



Clean Planet
Happy People
Shared Prosperity
Emerging Concepts

SBE19 **SUSTAINABLE BUILT ENVIRONMENT**

Helsinki, Finland May 22–24, 2019

Making sustainability resilient: the role of green
infrastructure and nature base solutions

Erik Andersson

Are you involved in making green solutions happen?

- A. Yes, I'm actively involved in planning and managing green infrastructure
- B. No, I primarily work with the built environment
- C. Maybe, I work with open space and urban quality in general
- D. No, I am only a user

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A COMPLEX WORLD

Constant slow and fast changes
that inhibit or amplify each other

U N C E R T A I N T Y



Emergent properties ($1+1=3$)
Cross-scale interactions

Uncertainty requires an ADAPTIVE APPROACH

ANTICIPATE

PLAN FOR

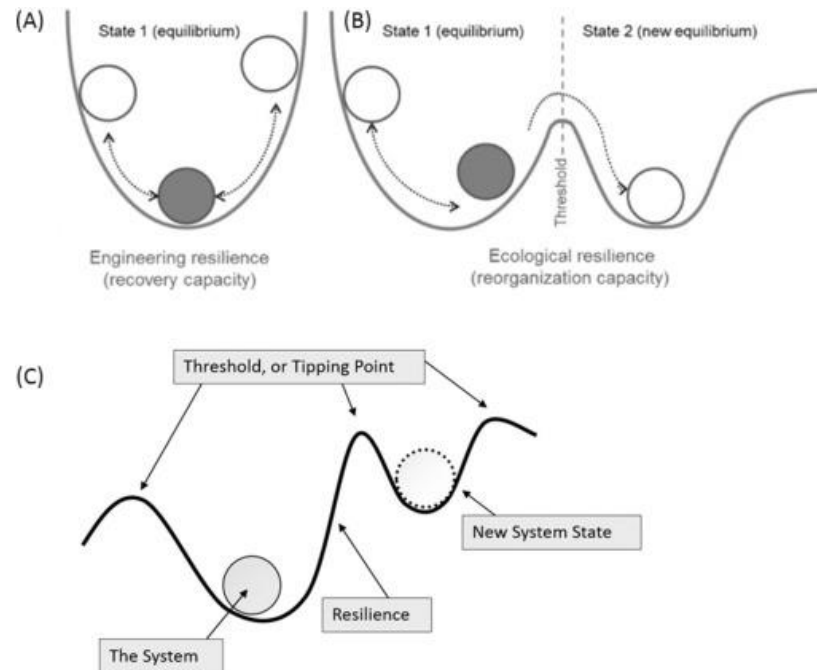
ACT UPON

LEARN FROM

CHANGE



Resilience



The capacity of a system to absorb disturbance, reorganize and maintain essentially the same functions over time.

This capacity stems from the character, diversity, redundancies and interactions among and between the components involved in generating different functions.

