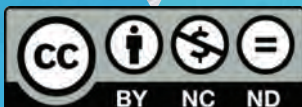


CLIMATE-RESILIENT BIODIVERSE CITIES IN LATIN AMERICA AND THE CARIBBEAN 2020

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Climate-Resilient Biodiverse Cities in Latin America and the Caribbean

IDB-LM-00220

Abstract

This toolkit is aimed to help Latin American Mayors and key decision makers to include and prioritize biodiversity in their agendas, fostering sustainable and climate-change resilient urban landscapes.

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Keywords

Cities Network, biodiversity, sustainable cities, resilient cities, climate change, mayors, cities, urban development.

Jel codes

R00: General
Q01: Sustainable Development
Q20: General. Renewable Resources and Conservation
Q54: Climate • Natural Disasters and Their Management • Global Warming
Q57: Ecological Economics: Ecosystem Services • Biodiversity Conservation
Bioeconomics • Industrial Ecology
R11: Regional Economic Activity: Growth, Development, Environmental Issues, and Changes

According to the World Economic Forum's 2020 World Risk Report, although the 7.6 billion people living on the planet account for only 0.01% of living beings, humanity has already resulted in the loss of 83% of wild mammals and half of plants. The current extinction rate is between tens and hundreds of times higher than the average of the last ten million years... and it's accelerating. Current patterns of production and consumption, land use and urbanization, demographic dynamics, trade, industry and governance models favour these losses, so that a radical rethink of humanity's relationship with nature is necessary.

It is then urgent to accelerate the valuation of natural capital and biodiversity within cities to the interior of cities, assess their level of dependence on ecosystem services and prioritize nature-based solutions. To do this, from the Cities Network in collaboration with the Urban Development and Housing Division and the Natural Capital Laboratory of the Inter-American Development Bank we have developed this toolkit as a reference tool for mayors in Latin America and the Caribbean and for key decision-makers. It serves as a guide to include and prioritize biodiversity in their local agendas, fostering sustainable and resilient cities to climate change. This toolkit will be key to answering questions such as:

Can other forms of life, besides human life, thrive in our cities?

Can humans find well-being and meaningful existence in cities without life forms?

How can biodiversity and ecosystem services be critical axes on which humanity depends to achieve a better quality of life?



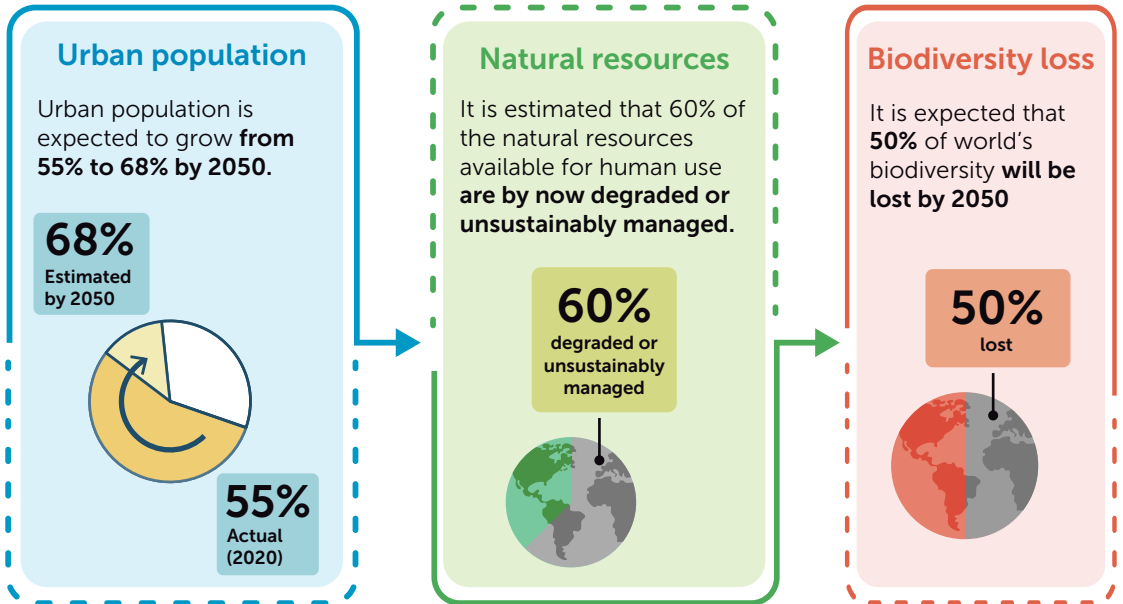
This toolkit is composed of **10 steps** that offer **decision-makers** a **road map** to design strategies that generate **tangible benefits from fostering** biodiversity in Latin American cities.

