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Nature-based solutions

Setting the stage & advocating for urban uptake

Input - Climate Academy webinar series: Nature-based solutions and urban vulnerability

Dr. Zita Sebesvari

Deputy Director

Head, Environmental Vulnerability &
Ecosystem Services Section

sebesvari@ehs.unu.edu

Dr. Simone Sandholz

Academic Officer

Head, Urban Futures & Sustainability
Transformation Programme

sandholz@ehs.unu.edu

Part 1: Setting the stage for NbS



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Nature-based Solutions



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IUCN definition	European Commission definition
Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. (WCC-2016-Res-069)	Living solutions inspired by, continuously supported by and using Nature designed to address various societal challenges in a resource efficient and adaptable manner and to provide simultaneously economic, social and environmental benefits. (Maes & Jacobs, 2015)

Source: Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016). Nature-based Solutions to address global societal challenges. Gland, Switzerland: IUCN.

Umbrella concept



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Associated approaches

- Ecological Restoration
- Ecological Engineering
- Forest Landscape Restoration
- Green Infrastructure
- Ecosystem-based Management
- Ecosystem-based Adaptation
- Ecosystem-based Mitigation
- Ecosystem-based Disaster Risk Reduction...

Source: Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016). Nature-based Solutions to address global societal challenges. Gland, Switzerland: IUCN.

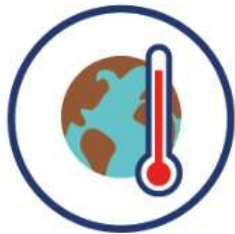
NbS addresses various societal challenges



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Climate change
mitigation and
adaptation



Disaster risk
reduction



Economic
and social
development



Human health



Food security



Water security



Environmental
degradation and
biodiversity loss

IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN

Ecosystem-based adaptation (EbA): The use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change. CBD (2009)

Ecosystem-based disaster risk reduction (Eco-DRR): The sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development. PEDDR (2010)

Success story



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- Growing evidence on effectiveness
- NbS were highlighted in all recent global assessment reports (IPCC, IPBES)
- CBD voluntary guidelines, UNDRR Words into Action for NbS
- IUCN Global Standard for NbS
- 66% of member states committed to implementing NbS in their Nationally Determined Contributions (NDCs) (Seddon et al. 2020)
- Strong commitment to NbS projects by the EC – influencing also the geographical spread of evidence and the type of ecosystems studies

Words into Action: NbS for DRR (2021)



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Words into Action: Nature-based Solutions for Disaster Risk Reduction

Chapter 3: Implementing the Sendai Framework with Nature-based Solutions

Other tools to integrate ecosystems into risk assessments

- The integrated valuation of environmental services and tradeoffs (InVEST), created by the international partnership Natural Capital Projects, is a suite of models used to assess and map ecosystems and their services. The habitat risk model and the urban flood risk mitigation model are useful in the DRR context, modeling ecosystem exposure to different types of hazard and how these changes affect the provision of ecosystem services (Bayani & Barthélemy, 2016; Doswald & Estrella, 2015; UNEP, 2016). InVEST scenarios thus help to assess tradeoffs of different management choices and to identify where investment in natural capital can enhance livelihoods (Bayani & Barthélemy, 2016). They offer decision-support tools for considering ecosystem-based solutions for DRR and CCA. The example of Haiti (case study 3.2) shows the application of InVEST to identify where and to what extent ecosystems can protect the community.

GUIDANCE AND LINKS RELATED TO THE TOOL

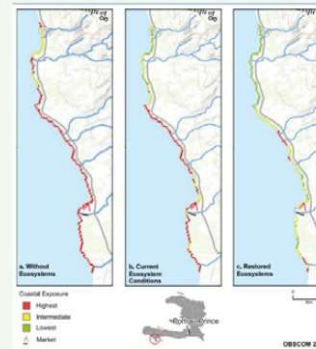
- InVEST user guide (English):
<http://releases.naturalcapitalproject.org/invest-userguide/latest/>
- Download InVEST 3.8.0 (Windows):
http://releases.naturalcapitalproject.org/invest/3.8.0/InVEST_3.8.0_x86_Setup.exe
Download InVEST 3.8.0 (Mac):
<http://releases.naturalcapitalproject.org/invest/3.8.0/InVEST-3.8.0-mac.zip>
- Relevant models:
Habitat risk assessment
<https://naturalcapitalproject.stanford.edu/software/invest-models/habitat-risk-assessment>
User guide
http://releases.naturalcapitalproject.org/invest-userguide/latest/habitat_risk_assessment.html
Urban flood risk mitigation
<https://naturalcapitalproject.stanford.edu/software/invest-models/urban-flood-risk-mitigation>

CASE STUDY 3.2

Application of InVEST in Port Salut, Haiti

To identify areas most exposed to storm surge and coastal flooding and determine the role of coastal ecosystems in protecting communities against these hazards, the InVEST coastal vulnerability model was applied in Port Salut, Haiti.

