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# Bringing politics back into water planning scenarios in Europe

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SUMMARY

The shift from government to governance in European water policies conveys a pluralist conception of stakeholder participation in planning. This article argues that the current Driving forces-Pressures-State-Impact-Response (DPSIR) approach to the planning of natural resource use, developed by the Organisation for Economic Cooperation and Development (OECD) and the European Environmental Agency (EEA) is at odds with a pluralistic conception. The DPSIR approach consists in constructing a single socio-environmental model to address a specific problem in water management, while paying no attention to the existence of conflicts surrounding the definition of the issue at hand, the social, political and spatial delimitation of that issue, and the translation of stakes in terms of quantitative variables. Scenarios produced in this process therefore explore a limited range of policies, i.e. those defining the problem in the same way, as illustrated here with the case of the Garonne River in France. This article presents an alternative method, combining knowledge in social science and natural determinisms to build contrasting socio-hydrological scenarios that do not share the same hypotheses regarding their respective key issues.



## 0. Introduction[1]

The shift from government to governance in European water policies (Kaika, 2003) conveys a pluralistic conception of stakeholder participation in water management planning. It acknowledges that the allocation of water resources does not only revolve around hydrological expertise, but involves social and political considerations relating to the issue at hand, priorities, uses, compensations, restrictions, sanctions, etc. It requires that stakeholders who neither share the same values nor interests should have an opportunity to debate future options for the use of water. In this pluralistic perspective, scenarios can serve as strategic tools for discussing environmental water policies and plans of action, provided they do not presume a single definition of the issue.

However, the prevailing approach to scenario building for water management planning in Europe often refers to the "*Driving forces – Pressures – State – Impacts – Responses*" (DPSIR) framework, which implies "the demarcation of a particular system of interest, with explicit or implicit boundaries" (Svarstad et al., 2008: 117). Kieken (2005) highlighted the limits encountered by foresight studies that, despite claiming to be "integrated", tend in practice to be based on a single model which excludes diverging views on the system in question.

The DPSIR framework, or model, was developed in the 1990s by experts from the Organisation for Economic Cooperation and Development (OECD) and the European Environmental Agency (EEA), (EEA, 1995, 2003; OECD, 1993, 2000), drawing on the concept of environmental impact, to account for a range of environmental problems and policies in similar terms. Based on system analysis, this model expands the ballistic metaphor of *impacts* used in environmental law to identify *pressures* and *driving forces* responsible for altering the *state* of the environment and *responses* likely to restore it. The framework was easy to transpose to any environmental issue, and became a common reference for modellers in this area. Meanwhile, the Directorate-General for the environment (DG Environment) of the European Commission specifically targeted water management, a field in which models

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are widely used, as a strategic policy domain (Aubin and Varone, 2002; Kallis and Nijkamp, 2000). Consequently, the use of the DPSIR framework has become particularly pervasive throughout the European Union (EU) in water resources planning, notably for the purpose of comparing the cost-effectiveness of management options – *responses* in DPSIR language – as required in many EU directives.

This framework relies on a single biophysical model representing the environment. It also presumes that the state of the environment, as represented in the model, is a serious concern upon which society should act. Other possible concerns on the political agenda are ignored, and politically important links between environmental questions and other dimensions – inequalities, for instance – are generally not mentioned. Historical power relationships surrounding water, referred to in social science as "water politics", that resulted in environmental "pressures" in the first place (Alatout, 2008; Espeland, 1998; Trottier and Slack, 2004) are similarly obscured. Garb et al. (2008) therefore argue that biophysical models shape the cognitive landscapes of stakeholders invited to contribute to scenarios in "Story And Simulation" (SAS) exercises (Alcamo, 2001), the most commonly adopted approach in the field of research to develop scenarios with stakeholders, and which is presented in Section 1. This article proposes an alternative scenario construction method, taking into account the plurality of concerns within society, and consequently identifying which biophysical models would be best suited to different research purposes.

Our method is broadly situated within the critical realist tradition, which rejects strong relativism and positivism alike. It "suggests important truths about nature, albeit generally on different scales (...) and [admits] that all knowledge is partial and a certain degree of relativism is thus unavoidable" (Proctor, 1998: 352). The method was tested on the Garonne River. The Garonne River begins in the Spanish Pyrenees and flows 525 km through southwest France down to the Atlantic Ocean, via the Gironde estuary (see Fig. 1).