The rigorous and methodical approach to each of the proposed stages helps to facilitate dialogue, understanding, justification, scope and financing of the various projects that **protect and enhance biodiversity.**

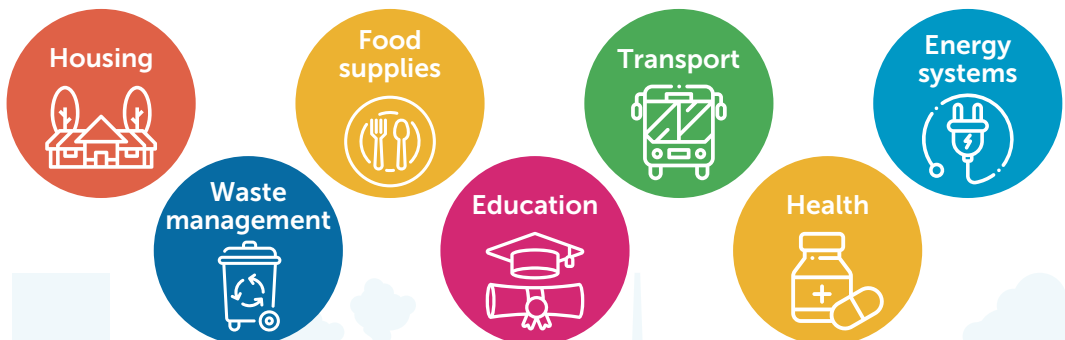
WHY IS BIODIVERSITY IMPORTANT?

Biodiversity provides us with ecosystemic services, which are basic for human subsistence and essential for the renewal of life sources in this planet.

Population growth and exponential expansion of urban landscapes has put an unbearable stress on ecosystems and thus, other forms of life.



Urban growth involves an increased demand in:



Urban growth requires an increase in demand in housing, food supplies, energy and many other services.

In return, cities generate negative externalities such as pollution and waste.

TOOLKIT ACTION PLAN

1

Profile
city's
biodiversity

2

Map
ecosystem
services
status

3

Identify
critical
issues

8

Implement
& **Monitor**

4

Define
objectives,
goals and
projects

9

Communicate
results &
engage the
community

7

Create
budget and
financing
plan

5

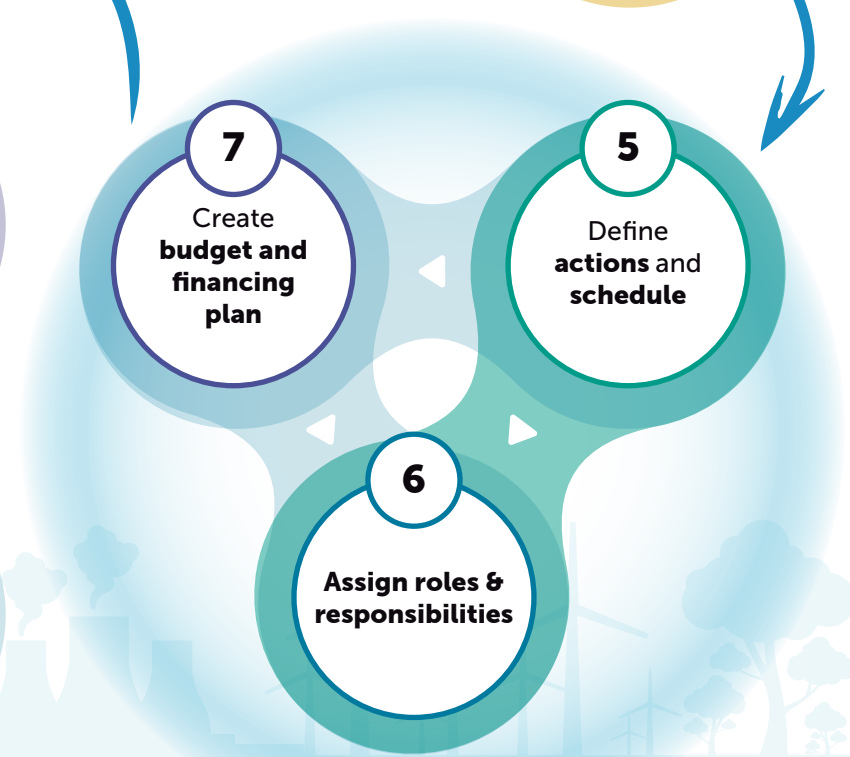
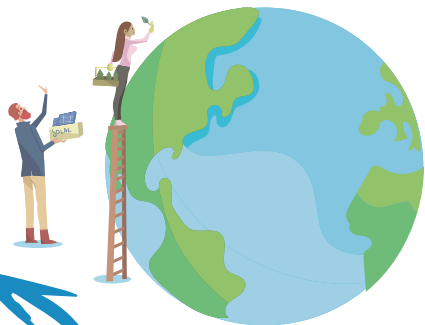
Define
actions and
schedule

10

Measure
positive
impacts in the
long-run

6

Assign roles &
responsibilities





PROFILE CITY'S BIODIVERSITY

1

PROFILE CITY'S BIODIVERSITY

The first step of this toolkit is focused on mapping the city's native biodiversity assets.

