Executive Summary

City life is becoming the default human experience. Cities are engines for development, and increasing urban populations provide connection and opportunity. But cities can also exacerbate some of the world's most serious environmental and socioeconomic challenges.

Cities concentrate millions of people into locations that can be highly vulnerable to disaster, pollution, and the impacts of climate change. Twenty-one of the world's 33 megacities are in low-lying coastal areas: it is estimated that almost 700 million people live in urban or peri-urban areas that are less than 10 metres above sea level. Meanwhile, cities are hotspots for both air pollution and disease. A recent study estimated that meeting WHO air quality standards in 1,000 European cities would save 52,000 lives annually.

For years the story of cities has been a tale of attempting to carve a place for humans outside of nature, but we are increasingly realizing that smart, sustainable and resilient cities need to **harness the power of nature.**

Nature-based solutions (NbS) deliver important ecosystem services to urban dwellers. Examples of NbS include forests, wetlands, green belts and parks in and around cities as well as green infrastructure such as natural wastewater plants, green roofs, green walls, combined non-motorized transport and ecosystem corridors and other green, blue and hybrid infrastructure. These and other nature-based solutions 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.

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.

NbS are ready-to-go, (often) low-tech and low-cost solutions for people, planet and prosperity. There is increasing evidence that green, blue and hybrid infrastructure can cost-effectively deliver what otherwise would require expensive grey infrastructure investments or other energy-intensive responses.

NbS can create jobs, and COVID-19 recovery schemes can tap into this potential. But, like any innovation and change, they can require trade-offs and lead to unintended consequences. This underlines the need to communicate better to policy makers and the general public about the opportunities, and also the implications, of NbS action.

This report highlights the multiple benefits that nature-based solutions offer to make cities smarter, more sustainable and more resilient in the twenty-first century...

Initiatives to pilot urban NbS are underway in many countries in the G20. These demonstrate that NbS – when adapted to local circumstances – can work in all contexts. They are providing important lessons on how to protect, sustainably manage, finance, and restore nature in an urban context. Yet these efforts are often piecemeal, underfunded and applied at too small a scale to have a transformative impact. Delivering NbS at scale requires action at all levels of government coupled with public-private partnerships and community engagement.

Quantifying and communicating the benefits of NbS will help to build the **new business and finance models** that are needed to scale up action. Incorporating the benefits of nature into **business accounting** allows the monitoring of impacts of NbS interventions. But environmental financial data, particularly in developing countries, is still missing.

For cities to make peace with nature, we need to design urban infrastructure with nature in mind. To be successful over the long term, NbS have to be integrated into the infrastructure planning process at the earliest stage possible (upstream planning stage) and tailored to local contexts. They also have to take into account the climate impacts that the region will experience. Stronger national policies, procurement guidelines and regulations, as well as technical capacities are needed to create a favourable environment for the effective implementation of NbS.

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The way we design, plan and manage our cities and infrastructure may determine whether we can meet the Sustainable Development Goals (SDGs). Three quarters of 2050's infrastructure doesn't yet exist. We need to integrate nature into infrastructure as we build it. This integration can take many forms, from green and hybrid infrastructure to renewed efforts to reduce the negative impacts of construction materials that put further pressure on climate and nature. The Global Biodiversity Outlook 5 identifies sustainable cities and infrastructure as key to a transition to living in harmony with nature.

The G20 is a powerful platform to accelerate the uptake of nature-based solutions to promote smart, sustainable and resilient cities around the world, including as part of COVID-19 recovery. NbS should be a cornerstone of a green and resilient recovery given its potential to create jobs, provide green space for recreation, and improve urban health.

...and suggests ways to scale up the experiments in urban NbS that are underway in many G20 countries.

Bosco Verticale
(Vertical Forest), Milan, Italy

01 Foundations

City life is becoming the default human experience; more than half of the world's population already lives in cities, and on current trends by 2050 two thirds of a global population of more than 9 billion people will live in urban areas. Cities are becoming an increasingly consequential force in the global ecosystem: already they account for some 75 per cent of global resource and energy use, while producing more than half of global waste and at least 60 per cent of greenhouse gas (GHG) emissions.[1]

This report

This report investigates the potential of nature-based solutions (NbS) to help build smart, sustainable and resilient cities. It draws from more than a decade of research and experience from G20 countries and beyond. It is informed by the rich discussions held by the energy and climate working group of the G20 in March and April 2021, as well as collateral events organized on 16 and 23 April 2021 by the Italian Presidency with the support of UNEP and UNDP.

Section 2 outlines what we mean by nature-based solutions and the multiple benefits they can deliver. Section 3 describes some of the experience that has been gained to date in applying nature-based solutions to urban challenges. Section 4 investigates the systems that need to be in place for NbS to thrive: viable business models and multilevel governance, drawing off a review of multilevel governance among G20 cities and countries (see Annex 1). Finally, section 5 looks to the future and the role of the G20 in deploying nature-based solutions at scale across the world's cities..

Cities on the frontline

Cities allow for economies of scale, delivering services to large numbers of people, driving economic growth and innovation, and creating jobs. But cities are also at the forefront of both the causes and impacts of major environmental challenges such as climate change, pollution and biodiversity loss.

Cities concentrate millions of people into locations that can be highly vulnerable to disaster and the impacts of climate change. Migrants arriving in cities from rural areas are particularly likely to end up in exposed and poorly serviced urban areas. Intense rainfall events put huge strain on urban storm wastewater systems, particularly where large parts of cities have been rendered impermeable by road and building construction. And with 21 of the world's 33 megacities located in low-lying coastal areas, it is estimated that more than 700 million people worldwide live in urban or quasi-urban areas that are less than 10 metres above sea level.[2]

Cities are often hotspots for air pollution, which is a major environmental cause of death worldwide. A recent study investigated the mortality impacts of air pollution across 1,000 European cities. It estimated that compliance with World Health Organization (WHO) guidelines would save more than 52,000 lives per year while reducing air pollution to the lowest levels could save 205,000 lives per year.[3]

Cities offer opportunity and innovation, but are also on the frontline of the planet's most serious environmental challenges: climate change, pollution and biodiversity loss.

Treelined streets in Guangzhou, China[4]