



Narodowe Centrum  
Badań i Rozwoju



UNIwersYTET  
WARSAWSKI

## **Lecture 4: Counteracting overheating of cities, improvement of biodiversity in cities through the implementation of solutions based on nature in the existing structure of cities.**

### **The importance of creating a shadow in the city.**

#### **Slide 2**

“Urban tree canopy”

This term refers to the canopy of a tree formed by a mass of leaves and branches. This mass influences the creation of a shadow, and thus reduces the air temperature.

(More about creating on the Citadine website) and <https://www.cwp.org/urban5-tree-canopy/>

#### **Slide 3-5**

How do trees cool the air in cities?

More on the influence of trees on the formation of temperature in cities at the link:

<https://www.climate-service-center.de/imperia/md/content/csc/report24.pdf>

#### **Slide 6-7**

The degree of cover of the surface in the urban space by tree canopy depends on many factors. From the policy of planting trees in cities, the management of given areas, diseases that may cause trees to fall out or specific natural disasters, e.g. strong winds.

Before starting the planning of new tree plantings, it is worth considering how large the area of the canopy created by the trees in a given city should be. For many years it was believed that the optimal area of tree crowns in the city should be about 40%. However, numerous studies show that there is no universal value for the coverage of tree space by tree crowns - it depends on the specificity of a given city or its geographical location. In addition to the diameter of the tree crown, it is also important to properly select tree species (avoid invasive species), as well as their appropriate diversity and age.<sup>1</sup>

More information in the brochure:

[https://www.itreetools.org/documents/175/Sustainable\\_Urban\\_Forest\\_Guide\\_14Nov2016.pdf](https://www.itreetools.org/documents/175/Sustainable_Urban_Forest_Guide_14Nov2016.pdf)

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<sup>1</sup>[www.americanforests.org](http://www.americanforests.org)

In individual cities, we have a different area of coverage of urban spaces by tree crowns. This is very well illustrated by the presentation of several American cities on the website: <https://www.nationalgeographic.com/news-features/urban-tree-canopy/>

#### Slide 8

To investigate the ecosystem benefits of specific tree species or even single trees in a given city - you can use the appropriate tools available on the Internet. One of them will be the application <https://www.itreetools.org/>. It is also worth visiting the website <https://tree-map.nycgovparks.org/> where we have individual tree species cataloged and measurable financial benefits presented that the city gains thanks to them.

#### Slide 9-10

The very selection of appropriate tree species is important. (see Citadine website for details)

#### Slide 11-12

Proper tree care is also important. (see Citadine website for details)

#### Slide 13-28

How trees improve conditions in urban spaces can be seen on the example of a tree planting project for the American city of Fontana, California. A description of the project can be found on the website: <https://www.asla.org/2020awards/105.html>

#### Slide 29-33

Many years have to pass for a tree to reach full maturity and thus be efficient in terms of ecosystem services. Therefore, work on solutions that are an alternative to the traditional tree. An example may be Algy trees (<https://www.photosynthetica.co.uk/copy-of-application-canopy-1>) (see Citadine website for details)

#### Slide 34

Green roofs. (see Citadine website for details)

**Slide 35-36**

Extensive green roofs.  
(see Citadine website for details)

**Slide 37-38**

Intensive green roofs  
(see Citadine website for details)

**Slide 39-40**

Green brown roofs.  
(see Citadine website for details)

**Slide 41**

The difference between green walls and vertical gardens.  
(see Citadine website for details)

**Slide 42-43**

Vertical gabion garden  
(see Citadine website for details)

**Slide 44-45**

Vertical modular garden  
(see Citadine website for details)

**Slide 46-47**

Vertical three-tier garden  
(see Citadine website for details)

**Slide 48-49**

Green walls with photobioreactors.

(see Citadine website for details)

**Slide 50**

Green walls made of creepers.

(see Citadine website for details)

**Slide 51-53**

Green container walls.

(see Citadine website for details)

**References:**

[www.americanforests.org](http://www.americanforests.org)