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Nature-based Solutions

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OVERVIEW

- Understanding Nature-based Solutions
- Use Cases for Mining and Water Management
- Planning Nature-based Solutions
- Case studies

MENTI-QUIZ

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Understanding Nature-based Solutions

WHAT ARE NATURE-BASED SOLUTIONS?

"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" – UNEA-5, 2022

WHAT ARE NBS?

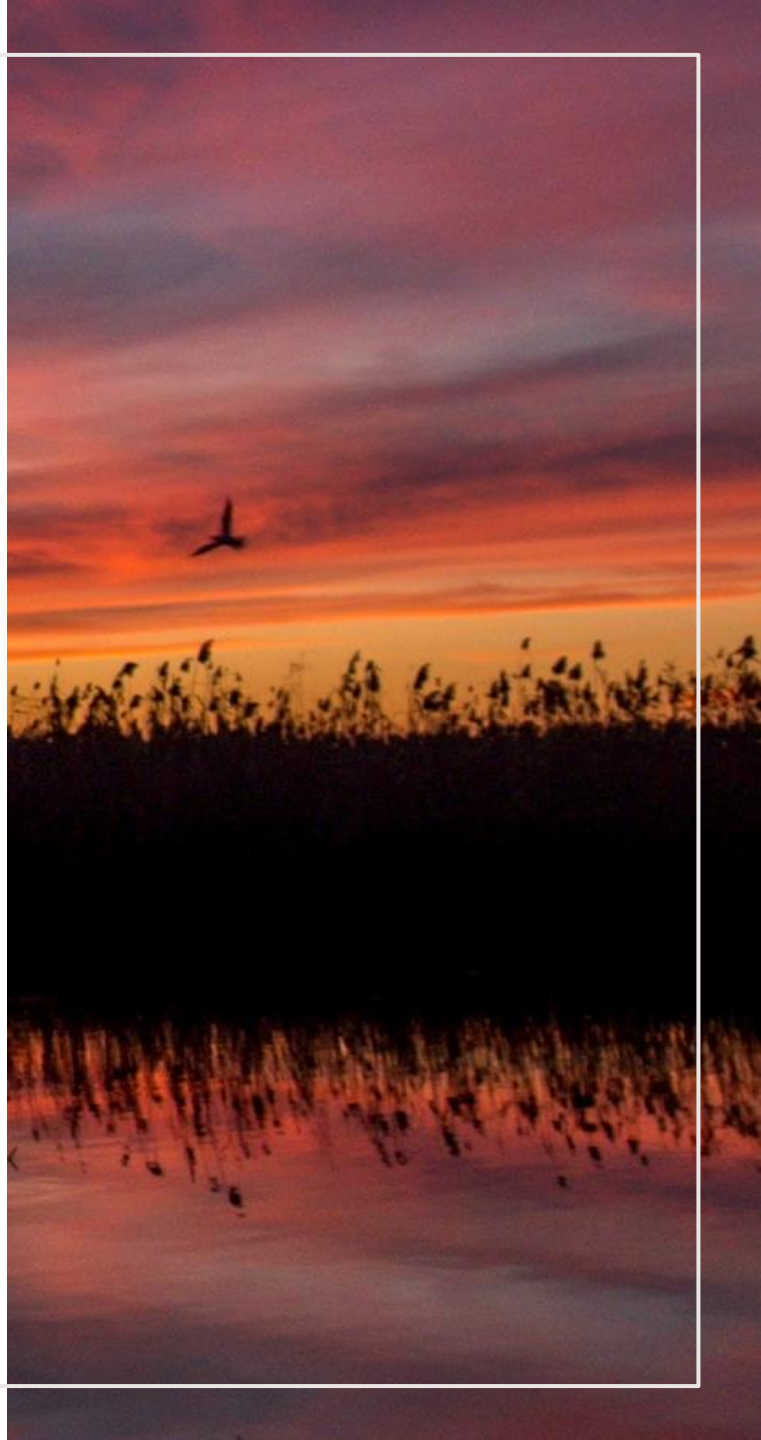
The UNEA resolution (UNEA-5, 2022) recognizes that NbS:

A- respect social and environmental safeguards, in line with the Rio Conventions and including those for local communities and Indigenous Peoples,

B- can be implemented in accordance with local, national and regional circumstances, consistent with the 2030 Agenda for Sustainable Development and managed adaptively,

C- are among the actions that play an essential role in the overall global effort to achieve the Sustainable Development Goals including by effectively and efficiently addressing major social, economic and environmental challenges, such as biodiversity loss, climate change, land degradation, desertification, food security, disaster risks, urban development, water availability, poverty eradication, inequality, unemployment, as well as social and sustainable economic development, human health and a large range of ecosystem services;

D- can help stimulate sustainable innovation and scientific research.



TYPES OF ACTION THAT CAN PROVIDE NBS

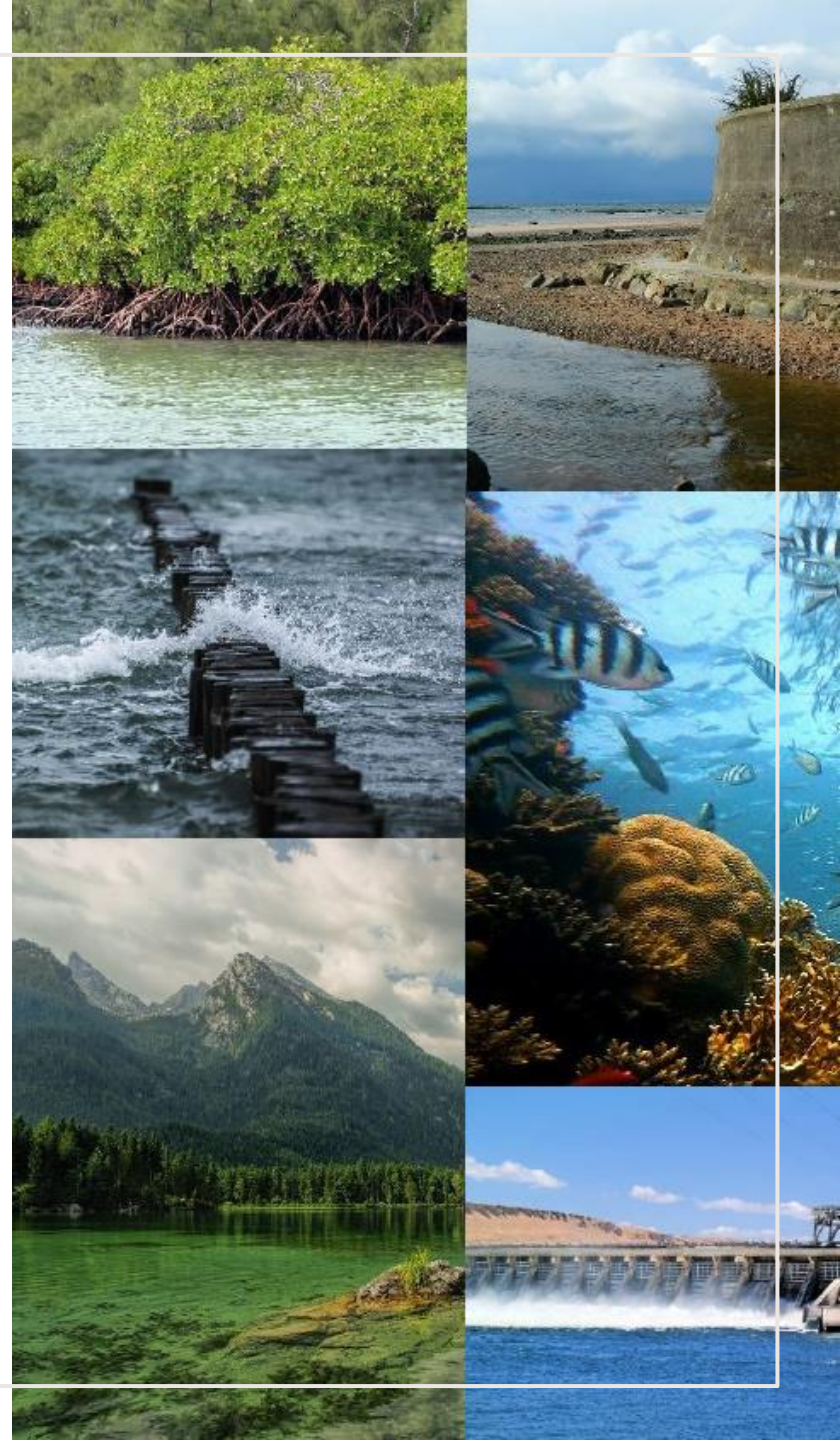
There are a number of nature-based approaches, which include:

- Ecosystem-based adaptation
- Ecosystem-based mitigation
- Natural climate solutions
- Green infrastructure
- Ecological engineering