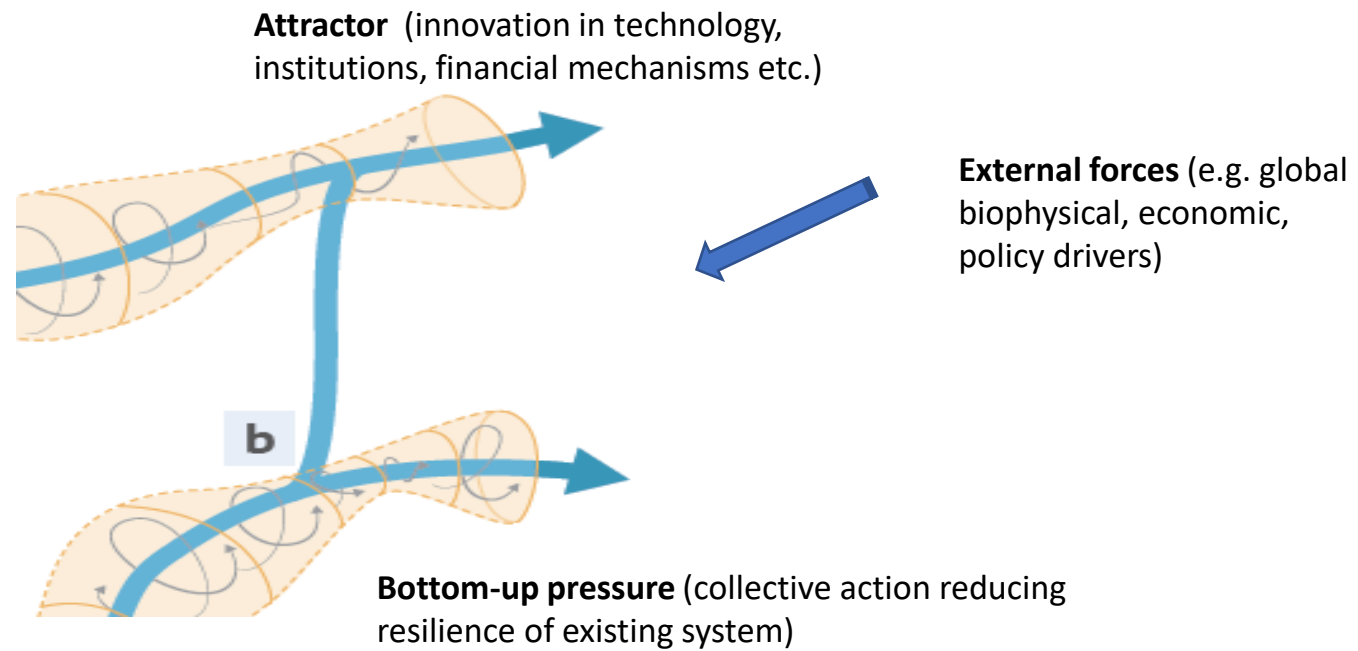
Sustainability

“Sustainable development is *development* that meets the needs of the present without compromising the ability of future generations to meet their own needs”

- the concept of 'needs,' in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

From the Brundtland report 1987, my emphasis

Abrupt transformation



Elmqvist et al (2019)

Resilient cities?

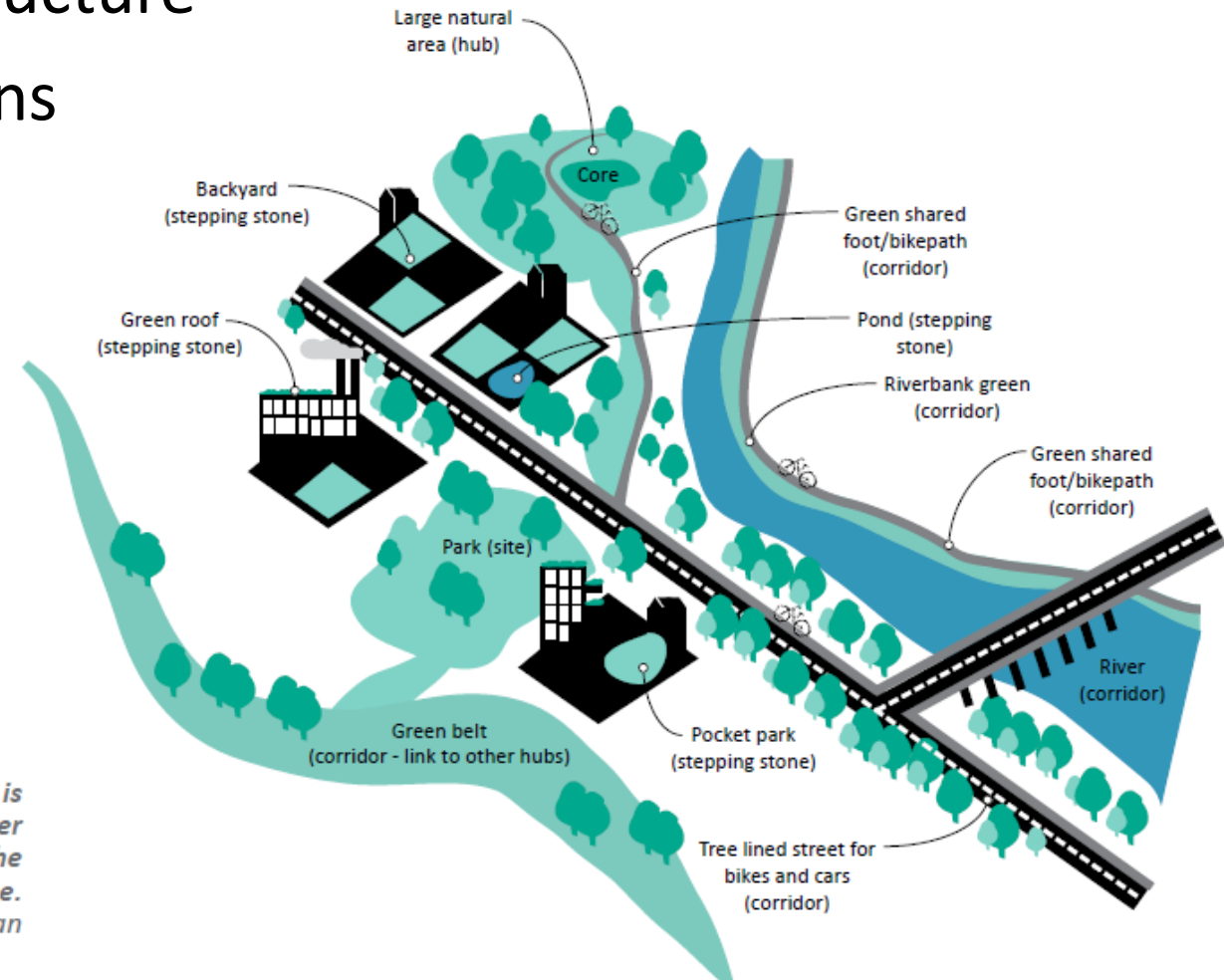
- Resilience of what, what is it we want to be resilient?
 - The built infrastructures
 - Tangible and intangible qualities of life
 - Decent places to live
- Manage disturbance and navigate change
- Urban green infrastructure
- Ecosystem or nature based solutions

