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Integrated Regimes and Sustainable Use of Natural Resources: A Multiple Case Study Analysis

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Introduction

This paper contains a comparative analysis of the case studies in the Euwareness project. The Euwareness project was a European Union sponsored 6 country study on the development of integral water management in the context of the European Water Framework Directive. Apart from country screenings also cases were studied of tributary river basin areas. In these case studies we looked at the accessibility of water systems as a natural resource for various users and use functions. In that context we considered rivalries between users and use functions as an indicator of an insufficiently sustainable use of water systems. A water system means a discrete and homogeneous element of surface water or groundwater such as an aquifer, a lake, a reservoir, a stretch of stream, river or canal, an estuary, or a stretch of coastal water. We assume that the sustainable use of water systems requires an optimum distribution of use options among present and future users and use functions. An example of distribution of use options is the distribution between upstream and downstream users. An activity that pollutes water upstream (using a stream to discharge waste or waste water) could interfere with the downstream use of that stream for drinking water supply. Or an upstream weir could impede the downstream flow and flow dependent use options. Such rivalries not only exist between different (heterogeneous) use types, they may also appear among homogeneous uses (uses of the same type). In arid areas farmers may feel the need to co-ordinate the water use for

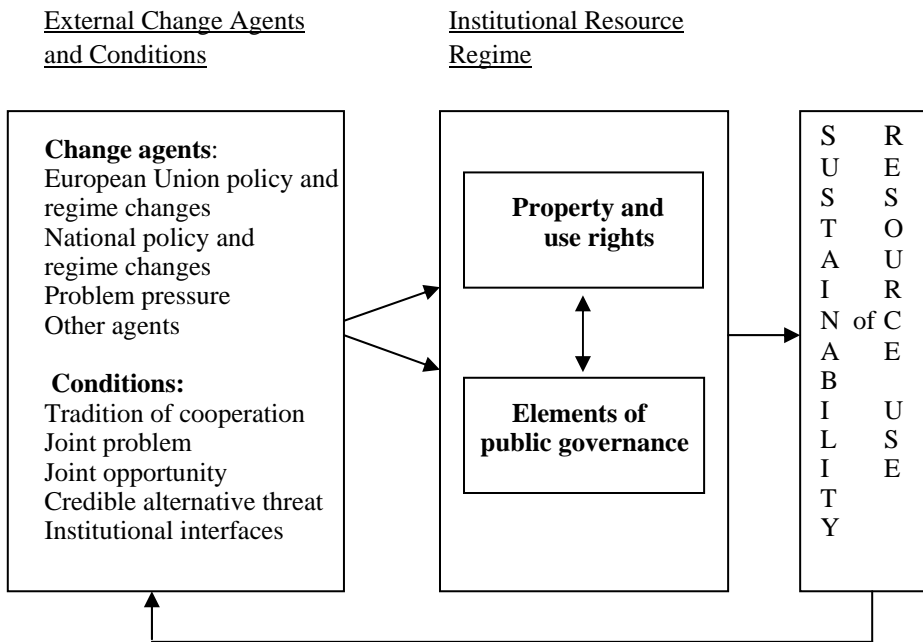
irrigation. Or in the field of fisheries, quotas may be used as an instrument to prevent the depletion of fish stocks.

A water system is often demarcated as a river or water basin, which means the area of land from which all surface water run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea via a single river mouth, estuary or delta. This implies that a water basin not only includes the water beds, but also the surrounding area of land from which the water bed receives and transports the water run-off. In this view the land use of river flood plains for urban development should be considered as a use that interferes with the use of flood plains for river dynamics and flooding. Another example of a water use rivalry in a water basin could be the rivalry between drainage of land for agricultural development versus the function of a minimum groundwater level for nature conservation in that area.

The main question for the researchers was whether the regime for the management of a water system provided sufficient guarantees for its sustainable use, by diminishing or preventing rivalries between users and use functions. To answer this question we focused on institutional regimes for natural resources, both from a public governance perspective (Bressers & Kuks 2001) and a perspective of private property and use rights (Ostrom 1990; Bromley 1991). The first perspective focuses on the management of natural resources from a public domain (although in interaction with private actors). The second perspective focuses on the accessibility of a natural resource in a broader sense, including the private domain, the domain of collective property and use, as well as the domain of 'no property' (*res nullius*). By applying both perspectives in a complementary way, we have developed a framework for understanding the access rights that users or use functions may possess or claim, and the proportion between and exclusiveness of the various domains. For instance, the option of having intervention from the public domain could be blocked by the existence of a private domain based on long term concessions for water use (which, especially in Spain and Switzerland, appears to be a problem of redistributing water access rights). On the other hand, attempts initiated by the public domain to redistribute private property and use rights could be effective in providing a better access to or protection of alternative users and use functions. Another question could be how the exclusiveness of the public domain is interpreted by public authorities. Does the public domain offer equal access to society as a whole, or are specific users and/or use functions discriminated against in favor of others? A public domain could appear as a private domain in the hands of society at large, or as a 'no property' domain, owned by no one and thus equally accessible to all.

We interpret ‘regimes’ as institutional resource regimes, comprised of a public governance component and a property rights component. The combination of those components can be more or less integrated and influences the sustainability of the use of the given natural resource. In turn, these regimes, or rather their property rights and governance components, are influenced by external change agents, which leads to regime change. Figure 1 illustrates these dynamics¹ as will be investigated in the case study comparison.

Figure 1, Research model



As the figure shows there are three groups of variables. These are linked by the central relationships in the research questions:

1. How far do more integrated water resource regimes lead to more sustainable resource use?
2. What change agents and conditions cause shifts towards more integrated regimes?

¹ We acknowledge the existence of several other possible feedback relations, but they are not presented in the graph since they receive less attention in our discussion.

The integration of the 'institutional resource regime' is the central variable. Question 1 should show the results of such integration. Question 2 should provide explanations for it.

In the next section, we start by explaining the regime components, the factors that might contribute to the integration of resource regimes, and our expectation of how more integrated regimes might benefit a more sustainable resource use. Section 3 goes into the methodology of the study and the comparison. Section 4 shows the results of the comparative analysis. Section 5 concludes with an outlook on the implications of these results for the European water management policies.

2 The public governance and property rights components

2.1 Governance

The governance structure of a regime can be analysed along five dimensions or elements. Thus, the governance structure of a regime can be parsed into (for an elaboration and basis in literature see Bressers and Kuks, 2003):

1. Levels and scales of governance (Where? - Multi-level: not necessarily administrative levels; 'governance' assumes the general multilevel character of policy making and implementation)
2. Actors in the policy network (Who? - Multi-actor: 'governance' assumes the multi-actor character of policy making and implementation)
3. Problem perception and policy objectives (What and why? - Multifaceted: 'governance' assumes the multifaceted character of the problem perceptions and objectives of policy making and implementation)
4. Strategy and instruments (How? - Multi-instrumental: 'governance' assumes the multi-instrumental character of policy strategies)
5. Responsibilities and resources for implementation (With what? - Multi-resource-based: 'governance' assumes the complex multi-resource basis for policy implementation)

This elaboration of governance is used in the Euawareness study, for instance to determine the degree of coherence of governance.

2.2 Property and use rights

Property rights arrangements are the second important component of an institutional resource regime (cf. Fuchs 2003). In the context of resource

research, the property rights approach is particularly worthy of mention (Bromley 1989, 1991; Bromley & Hodge 1990; Burns & Dietz 1996; Feeny et al. 1990; Schlager & Ostrom 1992; Libecap 1993; Devlin & Grafton 1998), specifically the common-pool resources theory (Ostrom 1990; 1992a; 1992b; 1994; 1997; Ostrom et al. 1994). According to Ostrom, property and use rights exercise a decisive influence on the use of natural resources in that they determine who has access to the resource and when and in what form it can be used. They define the position of interacting individuals in the community with respect to the utilization of scarce resources (Pejovich 1975: 40; Young 1994). As Stubblebine (1975) argues, the definition of property rights becomes necessary as soon as two individuals share a living environment. Robinson Crusoe didn't need them, until Friday's arrival on the island. Property rights are created or changed in response to economic forces, as opportunities to gain arise (North 1989: 1324; Feeny 1988: 273; Ensminger & Rutten 1991).

Property rights generally include the rights to use and consume the asset, to exclude others from the use of the asset, to change its form and substance, to obtain income from it, and to transfer these rights either in their entirety through sale or temporarily through, for instance, rental (Barzel 1989; Furubotn & Pejovich 1975; Kasper & Streit 1998). They are generally not unrestricted. This fact is important to remember in the context of debates on the environmentally desirable property regime. Private property rights are often treated as absolutes, which in reality they rarely are. Rather than having to choose between private property regimes, common property regimes, and state ownership, the imposition of some constraints on private property is often a reasonable alternative. Governments, for example, often impose regulations limiting the owners' options in terms of how they can use their resource.

Property rights should be conceived of as bundles of rights. With respect to environmental resources, for instance, property rights exist and frequently differ for the stock of a resource and the produced yield or the goods and services derived from a resource. 'Ownership of the resource' would thus pertain to a specific bundle of rights the owner holds with respect to the resource. The owner may, for example, hold the right to farm the land, but not to kill rare species on the land. What specific rights are regarded to be 'normally' included with the property title and to what extent these rights can also be unbundled, differs between different periods and cultures, and also between resources or other goods. Different 'property regimes' are likely to exist with respect to the attributes of many environmental resources. Property rights and regimes for such a resource thus tend to form a complex structure with several layers and dimensions.