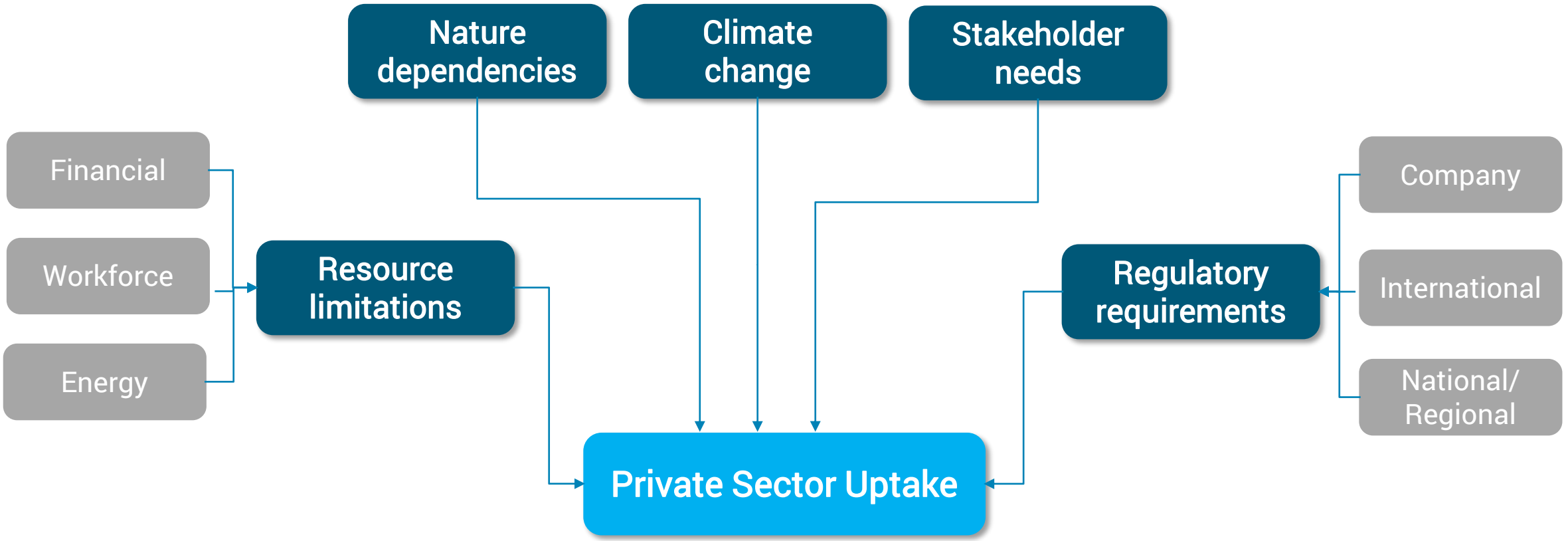
Global Change Biology, First published: 01 February 2021, DOI: (10.1111/gcb.15513)

EXAMPLES OF NATURE-BASED SOLUTIONS (NBS)

- Protection of mangroves and/or reefs to reduce erosion and storm damage to coastal areas and maintain fisheries
- Sustainable management of forests to reduce river siltation and contribute to climate mitigation
- Restoration of wetlands to reduce inland flooding risks and improve water quality
- NbS can be used instead of, in addition to, or in combination with other approaches.



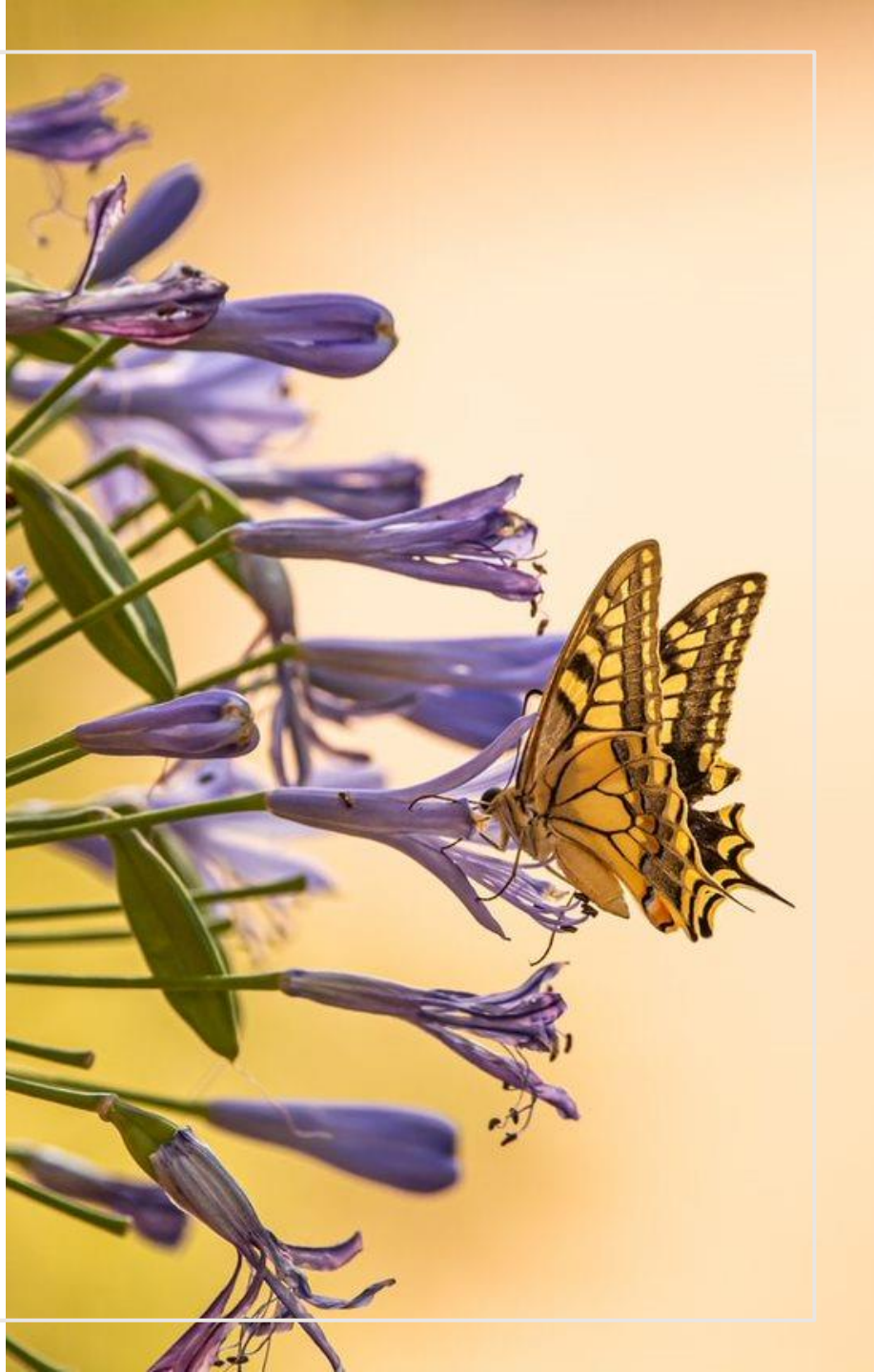
EXTERNAL DRIVERS FOR PRIVATE SECTOR UPTAKE OF NBS



INTERNAL DRIVERS FOR NBS

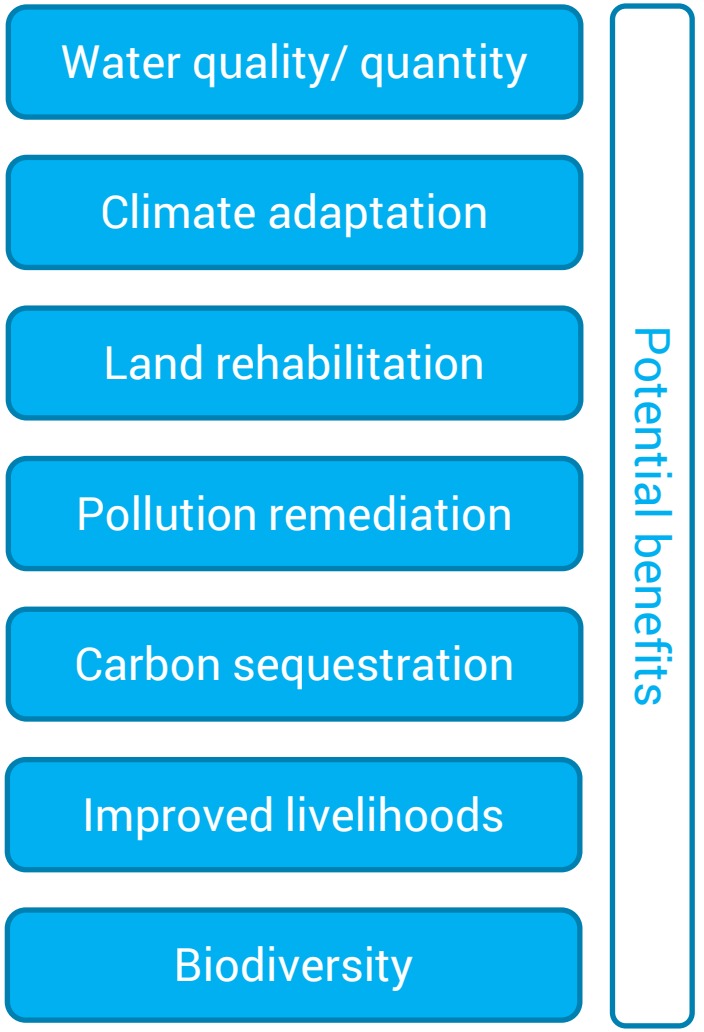
Nature-based Solutions can help to:

