

This research project addresses the problem of valuing ecosystem services provided by urban trees, that is a part of a broader issue in ecological economics: the interdependence and coevolution of human economies and natural ecosystems over time and space.

In particular, the research will examine the contribution of ecosystem services provided by urban trees to quality of life in cities, yet these services are rarely explicitly considered in environmental policy targets. The goal is to quantify regulating services provided by urban trees and evaluate their contribution to comply with policy targets of air quality and climate change mitigation in the municipality of Warsaw, Poland. The project will address key economic and policy questions.

In order to develop specific policy recommendations, as a first step first - the i-Tree Eco tool will be adjusted and applied to quantify – in biophysical terms. To express the result in monetary terms, BenMAP tool will be applied. BenMAP is intended as a tool for estimating the health impacts, and associated economic values, associated with changes in ambient air pollution. It accomplishes this by running health impact functions, which relate a change in the concentration of a pollutant with a change in the incidence of a health endpoint.

As a second step the Principal-Agent model will be created, and by that an analysis of optimal incentive contracts characterized by asymmetric information and externalities generated will be made. The study will focus on the joint provision of ecosystem services, which are a public good, by urban trees managed by a principal (high-level city officials that are supposed to react to citizens' needs) and an agent ("urban green" administration). For concreteness, we will frame the model with the specific example of environmental policy targets for Warsaw in mind.

The following steps sketch the overall research plan:

1. Collecting a detailed and comprehensive review of the current theoretical and empirical literature about valuating ecosystem services provided by urban trees;
2. i-Tree Eco modelling;
3. BenMAP modelling;
4. Elaborating on research results;
5. Principal-Agent model application;
6. Disseminating results through publications and conference presentations.

There are at least three reasons, why the research is so important to carry on:

Development of ecological economics

The project's research will contribute to the development of ecological economics by providing adjusted model for valuating of ecosystem services provided by urban trees in the climate and social-economic conditions of central and Eastern Europe country.

Practical meaning of the research

In the context of a rapidly urbanizing world, understanding complexity and managing human–environment interactions within urban areas is vital if we are to balance the interdependent social and ecological goals of sustainability.

Adjustment to UE regulations by an innovative way of applying Principal-Agent model

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