



Narodowe Centrum
Badań i Rozwoju



UNIwersytet
Warszawski

Lecture 5: Green infrastructure, environmental infrastructure, networking of solutions based on nature in the existing city tissue (various types of space).

Slide 2.

NBS concept

The idea of NBS (solutions based on nature) is considered to be a collective term for other tools that use natural aspects to obtain appropriate benefits for the environment, such as: green infrastructure or environmental infrastructure.

Green infrastructure should be understood as individual components of greenery combined into a network of connections. This network produces a number of ecosystem services. It can include both natural habitats and those of anthropological origin. It should be remembered that networked ecosystems are more efficient and more resistant to changes.¹

Environmental infrastructure - is a concept assigned to specific forms of greenery combined with engineering solutions.

Slide (3-5).

The importance of cross-linking nature-based solutions.

Networking of green areas should be based on the principle of building a distribution network of connections - such networks are more efficient and less likely to break the exchange chains. The network should also not be understood in the context of the so-called flat shot, but rather three-dimensionally. Green areas can be shaped horizontally, vertically, and at different heights.

This is well illustrated by the project prepared by ecoLogicStudio for Tallinn. More about the project at the link: <https://www.ecologicstudio.com/knowledge-room/tallinn-wet-city-conference-challenges-of-landscape-architecture-in-climate-change> and this short video below showing how to create networks of connections using slime molds:

¹Puzdrakiewicz K., 2017, *Zielona infrastruktura jako wielozadaniowe narzędzie zrównoważonego rozwoju*, Studia Miejskie, 27, p. 155 - 174

<https://www.youtube.com/watch?v=qRzRXUTkgP0&t=10s>

Slide 6.

The importance of urban metabolism.

Networking of green areas also allows to improve urban metabolism and close the cycles of changes taking place in it, which allows for building "resilient" cities, coping with disruptions, e.g., resulting from climate change.

Slide 7.

Designing and adapting cities to climate change.

An important element in building the resilience of urban areas is properly implemented spatial planning of cities, in cooperation with a large group of stakeholders.² The approach will be different for the design of undeveloped areas and quite different for built-up areas.

In the case of undeveloped areas, it is important to assess the occurrence of a potential threat in a given area, and thus to build an appropriate infrastructure that protects a given community against the threat. (flood protection, a sufficient amount of green areas, designed where the risk of a catastrophe is high - properly located and designed) - the multifunctionality of the proposed solutions is important, as well as the protection of the existing environmental resources (e.g. by maintaining naturally shaped water courses).

In the case of adaptation of built-up areas, this measure may be implemented as part of the revitalization process. Revitalization concerns brownfield sites in cities that are inhabited by a low-income community.³ (more about the synergy of the revitalization and adaptation process at the link:

https://www.pl/data/include/cms/Sustainable_development_crossing_Czerny_M_Serna_Mendoza_C_A_2021.pdf?v=1636543622916).

Slide (9-10).

²Reducing disaster risk by managing urban land use, 2016, Manila, Asian Development Bank, <https://www.adb.org/sites/default/files/publication/185415/disaster-risk-urban-land.pdf>

³Pourazar E., 2017, Spaces of vulnerability and areas prone to natural disaster and crisis in six SADC countries, Geneva https://publications.iom.int/system/files/pdf/spaces_of_vulnerability.pdf

Stages of the design process.

NBS implementation model on the Citadine website.

The design process is well presented on the example of the project: "Positive project for the climate" : <https://www.asla.org/2020awards/798.html>

Slide (11 - 31)

Implementation of NBS solutions in the existing city structure.