- Reduce costs
- Contribute to internal objectives
- Prepare for potential future regulatory / financing requirements
- Adapt to changing conditions
- Contribute to multiple needs and objectives



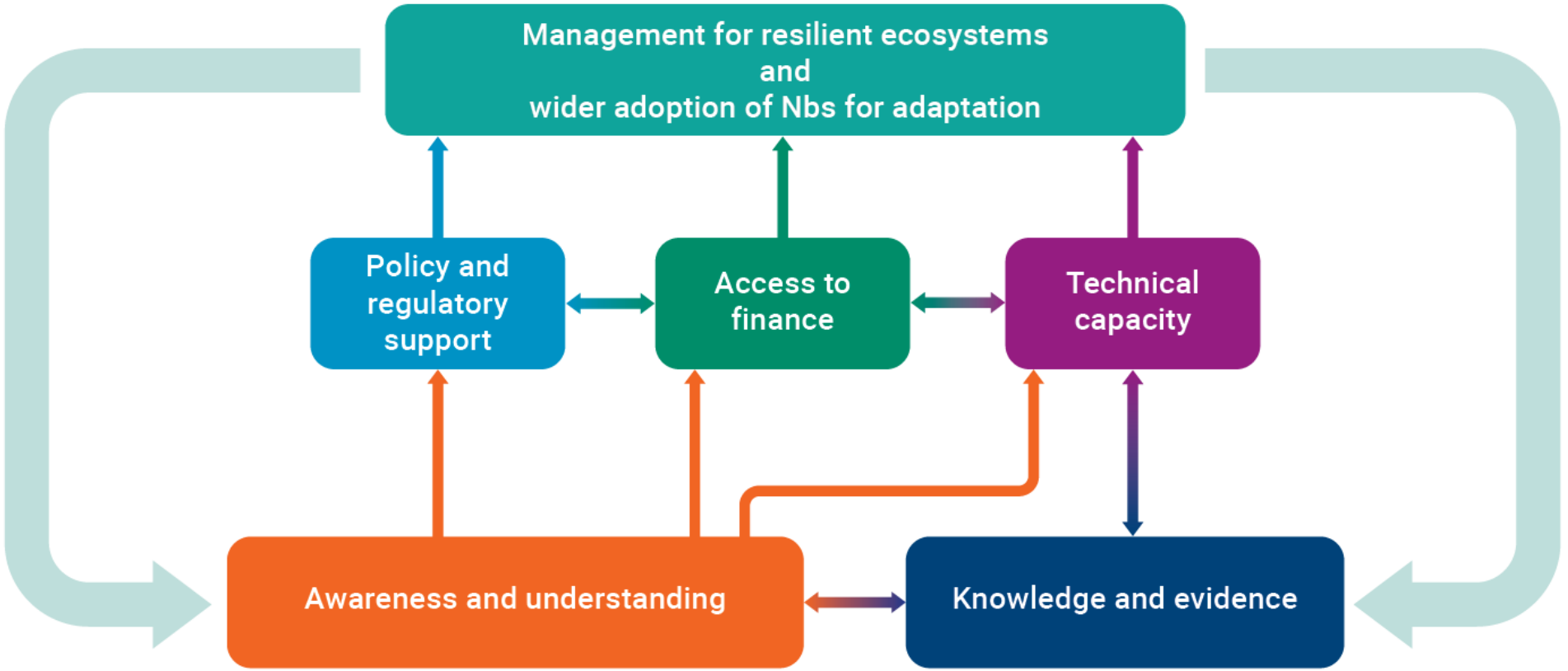
BENEFITS ASSOCIATED WITH NBS

- NbS can provide substantial environmental and social benefits by maintaining and enhancing ecosystem services
- Benefits exist at multiple scales
- Understanding and assessing the value of benefits can be challenging
- But taking account of these benefits can dramatically improve the cost-effectiveness of NbS

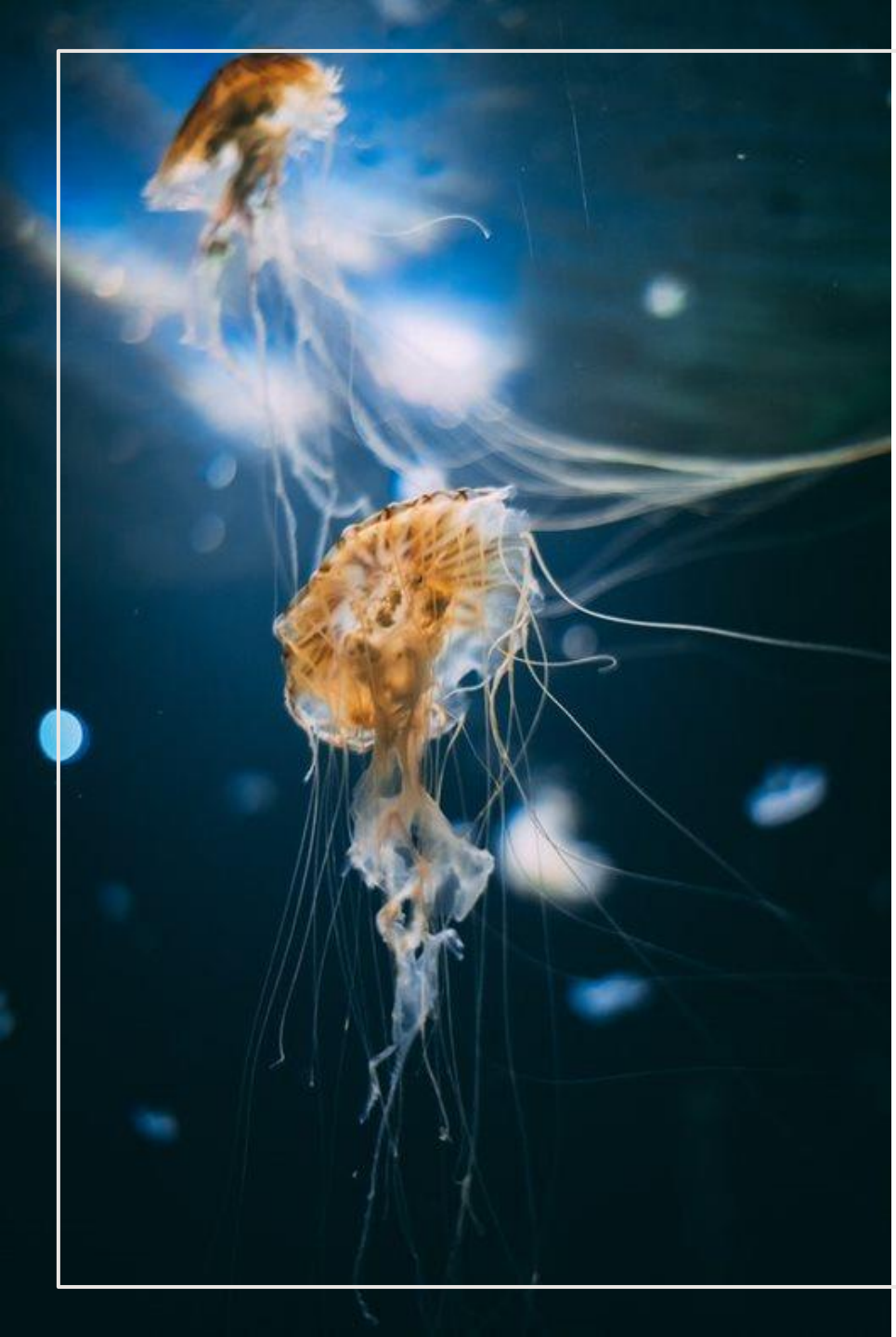


BARRIERS TO WIDER UPTAKE OF NBS

FIGURE 4 Building blocks to support improved management for ecosystem resilience and wider adoption of NbS for adaptation.



Source: Kapos, V., Wicander, S., Salvaterra, T., Dawkins, K., Hicks, C. (2019) The Role of the Natural Environment in Adaptation, Background Paper for the Global Commission on Adaptation. Rotterdam and Washington, D.C.: Global Commission on Adaptation.



