



WP4 Modelling Tools

D4.3: Video guidelines

Ecosystem Services Modeling Assessment

Tree mapping App and 100kTree Platform

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Table of Contents

1	<u>INTRODUCTION AND AIM OF DELIVERABLE</u>	<u>7</u>
2	<u>PART 1 – TREE MAPPING APP AND 100KTREE PLATFORM.....</u>	<u>8</u>
2.1	TREE MAPPING APP	8
2.2	100KTREE PLATFORM	10
3	<u>PART 2 – MODELLING OF RISK AND ECOSYSTEM SERVICES</u>	<u>12</u>
3.1	TREE GROWTH MODEL	12
3.2	ECOSYSTEM SERVICES	12
3.3	WHAT IF SCENARIOS.....	13
3.4	DECISION SUPPORT	13
4	<u>CONCLUSION</u>	<u>14</u>

Executive Summary

This deliverable presents comprehensive video guidelines for the 100KTREEs ecosystem services modeling tools and decision support platform. The guidelines are split into two complementary videos: Part 1 demonstrates the Tree Mapping App and 100kTree Platform for data collection and visualization, while Part 2 explains the underlying models for assessing disaster-risk reduction, air quality improvement, noise abatement, urban cooling, carbon mitigation, and biodiversity enhancement. Together, these videos provide end-users with practical guidance on utilizing the 100KTREEs toolbox for evidence-based urban greening decisions.

1 Introduction and aim of deliverable

The 100KTREES project has developed an integrated toolbox combining satellite data and ground-based observations to support urban decision-making on nature-based solutions. This deliverable (D4.3) provides video guidelines that demonstrate the complete workflow— from tree inventory collection through citizen science to high-resolution ecosystem services modelling and scenario comparison.

The original scope focused on assessment guidelines for environmental impacts across two pilot cities. However, to provide users with a complete understanding of the toolbox, we expanded the deliverable to include two videos:

- **Part 1:** Tree Mapping App and 100kTree Platform (data collection and visualization)
- **Part 2:** Ecosystem Services Modelling (risk assessment and decision support)

These videos serve as practical training materials for municipalities, urban planners, and citizens involved in urban greening initiatives.

2 Part 1 – Tree mapping App and 100kTree Platform

The video is available in this link <https://youtu.be/gOnVFJccJKE>



Deliverable D4.3 – Video guidelines

PART 1 – Tree mapping APP and 100kTree TOOLBOX

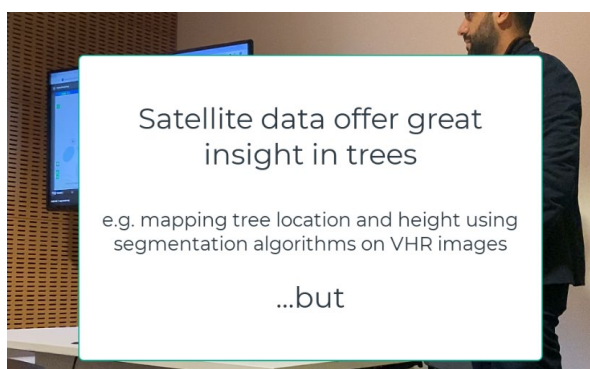
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with contributions by BitaGreen & One Tree Foundation (OTF)

Nov 2025



2.1 Tree mapping App

The video starts with explaining the WHY of the citizen-science app. While satellite data offer great insights in trees at low cost and comparable resolution, they also have limitations. The app therefore aims to be an addition to a first inventory created using remote sensing. It is conceptualized as citizen science, therefore using easy to understand concepts and steps, as to maximize the observations points in a city. The example is given for Sofia, which has hundred thousands of trees.



The video then goes on to explain the different key steps in mapping a tree using the app.

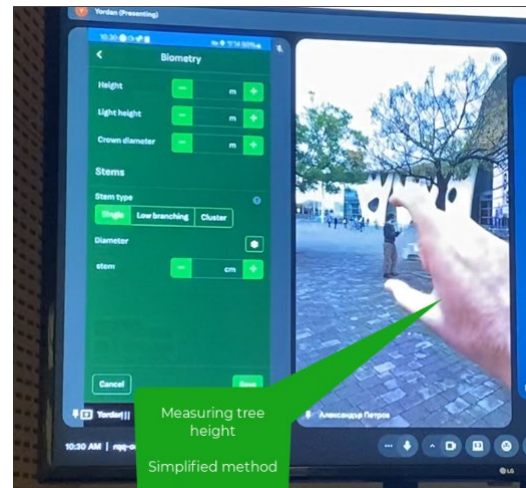
In step 1, the tree receives is identified: from geotagging it on the map (using OSM data) to giving it a name and taking a photo. At this stage the tree has its own passport, and its existence can no longer be denied.