In the context of the Euwareness project, the ‘coherence’ of this layering of property rights is of particular importance, because some combinations of property rights can also evoke rival demands for water resources. Farmers’ rights to extract water for irrigating their land can rival each other in times of scarcity, such as in Ostrom’s early irrigation studies, focusing on homogenous uses. In both the case of scarcity in a homogenous and heterogeneous use situation, property rights compete with each other. For instance, this is for instance the case when some farmers have the right to use a pond as a source for irrigation water, while the local fishery association has the fishing rights for that small lake. The objective of policy intervention in the context of an institutional resource regime, then, can lead to a coordination and harmonization of rights to different attributes of the resource and pursue sustainable management through a reduction in conflict between these rights.

2.3 Change toward more complex resource regimes

In general, we expect the elements of public governance (and the regime in general, i.e. including property rights) to exert a stabilizing influence on each other. This stabilizing influence occurs through processes of mutual adaptation of values, cognitions and resources. Thus, while changes in the elements of the governance pattern can be caused by changes in other elements, ultimately these changes must have external sources affecting one or more elements from the outside. Mutual adaptation mechanisms that, without external ‘disturbances’, have a stabilizing influence become the mechanisms by which substantial changes in one of the elements are followed by responding changes in other elements, resulting in complete regime changes.

Sources of change

In principle, external change agents can enter the scene through all of the elements that are discerned in the regime. There is a difference, though. Property rights might be conceived as somewhat more stable and less oriented towards invoking change than the elements of public governance. That means that, although property rights may act as a powerful context for developments in public governance, changing governance patterns is not their subject per se. On the other hand, interventions from the governance side often have the specific and deliberate intent to change property rights.

External change agents for the governance pattern stem from changes in political institutions, in the general policy process or policy processes in related fields, the spectrum of technological, demographic, and cultural developments mentioned above, as well as feedback from the actual problem

situation. Examples, are some specific and general external sources of change linked to the five elements of public governance (cf. Bressers & O'Toole 1995):

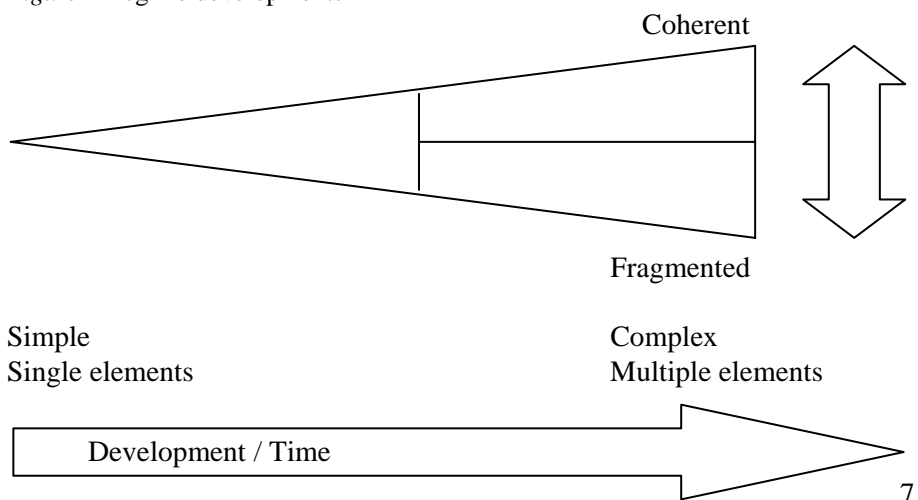
- Levels and scales of governance: Rise of the European Union;
- Actors in the policy network: Rise of environmental and nature organizations;
- Problem perception and objectives: Rise of environmental degradation information;
- Strategy and instruments: Rise of general ideological preference for indirect and procedural instrumental strategies; and
- Responsibilities and resources for implementation: Rise of proportion of (relatively) independent and businesslike organized implementation organizations, including privatization of water management.

While these fundamental sources of change agents are grouped by separate elements of the regime, we will use in the empirical research uses a general categorization of the more direct change agents that evolve from these fundamental ones:

- a. European Union originated policy pressures;
- b. National regime developments;
- c. Problem pressures;
- d. Various other pressures (e.g. rise of environmental NGO's).

These groups of change agents can be related to the development of regimes. The regime can be portrayed as moving from one stage to another. As long as one acknowledges that various intermediate and mixed situations are possible and probable, such stages can be a useful heuristic.

Figure 2 Regime developments



The integration of regimes can be described in terms of extent and coherence. The extent of a regime is the scope of the uses and users that are regulated by one or more of the regime's elements. Coherence is the degree to which these elements fit together. Very simple regimes regulate only one resource use or user. It's the way - in theory previously unregulated - resources begin to be a subject of regimes. Furthermore, relatively singular (or simple) regimes (one level, one governing actor, one problem aspect - e.g. a certain use or user - one instrument, one implementing agency) will not need coherence. Only after growth in complexity does coherence become a relevant concept. But then, it is by no means a logical follow up. Complex but fragmented regimes are empirically quite common.² While more complexity is part of a stream of societal developments that seem to increase as time goes by, both coherence and fragmentation seem to be common developments.

When we speak of complexity it means that regimes can be characterized by multiple formats in most of their elements. The most eminent feature is the gradual increase of the domain of the regime, that is the uses and users regulated by one or more parts of the regime. We will refer to this crucial variable as the regime's *extent*. Regimes with an insufficient extent are by definition weak as guardians of sustainable use, while some relevant parts of the domain go unregulated. With it also comes an increase in relevant property and use rights. The elements of governance tend to differentiate too: more layers and scales, more actors, and more perceptions of the problem and accompanying goals are involved, more instruments are part of the policy mix and more organizations share responsibilities for implementation.

Thus, complexity as such is not wrong. Most of the time, growing complexity is an answer to real needs and developments. Societies generally grew into more complexity during most of modern times. The sector of water management is no exception to that general course of development. A growing complexity in governance can be viewed as a logical adaptation to that development. This leads to the first hypothesis:

² In fact, while integration has clear theoretical advantages, it comes at a price. Every form of integration creates the need for additional interaction and increases transaction costs, at least initially.

Hypothesis 1

The observed change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes), but not without additional prerequisites to more coherent regimes.

2.4 Change toward more coherent regimes

While the growth of complexity in water management regimes seems a fairly straightforward part of a more general development in society, integration as a development is not. (See Figure 2) While the term 'integration' is common in most policy papers (e.g. 'integrated water management'), in this project we choose to use the term coherence instead, for the reason that, in most policy papers the term integration is used in a sense that implicitly or explicitly includes an increase in the domain of the regime, the extent to all relevant users and uses. Therefore, we believe that integration as it is used in the policy sphere is a combination of what we call *extent and coherence*. For the sake of conceptual clarity and the possibility to adapt to the meaning of the term integration in policy practice, we use these terms further when appropriate, and reserve 'integration' for the combination of the two.

The resource regime consists of two components and their mutual relationships: the regulative system of property and use rights and the public governance system. Consequently we discern three forms of coherence:

1. internal coherence of the public governance component of the regime,
2. internal coherence of the property rights component of the regime, and
3. external coherence between the public governance and property rights components.

By *coherence of the public governance* component we mean the following. When more than one layer of government is dealing with the same water resource (as is often the case), then coherence means inter alia that the activities of these layers of government are recognized as mutually dependent and influencing each others' effects. When more than one actor or target group is involved in the policy, coherence means that there is a substantial degree of interaction in the policy network. When more than one use or user is causing the sustainability problem, coherence means that the various resulting objectives are analyzed in one framework so that deliberate choices can be made if and when goals are conflicting. The same holds for instrumental strategies that are used to attain the different objectives, as well

as for the different instruments in a mix to attain one of these objectives. To conclude, coherence of the organization of implementation means that responsibilities and resources of various persons or organizations that are to contribute to the application of the policy are co-ordinated, or these actors themselves are co-ordinated.

The *internal coherence of the property rights system* is threatened when property or use rights are given to actors for uses that threaten uses already granted to others. This can have several background reasons. Sometimes use rights that were long seen as non-rival and thus compatible can become rival ones by a drastic increase in use, or by the use of new techniques. The internal coherence of the property rights system is thus the degree to which the interdependencies in the water system and its management that occur in reality are reflected within and between the property and use rights. The essence of this variable is that property and use rights of one actor do not inherently or under given circumstances make it unavoidable to clash with other rights and/or with the sustainability of the resource, without external intervention to prevent it.

The two components of the resource regime lack *external coherence* in case of a mismatch between actors targeted by the public governance system and actors with relevant property and use rights. In the second place a mismatch of the goods and services involved in both systems might also lead to a lack of coherence and thus change towards more coherence.

Important change (even if they involve change towards 'consensual management' or the like) often involves some kind of conflict, struggle or manipulation, with losers also involved. Even though these changes are heading towards integration, the change process itself will often involve overt or hidden conflicts (as observed in several of the case studies). Such opposition can also lead to 'failed' or partial regime shifts towards coherence, when changes in one element of the regime are encapsulated, rather than followed by matching changes in the other elements of the regime.

So, a change towards coherence occurs only when relevant actors acknowledge that coherence is necessary to prevent further deterioration of the resource and take action. Coherence is not a spontaneous development. Unlike an increase in complexity, then, developments in the direction of more coherence need some sort of deliberate attempt by motivated actors. This all leads to the question under what conditions such attempts will be relatively successful.