The paper is organised as follows. Section 1 presents the method. It first examines the DPSIR model, discussing its strengths and weaknesses (Section 1.1). How social theory can support a society-centred approach is then discussed in Section 1.2. From this, we develop a method to build DPSIR models corresponding to different water-related environmental issues (Section 1.3). Section 2 deals with the case of the Garonne River, for which a specific socio-hydrological DPSIR-like model was developed to understand and govern summer flows. We highlight the social and political assumptions justifying how the system was delimitated and how flows were quantified. Section 2.1. first describes the manner in which the Adour-Garonne river basin authority currently represents and manages the Garonne River system. Section 2.2. draws up a "genealogy" (Pestre, 2009) of the "Minimum Flow Requirements" (MFR) in order to understand how, and for whom, they became a norm and how they framed research issues. Section 2.3. identifies the links between MFR and a system of governance, with specific rights and responsibilities relating to the state of the Garonne River and particular financial agreements. The method designed in Section 1 was applied to the Garonne River. Section 3 displays the resulting scenarios in three different socio-environments under the same conditions of climate change. Each scenario considers a different area of responsibility: Gascony (Section 3.1), the Garonne valley (Section 3.2), and the European Union (Section 3.3). We infer actors' strategies and interests for the future from their past political commitments. The paper concludes with a discussion about the consistency of the resulting scenarios.

## 1. Building socio-environmental scenarios

### 1.1. Combining biophysical determinisms with actors' deliberations in the DPSIR model

Although the evolution of environmental systems is not purely deterministic, determinist models have previously proved to be powerful tools in better understanding their biophysical behaviour. However, managers are not always at ease with the use of biophysical models. Parson (2008) argued that models failed to produce useful outputs for decision makers when the latter were mere end-users. Such a gap between science and management has become a growing source of concern for EU governance bodies, notably the European Commission, which seeks support for policy design from managers and scientists (Robert and Vauchez, 2010). In this context, environmental scenarios have become a key method of translating integrated assessment models into understandable policy options (Alcamo, 2008; Bailey, 1997; Mahmoud et al., 2009; Therond et al., 2009).

Scientists producing such scenarios use narratives to imagine how socio-economic drivers could affect biophysical systems. The SAS method revolves around iterative adjustments between storylines developed by participatory panels and model simulations (Alcamo, 2001, 2008). Iterations are designed to produce consistent scenarios that integrate qualitative and quantitative information validated by stakeholders involved in the process early on (Kok et al., 2007). By combining determinisms and deliberation, scientists aim to integrate disciplines, improve communication on complex issues, support the comparison of policy options, test the robustness of policies, raise awareness about emerging problems, and support stakeholder involvement at the interface between science and decision making (Alcamo, 2008; Duinker and Greig, 2007; O'Neill et al., 2008). Despite critiques cited in the introduction (Kallis et al., 2006), proponents of the SAS method argue that it increases the legitimacy, credibility, salience, relevance, and creativity of scenarios (Alcamo, 2008; Hulme and Dessai, 2008; Parson, 2008). They advocate a dual improvement: involving more stakeholders, and making the process more explicit, through the use of causal loop diagrams, mind mapping, and quantitative models. This in turn means that environmental science and policy specialists find themselves confronted with representations that are difficult to share with outsiders. In this context, the DPSIR model is extremely useful in assessing future options with a limited set of variables. However, few scholars have reflected on the strong premises in a framework such as the DSPIR model. Indeed, this model draws implicitly upon the analogy of gravity acting on a pair of scales (see Fig. 2). It represents social practices as deterministic inputs – *pressures*, and does not discuss the specific scale used to manage the environment. We believe that the social practices and the choice of scale deserve greater attention.

The term "pressures" implies that relations between human practices and environmental degradation are as inescapable as gravity. The term "responses" suggests that it is possible to redress the balance, but does not take into account the various political processes and contexts in doing so. Both terms overlook the fundamental difference between social and biophysical relationships: whereas biophysical processes are governed by necessary and/or sufficient causal relations, "most human decisions, most political decisions involve (...) non-necessary and non-sufficient causal relations" (Trottier, 2006). The terms "pressures" and "responses" conceal conflicting accounts and responsibilities relating to environmental degradation.

The Pressures-State-Impacts part of the model deals with one definition of environmental degradation, whereas different groups