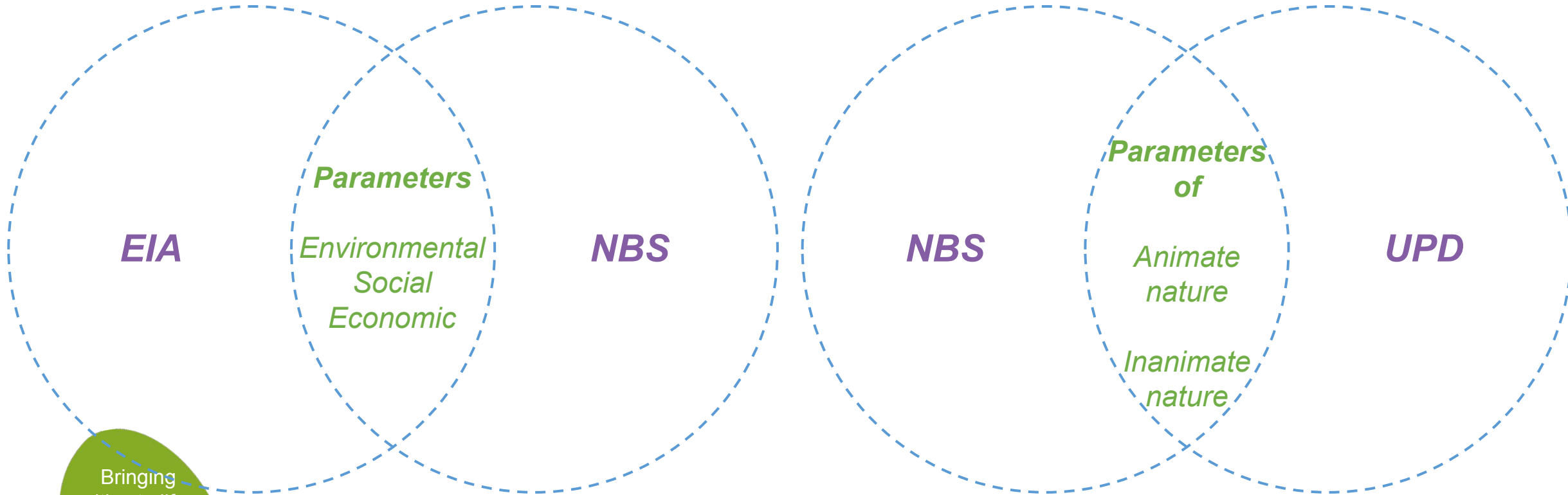




Connecting
Nature

Delivering NBS impact through Urban Spatial Planning

A key relations



Bringing cities to life,
Bringing life into cities.

Dr. Barbara Goličnik Marušič



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Connecting
Nature

Delivering NBS impact through Urban Spatial Planning

A key starting-point

- It is important to note that nature is made up of both living and non-living things: animate and inanimate nature

Physical world processes are also parts of nature, for example geological processes, matter and energy processes. In that sense, properties of the location such as natural ventilation by wind blow, local materials use, including closeness of their resources such as natural stone, wood etc., or shading because of steepness of the location, orientation of existing or planned built structure on it, can be very well addressed by the NBS or potentials for applying NBS in the planning processes as well as in actual implementations.

This is a base for developing and understanding NBS within the parameters of spatial planning going beyond green infrastructure and addressing also urban morphology, built structure patterns, buildings orientation etc..

Bringing
cities to life,
Bringing life
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Roles and abilities of natural processes

THE ROLES OF NATURAL PROCESSES IN NBS

1. Those, that use natural processes
2. Those, that use and mimic natural processes
3. Those, that mimic natural processes.

&

THE ABILITY OF NATURAL PROCESSES TO DELIVER RESULTS TO ADDRESS CHALLENGES SUCH AS

1. greenhouse gases & temperature reduction
2. urban water cycle management
3. noise reduction
4. air quality improvement

Bringing cities to life,
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SOME KEY OBSERVATIONS

