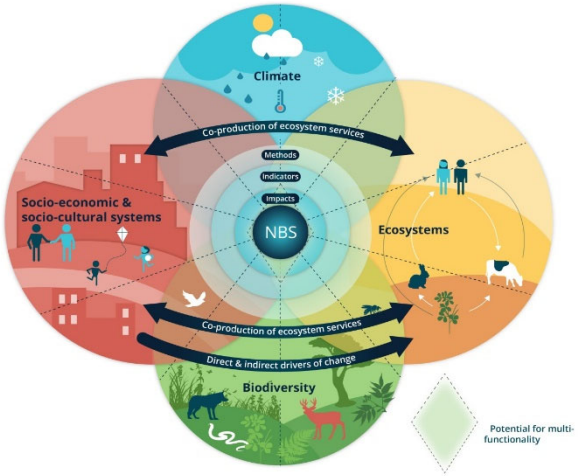

The co-benefits and (social) costs of nature-based solutions

Landscape architecture & Research: "*Landscape & the Sustainable Development Oxymoron*

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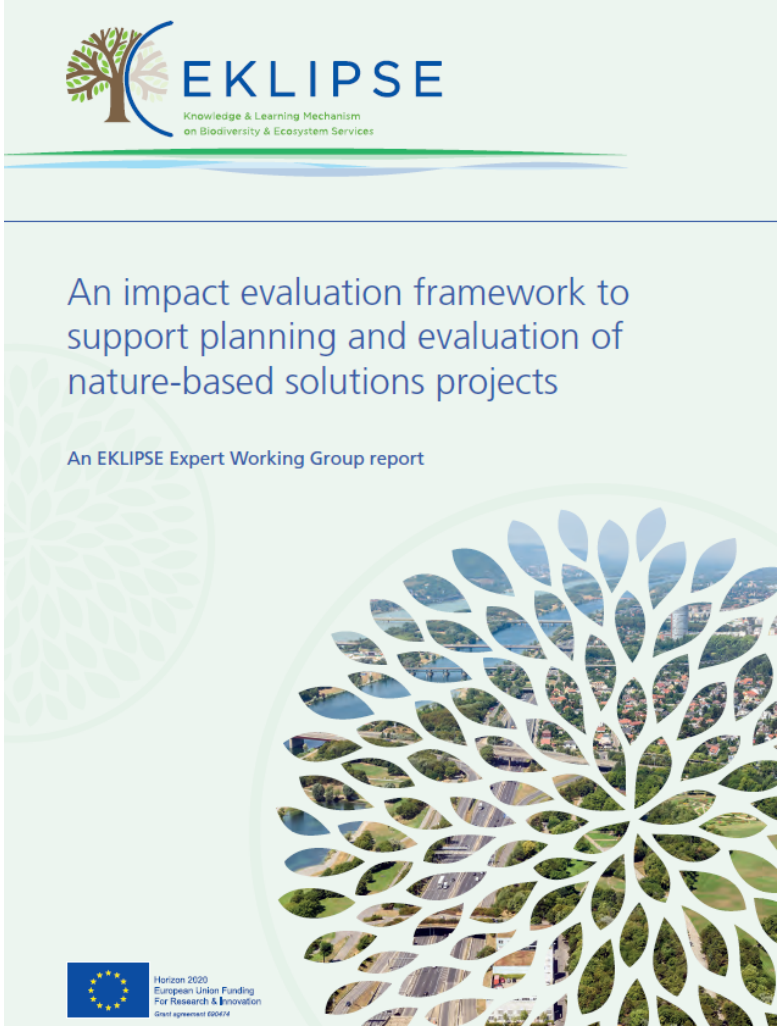
Overview

- What are nature-based solutions?
- How do you begin to assess their impact?
- What are some of the challenges associated with assessment and implementation?
- How do we begin to overcome them?

CO-AUTHORS OF THE FRAMEWORK



Co-chairs: Carlo Calfapietra, Niki Frantzeskaki and myself

Members: Pam Berry, Margaretha Breil, Mihai R. Nita, Nadja Kabisch , Mark de Bel, Vera Enzi, Niki Frantzeskaki, Davide Geneletti, Marco Cardinaletti, Leor Lovinger, Corina Basnou, Ana Monteiro, Holger Robrecht, Gregorio Sgrigna, Laura Munari

BACKGROUND TO FRAMEWORK

NATURE-BASED SOLUTIONS

Solutions that are **inspired and supported by nature**, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience (European Commission, 2016).

Emphasis on:

- Locally adapted, resource-efficient and systemic interventions (European Commission, 2016)

- Provision of benefits for human well-being and biodiversity (IUCN., 2016).

