In support of the working paper for the G20

UN environment programme 50 1972-2022

Smart, Sustainable and Resilient cities:

the Power of Nature-based Solutions

ANNEX III: ACCOUNTING FOR NATURE IN URBAN PLANNING

How Ecosystem Accounts can help scale up Nature-based Solutions for Smart, Sustainable and Resilient Cities

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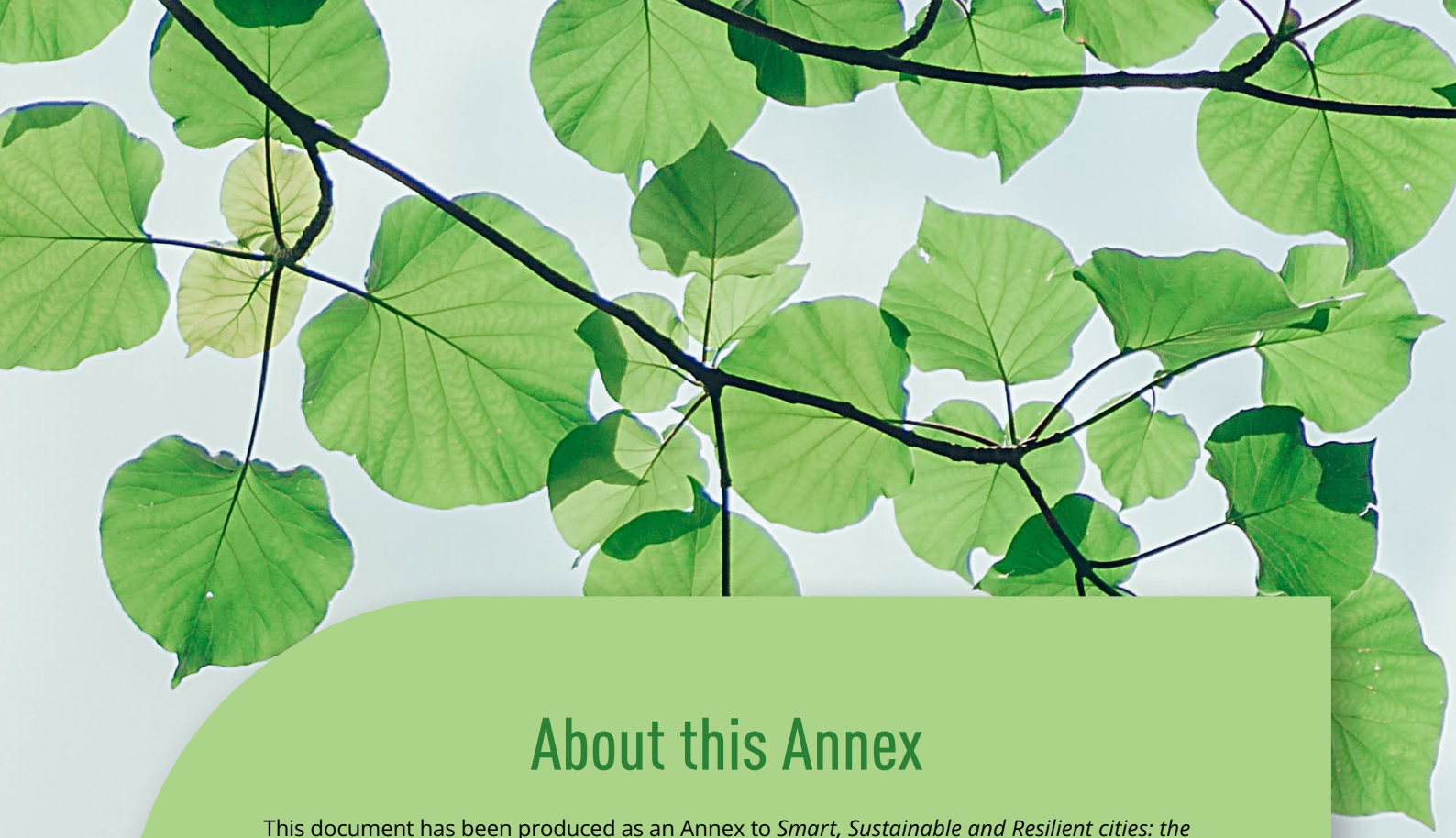

About this Annex

This document has been produced as an Annex to *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions.* One of the themes of the upcoming Stockholm+50 Conference is how we can redefine our relationship with nature, and Nature-based Solutions (NbS) will have an important role in this transformation.

This annex responds to some of the key barriers identified to scaling up the use of the NbS – particularly the challenges of showing that nature in cities can be an 'asset' rather than a 'cost'. It reviews how the application of urban Ecosystem Accounting (EA) can help decision-makers in cities scale up the use of NbS in the context of managing the wider natural environment. It explores how urban EA can help overcome barriers to greater use of NbS for sustainable and resilient cities and how cities can implement EA by:

- looking at how cities currently use urban EA and NbS;
- summarising the ways that the multiple benefits of NbS could be captured and valued to change perceptions of nature in cities from 'cost' to 'investment' using EA; and
- exploring how the policy and practice of EA and NbS at local and national levels could be aligned.

While this is a supplement to *Sustainable and Resilient cities: the Power of Nature-based Solutions* which was written for the G20, it is intended to be relevant beyond that audience. With the vast majority of future urban population growth and associated infrastructure needs expected across Asia and Sub-Saharan Africa, this is also where the greatest opportunities to benefit from NbS are likely to arise. Especially where path dependencies and lock-in effects from historic infrastructure developments are less prevalent and strong family and community connections can support grassroots experimentation, new and innovative solutions may emerge.[1]

The importance of these approaches is growing as we work towards meeting global goals and commitments, including implementation of the post-2020 global biodiversity framework.

Summary

Urban Ecosystem Accounting (EA) has a potentially important contribution to make to smart, sustainable and resilient cities, in part by helping to overcome barriers to realising the full potential of Nature-based Solutions (NbS). These barriers include:

- the perception that nature isn't a real part of the solution to many issues that cities face; and
- challenges around quantifying the many benefits of NbS, particularly to help make the case to finance and implement NbS.

Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions identifies NbS - if appropriately planned and implemented – as ways to help address three of the **urgent challenges faced by cities:**

- poor and/or declining quality of life;
- large and increasing urban ecological footprint; and
- negative impacts and disasters in urban areas resulting from climate change.

The report outlines how NbS can '*build resilience and reduce disaster risk while delivering many other benefits: climate adaptation and mitigation; clean water and air; cooler streets; and access to green public spaces for recreation and physical, mental and spiritual well-being*'.[2]

However, *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions* also identifies four **key barriers to realising the full potential of NbS** relating to:

- some policy makers' and other decision-makers' perceptions of NbS (including financiers and those in the private sector);
- standards and guidelines for urban planning that insufficiently consider NbS;
- timescale disconnects; and
- lack of access to finance for NbS.

Ultimately, NbS are often undervalued because they contribute to solving more than one problem (in a way many other approaches don't). These multiple benefits aren't always accounted for, and are context- and intervention-specific.

Key Definitions

NATURE-BASED SOLUTIONS

'This report recognises there is no multilaterally agreed definition of NbS.

Instead, it uses NbS as an umbrella concept that encompasses a range of established approaches, such as ecosystem-based adaptation, ecosystem-based management, green infrastructure and blue-green infrastructure and ecosystem-based disaster risk reduction, and so on'.

UNEP. (2021) Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions. A working paper for the G20

URBAN ECOSYSTEM ACCOUNTING

'Urban ecosystem accounting provides a framework for quantifying the extent and condition of urban ecosystems and the services they provide and associating these services with beneficiaries. Ecosystem accounting is not yet commonly used by local city planning institutions.'