OVERCOMING CHALLENGES TO SCALING UP NBS

- Routinely consider NbS for mitigating and managing climate change, biodiversity and pollution-related risks
- Increase awareness and provide sector leadership on use of NbS through building the evidence base (monitor, evaluate, publicize)
- Support PPP and collaborative governance structures where appropriate

Use Cases for Mining and Water Management

EXAMPLE CHALLENGE: WATER MANAGEMENT

- There are often competing demands for water in a landscape (e.g. agriculture, energy etc)
- Consistent access to clean water is a vital right for communities both locally and downstream
- From a business perspective, operations may be disrupted by fluctuations in supply

EXAMPLE CHALLENGE: WATER MANAGEMENT

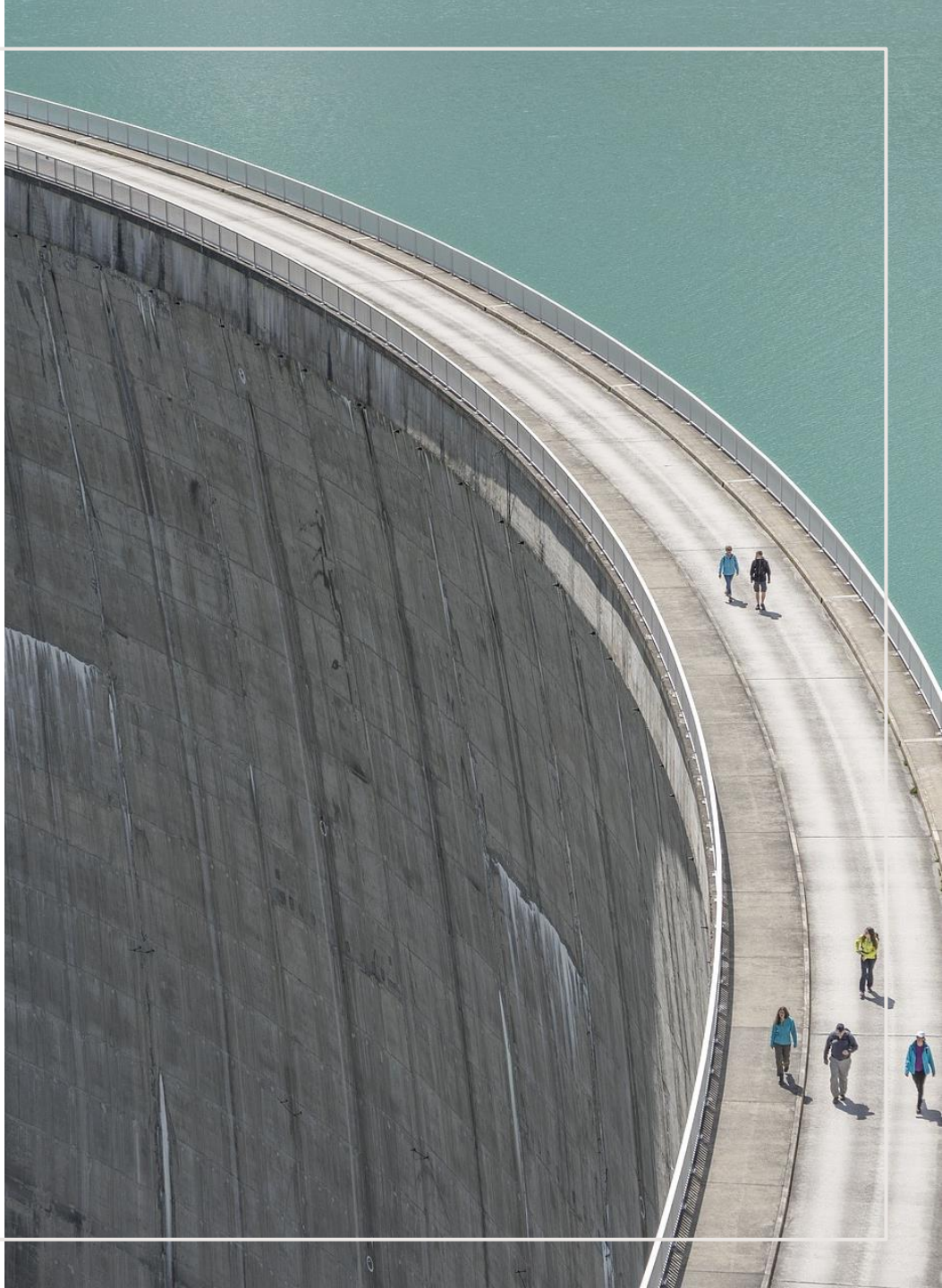
- Quantity (too much **or** too little) and quality (e.g. levels of pollution, silt etc) are important
- Grey infrastructure, nature-based solutions and/or hybrid approaches offer different advantages and disadvantages

WATER MANAGEMENT: GREY INFRASTRUCTURE

e.g. Concrete dams, canalised rivers, pipelines, constructed reservoirs

Advantages

- Operational as soon as complete
- Often built to withstand certain conditions or extreme events
- Familiar / well established process



WATER MANAGEMENT: GREY INFRASTRUCTURE

Disadvantages

- Limited (although often long) lifespan
- Can have a negative impact on ecosystems and disrupt natural processes
- Not adaptable with changing conditions
- Benefits may be fewer if used on their own but can be used with other approaches

WATER MANAGEMENT: NATURE-BASED SOLUTIONS

E.g. protection, restoration and/or sustainable management of upland forests, wetlands, river corridors

Advantages

- Multiple benefits including contribution to biodiversity
- Adaptable over time
- Sometimes lower costs
- Support / enhance ecosystem services and natural processes

WATER MANAGEMENT: NATURE-BASED SOLUTIONS

Disadvantages

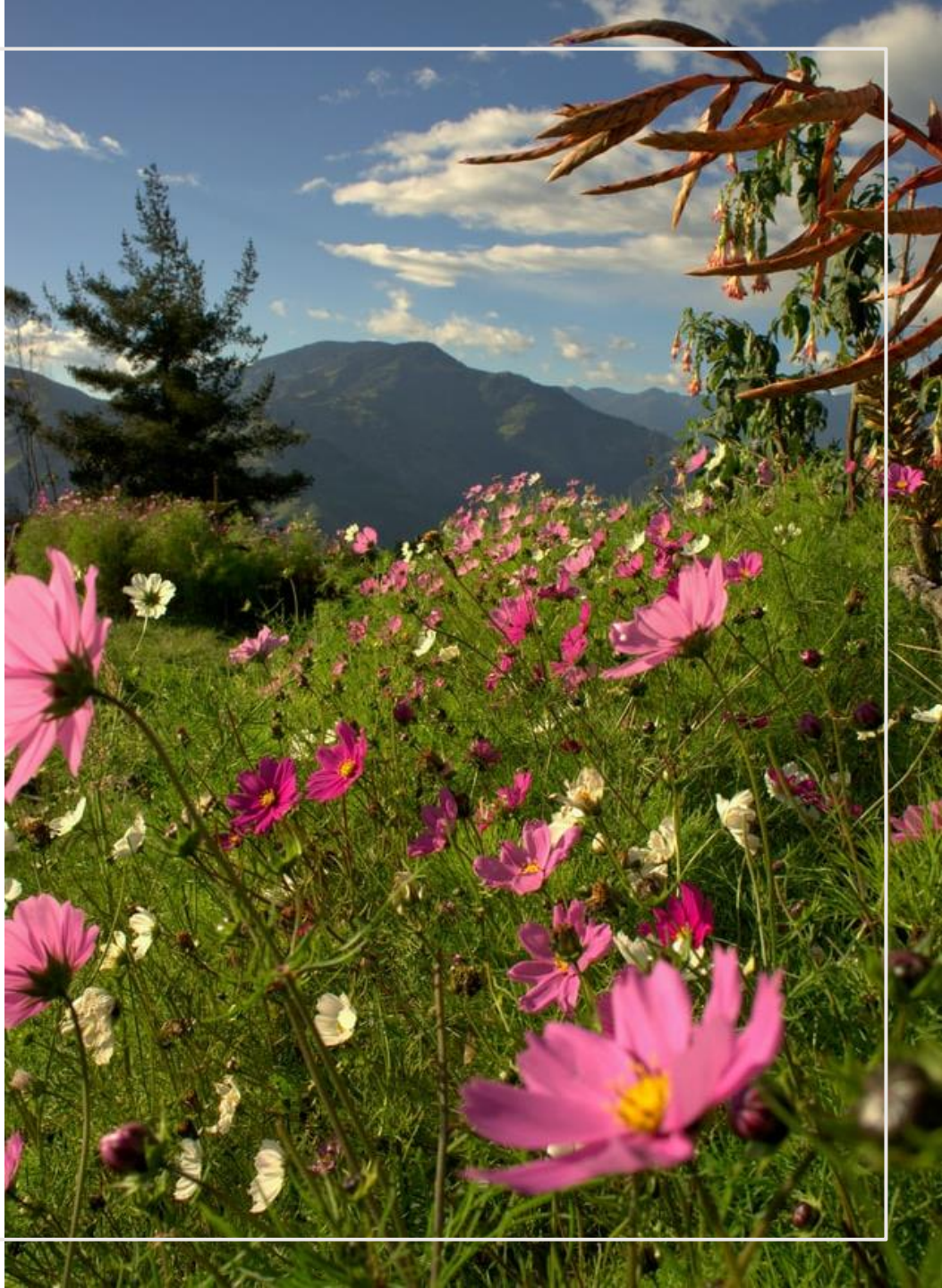
- Take time to establish
- Have vulnerabilities (e.g. from severe pollution events, climate impacts etc)
- Specific to the ecosystem, geography, type and severity of pressures etc
- Not yet ‘mainstream’