NBS		SOCIETAL CHALLENGES											
		Climate change adaptation and mitigation						Environmental improvement					
		GHG AND TEMPERATURE REDUCTION			URBAN WATER CYCLE MANAGEMENT			NOISE	AIR QUALITY IMPROVEMENT				
		result/effect of the natural process											
		carbon sink	shading / cooling	less heat emitted	evapotranspiration	surface runoff reduction	peak runoff reduction	water retention	water cleaning	noise containment	particles deposition	filtration of pollutants	oxygen production
Elements using natural processes	natural terrain with high vegetation	X	X	X	X	X		X		X	X	X	X
	natural terrain with low vegetation	X	X	X	X	X		X			X	X	X
	retention pond	X			X	X	X	X					X
	pond			X	X		X						X
Elements using and mimic natural processes	swale	X			X			X	X		X		X
	green roofs*	X		X	X	X		X			X	X	X
	vertical green*	X	X	X	X					X	X	X	X
	detention pond					X	X	X					
	constructed wetland	X			X			X	X		X		X
	planting pit system					X							
	underground water storage**					X	X	X					
Elements mimic natural processes	physical structure of the built environment		X	X						X	X		
	rainwater harvesting **					X		X					
	pervious pavement					X							
	sinkholes					X		X					
	underground water storage**					X	X	X					
selection of natural materials/ sources		X	X					X	X	X			

- Solutions addressing challenges related to air quality and temperature are mainly available in the NBS group, which uses the natural components and processes of space.
- NBS addressing the challenges of the urban water cycle are much more evenly spread from those solutions that directly use natural processes to hybrid and those that mimic nature.
- NBS with high vegetation in natural/rough terrain are the most versatile, addressing or improving the widest range of problems/challenges.



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Delivering NBS impact through Urban Spatial Planning

SOME KEY MESSAGES

NBS		SOCIETAL CHALLENGES											
		Climate change adaptation and mitigation						Environmental improvement					
		GHG AND TEMPERATURE REDUCTION			URBAN WATER CYCLE MANAGEMENT			NOISE		AIR QUALITY IMPROVEMENT			
		result/effect of the natural process											
		carbon sink	shading / cooling	less heat emitted	evapotranspiration	surface runoff reduction	peak runoff reduction	water retention	water cleaning	noise containment	particles deposition	filtration of pollutants	oxygen production
Elements using natural processes	natural terrain with high vegetation	X	X	X	X	X		X		X	X	X	X
	natural terrain with low vegetation	X	X	X	X	X		X			X	X	X
	retention pond	X			X	X	X						X
	pond			X	X		X						X
Elements using and mimic natural processes	swale	X			X			X	X		X		X
	green roofs*	X		X	X	X		X			X	X	X
	vertical green*	X	X	X	X					X	X	X	X
	detention pond					X	X	X					
	constructed wetland	X			X			X	X		X		X
	planting pit system					X							
	underground water storage**					X	X	X					
Elements mimic natural processes	physical structure of the built environment		X	X						X	X		
	rainwater harvesting **					X		X					
	pervious pavement					X							
	sinkholes					X		X					
	underground water storage**					X	X	X					
	selection of natural materials/ sources		X	X				X	X	X			

- Some solutions adequately address several problems or constraints in urban environments at the same time.
- This suggests that the NBS should be understood as a system for improving the quality of life in cities rather than as a set of individual solutions pursued in isolation.
- NBS are a system that can provide the infrastructure to improve the quality of life.

Therefore, in addition to defining what problem NBS are solving, it is also necessary to define what conditions the site should meet for implementing these NBS, what resources are needed for the operation of the NBS, and how to provide them.



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SOME KEY OBSERVATIONS

- the NBS that directly use natural processes (e. g. natural terrain with high vegetation, which in urban areas is most often associated with a park), especially in dense urban tissue, are generally more difficult to implement due to space constraints.
- The solutions that may be more appropriate in such situations may therefore come from a set of solutions that mimic nature.
- The largest number of NBS of any type and these to address the full range of challenges can be accommodated by the areas of mixed spatial characters.

NBS		SOCIETAL CHALLENGES											Urban patterns			
		Climate change adaptation and mitigation							Environmental improvement				a. a densely built-up historic urban tissue	b. a densely built-up urban tissue	c. a relatively compact urban pattern	d. an open, low-dense urban pattern
		GHG AND TEMPERATURE REDUCTION			URBAN WATER CYCLE MANAGEMENT				NOISE	AIR QUALITY IMPROVEMENT						
		carbon sink	shading / cooling	less heat emitted	evapotranspiration	surface runoff reduction	peak runoff reduction	water retention		water cleaning	noise containment	Particles deposition	filtration of pollutants	oxygen production		
		result/effect of the natural process														
Elements using natural processes	natural terrain with high vegetation	X	X	X	X	X		X		X	X	X		X	X	X
	natural terrain with low vegetation	X	X	X	X	X		X		X	X	X		X	X	X
	retention pond	X			X	X	X	X				X			X	
	pond			X	X		X					X			X	
	swale	X			X			X	X		X	X		X	X	X
Elements using and mimic natural processes	green roofs *	X		X	X	X		X		X	X	X		X	X	X
	vertical green*	X	X	X	X				X	X	X	X	X	X	X	X
	detention pond					X	X	X						X	X	X
	constructed wetland	X			X			X	X		X	X			X	X
	planting pit system					X								X	X	X
	underground water storage **					X	X	X						X	X	X
Elements mimic natural processes	physical structure of the built environment		X	X					X	X				X	X	X
	rainwater harvesting**					X		X						X	X	X
	pervious pavement					X								X	X	X
	sinkholes					X		X						X	X	X
	underground water storage **					X	X	X						X	X	X
selection of natural materials/ sources		X	X				X	X	X				X	X	X	