Heris, M., Bagstad, K.J., Rhodes, C., Troy, A., Middel, A., Hopkins, K.G. and Matuszak, J. (2021) Piloting urban ecosystem accounting for the United States, Ecosystem Services, Volume 48, 101226, ISSN 2212-0416

Urban EA can help overcome some of these barriers by offering access to regular, consistent and accurate information on the state of urban nature, the benefits it provides and the beneficiaries that depend on it. Urban EA records both the extent and condition of natural assets (like public parks or street trees) and the benefits that flow from them over time (like increased habitat for wildlife or improvements in air quality). Urban EA can therefore track the impacts of NbS on the well-being of urban populations and progress towards nature-positive[3] urban economies.

The information from urban EA can be used to:

- enhance the evidence base for and report on NbS (e.g., how climate finance has been spent on NbS) to build the case for investment in and implementation of NbS in cities;
- help change decision-makers' perceptions of the role of nature in cities - from a drain on public finances to an investment in an integral part of a 'toolkit' to address multiple challenges, which can be funded by multiple actors in the urban environment; and
- measure progress against sustainable urban development objectives.

EA can essentially be conducted at any scale. Urban EA is in its infancy, but there is now an internationally agreed standard for EA and first-generation accounts at the national level have already been collated in more than 34 countries around the world.[4] Experience of how EA can help integrate nature into economic development plans at the national level shows its potential for cities. Initiatives to support cities' efforts to rebalance their relationship with nature are expanding but, while the importance of data and knowledge is captured in these initiatives, most don't explore the potential role that urban EA could play. Expanding the piloting of EA in cities, using the internationally agreed System of Environmental-Economic Accounts Ecosystem Accounting (SEEA EA) standard, would help establish how readily urban ecosystem accounts can be collated and used to support increased use of NbS to contribute to a range of goals.

Ultimately, EA could play an important role within national strategies to scale up urban NbS and empower cities to contribute to national-level commitments, such as those agreed under the Sustainable Development Goals (SDGs), the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions* identifies the need for national strategies relating to development to:

- connect NbS with economic and infrastructure planning; and
- establish cross-cutting working groups that engage relevant ministries, departments and agencies, central and local governments and their associations, as well as private sector and financial stakeholders.

EA can be a tool to meet these needs, as it helps to engage different stakeholders by providing consistent, transparent information that connects the state of the environment to wider social and economic objectives. The SDGs recognise the need to address the environmental, social and economic dimensions of sustainable development through an integrated planning approach across all scales. EA is deliberately structured as an integrated information system to enable this and support better integration of nature into urban planning processes.

Contents

Acronyms and abbreviations

CBD	Convention on Biological Diversity
EA	Ecosystem Accounting
EbA	Ecosystem-based Adaptation
GDP	Gross Domestic Product
GEP	Gross Ecosystem Product
ICLEI	Local Governments for Sustainability
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IISD	The International Institute for Sustainable Development
IUCN	The International Union for the Conservation of Nature
NbS	Nature-based Solutions
SDGs	Sustainable Development Goals
SEEA EA	System of Environmental-Economic Accounts Ecosystem Accounting
TNC	The Nature Conservancy
UNEP	United Nations Environment Programme
UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
WEF	World Economic Forum

Glossary of key EA terms

TERM	DEFINITION
Ecosystem Accounting	*'Ecosystem accounting is a coherent framework for integrating measures of ecosystems and the flows of services from them with measures of economic and other human activity'*[5]
Natural Capital	*'The stock of renewable and non-renewable natural resources (e.g., plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people (adapted from Atkinson and Pearce 1995; Jansson et al. 1994)'*[6]
System of Environmental-Economic Accounts	*'the accepted international standard for environmental-economic accounting, providing a framework for organizing and presenting statistics on the environment and its relationship with the economy. It brings together economic and environmental information in an internationally agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics'*[7]
Urban Ecosystem Accounting	*'Urban ecosystem accounting provides a framework for quantifying the extent and condition of urban ecosystems and the services they provide and associating these services with beneficiaries'*[8]

01 Introduction

1.1 Cities face increasingly urgent and fundamental challenges

As outlined in *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions*, cities both impact and depend on nature. Rapid urbanisation poses enormous challenges in terms of poor and/or declining quality of life for urban populations, large and increasing urban ecological footprint, and negative impacts and disasters in urban areas resulting from climate change.

One of the key challenges for cities is their vulnerability to natural hazards. Previous assessments estimated that nearly 60% of cities with a population of 500,000 or more people were at a high risk from at least one of six natural disasters including floods, landslides, volcanic eruptions, earthquakes, droughts, and cyclones.[9] Recent estimates suggest an additional 500 million people will be at increased risk of coastal hazards by 2050 as result of sea level rise, urbanisation in coastal areas and loss of coastal habitats.[10] Exposure to these hazards is increasing with climate change and the loss of nature – which are in turn exacerbated by unsustainable development in cities. Despite covering only around 3% of the Earth's land, the world's cities consume an estimated 60-80% of manufactured energy and are responsible for 70% of carbon emissions.[11] Furthermore, urban expansion is projected to threaten 290,000km^2 of natural habitat and bring 40% of strictly protected areas within 50km of a city by 2030.[12] Cities' impacts also spread beyond their administrative boundaries. The ecological footprint of the city of Vancouver, for example, has been estimated to be 36 times the size of the city.[13]

Climate change and the loss and degradation of nature at global and local levels is exposing cities and their residents to rapidly rising risks. Addressing these challenges must include both mitigation and adaptation actions. This creates an urgent need for strategic investment to deliver benefits for cities and nature.

Figure 1:
Examples of NbS in Cities and their benefits

HABITAT / ECOSYSTEM	CASE STUDY TITLE
Living roofs / walls	Urban stormwater management in Augustenborg, Malmö, Sweden
Street trees and urban forests	Urban Forest, Johannesburg, South Africa
Parks and open spaces	Queen Elizabeth Park, London, UK
	Seonyu island, Seoul, South Korea
	New York Parks, United States
Urban waterbodies / wetlands	Resilient Landscapes in the Serrana Region of Rio de Janeiro, Brazil
	Active, Beautiful, Clean Waters (ABC Waters), Singapore
Coastal (e.g., mangroves, corals)	Urban Mangrove Restoration in Ciénaga de la Virgen, Cartagena, Colombia
Peri-urban	Natural Flood Management Project in the Cotswolds, UK
	Water Fund, Quito, Ecuador

1.2 NbS within, around and away from cities are important to address the challenges cities face

There is wide and growing recognition that NbS can help cities address the challenges they face through, for example:

- restoring forests to store and sequester carbon that would otherwise end up in the atmosphere (and thus reduce exposure to climate risk);
- managing upstream ecosystems that regulate water flows and quality (one study estimates that a third of the world's hundred largest cities draw a substantial proportion of their drinking water from forest protected areas[14]);
- increasing the area and quality of urban and peri-urban habitats that reduce run-off and enhance flood regulation; and
- planting vegetation in urban areas to reduce air pollution or cool buildings[15], and reduce urban heat island effect.

Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions explores this topic in more detail. Further examples of how NbS are already being used to help cities address multiple challenges are outlined in Figure 1 and Annex A.