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REQUEST OBJECTIVES (REFINED)

OBJECTIVE 1 To develop an impact evaluation framework with a list of criteria for assessing NBS' performance in dealing with challenges related to climate resilience in urban areas

OBJECTIVE 2 To prepare an application guide for measuring how NBS projects fare against the identified indicators in delivering multiple (environmental, economic and societal) or co-benefits

OBJECTIVE 3 To make recommendations to improve assessment of the effectiveness of NBS projects, including the identification of knowledge gaps according to the criteria presented in the impact evaluation framework

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AUDIENCE AND INTENTION

AUDIENCE

- Current and future European projects with an interest in nature-based solutions in urban areas
- Practitioners seeking to compare the effectiveness of NBS design, implementation and evaluation.

SCOPE

- Framework reflects a quick scoping review of the literature. It is by no means comprehensive.

CONTEXT

- The type and intensity of NBS impacts may vary according to the characteristics of the NBS and the context in which they are applied/implemented.

REVIEW PROTOCOL

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METHODS – QUICK SCOPING REVIEW

Agreed on 10 challenge areas

- Climate mitigation and adaptation
- Water management
- Coastal resilience
- Green space management (including enhancing/conserving urban biodiversity)
- Air/ambient quality
- Urban regeneration
- Participatory planning and governance
- Social justice and social cohesion
- Public health and well-being
- Potential for new economic opportunities and green jobs

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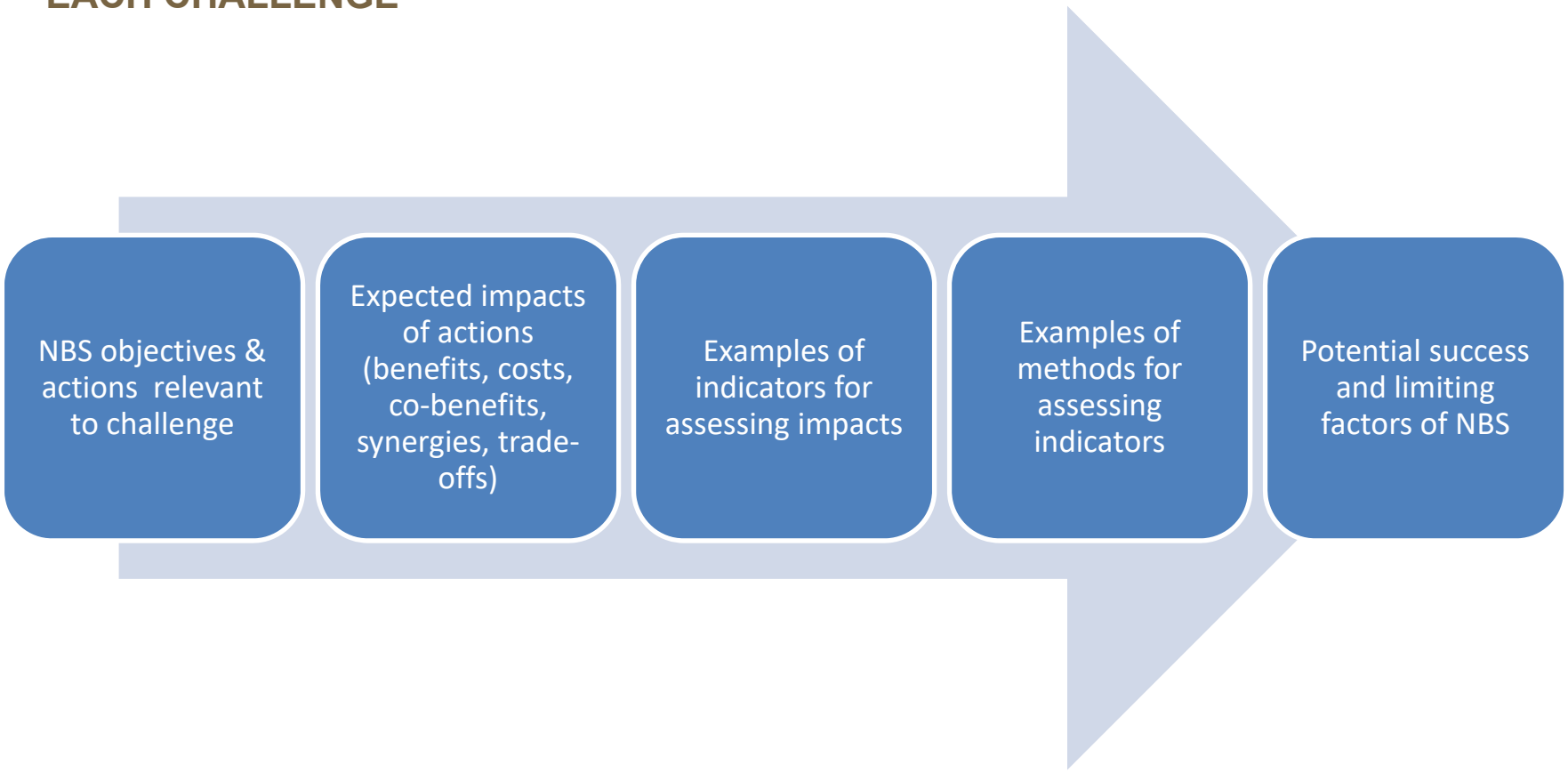
METHODS – QUICK SCOPING REVIEW

