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Gobierno de Colombia

INSTITUTO HUMBOLDT COLOMBIA

WORLD ECONOMIC FORUM

In collaboration with
Arup and AlphaBeta

BiodiverCities by 2030:
Transforming Cities' Relationship with Nature

INSIGHT REPORT

JANUARY 2022

About the initiative for BiodiverCities by 2030

BiodiverCities by 2030 is a joint initiative of the World Economic Forum and the Alexander von Humboldt Institute, championed by the Government of Colombia. This initiative aims to support city governments, businesses and citizens, to enable cities to live in harmony with nature by 2030.

The initiative brings together multidisciplinary expertize, combines existing initiatives and surfaces innovative solutions to promote sustainable, inclusive and nature-positive urban development at a global scale. To deliver on its objectives, the initiative has curated a high-level commission of experts and practitioners from the public and private sectors, academia and civil society - the Global Commission on BiodiverCities by 2030 - to combine insights and co-create a forward-looking perspective on nature-positive cities. Artificial intelligence and crowdsourcing technologies have also been set as key tools for the initiative through the Forum's Strategic Intelligence and UpLink platforms to pool the latest innovations and conceptual developments linking biodiversity and urban development.

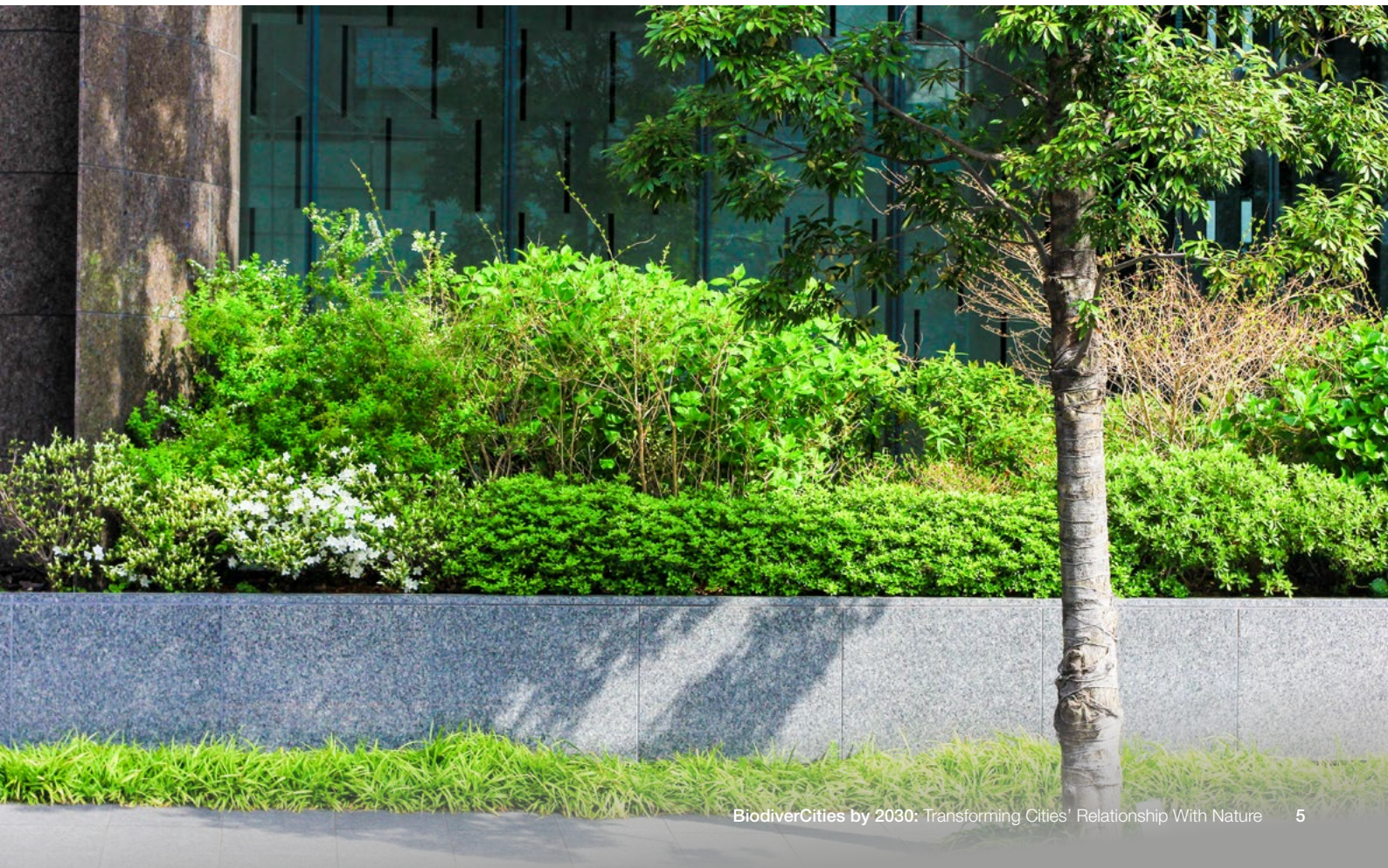
This report was developed as an output of the BiodiverCities by 2030 initiative and sets out:

