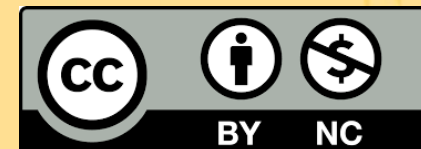


Urban Green Spaces: Enhancing Cities through NBS

Lecture (online)

Trinity College Dublin

Content created in 2024



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“Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience.

Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.”

Why Urban Areas Need NBS

Urban Challenges:

- Heat islands,
- air pollution,
- flooding,
- biodiversity loss.

NBS Contributions:

- Sustainable urban development.
- Improved resilience and quality of life.



*Flooding is a major threat for many EU cities
NBS are being used to alleviate the impacts*

Benefits for Urban Environments

Environmental

- Carbon sequestration,
- flood protection,
- biodiversity enhancement.
- Mitigating climate change impacts.

Economic

- Increased property values near green spaces.
- New job sectors in green infrastructure.

Social

- Reduced stress, improved mental health.
- Social cohesion through shared green spaces.

Local Government & NBS

Public Administration and NBS: Key Responsibilities

- **Policy Development:** Local governments create and enforce policies that promote **nature-based solutions** (e.g., zoning laws, urban planning regulations).
- **Resource Allocation:** Governments allocate funding and resources for the planning, implementation, and maintenance of NBS.
- **Community Engagement:** Encouraging **local participation** and ensuring that the needs of residents are met through **inclusive governance**.

EU's Role in Advancing NBS

- A major driver of NBS innovation is EU funded research projects such as NBS EduWORLD
- EU Research Exemplar Projects:
 - Connecting Nature: Managing urban infrastructure
 - URBAN GreenUP: Greening urban infrastructure.
 - CLEVER Cities: Inclusive and sustainable planning.
 - GrowGreen: Integrating NBS in urban strategies.



EU's Role in Advancing NBS

Key EU and National Policies

- **EU Green Deal:** Emphasizes **climate neutrality** by 2050, with a focus on urban sustainability.
- **European Biodiversity Strategy:** Promotes **green infrastructure** and the restoration of ecosystems.
- **Local Zoning Regulations:** Mandating the integration of **green infrastructure** in urban planning.



Green Roofs and Walls

How Local Communities Can Get Involved in NBS Implementation

- **Engagement through Workshops:** Public workshops, consultations, and participatory processes to design NBS projects.
- **Volunteer Programs:** Encouraging local residents to participate in tree planting, maintenance of public green spaces, and community-based monitoring of NBS projects.
- **Local Partnerships:** Collaboration with **NGOs, businesses, and schools** to implement NBS solutions in urban spaces.

Green Roofs and Walls



GREEN ROOFS AS NATURE BASED SOLUTIONS FOR A BETTER LIFE IN CITIES



Better water management

Green blue infrastructure store up to 100 % of annual rainfall, restoring a natural water-cycle.




Reduced Urban Heat Island Effect

Green roofs provide a better insulation, leading to a decreased energy demand. Temperatures on traditional roofs can be up to 40°C higher compared to the green roof.



Increased energy efficiency of cooling systems

A temperature decrease of 1°C improves the efficiency of air conditioning for up to 2%.



Increased energy output of photovoltaic Solar panels

Energy production can be increased up to 16% by cooling down the surrounding when green roofs are installed under photovoltaic panels.



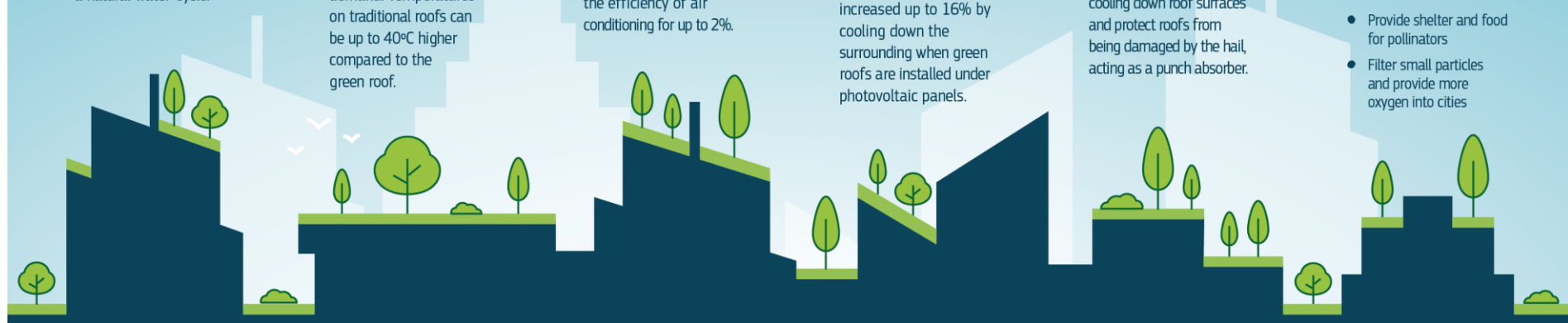
Reduced effects of severe storms

Green Roofs can minimise severe storms effect by cooling down roof surfaces and protect roofs from being damaged by the hail, acting as a punch absorber.



Increased urban biodiversity

- Green roofs
- Create stepstones to invite more biodiversity into the cities
 - Provide shelter and food for pollinators
 - Filter small particles and provide more oxygen into cities



Reference:
World Green Infrastructure Network

Environment

Urban Parks and Public Green Spaces

■ Definition:

- Large open spaces with vegetation designed for recreation, biodiversity, and aesthetic enhancement.

■ Key Benefit:

- Providing community recreational areas and supporting biodiversity.