WATER MANAGEMENT: HYBRID / COMBINED

e.g. constructed wetland creation / forest restoration plus small reservoir construction

Advantages

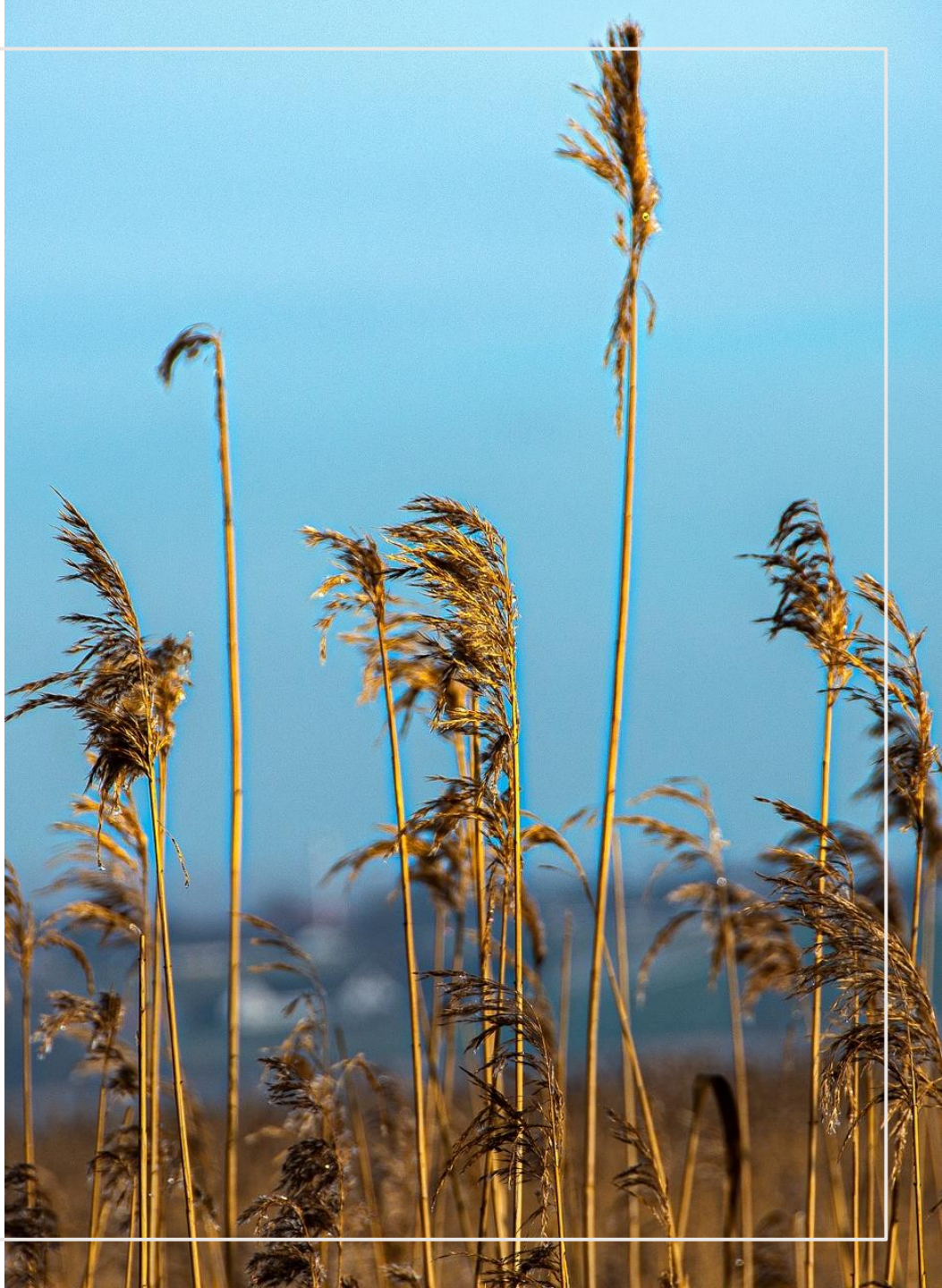
- Potential for multiple benefits
- Enhances the effectiveness of and/or the reduces requirement for grey infrastructure
- Can be used where NbS alone cannot address key challenge(s)



WATER MANAGEMENT: HYBRID / COMBINED

Disadvantages

- Relatively ‘new’ approach
- Potentially complex, particularly when conducted across ecosystems or jurisdictions
- Some (particularly hybrid) approaches are untested



USE CASE 1: ECOSYSTEM RESTORATION FOR MINE SPOIL RECLAMATION

- **Challenge**: Contaminated post-mining landscape may degrade ground water, soil and biodiversity
- **Solution**: Restore the ecological integrity of post-mining landscapes through re-vegetation
- **Benefits**: Habitat creation, erosion control, carbon sequestration, water and soil protection
- **Actors involved**: Mining company, regulatory bodies and authorities, environmental consultancies

Source: CSIR - National Environmental Engineering Research Institute

USE CASE 2: ECOLOGICAL ENGINEERING FOR FLOOD RESILIENCE

- **Challenge**: Populated areas are increasingly under pressure from flooding events
- **Solution**: Implementation of natural catchment measures and floodplain storage
- **Benefits**: Natural habitat protection, community greenspaces, landscape beautification, carbon sequestration
- **Actors involved**: Environmental agencies, local and national park authorities, universities, local communities

Source: Institution of Civil Engineers (2016)

USE CASE 3: ECOSYSTEM-BASED ADAPTATION FOR COASTAL PROTECTION

- **Challenge**: Coastal communities and business operations are threatened by flooding and erosion caused by storm surges
- **Solution**: Restoration and sustainable use of mangroves which protect the coastline
- **Benefits**: Habitat provision, increased fish stocks, carbon sequestration
- **Actors involved**: Local communities, businesses, NGOs, donor agencies, experts, government

Source: Marine Conservation Institute (2018)

MANGROVES AS NATURAL COASTAL BARRIERS

MENTI-QUIZ

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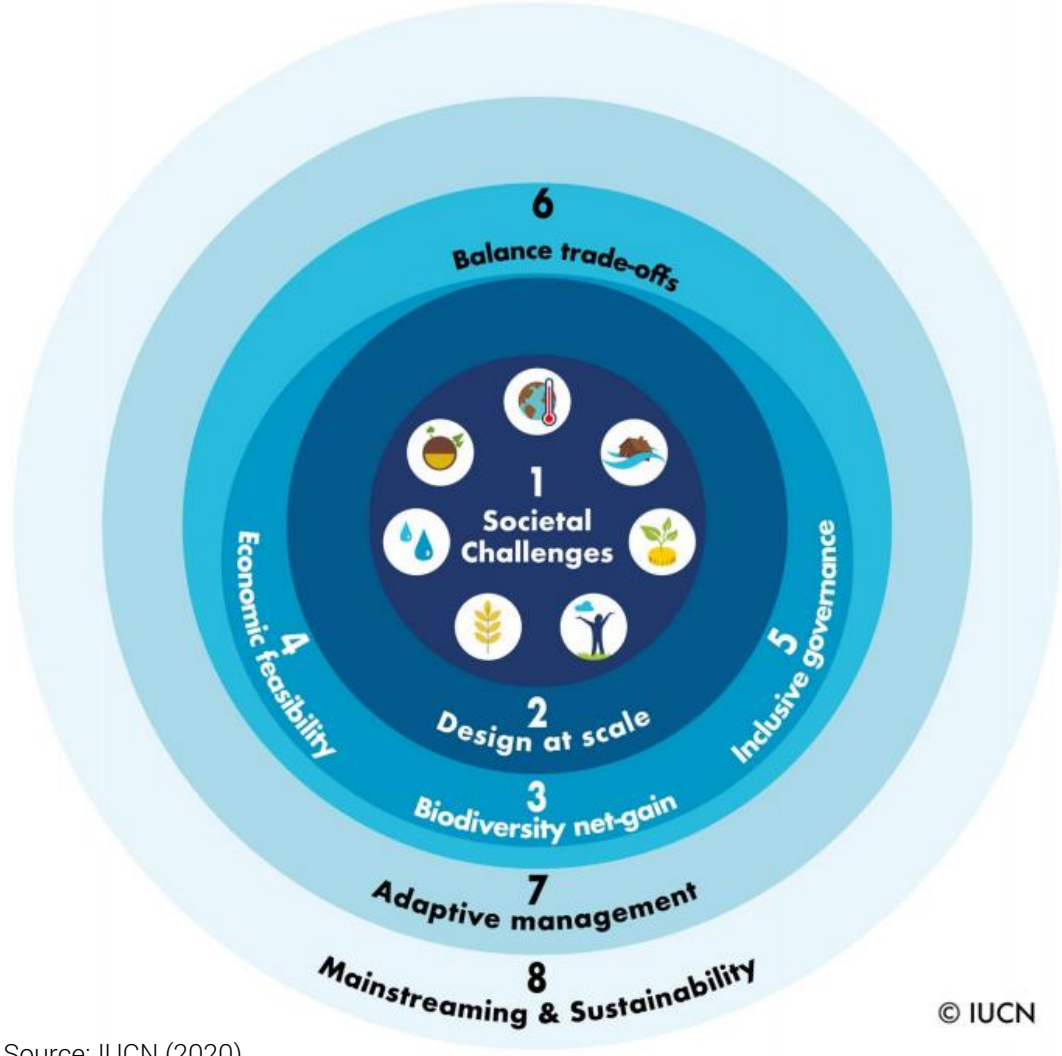
Planning Nature-based Solutions

