



**Periodic report, M18
Publishable summary**

30 July 2014



From concepts to real-world applications
www.openness-project.eu

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Summary description of project context and objectives

The concepts of ecosystem services (ES) and natural capital (NC) provides a powerful way of examining the interaction between ecosystems and human well-being. Yet mechanisms and approaches for making the concepts operable and integrating them into policy making and management practices are still lacking.

The overall objective of the OpenNESS project is to translate the concepts of ecosystem services (ES) and natural capital (NC) into operational frameworks that provide tested, practical and tailored solutions for informing sustainable land, water and urban management at different locales and scales. The specific objectives are the following:

1. To advance conceptual understanding of ES and NC and provide operational frameworks for application of the concepts in real-world management and decision-making situations
2. To examine how existing and forthcoming EU regulatory frameworks and other key drivers of change can enhance or restore the benefits from ES and NC using multi-scale scenario approaches
3. To develop and refine approaches for mapping and modelling the biophysical control of ES that can be used to assess the effectiveness of mechanisms, instruments and best management practices for sustaining ES delivery in the face of multiple uncertain drivers whilst conserving biodiversity
4. To develop hybrid methodologies that address trade-offs, synergies, and conflicting interests and values in the use of ES through a combination of monetary, non-monetary and deliberative methods with multi-criteria and Bayesian approaches for decision support.
5. To apply the concepts and methods developed and refined in the project to concrete, place-based case studies in a range of social-ecological systems with stakeholders and analyse the implications of local, regional and EU level decisions on ES flows and use in other parts of the world.
6. To translate the results into policy recommendations and integrate the outputs in a Menu of Multi-Scale Solutions and associated datasets that are available for ES users and managers as well as decision-makers
7. To disseminate the results to reach a broad audience and to promote and maintain science-policy dialogue on the use of the concepts of ES and NC.

The OpenNESS work programme will integrate methodological advances and empirical analysis in an iterative cycle of application and refinement that draws on experience from real-world case studies (Figure 1 and Figure 2):

1. WP1 creates the foundation for the overall work programme in advancing conceptual understanding and providing operational frameworks for the key ES and NC challenges related to human well-being, sustainable land and water management, governance and competitiveness.
2. WPs 2 to 4 will develop the methods related to policy and scenario analysis. WP2 will develop participatory multi-scale scenario approaches to analyse drivers of ecosystem change, including existing and forthcoming EU regulatory frameworks. WP3 will focus on

biophysical control of ecosystem services and develop a range of spatially explicit methods for investigating the effects of multiple drivers on ecosystem service supply. WP4 will focus on the demand of ecosystem services and develop a hybrid evaluation framework that can take into account of both monetary and non-monetary value dimensions of ecosystem services. These WPs will work together to develop cross-cutting methodologies such as Bayesian Belief Networks and multi-criteria evaluation methods.

3. The focal point of the research will be the application and testing of the methodologies and concepts from WPs 1 to 4 in a coherent set of real-world case studies in WP5 so that operational issues can be identified and good practice discovered.
4. Results from the case studies will be integrated into coherent databases, guidelines and recommendations by WP6 into Common Platform.
5. WP7 will promote the science-policy interface and the uptake of results.

Description of work performed and main results

The project has made very good progress towards its objectives. All deliverables due in the first period have been submitted to the European Commission (see Table 1).

One of the achievements is building common understanding on the key concepts and conceptual frameworks as well as methodological approaches. To that end, WP1 has set up a process to develop synthesis papers (SP). Three SPs were published in the website by M18 (The link between biodiversity and ES; Typology/classification of ES; Stakeholder involvement) and eight SPs were sent out for consultation. These SPs, along with a draft glossary of the key terms, form a basis of the OpenNESS Reference Library. The second SP was used as a basis for the first policy brief 'Benefiting from ecosystem services: towards a shared understanding' (D6.1). Further efforts to create shared conceptual understanding and help the case studies to derive specific research questions related to the key challenges include the "Review of the existing information for the key Challenges" (MS1) and a report on conceptual frameworks (D1.1).

Following the OpenNESS iterative research design, the first cross-WP workshop (MS12) was organized in October 2013. The iterative process with respect to WP2-4 has proceeded as follows:

- Six spatially-explicit methods for investigating the effects of drivers of change on ES have been selected (MS6) and documented in WP3: spreadsheet/GIS methods; QUICKscan; Bayesian Belief Networks (BBN); State-and-Transition Models; ESTIMAP; and InVEST.
- WP4 has prepared methodological briefs on monetary valuation methods; ES demand mapping, BBN, Multi-Criteria Decision Analysis, and other non-monetary valuation methods, and prepared an action plan for the application of valuation methods in specific policy contexts (MS8).
- WP 2 has developed a briefing note for carrying out policy and institutional analysis in the case studies as well as guidelines for participatory scenario analysis (D2.4).