It will help us understand what's at stake, and why is it important to protect local biodiversity and embed it into the city's landscape.

How can we profile the city's native biodiversity?

The **Singapore Index**, is a self-assessment tool for cities to evaluate and monitor the progress of their biodiversity conservation efforts against their own individual baselines.

It comprises:

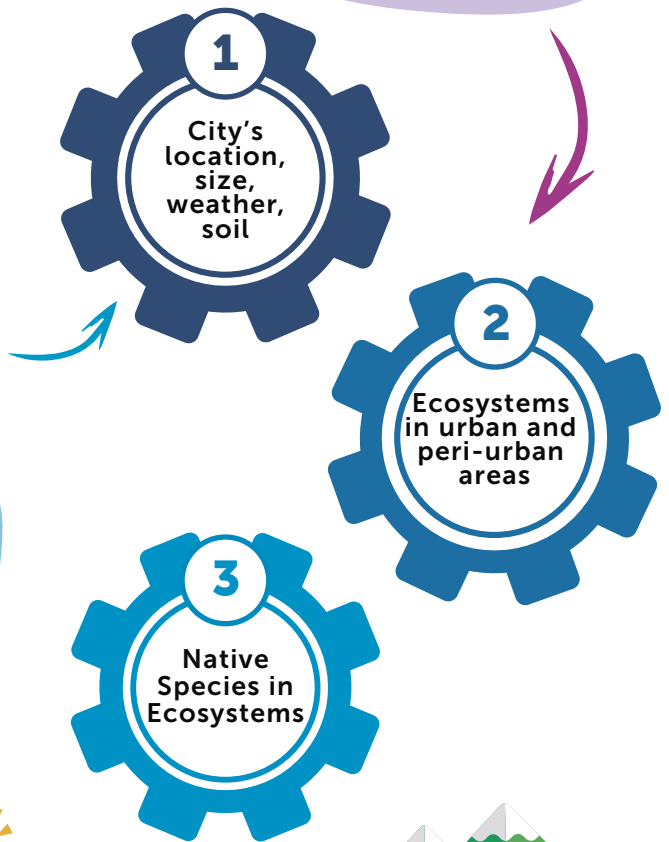
a) The **"Profile of the City"**, which provides background information on the city (location, physical features, demographics, economic parameters)

+

b) **23 indicators** that measure **native biodiversity**, **ecosystem services** and governance and management of biodiversity.

(STEP 8 IMPLEMENTATION)

Which are the ecosystems in which biodiversity is immersed?



STEP 1 RESULTS

- Ecosystems' Map: urban and peri-urban areas
- Biodiversity Map: connectors at regional, national or international level