Social-ecological systems

- Nature is the basis, but not a 'solution'
- Linkages just as important as the components
- Feedback mechanisms
- Management of natural resources
- Resilience of and through ecosystem services
 - Extreme weather
 - Alternative food sources

Green infrastructure

- Planning approach and physical structure
- Ecosystem or nature based solutions
 - Ecosystem services
 - Multifunctionality
 - Inexpensive (?)
- What we want:



*An urban green infrastructure network is made up of many elements that together facilitate movement through the city landscape.
Design: Eleanor Chapman*

Four challenges

- Adapting to climate change
- Protecting biodiversity
- Promoting a green economy
- Increasing social cohesion

How and when can green infrastructure help?



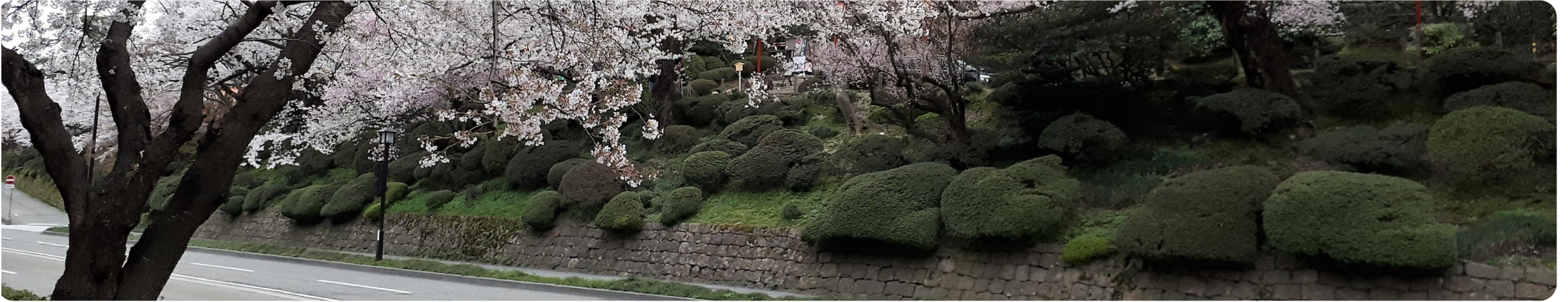
Flooding

- Coastal protection
- Infiltration
- Retention



Local climate

- Shading
- Evapotranspiration
- Insulation



Health and wellbeing

- Environmental quality – air, water, soil
- Recreational opportunities
- Stress relief

What about our trees?

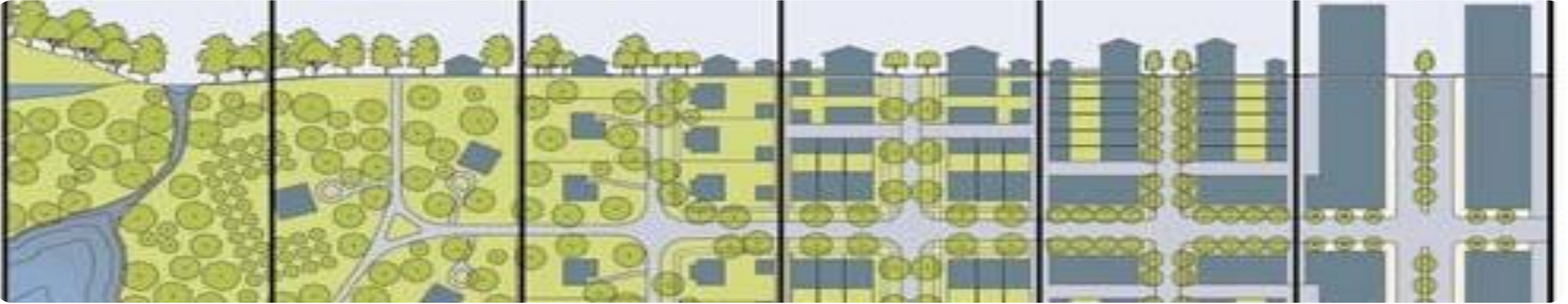
- Trees help regulate local climate
- Trees are also sensitive to drought
- What happened last summer in Europe?