Step 1
Identify
Geotag
Name
Take a photo



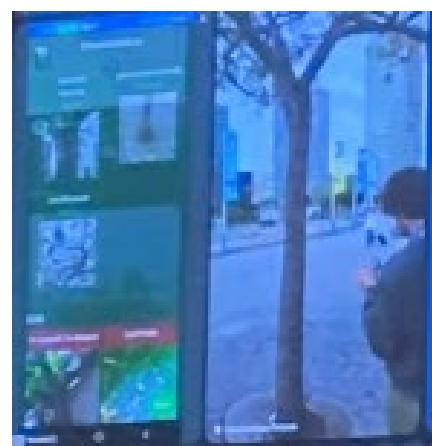
In step 2, the biometry of the tree is introduced. From height (using simple methods as showcased in the video, or more advanced tools) to light height and crown diameter. The result is a 3D object we can now work with.

Step 2
Biometry
Height
Light Height
Crown Diameter



Finally, in the 3rd step, the tree is further observed for anomalies, defects, diseases. This is the step that requires more expert knowledge and that sets the tool apart from remote sensing techniques. These tree attributes will help understand the health and the (ecosystem services) performance of a tree. In addition, it gives valuable information for maintenance.

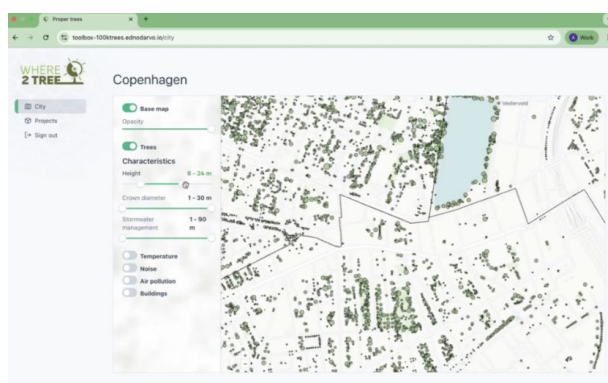
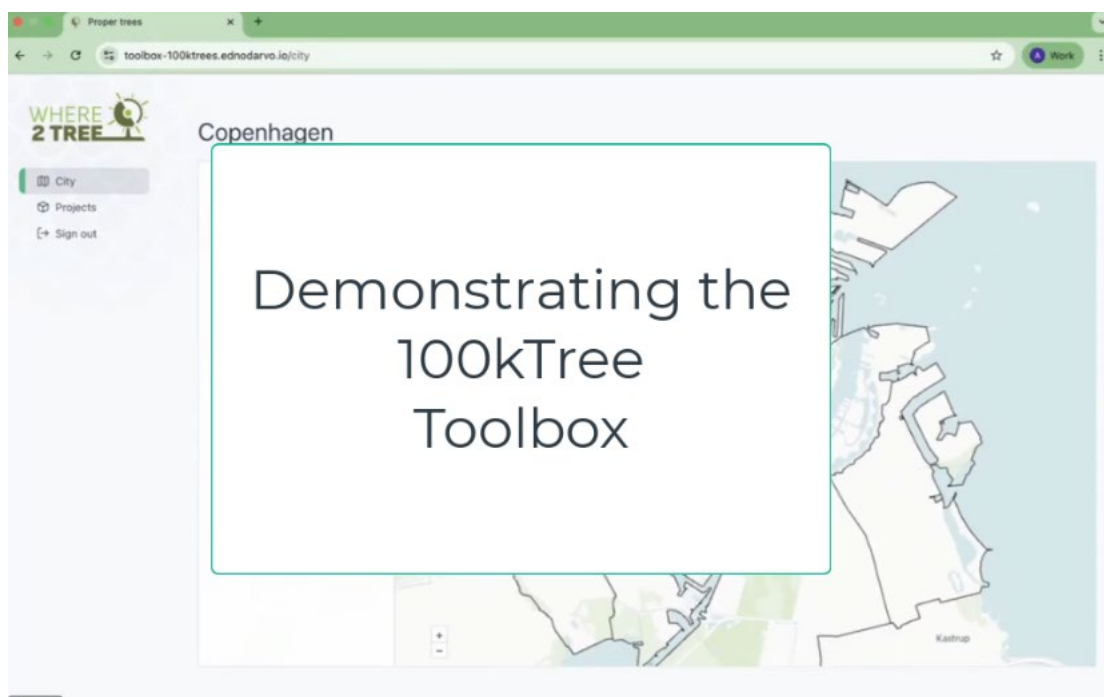
Step 3
Tree Attributes
Anomalies
Damages
Observations



At the end of this process, a detailed tree inventory is created. By opening this app to citizens and experts alike, a powerful tool to map trees in detail is provided.

