Nature-based Solutions for Addressing Climate Change

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OUTLINE

- What is a nature-based solution?
- What are examples of nature-based solutions?
- What benefits do nature-based solutions provide?
- Challenges in employing nature-based solutions
- Overcoming the challenges

What is a Nature-based Solution?

IUCN

Nature-based Solutions™ are **actions** to **protect**, sustainably **manage** and **restore** natural and **modified** ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature.

Nature-based Solutions **leverage** nature and the power of healthy ecosystems to **protect people**, **optimize infrastructure** and **safeguard** a stable and **biodiverse future**.

World Bank

Nature-based Solutions are actions to protect, sustainably manage, or restore **natural ecosystems**, that address societal challenges such as **climate change**, **human health**, **food and water security**, and **disaster risk reduction** effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

WWF

Nature-based Solutions harness the power of nature to boost natural ecosystems, biodiversity and human well-being to address major societal issues, **including climate change.**

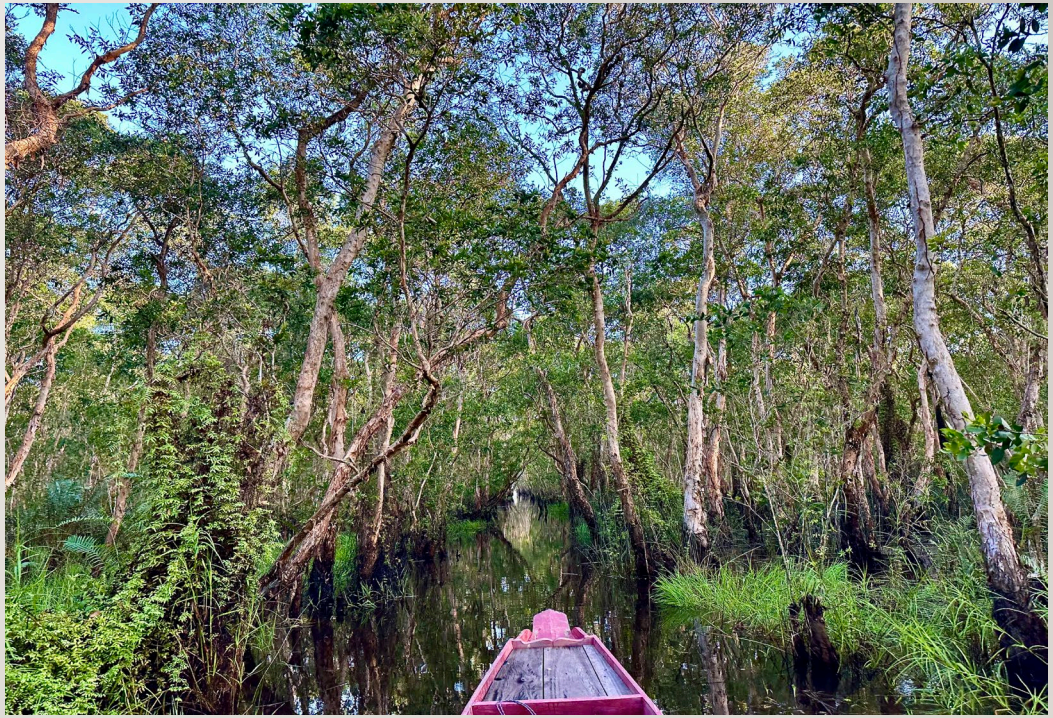
They **protect**, **restore** or sustainably **manage landscapes**, **seascapes**, **watersheds** and **urban areas** so they can tackle challenges such as food and water security, climate change, disaster risks and human health

Nature-based solutions are "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and **resilience** and biodiversity benefits."*

*2022 United Nations Environment Assembly

What are some Examples of Nature-based Solutions?