CONSIDERATIONS FOR IMPLEMENTING EFFECTIVE NBS

- Multiple options
- Uncertainty
- Long-term
- Stakeholder buy-in
- Safeguards
- Addressing pressures

IUCN GLOBAL STANDARD FOR NBS



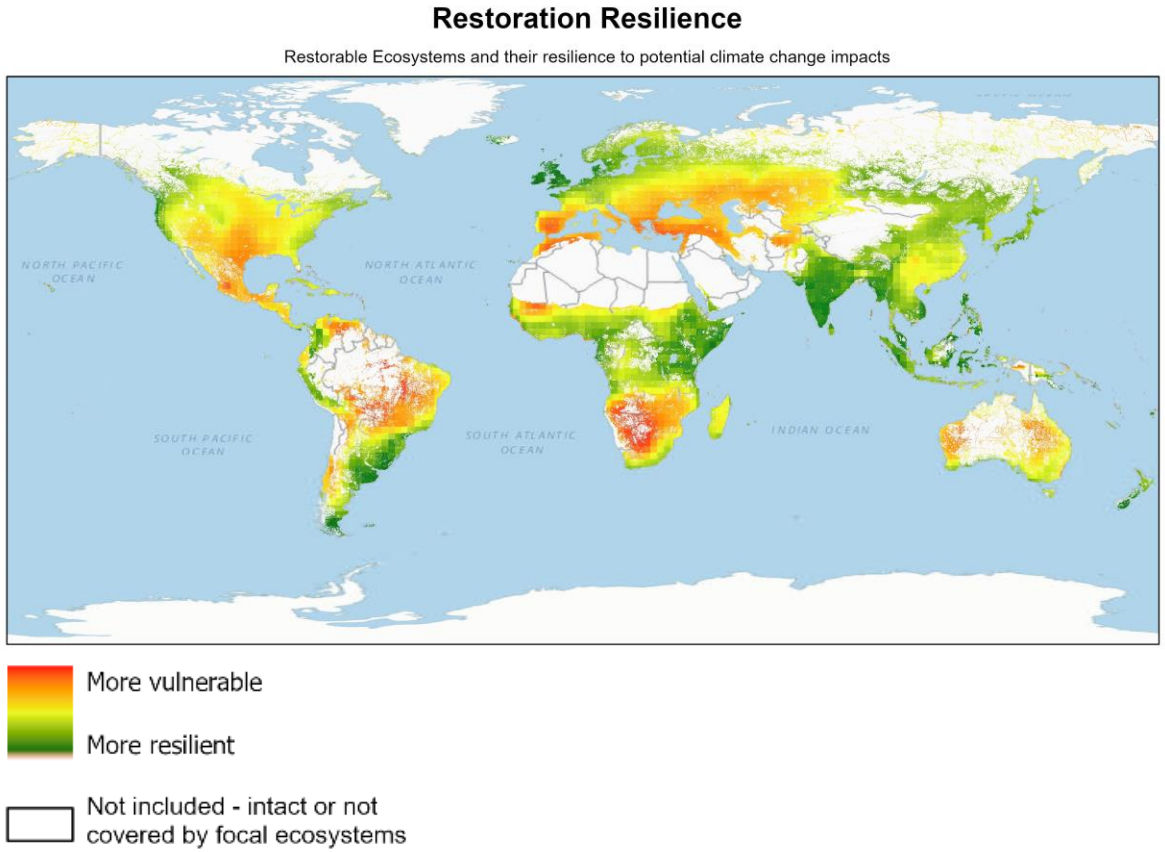
Source: IUCN (2020)

ENGAGEMENT

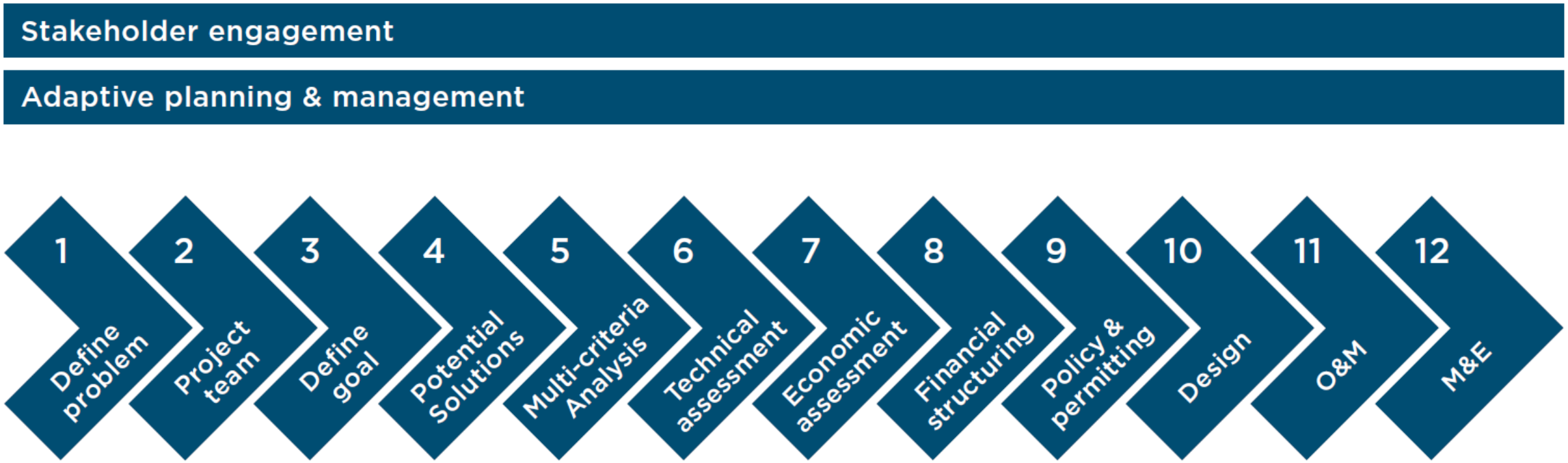
- Robust Environmental and Social safeguards (e.g. IUCN Standard, REDD+, ESG)
- Early, meaningful and ongoing consultation
- Challenges identified and prioritised by stakeholders
- Effectively address challenges, using adaptive management where needed
- Good governance

SCREENING AND EARLY PLANNING FOR NBS

- Stakeholder engagement
- Identify, understand and target benefits
- Screen for suitable sites to support NbS objectives and long-term success
- Consider potential synergies and trade offs



PLANNING FOR IMPLEMENTATION

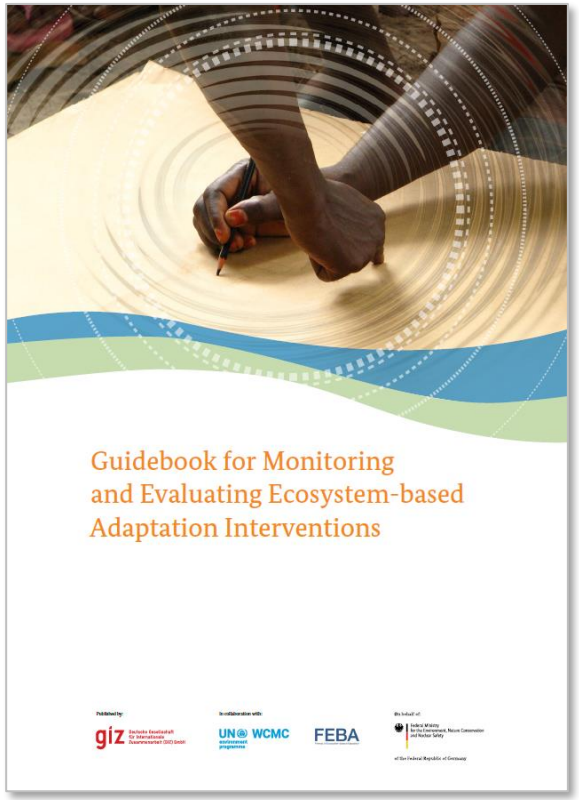


Source: IDB 2020

MONITORING AND EVALUATION

Four steps to keep in mind when designing and rolling out an M&E process for NbS:

