

Problems of Scalar Fit in Implementing the EU Water Framework Directive – Contributions of Transaction Cost Economics and a Framework for Empirical Research¹

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1 The Problem

One of the major innovations of the Water Framework Directive (WFD) of the European Union is that it requires its member states to manage water resources at the river basin level (EU). In order to achieve a good status of all water bodies until the year 2015 the member states are supposed to prepare river basin management plans and programs of measures to be implemented at a river basin level. However, in particular for federal states, such as the Federal Republic of Germany, where the responsibility for water resources management is with the federal states (German Länder), the implementation of a river basin management approach remains challenging. Some rivers feature a river basin management approach at the local level, such as the river basin associations in North Rhine Westphalia (e.g. the *Ruhrverband* and the *Wupperverband*) (Petry and Dombrowsky 2007). However, in particular for river basins transcending state boundaries pose significant problems of fit between hydrological scales on the one hand and political and administrative scales on the other (Moss 2003). This raises the question how such a river basin management approach can best be implemented in federal states.

In principle, two different approaches to solve such problems of scalar fit are conceivable, an organizational solution and a cooperative solution (Oates 1999; LAWA 2001; Dombrowsky 2005). In the case of the organizational solution (*Planungsverbund*), a specific river basin organization is being set up and responsibilities are transferred from the existing political-administrative units, such as the respective federal states, to the river basin organization. Such a river basin organization would be equipped with its own budget and would have the power to set norms. In the case of a cooperative solution (*Koordinierungsverbund*), a commission or similar arrangement at the river basin level would be set up within which the exist-

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ing relevant jurisdictions cooperate and reach agreements. However, the budgetary and norm-setting competences would rest with the respective states.

In order to evaluate the advantages and disadvantages of a cooperative versus an organizational solution, a research framework is being proposed that builds upon economic concepts and empirical work. While the detailed empirical work is still outstanding, this paper will present first conceptual findings drawing upon Transaction Cost Economics. Section 2 will present the main insights of TCE. Section 3 will discuss the applicability of these considerations for the resolution of problems of scalar fit in the management of water resources. Section 4 will outline a framework for empirical research.

2 Implementing the Water Framework Directive in Germany

For implementation of the WFD in Germany, ten river basin districts have been defined for which Programs of Measures and River Basin Management Plans will be developed by 2009. Due to its federal structure, Germany decided to forego the establishment of river basin organizations and rather to set up cooperative arrangements among those federal states which share a river basin, allowing for coordinated water management at the basin level (LAWA 2001; Strathenwerth 2002). This decision was taken for a number of reasons: First it was expected that the set up of river basin organizations would be difficult from a constitutional point of view and would result in difficulties of determining the competences of the federal states and the respective river basin organizations respectively. Second it was expected that planning for the implementation of the WRRL would tie in more closely with usual practice of water resources management within the German Länder. Third it was argued that the cooperative solution could build upon the positive experience of existing coordination structures between the Länder in the Elbe and Rhine river basins (ARGE Elbe, Deutsche Kommission zur Reinhaltung des Rheins) (LAWA 2001: 9f).

The detailed arrangements for the implementation of the WFD in Elbe river basin are illustrated in Figure 1. In principle, at each level of political-administrative organization a mechanism for coordination at the hydrological level is being set up. The lowest hydrological level considered is the level of water bodies which are usually located within a certain federal state. Federal states, however, coordinate both at the sub-basin level through 'coordination groups' and at the level of national river basin districts in the form of 'river basin associations' for the (*Flussgebietsgemein-*

schaften). The Working Group of the Federal States on Water (LAWA) which assembles representatives from all federal states and the federal government, serves as an overall coordination body, e.g. by developing a national implementation guidance document (LAWA 2003). In addition, for river basins transcending international boundaries, international coordination groups are being set up. In their work these also rely on existing international water commissions, such as the International Commission for the Protection of the Elbe or the International Commission for the Protection of the Rhine.