WETLANDS



FORESTS

Performance Evaluation Report

Nepal: Kali Gandaki "A" Hydroelectric Project

Independent Evaluation ADB

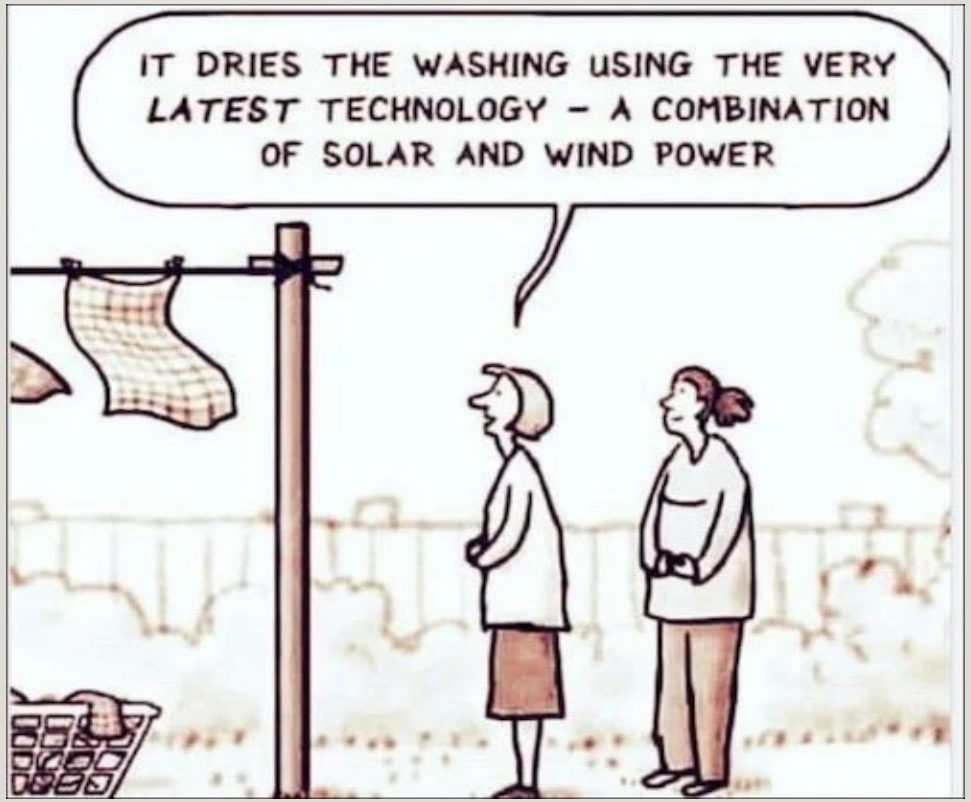
NbS and Hydropower Projects

Protect/restore forested watersheds as part of a comprehensive management plan

Dam proceeds pay for ecosystem services (clean and dependable water)

Multipurpose (flood control, irrigation) when possible

OTHERS


IT DRIES THE WASHING USING THE VERY LATEST TECHNOLOGY – A COMBINATION OF SOLAR AND WIND POWER

What are some benefits of Nature-based Solutions?

European Commission

NATURE BASED SOLUTIONS

Good for biodiversity

Deployment of urban green infrastructure increases habitat for nature.

Good for disaster risk reduction

Coral reefs dissipate more than 97% of wave energy.

[Nature communications, 2014]

Good for our health

Health benefits from NBS include

- reduced depression,
- mental health improvement,
- reduced cardiovascular morbidity,
- improved pregnancy outcomes,
- obesity and diabetes reduction.

[EKLIPSE, 2017]

Important for jobs and business

Over 56,000 jobs created through the Emscher Landscape Park in North Rhine Westphalia region in Germany.

[WWF ILO Report: Nature Hires, 2020]

Vital for the climate

37% of climate mitigation needed until 2030 to keep global warming below 2°C.

[IPBES GA SPM key message D8, 2019]

References:

1. EKLIPSE, *An impact evaluation framework to support planning and evaluation of nature-based solutions projects*, 2017, https://bit.ly/3daSnSC.

2. IPBES Global Assessment on Biodiversity and Ecosystem Services, *Status and Trends - Nature's Contributions to People (NCP)*, 2019, https://bit.ly/3li7Bsx.