- The urgency of addressing cities' untenable relationship with nature.
- The opportunity to prioritize nature-positive interventions and investments to fight cities' challenges.
- A clear path for city leaders to embrace the BiodiverCities by 2030 vision and increase urban competitiveness and liveability through nature.

This report builds on the work of the World Economic Forum's New Nature Economy Report series, which identified nature-related economic risks (affecting more than half the world's GDP) and opportunities from nature-positive pathways, including an increase in business value by $10.1 trillion and the creation of 395 million jobs by 2030.

About the Alexander von Humboldt Institute

The Alexander von Humboldt Biological Resources Research Institute is an independent research institute linked to Colombia's Ministry of Environment and Sustainable Development. The Institute contributes to the knowledge, conservation and sustainable use of continental biodiversity and its ecosystem services, supporting informed decision-making through a joint, coordinated and concerted action between the state, the private sector, academia and civil society.



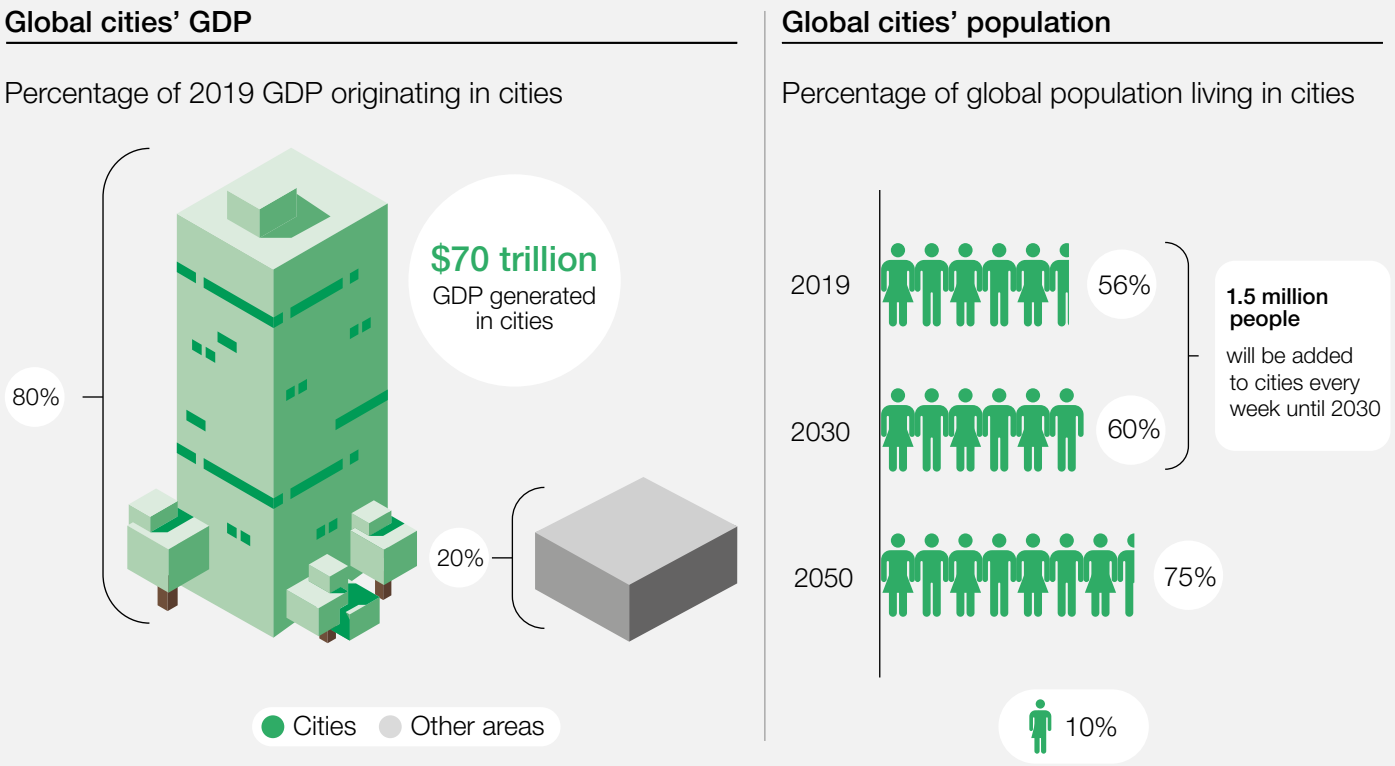
1 Cities' relationship with nature

Rapid expansion of the built environment has proven detrimental for cities' natural ecosystems, denting economic prospects and necessitating a systemic transition in urban development.

1.1 Cities: The engine of the modern global economy

Cities are at the heart of the global economy. As the main stages for human activity, cities now generate over 80% of global GDP and contain 56% of the global population (Figure 1).[1] Cities around the world are projected to add 1.5 million people to their populations each week before 2030. This means that over 5.5 billion humans will be interacting, eating, collaborating, producing, consuming, creating, breeding and sheltering in urban areas by 2030 – up from 4.4 billion today.[2] Cities, in turn, rely on nature to provide key services for these activities, such as sufficient safe, and clean water; productive and resilient food systems; and energy, medicine, and other materials.[3] By 2050, three out of every four people on Earth are expected to be living in cities.