Source: <https://gunnison-tree.com/tell-tree-dead-just-needs-water/>

Principles to help you think

- Infrastructures
 - Green-grey integration
 - Connectivity
- Institutions
 - Land titles and rights
 - Inclusive decision making
- Perceptions
 - Appraisal
 - Inclusivity

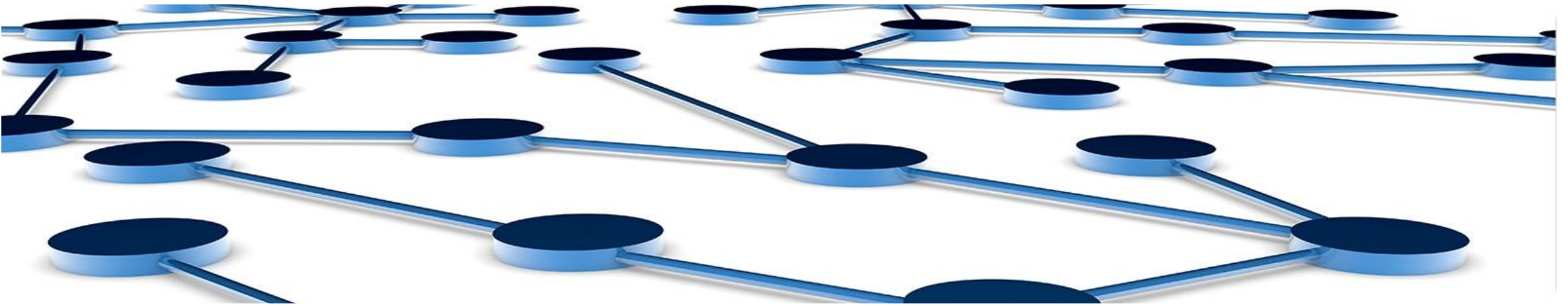


Green-grey integration

- ...aims at physical and functional synergies between urban green space and other kinds of infrastructure.
- ...not only targets primary infrastructural needs, but also seeks to provide wider environmental, social and economic benefits.
- ...is based on sound knowledge from different disciplines and sectors, and on cooperation between them.

Sustainable Drainage Systems (SUDS)

- SUDS use a range of techniques (including both hard, engineered components and soft landscaped features) to manage surface water as close to its source as possible.
- Thought-through combination of different components where the function is dependent both on location in the system and the nature of the other components.
- SUDS combines three objectives:
 - to control the quantity and rate of run-off from a development;
 - to improve the quality of the run-off;
 - to enhance the nature conservation, landscape and amenity value of the site and its surroundings.



Connectivity

- ...is relevant when a function is dependent or at least influenced by exchange and flows between units
- ...involves both structural and functional connections between green spaces, in order to create added value from an interlinked system
- ...matches aims and strategies to different spatial scales – regional, city and local – and ideally is integrated across them.

Increasing connectivity at the city level, Berlin

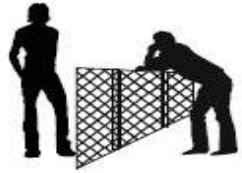
Against a backdrop of rapid population growth, the city-wide Landscape Programme (LaPro) has been an important strategic instrument for promoting social and ecological connectivity in Berlin, Germany.



Four themes

- urban climate
- habitat and species protection
- Recreation
- landscape aesthetics.

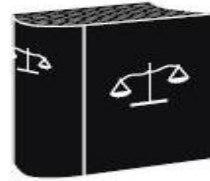
These are supported by the 'General Urban Compensation Plan' (GAK).