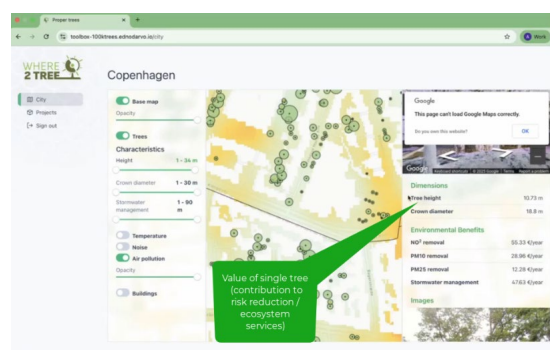
2.2 100kTree Platform

The second part of the video (min 10'22'') showcases the 100kTree platform, which is also an online application that visualizes both the previously mapped trees and links to the models that map their impact on heat, air quality, flood, biodiversity, noise and carbon sequestration.

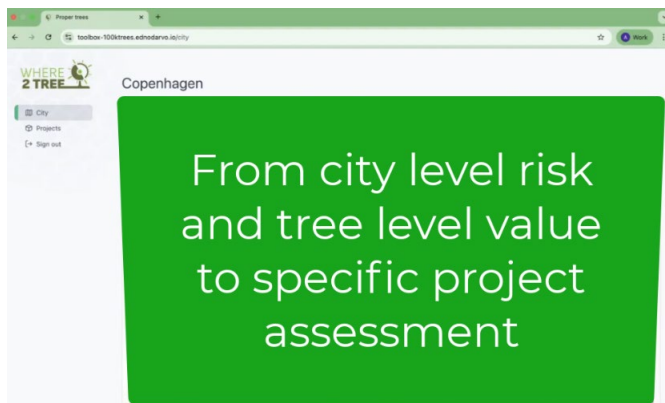


In a first step, the platform allows to select a city for the assessment and visualizes the trees in the inventory. Trees can be selected based on their height, age and crown diameter, which is interesting to understand the difference of trees in the inventory.

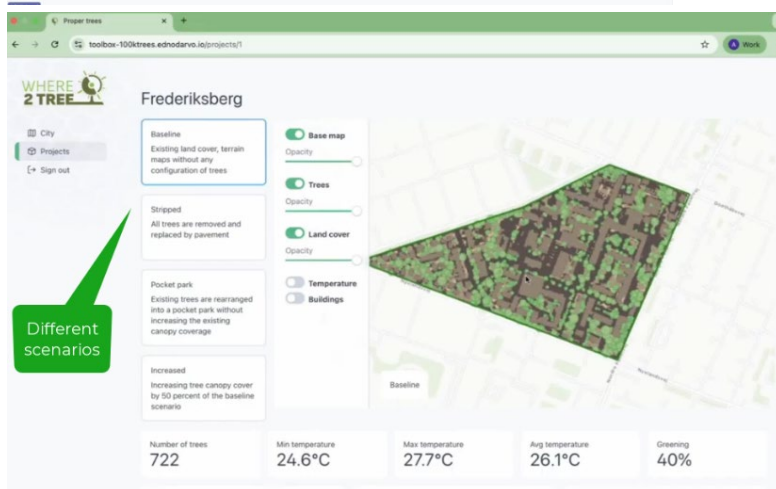
The platform visualizes the environmental risk at city scale (using the previously modelled maps of environmental parameters – for more info see video 2) and then translates this into the impact a given tree has on environmental risks. Be it air quality improvement (due to for example NO₂ deposition), noise abatement, cooling etc.