3. Nature communications, *The effectiveness of coral reefs for coastal hazard risk reduction and adaptation*, 2014, https://go.nature.com/30FR2y3.

4. WWF & ILO, *NATURE HIRES: How Nature-based Solutions can power a green jobs recovery*, 2020, https://bit.ly/3k7CFdO.

UNEP, 2021. Smart, Sustainable and Resilient Cities: the Power of Nature-based Solutions

REGIONAL FLYWAY INITIATIVE INVESTMENT CONCEPT 4

POLLUTION PREVENTION AND WATER MANAGEMENT

Preventing pollution and sound water governance offers massive benefits.

Properly managed wetlands can intercept runoff and transform and store pollutants like sediment, nutrients, coliform and certain heavy metals without being degraded.

RFI investments will aim to realize the full potential of wetlands—particularly in urban environments—for delivering effective pollution and water management using nature-based solutions. This will ensure local wetland communities are less susceptible to flooding and pollution events. RFI investments will provide financing schemes to ensure wetlands are managed sustainably, over the long-term.

WHY POLLUTION PREVENTION AND WATER MANAGEMENT MATTERS

$1.4 million/year saved
by 220 people using constructed wetlands for wastewater treatment (Albania)

48% reduction
of biological oxygen demand in wastewater treated in constructed wetlands (Australia)

85%-90% organic pollutants reduced
in wastewater treatment in constructed wetlands (Dominican Republic)

BENEFITS OF WETLANDS TO POLLUTION PREVENTION

$2.9 billion/year
avoided cost of constructing artificial wetlands to replace natural wetlands' existing phosphorus filtration

$4.2 billion
avoided costs of sediment filtration and phosphorus removal services

$13 billion
cost of implementing agricultural best management practices to remove an equivalent phosphorus load annually

Data based on Canada (2021)

CASE EXAMPLE

ATHURA DISTRICT, UTTAR PRADESH STATE, INDIA

Constructed Wetlands and Natural Treatment of Wastewater

Area: 1.2 hectares

90% to 95%
rate of removal of fecal coliform in waste water through a constructed wetland

35 square meters
area required to treat a wastewater load of about 20 cubic meters a day

Significant biodiversity value
Significant reduction of contaminants entering big bodies of water, 100% of water recycled, minimal electricity use

References: University of Waterloo (2022); GIZ Albania (2021); Greenway & Simpson (1996) as cited in Almuktar et al. (2018); The Nature Conservancy (2021); Thamke (2021).

Water Supply and Quality

Nature-based Solutions in an Urban Context?

GREEN INFRASTRUCTURE (GI)

Green Infrastructure Ontario Coalition

Nature-based Solutions (NbS)/Nature-based Climate Solutions

Natural Infrastructure (NI)

Low Impact Development (LID)

NATURAL ASSETS:*
- Wetlands
- Forests
- Parks
- Meadows
- Lawns and gardens
- Soil

ENHANCED ASSETS:*
- Rain gardens
- Green roofs and walls
- Bioswales
- Urban trees
- Naturalized stormwater ponds

ENGINEERED ASSETS:*
- Permeable pavement
- Rain barrels
- Cisterns
- Perforated pipes
- Infiltration trenches