Conditions for coherence

Change agents and conditions belong to the same set of causal factors. We distinguish them for the reason that the 'conditions' are often forgotten. Causal explanations are often sought in the form of 'new' and 'provocative' factors that are labeled as the 'causes'. In reality, this image of causality often forgets the array of factors to which the analyst is used as being the 'normal' status (causal factors that one is inclined to forget about). It might then be delusory to think that the 'causes' really are the complete explanation of what happens.

A simple example may clarify this. When a fire burns a house and one seeks the cause, one will be looking for sources of fire (e.g. an electrical short circuit) and exceptional forms of flammable material (e.g. a leaking cooking gas container). That there is a great deal of flammable material and sufficient oxygen in a normal house will be considered 'normal' or not even considered at all, while these factors are, of course, as essential as the previous ones.

In our cases, the division between the 'extraordinary' causes (that we labeled 'change agents') and the 'normal' conditions are not as clear cut as in the example. Nevertheless, also in the case studies analyzed in this paper similar change agents sometimes set in motion a development towards coherence. Compare similar seeds sown in different seedbeds. For us, the reasons why similar problem pressures all over Europe and similar EU and even national developments have dissimilar effects on water management regimes at the case level are interesting. Here the 'conditions' enter the picture. We hypothesize the following relationships:

Hypothesis 2

Attempts to change regimes into a more coherent status will have relatively more success when:

- There is already a longer *tradition of co-operation* in the water management sector.
- There is a common understanding that the counteracting (side) effects of non-integrated water management harm sustainability and that this sooner or later will have to be stopped anyhow (*joint problem*).
- There is a notion of possible joint gains from coherence, so-called 'win-win situations' (*joint opportunities*).
- There is a credible threat of a dominant actor accumulating power and altering the public governance pattern in his interest when no solution is reached (*credible alternative threat*).
- There are well functioning institutions that provide fertile ground for coherence attempts (*institutional interfaces*).

(see appendix for indicators for these types of conditions)

2.5 The sustainability implications of more integrated institutional resource regimes

The sustainability of a given institutional resource regime depends on its property and use rights component, the public governance component, and the interaction between these. The expectation that more integrated regimes will *ceteris paribus* perform better for sustainability is part of European political ideology on water management. Here we will theoretically underpin this relationship only briefly. First we make some remarks on how we dealt with the variable ‘sustainability of the use of the natural resource’.

There are many indicators that can genuinely be considered to represent aspects of sustainability (cf. the ‘good status’ as specified in the EU water directive). It is not the purpose of our research to assess the overall sustainability of the resource use. Though, for various reasons, it is hard to give an overall assessment of the sustainability of the regime, it is less difficult to assess whether the concrete regime changes lead in the direction of more or less sustainability.

The overall sustainability of resource use was beyond our capacity as social scientists to judge. Furthermore we were especially interested in the effects of the observed regime changes. This starting point is also part of the solution to the first problem. The assessment was concentrated on the *implications of the observed regime changes* for indicators that are relevant to sustainability. Developments in sustainability of use that clearly had nothing to do with observed regime changes, for instance climate change or rapid economic development, were excluded from the judgment.

The balance between environment, natural resource protection and risk avoidance on one hand and the economic and social implications of these ecological changes and/or measures taken to achieve them on the other hand is a hard nut to crack. We weren’t inclined to judge in favor of increased sustainability without some ecological improvements, even though economic or social indicators might have improved. Here we also paid attention to the relevant EU ‘good status’ indicators.

That a sufficient *extent* is a precondition for a benign effect on the sustainability of the use has been previously explained. Non-regulated uses and users will tend to disrupt the regime effects on sustainable use.

The *internal coherence of the property and use rights component* is important for the sustainability of resource use since such coherence enables

stakeholders to better come to an agreement to guard a sustainable use even without government interference (Ostrom 1998; Sandler 1992).

The *internal coherence of the public governance component* is important because it lessens the chance that negative side-effects of one element (level, actor, instrument, etceteras) undo the positive effects of another element (cf. Ligteringen 1996). Stronger coherence will also increase the visibility and feasibility of chances to create more synergy of the various elements. More coherence can also lead to less initial uncertainty, and increase in information exchange and trust, important for dealing with uncertainties (cf. Arentsen, Bressers & O'Toole 2000). The chances also get better for productive combinations of motivation, information and balance of power with the actors involved in policy implementation processes (cf. Bressers 2004).

The *external coherence between the property & use rights component and the governance component* deals with the degree to which the proper connections are made between the elements of governance (for instance policy instruments) and the relevant aspects of property and use rights. For instance: are the actors that hold the relevant property and use rights also the designated targets of such policy instruments?

All in all this leads to the last hypothesis:

Hypothesis 3

- a) Regimes with a deficient extent will be more likely lead to degradation of water resources or inability to protect the ecological functions of the water resource, than regimes with a larger extent.
- b) Regimes with a large 'extent', but with low coherence will more likely lead to degradation of water resources or inability to protect the ecological functions of the water resource, than regimes with a similar extent but a higher degree of coherence.

3 Case study design

3.1 Selection of cases

In the research on which this paper is based, the Euawareness project, two cases are studied in each of the six participating countries. The main criteria for the selection of the cases were:

- The demarcation of a case should follow the hydrological and geographical boundaries of a water basin at a regional scale or with a tributary character.
- We have been looking for cases of rivalry between heterogeneous / homogenous uses/users of the same water resource. We preferred cases where several rivalries show up to allow intra-case analysis. It was not necessary that these rivalries are manifest in the whole case area, they might also be at stake in just a part of the case area.
- There was a preference for cases where not only public ownership but also private ownership of water resources could be found.
- Cases should be selected on the presence of at least attempts to obtain transitions towards more coherence during the last two decades.

The sample of case studies is based on a combination of similarities and differences. In some respects, it seeks similarities (e.g. medium size river basins) that define boundaries of the research subject. In some respects, it deliberately encompasses different situations (e.g. ‘wet’ cases and ‘dry’ cases). But the most significant decision has to do with how the cases relate to the three main variable-groups, since these relations influence the inferences that can be drawn about the hypotheses that relate to these variables.

There are various modes of sample selection, depending on the sort of inferences one wants to make. On the surface, the last mentioned criterion, namely that there should be the *ex ante* impression that a serious attempt to attain more integration in the regime took place in the proposed case, looks similar to the other (similarity) criteria. Nevertheless, this criterion is a combination of an extreme case sampling strategy and a random variation driven strategy (cf. Patton 1980). It is extreme case sampling in the sense that it leaves out all possible cases where there is no *ex ante* evidence that attempts towards more integration have been made. The implication of this is that if we don’t find improved factual (‘real’) integration in our cases, the chances are slim that we shall find it on any large scale outside of our sample.

It is also a random variation strategy though, since any attempt to attain more integration surely doesn’t imply its success in close observation. On the contrary, we expect to see anything, from major improvements to only symbolic alterations and everything in between, due to the various conditions of the case. To re-use a metaphor from above: we confine ourselves to cases where seeds have been sown, in the expectation that these will be shown to bear fruits to very divergent degrees. This gives us the opportunity to make an inventory of change agents observed and test expectations about beneficial conditions. On a separate case level, the

disadvantage is that in case that in practice little or no regime change towards more integration could be shown, it is not possible to look for sustainability effects of these non-existent regime changes. Nevertheless, on a comparative level we'll find some variation in the independent variable, with the hypothesis to be tested that improved integration will show connections with some improved aspects of sustainable resource use.

3.2 Case study protocol

The case studies had two stages. The first one is a descriptive one, in which the emphasis lies on the story or stories to be told. The second one is an analytical one in which the values of the variables are assessed that play a role in the theory that is used in the intra- and/or inter-case comparisons to arrive at an answer to the research questions of the project (Dente, Fareri & Ligteringen 1998). In many cases, the case study will contain more than one story of regime change. This may imply developments that can be seen as partial coherence in geographical sub-units of the case study territory or between certain aspects of the resource use but not between others. Our proposal was not to submerge these sub-stories and force them into one over-all case description, but to pay separate attention to them against the background of descriptions of the more general case situation and development. Some of the cases contain general more or less independent developments or 'stories'. In these examples, *sub-cases* may be discerned. There is only one case-story under the following conditions:

- If there is only one (major) or at least only one selected rivalry;
- If there is only one line of development or only one aspect with which the regime has changed;
- If the regime changes observed are highly interdependent; and/or
- If the rivalries in the case are highly interdependent.

If none of these statements hold true, we discerned separate sub-cases when analyzing the variables and hypotheses. A sub-case is then a set of observations for which the above criteria *do* hold.³ In many instances, this also meant that not only regimes on the water resource, but regimes on land use, nature protection and other natural resources (e.g. fish) were also at stake.

³ Compare a detective story in which more than one murder takes place. If these are interconnected it makes no sense, when analysing the plot, to divide them into sub-cases, but if they are just connected by the fact that they take place in more or less the same period, they will probably have quite different plots that require separate attention when analysed.

The analytical part of the case studies consists of the assessment of relevant variables (translating 'real life' observations into theoretical language) and the inferences and conclusions that can be based on these variables and their relationships.

As an aid to the comparative analysis, questionnaire forms were used for the case study researchers to fill in. These 'case study fact and assessment sheets' represent the variables and indicators of the theoretical model. Their purpose was to summarize the case information in a uniform format so that it case is comparable along the lines of the theoretical variables and hypotheses. The exercises of filling in the forms also proved very helpful in getting a grip on the case analysis itself.

