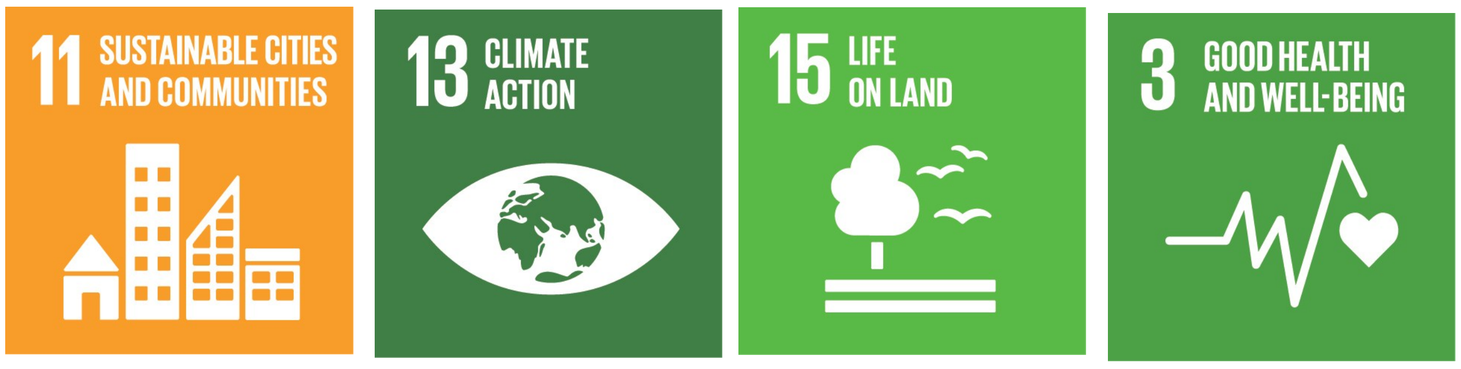
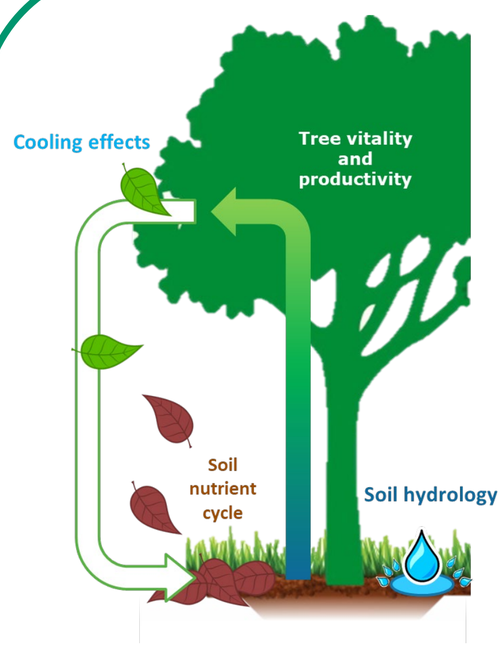
The multiple ecosystem services of urban green infrastructure and their trade-offs: A European citizen science project

Macarena L. Cárdenas[1], *Daphne Parramon-Dhawan*[1], *Jo Clark*[2], *Nerea Ferrando*[2], *Ana Mijic*[3], *Wouter Buytaert*[3], *Thierry Ameglio*[4], *Marc Saudreau*[4], *Jérôme Ngao*[4], *Jérôme Colin*[5], *Guillaume Schreiner*[5], *Steven Loiselle*[1]

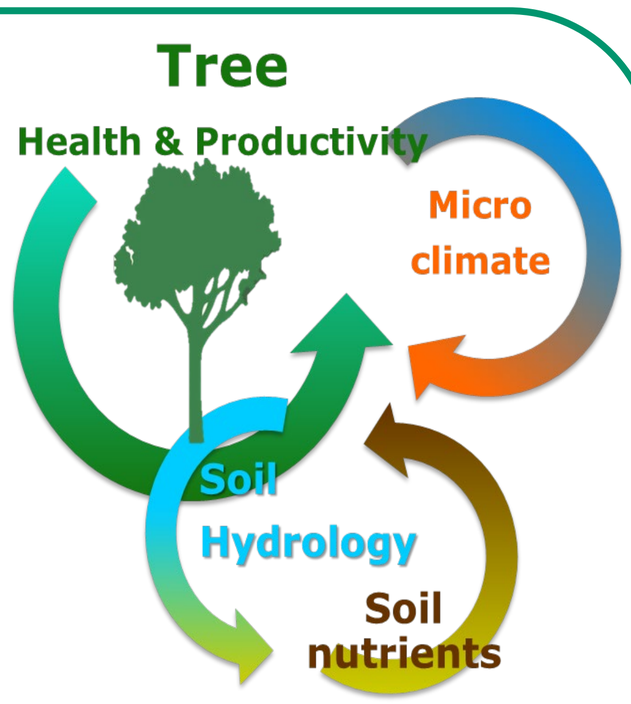
THE CHALLENGE

Urban areas present many advantages regarding services and social networks, yet they face major environmental issues due to the increased presence of built and impermeable structures. This includes locally elevated temperatures (urban heat island effect), increased ambient noise, stormwater flooding and elevated water and air pollution.