Coastal ecosystems are mapped via remote sensing to establish their current conditions. Exposure is modelled under different ecosystem management scenarios (ecosystem degradation / restoration). This results in maps showing the impact of ecosystems on exposure (see figure below), which supports decision-making (Bayani & Barthélemy, 2016).



Model of results of exposure under different ecosystem conditions. Source: UNEP, 2016.



PEDRR
Ecosystems for Disaster Risk Reduction and Adaptation



Wetlands
INTERNATIONAL



University
of Glasgow

Technology
Arts Sciences
TH Köln



Save the Children.



GNDR
Global Network of Civil Society
Organisations for Disaster Reduction



Challenges



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- Limits of NbS - reduced effectiveness due to global warming (e.g. IPCC SROCC 2019)
- Losses and damages to NbS and changes in effectiveness over time – reporting gaps, low awareness
- Monitoring and evaluation of performance – still in its infancy
- Over-emphasis on tree planting rather than a wide range of NbS (Seddon et al. 2021)
- Lack of benefits for biodiversity (CBD voluntary guidelines)
- Overemphasis on creating something new versus protecting healthy ecosystems
- Cost-effectiveness studies versus implementation at scale

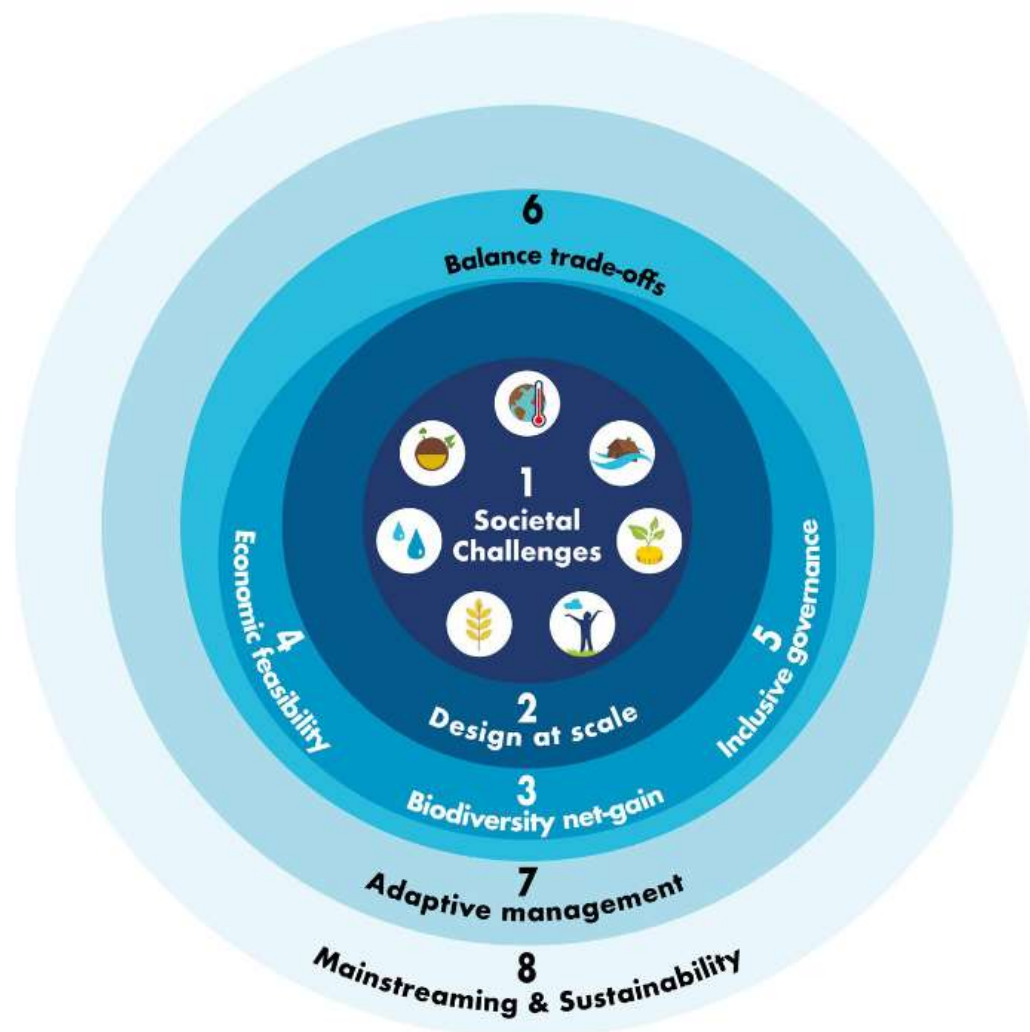
IUCN Global Standard for NbS Eight Criteria