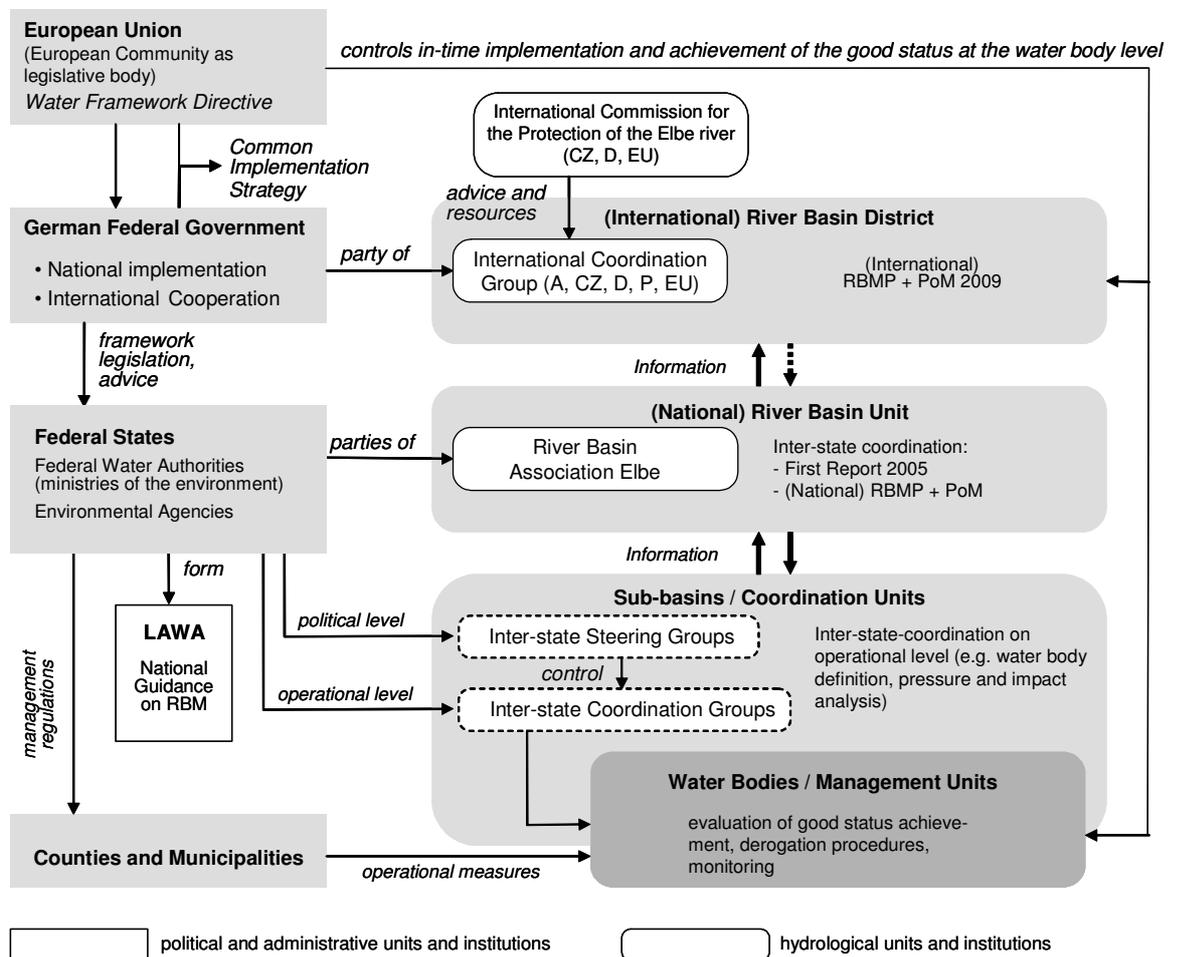


Figure 1: Preliminary institutional arrangements for implementation of the WFD in the Elbe River basin (Petry 2005)

This means that the federal states maintain their legislative as well as executive autonomy and continue to be the key players in water resources management. At the same time, their decisions have to be coordinated at the river basin level. In consequence, all management activities have to be coordinated at the state as well as at a river basin level.

The emerging practice shows that while the EU procedures are formally harmonized within basins and sub-basins, e.g. in common reports, the methods, models, and assessment procedures, used for pressure analysis and impact assessment for instance, may still differ from federal state to federal state sharing a basin or sub-basin. For example, surface water or groundwater bodies in a similar condition might be at risk of failing the good ecological or chemical status in one federal state while meeting them in another for methodical reasons only (FGG Elbe 2007).

