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Ecosystem services for water policy: Insights across Europe

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ABSTRACT

In this research we explored how the concepts and approaches of ecosystem services are currently used in water management in Europe, in the application of River Basin Management Plans (RBMP) developed for the EU Water Framework Directive (WFD). Five case studies have been considered, located in the River Basin Districts of the Po river (Italy), Scotland (United Kingdom), Scheldt river (Belgium), Danube river (Romania), Sado and Mira rivers and Ribeiras do Algarve (Portugal). These cases represent different regional contexts of application of this EU water policy, with specific socio-economic drivers and environmental issues. Each case study has developed an operational framework to analyse ecosystem services in practice together with a group of local stakeholders. In each regional case, we examined how EU water policy and RBMPs are implemented, considered legal and planning instruments from the national to the local scale, and we analysed the use of ecosystem service terms and concepts in the relevant planning instruments. In parallel, we explored the view of local stakeholders and water managers on the topic, collecting their opinion on three major aspects: the usefulness of the concepts and approaches of ecosystem services for WFD river basin management plans, the risks and benefits of their use, and the knowledge needs to put the concepts into practice. The major drawback of the ecosystem service approach seems to be the challenge for practitioners of understanding new concepts and methodologies, while the major advantages are that it highlights all the hidden benefits of a water body in good health and promotes multi-functionality and sustainability in water management. The results of this study provide a picture across Europe of the current use of the concepts of ecosystem services in the RBMP and relevant insight on the opinion of local stakeholders and water managers.

1. Introduction

Improving human well-being, while ensuring sustainable use of natural resources, is a challenge for decision making and policy design (Guerry et al., 2015). A central element is to recognise the dependence of human well-being from nature, i.e. the multiple benefits, or ecosystem services, that people obtain from ecosystems (MEA, 2005; TEEB, 2010).

Since 2000, the European Union has adopted an ambitious policy for the protection of all surface, groundwater and coastal waters through the Water Framework Directive (WFD, Directive 2000/60/EC). The WFD aims to protect and enhance the status of aquatic ecosystems and to promote sustainable water use. To achieve these ambitious goals, the Directive foresees the adoption of River Basin Management Plans (RBMP) and Programmes of Measures to reduce the pressures on aquatic ecosystems. While the concept of ecosystem services is not mentioned directly, the WFD clearly supports the protection of ecosystems to secure long-term availability of water resources and benefits from aquatic ecosystems.

More recent EU strategies, also affecting water policy, have called attention to the central role of ecosystems and biodiversity in ensuring current and future human well-being. The Biodiversity Strategy (European Commission, 2011) aims at halting the loss of biodiversity and the degradation of ecosystem services, recognising their fundamental contribution to human health and economic

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prosperity. The Climate Adaptation strategy (European Commission, 2009) stresses the need of increasing the resilience of biodiversity and water-related ecosystems, exploiting the co-benefits of measures to fight global warming. Finally, the Blueprint to safeguard Europe's water resources (European Commission, 2012a) suggests to include ecosystem services in the cost-benefit analysis of water measures, and to adopt measures that foster ecosystem services for mitigating the effects of floods and droughts, such as natural water retention measures.

To put ecosystem service concepts into practice, evidence, methodologies and guidelines are needed (Polasky et al., 2015). At the European scale the MAES Working Group has suggested an analytical framework for the implementation of the ecosystem service approach in the EU (Maes et al., 2016). Currently, the EU FP7 research projects OpenNESS (2016), OPERAs (2016) and ESMERALDA (2016) are studying how to make the ideas of ecosystem services and natural capital operational based on the experience of concrete case studies and assessments; and the MARS (2016) and GLOBAQUA (2016) projects are applying the concepts of ecosystem services to support EU water policy.

Several recent studies have examined the potential of ecosystem service approaches for achieving the objectives of EU water policy (Grizzetti et al., 2016; Vlachopoulou et al., 2014; COWI, 2014; ESAWADI, 2010; Martin-Ortega, 2012), by considering the co-benefits of measures and facilitating the integration of policies.