STATED BENEFITS											Reference
Carbon Reduction / Sequestration	Biodiversity	Water / Watershed Protection	Soil Protection	Erosion / Silt Control	Reduced heat island effect	Air quality	Human health and wellbeing	Livelihoods	Coastal flood protection	Inland and flash flood protection	
	■				■		■	■		■	16
■	■				■	■	■				17
■	■					■	■			■	18
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1.3 There is often a good case for investing in urban NbS

Investing in NbS has huge potential benefits. The World Economic Forum (WEF) estimates that investing in nature as infrastructure in the transition to a "nature-positive built environment" could create 4 million jobs and $160 billion of business opportunities[28], while The Nature Conservancy (TNC) estimates that one in six cities could financially benefit from protecting upstream habitats as a result of reduced water treatment costs alone.[29] NbS not only help to address different challenges, but also represent an investment in enhancing a city's 'asset base'. Natural 'assets' (like urban green spaces or forests surrounding cities) tend to deliver a broader range of benefits than man-made alternatives, so it's important to recognise these when making the case to invest in nature. For example, the International Institute for Sustainable Development (IISD) estimates that shifting from grey infrastructure solutions to NbS (where suitable options are available) would increase the associated benefits by an average of 28% globally. At the same time NbS are estimated to be more cost effective – potentially reducing the costs of meeting infrastructure needs by about 50%.[30] Despite increasing recognition of the opportunities that can arise through more widespread use of NbS, the WEF's BiodiverCities by 2030 Insight Report highlights that in 2021 only about 0.3% of urban infrastructure spending was allocated to NbS.[31]

There is a growing body of information about the range of benefits that different types of NbS can deliver in cities (Figure 1). Some studies indicate that urban NbS can result in benefits far beyond the initial investment (Table 1). However, valuation does not necessarily imply the need to place monetary values on the benefits of NbS. Indeed, in some cases it may be more useful and informative for decision-makers to be able to understand and quantify biophysical impacts, such as changes in air quality or ambient temperatures. It is important to include information that will resonate with decision-makers, both in looking at the benefits of NbS and when considering accounts to collate through EA. As cities seek to address multiple challenges, the provisioning, regulating and cultural services that NbS can provide makes their use increasingly attractive from an investment perspective. In some circumstances, natural assets may even generate a commercial return on investment, opening opportunities to mobilize private sector or public-private partnerships.

Table 1: Examples of benefits from investments in NbS

Habitat / Ecosystem	Description	Investment	Main challenge considered by the study	Additional benefits considered by the study	Scale of benefits	Ref
Urban waterbodies / wetlands	A project in Philadelphia to assess different options for a stormwater management programme to reduce combined sewer overflows, including using blue-green surface water management techniques	$2.4 billion over 25 years	Flash flooding	Health and wellbeing Biodiversity	Net benefits worth $3 billion (compared to less than $100 million for grey alternative)	26
Street trees and urban forests	Analysis of potential impacts of investing in future tree planting in heavily polluted cities like Beijing	$2.9 million per year	Air quality	Health and wellbeing	Reduction in fine particulate matter (PM 2.5) of between 1μg/m^3 and 10 μg/m^3 (depending on proximity)[a]	27

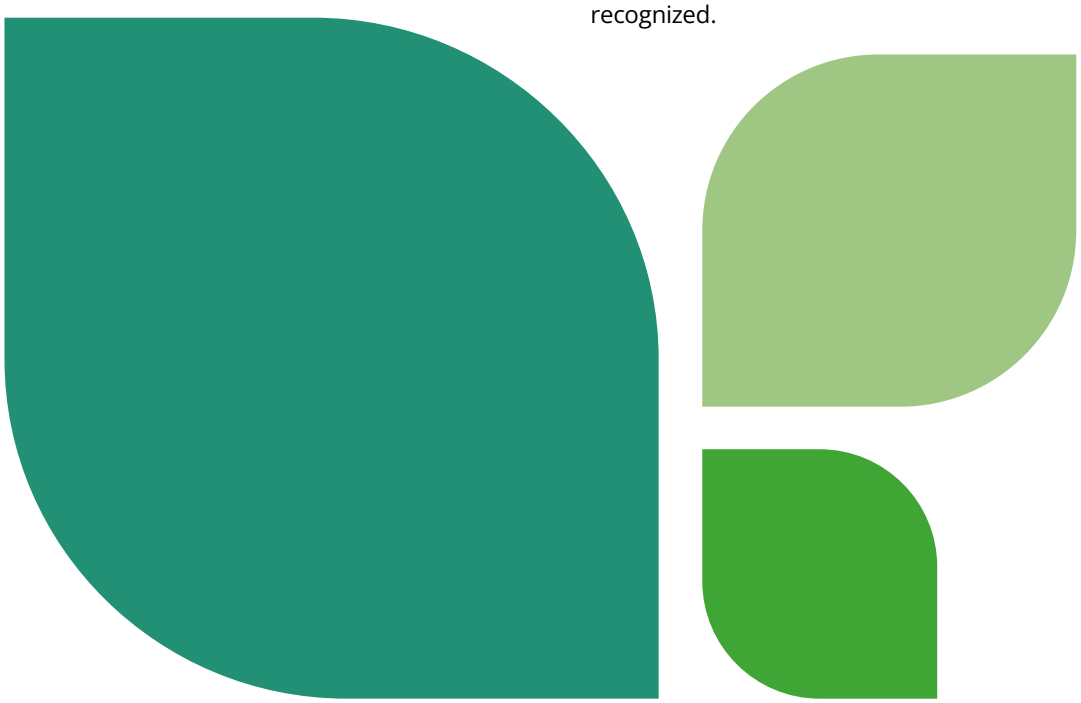
a Average concentrations of PM2.5 did not exceed 30 μg/m^3 across the Americas and Europe between 2010 and 2014 but rose above 75 μg/m^3 in some Asian cities.

1.4 There are several barriers to the wider implementation of NbS in cities

The trends in the state of nature in and around cities (and therefore nature's potential to support urban sustainable development) remain largely negative.[32] While NbS can bring multiple benefits, including improving the state of nature, there are still barriers to their wider uptake. *Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions* identified the following four key barriers to wider implementation of NbS in cities:

- perception among some policy makers that nature is not a real part of the solution to address the complex environmental and social challenges that cities face;
- standards and guidelines for urban planning and development that obstruct investment in more innovative approaches, such as NbS;
- the disconnect between short-term municipal initiatives and the long-term perspective required to establish and manage NbS as part of a city's infrastructure; and
- lack of access to finance for NbS, exacerbated by management of environmental features in cities often being treated as a 'cost' that needs to be serviced rather than as investment in assets.

Many of these barriers are linked to gaps in the information needed to quantify (particularly in monetary terms) the multiple benefits and relative monitoring and maintenance costs of NbS, and to assess how NbS 'perform' compared to other approaches.[33] Unlike some engineered approaches (where benefits may be fewer but are relatively clear and well documented), the full range of NbS benefits may be less well understood. To understand all the benefits of NbS, additional, context- and intervention-specific information (including that provided through EA) and tailored comparisons matched to the context and the intervention could be required. Similarly, it is also important to think about the distribution of benefits over space, time and different groups in society. Where engineered solutions may have a core constituency of beneficiaries and benefits that are delivered immediately after construction is completed, NbS may take time to mature but deliver a wider selection of benefits dispersed across different stakeholders. These benefits may be less visible, especially if urban planners are not used to evaluating solutions that deliver across multiple agendas. Ultimately, NbS are often undervalued because their multiple benefits aren't always accounted for. Their full contribution to society is therefore rarely recognized.



1.5 EA can help support greater uptake of NbS in cities

The pattern of underinvestment in NbS is not unique to cities, it is a characteristic of how our economic system undervalues nature. It will take a huge shift to address the imbalance between the demands of our economic system and nature's capacity to meet those demands. Cities will play an important role in this transformation, with support from national and international policy makers. In this context, it is important to understand and value the vital role that nature plays in urban areas. Framing nature in and around cities as natural assets can be one way to do this. Examining how natural assets (alongside man-made or manufactured and human capital) are supporting social and economic objectives over time can reveal important information about a city's ecological footprint and how changes in nature are impacting a city.

EA can help to establish where the use of NbS may have the greatest impact in relation to the investment made. EA collates data on natural assets and their benefits so areas within cities that are lacking in the important services provided by nature can be identified.[34] Using this information to engage communities in the design and management of NbS can also support their uptake, especially in developing countries where inconsistent funding of greenspaces management can otherwise see their condition and benefits to local people decline.[35]

EA could also support coordinated funding or pooling of resources for NbS across multiple city budget lines. An example of this could be a city that has high levels of air pollution and decides to include urban tree planting as part of the strategy to reduce the associated human health impacts. By looking both at where the highest levels of pollution occur and the areas of the city in which nature is 'under provided', the city could identify and target the areas in which tree planting would have the greatest health benefits while also providing much needed recreational space and biodiversity habitat. In turn, this could mean that city budgets for recreation or conservation can also be accessed to support the tree planting, rather than all of it having to come from health-related budgets. Mapping the range of costs and benefits of NbS through approaches like EA provides a framework to compare the relative benefits of grey and green infrastructure and could be used to monitor the impacts of NbS over time, providing a consistent approach to measuring the impact of an investment.