AGREED ON CRITERIA TO BE USED TO REVIEW LITERATURE RELEVANT TO EACH CHALLENGE



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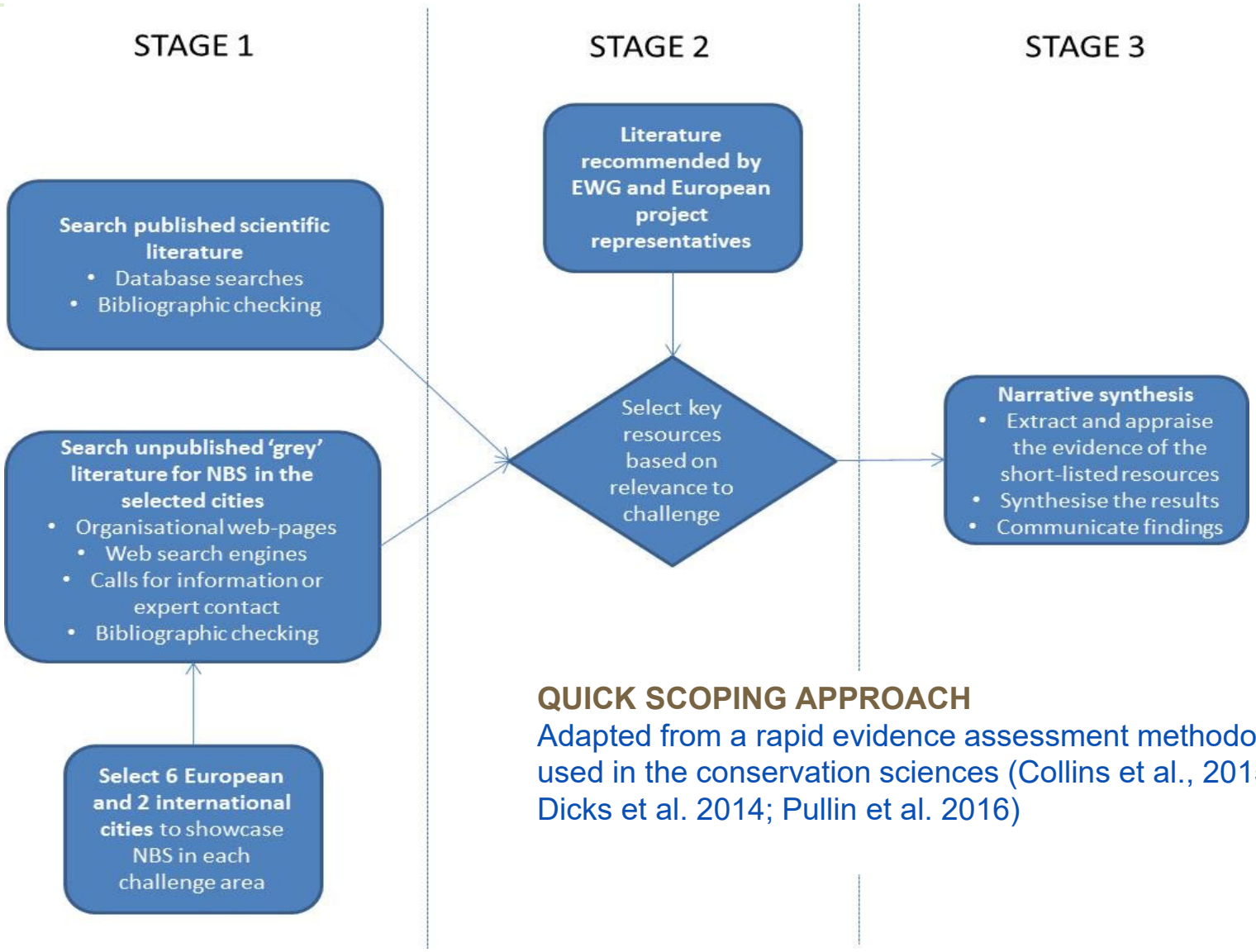
METHODS – QUICK SCOPING REVIEW



QUICK SCOPING APPROACH

Adapted from a rapid evidence assessment methodology used in the conservation sciences (Collins et al., 2015; Dicks et al. 2014; Pullin et al. 2016)

METHODS – QUICK SCOPING REVIEW

NUMBER OF RELEVANT DOCUMENTS RETRIEVED USING KEYWORD SEARCHES (STAGE 1)

* Relevance – challenge keywords AND one of the additional attributes presented in the search strategy – see protocol document

- 320 peer-reviewed, 1223 grey literature
- All peer-reviewed read to at least abstract level
- Grey-literature further screened based on titles, 10% read to at least summary level

NUMBER OF DOCUMENTS RECOMMENDED (STAGE 2)