While several studies have reflected on the potential of using the ecosystem services concept in the implementation of the WFD, less evidence is available on the real use of the ecosystem services approach in the current applications of RBMPs. To analyse the current uptake of the concepts, we focussed on two aspects: the formulation in official policy documents (legal acts, planning instruments, national guidelines) and the point of view of the local managers and practitioners, who are responsible for or affected by the water policy.

The objective of this study was to analyse and compare how the concepts of ecosystem services are currently used in the application of River Basin Management Plans of the EU Water Framework Directive across Europe, considering both the policy documents and the opinion of stakeholders. The stakeholders included water managers responsible for the implementation of the WFD, local actors and NGOs, and technical and scientific experts. The research, which is part of the EU FP7 project OpenNESS, was conducted in five case studies representing a wide range of water management situations across Europe: Gorla Maggiore in Italy, Loch Leven in United Kingdom, Lower Danube in Romania, Stevoort in Belgium, and Sudoeste Alentejano/Costa Vicentina in Portugal.

The paper is organised as follows. After a brief presentation of the methodology (Section 2), we describe and compare how the WFD has been implemented in the five case studies across Europe (Section 3), and how the concepts of ecosystem services have been adopted in the relevant planning instruments for the implementation of the RBMP (Section 4). Then, we analyse the opinion of the local stakeholders on the use of ecosystem services concepts and approaches for the RBMP (Section 5). Finally, we summarise the outcomes of the analysis and draw some final recommendations (Section 6).

2. Methodology

2.1. Structure of the analysis

In the OpenNESS project, the case studies (27 in total) cover different social-ecological systems; they are led by a team of national researchers and include collaborative work with local stakeholders. A Case Advisory Board (CAB) is established in each case study involving key stakeholders in the specific policy and decision-making context of the case study. The OpenNESS case studies work since 2013 to operationalise the ecosystem services concepts into real-world applications using a range of spatially-explicit methods to identify, quantify and value ecosystem services. The design and results from this research is shown and discussed regularly with the local CABs. As a result of this process both the researchers and the stakeholders have a well-informed opinion of the potential of analysing ecosystem services to support land, water or urban management. The work presented in this paper involved 5 OpenNESS case studies (see Section 2.2) whose topic of research was related to water resources and river basin management. Therefore the case studies considered have been developed in the same EU project framework (OpenNESS), with a similar mechanism of interactions between researchers and stakeholders (CABs meetings), and the opportunity for the researchers to develop common understanding and shared terminology in the use of ecosystem service concepts, through regular project meetings.

The analysis shown in this paper consisted of two parts: the study of the normative and planning documents and the examination of stakeholders' opinions. The work was conducted in each case study by the respective research team, according to a common structure, and coordinated through dedicated workshops.

In the first part of the analysis, each case study considered the legislative framework and the institutional setting of the application of the RBMP, identifying the relevant planning instruments. The objective was to describe how the RBMP of the WFD is implemented in the country and at the specific scale of the case study. This was instrumental to identify the planning instruments that correspond to the RBMP and additional planning instruments implementing the RBMP at the local scale. It also included an institutional analysis (map the administrations involved in the implementation). Our analysis covered the first RBMP and the proposal for the second RBMP, which was available for public consultation in autumn 2015. Then, in the official documents selected, we examined how the terms and concepts of ecosystem services were used. This involved the consideration of different geographical scales (EU, national, regional, local). In most of the case studies, the language of legal acts and planning instruments and the name of the competent authorities are not in English; in the results we provide an English translation and report the original names in Supplementary material S1.

In the second part of the analysis, we examined the view of the stakeholders on the use of the concepts of ecosystem services for the RBMP. The people consulted were the members of the respective CABs[1] (the consultation took place between January 2015 and November 2015). They were asked three questions (through focus groups, interviews or surveys):

1. Can the ecosystem services approach be useful for the River Basin Management Plan? Why?
2. What are the risks and benefits of using the concept of ecosystem services in the integrated water management?
3. What are the knowledge needs to put into practice the concepts of ecosystem services?

The answers of stakeholders were summarised considering three groups of interest: 1) water management institutions (public institutions); 2) local actors and NGOs; and 3) scientific and

[1] In the Sudoeste Alentejano and Costa Vicentina also stakeholders outside the CAB were contacted, as the focus of the case study is not primarily on water management.