■ Typical Scale:

- City-wide; can range from small neighbourhood parks to large urban landscapes.
- **Cost:** Approx. €10-50/m² for establishment and maintenance.

■ Example:

- London's Olympic Park transformation.

Urban NBS Example 1

Local Examples for the urban environment

Rain Gardens and SUDS

■ Definition:

- Rain gardens are shallow depressions planted with vegetation that absorb rainwater. Sustainable Drainage Systems (SUDS) manage stormwater sustainably.

■ Key Benefit:

- Reducing urban flooding and improving water quality.

■ Typical Scale:

- Neighborhood-level applications, integrated into urban landscapes.
- **Cost:** Approx. €50-100/m² depending on design.

■ Example:

- Sponge cities and rain gardens in Europe.

Urban Forests and Tree Canopies

■ Definition:

- Networks of trees planted in urban areas to form canopies and improve ecological balance.

■ Key Benefit:

- Cooling urban heat islands and improving air quality.

■ Typical Scale:

- City-wide implementation; significant impacts at block or district levels.
- **Cost:** Approx. €500-1,500/tree including planting and maintenance.

■ Example:

- Urban forestry initiatives in Amsterdam.

Urban NBS Example 3

Local Examples for the urban environment

In-Class Exercise 1:

In-Class Group Exercise: Analysing the fit of a urban examples

- **Objective:** Students will assess the socio-economic benefits of the given examples and **reflect** on a familiar urban setting
- **Tasks:**

Reflect on examples of these NBS in your home

What impact are these having?

Who is responsible for them?

TAKE FIVE

Role of Local Government

Case Study: ReGREEN Project and Local Administration

- The **ReGREEN** project demonstrates how **local governments** work alongside communities to enhance **urban resilience** through **green infrastructure**.
- Local authorities lead in the design and funding of **green spaces**, while community groups are involved in the maintenance and **biodiversity monitoring**.
- **Example: Rome**, with the active participation of local citizens, implemented **green corridors** and **urban parks** to improve air quality and reduce flooding.

Identify a local issue and match the relevant NBS
Find the fit

Integrate NBS Planning in local areas

Step 1:

- **Identify Urban Challenges**
- Understand local urban issues (e.g., flooding, pollution, heat islands).
- **Example:** Cities facing frequent **urban flooding** could benefit from **green roofs** and **rain gardens**.

Step 2:

- **Policy Development and Integration**
- Develop or update urban policies to incorporate **nature-based solutions** in planning and zoning regulations.
- **Example:** Mandate **permeable surfaces** in new developments to manage stormwater.

Step 3:

- **Community Engagement and Collaboration**
- Involve **local communities**, **NGOs**, and **businesses** in the decision-making process.
- **Example:** Use **community workshops** to gather input on desired green spaces.

Step 4:

- **Funding and Resource Allocation**
- Secure funding through **EU grants**, local government budgets, and public-private partnerships.
- **Example:** Apply for **Horizon Europe** or **LIFE Program** funding to support NbS projects.

Step 5:

- **Implement and Monitor**
- Implement NbS, ensuring that they are monitored for effectiveness and maintained properly.
- **Example:** Use **smart technologies** to monitor stormwater systems or green spaces in real time.

Local Government Impact

Case Study: Sustainable Urban Drainage Systems (SUDS) in London

- The **London Borough of Islington** integrated **SUDS** in urban planning to mitigate **flooding** and improve **water quality**.
- **Local Government Role:**
 - Policy changes that mandate **permeable pavements** and **rain gardens**.
 - Active collaboration with **local communities** for ongoing maintenance of green spaces.



In-Class Exercise 2:

TAKE FIVE

Objective: Students will work in groups to design a nature-based solution for a local community or urban area.

• **Instructions:**

- Choose an urban challenge (e.g., stormwater management, heat islands, or pollution).
- Design a **nature-based solution** (e.g., **rain gardens**, **green roofs**, or **swales**) to address the chosen challenge.
- Develop a **step-by-step implementation plan** that includes community engagement, budget considerations, and policy integration.

Scaling NBS

Challenges and Solutions in Implementing NBS at the Local Level

- **Challenges:**
 - **Lack of funding** and resources.
 - **Public resistance** to change or disruption during implementation.
 - **Space constraints** in dense urban areas.
- **Solutions:**
 - **Leveraging EU funding** (e.g., **Horizon Europe**, **LIFE Program**).
 - **Engaging communities** early in the planning process.
 - Implementing **smaller-scale pilot projects** to demonstrate success.

Vision for Nature-Integrated Cities

Trend	Future Focus
Integration of Smart Technologies	Use of smart sensors and IoT to monitor and optimize NBS performance.
Expanding Public-Private Partnerships	Increased collaboration to scale NBS projects through green bonds and EU funding .
NBS as Standard Practice	Make NBS a mandatory requirement in urban planning and zoning regulations.
Climate Change Adaptation & Mitigation	NBS for carbon sequestration , flood resilience , and biodiversity restoration .
Community-Led NBS Implementation	Empower local communities in the design , implementation , and maintenance of NBS.
Enhanced Policy Frameworks	Strengthen policies and incentives to make NBS integral to sustainable cities .

Conclusion

NBS as a Pathway to Sustainable, Resilient Cities

- **Nature-Based Solutions (NBS)** are crucial for creating sustainable, resilient, and healthy urban environments.
- **Local governments** play a pivotal role in enabling the integration of NBS into urban planning, policymaking, and community engagement.
- Collaboration between **governments**, local **community groups**, and **private sectors** is essential for ensuring the success and long-term impact of NBS.



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