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NbS Standard Criterion 4: economic viability

- 4.2 A cost-effectiveness study is provided to support the choice of NbS including the likely impact of any relevant regulations and subsidies
- **Is this a good way to reach scale?**

IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN

Cost effectiveness versus mission economy



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- New EC Funding scheme Horizon Europe takes a different approach
- Mission-based funding

Examples for “missions”

- Apollo mission to bring the first man to the Moon
- Salmon 2020 in the Rhine
- Sweden's Vision Zero policy that aimed to reduce the number of road-accident fatalities to zero by 2020
- Germany's energy transformation
- **What is the mission for NbS??**

Part 2: Making the case for urban NbS



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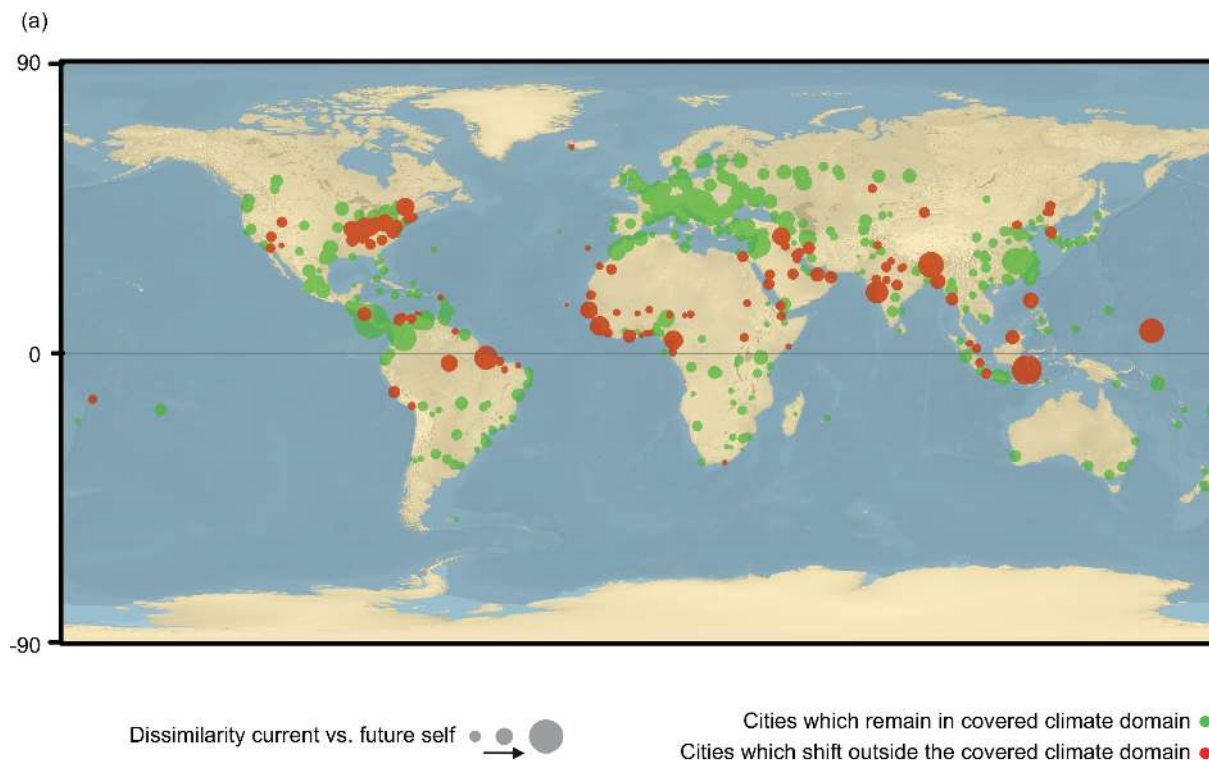
Why do we need to care about cities & climate change?