- 247 unique documents, 90% peer-reviewed
- All read to at least abstract or summary level

IMPACT ASSESSMENT FRAMEWORK

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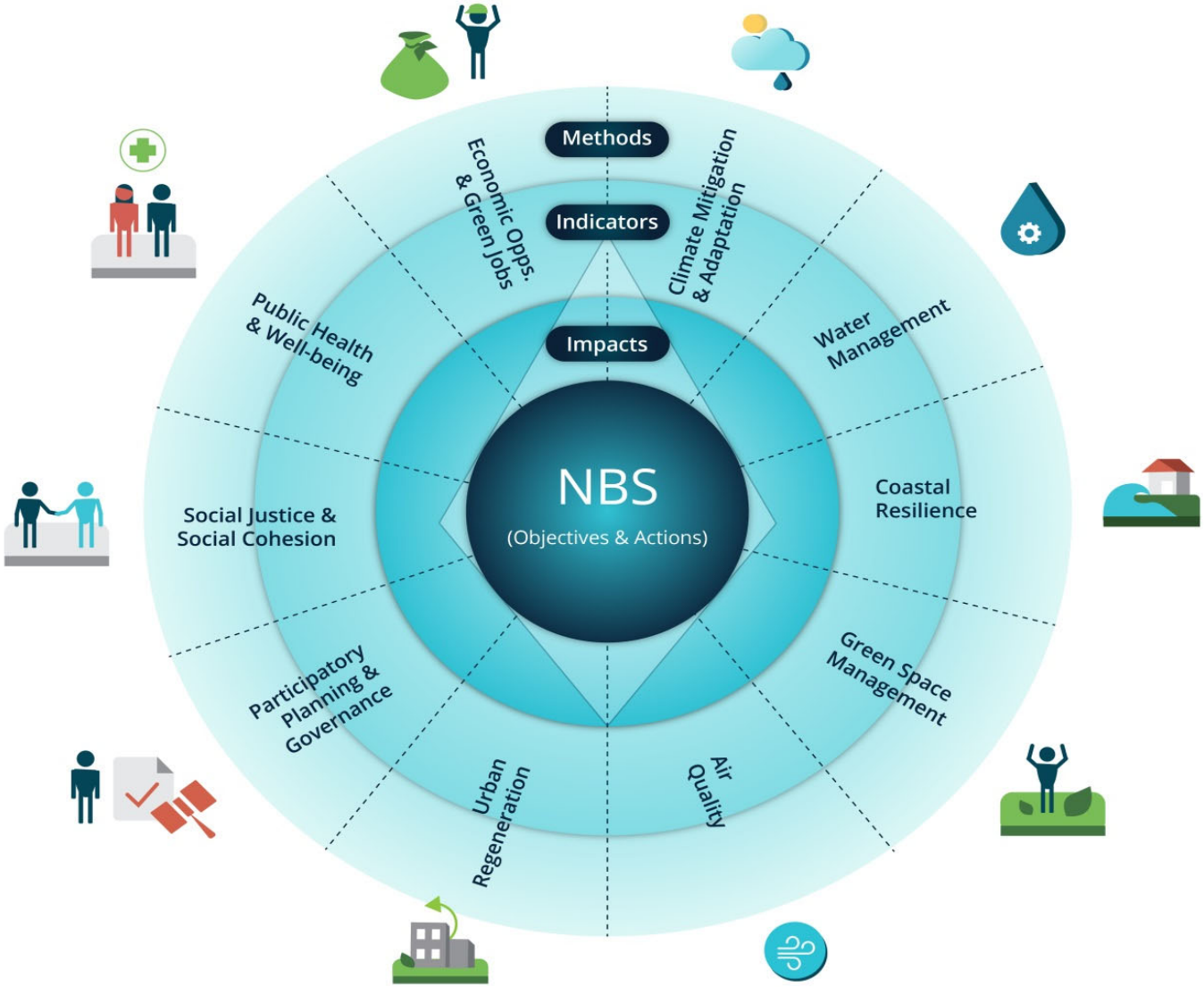
IMPACT ASSESSMENT FRAMEWORK