The remainder of this supplement explores what EA is, its potential application in cities and how it could be used to overcome some of the barriers to greater use of NbS to address multiple challenges.

02 Ecosystem Accounting (EA)

2.1 What urban EA is and what it does?

Urban EA offers access to regular, consistent and accurate information on the state of nature in cities, the benefits it provides and the beneficiaries that depend on it. EA can reveal the interrelationships between a city's stock of natural assets (both within and outside cities) and the achievement of its socio-economic (as well as environmental) objectives. Through this, EA can provide decision-makers, planners and other stakeholders with the information base they need to effectively mainstream nature across all aspects of urban development.

An important feature of EA is the ability to link ecosystem services supply to ecosystem service users. This allows the value of ecosystem services to businesses, the government and to households to be distinguished. EA also have an advantage over one off assessments in that they are collated repeatedly. Being able to compare the condition and extent of natural assets over time allows planners to see a city's footprint, and where a city's expansion or economic activities are at the expense of the local environment. EA can highlight the ramifications of this for people through the impact on the supply and use of ecosystem services. EA can therefore help inform judgements on a city's progress towards sustainable development and against city, national or international goals.

2.2 System of Environmental-Economic Accounts – Ecosystem Accounting (SEEA EA)

Practise in accounting for nature has advanced significantly over the last 10 years, particularly though the development of statistical guidance around Ecosystem Accounting (EA) under the System of Environmental-Economic Accounts (SEEA).

SEEA provides a framework to organise and integrate data on the environment and the economy in a consistent manner to derive a wide range of statistics, indicators and aggregates to inform on different environmental policy themes. There are multiple advantages of using such an approach to organise information on the environment and integrate this with other environment and economic data, which include:

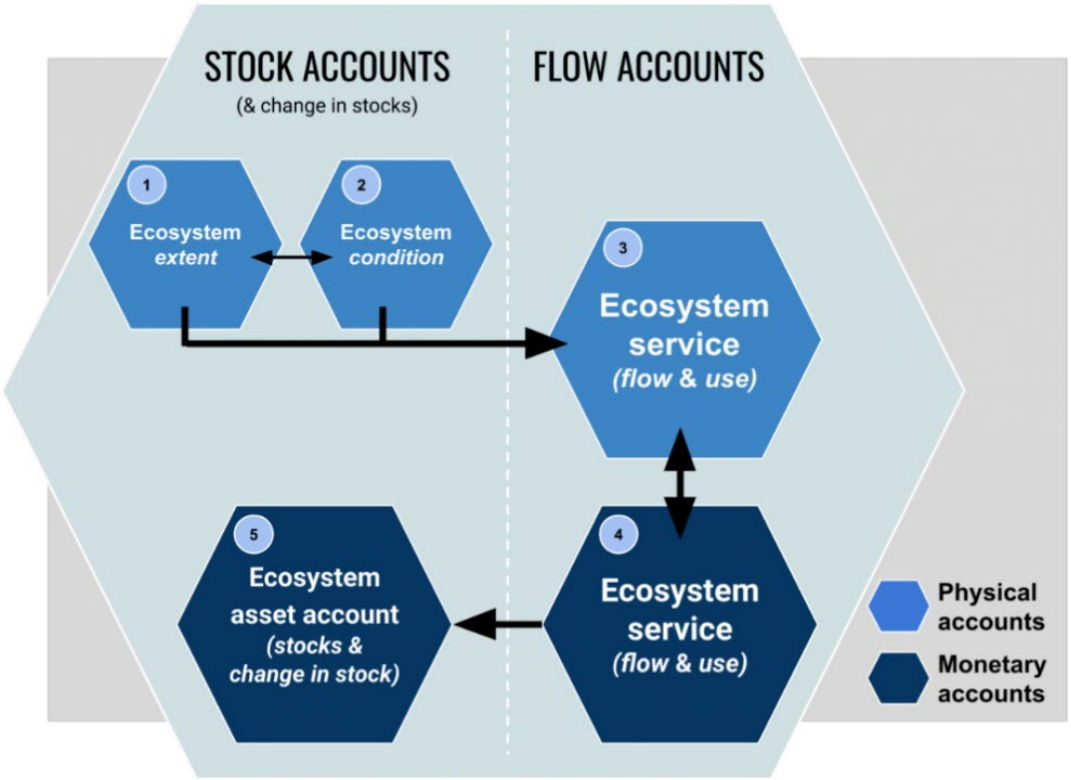
- boosting the flow of consistent and regular information available to decision-makers, reducing the need for one-off studies and analyses;[36]
- promoting harmonization of environmental data and bringing coherence and consistency across statistics;[37]
- ensuring that information can be compared with confidence across time;[38]
- enabling trade-offs and synergies related to environmental management decisions to be more readily revealed;[39] and
- allowing mainstreaming of environmental information into economic planning by using common classifications, concepts and measurement boundaries with economic accounts.

The SEEA standards for EA were adopted by the UN Statistical Commission in March 2021. The same body encouraged countries to implement such accounts in the context of their own priorities. The SEEA EA standards provide an international standard to follow in recording the biophysical state of the natural capital stock and the benefits it delivers.

2.3 How SEEA EA is structured

The ecosystem extent, condition and services (flow and use) accounts are the core accounting modules of the SEEA EA. How these accounts relate to each other is summarised in Figure 2.

Figure 2: Ecosystem accounts and how they relate to each other[40]



The SEEA EA guidance manual proposes that changes in the stock of ecosystem assets in cities are measured through monitoring the physical extent of different ecosystems (1 in Figure 2 above) and their condition (2) over an accounting period (typically a year). This information is recorded in ecosystem extent (1) and condition (2) accounts. The ecosystem extent (1) and condition (2) accounts feed into the ecosystem services flow and use accounts (3 and 4). These accounts record information on the flow of ecosystem services to economic users - in both physical (3) and monetary (4) terms. The monetary value of expected future flows of ecosystem services from ecosystem assets (net present values) informs the valuation of those ecosystem assets. This information is recorded in the Monetary Ecosystem Asset Account (5).

It is important to note that the SEEA EA can be implemented in a modular fashion and compiling monetary accounts when implementing the framework should not been seen as compulsory. The most important aspect of urban EA is to compile a set of ecosystem accounts that convey information on the benefits that cities derive from nature in a way that resonates with decision-makers. Sometimes this may be information on monetary values, in other cases it may not. Attributing a monetary value in an account does not equate to putting a price on nature. Accounts focus only on a range of instrumental values of nature and so will not provide a holistic argument for investing in nature. However, they may help ensure that the (often-neglected) benefits of investing in nature are more fully considered in decision-making processes.

2.4 Other EA approaches

The SEEA EA is the international standard for EA. Most efforts around urban EA, whether described as EA or something else, tend to follow a similar logic and require a similar information base. For example, Gross Ecosystem Product (GEP) is a metric that has been developed in China to reflect the contributions of nature to people's well-being and complement other social and economic indicators such as Gross Domestic Product (GDP). GEP, which has been piloted across four provinces and more than 10 municipalities, focuses on the monetary value of ecosystem services, and so provides an aggregated value of ecosystem services in a given accounting period (generally a year). GEP is identified in the SEEA EA handbook as an indicator of the total value of ecosystem services that can be derived from the monetary ecosystem service accounts. To estimate GEP, data on the underlying ecosystems and the biophysical flows of services generated are still required. Likewise, natural capital accounts, which focus on the stock of ecosystem assets and their condition, are also captured in the SEEA EA framework. Natural capital accounts are often connected to benefits such as ecosystem service flows in the same way as the ecosystem service and flow accounts. They can also be linked to other processes that cities may be undertaking to better understand their relationship with nature, such as the Singapore Index on Cities' Biodiversity (also known as the City Biodiversity Index).[41]

03 EA in cities

3.1 First steps for EA

Collating urban ecosystem accounts may seem a daunting challenge, especially as capturing the benefits of some assets may require very high-resolution spatial data. However, a pragmatic approach can be taken to collate and develop the first set of accounts for a city (or other area). Where there are data gaps or other challenges, accounts can still be compiled based on the best available information. The broad intention should be to compile accounts that are good and useful, rather than aiming for the perfect set on first production. This process can also help identify where additional data or information would be useful for the next accounting period.