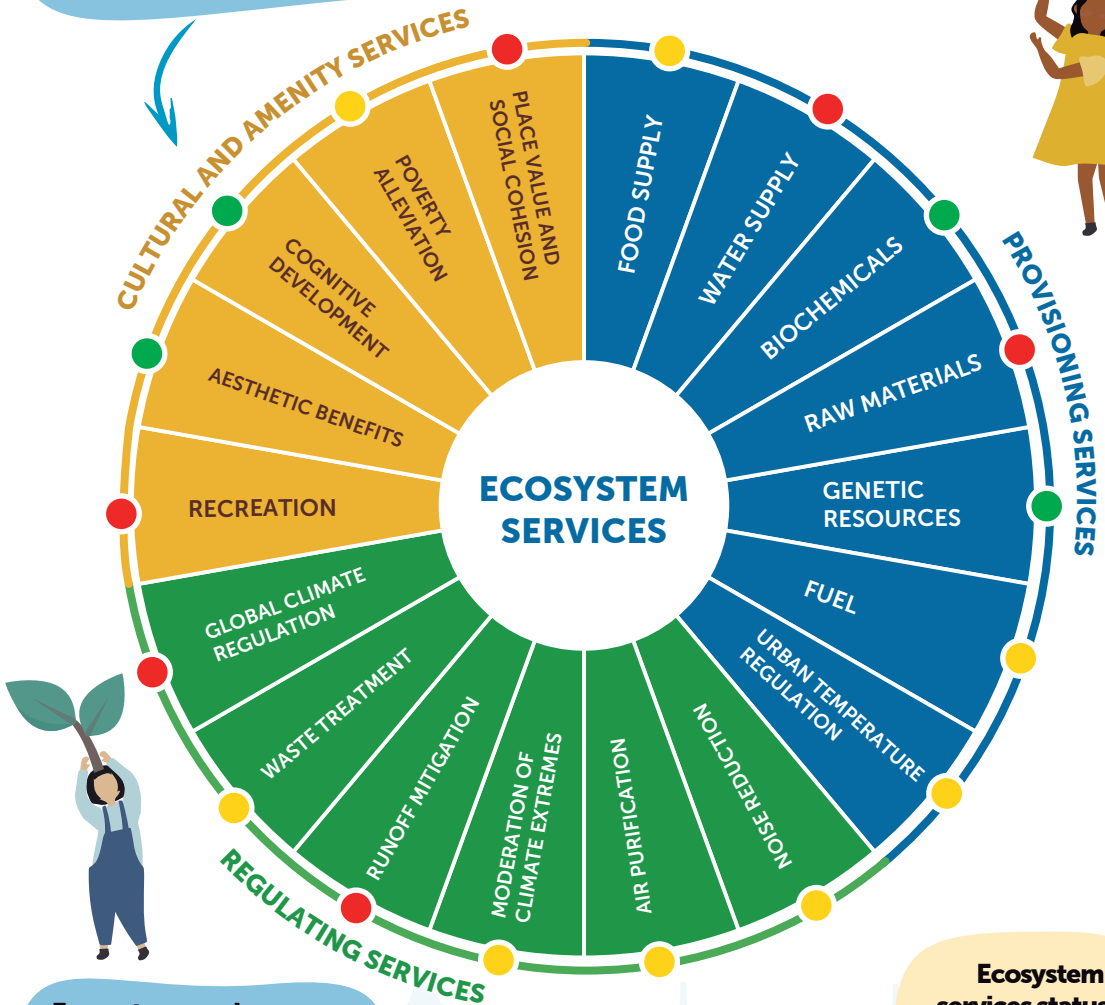
**MAP ECOSYSTEM
SERVICES STATUS**

MAP ECOSYSTEM SERVICES STATUS

2

Which are the services provided by natural ecosystems and what is their current status?

In a city, the surrounding or embedded ecosystems provide services to its inhabitants.



Ecosystem services may be impacted due to social, environmental, cultural, political or economic issues.

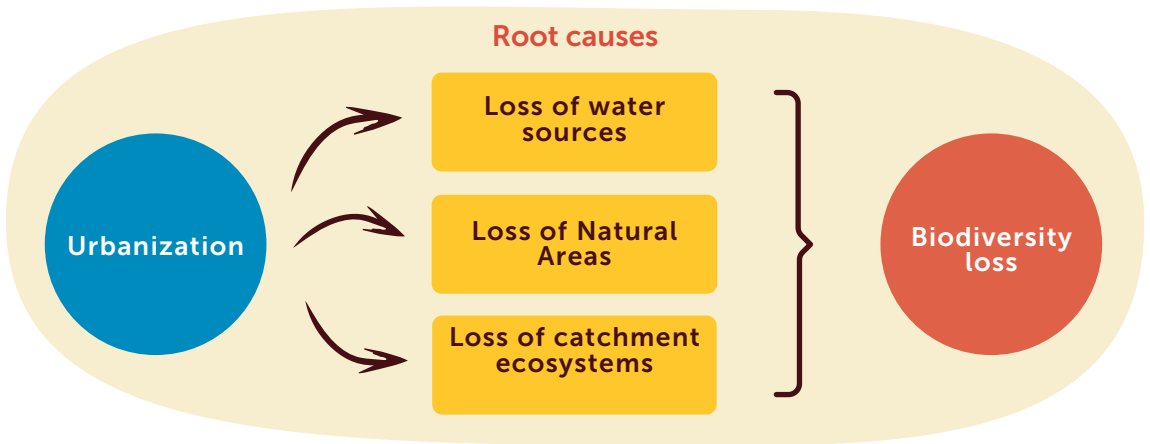
Ecosystem services status

- Abundant (Green dot)
- At risk (Yellow dot)
- Critical (Red dot)

2

MAP ECOSYSTEM SERVICES STATUS

What is affecting the ecosystems and the services provided by them?



Alarm Signs



Fast growing population



Decreased rainfall or increased droughts



Increased temperatures or extreme cold



Increased water demand

Urbanization and fast population growth can deplete the ecosystem services that provide the cities with **safe drinking water, clean air and food!**



STEP 2 RESULTS

Ecosystem services status: identifying the main causes that are contributing to biodiversity loss and damage, and thus to ecosystem services.



**IDENTIFY CRITICAL
ISSUES TO BE ADRESSED**

3

PROFILE CITY'S BIODIVERSITY

Healthy ecosystems can provide protection and resilience from extreme weather events and disasters.

For example, **strategic placement of trees in urban areas** can **cool the air** between 2°C and 8°C, in cities where the **critical issue is increasing temperatures due to climate change**.