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Extent of climate changes in major cities of the world by 2050.

Cities predicted to have climates that no major city has experienced before are colored in red (mostly within the tropics). Cities for which future climate conditions reflect current conditions in other major cities of the world are shown in green. The size of the dots represents the magnitude of change between current and future climate conditions

Uptake of urban NbS in global policy



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New Urban Agenda

Section on 'Planning and managing urban spatial development':

*...integrate disaster risk reduction and climate change adaptation [...] into [...] urban and territorial development and planning processes, including [...] **nature-based solutions.**"*

Efficiency of urban NbS for DRR

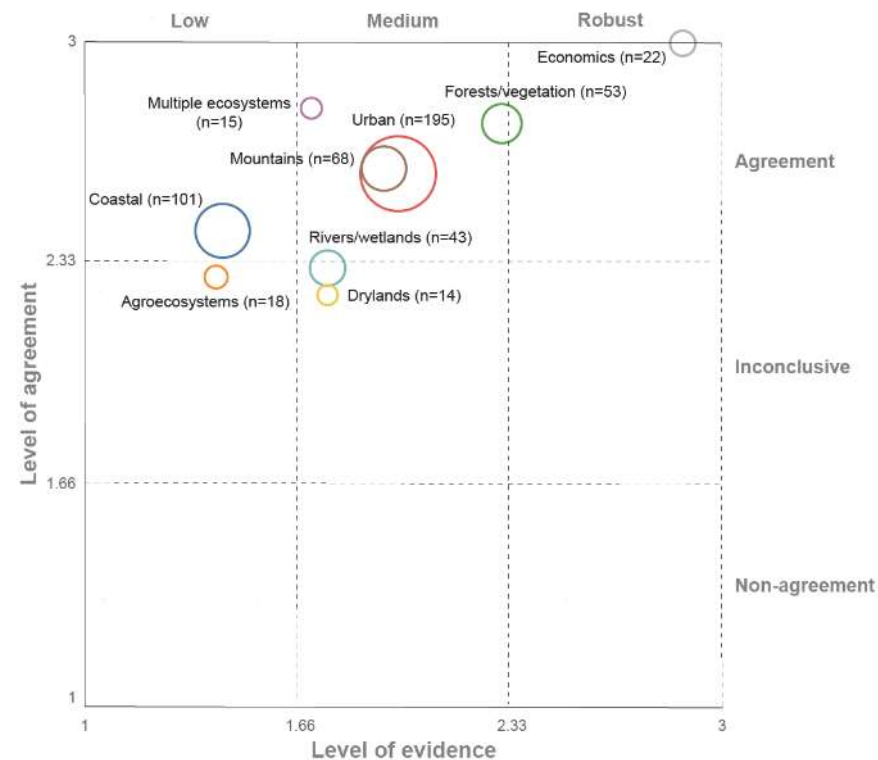


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a - Level of evidence x Level of agreement