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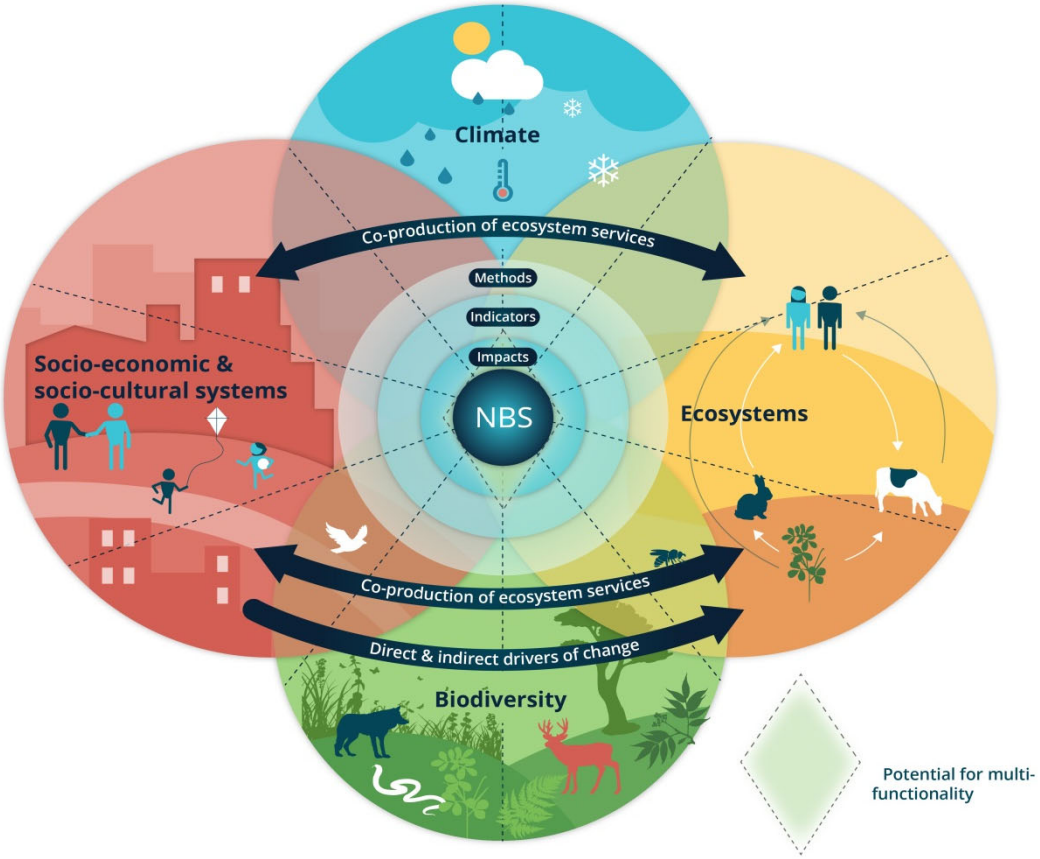
IMPACT ASSESSMENT FRAMEWORK



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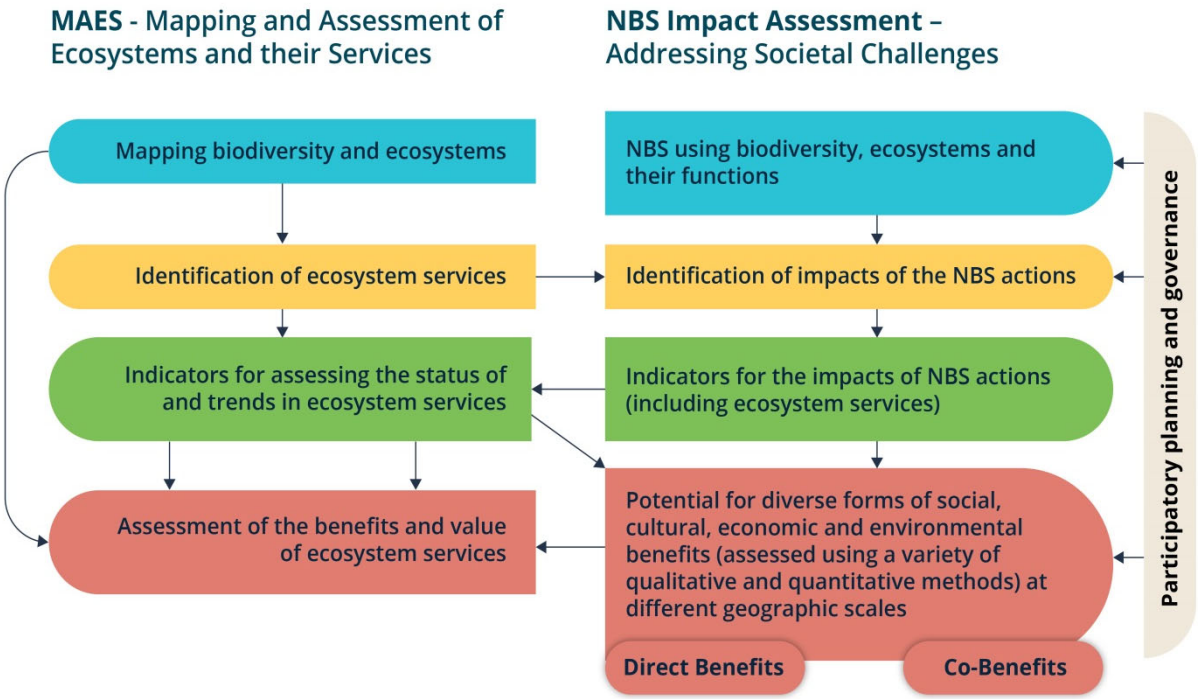
RELATIONS BETWEEN NBS FRAMEWORK AND MAES (2013)