Each city will have a set of critical issues that need to be addressed **urgently or in the near future**.

Once the **critical problem is identified**, then we can move on to developing a set of actions that respond to the city's needs.




When identifying the critical issues, all stakeholders should be taken into account and should contribute to a list of prioritized issues, **to be addressed in the local agenda**.



STEP 3 RESULTS

Critical problems identified through stakeholders engagement and collective input.



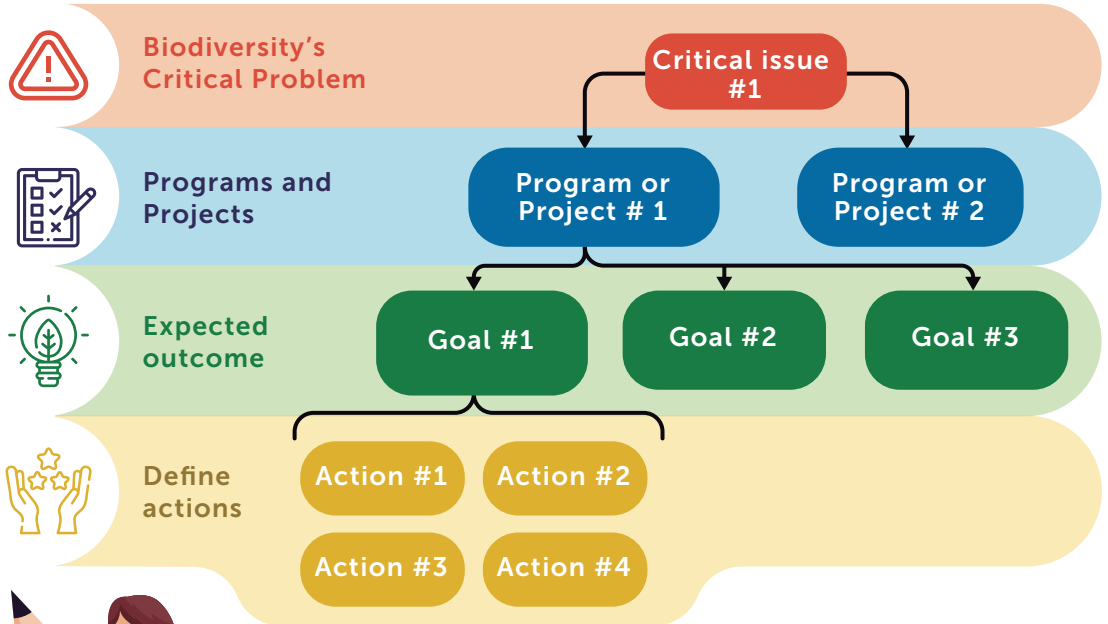


**DEFINE OBJECTIVES,
GOALS AND PROJECTS**

4

DEFINE OBJECTIVES, GOALS AND PROJECTS

Once the critical issues are prioritized, the next step is to formulate the **programs and projects** that ensure the objectives and goals will be achieved successfully.



STEP 4 RESULTS

Portfolio of programs and projects formulated with short, medium and long term vision