As with wider EA, demonstrating the value of accounts is a useful entry point. Choosing an account or set of accounts relating to a live urban development issue or policy will help build capacity to collate and use accounts. This process can also help decision-makers understand the wider potential applications of EA. Focussing on a particular question or issue in this way requires less upfront investment while helping to build demand from decision-makers to extend and improve future compilations for urban EA.

3.2 EA at different scales

EA can be conducted at many different levels. Urban planning could clearly benefit from the regular, consistent and integrated information on ecosystems and the services they supply that the SEEA EA (and related approaches) can provide if implemented at municipal scale. The SEEA EA guidance manual includes details on the application of urban EA, and two options regarding scale are available for considering urban ecosystems and the services they supply.

Landscape approaches recognise ecosystems as larger areas of the same ecosystem type, for example a peri-urban forest or wetland. Such accounts may be important in the context of benefits derived from outside the core urban centre. Examples could include water supply benefits from uplands around the city, or coastal ecosystems offering protection from storm surges.

However, finer scale, **individual asset approaches** have also been implemented. These focus on specific features - including some NbS such as street trees, urban parks, rain gardens, or other sustainable urban drainage systems, green roofs, community gardens, etc - based on available very high-resolution spatial data. These form the basis of finer scale integration of elements of nature into cities.

Each of these options is relevant in different contexts, and both are likely to be needed to properly take natural assets into account at the city scale.

3.3 Current use of EA

Whilst recognizing the increasing role of nature in urban land-use management, there is an imperative need to understand the true value of natural capital and ecological functioning in urban ecosystems. As demand for natural resources increases and cities experience rapid growth, a regularly maintained and consistent framework for urban ecosystem accounting can reveal the true values of ecosystem services and the contribution of ecological urban assets to our economic and social wellbeing. As a result, multiple cities around the world have institutionalized approaches to account for urban ecosystem services in support of national, sub-national, and municipal level policies and decision-making.

Although not as widespread as efforts to compile ecosystem extent, condition and service accounts at the national level, SEEA EA is now being trialled in a number of urban areas around the world.

Table 2 summarises experience reported by the UN Statistical Division's Global Assessment of Environmental-Economic Accounting and Supporting Statistics 2020.[42] For example, the UK Office of National Statistics produces regular EA for urban areas[43], and the South African 10-year strategy for advancing Natural Capital Accounting, published in June 2021 highlights the role of municipal land accounts to support urban planning.[44] A recent review[45] of lessons learned from the development of EA in the USA and Europe highlighted the role formal accounts can play in providing structured, consistent methods to collate information relating to issues that cities are already working on. These issues include climate action, heat mitigation, flood alleviation and equity.

Table 2: An overview of experience of ecosystem accounting (including urban ecosystem accounting) across the G20[46]

This table summarises the experiences of G20 countries as reported by those countries to the UN Statistical Division for the 2020 assessment (including countries that responded to the survey but did not provide specific information about EA). Note some accounts may have been compiled for other purposes but have been included here for completeness. Where countries in the G20 did not respond to the UN Statistical Division's request for information, they do not appear in the table. As experience varies across EU member states, the EU as a whole is also not included in the table.

Country	Compiling SEEA EA	Accounts compiled under SEEA EA implementation efforts as reported to the UN Statistical Division (2020)									
		Ecosystem extent	Ecosystem condition	Ecosystem services	Ecosystem asset accounts	Spatially-explicit water accounts	Carbon-related stocks and flows	Species	Ocean	Urban	Protected Areas
Argentina											
Australia	Yes	X	X	X	X		X	X			X
Brazil	Yes	X	X	X							
Canada	Yes	X	X	X		X			X	X	
China	No										
France	Yes	X	X	X	X				X		
Germany	No	X									
India	Yes	X	X	X				X			X
Indonesia	Yes	X	X	X			X				
Italy	No										
Japan											
Mexico	Yes										
Russian Federation	No										
Saudi Arabia*											
South Africa	Yes							X			
Turkey	No										
UK	Yes	X	X	X	X	X	X			X	X
USA*											

** indicates those countries did not implement SEEA but they have multi-stakeholder coordination mechanism in place.*

Source: https://seea.un.org/content/2020-global-assessment-results-1

3.4 Urban EA in action

The detailed case studies below reveal how EA (and related approaches) have been used by three G20 countries to date.

CASE STUDY 01 THE ECONOMIC VALUES OF PUBLIC PARKS IN LONDON, UK

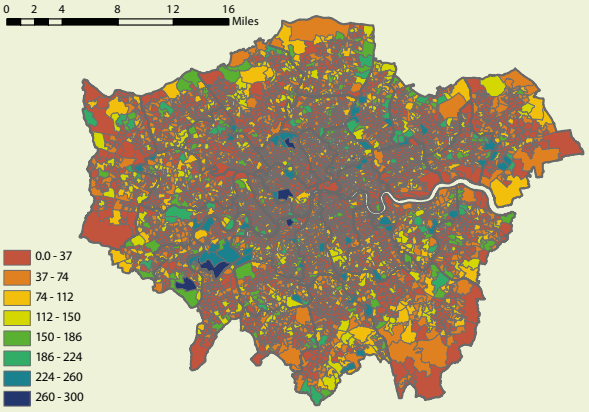
Determining the true value of nature, its role in supporting economic activity and the wider social benefits it brings helps justify investments in natural capital across urban landscapes and ecosystems. London's Natural Capital Accounts focussed on the monetary economic values and the potential benefits of natural capital in urban green spaces, by applying an integrated spatially explicit approach. According to the report carried out by Vivid Economics[47], the gross value of public parks in London as natural capital assets (generating ecosystem services) is estimated to be around £91 billion (~$117 billion). This represents a discounted flow of services worth £5 billion (~$6.5 billion) per year over 30 years. When compared to the costs of maintaining London's parks, this study indicated that for every £1 (~$1.30) spent by the municipal authorities on public parks, the people of London enjoy at least £27 (~$35) in value. The report noted that this economic value can't include the vital intrinsic or social value of London's public parks, and that these values should not be overlooked.

While a large proportion of the benefits accrue to private residents in terms of property value, there are also significant wider social benefits (Table 3). For example, health benefits account for 20% of the total economic value of public parks in London. The residents of London benefit from approximately £950 million (~$1,220 million) of avoided health costs every year. This includes the avoided costs due to improved physical and mental health, owing to the opportunities created by public parks in terms of social interaction, relaxation, exercise, and communal gathering. However, these benefits are unevenly distributed (see Figure 3 for the example of avoided mental health costs). Comparing this with a map of health needs, or overall health outcomes, would help prioritise investment in green space from a health perspective across the city. The benefits delivered alongside the health outcomes would enhance the case for investment.