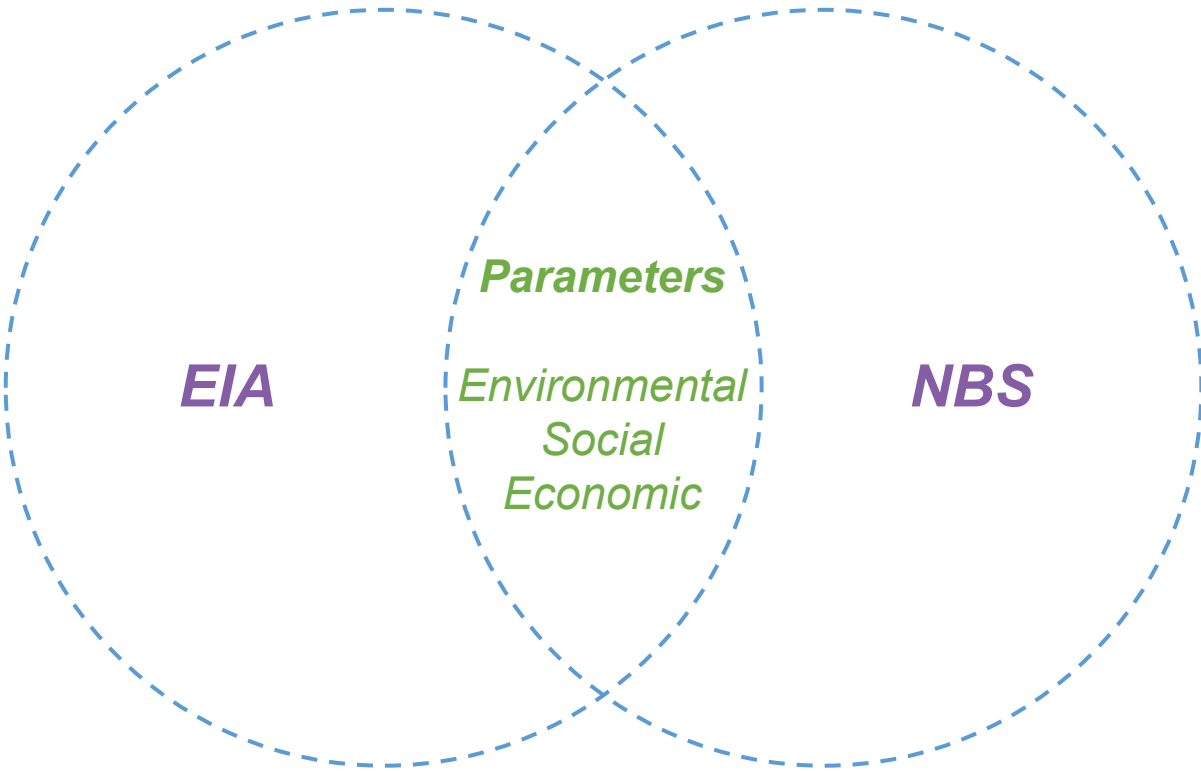


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Key messages



To pay greater attention to NBS impact areas and discover them, eg. the area of influence of the solution; the impact range of the resource for the solution to still be sustainable.

- To see NBS as a system, going beyond single interventions, and connecting solutions of different kinds to solve specific issue/challenge.
- Necessity to obtain a good knowledge about the mutual effects of different NBS or the multifaceted effects of individual NBS.
- To understand suitability of NBS for a certain type of urban agglomeration and/or characteristics of locations within it, the conditions of the NBS implementation are necessary to be considered and understood also as a key parameter or a criterion of impact assessment.





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Thank you!

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