Apart from the few short statements per variable ('key facts'), the researchers were asked to use a five-point scale to score the variables in order to make the cases comparable. Of course such a score is not a fact, but a judgment, much like marks are with school test papers. Therefore, we also wanted to know the most relevant facts that they had in mind while scoring ('key facts'). While it might give a case study researcher an uncomfortable feeling to transform observations into scores, in fact, it gave them an influence on the way the case study comparison is made. For when comparing cases one always makes, explicitly or implicitly, these kinds of judgments on the rating of variables. We chose to do so explicitly.

The great advantage of this procedure is that the people who do the assessments have extensive and intensive knowledge about the cases at hand, often even more than they described in the reports. In this way, we tried to combine the best of both worlds: the depth of information realized in extensive case studies and the clarity and overview of a data-matrix enabling all kinds of comparative analysis (cf. Patton 1980). Compared with the direct, qualitative comparison of the case studies as reported, the approach diminishes the risk of bias that the comparative analyst is misled by surprising, but anecdotal evidence of only one or two cases not representative of the relationships in the whole sample.

Since sub-cases are treated as equal cases in the analysis of the assessments of the relevant variables, cases that are split into sub-cases are in a sense over-represented in the data for the comparative analysis. Therefore, we also constructed a 'weighted database' in which all cases were assigned four units of research. That means that when a case is not split into 2 or 4 sub-cases but analyzed as a single case, that case was included fourfold in the 'weighted database'. All the analyses were also done with this 'weighted database'. Rarely, though, did the results differ.

In addition, one might question whether the case study researchers were not unconsciously inclined to 'fix' the case by assessing the variables not independently of each other but having the scores on dependent variables influenced by their assessment of independent variables or vice versa. The demanded association with mentioned 'key facts' already gave some protection against this. Luckily, we were able to test this possible form of bias. In the theory, both the forces of the change agents and the conditions for change explain regime change. The latter are the less 'visible' elements of the causal set. In the case study reports, far more attention was paid to the various change agents than to the conditions. This is often a large part of the story in the reports. If the suspected form of bias were real, then one could expect the variables of 'degree of regime change' and 'force of change agents' to be scored by the researchers in such a way that they would correlate strongly. But the opposite is true: the force of change agents proved afterwards to be far less correlated with regime changes than the conditions are. This attests that the researchers assessed the variables independently on their own merits.

4 The results of the comparative analysis

This section presents the results of the comparative analysis. This is based on the assessments of cases (including sub-cases) by the researchers of the main variables of the theory. These assessments were based on ordinal scales with five values. The 24 (sub)cases and 13 variables per case are of course too many to be handled in a purely qualitative way. Therefore the analysis below mostly uses descriptive and analytical statistics that are apt for ordinal level variables. Some of the main conclusions are illustrated by real life examples from the case studies.⁴

In this section we start first in 4.1 by presenting the developments for the central variable, the regime changes. Thereafter we relate them first as independent variable with the sustainability of the resource use. In 4.3 the regime changes are themselves the dependent variable and we consider which incentives and circumstances have influenced them.

⁴ These illustrations are derived from the case studies that are described in Bressers and Kuks (2004).

4.1 Regime changes

What interests us here is the degree to which the listed aspects of the regime, separately and as a set, moved in the direction of more integration (extent and coherence) in the cases studied.

The *extent* is the degree of completeness of the domain of the regime in terms of relevant uses and users. In most of the cases and sub-cases in the study the extent of the water resource regime changed positively, in many cases even to include more or less all relevant uses and users. Almost always the introduction or the increase in valuation of the protection of the environment and nature are part or even the core of the extent changes. Sometimes new human uses like tourism are the extra issues that are taken into account. Where ecological values were already incorporated, new issues might arise, like diffuse agricultural pollution.

The *internal coherence of public governance* is the degree to which the interdependencies in the water system and its management that occur in reality, are reflected within and between the contents of the elements of public governance. The internal coherence of public governance generally increased too, but less than the extent. Almost nowhere could a 'full coherence' statement be made and in several instances only small improvements occurred. The changes in the internal coherence of public governance in most cases included aspects of all five elements of public governance: levels and scales, actors and networks, perspectives and objectives, strategies and instruments, and responsibilities and resources for implementation.

Illustration 1: Remaining difficulties with non-river basin jurisdictions

In France the SAGE process has generated a collective dynamic. Among other things the extent of the regime that was slowly built before, was quickly enlarged. The SAGE process could build on the gradually increased openness to cooperation that emerged over the last 25 years. The SAGE procedure has led to awareness of most (and new) stakeholders that they are not the only one 'main' user. But that doesn't always imply that there is participation from all actors or this participation is dedicated to reinforcement of collective action, but rather considered by some powerful users as a way to get information that helps them to keep their power. They proceed actually in behind-the-scene negotiations. Therefore, the participation is often only to defend one's own interests. Some powerful actors, like industrialists, abstain from further participation once their interests are safeguarded, mainly because their management of water and wastewater relies upon technical supports (i.e. when their demand is satisfied they often don't see an interest in participating any more since they cannot really get more assets).

The main problem remains that there can be lack of co-ordination or even competition between state administrations at the regional and departmental levels. There can be incoherence in rules and public actions when administrations share the same river. In the case of the Sèvre Nantaise, where the river is the boundary between two Departments, you can take all the water you want on one side, while it is forbidden on the other side. (*Isabelle Verdage, Jean-Marc Dziedzicki & Corinne Larrue, Sèvre Nantaise case study*)

The *internal coherence of the property rights* is the degree to which the interdependencies in the water system and its management that occur in reality, are reflected within and between the property and use rights. The essence of this variable is that property and use rights of the one do not inherently or under the given circumstances cause rival uses to unavoidably affect the sustainability of the resource, without external intervention. With the internal coherence of the property rights the picture is somewhat more differentiated. In two cases no improvement or even new inconsistencies occurred. But there were also four cases with a rather complete (change to) coherence in this respect. Generally when absolute limits of the resource are at stake (water, fish) the property and use rights are used more for self-regulatory regimes, than when the protection of the quality of the resource (water, landscape, shores) is at stake. For the water resource in a stricter sense this means that predominant protection by property and use rights occurs more in the 'dry' cases than in the 'wet' cases. In 'wet' cases property and use rights are often restricted and must give way to public governance in order to improve the sustainability of the resource use. At least, this seems to be common practice.

Here, for instance, developments were reported like the transfer of shares in relevant private and public companies, privatization, gradual acceptance of the water body as a common good, the lack of introduction of concession system with new uses, introduction of tradable fishing rights, multi-level issues like state ownership as a basis to allow new uses (e.g. to issue gas drilling concessions), while provinces and municipalities hold the public authority to protect other uses, the redistribution of property and use rights, disposition rights, the buying of land by a user or a public authority to solve conflicting property and use rights, expropriation for similar reasons (rarely and sometimes on the basis of 'expropriation agreements', as in Spain), regulatory unification of the property of land and water, the organization of users, the acknowledgement of traditional and 'de facto' use rights of some users, agreements (between fishers and kayakists or irrigators and fishermen) to share water use and the withdrawal of informal use rights.

The *external coherence between public governance and property rights* is the degree to which the interdependencies in the water system and its

management are reflected in the interdependencies between public governance and the property and use rights. External coherence between public governance and property rights changed considerably in half of the cases for the better and only modestly or less in the other half.

Here the following developments were reported, among others: expired use rights were gradually transferred to other (public or semi-public) institutions, the aim of minimal water flow was incorporated as a sort of use right for environmental protection, an EU inspired programme gave compensation to farmers for not exerting their use right to part of their farm land, some technical measures required new responsibilities and resources for implementation that demanded changes in property rights, adaptation of use rights to public policy aims, voluntary restrictions of the property right holder accepting public policy aims (one of the Belgian cases), the localization of drinking water industry was problematic but not considered as a question per se, subsidies allowed the regional administration to influence nature management by owners, modification of property rights by creation of zones that were liable to flooding, concessions were given by law to user communities, a policy plan to improve the information for self-governing user communities by the development of a census to prevent free riders and by studies, creation of (semi-)public bodies or platforms where practically every user is represented, policies opening up to take also other users than those with a use right to the water itself into account (tourists, fishermen, nature), incorporation of relevant use right holders (farmers, tourists) as targets in public water policy.

The *overall assessment of the regime change* is clearly that in most cases there were considerable improvements on many of the important aspects. Nevertheless seven occasions of more or less failed attempt to regime change and 3 occasions where the results were better than average and where at the end of the case period one could really speak of integrated water management also occurred.⁵

Illustration 2: An example of broad improvements

In the Matarranya river process, there are clear signals of regime change, both regarding extension and coherence of the water regime. The extension of the

⁵ While 7 of the 12 areas studied were analyzed as single cases and the other 5 split into 17 sub-cases, one might suspect that the sub-cases are on average more coherent than the single cases, while each sub-case only deals with a part of what is relevant. We tested whether such an artificial 'coherence' bonus was indeed observable in the assessments. This was hardly the case. The assessments of the internal coherence of public governance, the internal coherence of property rights and the external coherence were almost the same with the single (un-split) cases as with the sub-cases in the sample of 24.

water uses increases as it includes irrigation, population supply, cattle rising, nature protection and tourism. Rivalries between users can be interpreted in territorial terms (intra-basin driven rivalries). There is also an increase of public governance coherence, as it regards levels and scales, multilevel interaction and networks. The most relevant event proving the increase of governance coherence is the Water Agreement reached by the main actors operating at the river basin level. This agreement is the outcome of a process in which a wide range of actors operating at different scales of governance interact: the regional government promotes environmental initiatives; local actors appeal to EU regulation as a legal resource by local actors; the Central Union of Irrigation Communities is created as a body representing all irrigation communities at the basin; PLADEMA - an ad hoc local association - aggregates and mobilizes actors against the construction of hydraulic works; the Ebro river basin administration negotiates with the local irrigation communities; and the Ministry of Environment finances the construction of lateral pools. These actors, especially those located at the river basin, share a perception of risk caused by an extreme situation of drought among the basin actors and progressively adopt a new water culture.