Table 3: The sources of economic value provided by public parks in London[48]

VARIABLE	PUBLIC SERVICES (£bn)	RESIDENTS (£bn)	BUSINESSES (£bn)	TOTAL (£bn)	SHARE %
Recreation		17		17	19
Mental health	1.4	3.4	2	6.8	7
Physical health	2.1	5.5	3.1	10.7	12
Residential property		55.9		55.9	61
Carbon (soil)				0.2	0
Carbon (trees)				0.1	0
Temperature		0.6		0.6	1
Gross asset value	3.5	82.4	5.1	91.3	100
	4%	90%	6%	100%	

Figure 3: Avoided mental health costs (£ per person)[49]



Estimating the economic values of public parks for all 33 boroughs of London enables municipal planners, urban land-use managers, and local authorities to appreciate the true value of urban green spaces. It also helps to design evidence-based policies and strategies for urban land-use and sustainable infrastructure based on monetary valuations. In London the Natural Capital Account report led to the establishment of the London Green Spaces Commission[50] whose report[51] highlighted that investment in parks services are out of step with the benefits they provide. The report recommended the establishment of centre of excellence to champion and secure investment in London's parks, and investment in skills to create the opportunities for parks to deliver across social economic and environmental objectives. The original Natural Capital Account was also influential in the decision for London to become a National Park City.[52]

CASE STUDY 02 PILOTING URBAN EA IN THE UNITED STATES

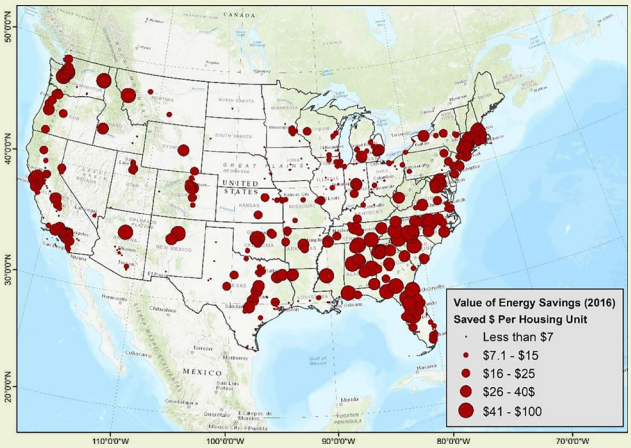
The USA does not produce formal environmental economic accounts, but urban EA have been piloted as inter-agency 'proof of concept' projects. Piloting urban EA in the United States illustrates how, despite building from a relatively limited global database of urban EA experiences, application of urban accounting approaches at the national scale is possible. Looking across 768 medium and large sized cities, the pilot focused primarily around two ecosystem services – urban heat mitigation and rainfall interception provided by urban trees.[53]

The pilot exercise reported conservative estimates that:

- urban trees provided heat mitigation valued at $523 million (in 2011) and $539 million (in 2016); and
- the benefits of rainfall interception amounted to $434 million (in 2011) and $424 million (in 2016).

Figure 4 shows the financial savings to households from heat mitigated (accrued through reduced energy requirements for household cooling) across the cities examined.

Figure 4: Value of energy savings ($ per housing unit) in 2016 for U.S. cities with population over 50,000[54]



In line with the SEEA EA framework, the exercise also presented urban EA tables at the national, state and city level, using the state of Colorado and the city of Denver as examples. The accounting period was 2011 – 2016.

Table 4 is the monetary ecosystem service supply table for both the value of heat mitigation (estimated through the value of energy saved through avoided cooling) and the value of rainfall interception (estimated through avoided storm water management costs).[b]

Table 4: Monetary ecosystem service supply table[55]

Ecosystem Accounting Area	Metric	Year	Ecosystem Types															
			Open Water	Developed - Open	Developed - Low	Developed - Medium	Developed - High	Barren	Deciduous Forest	Evergreen Forest	Mixed Forest	Scrub/Shrub	Grassland/Herbaceous	Pasture/Hay	Cultivated Crops	Woody Wetlands	Emergent Herbaceous Wetlands	Total
All Cities	Intercepted water (1000m^3)	2001	7,647.7	320,911.4	209,883.4	54,797.1	3,327.4	1,199.0	422,914.2	260,253.1	69,532.0	37,858.4	22,132.8	18,067.9	10,728.6	300,915.5	15,339.8	1,755,508.2
		2011	5.5	404,770.9	266,974.4	70,641.5	7,073.8	1,872.6	433,311.9	184,358.4	59,537.3	49,801.8	35,074.9	25,727.2	14,510.1	303,279.8	16,909.7	1,873,849.7
	Energy Savings (mWh)	2001	0.0	835,786.8	1,317,080.0	453,284.0	40,755.6	1,433.5	194,296.9	178,506.7	40,937.2	31,512.9	15,587.3	13,808.0	17,521.9	85,012.7	4,155.1	3,229,678.6
		2011	0.0	1,156,525.8	2,024,202.4	772,508.6	90,223.3	1,081.6	118,208.7	93,441.7	22,534.8	23,464.2	15,067.5	8,824.5	3,011.3	32,611.0	3,697.9	4,365,403.4
Colorado	Intercepted water (1000m^3)	2001	12.3	626.6	1,684.2	258.3	6.7	0.1	134.8	579.8	0.4	184.0	36.1	6.3	12.2	216.9	16.7	3,775.3
		2011	0.0	770.6	2,317.4	665.4	59.2	1.1	131.7	522.5	0.6	350.7	80.2	11.7	22.0	235.6	23.1	5,191.8
	Energy Savings (mWh)	2001	0.0	11,578.5	51,036.4	8,749.4	315.5	0.3	442.0	571.3	0.9	532.6	140.0	24.4	83.5	814.1	65.2	74,354.1
		2011	0.0	16,970.1	93,034.7	30,284.4	3,441.3	6.4	486.9	628.3	5.0	876.0	216.9	30.0	32.5	720.0	62.6	146,795.0
Denver	Intercepted water (1000m^3)	2001	2.5	151.7	410.8	53.0	1.9	0.0	0.7	0.5	0.0	0.6	1.8	0.2	1.0	23.7	1.0	649.4
		2011	0.0	174.0	515.8	142.8	19.6	0.1	0.8	0.4	0.1	0.7	3.0	0.1	4.8	23.8	0.8	886.8
	Energy Savings (mWh)	2001	0.0	4,206.0	16,498.0	2,267.8	109.2	0.0	16.4	0.3	0.8	6.2	5.2	0.0	2.3	49.1	2.0	23,163.4
		2011	0.0	6,974.7	30,416.9	8,983.4	1,445.6	0.0	22.6	0.5	4.5	2.9	15.8	0.0	1.2	65.7	3.1	47,936.7
Sensitivity analysis on Denver	Intercepted water (1000m^3)	2011	32.1	3,156.6	10,063.7	3,172.1	432.4	2.0	7.0	3.8	0.7	3.9	36.9	2.9	37.1	222.5	4.8	17,178.4
	Energy Savings (mWh)	2011	0.0	6,585.6	38,124.8	12,476.1	1,880.9	0.4	14.4	0.3	2.0	3.8	5.7	0.0	3.1	40.9	1.6	59,139.7

The study reveals how urban EA can derive outcomes for quantifying ecosystem services, the variation of services between different cities and regions, and how the benefits eventually accrue to various users and beneficiaries of ecosystem services such as households, industries and governments. The compilation of urban EA also contributes to a wider agenda of compiling EA across the United States, beyond the urban and peri-urban spaces. In summary, the study demonstrates how people in the built environment interact with nature, and benefit from the supply of ecosystem services in the context of urban planning and sustainable development.

b CSO in Table 4 stands for 'combined sewer outfall' systems – the report describes this as 'where stormwater runoff and sanitary sewage share the same pipe', and where such systems are used 'increased stormwater flows result in higher treatment costs at the wastewater treatment plant and combined sewer overflows to waterways'.

CASE STUDY 03 CONNECTING ACCOUNTS AT DIFFERENT SCALES IN CHINA

SEEA EA and GEP accounts have been piloted and developed alongside each other in China, at the province and city scale. GEP accounts have been compiled for Qinghai province. The province is the source of the Mekong, Yangtze, and Yellow Rivers. As such it is not surprising that over half of the ecosystem services values estimated (57.6% in 2015) are attributed to water supply. Less than one-third of ecosystem services generated in Qinghai province benefit residents of Qinghai, with the remainder being exported out of the province and, to a lesser degree, out of the country (largely relating to carbon storage benefits).[56]

This shows the importance of recognising that services benefitting cities may not be generated within the city's administrative boundaries. In China GEP calculations are used to support transregional (eco) compensation payments. These payments are used to invest in the ecosystem assets that provide ecosystem services which, in turn, support economic and social wellbeing elsewhere.

The City Government of Shenzhen has adopted GEP to inform urban planning. The expectation is that GEP accounts will be used to:

- design land use plans;
- assess management performance of administrative sub-areas; and
- communicate with citizens about the economic value of local ecosystems.

