

## **A software tool for ecosystem services assessments**

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The EU FP7 DESSIN project is developing methods and tools for assessment of ecosystem services (ESS) and associated economic values, with a focus on freshwater ESS in urban settings. Although the ESS approach has gained considerable visibility over the past ten years, operationalizing the approach remains a challenge. Therefore, DESSIN is also supporting development of a free software tool to support users implementing the DESSIN ESS evaluation framework.

The DESSIN ESS evaluation framework is a structured approach to measuring changes in ecosystem services. The main purpose of the framework is to facilitate the application of the ESS approach in the appraisal of projects that have impacts on freshwater ecosystems and their services.

The DESSIN framework helps users evaluate changes in ESS by linking biophysical, economic, and sustainability assessments sequentially. It was developed using the Common International Classification of Ecosystem Services (CICES) and the DPSIR (Drivers, Pressures, States, Impacts, Responses) adaptive management cycle. The former is a standardized system for the classification of ESS developed by the European Union to enhance the consistency and comparability of ESS assessments. The latter is a well-known concept to disentangle the biophysical and social aspects of a system under study. As part of its analytical component, the DESSIN framework also integrates elements of the Final Ecosystem Goods and Services-Classification System (FEGS-CS) of the US Environmental Protection Agency (USEPA).

As implemented in the software tool, the DESSIN framework consists of five parts:

- In part I of the evaluation, the ecosystem is defined and described and the local stakeholders are identified. In addition, administrative details and objectives of the assessment are defined.
- In part II, drivers and pressures are identified. Once these first two elements of the DPSIR scheme have been characterized, the claimed/expected capabilities of a proposed project can be estimated to determine whether the project affects drivers, pressures, states or a combination of these.
- In part III, information about impacts on drivers, pressures, and states is used to identify ESS impacted by a proposed project. Potential beneficiaries of impacted ESS are also identified.
- In part IV, changes in ESS are estimated. These estimates include changes in the provision of ESS, the use of ESS, and the value of ESS.
- A sustainability assessment in Part V estimates the broader impact of a proposed project according to social, environmental, governance and other criteria.

The ESS evaluation software tool is designed to assist an evaluation or study leader carrying out an ESS assessment. The tool helps users move through the logic of the ESS evaluation and make sense of relationships between elements of the DPSIR framework, the CICES classification scheme, and the FEGS approach. The tool also provides links to useful indicators and assessment methods in order to help users quantify changes in ESS and ESS values.

The software tool is developed in collaboration with the DESSIN user group, who will use the software to estimate changes in ESS resulting from the implementation of green technologies addressing water quality and water scarcity issues. Although the software is targeted to this user group, it will be made available for free to the public after the conclusion of the project.