Challenge area	Example of indicators	Type of indicator	Unit of measurement
	Net carbon sequestration by urban forests (including GHG emissions from maintenance activities)	Environmental (chemical)	t C per ha/year
	Economic benefit of reduction of stormwater to be treated in public sewerage system	Economic (monetary)	Cost of sewerage treatment by volume (€/m^3)
	Area remaining for erosion protection	Environmental (physical)	km^2 or m^2
	Species richness of indigenous vegetation	Environmental (physical)	A count, magnitude or intensity score of indigenous species per unit area
	Annual amount of pollutants captured by vegetation	Environmental (chemical)	t pollutant per ha /year
	Index of ecological connectivity (integral index of connectivity	Environmental (physical)	Probability that two dispersers randomly located in a landscape can reach each other
	Quality of the participatory or governance processes	Social (process)	Perceived level of trust, legitimacy, transparency and accountability of process
	Accessibility to public green space	Social (justice)	% of people living within a given distance from accessible, public green space
	Level of involvement in frequent physical activity in urban green spaces	Social (physiological)	Number and % of people being physically active (min. 30 min 3 times per week) in urban green spaces
	Net additional jobs in the green sector enabled by NBS projects	Economic (productivity)	New jobs/specific green sector/year

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EXAMPLE: COASTAL RESILIENCE

Examples of indicators	Measurement scale				
	Regional	Metropolitan	Urban	Street	Building
Physical indicators (Fagherazzi, 2014; Gedan et al., 2011; Grabowski et al., 2012; Stark et al., 2016).					
Shoreline characteristics and erosion protection	●	●			
Soil, temperature, drainage			●		
Flooding characteristics	●	●			
Economic indicators (Gedan et al., 2011; Narayan et al., 2016; Shuster and Doerr, 2015).					
Avoided damage costs			●	●	●
Changes in property value				●	●
Social and education indicators (Piwowarczyk et al., 2013; Schuster & Doerr, 2015).					

But there are (social) challenges…

4 Theses

- Haase, A (2017) The Contribution of Nature-Based Solutions to Socially Inclusive Urban Development– Some Reflections from a Social-environmental Perspective

Thesis 1

- *Nature-based solutions are not inherently socially inclusive or just. Under certain conditions, they might even work as triggers for segregation and displacement or be employed as deliberate strategies for selective upgrading.*

Gentrification

- Urban greening projects can set off rounds of gentrification, dramatically altering housing opportunities and the commercial/retail infrastructure that supports lower income communities
  - By simultaneously making older and typically low-income and/or industrial areas of existing cities more liveable and attractive,

- Wolch et al. (2014) Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. Landscape and Urban Planning.

Fig. 3. Green space retrofits, Hangzhou, China.

Example: Lene-Voigt-Park, Leipzig

- Built in 2005
- Main aim of this park creation was to offer more green space for the dense housing area and to create playgrounds for kids
- New residents moved there and housing vacancies started to decrease. Among the new residents, therewere more young families with kids and higher incomes. As a consequence, rents started to rise from 4.5 Euro per sqm in 2000 to almost 7 Euro per sqm as of today.

- Haase, D et al. (2017) Greening cities: To be socially inclusive? About the alleged paradox of society and ecology in cities. Habitat International

Thesis 2

- *In order to meet the ambition of combined effects of NBS, existing trade-offs between ecological 'solutions' and their social environment, embedding and impacts have to be seriously examined and discussed.*

Challenge	Indicators										
	Carbon sequestration		+	O	+	+	+	O	O	O	
	Flood peak reduction			+	+		O	O	O	+	+
	Daily mean temperature or daily temp. variation				+		O	O	O		+
	Accessibility to public green space		O			+	O	O	+	+	+
	Amount of pollutants captured by vegetation		+		+			O	O	+/-	+
	Ecological connectivity		O		+			O	O	+	+
	Quality of the participatory or governance processes			+	+	+				O	O
	Being able to move freely and safely from place to place				+		O	O		O	O
	Number and amount of people being physically active				O		O	O	O		O
	Net additional jobs				+				+	+	

Thesis 3

- *Nature-based solutions do not sufficiently address political and social power structures and embeddings*