Permeable walls



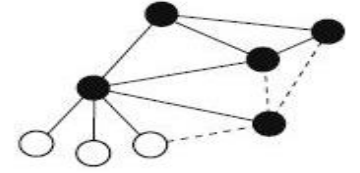
Property boundaries



*Formal institutions:
Laws & regulations*



*Informal institutions:
Local culture & traditions*



Social networks

Institutional design

- ...regulates who may use or access a certain function
- ...decides who can influence the generation of function
- ...influences the type of interaction between user and resource, and its outcomes.



Stalled Spaces, Glasgow - temporary community use of underused space

While waiting for something to happen: The Stalled Spaces project gives communities the opportunity to temporarily use a plot of such land in a way which brings benefit to the community. The community can choose to adapt the plots for uses such as pop-up gardens, urban gyms, play or art spaces.



Inclusion

- ...means being open to different interests
- ...decision making, supporting alternative ways of 'doing things'
- ...plurality as a flexible solution – every individual solution will have trade-offs

PARTICIPATORY BUDGETING, LISBON, PORTUGAL

- Submit your ideas about developing local public spaces! 2.5 million Euros budget to implement the winning proposals
- After the municipal evaluation the plans were presented to the citizens and everyone could take a vote. Winning projects got implemented (e.g. the restoration of Lisbon Botanic Garden).
- Innovations in voting and ranking methods and the outreach techniques used to diversify the kinds of people engaged widened the base of cultural and environmental values incorporated in the successful projects.

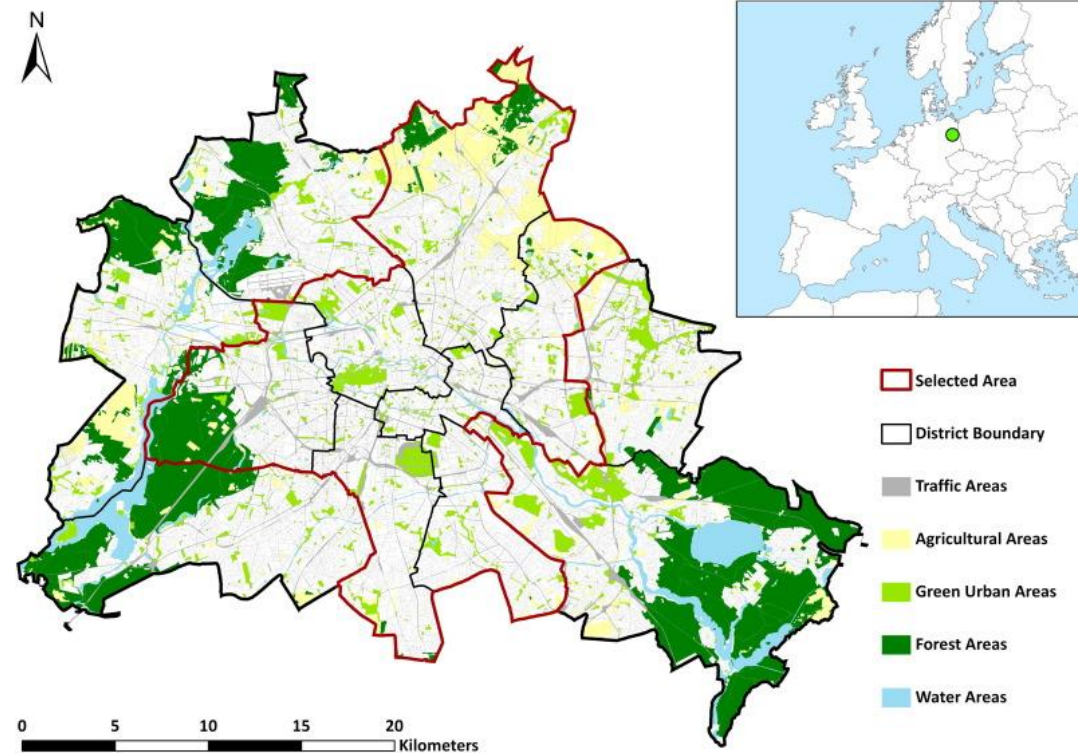


A growing
concern
about justice

- Green gentrification
- Multifunctionality for whom?
- Recognition and support
- Compatibility
- Different needs and abilities

The lay of the land

- Green and blue spaces is unevenly distributed and of uneven quality
- The human habitat
 - Housing, transportation, work, recreation...
- How far are we prepared to travel?
- And which spaces can we use for what?



From Bertram and Rehdanz 2015



Summing up

- Multifunctionality is both the target and the key
- Nature is the base, not in itself necessarily a solution
- Components are situated in space and time
- Need for systemic solutions

Thank you!

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