The partial estimates released to date highlight the importance and value of natural infrastructure for reducing stormwater runoff, retaining sediment and urban cooling. For example, in 2018, natural infrastructure was estimated to have reduced the daily air temperature by an average of 3 °C in built-up areas during summer days. The monetary value of this reduction in temperature was estimated at $ 71,000 per day for the city as a whole.[57]

Both within and outside cities, EA can shine a light on the connection between cities and the natural systems they depend on. By identifying and recognising these relationships, city planners can make informed decisions about how to deliver smart, sustainable and resilient cities.

04 Next steps for EA and NbS in cities

4.1 Urban EA could help scale up the use of NbS to address multiple challenges

Urban EA can provide the information system that decision-makers need to move from a policy-by-policy siloed approach, to one that recognises the multiple benefits that nature can provide for urban economies and the well-being of urban populations.

A key motivation for the use of EA at the city level is to support improved urban planning. Spatially explicit data can help to readily identify potential trade-offs between development options, which may have previously been invisible. There are a wide range of potential advantages that urban planning and decision-makers could derive from urban EA including:

- increased awareness of the value of nature in the urban environment and mainstreaming of nature into planning, changing the perception among some policy makers that nature is not a real part of the solution to urban challenges;
- a regular flow of consistent, coherent data and information that can be compared with confidence across time and used to establish targets and track progress towards sustainable urban development goals;
- better understanding of the likely trade-offs and synergies related to different urban planning options, as both the wider impacts of loss and investment in natural assets will be more visible;
- the ability to evaluate the cost effectiveness of NbS, so they can be built into local government budgets and overall city financial planning;
- greater understanding of the multiple benefits supplied by ecosystems, highlighting opportunities for cost sharing with respect to different urban objectives;
- better understanding of the role of nature in supporting the health and well-being of urban populations though insights into where people may have insufficient access to important ecosystem service benefits; and
- helping to build collaboration across stakeholders through the social process of EA, which requires input from many actors.

The fact that accounts are also transparent and tend to be publicly available means that they provide a shared, credible basis for integrating nature into decisions, plans and policies across a wide range of challenges facing municipal governments.

Public (i.e. government-led) investment in NbS is vital to increase implementation. Collaboration between government departments and institutions can ensure multiple funding sources for NbS are allocated with the common goal of obtaining multiple benefits from NbS implementation.[58] However, other stakeholders also have important roles to play in funding, implementing and monitoring NbS. For example, communities are a fundamental stakeholder in NbS, and community-based approaches can be an effective and engaging way to monitor public NbS in cities. Partnerships with business owners and the private sector, such as real estate developers or sustainability investors, can also help scale up investment in NbS, particularly where municipalities' financial resources for NbS are limited.

Although EA can be a powerful tool to help increase adoption of NbS in cities, it should be noted that NbS can also help change our perception of nature and its role in cities - nature has a vital intrinsic value that goes beyond the monetary values that EA can generate.

4.2 Urban EA can help cities contribute to national and international goals

EA can help identify how urban areas are contributing to national and international goals, especially those around biodiversity, climate change and pollution. Through helping to scale up the use of NbS, EA could play an important role in empowering cities to contribute to national and international commitments. For example, the need to protect and invest in nature in and around cities is reflected under Sustainable Development Goal 11, to make cities and human settlements inclusive, safe, resilient, and sustainable. However as highlighted in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment the trends in nature's potential to support urban sustainable development are largely negative (Figure 5).

Figure 5: Trends in nature's potential to support urban sustainable development[59]

Selected Sustainable Development Goals	Selected targets (abbreviated)	Recent status and trends in aspects of nature and nature's contributions to people that support progress towards target *		Uncertain relationship
		Poor/Declining support	Partial support	
11 SUSTAINABLE CITIES AND COMMUNITIES Sustainable cities and communities	11.3 Enhance inclusive and sustainable urbanization	■		
	11.4 Protect and safeguard cultural and natural heritage		■	
	11.5 Reduce deaths and the number of people affected by disasters	■		
	11.6 Reduce the adverse environmental impact of cities	■		
	11.7 Provide universal access to green and public spaces	■		

It is also evident at the global level that while we have invested in manufactured and human capital over the past 30 years, natural capital has been allowed to decline. For example, UNEP's 2018 Inclusive Wealth Report shows that the value of produced capital per capita doubled and human capital per capita increased by around 13%, but the value of the stock of natural capital per capita declined by nearly 40%.[60]

International policy is increasingly recognising the important role that cities have in helping to transform our economies. With national targets responding to international policy agendas, there is a clear need for policy coherence and support from the national to municipal level to deliver this. The need and demand to improve how nature is used and integrated into city development and planning is clear. Both EA and NbS seem important parts of the solution, as they can bring forward investment ideas which deliver across local, national and international goals. In cities where space is in such high demand, a formal and transparent mechanism to expose and track changes in nature and the contributions it makes to city life is likely to be particularly important. Such a mechanism is needed to ensure nature is considered and seen as a solution alongside the complexity of other issues that urban planners need to resolve. Nature should not be seen a simply a cost to cities, but as an opportunity to find new solutions that deliver for cities' own goals, as well as national and international ones.

4.3 Embedding EA in policy could help to support greater uptake of NbS

Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions notes that '*NbS are not yet widely recognized, and consequently supportive legislative frameworks do not exist in many places*'. In particular, multi-level governance is required for the many and varied ecosystems that provide vital services to cities but that stretch beyond city boundaries. City policies therefore need to link well with regional and national policy frameworks to be effective. EA has the potential to be a useful tool to inform policy, as EA spans administrative boundaries and provides a framework to increase focus and attention on the role and value of nature in and for cities.

Because EA can be such a useful tool, integrating EA itself into policies for cities can be an important step towards scaling up the use of NbS.

Recognising the benefits of a 'nature focussed' approach, some cities are starting to include both NbS and EA in their policies and urban planning processes - although these specific terms may not always be used. For example:

- London's 2021 plan refers to green infrastructure's importance and value (as highlighted in the City's Natural Capital Account for its Public Parks; Case Study 1 and Figure 6);[61]
- Utrecht focuses on green and blue infrastructure and ecosystem restoration in its Green Structure Plan 2017-2030; and
- The City of Berlin has integrated 'green' solutions throughout its urban planning frameworks.

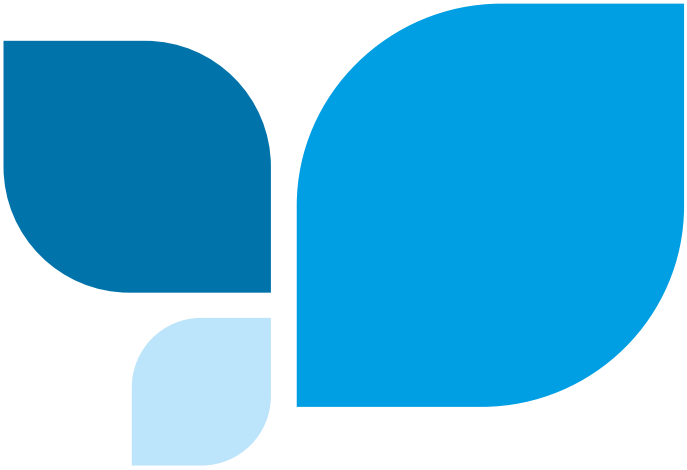
Figure 6: London's EA for public parks and NbS-related policies

4.4 Institutionalising EA

When developing accounts, they should be strategically planned to respond to user needs. This means asking questions such as:

- What are the key urban development challenges of concern?
- What are the goals and targets of current policies to address these challenges?
- Which ecosystems and ecosystem services are most relevant to the identified challenges and policies?
- Which ecosystem service users are most relevant to the identified challenges and policies?
- Are there other stakeholders that need to be involved?
- What is the geographical area of focus (e.g., municipal boundary, administrative extent), and are important ecosystem services supplied from outside this area?
- What spatial resolution is required for planning purposes?
- How often should the accounts be updated to match decision-making cycles?
- What data and expertise are available for compiling the accounts?