FIGURE 1 **Cities are at the heart of our economies and societies, accounting for 80% of global GDP and 56% of global population**



Source: World Bank; UN Population Division; Alphabeta analysis

1.2 Cities' impact on nature

Coupled with this urban rise, the world is witnessing a sharp decline in biodiversity.[4] Cities have historically been established and developed in or near ecosystems that provide abundant contributions to urban societies, including water, rich soils and areas protected from extreme weather events. This natural layer underpinning the built environment has been increasingly degraded through the direct and indirect impacts of urbanization.

The most noticeable direct impact of urban growth on biodiversity is the loss of natural habitats. The rapid expansion of the global built environment – a 66% area increase in the first 12 years of the 21st century[5] – has significantly impacted natural ecosystems. Much of the land in and around cities is degraded, threatening native habitats, the genetic and functional diversity of flora and fauna, and the quality of air and waterways.[6] A high proportion of the direct impact to nature from this urban expansion is forecast to occur in some

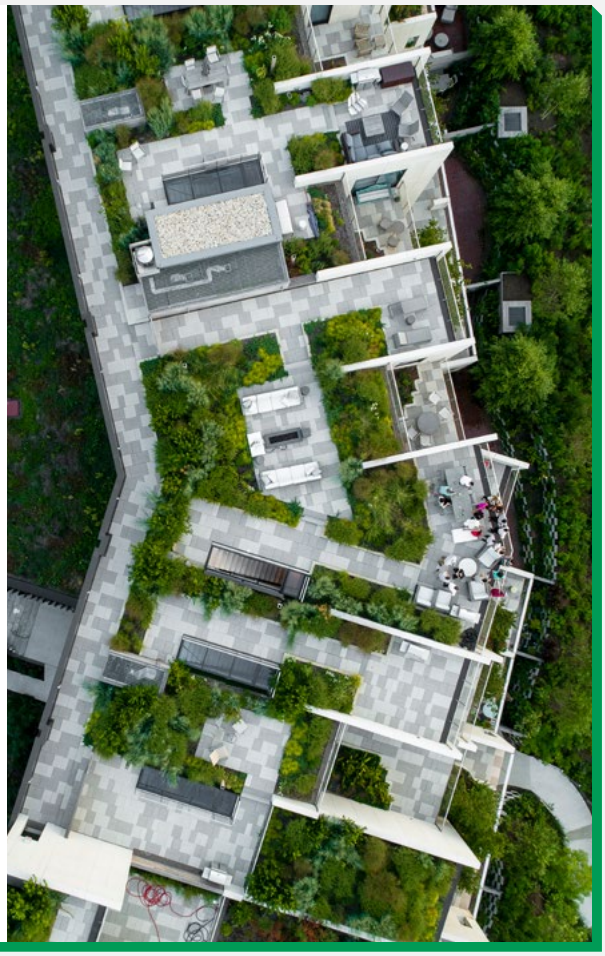
1.4 The cities of tomorrow: BiodiverCities by 2030

Healing or resetting cities' relationship with nature requires a brighter paradigm of urban development. The vision for BiodiverCities by 2030 is one such paradigm: **a vision of cities as living systems,** wherein economic, social and ecological functions are in harmony. This is consistent with the UN Convention on Biological Diversity's (CBD) vision of "Living in harmony with nature by 2050" – reaffirmed within the post-2020 Global Biodiversity Framework.[39] BiodiverCities are defined by five key characteristics - each is a seed for transformation from which cities can start navigating towards a nature-positive future (Figure 3).