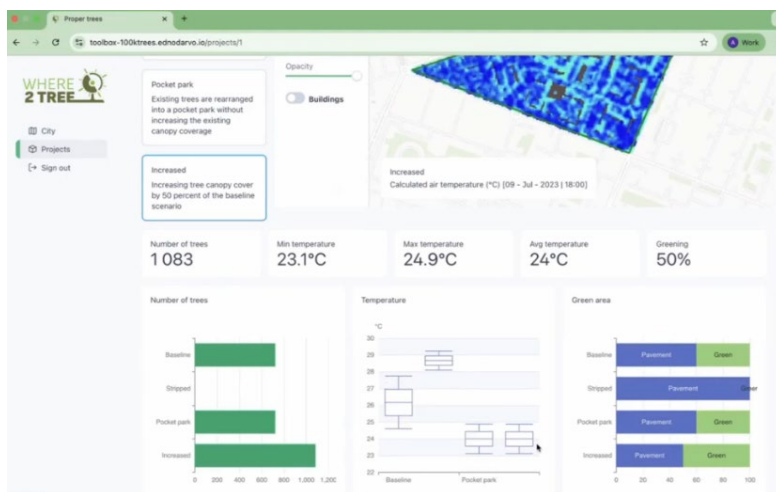
D4.1 – Cloud-based environmental service and urban tree locator tool



The video then moves from the city-wide assessment (situation as is) to the assessments of specific projects. This links to the what-if scenarios that are explained in video 2.



For a given project or location (in the video we show a hospital site in Frederiksberg), the platform visualizes different tree planting scenarios: from existing (baseline) to stripped (removing all the trees) to a scenario with increased trees (whether concentrated in pocket parks or more equally distributed)



The platform then shows the impact of each scenario on the environmental parameters. What is the potential gain in flood mitigation, cooling, air quality improvement etc of a scenario with less or more trees in comparison with the baseline.

This understanding forms the basis for decision makers by the end users of the tool.

3 Part 2 – Modelling of Risk and Ecosystem Services

The second part of the video guidelines focuses on the underlying models and assessment tools that produce the data / assessment used in the 100kTree Platform. It is available in this link: <https://youtu.be/jHx-q1i0SAE>



Deliverable D4.3 – Video guidelines

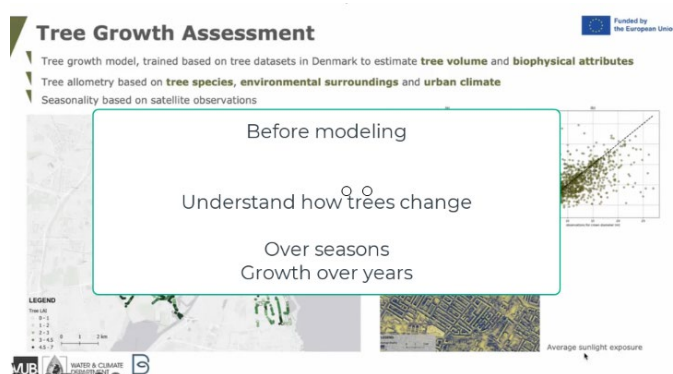
PART 2 – Modeling demonstration of flood, noise, heat, air quality and biodiversity

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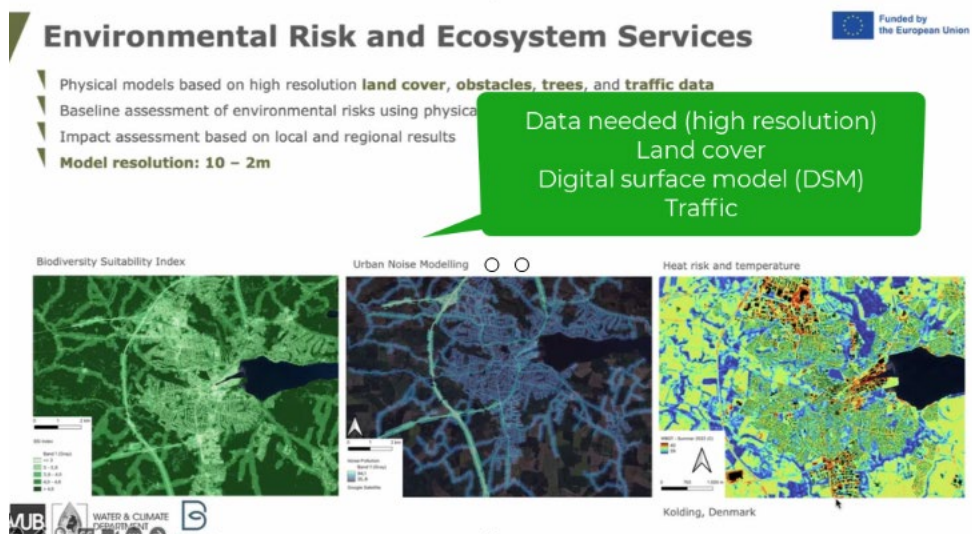
3.1 Tree growth model



The guidelines start with explaining that to assess the impact of trees on urban climate and nature properly, we need to consider that trees are a living infrastructure. So, understanding how they change over seasons and over the years is a first step. The video explains how the tree growth model is constructed with machine learning using a large dataset of tree attributes (species, ages, DBH etc).