Political ecology

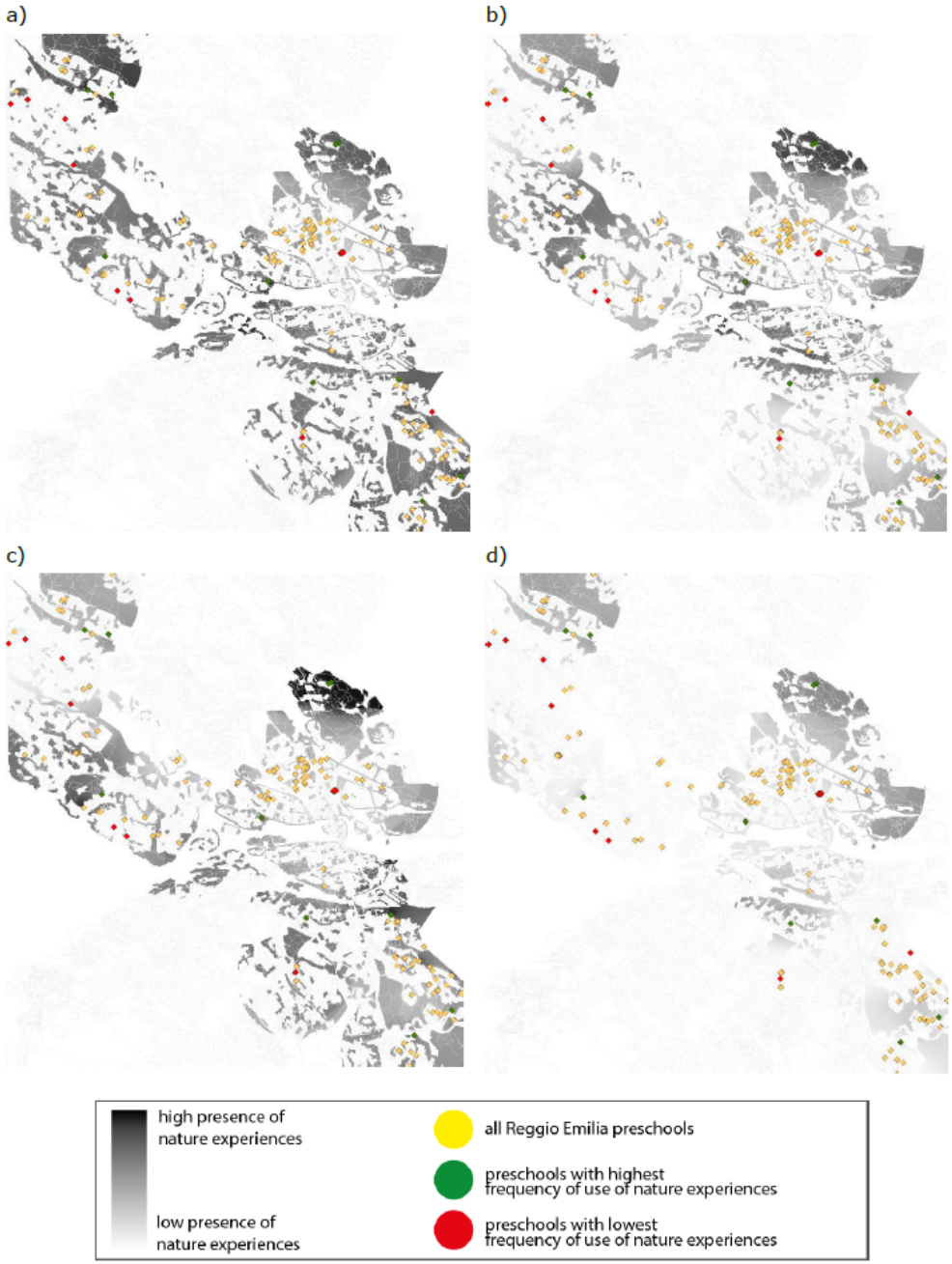
- Unequal distribution of (access to) urban green space/areas, between classes, ethnic/cultural minorities, and different socio-economic groups

Filka Sekulova & Isabelle Anguelovski (2017) The Governance and Politics of Nature-Based Solutions. NATURVATION

Thesis 4

The concept of nature-based solutions so far do not consider socio-spatial differences as well as different levels of in- and exclusion of people in cities, different everyday life routines as well as differing needs and wants of a heterogeneous and diversifying urban society.

Figure 1. Distribution of nature experiences of a) recreation, b) natural beauty, c) wilderness, and d) rurality from preschools in Stockholm.



Nature routines

Attitudinal Affinity with the Biosphere

Select image and motivate:

"Where do/don't you like to play?" "Why?"

"Where do/don't you feel free to play?" "Why?"

"Where do/don't you feel safe to play?" "Why?"