From these preliminary observations it may be concluded that the German federal states still have some way to go before they achieve meaningful river basin management. On the other hand, one of the benefits from the emerging institutional regime is that River Basin Management Plans and Programs of Measures can rely on the legislative and executive power of the established federal state authorities. At the same time, the 'hydrological management track' (right column in figure 1) clearly increases transaction costs due to the requirement of double coordination within administrative and hydrological boundaries. The German Advisory Council on the Environment, an advisory body for the federal government, has criticized the decision to pursue the cooperation model as inappropriate for the realization of adequate river basin management. The Council recommends that

"the federal government be given concurrent legislative powers in order to ensure the coherent transposition and subsequent implementation of EU legislation on the protection of surface waters. In parallel with changing legislative competences, alternatives to the planned, or already agreed upon, interstate cooperations should be considered, as the current administrative structures are, in the opinion of the Environmental Council, not compatible, in the final analysis, with the effective and efficient management [of] surface waters in river basin sections."(SRU 2004:36).

This statement indicates that the final judgment on the expedience of the existing arrangements is still out. At the same it raises the question what an organizational solution would look like in the case of Germany. In order to gain further insights into the choice between a cooperative and an organizational model, in the following the problem shall be conceptualized from an economic perspective.

3 Economic Conceptualization - Negotiated versus Hierarchical Solutions

In order to analyze the choice between an organizational and a cooperative solution towards a river basin management in the following two extreme forms of coordination will be conceptualized and compared in terms of their capacity to lead to efficient outcomes: voluntary negotiations on the one hand and hierarchical decision-making on the other.²

3.1 Efficiency of Negotiated Solutions

From an economic perspective, transboundary water problems can be conceptualized as externality problems and the efficiency and transaction costs of negotiated agreements can be analyzed on the basis of the Coase theorem (Coase 1960). According to the Coase theorem, in a bilateral setting, negotiations on external effects lead to efficient outcomes if property rights are fully defined, and if there are no transaction costs involved. Property rights can be understood as the rules regulating the use of objects, the capture of income from them, and their alienation. Transaction costs comprise all costs leading to, and of implementing a transaction. They involve search, information, bargaining and enforcement costs.

In the case of transboundary negotiations over the use of water, these efficiency conditions will rarely be entirely fulfilled. Instead, transboundary water negotiations are prone to go along with relatively high transaction costs. This includes in particular information, bargaining and enforcement costs. Furthermore often they are also characterized by situations in which property rights to water functions are not fully defined or disputed.

With respect to *information costs*, it is useful to distinguish between information costs concerning the substantive issues on the one hand, and with respect to the preferences and potential strategies of the respective actors on the other. Substantive information about water resources and their behavior and possible management strategies requires scientific monitoring and analysis. Thus the compilation of respective information entails considerable transaction costs. In the case of transboundary water resources, each jurisdiction usually only has access to information within its boundaries, and in the absence of further arrangements there are no mechanisms in place to analyze this information and to develop manage-

² Earlier discussion of these two mechanisms for the case of international water management have been presented in Dombrowsky (2005) and Dombrowsky (2007).

ment measures at the river basin level which might present a major obstacle towards identifying mutually advantageous solutions.

With respect to information about the preferences and potential strategies of the respective participants, negotiations have the distinct advantage that all participants may articulate their preferences. However, in doing so negotiators are often faced with the so called *negotiator's dilemma* (Lax and Sebenius 1986). Negotiators must solve two problems. They have to identify potential welfare-enhancing solutions (problems of production), and they have to agree on the sharing of the net gains from cooperation (problems of distribution). However, simultaneous problem-solving (coordination game) and distributive bargaining (zero-sum game) requires contradictory negotiation attitudes. While the solution of production problems requires creativity, effective communication and trust, the success of distributive bargaining depends on strategic and opportunistic behavior and the withholding of information (Scharpf 1997:139 f.). Opportunistic behavior means that parties are willing to use guile in the pursuit of their self-interest (Williamson 1985: 30; Williamson 1985). The implication is that those who seek to contribute in good faith to problem-solving make themselves vulnerable to exploitation should negotiations fail or when it comes to the sharing of the benefits from cooperation. The negotiator's dilemma has the structure of a Prisoner's Dilemma game (Lax and Sebenius 1986: 39).