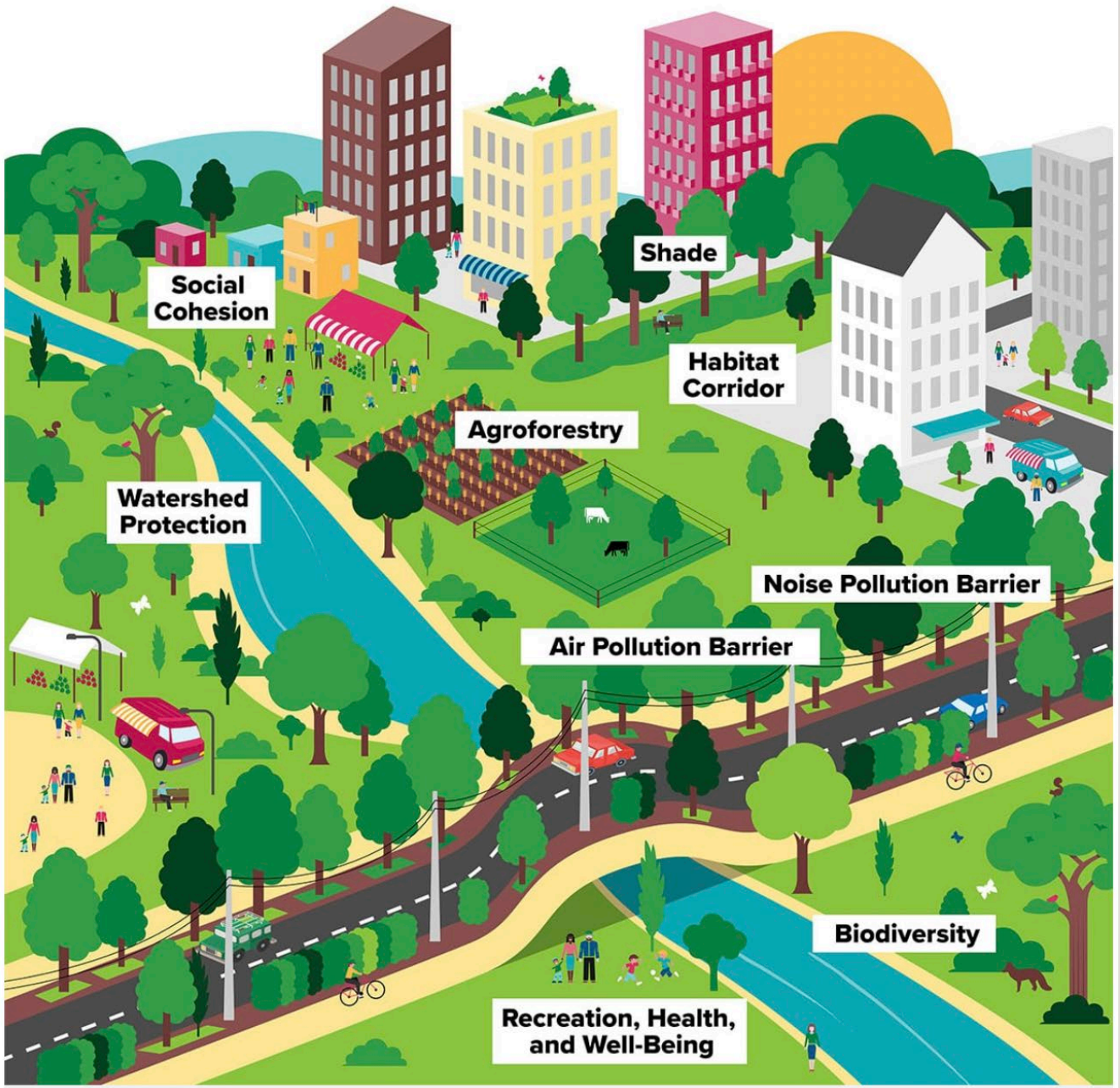
GREY INFRASTRUCTURE:*
- Bridges
- Roads
- Parking lots
- Culverts
- Pipes

What are some examples of Nature-based Solutions in urban communities?

Biophilia

The innate human instinct to connect with nature and other living beings.

Photo by Jon Pinder



Urban forests offer many benefits to residents, which are moderated by climate, geography, characteristics of the built environment, social and political conditions, and even individual or cultural identity. Image: Cities4Forests.

