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The use of cost–benefit analysis in environmental policies: Some issues raised by the Water Framework Directive implementation in France

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ABSTRACT

This paper aims to practically contribute to the literature on the use of cost–benefit analysis (CBA) and economic evaluation in environmental decision-making through a practical case study: the implementation of the Water Framework Directive (WFD) in France, for the first cycle (2010–2015). The WFD requires that Member States achieve "good status" for all water bodies in 2015. However, exemptions can apply, if justified, on natural, technical or economic reasons. For the latter, EU guidance documents recommend to use CBA. In France, the water agencies carried out 710 CBAs on proposed restoration projects for water bodies. This article reports on this experience. Issues concerning these analyses are discussed, especially the assessment of non-market benefits. Finally, this article questions the use of economic analysis in the implementation of environmental policy.

1. Introduction

1.1. Cost–benefit analysis and valuation in environmental policy-making

1.1.1. Context

Both economics and law offer normative benchmarks on the way public policies should be implemented (Kirat, 2012). The legal benchmark relies on laws adopted by citizens' representatives, the economic one on social welfare reflecting individual preferences. The latter can be used against the former when it helps policy-makers to balance the costs of public policies, e.g. related to health, transport, environment, with the social benefits generated by these policies. In particular, cost–benefit analysis (CBA) is applied to environmental policies in order to compare the social costs and benefits of legal environmental norms (Hansjuergens, 2004; Hansson, 2007). Its use has grown in Europe since the mid-1980s (Börger et al., 2014; Pearce et al., 2006).

Two categories of economic values are usually differentiated to perform a CBA (Heal, 2000): the first is use values (divided into direct use, e.g. angling, and indirect use, e.g. flood control) and the second is non-use values (divided into bequest for future generations, altruistic and existence values of the biodiversity components, e.g. the existence value of wild species).

Assessing use values through monetary indicators is relatively easy when they are connected with market prices (e.g. production of drinking water), but it is more complex to capture the non-market benefits (e.g. recreational fishing or bird watching). To estimate non-market benefits, three types of valuation methods can be used (Barbier et al., 2009): cost-based methods (cost of avoided damages, replacement costs, substitute costs, restoration costs, impact on productivity); revealed preference methods

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(hedonic pricing, travel cost method); stated preference methods which employ hypothetical markets (willingness to pay (WTP) based on contingent valuation or choice experiments).

Stated preference methods are the only way to capture non-use values in monetary units (Heinzerling, 2011; Levrel et al., 2012). Thanks to these methods, it is possible to assess how much people would be willing to pay (or accept as compensation) for conserving (or degrading) a component of the environment from which they do not benefit, but which has value by virtue of people expressing an attachment to its existence.

To facilitate the implementation of these conventional valuation methods, the benefits transfer method is increasingly used in order to carry out a large number of CBA at low costs (Johnston and Rosenberger, 2010). This method involves applying to a given site a monetary value obtained from another site – ideally similar regarding its biophysical and socio-economic characteristics – with adjustments if necessary. The method is now widely used as it can lead to substantial savings.

Once the values for all benefits estimated (provided that duplications are avoided), they are aggregated to give the "total economic value" of the targeted environmental components (CGDD, 2011; Chevassus-au-Louis et al., 2009).

Although the literature often mentions an increasing use of CBA and economic valuation to support environmental decision-making, some authors argue that their actual utilisation remains limited in practice (Laurans et al., 2013; Nyborg, 2014; Posner and Adler, 2000; Salles, 2011). Few concrete examples have been published, and knowledge on whether and how they are used, and on their practical limitations, is still lacking (Laurans et al., 2013; McKenzie et al., 2014).

1.1.2. Objective of this paper

First of all, this paper intends to give a concrete example of economic valuations applied to an environmental policy, i.e. the Water Framework Directive (WFD) implementation. Second, this article aims to illustrate the methodological difficulties raised by CBA and the uncertainties affecting the assessment process. Lastly, this paper will discuss the strengths and limitations of using an economic benchmark in environmental policy implementation.

1.2. Background: the Water Framework Directive and cost–benefit analysis

1.2.1. Economic analysis in the WFD

One notable exception of an environmental public policy where monetary valuations are broadly used is the European WFD (Laurans, 2006). This Directive, published in 2000, requires Member States to achieve "good status" for their "water bodies" (lakes, stretches of water courses, groundwater and coastal water) by 2015. Exemptions from deadlines or objectives may be justified on the basis of three types of arguments: "technical" (no technical means exist to achieve the objective), "natural" (the natural environment response time is such that the deadline cannot be met) and "economic" (the cost of a project, or group of measures, that should be implemented to achieve good status is considered as disproportionately costly). In the following sections, we focus on the latter. According to Article 4 of the WFD, disproportionate costs can justify extending deadlines for good status achievement to 2021 or 2027 and setting less stringent environmental objectives than good status.

1.2.2. Exemptions and disproportionate costs in the WFD

The WFD therefore requires the use of economic analysis to support public decision-making, and to assess the risks of disproportionate costs supported by society, arising from its implementation. However, the WFD does not specify which criteria and methods should be used to assess and decide whether costs are disproportionate. Yet, water quality targets can be altered through exemptions based on this analysis. Biases in competition could arise between Member States through differences in interpretations. At the river basin or even at a more local level, it is clear that studying whether a project is disproportionately costly will expose tensions between environmental services delivered by the project and the changes necessary to achieve them. The most appropriate method to use to assess whether costs are disproportionate has been debated by Member States' Water Directors. In this debate, some countries have supported the assessment of stakeholders' financial ability to bear the costs (e.g. Denmark), whereas others have preferred CBA (e.g. England) (Martin-Ortega et al., 2014).

Balancing the legal benchmark for good status against an analysis of the costs and benefits of achieving this objective for society may appear entirely justified. If the social cost of an environmental measure is deemed to be "disproportionate", then it should be possible to reduce its scope. This explains why this precaution was explicitly mentioned in the Directive. However, applying this criterion entails a risk of substantially reducing the environmental scope of the legal framework. As a consequence, it is essential that Member States calculate these costs and benefits in a robust way.

2. Method

2.1. The case study

Materials used in this paper are based on the French implementation of 710 CBA (corresponding to water bodies or groups of water bodies) aiming to assess whether the costs of reaching good status for water is "disproportionate" or not. The water agencies economists (authors of this paper) carried out these CBA to justify exemptions during the first WFD implementation cycle. They also had to present these results for discussion and take stakeholders' feedback into account. Consequently, data and results rely on the authors' own experience.

2.1.1. Water governance and the French water agencies system

The water agencies are responsible for the WFD implementation. Created in 1964, they coordinate water policy at the river basin level in order to maintain or restore water quality. They levy taxes on water uses and grant financial support to project leaders seeking to improve water management. The level of subsidy provided and the amount of tax levied are defined and approved by a Basin Committee, i.e. a "Water Parliament", which includes representatives from local governments, water users and the central government. In this framework, the Basin Committee defines the objectives of the river basin management plans. They are submitted for approval to the coordinating State representative for the basin.

2.1.2. The approach for disproportionate costs in France

In France, guidance on exemptions was published in October 2009 detailing the method to be used[1] for disproportionate costs assessment. Monetary valuation and CBA should be applied to water bodies for which measures were "likely to incur disproportionate costs" (on financial capacity criterion), if exemptions could not be granted due to a lack of technical feasibility or to natural conditions. When benefits were less than 80% of costs, it was considered that costs were disproportionate. This rule, decided at

[1] Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer, 2009. Guide Méthodologique de justification des exemptions prévues par la directive cadre sur l'eau, pp. 1–54.