Efficiency of urban NbS for DRR

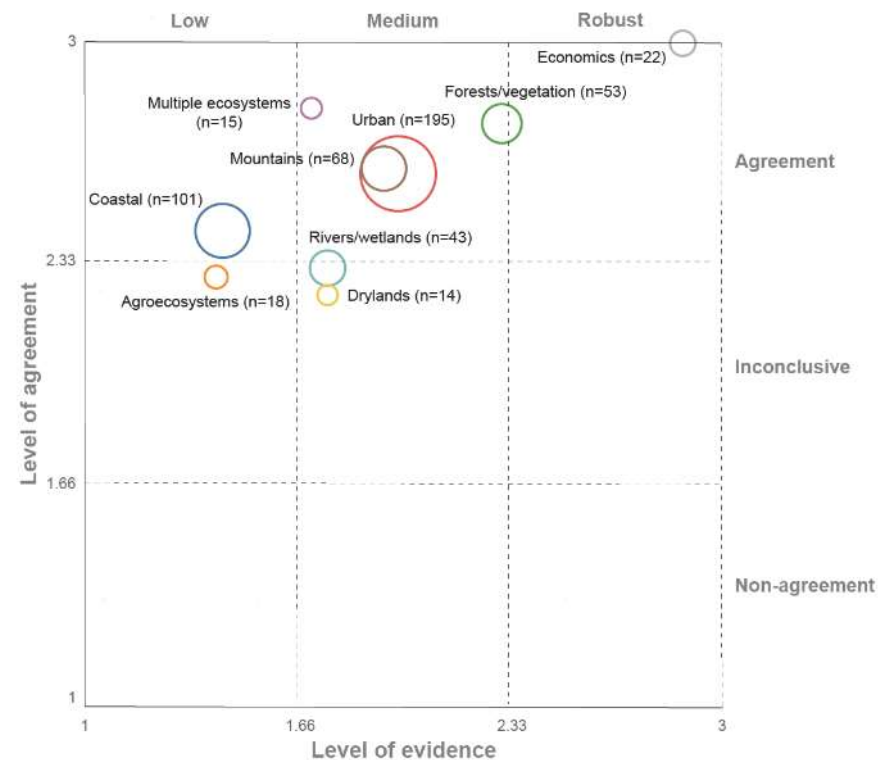


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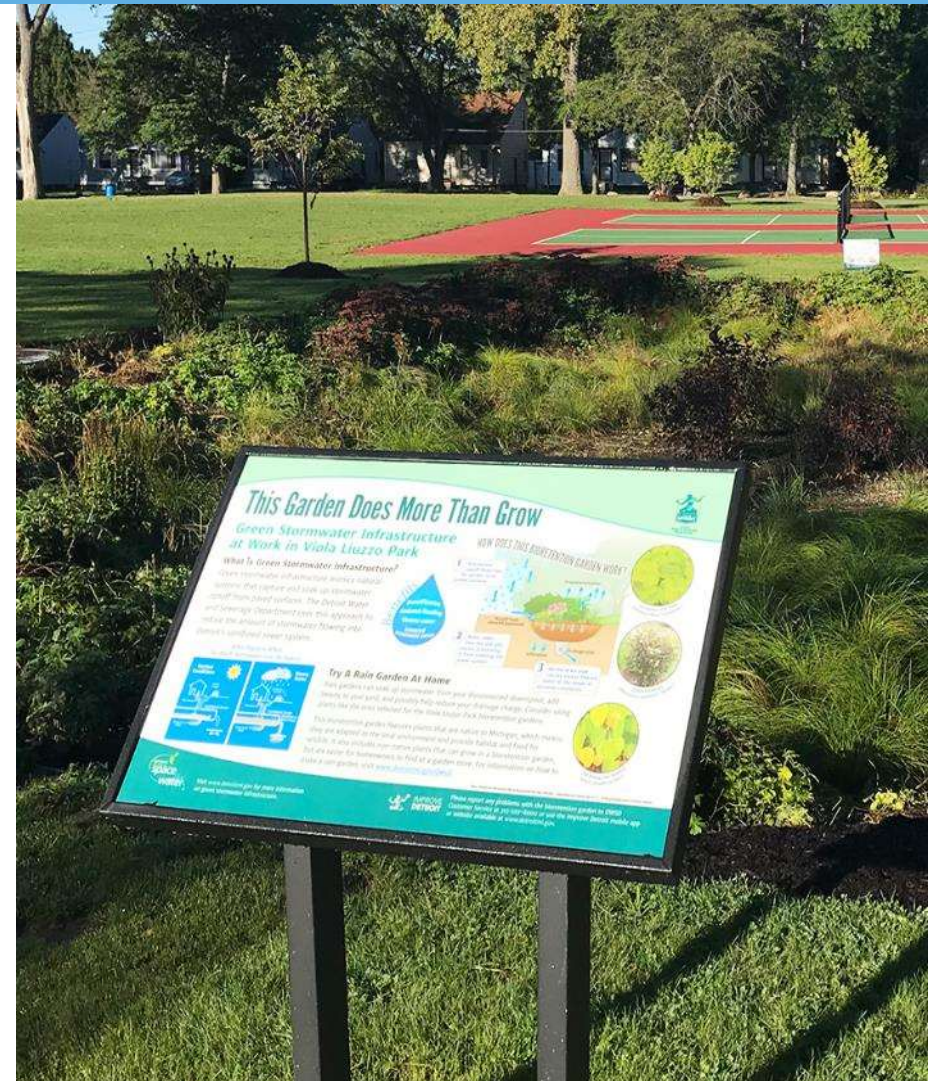
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a - Level of evidence x Level of agreement