Negotiation costs mainly pertain to costs of bringing negotiators together and to the time required to reach an agreement. Both can be relatively high in a transboundary context. Transaction costs usually increase with the number of players involved. From an analytical point of view if each actor has to negotiate with each other actor, the number of negotiations increases exponentially with the number of actors.

Bargaining costs apply to costs of reaching an agreement on the sharing of the gains of cooperation

Additional transaction costs occur with respect to the *enforcement* of agreements, as any monitoring and sanctioning mechanism involves extra costs. In the case of inter-state agreements, the question is whether the federal government would be able to ensure that agreements are enforced. Otherwise respective agreements would have to be designed in a way so that they are self-enforcing (e.g. Barrett 1994). Hence, the respective parties would have to sanction non-cooperative behavior.

Next to these transaction costs, *property rights* to water are often not well defined, and may even be disputed. The clear-cut definition of property rights to water is further exacerbated by the fluidity and multifunctionality of the resource. Thus, often the purpose of transboundary water negotiations is not the exchange of property rights, but their definition,

i.e. the mutual recognition of respective property rights to water functions by the parties involved. While the issue of property rights is often being perceived as zero-sum bargaining, the mutual recognition of property rights usually also has welfare enhancing effects. Economic incentives for the definition of property rights are the creation of assets, e.g. by maintaining the resource against depletion or pollution, and the establishment of the preconditions for potential gains from the trade in property rights (e.g. Libecap 1989). The latter requires that property rights are tradable. In a federally organized state the question is whether agreement on property rights depends on voluntary negotiations among federal states or whether the federal government also plays a role in their definition.

In sum, while negotiations in principle have the potential to lead to efficient outcomes, in the case of transboundary water management, this outcome is unlikely as long as property rights are disputed. Furthermore, the ex ante and ex post transaction costs of negotiated solutions may be high. Therefore, in the following the problem-solving capacity of hierarchical direction will be analyzed.

3.2 Efficiency of Hierarchical Solutions

While negotiations require each negotiation partner's consent in order to reach a decision, in the case of hierarchies, a decision-maker exists who can impose a solution on other actors. This raises the question under which conditions hierarchical direction leads to efficient outcomes. It can be argued that this will be the case if the decision-maker has all relevant information and uses them, and if he or she acts in the interest of all members of the organization and their constituencies. The first condition points at the position of the omniscient and the second at that of the benevolent dictator. Reversely, this implies that the efficiency decisions may be decreased by information and motivation problems (Scharpf 1997: 174-183).

Information problems pertain to the problems in transmitting information from lower to higher levels of organization. These problems may often either lead to information overload or impoverishment at the decision center. The result may be ill-informed or unresponsive decisions. In the case of private firms, transaction cost economics tends to be rather optimistic about the possibility of a relatively frictionless transfer of information within private organizations if the 'principle of selective intervention' is applied, which says that superiors should strictly limit their interventions to matters that must be handled at their own organizational level (Williamson 1985: 133-135). In contrast principal-agent theory assumes that fundamental information asymmetries exist between principal and agent, leading to moral hazard and opportunistic behavior (Grossman and Hart 1983).

For public bureaucracies, Hayek (1945) has pointed out that hierarchies tend to lack mechanisms to mobilize information in the form of local knowledge, both concerning production opportunities or management options and concerning demand. Thus, hierarchies are principally faced with the problem of the transmission of information from affected people and lower levels of administration to the decision-making center. How severe these problems are, depends on how successfully organizations realize the principles of subsidiarity and participation.