1. Developing a results framework
2. Defining indicators and setting a baseline
3. Operationalising the monitoring and evaluation system
4. Using and communicating the results



DEFINING INDICATORS, BASELINES AND TARGETS

- Focus on outcome and impact indicators that represent key aspects of the system the NbS is set in
- Link indicators to the results framework
- Indicators need to be context-appropriate – there are no commonly accepted “best” impact indicators yet

RESOURCES & GUIDANCE

Nature-based Solutions

- IUCN Global Standard for Nature-based Solutions
- Increasing Infrastructure Resilience with Nature-Based Solutions: a 12-step technical guidance document for project developers
- Strategies for Operationalizing Nature-Based Solutions in the Private Sector
- Nature-based Solutions Handbook
- Decision-making in a nature positive world
- Nature Based Solutions For Climate Change Mitigation

RESOURCES & GUIDANCE

Ecosystem-based Adaptation (EbA)

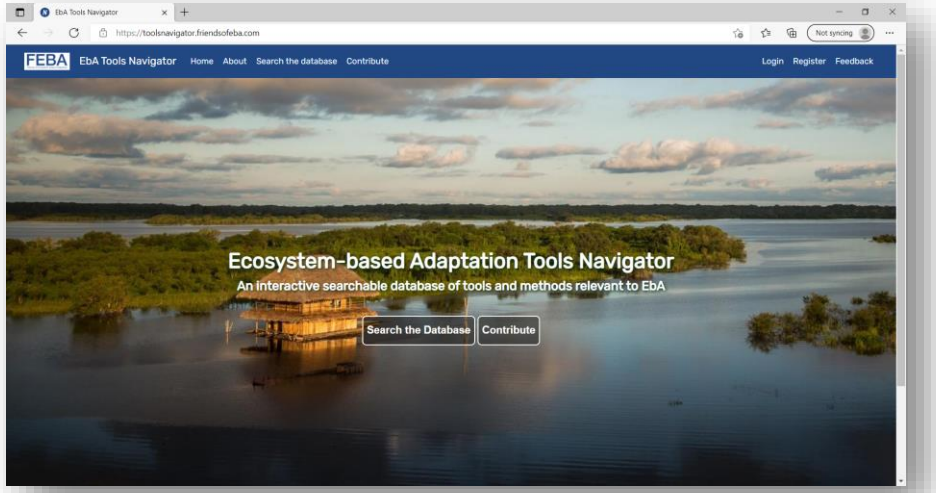
- Ecosystem-based Adaptation Tools Navigator: searchable database of EbA-relevant tools
- Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions
- Adapt now: a global call for leadership on climate resilience

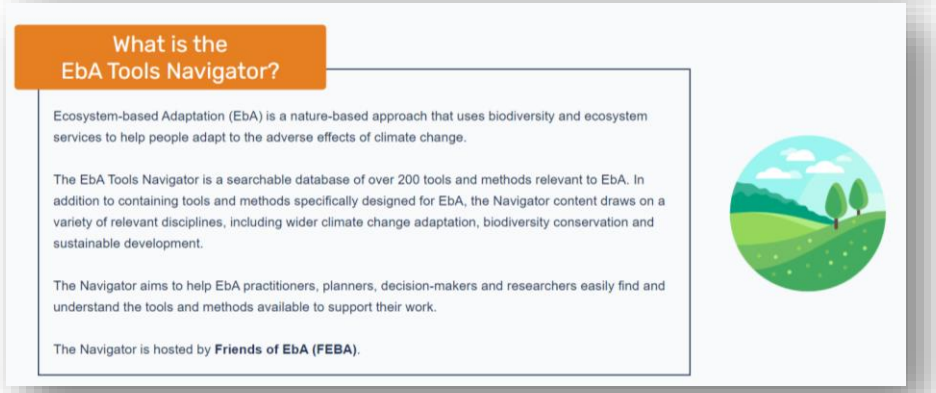
Green / Gray Infrastructure

- Practical guide to implementing green/ grey infrastructure

ECOSYSTEM-BASED ADAPTATION TOOLS NAVIGATOR

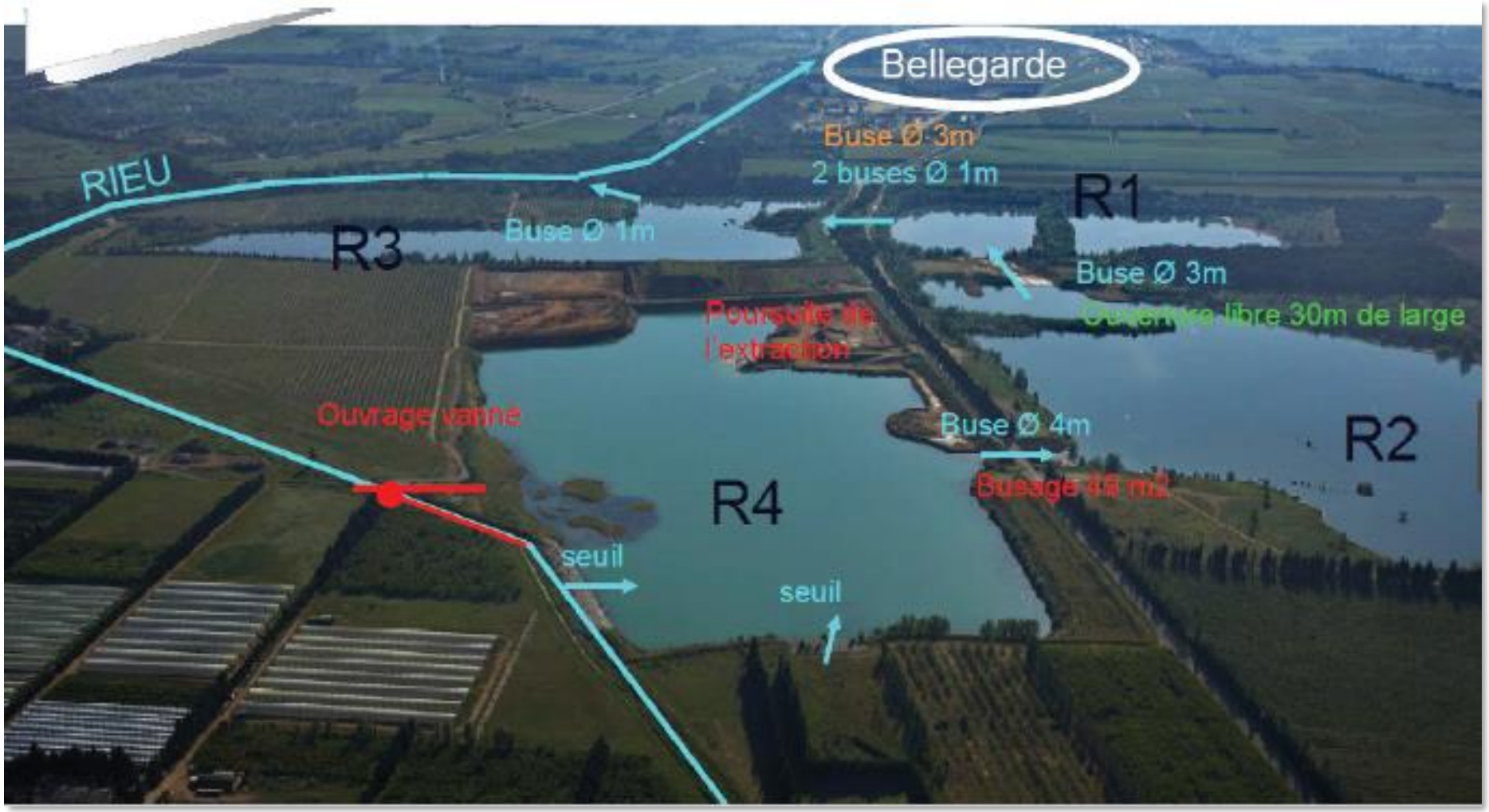
- Searchable database of over 280 EbA-relevant tools and methods
- Find and understand available tools and methods that support one or multiple stages of EbA from *Planning* to *M&E* and *Mainstreaming*
- Additional information such as *resources, time, skills and training required, accessibility, target audience, etc.*



