key challenges a city faces, with individual interventions contributing more heavily to climate, biodiversity, or other targeted challenges as is most appropriate. Yet all solutions should consider the potential to deliver multi-functionality and contributions towards diverse goals. For example, while some solutions will not always be the most efficient option available to store

carbon, they may represent the best option once climate resilience and the wider enhancement of biodiversity are considered. Indeed we see this as a key opportunity for policy makers at both the local and regional level to tap into to fully harness the possible benefits that nature-based solutions can realise across different agendas.



### *From rhetoric to realisation: Fostering multi-functionality in practice*

While urban nature-based solutions cannot all deliver equally on climate and biodiversity goals, cities should be equipped to design nature-based solutions so that they deliver multiple benefits. Yet lacking data, a status quo of choosing grey over green infrastructure, limited understanding of benefits, and silos between sectors present obstacles for forging cross-jurisdictional and multilevel institutional connection to adopt such solutions.



NATURVATION has found that realising the potential of climate nature-based solutions to jointly deliver climate and biodiversity goals thus depends in large part on their successful mainstreaming and has identified several pathways to do so, including: position nature-based solutions as a promising climate strategy; integrate actions towards coordinated climate change response and wider sustainability benefits; and invest in nature-based solutions to reduce climate risk. Each of these pathways is introduced below and complemented with concrete ‘stepping stones’ and linkages to relevant European policy processes to help make the most of opportunities and overcome common challenges hindering wider mainstreaming and uptake.

### *Position nature-based solutions as a promising climate strategy*

Addressing climate change is increasingly recognised as a strategic priority for urban areas. One way that nature-based solutions can be mainstreamed into urban development is by positioning them as ‘natural climate solutions’. To do so, significant efforts are needed to demonstrate that cities can contribute to their climate objectives by choosing nature-based solutions over grey infrastructure solutions when addressing challenges such as stormwater management and flooding. It is essential to change the status quo which often prioritises grey over green infrastructure in urban decision-making processes and values engineering expertise, established quantitative data, quick effects, and single-objective solutions with proven effectiveness. Organisations such as the European Covenant of Mayors for Climate & Energy, which supports local governments in setting and implementing ambitious climate mitigation and adaptation targets, have a key role to play by communicating nature-

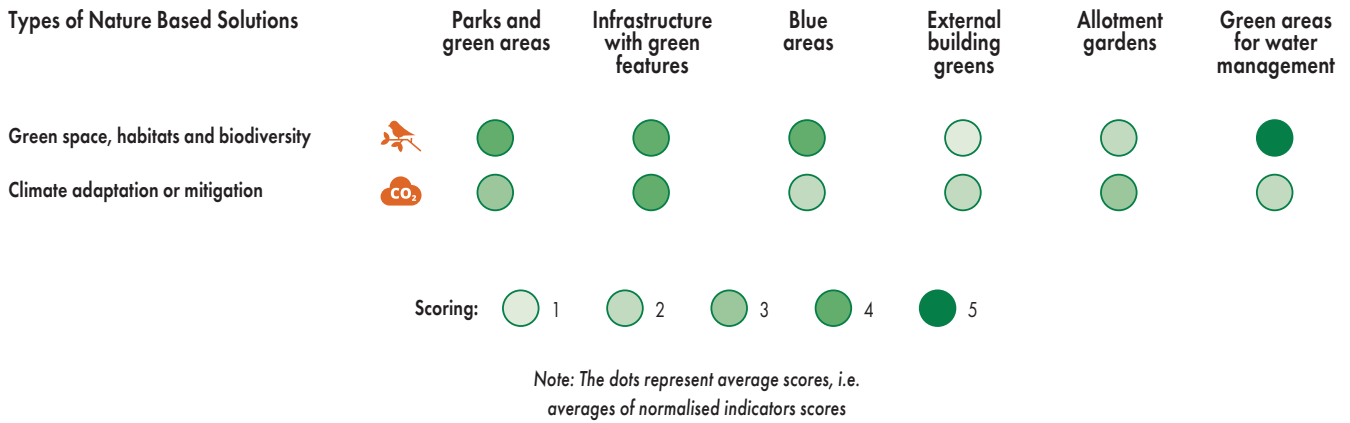
The *Urban Nature Navigator* is an online tool that helps to assess the potential contributions of different types of nature-based solutions to meet urban sustainability challenges. It is the first framework to combine multiple indicators that capture ecological, social, cultural and economic benefits to cover a wide variety of impacts - biophysical, sociocultural and economic - as well as twelve urban challenges.



based solutions as vital tool to jointly address mitigation and adaptation in urban areas.



In the same vein, concentrated efforts to push cities to consider climate mitigation and adaptation goals when developing their Urban Greening Plans under the new EU Biodiversity Strategy for 2030 would help to position nature-based solutions as promising urban climate response strategy. At the moment, the Green City Accord - the European Commission’s initiative to make cities greener, cleaner and healthier by facilitating the development of urban greening plans - does not include climate change among the urgent environmental challenges it aims to tackle, suggesting this issue is to be dealt with separately. An important opportunity exists to increase the recognition of and guidance for cities for including climate mitigation and adaptation potential in the design of the foreseen greening plans.