Regarding the internal coherence of property rights, some improvements can be identified: the Ebro river basin Plan establishes water needs and uses as well as a minimal ecological flow; some maladjustments between legal aspects and real practices of the CHE and the Central Users Community increase its level of influence regarding decisions on the watering out of the Pena dam and the distribution of water; traditional use rights of some users are respected; and a kind of de facto use rights are given to illegal users of water by the Irrigation Communities of the basin. After the signature of the Water Agreement, the external coherence between public governance and property rights improves to a certain extent. All the main water users have proved to be able to negotiate and reach an agreement based on a common perception of the river as a key element for the future development of the basin. (*Meritxell Costejà, Nuria Font & Joan Subirats, – Matarrana River case study*)

4.2 Implications of regime changes for sustainable use

The approach to the assessment of this variable (-group) is the following: the researchers started with the rivalries that are at stake in the case story or stories. In the first instance, the assessment of the changes in the sustainability of the resource use is limited to the natural/environmental indicators that are directly at stake in these rivalries. Without any ecological improvements the researchers were not inclined - in wealthy Western Europe - to judge an improved sustainability even when economic parameters would have improved. In the second instance, the social and economical development consequences of the changes in these indicators and/or the measures taken for this purpose are also taken into account. In the last instance, a marginal check was performed to see whether the observed

changes had important side effects on other natural resource/environmental indicators and whether these in turn had indirect social and economic consequences.

Illustration 3: Rivalries and ecology

In the Idro Lake and Chiese River case the problem generates from conflicting interest of the various users of the lake and the water basin. The conflicts occur between water uses for agriculture, hydropower production, tourism, ecological balance, and protection from risks related to flooding, soil erosion, and land sliding. As a response the use of water was managed not only accounting for water needs, but also for water availability. Environmental and land conservation was supported by the maintenance of a constant minimal vital flow, even in summer and controlling the speed of lake depletion. The maximum water-storage level was reduced to avoid the risk of flooding. (*Bruno Dente & Alessandra Gorla, Idro Lake and Chiese River case study*)

Often the picture for the *economic consequences* is somewhat mixed. As negative economic consequences we found the financial costs and/or restrictions for the sectors involved (agriculture, fishery, resource extraction or industry) and in some cases higher water prices are mentioned. On the positive side the following economic phenomena were often mentioned: gains for tourism, avoidance of future costs, job creation and job safeguarding, and an improved natural resource basis for further economic development. Occasionally lower water costs and increases in productivity were also reported.

Illustration 4: Nature reserves

In the Dender basin, the structure of the economy is modifying. The relative importance of industry and agriculture diminishes as tourism is increasing. In this context changes in the ownership of land are occurring. In fact, associations for the protection of nature buy land to the farmers. Their purpose is to develop natural areas, creating 'green corridors' throughout the region. This activity was initiated and is still supported by the Region. The Flemish Region subsidizes the acquisitions. Nature associations negotiate with individual farmers. The farmers are often aged and then get additional financial resources (to the pension). The two groups of actors benefit from the subsidies of the Region that still manages the conduct of the policy. (*David Aubin & Frédéric Varone, Dender River Basin case study*)

Illustration 5: Tourism development in the Vesdre basin

The low quality of the Vesdre creates rivalries. Pollution prejudices the development of tourism, the only economic reconversion expected for this former industrialized area. At the same time purification of urban wastewater has come compulsory. The tourist sector and the water purification sector are mutually supportive. In both cases the European Union plays the role of institutional interface. In the first place it allocates structural funds. The valley

of the Vesdre is classified as an area in economic reconversion. Both tourism development project and purification plants benefit from the subsidies. In the second place, the EU compels the Member States to purify domestic wastewater. As a consequence, the competence authority, i.e. the Walloon Region, developed an ambitious catch up policy and raised the necessary funds. The Vesdre river basin is one of the main recipients. This context should allow of tourist activities in the valley to take off. (*David Aubin & Frédéric Varone, Vesdre River Basin case study*)

While the economic consequences were mixed, the *social consequences* were often very positive and remarkably varied. The only negative social consequences mentioned were limitation of land ownership rights and a negative impact on the landscape, both mentioned once. By contrast, the positive social consequences include: modernization of agriculture, development of new associations of people, more open public debates and more information for the people in general, improved feeling of safety, prevention of population decline and maintenance of young population, fairer distribution between upper and lower communities, resolution of conflict in the local area, improved living conditions, and the reinforcement of the qualities of the river as a key element of social identity.

Illustration 6: Concertation

In Wallonia, the tributary basin of the Hoëgne-Wayai hosted a conflict between the fishers and the local mineral water producer. Fishers were complaining about accidental discharges of caustic soda that caused fish disease. During the case, the actors exchanged violent arguments via the press. In order to come out of the conflict, the fishers' federation proposed to the mineral water producer to make a river contract. The river contract is a non-binding, voluntary local concertation mechanism. All the local actors meet and discuss their problems. A monitoring network is put in place. The rivalry is broadened to the whole range of uses. All the quality aspects are taken into account. However, every action is done on a voluntary basis by the actor concerned actor and at its own expenses. Even if results in terms of water quality are mitigated, the initial conflict moved into cooperation and then every local water actor adopted a resource logic. (*David Aubin & Frédéric Varone, Vesdre River Basin case study*)

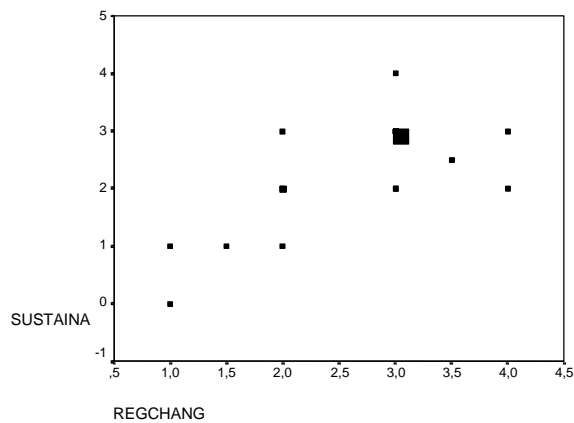
Our expectations (hypothesis 3) regarding the relation between the regime (change) and the sustainability of institutional resource regimes were:

- a) Regimes with a deficient *extent* will be more likely to lead to degradation of water resources or inability to protect the ecological functions of the water resource, than regimes with a larger extent.
- b) Regimes with a large extent, but with low *coherence* will be more likely to lead to degradation of water resources or inability to protect the

ecological functions of the water resource, than regimes with a similar extent but a higher degree of coherence.

Indeed, the relation between the extent and the sustainability estimates is rather weak and hardly significant, if one leaves out the coherence of the regime aspects (Spearman's Rho is .342 with one-tailed sign. $p = 0.051$, all calculations $n = 24$). The relation between the general assessment of regime change and the assessment of sustainability is however much stronger ($\rho = .533$, $p = .004$). In a scatterplot this is made visual (see Figure 3). Remember that several (sub) cases share their values in this plot. This is shown by the size of the dots.

Figure 3 Relation between the general assessment of regime change and the assessment of sustainability



Of the separate regime aspects, by far the most important factor was the coherence of public governance. It correlated even more strongly with the assessment of sustainable resource use than the general regime change.

The correlations of the development of separate regime aspects with the development towards a more sustainable resource use are as follows (all correlations in rho):

General regime change	.533 ($p = .004$)
a. Extent	.342 ($p = .051$)
b. Coherence governance	.686 ($p = .000$)
c. Coherence property rights	.527 ($p = .004$)
d. External coherence b. & c.	.380 ($p = .034$)

Illustration 7: Sustainability and regime changes

Regime changes in the case of the Mula river have some positive impacts on sustainability including the environmental, economic and social dimensions. Regarding the environmental dimension, energy and water savings are considerable, there is a decrease in water losses, some measures to avoid the overexploitation of wells and aquifers are adopted, and a minimal ecological flow is established. Regarding the economic dimension, the price of water to farmers is lower than it used to be and the productivity of the huerta improves. Finally, regarding the social dimension, there are some training programs for farmers and an improvement of life quality. In general terms, the positive impacts on sustainability seem to be more related to the increase of internal and external coherence rather than to the increase of extent. (*Meritxell Costejà, Nuria Font, Anna Rigol & Joan Subirats – Mula River case study*)

All in all, the conclusion is that there is only weak support for our first expectation here (hypothesis 3a): that an increased extent contributes as such to a more sustainable resource use. The support for the second expectation (hypothesis 3b) - that increased coherence contributes to a more sustainable resource use - is much stronger. Though this can be regarded as supportive evidence for the proponents of ‘integral water management’, it should be considered that this isn’t a sort of ‘mechanic’ causal relationship. It still holds true that ‘the devil is in the details’.