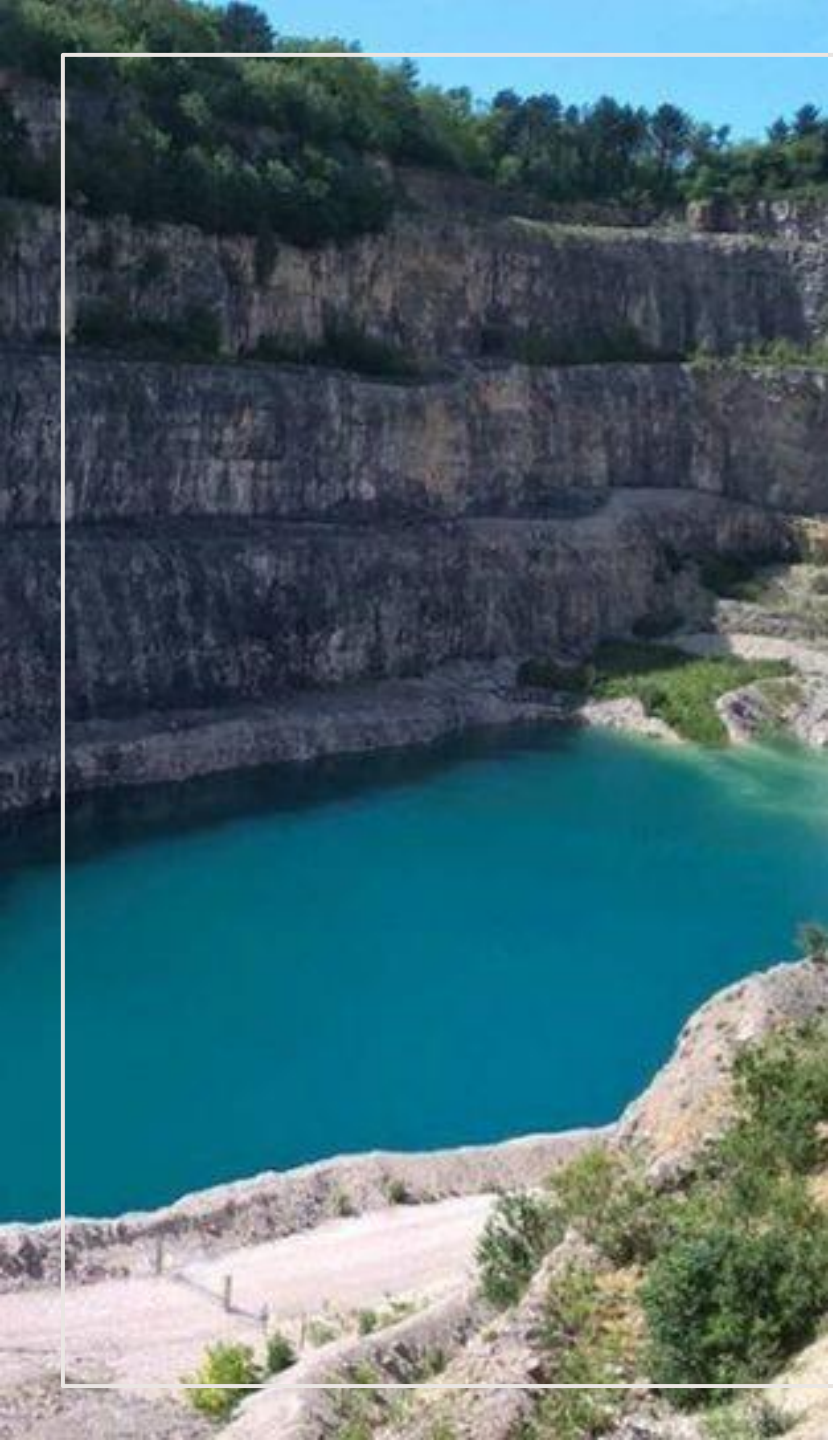


Case studies

QUARRY BROWNFIELD SITE, BELLEGARDE/ FRANCE



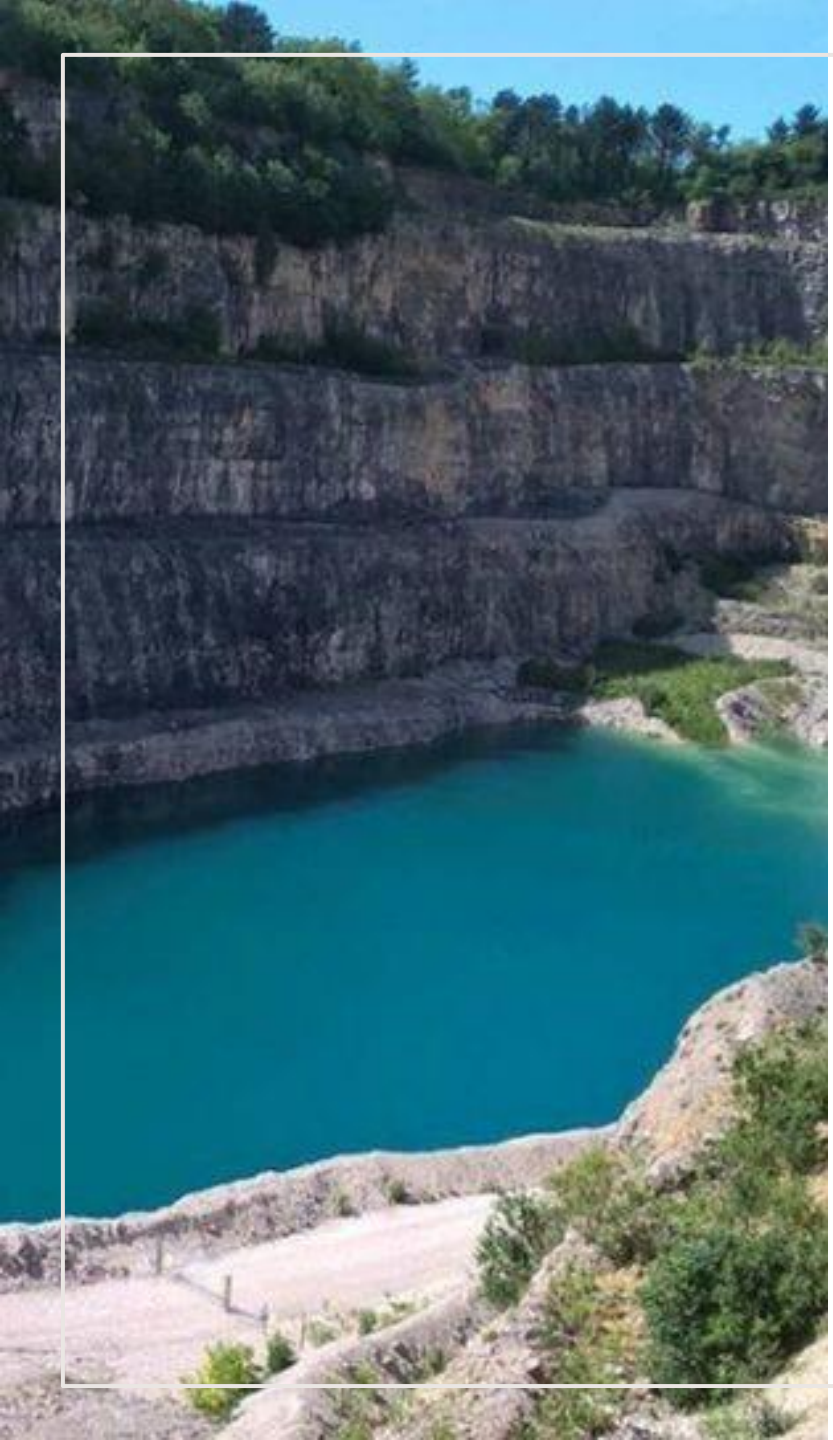
Source: WBCSD (2015) Natural Infrastructure Case Study: Water management and flood prevention in France.



CHALLENGE AND ACTIONS TAKEN

Challenge: Seasonal flooding of sites and adjacent communities (disruption of operations and safety risks)

Actions: Expand flood prevention infrastructure through quarry rehabilitation and creation of wetlands



OUTCOME AND BENEFITS

Outcome: Reduced flood risk to operations and local communities

Benefits: Habitat creation for a variety of species, regulating Ecosystem Services (such as water purification)

MEUSE RIVER / THE NETHERLANDS

CHALLENGE AND ACTIONS TAKEN

Challenge: Flooding and associated risks to communities and infrastructure, biodiversity loss

Actions: Reprofiled the river bed, restored habitats along the river bank and beyond

OUTCOME AND BENEFITS

Outcome: Hydromorphological processes restored, increased flood security (severely tested in 2021), increase in biodiversity and ecosystem health

Benefits: Sustainable tourism, local economics (and potentially others e.g. drought management?)

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