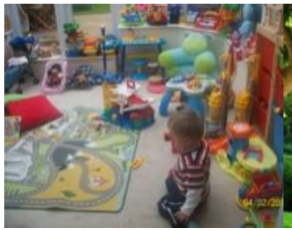
Recreation area

Videogames

Playground

Farm

Toys



Green area

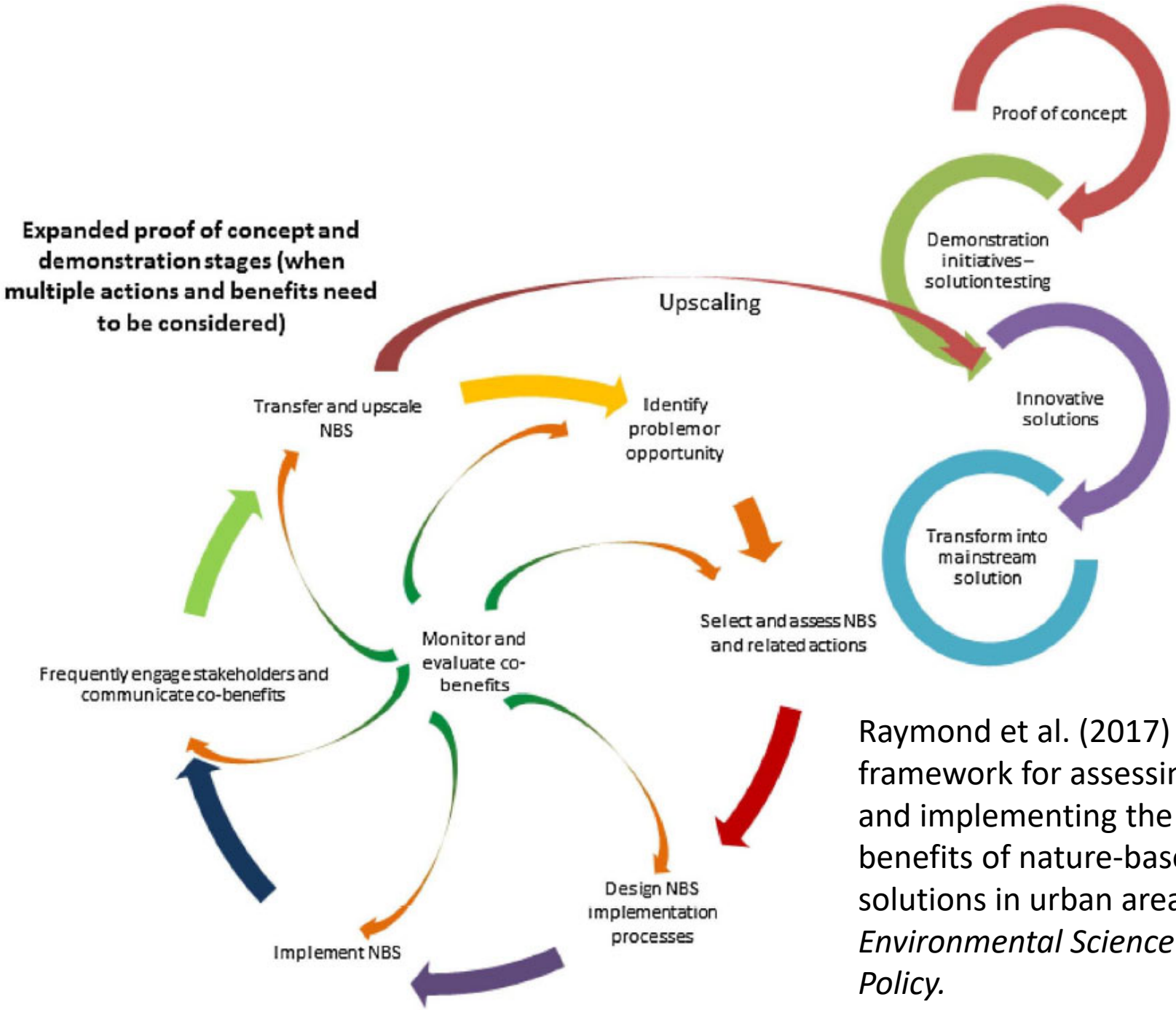
Outdoor street

Forest

Giusti et al. (2014) Nature Routines and Affinity with the Biosphere: A Case Study of Preschool Children in Stockholm. *Children, Youth and Environments*

How do we begin to address such challenges?

Group exercise



Raymond et al. (2017) A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science and Policy.*

1. Identify problem or an opportunity

- What are the identified needs and challenge areas to be addressed in the project and which criteria will be employed to understand problem dynamics?
- What NBS are proposed to address these problems? Which alternative grey solutions are at stake?

2. Select and assess NBS and related actions

- How are the objectives of the plan identified?
- How are the actions relevant to NBS identified?

3. Design NBS implementation processes

- How are processes established for the engagement of multidisciplinary teams?

4. Implement NBS

- How are the actions relevant to the NBS implemented?
- How are NBS implemented alongside grey solutions?
- How are the negative perceptions of some stakeholders managed?

5. Frequently engage stakeholders and communicate co-benefits

- How are different types of stakeholders engaged in the project, and what forms of communication are used?

6. Transfer and upscale NBS

- Why upscale NBS and how can it be done?
- What are the characteristics of NBS that are more prominent or promising for up-scaling?

(all) Monitor and evaluate co-benefits across all stages

- What is the aim of monitoring and evaluation?
- What standard indicators and methods are used to measure and monitor the direct and co-benefits of the NBS actions?

Thank You!

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- EKLIPSE Knowledge Coordination Body
- External reviewers of the protocol
- Internal reviewers of the report (existing European projects)
- External reviews of near final report

REPORT NEXT STEPS

- Successful NBS projects (2016) have agreed to use framework as a starting point for their project design