Illustration 8: Voluntary restriction

The lower part of the Vesdre river basin was regularly under water due to water releases from the dams of Eupen and the Gileppe. During periods of heavy rainfalls, the dam reservoirs reached their maximum capacity and it became dangerous to stock more water. People and communes downstream were complaining. Consultations went on to circumscribe the problem in the basin despite the lack of regulation. In fact the manager of the dam agreed with the main user of the reservoir, i.e. the drinking water producer, to constitute a higher safety margin in case of significant rainfall. The two actors have endorsed the risk of water shortages in drought periods. The dams no longer threaten the downstream part of the basin. Informal agreements were later extended to other consequences of water releases, i.e. minimum flows and extraordinary releases for canoeing. Moreover, this kind of agreement generated an extended mobilization of all the local actors involved in water quantity management as the problem of floods remains, but on different patterns. (*David Aubin & Frédéric Varone, Vesdre River Basin case study*)

4.3 Explaining regime changes by change agents and conditions

Change agents

This is the combined force of the listed change agents as an impetus to set in motion regime changes in the direction of more integration. The joint force

of the identified change agents in the cases was assessed as moderate (4x), strong (12x) or even very strong (5x). Only in 3 (sub)cases was it assessed as weak or absent. The types of change agents mentioned were EU originated pressures, national regime developments, problem pressures and various other case circumstances. In 13 of the 24 cases EU policies were mentioned as relevant.⁶ In all but two cases national policy and regime changes were influential.⁷ In 19 cases was there influence from problem pressure.⁸ In 10 cases various other circumstances were mentioned.⁹

Illustration 9: Example of a set of change agents on case level

Change agents in the case of the Mula River include the leadership of regional government, which has technical and financial resources and support from other institutions (EU, national administration) in the elaboration of the Modernization Plan. Of crucial importance is the ability of the Irrigation Community to break the Heredamiento monopoly of water distribution. Problem pressure also becomes an important change agent -- drought conditions precipitate a deep crisis of the traditional structure of the Mula huerta. In addition, policy initiative and new scientific knowledge about the state of the resource are important variables leading to a regime change.

⁶ As such a great variety of EU policies were mentioned as relevant: the standard for minimal flow of rivers, (national laws that were triggered by) directives on the water basis system, the 1991 waste water treatment directive (5x), phosphate and nitrate standards, fishery policies, the 1972 wild birds and 1992 habitat directives with their special protected areas (3x), the 1975 drinking water directive (3x) (and the role of the European Court of Justice to force implementation), the regional development policy with its structural funds (2x). More generally various EU regulations were used as arguments in the debates, even when not self-enforcing.

⁷ Apart from various 'normal' water (and some nature) policies, some more regime oriented pressures were also mentioned: promoting regime development at the level of the water basins (3x), laws demanding (land-use) planning (4x), acts that allow the government as owner of the water to regulate fishing on the basis of considerations of nature protection, environmental impact assessment, white papers pushing for 'integral water management' (3x), federalisation (Belgium), legislation allowing expropriations and indemnities in favour of flood protection, and the designation of parts of the basin as nature protection area. Note that several of these are not or might not be independent from the relevant EU policies!

⁸ With the problems at hand there is a clear division between 'wet' cases (the majority) and 'dry' cases. In the dry cases increased use by agriculture and tourism are main problem causes. In the wet cases pollution and the risk of flooding are the most mentioned problems. For almost all cases the increased value attached to nature and environment considerations makes these enter the picture as 'new' problem pressures.

⁹ Some examples are: the expiration of concessions for irrigation, changing market regulations pushing for new economic developments, state withdrawal from participation in economic developments, expanding land use for building, the break-down of traditional management regimes, experts providing new information, local and environmental associations and devoted individuals.

(Meritxell Costejà, Nuria Font, Anna Rigol & Joan Subirats – Mula River case study)

Maybe national policy support is a necessary, though not a sufficient condition. Often the national government provided crucial resources like formal rules and money. The two cases where such influence was not reported had a very low overall force of change agents. But generally it is not the type of change agents or the presence of a variety of them that matters. Each change agent can ‘do the job’ of exerting a major ‘force of change agents’ if it is pressing enough.

Our expectations (hypothesis 1) regarding the relation between the general force of the change agents and regime change was: “The observed change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes), but not without additional prerequisites to more coherent regimes.” As expected of the various forms of regime change, only the extent seems directly related to the force of the change agents. For the other relations more is necessary. And these attempts to attain more coherence are expected to depend on several conditions.

The correlation of ‘the combined force of all change agents’ with the general regime change in the direction of more integrated regimes, and with the separate regime aspects are as follows:

General regime change	.200 (p = .175)
a. Extent	.446 (p = .015)
b. Coherence governance	.128 (p = .275)
c. Coherence property rights	.072 (p = .369)
d. External coherence b. & c.	.153 (p = .238)

Illustration 10: Finding political will

In Verviers, drinking water consumption has led to lead-poisoning for more than a century. Poisoning was due to lead pipes attacked by naturally acid water. Diverging interests and the weakness of knowledge around the nature of the contamination explained the status quo. The dam that provides water to the town had initially been build for industrial uses. The network was later extended to private housings and water declared to be drinking water without prior treatment. Acid water was very convenient for the industries because of its cleaning properties. This position was well reflected in the municipal council. The commune was the owner of the water distribution service. In 1980, the EU drinking water directive set up constraining standards for lead concentration in drinking water. The commune of Verviers had to adapt but missed both the political will and the financial means. Finally, the building of a treatment plant was taken in charge by the Region and a deviation of the main

pipe did not counteract the industrial interest. Work began only when industry had guarantee on the unchanged properties of its water. The public health problem was taken into account without inducing any redistribution at the detriment of other water uses, industry in the present case. (*David Aubin & Frédéric Varone, Vesdre River Basin case study*)

Illustration 11: Bottom-up regime changes

Sometimes it was not national regime change influencing the extent of the regime at the case level, but the other way around. Here are two examples of bottom-up processes and subsequent 'legitimization' of local developments through national legislation in Switzerland.

The process of regional regime inventions arising from local problem pressure which are subsequently supported and thus legitimated by changes in the policy design at federal level can be observed in both Swiss case studies. In the Seetal valley, the canton of Lucerne had already issued a notice in 1988 reducing the restrictions on the number of production animals on farms from four to three livestock units per hectare. Even if this restriction was never really implemented at regional level, it served as a model for the introduction of the same restriction into the Federal Law on Water Protection of 1991. In the Maggia valley in the canton of Ticino, quantitative protection of the water resources dates back to 1976, anticipating the changes in the federal regime by a wide margin. At the level of the water basin, protective measures in terms of minimal residual flows were applied in 1982, a full 10 years before the enactment in the Federal Law on Water protection of 1991. (*Corine Mauch & Adèle Thorens – Swiss case studies*)

Conditions

This is the degree to which the listed conditions provide, separately and as a set, favorable or unfavorable conditions for regime changes in the direction of more integration (extent and coherence).

Hypothesis 2 was that attempts to change regimes into a more integrated status would have relatively more success when:

- There is already a longer tradition of thinking in terms of cooperation in the water management sector or such a thinking is built during the case early enough to influence later stages of the case history.
- There is a common understanding that the counteracting (side) effects of non-integrated water management harm sustainability and that this sooner or later will have to be stopped (joint problem).
- There is a notion of possible joint gains from coherence, so-called 'win-win situations' (joint opportunities).
- There is a credible threat of a (potentially) dominant actor accumulating power and altering the public governance pattern in his own way and to his own interest when no solution is reached (credible alternative threat).
- There are well functioning institutions that provide fertile ground for coherence attempts (institutional interfaces).

Generally the researchers assessed that in their (sub)cases there was no very stimulating tradition of earlier co-operation between the actors involved in the rivalry/ies. Joint problem awareness has been present to some extent in several cases, though often only on a part of the relevant aspects or only with some of the relevant actors. There has been considerable differentiation between the cases in terms of the degree to which the actors involved saw chances to actually gain by solving the rivalry with a more integrated regime. In one case there was even a sense of joint loss. With the condition of a credible threat of interventions by a dominant actor to solve the disputes to his own benefit there has been a considerable differentiation among the cases. Generally speaking the condition of institutional interfaces was somewhat better than most of the other conditions. Nevertheless, in many cases these were only a part of the relevant aspects or not functioning very well.

All in all, the assessments of the conditions for regime change in many cases are rather favorable. In nine cases the conditions are viewed less favorably. Especially the awareness of joint chances and good institutional interfaces - and to a lesser extent an existing tradition of co-operation were all seen as important positive conditions for regime change. These assessments of the favorability of the conditions was especially related to the assessment of the institutional conditions (.679), joint chances (.508) and previous experiences with cooperation (.405).

Lower assessments of the general conditions indeed correlate with smaller regime changes, as expected in hypothesis 3. The correlation is .687 ($p = .000$). Figure 4 shows this relationship in a visual way.