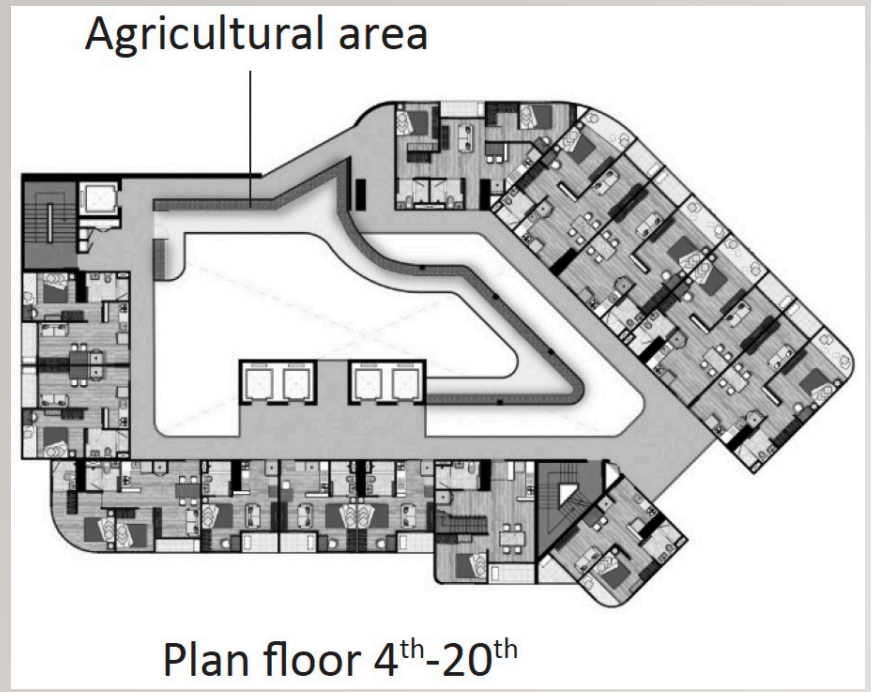
Benefits of Urban Forests

Green Roofs

Urban Parks
Retention Ponds
Wetlands

Kotchakorn Voraakhom

- Landscape architect
- Ted Fellow
- Asia Foundation Development Fellow
- Chair, Landscape Without Borders
- Time Magazine's '100 Next' List
- Founder of several organizations



Vertical or Rooftop Farming

CHALLENGES

- Decision makers' doubts about nature having a realistic role in addressing urban development issues

CHALLENGES

- Outdated building codes, construction standards and planning guidelines

CHALLENGES

- Long-term investment and development needs versus normal short-term city planning initiatives

CHALLENGES

- Allocating sufficient finance or recognizing opportunities for innovative finance to sustainably cover long-term implementation and maintenance costs

CHALLENGES

- Anticipating and dealing appropriately with tradeoffs and unintended consequences

OVERCOMING THE CHALLENGES

- Employ multi-level governance
  - Start with a national strategy
  - Encourage both vertical and horizontal governance
  - Broad participation

OVERCOMING THE CHALLENGES

- Build awareness of NbS opportunities and benefits

OVERCOMING THE CHALLENGES

- Assess building codes, construction standards and planning guides and introduce NbS elements and/or eliminate NbS blockages where possible

OVERCOMING THE CHALLENGES

- Assess opportunities to amend policies and regulations to accommodate NbS
- Flexibility is essential as requirements for NbS vary by location, climatic conditions and over time