STEP 1

City's ecosystem profile

outcome

STEP 2

Ecosystem services status

outcome

STEP 3

Critical issues identify

outcome

STEP 4



**DEFINE ACTIONS
AND SCHEDULE**

5

DEFINE ACTIONS AND SCHEDULE



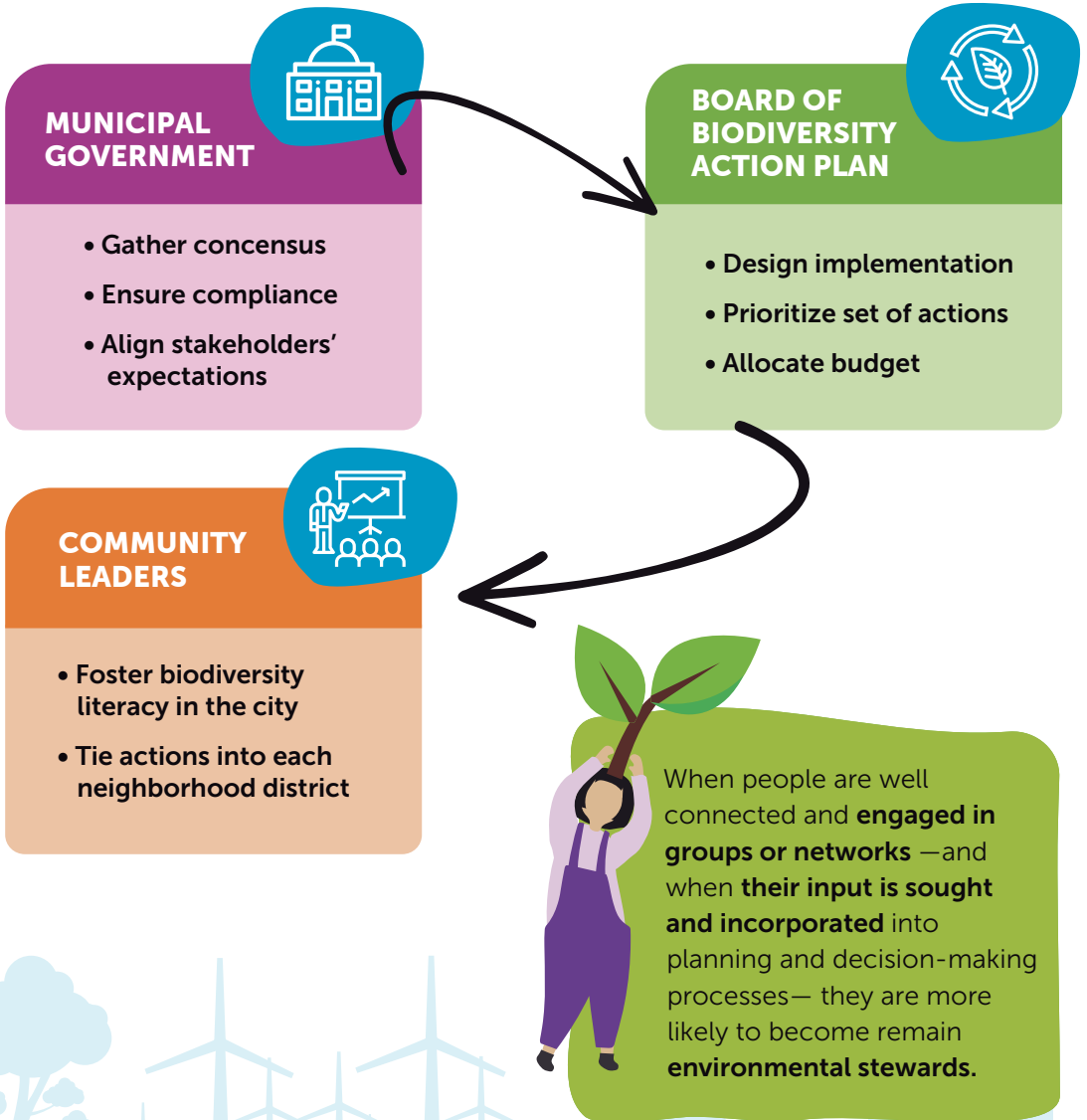
A stylized illustration of a globe with a green landscape, a white house, and wind turbines. The globe is rendered in shades of blue and green, with a white house and several wind turbines on the landmass. The background consists of concentric light blue circles. The text "ASSIGN ROLES & RESPONSIBILITIES" is centered on the globe in a white, bold, sans-serif font with a slight shadow.

**ASSIGN ROLES &
RESPONSIBILITIES**

6

ASSIGN ROLES & RESPONSIBILITIES

Once the deliverables and the timeframes have been defined, bringing everyone on board is the next step. **Social connectedness** has a role to play in the **collective management of nature**: to help build trust among community members, to develop new norms and social practices, and to make local environmental issues more prevalent and important to everyone.





BUDGET & FINANCING

7

BUDGET & FINANCING

How can we fund biodiversity initiatives?

The need to **fund biodiversity initiatives** is the most frequent constraint. However, it can also be a driver: there is a wide range of revenue sources available to those local governments that are willing to **think creatively!**

Creative ways of financing can be drawn from innovative examples

The Cape Town Water Fund

Collective platforms

Governance + Funding + Community

The Cape Town Water Fund acts as a collective platform where the private and the public sector can contribute in the implementation of Green Infrastructures, targeted at the protection and preservation of the water sources that provision the city.

Ecuador's Sovereign Social Bonds

The Republic of Ecuador, in order to diversify its financing sources for affordable housing access, and thus reduce the housing deficit in the country, has issued its first social bond.

*Source IDB Publications 2020

Compensation

Involves a payment made by a development proponent to a conservation body to pay for the replication of ecosystem services.



Development charges

These are the fees collected by municipalities to offset capital costs incurred to support growth-related infrastructure projects.



Habitat banking

Habitat banking is a market-based mechanism that rewards those who restore or improve habitat.



COST OPTIMIZATION ANALYSIS

Financing results determine **how the project will be executed**

• **Green Infrastructure** requires more long-term planning but less upfront costs

Green Infrastructure utilizes nature's ability to renew ecosystems by supporting the ecological processes from the earth.

It refers to:

- Creation and preservation of natural and semi-natural areas.
- Preservation and rehabilitation of catchment areas.
- Parks and recreation zones.
- Green roofs.
- Water sources conservation.
- Eradication of invasive alien species (that may erode / dry the soil).