Figure 4 The relation between favorable conditions and regime changes towards more integrated water management regimes

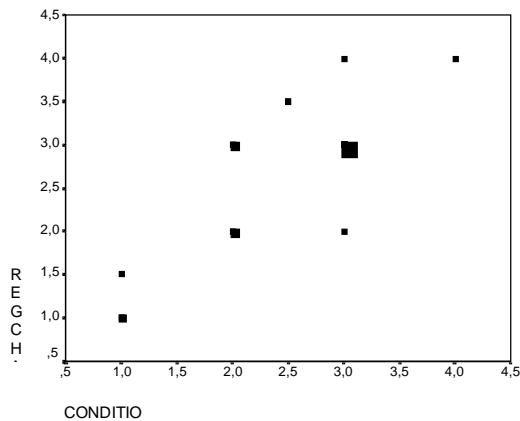


Illustration 12: Polders and wateringues versus water floods

All along the river Dender in Flanders, riparian landowners are involved in a particular kind of public administration, the polders and the wateringues. The polders and wateringues manage drainage on their territory. They finance their activity with direct taxation. Draining activities are in conflict with the need to create buffer zones. The competent authority for water quantity management on the Dender faces frequent floods of growing importance. As the problem pressure is growing, solutions introduced are residual. The weakness is due to an absence of common concern between the involved users. The water manager has no possibility to build new relief basins. It only builds dikes to divert the flood. It is not confronted with claims from the polders and wateringues that come under flow as a matter of tradition. Moreover, there is no real mechanism of concertation between the users and no coordination between the various competent authorities. Mutual information remains weak. Everyone is only preoccupied by the evacuation of water out of its territory. The problem should increase without a sustainable response is put in place. The only answer consists in building a huge pumping station at the mouth of the Dender. (David Aubin & Frédéric Varone, Dender River Basin case study)

The *assessment of the conditions* not only correlated with the general regime change, but also with all other aspects of regime change.

General regime change	.687 (p = .000)
a. Extent	.721 (p = .000)
b. Coherence governance	.798 (p = .000)
c. Coherence property rights	.583 (p = .001)
d. External coherence b. & c.	.527 (p = .004)

Hypothesis 2 mentions the conditions separately. This implies that the various circumstances can have different effects. We have investigated this by a correlation analysis of all conditions mentioned with all regime aspects. Here we mention all significant relations. Also a few almost significant relationships are mentioned, with their uncertainty.

The *tradition of cooperation* in the water management sector showed significant correlations only with the internal coherence of public governance (.416) and almost with the extent (.315, p = .067).

The condition of a common understanding that the counteracting (side) effects of non-integrated water management harm sustainability and that this sooner or later will have to be stopped anyhow (*joint problem*) did not correlate significantly with any of the regime indicators. Closest was the correlation with the internal coherence of public governance (.313, p = .068).

The notion of possible joint gains from coherence, so-called 'win-win situations' (*joint opportunities*) again correlated with some regime indicators (coherence governance .509, external coherence .599) and with general

regime change (.554). The fact that the correlation of the awareness of 'win-win' situations is even stronger with the external coherence between public governance and property rights than with the general regime change is striking. It might point to an often 'public-private' nature of such opportunities.

The credible threat of a dominant actor accumulating power and altering the public governance pattern in his interest when no solution is reached (*credible alternative threat*) did not correlate significantly with any of the regime indicators. It almost significantly correlated with the extent, though (.305, $p = .074$).

Last but not least, the existence of well functioning institutions that provide fertile ground for coherence attempts (*institutional interfaces*) correlates with the extent (.751, $p = .000$), internal coherence of public governance (.3431) and with the general regime change (.380).

All in all, of the separate conditions (and the force of change agents) the *joint opportunities* and the *institutional interfaces* conditions (see the appendix for a specification of these factors in this study) stand out in the explanation of the various forms of regime changes.

Illustration 13: Joint opportunities and institutional interfaces around the IJsselmeer

Sometimes rival uses can nevertheless be turned into win-win situations. The shores of the Dutch IJsselmeer (Lake IJssel) have rival uses of inter alia nature (bird habitat) and tourism (boating marinas). Of course tourism on the other hand benefits from beautiful nature. Seeking the balance between the two uses can therefore be beneficial for both. With a homogeneous use like IJsselmeer fisheries there is rivalry between the users, but on the other hand all users have a certain interest in a just distribution of rights, and therefore may favor a regime that guarantees this while preventing a 'tragedy of the commons'. This creates a basis for joint action that can be further exploited by having the right institutional interfaces in place.

These institutional interfaces can be triggered by European and national measures. In the IJsselmeer case the national government founded a negotiation platform, a steering committee on the so-called corner lakes, a producers' organization on fishery, environmental impact procedures (gas drilling) and land use planning procedures with open participation. Such institutions catalyzed the involvement of users and other citizens (cf. the EU WFD) and functioned sometimes as 'policy brokers' and sometimes as forms of 'institutional leadership'. (*Dave Huitema, IJsselmeer case study*)

5 Outlook: our conclusions in the perspective of the European water management policy

European water policy has developed along two lines - water quality and emission standards - that reflect different national views. The new European Water Framework Directive (WFD) is an attempt to reconcile the two approaches and to integrate water quantity aspects. The purpose of the WFD is to achieve good ecological quality for all waters inside the European Union, at the scale of water basins, where an authority implements integrated management programmes. The WFD should guarantee, as of 2015, a 'good status' for all ground- and surface waters, in quality and quantity, according to an eco-centered logic. In order to achieve this goal it promotes an integrated water management, i.e. a management that considers all the water aspects and legislation in a single picture and on a delineated territory, the water basin. The integration of control and action should occur for quality and quantity aspects, surface and groundwater, exploitation and preservation, objectives of quality and emission limit values and water policy vis-à-vis other policies. The WFD sets up guidelines and leaves significant room for manoeuvre to the Member States. The guidelines allow an evaluation and a comparison of the efforts developed by the Member States and their results.

The main concepts of this paper relate closely to the central themes of the new European water policy. The '*good status*' of the WFD is related to the ultimate dependent variable in our analysis, the degree of 'sustainable use', especially to the ecological aspect of sustainable use. However, even in the 1996 communication leading to the WFD due attention is also paid to the 'evaluation of costs'. This aspect is reflected in the 'economic consequences' aspect of sustainable use. We observed that besides costs, economic consequences could be observed both positive and negative. A third aspect that was included in our research was that of the social consequences. Here a remarkable number of positive developments were reported from the case studies. Generally, a higher degree of sustainable use correlated with a more integrated regime at the water basin level, just as was expected by both the theory described in this paper and the 'practical policy theory' underlying the WFD. Though this can be regarded as supporting evidence, it should be considered that this isn't a sort of 'mechanical' causal relationship. Under certain circumstances it can even be envisioned that more integration leads to deterioration of sustainable use. It still holds true that 'the devil is in the details'. Nevertheless, empirically in our 24 cases the relationship between integrated management and the status of the water resources shown to correspond with the ideas guiding the WFD.

The main venue by which the new European water policy seeks to improve the good status of European waters is by 'integrated water management at water basin scale'. In this paper the cases that are studied were not at the full water basin scale, but at the lower level of tributary river basins. The reason for this is that we believe that integration of management is a multi-level endeavor. At the higher level of international rivers like the Rhine or even large national rivers like the Loire, circumstances vary to such a degree that there is not one, but several sets of uses and users and consequently also multiple resource regimes needed at a sub-basin level. This is not to state that the full water basin should not be in need of coordinated management, but only that for impacting many uses and users, sub-regimes at a tributary river basin level are also needed. This idea is in accordance with the principle of subsidiarity that is explicitly endorsed in European water policy. The case studies concentrated on this level (with areas of some 500 to 2500 km²) and found many interesting experiences with (attempts to achieve) more integrated water management. These illustrate the assumption of the European water policy that it is necessary to accept some variation of the institutional arrangements that are used to promote integrated management. Though the organization of management on a sub-basin level is left predominantly at the discretion of the member states, we think that at least devices for Europe-wide communication and exchange on experiences with integral water management on that level could be helpful for the actual practical implementation of the WFD. This could be part of 'joint implementation' arrangements.

Integrated water management in this dissertation is conceptualized with the help of the concepts of extent and coherence. The 'extent' of the regime reflects the elements of integration in the WFD that stress that all relevant directives and all waters in the area should be managed in a combined approach. We stress the completeness of the regime to regulate all relevant uses and users. The elements that stress multi-level (even international if necessary) and multi-actor (stakeholders and citizens) involvement and the coherent action guided by management plans are reflected in the concept of 'public coherence'. As a special feature of our research, not only the coherence of public governance, but also the coherence of the property & use rights regime and the coherence of the relation between public governance and property and use rights are included in the assessments. The study illustrates that these are important aspects of the water management regimes, especially - but not exclusively - when quantity issues are at stake. Theoretically it can be expected that inclusion of former socialist economies in Eastern Europe would increase the variation in the regimes of property and use rights considerably and would make this issue even more important. In Switzerland public policies that reduce use rights by more than 7% need

to include compensations acknowledging these rights. All aspects of integrated water management studied seem to make a difference, though not equally in all cases. The research in this paper has shown that special attention to the property and use rights affected and the relation between those and the public governance measures is a worthwhile extension of the focus of integrated water management.

The integration between water management and other sector policies is in the new European water policy envisioned by the mechanisms embedded in 'full cost pricing'. In our cases we did not specifically encounter this subject. Consequently we don't have a conclusion on full cost pricing. What we did encounter were a number of cases in which issues other than direct water issues entered the process of development of new water regimes. Examples are issues of landscape, wetlands and fishery, which were entered into the debate by interested actors. Though 'full cost pricing' could be important to send the right price signals to all actors, there will probably remain various rivalries that need a form of integrated water management that deliberately tries to bridge externally to other sector policies for coordination.

The research in this paper did spend a great deal of effort in providing better insight into a variety of change agents and conditions that stimulate more integrated water management. We learned that integrated management regimes are not something that one can 'proclaim into reality'. Deliberate attempts by motivated actors are surely needed to realize it in practice. We won't repeat all our conclusions on this subject here, but concentrate on the points where EU policies come in.