This will ensure that accounts collated are relevant, include the right people, and therefore can meet the needs of urban planners looking to use nature better in the context of the challenges they face. Ensuring that accounts meet user needs also increases the likelihood that the replication of accounts will be sustained over time.



To yield the full benefits of urban EA, accounts need to be institutionalised. This means integrating the compilation of urban ecosystem accounts into regular municipal processes and mainstreaming their use in urban planning. A key part of mainstreaming EA is ensuring that the cycles for ongoing accounts compilation are established in line with user needs. Links to national accounts and the input data that can be derived from them should be made. Formal data sharing arrangements between relevant institutions, aligned to cycles of the accounts compilation process, should also be established. Accounts become more powerful as evidence builds up over time, trends become visible, updates become anticipated and changes to what is recorded in accounts are targeted.

As urban EA is an emerging field that remains unfamiliar to many, it is important to communicate the information the accounts contain in a way that will resonate with urban planners and policy makers. This will foster use and ownership of urban ecosystem accounts and the EA process over the long term. Policy briefs are increasingly used to summarise the technical information in accounts in a compelling way on different themes. For instance, a policy brief built from accounts could look at the cost effectiveness of NbS to address urban development challenges, tailored for a particular stakeholder group or sectoral audience.

With an internationally agreed standard for EA and increasing use of such accounts at a national level, there is clearly scope to expand the use of linked EA for cities. This will in turn raise awareness of the multiple benefits of nature, and therefore could be expected to raise interest in investments in nature through NbS.

4.5 Using EA to help scale up the use of NbS in cities

This document outlines the potential for urban EA to make an important contribution to smart, sustainable and resilient cities by reducing barriers to greater uptake of NbS. Together, EA and NbS could support cities to make the case for nature in urban areas and, in turn, help address many urgent and interconnected global challenges. Some key actions that cities could take to achieve this are summarised below.

4.6 Potential actions for cities

To help scale up the use of EA to address multiple challenges through approaches like NbS, cities could:

- **Pilot the use of EA** to identify how and where natural assets can support NbS in urban environments, and share the results publicly.
- **Use evidence** from national, their own and other cities' EA to demonstrate the value and range of benefits that NbS can bring to:
  - help **change the perception** among policy makers that nature is not a real part of the solution;
  - shift thinking from seeing funding NbS as a 'cost' to viewing it as a **sound 'investment' in important assets**, that can generate returns in some cases; and
  - **catalyse community engagement** in the design and management of NbS in urban and peri-urban areas.
- Review the enabling environment for NbS at the city level to **remove or update urban development standards and guidelines that obstruct investment** and **implement supportive policies** for EA and NbS.
- Use EA to **make the connection between the different timeframes required to establish and manage NbS as part of a city's infrastructure,** such as between shorter-term political cycles or municipal initiatives and the long-term period over which the benefits of NbS are fully recognised.
- Consider the **use of EA and other valuation techniques to help integrate NbS into traditional accounting and evaluation processes**, and consequently open up access to other existing sources of funding.
- Seek and create opportunities to **develop novel / specific sources of funding for NbS**, **supported by evidence from EA** to demonstrate the need and investment potential.
- Work with national and international policy makers to **embed the use of EA and NbS in long-term policy and global goals** and ensure this is well **linked to policy at the city level.**
- Join relevant **networks and initiatives** to help share experiences and build capacity (e.g. CitiesWithNature, BiodiverCities by 2030 etc).

Annex A: Types of NbS already being applied in Cities

Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions identifies that NbS is important for cities on three levels: within cities; around cities; and away from cities.

NbS within cities are often also referred to as urban blue-green infrastructure and can comprise green-grey hybrid solutions to maximise the benefits within sometimes confined spaces. Such measures include the creation, restoration, protection and/or sustainable management of:

- urban wetlands
- urban farms
- parks, tree-lined streets, green roofs and building facades
- city parks

Many of these measures are most commonly applied with the primary purpose to regulate the water cycle. They alleviate the pressure on existing drainage systems by increasing the area of permeable surface and creating water retention areas. There are additional benefits to these types of NbS which include increasing the water availability and quality, supporting biodiversity, enhancing the liveability and wellbeing of the local communities, reducing the heat island effect and improving air quality.

While these measures can create significant benefits for cities, their application is limited by the amount of available space, especially when they are retrofitted to existing urban spaces. Considering such measures from the design and planning stage can assist in wider implementation.

Nevertheless, it is equally important to consider opportunities for **NbS around and away from cities**. These NbS include the protection, restoration, sustainable management, or creation of habitats and ecosystems, such as:

- forested catchments
- peri-urban farms
- mangroves, dunes and healthy reef systems

These ecosystems deliver a range of important ecosystem services that affect nearby cities. By maintaining functional systems, they can provide the same benefits as NbS in cities but at a larger scale.

NbS within, around and away from cities can either replace or complement grey infrastructure approaches to help improve:

- water quality and security
- food security
- air quality
- human health (physical and mental)
- the availability and quality of habitats for wildlife, and other biodiversity measures
- flood protection and reduction
- noise levels
- urban heat island effect

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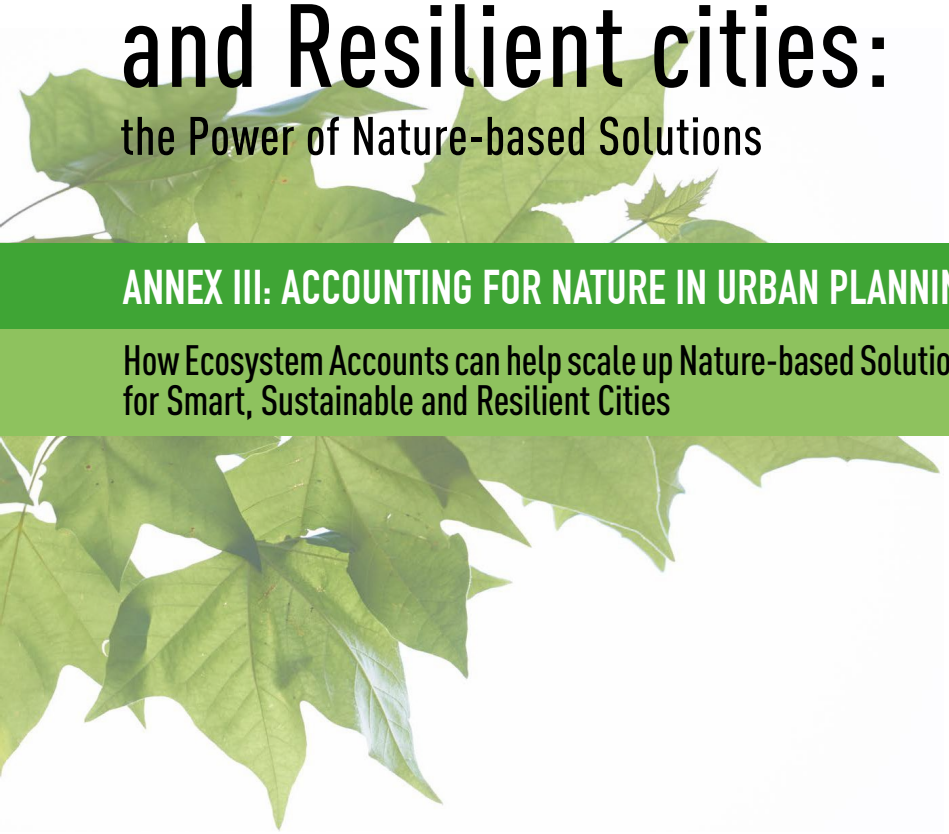
In support of the working paper for the G20

Smart, Sustainable and Resilient cities:

the Power of Nature-based Solutions



ANNEX III: ACCOUNTING FOR NATURE IN URBAN PLANNING

How Ecosystem Accounts can help scale up Nature-based Solutions for Smart, Sustainable and Resilient Cities

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