In order to assist application of the methods in the case studies, a strong emphasis has been placed on methodological training during the first period. A training event on BBNs was organized in September 2013, and a training event on non-monetary valuation methods as well as the six WP3 methods was organized as a part of the 1st Annual Meeting. E-learning material on multi-criteria decision analysis methods has been

placed in the shared working space Extranet, and a platform for deploying spatially explicit and dynamic BBNs has been developed.

WP3 has started tackling the question of the linkages between biodiversity and ES by setting up a protocol for undertaking a systematic review of linkages between NC and ES. The review is nearly complete and data from over 650 papers covering 13 ES have been extracted into a common database.

Another important challenge is to develop hybrid methodologies to address the multiple value dimensions of ES. To that end, WP4 has prepared a state-of-the-art review of integrated valuation methods (D4.1).

In order to select key regulatory frameworks for in-depth analysis, a workshop was organized with EU level stakeholders in January 2014 (MS3). These results will feed into the recommendations for future EU policies and regulatory frameworks. WP2 has also reviewed existing European scenario projects (MS4) and developed draft scenarios to analyse drivers of ecosystem change.

All 26 case studies have determined their work plans, documented in D5.1, and started to conduct ES assessments testing the tools and methods of WP1-4. The merits of these concepts and methods will be assessed in the light of tentative evaluation criteria (MS11).

OpenNESS and OPERAs projects have agreed to develop a Common Platform (CP), which combines the OpenNESS Clearinghouse and OPERAs Resource Hub. The first steps during the first reporting period include a scoping document and a draft functional design for the CP.

Expected final results and potential impacts

The expected major outcomes of OpenNESS will be the following:

1. A critical and tested understanding of the strengths and limitations of the concepts of ES and NC as an operational framework that can be used to address the four key challenges: human well-being, sustainable land and water management, governance and competitiveness.
2. Guidelines on how to mainstream the concepts of ES and NC into existing and forthcoming EU regulatory frameworks and to improve decision-making at different governance levels; and the development of participatory multi-scale scenarios to analyse the direct and indirect drivers of change in relation to NC stocks and ES provision, and their relationships to key regulatory frameworks.
3. The development of operational approaches, and biophysical methods and models, designed to deliver spatially-explicit quantified information on ES at multiple spatial and temporal scales; and best practice guidance on the potential of financial and governance mechanisms and instruments to sustain and restore ES.
4. A hybrid valuation framework that can take into account both monetary and non-monetary value dimensions of ES and NC, and that be used by stakeholders to determine trade-offs and synergies; and the development of innovative methods for integrating ES modelling and valuation that capture uncertainties in a transparent manner for communication in decision-making processes.

5. Documentation of the applicability, benefits and limitations of combining and utilising different biophysical models, databases and valuation methods in a wide range of concrete environmental and natural resource management and decision-making situations.
6. The creation of a Menu of Multi-Scale Solutions for operationalising the concepts of ES and NC in different decision-making situations, to be integrated into the Common Platform
7. The development of knowledge exchange mechanisms to ensure enhanced policy-maker capacity to take up the project's recommendations; and a knowledge network that is capable of being sustained in the long-term, by helping embedding results in current and future professional practice.

The outcomes of the OpenNESS project will better inform policy-making and policy implementation related to the management of NC and ES:

- At a general level, the project will contribute with methods, tools, assessments and recommendations that will make it possible to operationalise the concepts of NC and ES. This will be achieved by supporting the targeted design and implementation of cost-effective measures that sustain the provision of goods and services for human well-being.
- At a specific level, the project will develop a Menu of Multi-Scale Solutions that deliver stakeholder targeted solutions for ES assessments in real-life planning and decision making situations. The Menu of Multi-Scale Solutions will be integrated into the Common Platform that will be developed jointly with OPERAs project. The Common Platform will enable European communities to better manage our ecosystems for human well-being and livelihoods by linking them to best practice knowledge and experience on ecosystem services and natural capital.

OpenNESS will also contribute expertise and results to several key EU policies and regulatory frameworks such as Biodiversity Strategy to 2020, Water Framework Directive, the Renewable Energy Directive, and the Thematic Strategy of Urban Environment. At the national and regional level, it will consider the potential to mainstream the concepts of ES and NC into policies and management practices such as land use and forest management processes. It will also contribute to the Intergovernmental Platform for biodiversity and Ecosystem Services (IPBES); at the moment ten OpenNESS consortium members are involved in expert panels preparing IPBES scoping documents and outlines of guidelines regarding ES valuation and assessments.