Green Infrastructure should be prioritized and implemented in Latin American cities



Grey Infrastructure requires more upfront costs but immediate responses

Grey Infrastructure refers to "concrete-based" solutions to counter-balance the negative externalities of a city, such as:

- Deep aquifer drilling
- Desalination plants
- Water treatment plants

Grey infrastructure is usually costly upfront and requires technical maintenance in the long-run. Ideally a mix between Green and Grey Infrastructure is implemented in cities.



**IMPLEMENT
& MONITOR**



Tips for successful implementation and monitoring

For **implementation** to be successful, it is necessary to build **consensus** about biodiversity values across **multiple institutions and stakeholders**, in other words, **seek the cooperation and validity** among all participants.



The process is as important as the final product.



It is important to always keep in mind the cultural setting of your city. (STEP 1 – City's profile)



The action plan needs to set indicators that measure the start point, the progress and the continuous improvement.



Communication should be a transversal axis across all steps. Without community engagement, any plan has a great potential for failure!



Policy planning and compliance should be constantly assessed.

INSPIRATION TIP Singapore Index Indicator Examples

- Change in Number of Bird Species
- Change in Number of Butterfly Species
- Proportion of Protected Natural Areas
- Proportion of Invasive Alien Species
- Regulation of Quantity of Water
- Climate Regulation: Carbon Storage and Cooling Effect of Vegetation



Next page provides an in-depth look at all indicators!

FRAMEWORK OF THE SINGAPORE INDEX ON CITIES' BIODIVERSITY

	Core Components	Indicators	Maximum Score
PART II - Indicators	Native Biodiversity in the City	1. Proportion of Natural Areas in the City	4 points
		2. Connectivity Measures	4 points
		3. Native Biodiversity in Built	4 points
		4. Number of Vascular Plant Species	4 points
		5. Change in Number of Bird Species	4 points
		6. Change in Number of Butterfly Species	4 points
		7. Change in Number of Species (any other taxonomic group selected by the city)	4 points
		8. Change in Number of Species (any other taxonomic group selected by the city)	4 points
		9. Proportion of Protected Natural Areas	4 points
		10. Proportion of Invasive Alien Species	4 points
	Ecosystem Services Provided by Biodiversity	11. Regulation of Quantity of Water	4 points
		12. Climate Regulation: Carbon Storage and Cooling Effect of Vegetation	4 points
		13. Recreation and Education: Area of Parks with Natural Areas	4 points
		14. Recreation and Education: Number of Formal Education Visits per Child Below 16 Years to Parks with Natural Areas per Year	4 points
	Governance and Management of Biodiversity	15. Budget Allocated to Biodiversity	4 points
		16. Number of Biodiversity Projects Implemented by the City Annually	4 points
		17. Existence of Local Biodiversity Strategy and Action Plan	4 points
		18. Institutional Capacity: Number of Biodiversity Related Functions	4 points
		19. Institutional Capacity: Number of City or Local Government Agencies Involved in Inter-agency Cooperation Pertaining to Biodiversity Matters	4 points
		20. Participation and Partnership: Existence of Formal or Informal Public Consultation Process	4 points
		21. Participation and Partnership: Number of Agencies/Private Companies/NGOs/Academic Institutions/International Organisations with which the City is Partnering in Biodiversity Activities, Projects and Programmes	4 points
		22. Education and Awareness: Is Biodiversity or Nature Awareness Included in the School Curriculum	4 points
		23. Education and Awareness: Number of Outreach or Public Awareness Events Held in the City per year	4 points
Native Biodiversity in the City (Sub-total for indicators 1-10)		40 points	
Ecosystem Services Provided by Biodiversity (Sub-total for indicators 11-14)		16 points	
Governance and Management of Biodiversity (Sub-total for indicators 15-23)		36 points	
Maximum total:		92 points	

SINGAPORE INDEX

How does Singapore Indicators look like when they are implemented in a city?

How is Green Infrastructure reflected in this map?



There's a mix of:

- Natural
 - Semi-natural areas
- embedded in the city

GREEN VIEW INDEX

TOP CITIES

1. Vancouver 25,7%
2. Sacramento 26,6%
3. Geneva 21,4%

Rating that quantifies each city's percentage of **canopy coverage** based on aerial images.

INDICATORS

- ▲ Proportion of
- ES Ecosystem Services
- 👉 Native Biodiversity
- GO Governance and Management of Biodiversity

Connectivity Measures

▲ Natural areas in the City

👉 Native Biodiversity in Built Up Areas (Bird Species)

▲ Invasive Alien Species

▲ Protected Natural Areas



GO Budget Allocated to Biodiversity + Number of Biodiversity Projects Implemented by the City Annually

Green Roofs

Carbon storage and cooling effect of vegetation

ES

Area of parks with natural areas

ES

Wetland



**COMMUNICATE
RESULTS AND ENGAGE
THE COMMUNITY**

COMMUNICATE RESULTS AND ENGAGE THE COMMUNITY

9

Impact Measurement

Without drawing a baseline of where we started (STEP 1 Profile of the City), we will not be able to demonstrate the biodiversity improvement.