	North America	Europe	Asia	Oceania	South America	Africa	Other
Urban (n = 185)	44%	22%	19%	6%	2%	1%	6%



Cost-efficiency of urban NbS

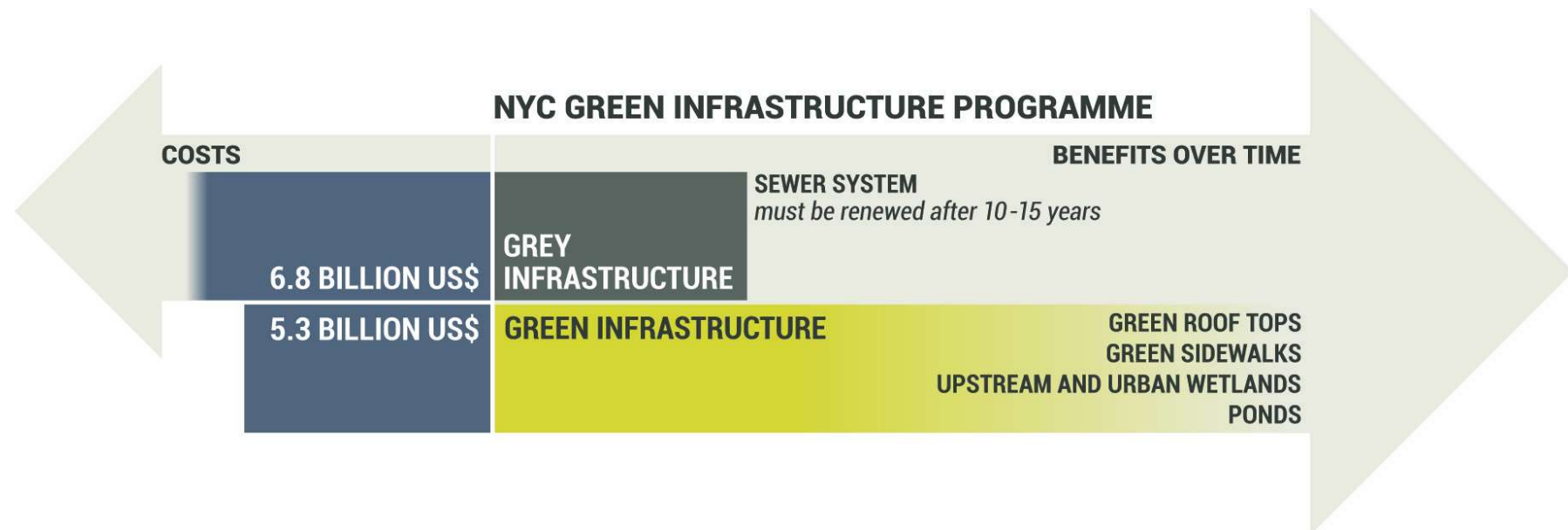


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Frontrunner of introducing urban NbS:
New York City's «Green infrastructure plan»



Challenges of urban NbS



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Different cities with different governance & ecosystems





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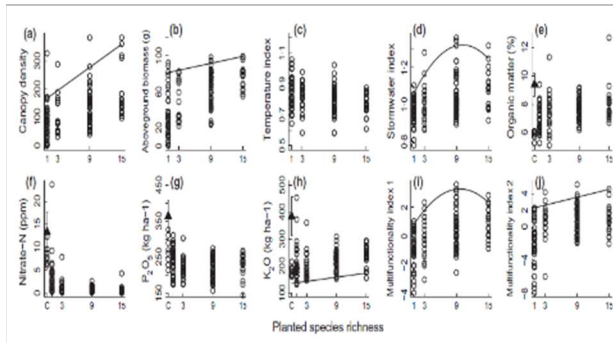
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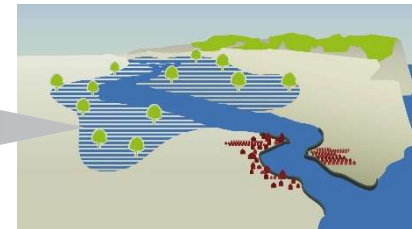
Urban NbS research & policy gaps



Many more studies
in Global North –
lack in (semi-)arid areas



“small-scale” research
focus – lack of large-scale
studies



Promotion of “modern”
instead of traditional
approaches





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Thanks for your attention