Trees are naturally sustainable as circular systems, providing multiple ecosystem services to mitigate and adapt to climate change



This research is investigating the trade-offs between the multiple ecosystem services of trees

SUSTAINABLE SOLUTIONS

Urban trees are nature-based solutions that provide us with multiple ecosystem services, such as stormwater control, carbon sequestration, improved soil health and temperature regulation.
When managed appropriately, urban trees can have positive effects on urban sustainability and human wellbeing, providing environmental, social and economic benefits.
Despite their key role, understanding trade-offs amongst the multiple ecosystem services urban trees provide, and the best land management practices to support them, remains understudied.

AIMS

We are conducting a two-year research programme (2018-end 2019) to:

- **Explore the benefits of urban trees as a nature-based solution using citizen science in three European cities**
- **Provide recommendations to land managers and local councils to support sustainable and resilient urban planning.**
- **Increase public and business awareness of the potential benefits nature-based solutions can provide to cities**

PIONEERING CITIZEN SCIENCE

A multidisciplinary citizen science project that uses state-of-the-art and traditional techniques to study carbon cycles, hydrology, microclimate and green infrastructure health and productivity.

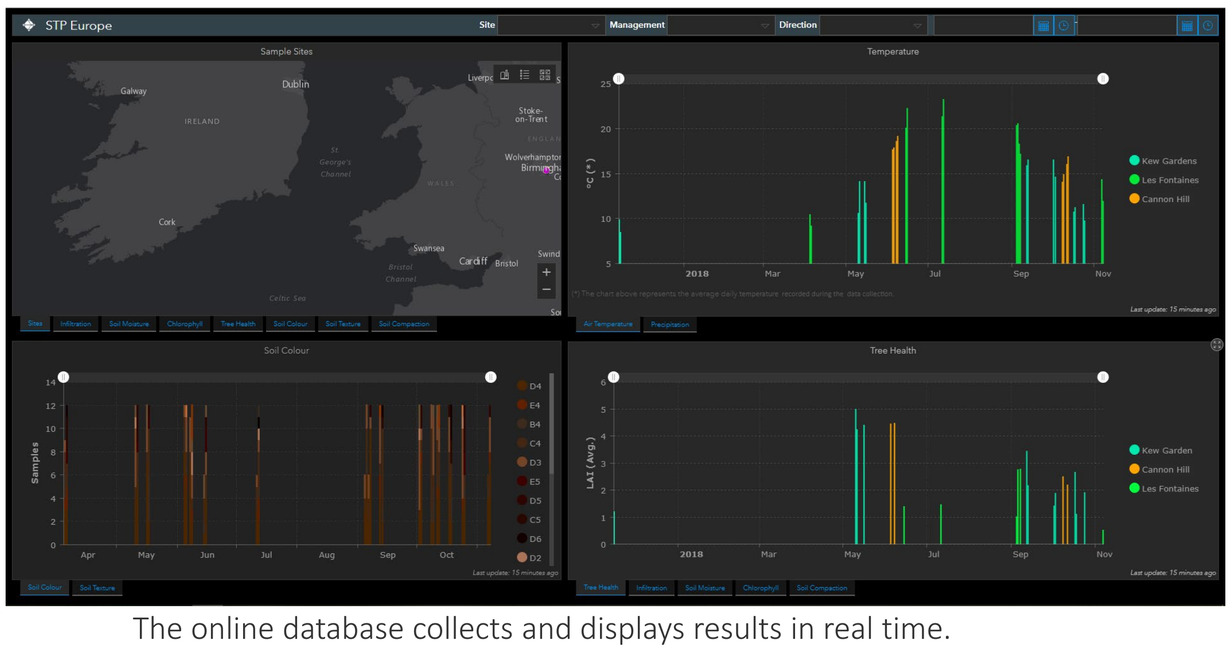
Leading researchers work with corporate participants to collect key environmental field measurements that is providing knowledge for improved land management practices.
Each citizen science event includes six hours of fieldwork and 10 hours of environmental education.

Citizen scientists collecting key environmental and tree data

STUDY SITES

DATA

Research datasets collected by citizen scientists at each event are compiled in online datasets that can facilitate identifying patterns of land use and the benefits for green infrastructure.



The online database collects and displays results in real time.

OUTCOMES

Our research is: addressing knowledge gaps in urban tree land management; engaging business in building urban resilience to climate change; and delivering key information for city planners and developers.
After 16 citizen science events:

>56,000 research data points have been collected

95% of participants found contributing to the research a useful experience

96% of participants felt that taking action on climate change and sustainability benefits their business

The preliminary results show high complexity with regards to the trade-offs between the multiple ecosystem services provided by trees, so far considered in silos in previous studies.

The next phase of data collection during 2019 will allow us to understand the most appropriate land management strategies to facilitate different ecosystem services in different locations.

Institutions: 1. Earthwatch Europe, 2. University of Reading, 3. Imperial College of London, 4. INRA, 5. CNRS
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Contact: Macarena Cárdenas, Research manager: mcardenas@earthwatch.org.uk

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