NBS implementation projects are mainly created on two scales (district and facility scale). We use the so-called wastelands of different sizes and morphologies, using stagnant vegetation - which is in line with the principles of sustainable urban development.⁴

Brownfields can be found almost all over the world. It is estimated that 15% of US city spaces are wastelands (degraded, abandoned, and polluted spaces). These are often dangerous areas that are at risk of crime. Revitalization of these areas is mainly aimed at creating "luxury" spaces, which in the long run will be used mainly by better-off residents, which may contribute to social segregation and initiate the process of gentrification.⁵

Types of brownfields used for NBS solutions:

- a) post-industrial areas (slide 11) "Drucianka" in Praga District, Warsaw.
- b) former agricultural lands (slide 12) "The space of former fields in front of Miasteczko Wilanów".
- c) post-sport areas (slide 13) "The area of the former Legia swimming-pools, Warsaw".
- d) areas of degraded parks (slide 14) "Post-parkarea in Powiśle, Warsaw".
- e) unused urban spaces in the central parts of cities (slide 15) - large unused area at Szwoleżerów Street, Warsaw.
- f) degraded areas of central cities (slide 16) "Courtyard in Nowa Praga in Warsaw"
- g) concrete spaces in front of buildings (slide 17 - concrete parking lot in the Łazienki park,

⁴Nature Based Solutions for re-naturing cities: knowledge diffusion and decision support platform through new collaborative models, 2016, https://9e99b973-33ae-43f5-b05a-fbba8e8b1314.filesusr.com/ugd/55d29d_8813db2df690497e80740537b6a8a844.pdf

⁵Charles C. Branas, Eugenia South, Michelle C. Kondo, Bernadette C. Hohl, Philippe Bourgois, Douglas J. Wiebe, and John M. MacDonald, 2018, Citywide cluster randomized trial to restore blighted vacant land and its effects on violence, crime, and fear, PNAS, 115(12), p. 2946-2951

slide 18 - asphalt yard in Wilanów, slide 19 - asphalt space in the park in Warsaw's Powiśle, slide 20 - asphalt yard in the Torwar estate, Warsaw)

h) wasteland at and under bridges, footbridges and viaducts (slide 21, 22, 23 in Warsaw's Powiśle),

i) areas of former playgrounds (slide 24 - remains of a playground - Warsaw),

j) gaps, undeveloped micro-spaces on the example of Warsaw (slide 25, 26),

k) undeveloped spaces along communication routes (slide 27 - 31)

In cities, we also have many other spaces (micro spaces) where single NBS solutions can be implemented, such as: bioswales, retention basins, rain gardens, etc.

The website can testify to the scale of brownfield sites in cities around the world:

<http://wasteland-twinning.net/wasteland-sites>

Slide (31 - 54)

How to implement NBS solutions in existing urban spaces is well illustrated by the following two projects:

The first was prepared for a modernist estate in the Chinese city of Wuhan. More about this project at the link: <https://www.asla.org/2020awards/466.html>

The second of them - a strategy for adapting urban spaces exposed to a disaster related to local floods was prepared for Lumberton - a city in the state of North Carolina in the USA - more about the project at the link: <https://www.asla.org/2020awards/262.html>

Slides

References

Charles C. Branas, Eugenia South, Michelle C. Kondo, Bernadette C. Hohl, Philippe Bourgois, Douglas J. Wiebe, and John M. MacDonald, 2018, Citywide cluster randomized trial to restore blighted vacant land and its effects on violence, crime, and fear, PNAS, 115(12), p. 2946-2951

Nature Based Solutions for re-naturing cities: knowledge diffusion and decision support platform through new collaborative models, 2016, https://9e99b973-33ae-43f5-b05a-fbba8e8b1314.filesusr.com/ugd/55d29d_8813db2df690497e80740537b6a8a844.pdf

Pourazar E., 2017, Spaces of vulnerability and areas prone to natural disaster and crisis in six SADC countries, Geneva https://publications.iom.int/system/files/pdf/spaces_of_vulnerability.pdf

Puzdrakiewicz K., 2017, *Zielona infrastruktura jako wielozadaniowe narzędzie zrównoważonego rozwoju*, Studia Miejskie, 27, p. 155 - 174

Reducing disaster risk by managing urban land use, 2016, Manila, Asian Development Bank, <https://www.adb.org/sites/default/files/publication/185415/disaster-risk-urban-land.pdf>