FIGURE 3 **BiodiverCities as seeds for transformation**

BiodiverCities can restore balance between cities and nature by…

1. Increasing nature in their infrastructure and built environment.
2. Improving urban governance models to support nature-based solutions for cities' challenges.
3. Forging positive links between urban and rural settings and helping to safeguard global biodiversity.
4. Prioritizing bio-circular economy and bio-inspired innovations for economic competitiveness.
5. Nurturing nature-positive values in citizens for health and wellbeing.



Source: World Economic Forum, Alexander von Humboldt Institute

Infrastructure and the built environment are critical entry points for cultivating nature-positive cities. Reversing the impact of cities' built environment on nature remains critical as a larger, wealthier global urban population continues to materialize, and demands for housing, offices, commercial space, transport, energy, power and utilities increase. Societies have long relied on purely human-engineered solutions to fulfil these needs, however strategically deploying ecosystem services from natural ecosystems - often in combination with conventional engineering - can provide far more viable and sustainable solutions (explored in detail in Section 2). Beyond transitions to address the built environment's impact on nature, future research will explore how cities can address the larger, indirect impact on natural ecosystems beyond their immediate surroundings, including via food and energy systems (Case study 1).

Nature-based systems for water supply

The costs of building nature-based solutions for water supply can be as low as $2 per person, per year.

NbS for water supply could save $140 billion annually and provide clean and safe drinking water for 1.4 billion people by 2030. The associated annual investment opportunity over 2021-30 is $45 billion – although costs can be as low as $2 or less per person, per year based on a variety of regional factors.[70] Water access and security are some of today's main urban development priorities. Water depletion across urban watersheds is high around the world due to pressures from agriculture, mining and urbanization – in some regions, up to 60% of the area encompassed by source watersheds is at risk.[71] Reforestation and protection of urban and peri-urban watersheds remains a key solution. The opportunity lies not only in restoring degraded landscapes and improving water security, but also in conserving the natural habitats of thousands of species, including several at risk of extinction. Additionally, significant carbon benefits could be felt by avoiding up to 603 million metric tonnes of carbon dioxide equivalent ($MTCO_2e$) emissions per year from deforestation and sequestering up to 2,168 $MTCO_2e$ per year in preserved soils and forests. Cities could even see positive returns on their total project investment from savings generated through reduced annual water treatment costs.

CASE STUDY 5

Upper Tana-Nairobi Water Fund - The business case for natural water supply[72]

Since the 1970s, Kenyan forests on steep hillsides and in wetlands have been converted for agriculture, removing natural areas for storing run-off and accelerating the sedimentation of rivers. The Tana River watershed, which supplies 95% of the water for Nairobi's four million residents and another five million people living in the river's catchment, has been subject to this type of land-use change. Due to changes in the hydrological cycle brought about by conversion, 60% of Nairobi's residents now lack access to a reliable water supply.

In response, the Upper Tana-Nairobi Water Fund was created in 2015 to provide a secure source of water and conserve the watershed. A public-private steering committee was established, bringing together diverse stakeholders, including major utility companies, the Water Resources Management Authority and the Tana and Athi Rivers Development Authority, as well as prominent corporations. Contributors to the Fund include downstream users and upstream stewards, such as agricultural landholders and development organizations. Finances are used to promote sustainable land management practices, including strategic tree planting and land terracing to filter and regulate water supply to the river's watershed. Funds are also used to distribute water-saving technologies for agricultural use, boosting productivity and generating cost savings.

The Fund's activities now provide "several million more" litres of water to Nairobi each day. Furthermore, project monitoring revealed a 15% decrease in sedimentation, with Nairobi's water supply achieving World Health Organization turbidity standards for the first time in 2016. It has been estimated that an investment of $10 million in the Water Fund will return $21.5 million in economic benefits over 30 years.