Motivation problems pertain to principal-agent problems and the problem of government failure. They are at the heart of the principal-agent and the public choice literature. The motivation problem in the public sector may be illustrated by contrasting it with decision-making in the private sector: When it is assumed that the owner and the manager of a firm coincide in the same person, and that the owner-manager is also the residual claimant of profits and losses, motivation problems can be largely neglected. In this case the pursuit of the self-interest of the owner-manager can be expected to coincide with the overall interest of the firm. If, however, the company is owned by shareholders and the firm is managed by an employed executive manager, this relationship between the shareholders and the executive manager can be characterized as a principal-agent problem, in which the executive manager's interest does not necessarily coincide with the shareholders' interest. Similarly in the public sector, if we drop the assumption that politicians and bureaucrats solely act in the public interest, but if it is assumed that they represent rational, self-interested individuals, then there may be many situations in which decision-makers do not decide in the public interest even if they know what the public interest is. In the public sector, the motivation problem can to a certain extent be alleviated once mechanisms ensuring democratic accountability are in place. This requires the set-up of a circular relationship between the governor and those governed. Elections then provide the opportunity to elect the candidate who best represents the interest of the voter and to deselect politicians who did not act in the voter's interest.

In sum, a hierarchical decision-maker theoretically can be expected to impose an efficient (and fair) solution if he or she has all relevant information and if he or she acts in the interest of all members of the organization and their constituencies. Hence, the efficiency of a hierarchical solution relies on the establishment of mechanisms that ensure subsidiarity and accountability.

3.3 Implications for River Basin Management

What are the implications of the above for the institutionalization of river basin management? Neither voluntary negotiations nor hierarchical direction within a hierarchical river basin organization appear to represent ideal coordination mechanisms. The above shows that if we (or the SRU) talk about river basin organizations we need to specify what we mean by that. When reference is made to river basin organizations equipped with far reaching decision-making competencies, clearly information and motivation problems must be addressed in a careful manner. One main problem is how to maintain accountability once decision-making competencies are transferred from (democratically or otherwise) accountable jurisdictions to a river basin organization. More specifically, does the need for expert knowledge justify a curtailment of democratic accountability? The answer appears to depend on the role of expert and local knowledge respectively. As argued above, given complex interdependencies in the natural system, decisions in water resources management to a great extent need to be informed by expert knowledge. However, it appears to be equally important to have mechanisms in place that ensure that the legitimate interests of affected parties are taken into consideration. In this respect, a hierarchical river basin organization would seem to have a disadvantage compared with set ups in which the legitimate interests of affected parties are represented by representatives for whom mechanisms ensuring accountability are readily in place.

In other words, the respective organizational solution could only be considered efficient, if it was ensured that the respective organization had all relevant information and if there was a mechanism that ensured its accountability vis-à-vis the public. However, this may be difficult to achieve at least at the level of the larger river basin districts that transcend several German Länder. It may, however, still be an interesting solution at a local level. However, even in this case the question is how different interests can be represented and what the ultimate decision-making modus would look like. And even if decisions were made by a group of representatives would that not imply a reversion to negotiated decision-making?

Overall, the above conceptual considerations caution if an organizational solution would make sense in a federal setting. Still, given that the cooperative model for the implementation of the WFD in Germany is also frequently questioned, an empirical analysis of these arrangements is being proposed.

4 Implications for Detailed Empirical Research

In order to gain greater insight into the expedience of the existing institutional arrangements for the implementation of the WFD in Germany, it is proposed to carry out a more detailed empirical analysis of the expedience of the institutional arrangements in two German river basins, the Rhine and the Elbe basin. In doing so two levels of political-administrative organization shall be addressed: the inter-state level and the municipal/local level. In the Rhine basin the respective local level analyses will be carried out for the Wupper sub-basin. In the Elbe basin the local level analysis will be carried out for the Erlbach. The Wupper sub-basin has been selected as the Wupper has long-standing experiences with an organizational solution. For more than 100 years, responsibility for water resources management in the Wupper basin has been with the Wupperverband. The Erlbach has been selected as it serves as a pilot area for the definition of River Basin Management Plans and Programs of Measures in the State of Thuringia. In the case of the Erlbach, the planning process is by and large carried out by the state water administration. Thus, at the local level two different institutional arrangements will be compared (quasi 'hierarchical' and RBO approach!).

The advantages and disadvantages of the existing arrangements at the inter-state and the local level will be identified through qualitative interviews. Based on the interviews opportunities and limits for institutional change will be identified.

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