In addition, this pathway requires the development of evidence to increase the awareness of nature-based solutions’ multiple benefits for both climate and biodiversity goals as well as possible tradeoffs. NATURVATION’s Urban Nature Navigator (see box) helps address this critical need by providing evidence on the potential of different types of urban nature-based solutions to address a diversity of challenges in different contexts. Overall, the potential to deliver multiple benefits strongly depends on local conditions. The degree to which biodiversity can benefit also varies greatly based on the size of the area and - more importantly - the quality and ecological value as well as functional connectivity of the nature-based solution.

According to the Urban Nature Navigator, urban green that is connected with grey infrastructure and parks shows the highest potential to contribute to both climate change and biodiversity goals.

Working with the Urban Nature Navigator at municipal level revealed that this tool can be an “eye-opener” to increase the level of understanding and awareness about the potential of the different types of nature-based solutions to deliver benefits, address challenges and inspire cities to increase implementation.



***Integrate actions towards coordinated climate change response and wider sustainability benefits***

This pathway is focused on overcoming silos between sectors, municipal departments, and areas of expertise in designing and implementing nature-based solutions to enable synergies among different urban sustainability agendas. By positioning them





as part of developing integrated approaches to climate change, nature-based solutions no longer have to be undertaken as standalone initiatives. Assuring that such solutions support or – at the very least - do not harm biodiversity can serve to generate positive feedback loops and build political support, mobilise funds, and increase the scope and scale of benefit generation through increased implementation. Aligning nature-based solutions with wider strategic priorities can also help to access not only budgets and existing capacities dedicated for climate change mitigation and adaptation, but also those earmarked for other related prioritised paradigms.

At the EU level, this could entail increased inclusion of biodiversity considerations and of wider urban sustainability benefits within policies promoting climate nature-based solutions. This is particularly relevant for the forthcoming EU Adaptation Strategy, Forest Strategy and Nature Restoration Plan as well as for the implementation of existing policy frameworks such as the European Green Deal and its 2030 Climate Target Plan and European Climate Pact



At the same time, most National Energy and Climate Plans – the key national-level documents that are to steer the implementation of 2030 climate mitigation targets in the EU Member States - do not currently include any considerations of biodiversity or climate change adaptation. Most EU Member States do not even fully acknowledge the key role municipalities can play in climate and energy transition. Instead, they focus on decarbonisation across energy, industry, transport or building sectors at national level. The recent increase in the EU greenhouse gas emissions reduction target from 40 to 55% from 1990 levels by 2030 means that many of these national plans may need to be revised in response to this new, more ambitious target. This opens a significant window of opportunity to better integrate climate nature-based solutions within other policy agendas and augment the role of cities in this regard.

This pathway thus highlights that policies do not have to be specifically focused on biodiversity in order to present opportunities for mainstreaming nature-based solutions to deliver both climate and biodiversity benefits.



As climate change impacts increase in scope and severity, nature-based solutions are being identified as potential adaptation solutions and risk reduction strategies for cities. The financial risks of climate impacts are a core component of such discussions. Stimulating institutional investment for risk reduction can unlock and (re)direct existing and new funding earmarked for climate adaptation measures and bring industry knowledge (e.g. insurer’s expertise on risk evaluation) to nature-based solutions.

The European Green Deal (EGD), which features biodiversity and climate across sectors, raises high hopes for a genuine transformative change in this regard. In particular, it is accompanied by the New European Bauhaus initiative, which aims to combine design, sustainability, accessibility, and investment in order to deliver the EGD and spur systemic changes. In its quest to break down barriers between science, technology, art, culture and social inclusion, the initiative aims to find sustainable solutions for everyday problems – such as adapting to the effects of climate change. The potential for investment in and innovation with nature as multifunctional solutions is significant.

A further source of increased potential investment is the European Investment Bank (EIB), which can provide dedicated project-specific investment loans to municipalities for projects larger than 25 million EUR under its Municipal Framework Loans Programme. These loans can cover up to 50% of the total cost for both public and private sector promoters. EIB support is often key to attracting other investors. Moreover, the Natural Capital Financing Facility (NCCF) of the EIB invests in projects generating revenue or cost savings based on provision of environmental goods and services, including green roofs and facades, sustainable urban drainage systems or nature-based flood protection and erosion control. EIB in partnership with the European Commission has also launched URBIS<sup>3</sup>, an investment advisory platform set up to support urban authorities to facilitate, accelerate and unlock urban investment projects and programmes.

There is further significant potential to increase the use of diverse European structural and investment funds and funding programmes to realise nature-based solutions for reducing climate risk. The EU Cohesion Policy Funds (ERDF Art.7-9) has, for example, earmarked 5% of its funding for sustainable urban development - including the implementation of nature-based solutions. Other examples of relevant European funding programmes include LIFE, INTERREG, Horizon2020 and the Urban Innovative Actions initiative. At city-level, financial instruments such as green municipal bonds and climate bonds can be used to finance nature-based solution investments. The city of Lisbon aimed to use its green participatory budget scheme as catalyst to unlock private-sector capital for climate change mitigation and adaptation projects. In another example, the ISAR plan in Munich invested €35 million in river restoration in response to the need for flood protection and improved water quality. The plan worked successfully across municipal silos and together with private actors.

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<sup>3</sup> <https://eiah.eib.org/about/initiative-urbis.htm>