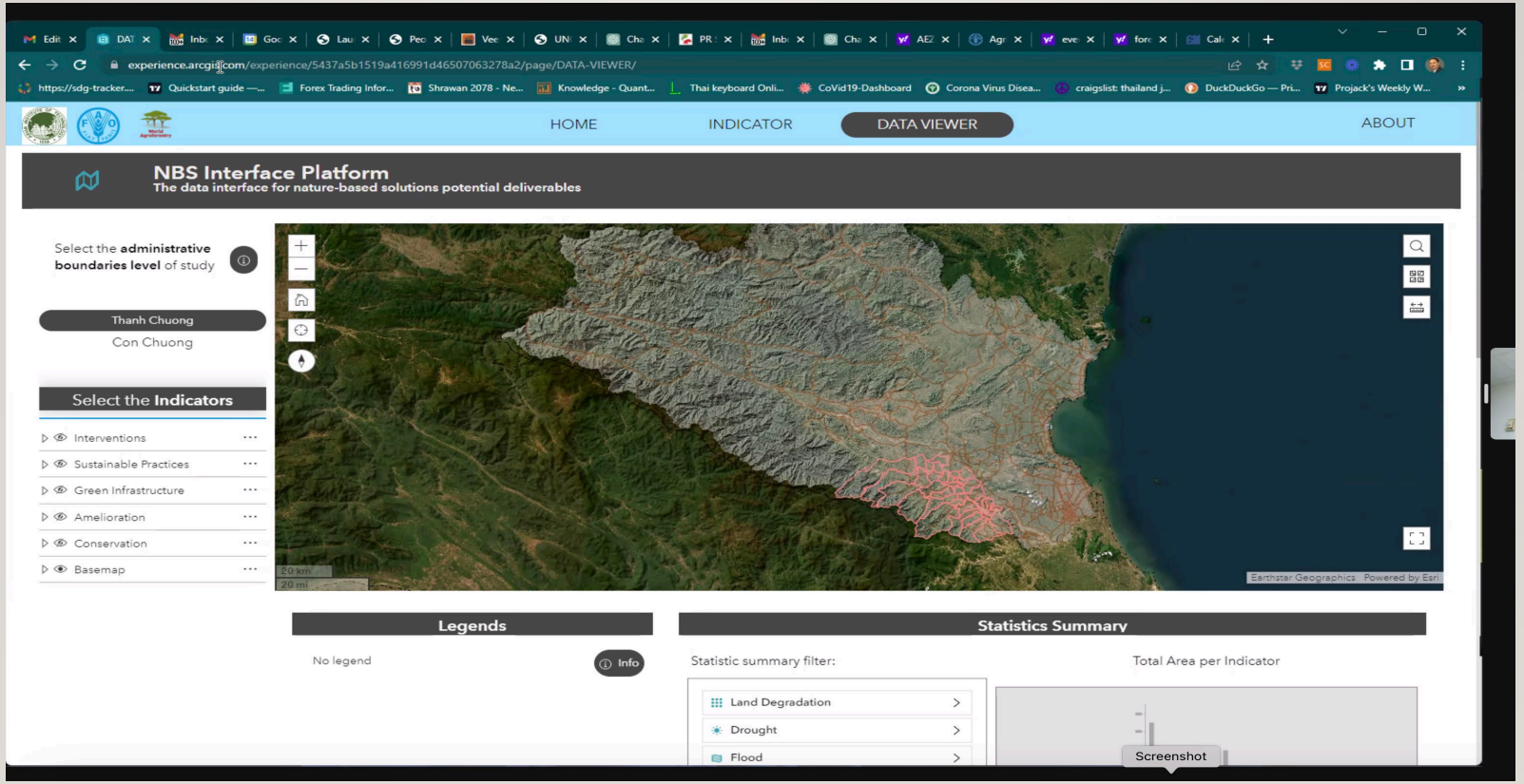
OVERCOMING THE CHALLENGES

- Assess and address capacity issues
  - Access case studies, share lessons and good practice, provide training

OVERCOMING THE CHALLENGES

- Innovative financing
  - Access international green funds
  - Bring in private sector
  - Strengthen NbS financial analytical tools to demonstrate viability