Among the change agents we have seen that in more than half of the cases EU directives and other policies play an important role. Among these directives are also some that are not directly 'water directives'. Another observation is that national policies that are mentioned as leading to regime changes were often in their turn triggered or in any case related to EU directives.

Even more important than the change agents mentioned proved to be the conditions for change. The European Union can have important - indirect - effects here too. A first observation is that European policies are often used in the internal debate at case level as arguments to pursue a certain position. This holds especially for NGOs and other actors with little formal power and of course when they want to move in the same direction as the relevant EU policy involved. Even when these policies are non-obligatory, in this way they have a certain influence. Of course, part of this influence is generated by the prospect that these policy lines will become more compelling after a while. So for the WFD aim of participation in water management, EU

policies can play an important role. Of the several conditions joint chances and institutional interfaces proved to be the most important. Both can be seen as venues at which to aim supplementary EU measures in the context of joint implementation, to improve the chances for regime changes in the direction of integrated water management.

REFERENCES

- Arentsen, Maarten, Hans Bressers & Laurence O'Toole (2000) 'Institutional and policy responses to uncertainty in environmental policy: A comparison of Dutch and US styles.' in: *Policy Studies Journal*, Vol. 28, No. 2, pp. 597-611.
- Björk, Peder, & Hans Johansson (2000) *Towards a governance theory: A state-centric approach*. paper IPSA Quebec, August 2000.
- Barzel, Yoram (1989) *Economic analysis of property rights*. Cambridge: Cambridge University Press.
- Bressers, Hans, & Laurence O'Toole (1995) 'Networks and water policy, Conclusions and implications for research.' in: Hans Bressers, Laurence O'Toole & Jeremy Richardson *Networks for water policy: A comparative perspective*. London: Frank Cass, pp. 197-217.
- Bressers, Hans (2004) 'Implementing sustainable development; How to know what works, where, when and how.' in: William M. Lafferty (ed.) *Governance for Sustainable Development: The Challenge of Adapting Form to Function*. Cheltenham: Edward Elgar.
- Bressers, Hans, & Stefan Kuks (2003) 'What does governance mean? From concept to elaboration.' in: Hans Th. A. Bressers & Walter A. Rosenbaum (eds.) *Achieving sustainable development: The challenge of governance across social scales*, New York-Westpoint-London: Praeger (2003).
- Bressers, Hans, & Stefan Kuks (eds.) (2004) *Integrated governance and water basin management conditions for regime change towards sustainability*. Dordrecht, Boston, London: Kluwer Academic Publishers.
- Bromley, Daniel W. (1989) 'Property Relations and Economic Development: The Other Land Reform.' in: *World Development* Vol. 17, pp. 867-877.
- Bromley, Daniel W. & Ian Hodge (1990) 'Private property rights and presumptive policy entitlements: Reconsidering the promises of rural policy.' in: *European Review of agricultural economics*, Vol. 17, No. 1, pp. 197-214.
- Bromley, Daniel W. (1991) *Environment and Economy. Property Rights and Public Policy*. Oxford UK /Cambridge USA: Blackwell.
- Burns, Tom R., & Thomas Dietz (1996) 'Cultural Evolution: Social Rule Svstems, Selection and Human Agency.' in: *International Sociology*, Vol. 7, pp. 259-283.
- Dente, Bruno, Paolo Fareri & Josee Ligteringen (1998) 'A theoretical framework for case study analysis.' in: Dente, Fareri & Ligteringen (eds.) *The waste and the backyard*. Dordrecht: Kluwer, pp. 197-223.
- Devlin, Rose Anne, & Quentin R. Grafton (1998) *Economic Rights and Environmental Wrongs. Property Rights for the Common Good*. Cheltenham: Elgar.
- Ensminger, Jean, & Andrew Rutten (1991) 'The Political Economy of Changing Property Rights: Dismantling a Pastoral Commons.' in: *American Ethnologist* Vol. 18 No. 4, pp. 41-57.

- Feeny, David (1988) 'The Development of Property Rights in Land: A Comparative Study.' in: Robert H. Bates *Toward a Political Economy of Development. A Rational Choice Perspective*. Berkeley, Los Angeles and London: University of California Press.
- Feeny, David, Fikret Berkes, & Bonnie McCay (1990) 'The tragedy of the commons. Twenty-Two years later.' in: *Human ecology*, Vol. 1, pp. 1 - 19.
- Fuchs, Doris A. (2003) *An institutional basis for environmental stewardship*. Dordrecht-Boston-London: Kluwer Academic Publishers.
- Furubotn, Eirik G., & Svetozar Pejovich (1975) 'Property Rights and Economic Theory: A Survey of Recent Literature.' in: Henry G. Manne (ed.) *The Economics of Legal Relationships. Readings in the Theory of Property Rights*. St. Paul, New York, a/o.: West Publishing Company. pp. 53-65.
- Kasper, Wolfgang, & Manfred Streit (1998) *Institutional Economics. Social Order and Public Policy*. Cheltenham: Edgar.
- Libecap, Gary D. (1993) *Contracting for Property Rights*. Cambridge: Cambridge University Press.
- Ligteringen, Josee (1996) 'The effects of public policies on household metabolism' in: Klaas Jan Noorman and Ton Schoot Uiterkamp *Green households? Domestic consumers, environment and sustainability*. London: Earthscan, pp. 212-235.
- Ligteringen, Josee (1998) *The feasibility of Dutch environmental policy instruments*. Enschede: Twente University Press.
- North, Douglass (1989) 'Institutions and Economic Growth: A Historical Introduction.' in: *World Development*, Vol. 17, No. 9, pp. 1319-1332.
- Ostrom, Elinor (1990) *Governing the Commons, The evolution of institutions for collective action*. Cambridge: University Press.
- Ostrom, Elinor (1992a) *Crafting Institutions for Self-Governing Irrigation Systems*. San Francisco, California: ICS Press Institute for Contemporary Studies.
- Ostrom, Elinor (1992b) *The Rudiments of a Theory of the Origins, Survival, and Performance of Common-Property Institutions*. Workshop in Political Theory and Policy Analysis, Bloomington, Indiana.
- Ostrom, Elinor (1994) *Neither Market nor State. Governance of Common-Pool Resources in the Twenty-First Century*. Paper presented at the IFPRI Lecture Series, Washington, D.C.
- Ostrom, Elinor (1997) 'Private and Common Property.' in: *The New Plagrave Dictionary of Law & Economics*, Vol. 3, pp. 424-432.
- Ostrom, Elinor (1998) 'A Behavioral approach to the rational choice theory of collective action.' in: *American Political Science Review*, Vol. 92, No. 1, pp. 1-22.
- Ostrom, Elinor, Roy Gardner & James Walker (1994) *Rules, Games, & Common-pool Resources*. Michigan: The University of Michigan Press.
- Patton, Michael Quinn (1980) *Qualitative evaluation methods*. Beverly Hills / London: Sage.
- Peters, B. Guy, & John Pierre (1998) 'Governance without government? Rethinking public administration.' in: *Journal of Public Administration and Theory*, Vol. 18, April 1998, pp. 223-243.
- Pejovich, Svetozar (1975) 'Towards an Economic Theory of the Creation and Specification of Property Rights.' in: Henry G. Manne (ed.) *The Economics of Legal Relationships. Readings in the Theory of Property Rights*. St. Paul, New York, a.o.: West Publishing Company, pp. 37-52.
- Sandler, Todd (1992) *Collective action. Theory and applications*. Ann Arbor: The University of Michigan Press.
- Schlager, Edella, & Elinor Ostrom (1992) 'Property Rights Regimes.' in: *Land Economics*, Vol. 68, pp. 250 ff.

- Stubblebine, Wm. Craig (1975) 'On Property Rights and Institutions.' in: Henry G. Manne (ed.) *The Economics of Legal Relationships. Readings in the Theory of Property Rights*. St. Paul, New York, a.o.: West Publishing Company, pp. 11-22.
- Young, Oran (1994) *International Governance. Protecting the Environment in a Stateless Society*. Itaca: Cornell University Press.

Appendix

The indicators for the relevant conditions used are:

a Tradition of co-operation

- a dominant policy ideology that supports integration
- positive examples of integration known by the actors involved
- mutual respect and trust in 'fair play' of the actors involved

b Joint problem

- knowledge bases in the form of reports and statements by respected sources on resource deterioration due to fragmentation
- information symmetry between the actors involved on these points
- a sense of responsibility for the future with the actors involved

c Joint opportunities

- knowledge bases from respected sources on opportunities stemming from more integration
- information symmetry between the actors involved on these points
- a sense of respect for each others' interests among the actors involved

d Credible alternative threat

- sufficient imbalance of power favouring a dominant actor (government?) to enable unilateral action
- information on alternative options to 'solve' the problem from the perspective of the dominant's actor's perspective
- alternative option has more severe consequences for the other stakeholders than the specific form of integration would have

e Institutional interfaces

(not all indicators below are equally important to all forms of integration)

- clarity of assigned responsibilities (to prevent territorial battles)
 - free and alert mass media to induce awareness of challenges to the system
 - legal or practical possibilities to protect negotiated compromises from continuous litigation
 - actors, independent or within the administration, with solely process objectives (brokers)
 - a small number of stakeholders or a strong representative organisation for the major groups of stakeholders to enable authoritative a small number of interaction processes
 - legal leeway for more integrative approaches
 - official (not only laws, but also white papers and the like) policy guidelines to achieve more integration in water management
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