Integration of land use and climate change risks in the Programmes of Measures of River Basin Plans

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In their paper from 2019, Fidélis and Rodrigues discuss the relevance of land use and climate change issues for River Basin Management Plans (RBMP, in accordance with the EU Water Framework Directive, WFD) from the perspective of the southern European state of Portugal. These issues do not seem to be adequately addressed in current water management policies. This may be interpreted as a call for in-depth evaluation of water management strategies on national levels.

The issues that are addressed by Fidélis and Rodrigues are of relevance throughout all of the EU. Here, short summaries of two papers with quite different perspectives are provided. The first one (Apostolaki et al., 2019), focuses on a holistic method to improve sustainable river basin management, while the second paper (Jacobsen et al., 2017) presents the Danish situation regarding the management of agricultural land-use based stressors on aquatic ecosystems.

Apostolaki et al. (2019): **Using a systemic approach to address the requirement for Integrated Water Resource Management within the Water Framework Directive**

In order to adequately fulfil the claims of the EU WFD, Integrated Water Resource Management (IWRM) approaches are needed. Apostolaki et al. (2019) describe a holistic, "systemic approach", called *Globaqua*, which combines already established methods (DPSIR – Driver, Pressure, State Impact, Response – and Ecosystem Services Approach). In doing so, the evaluation of multiple stressors as well as interactions between natural environment, constructed environment and human societies can be improved. The ultimate goal is to enhance the outcomes of ecosystem management and to work towards sustainable results for future generations. This represents an extension to conventional water management approaches.

Potential effects of Programs of Measures (PoM) are discussed based on Scenario Development methods. The method is applied to two river basins, on in Spain (the Ebro) and one in Greece (the Evrotas). The *Globaqua* approach incorporates the following three steps: 1) characterization of the river basin area, 2) recovery of costs and impact assessment and scenario development, and 3) identification of revised program of measures. The authors stress the need for informed, participatory decision making, including both environmental and stakeholder perspectives. They also point out that the *Globaqua* approach could successfully provide suggestions for the response cycle of river basin management plans.

Jacobsen et al. (2017): **Implementing the water framework directive in Denmark – lessons on agricultural measures from a legal and regulatory perspective**

In the northern-European state of Denmark, diffuse agricultural pollution poses a significant threat to the aquatic environment. The WFD was officially implemented in Denmark by the Act on Environmental Objectives of 2003, which was complemented in 2009 by the Green Growth Agreement, aiming to ensure WFD implementation. Comprehensive legislation has been put into place in order to fulfil the WFD goals. In their 2017 paper, Jacobsen et al. analyze the implementation process of the WFD along the following three key elements: 1) effectiveness (incl. cost-effectiveness), 2) scale and location issues, and 3) legal issues. The paper focuses on those three mandatory measures, that are most important, according to the authors: riparian zones, reduced dredging and vegetation management in water courses, and additional targeted catch crops.

One finding was that uncertainties regarding legal and regulatory issues often remain. A lack of legal certainty is likely to negatively influence the success of the measures in question (e.g. protection of private property vs. restrictions of use of private property). Sufficient knowledge regarding the site-specific environmental effects of the measures in question is necessary in order to justify them. A vital lesson, as pointed out by the authors, is that the "regulatory complexity" (reflected by the interactions between matters of effectiveness, scale/location and legal issues) has been underestimated. Effectiveness and costs are often highly site specific, which may justify a more targeted approach in certain cases (e.g., the application of riparian zones only to designated watercourses and lakes). In doing so, both legal certainty and the legitimacy of the measure could be increased. The authors point out that the need for more flexible and localized approaches has become apparent in other countries, too.

References

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