TOOLS & REFERENCES



TOOLS & REFERENCES

Ecosystems (IUCN typology 2.1)	Intervention type	Number of case studies where specific interventions in specific ecosystems, implemented in specific countries, presented a positive effect on spec														
		Loss of food production	Soil erosion	Reduced water availability	Freshwater flooding	Biomass cover loss	Reduced soil quality	Loss of other ecosystem goods	Coastal erosion	Loss of timber production	Reduced water quality	Drought	Wind damage	Wildfire	Coastal inundation	Storm surge	Desertific
Tropical-subtropical montane rainforests		2	5	4	3		2	4		1			1				
	assisted natural regeneration and restoration with native species		1	1	1												
	assisted natural regeneration and soil conservation		1				1										
	fire and water management, protection and restoration	1	1	2				2									
	natural regeneration		1														
	plantation (fruiting trees in small scale), protection and restoration	1	1	1	1		1	1		1			1				
	protection and restoration with native species							1									
	selective logging				1												
Temperate subhumid grasslands		3	6	4	2	1	4				1						
	assisted natural regeneration	2	3				2										
	assisted natural regeneration and protection																
	assisted natural regeneration and restoration with native species										1						
	grazing management	1	1	1			1										
	natural regeneration and restoration with native species		1		1												
	restoration				1												
	restoration with native species		1	3		1	1										
Trophic savannas		11	3	1		1	1	1				4					
	restoration using native species and by controling erosion	1	1														
	assisted natural regeneration	1	1														
	assisted natural regeneration and protection	1															
	assisted natural regeneration and restoration with native species	1		1		1	1										
	grazing management	2	1														
	grazing management and protection	3										2					
	protection	1										2					
	restoration with native species	1						1									
Deciduous temperate forests		2	1			4				4							
	assisted migration of plant species									4							
	restoration with native species	2	1			4											
	thinning																
Intertidal forests and shrublands		1		1					3				2		1	2	
	creation of mangrove														1		
	natural regeneration and restoration with native species																
	protection	1							1				1			1	
	protection, restoration with native species and sustainable use			1					1								
	restoration with native species								1				1			1	
Boreal and temperate montane forests and woodlands				5	3	1				2							
	forest management and restoration with native species			1	1												
	grazing management					1											
	natural regeneration			1													
	natural regeneration after clearcut			2	1												
	restoration with native species				1												

NbS Evidence Platform (Oxford, et al)

TOOLS & REFERENCES

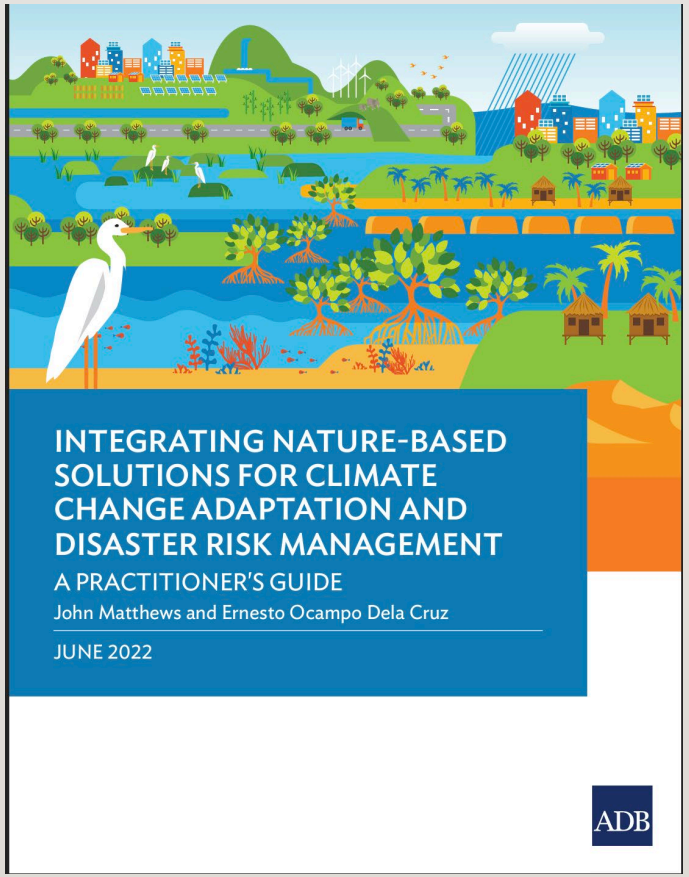
IUCN

IUCN Global Standard for Nature-based Solutions

A user-friendly framework for the verification, design and scaling up of NbS

First edition

TOOLS & REFERENCES



CONCLUSION

- NbS is real and viable and beneficial
- Many examples available in Asia to replicate and tools available to employ
- Support pilot initiatives as proof of concept, assess and modify key policies, regulations and standards