

FORLUX

Health, adaptation and resilience of forests in the context of climate change: impact of drought intensification on the sustainability of the city of Luxembourg forest ecosystems.



Motivation

Forests contribute to stabilizing micro and macro climate, sustain and protect biodiversity, contribute to global carbon uptake and storage, support livelihoods, and help drive inclusive and sustainable growth. Luxembourg city is one of the country's largest forest owners, with its 1,055 hectares of forests (managed by the 'Administration de la nature et des Forêts - ANF') playing multiple roles - including (i) recreational purposes, (ii) drinking water production from the Luxembourg sandstone aquifer, (iii) air purification, and (iv) wood production.

However, Luxembourg's forests are far from being sheltered from threats related to global change. In recent years, they have shown a rapid decline in forest health, likely due to increasingly strong exposure to various pressures related to the combined effects of climate change (droughts, flash floods, insect pests and diseases), air pollution, and the development of newly urbanized areas. To maintain and protect the benefits of forests, there is thus a pressing need for a better understanding of these pressures, and more sustainable forest management strategies.

Innovation

The objectives of the FORLUX project are fully aligned with priorities defined by the Government, and more specifically, Luxembourg city, with a focus on the management of its forests under climate change. The main goal is to preserve the ecosystem services of the forests by, on the one hand, establishing a system for monitoring tree health with representative experimental plots equipped with innovative data transfer technologies and, on the other hand, deliver data-based and model-based scientific insights into tree-water interactions, forest carbon sequestration and air quality. These results, which integrate both the water and carbon cycles, will be the first of their kind for Luxembourg's forest ecosystems and will pave the way for new forest management strategies under global change.

Impact

The know-how, skills and resources developed at LIST over nearly two decades are perfectly aligned with these goals - combining the design and implementation of long-term experimental sites in forests, *in situ* studies of the water and carbon cycles, remote sensing technologies, land surface modelling, environmental data transmission technologies, and more. Developed in a co-creation framework between LIST, Luxembourg city and the ANF, the FORLUX project will be a trailblazer for the design of urgently needed sustainable management strategies of forest ecosystems under global change.

Partners

Luxembourg City, Administration de la nature et des forêts (LU)

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