Impact measurement and indicators are essential data-gathering steps for building the success story.


Focus on positive stories that engage the community and inspire new ideas at round tables. Connecting with influential opinion leaders and media is a key step here.

Positive Stories

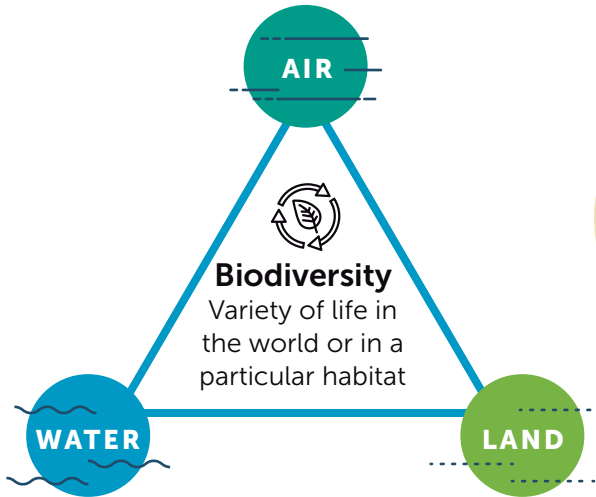
Municipal budget

Storytelling is a key component for the success and future **Budget approvals on Biodiversity Action Plans**. These plans should be thought and implemented **long-term**, and storytelling becomes a key ingredient in ensuring that the importance of biodiversity is never understated, **regardless of the change in mandates!**





**MEASURE
POSITIVE IMPACTS
IN THE LONG-RUN**



Natural resources and ecosystemic services such as clean air, fertile land and safe drinking water sources are long term factors that **ensure the survival of other species on this planet, and thus humankind.**



Identification, management, and promotion of **biodiversity assets** will enhance municipal operations, **community livability, and economic development.**



Failure to do so will decrease community resilience and **increase societal risk** by increasing **vulnerabilities to human health, the environment, and economy.**

Policy efforts should be focused in the long run in:

Stimulating and funding implementation of Green Infrastructure



Creating "Green Jobs"



Building of resilient cities in the face of climate change



Protecting biodiversity



Municipal and national governments in Latin America fail to implement long term action plans. Strategies do not survive the "4-year" mandates. **Biodiversity action plans should be approached as fundamental investments for the future and survival of cities.**

WHICH CITIES INSPIRE BEST PRACTICES AROUND THE WORLD?

EDMONTON

- City's capacity to manage natural areas.
- Well-connected network of conservation partners.
- System of shared conservation education.

MEXICO CITY

Mexico City focused in the creation of Green roofs as a semi-natural area design solution, that helps water filtration and regulates temperatures.

CURITIBA

Ecological capital

- Residents planted 1.5 million trees along city streets.
- Tax breaks for the construction industry for inclusion of green areas.
- Propose a ratio? - 52 mts * Person.

MEDELLIN

Medellin created Think Tanks that are a multi-scale and cross-sector approach to address urban ecological design

ROSARIO

Rosario in Argentina focused their efforts in urban agriculture and in creating green circuits, connecting their "productive neighborhoods".

CAPE TOWN

Cape Town managed to avoid their Day Zero water crisis (the day when city's water demand exceeded water supply) by implementing emergency measures alongside with long term strategies, such as the Water Fund.

VALDIVIA

Valdivia focused in the conservation and maintenance of urban wetlands, accompanied by GIS implementation

They estimated the Net Present Value of their natural resources and ecosystem services, and allocated a portion of it into the Water Fund.



RECOMMENDATIONS



Risk management should be integrated in each step of the toolkit as a **best practice**. Evaluating risks incorporates a prevention culture in the management of projects and in the mitigation strategies that increase biodiversity in cities.



A bold **communication strategy** should be a transversal axis and should be constantly implemented. Communications include data gathering, data analytics, managing expectations and obtaining stakeholder engagement, from technical, social or financial roles.



Measuring impacts and success does not only contribute to biodiversity but also to the SDGs agenda. The SDG agenda should be promoted and aligned to public policies and private efforts.

Also, **biodiversity focused projects in cities** can be one of the elements that has the **greatest impact** in achieving a **sustainable world by 2030**.



Projects are only executed if the **time and cost estimates are viable**, agreed upon and with a formal financing plan. Estimating budgets also involves evaluating and **monetizing the benefit** that will be obtained from **achieving social and environmental goals**.