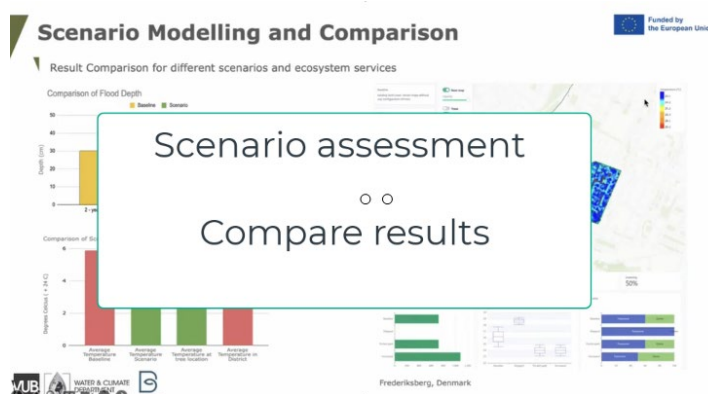
3.2 Ecosystem services

The video then continues to explain how the individual ecosystem services are being modelled. Starting from high resolution data on land cover, digital surface model (DSM) and (in the case of noise) traffic, we model the impact of trees on flood, heat, biodiversity, noise, air quality and carbon sequestration. The model can work at 2–10-meter resolution depending on the quality of the input data. Results are showcased for a demo city.

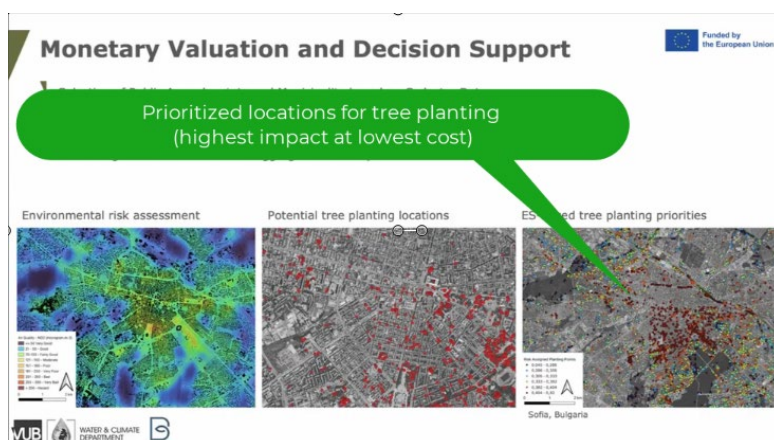


3.3 What if scenarios

The guidelines then showcase the what-if scenarios and comparison of results with baseline. What if we would plant more trees in a parking lot? What would be the impact on the flood / runoff for different rainfall events? What would be the impact on temperature during a heat wave? Results are shown at different scales, showcasing the potential of the modelling tools.



3.4 Decision support



Based on the comparison of the quantified and subsequently monetized scenarios (at district, local or city scale), urban decision makers can select prioritized tree locations and build investment projects that will give highest impact at optimal cost.

4 Conclusion

This deliverable provides comprehensive visual guidelines for the 100KTREEs toolbox through two complementary videos. Part 1 demonstrates how the Tree Mapping App enables detailed ground-based tree inventories that complement satellite data, while the 100kTree Platform visualizes both existing tree inventories and their environmental impacts. Part 2 explains the underlying modelling framework that quantifies ecosystem services at 2-10 meter resolution, enabling evidence-based comparison of different urban greening scenarios.

Together, these videos equip end-users with the knowledge to collect tree data, assess environmental risks, and make informed decisions about urban tree planting strategies that maximize benefits for flood mitigation, cooling, air quality, biodiversity, noise abatement, and carbon sequestration.

The video materials are publicly available and serve as training resources for the project's pilot cities and broader urban planning community.