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EUWARENESS

European Water Regimes and the Notion of a Sustainable Status

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Integrated Water Management Regimes and more Sustainable Water Resources in Europe: A Case Study Comparison

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1 Introduction

The EUWARENESS project systematically studies the generation and results of diverse and innovative institutional resource regimes at a (tributary) water basin scale. The project aims at the key action 'Sustainable management and quality of water', targeted field 'Integrated management and sustainable use of water resources at catchment scale: Socio-economic aspects of sustainable use of water' of the fifth EU research framework. It investigated the dynamic relationships between various uses of water resources, the regimes under which these uses of water resources are managed, and factors in the political context generating regime shifts.

In this project, a theoretical framework on institutional regime analysis will be used that combines property rights theory and institutional rational choice with approaches from political science (policy analysis, in particular policy design theory), thereby innovating the theory of institutional regime. The study examines the potential for an increased integration of institutional elements such as property rights to natural resources and the deliberate combination of these institutional elements with other resource protection and use policies. So far, the response to the deterioration in water resource quality arising from the effects of economic growth has taken the form of environment policy intervention. However, the capacity for government intervention in this area of the environment is limited due to the existence of implementation deficits, the restriction of traditional environmental policy to selective and often individual and media-oriented emissions management, and the frequent absence of an integrated management of water resources. We define integrated management of water resources as a conscious and planned management which takes into account the joint impacts of all forms of use on a given water resource. This also applies in cases where individual uses are not actually excessive.

The EUWARENESS project is build around two research questions. The first one asks for 'forms and examples of sustainable water resource regimes and the way they affect sustainability' and the second one – which is emphasised in our research – is about the 'political conditions that give rise to such regimes'. Furthermore our initial research proposal made very clear in text, pictures and hypotheses, that these sustainable water resources regimes would be expected to be "integrated regimes", rather than simple ones or complex ones. Consequently, we decided to concentrate us on explaining changes of water resource regimes leading towards more integration. This is related to second question, but involves giving examples of relatively more integrated regimes (aspect of first question). About the other aspect of the first question (how do these regimes affect sustainability) we decided to remain modest, only looking for obvious implications of the concrete changes in the regimes as observed for the sustainability of resource use and/or the protection of the ecological functions of the water resource. In this way we avoid the necessity of working with a complete and ultimate concept of sustainability. Nevertheless we explicitly leave the possibility open that the observed forms of more integration do NOT

lead to more sustainable use. They might affect trivial aspects, be counteracted by other forces, or even be perverse in themselves.

Part of the research is done by case studies. This report presents the comparison of the case studies as part of the final report on the Euwareness project. The case studies consist of a detailed examination of the development of more integrative regimes. With the help of this information we will test hypotheses on the generation and effects of such regimes in practice. The cases were water-basin based and of intermediate scale (mostly tributary basins). Cases of regimes studied addressed issues of surface water, groundwater, wetlands or combinations of these.

The remainder of this report has a methodological logic. First the theoretical backgrounds and the hypotheses for the research are explained and stipulated in Chapter 2. Next the methodological backgrounds and choices are made explicit in Chapter 3. Chapter 4 presents the results. In a concluding Chapter 5 some implications of these results are given. Here we will return to the starting point in this introductory chapter: what insights could be helpful for the implementation of the European Water Framework Directive?

2 Integrated regimes and their relevance for sustainable resource use: Theoretical backgrounds and hypotheses

2.1 *Introduction*

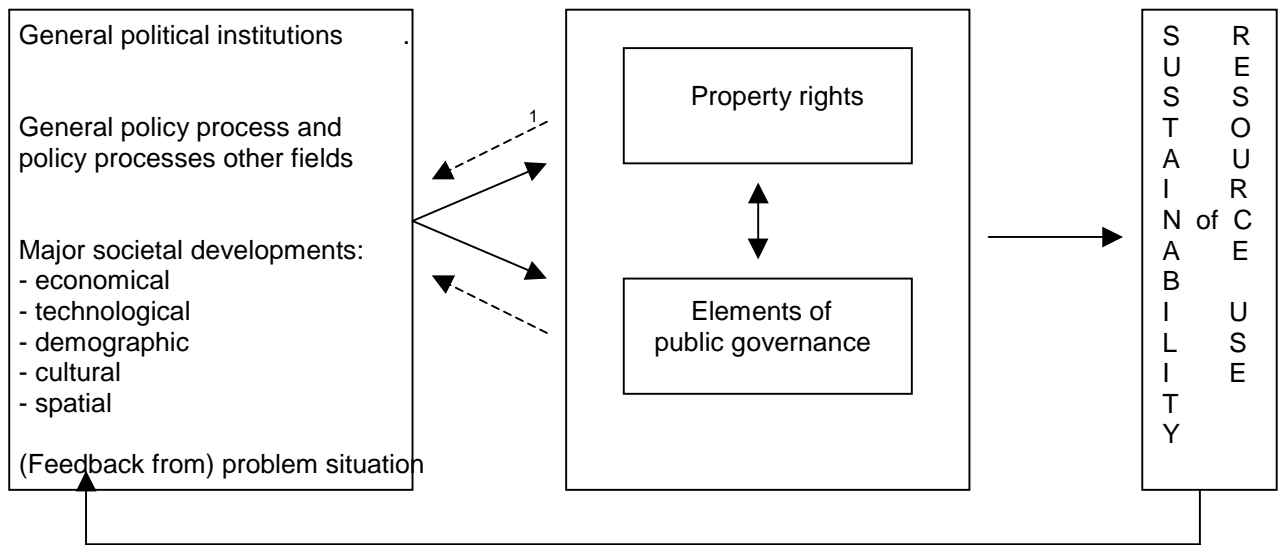
In this section we do not aim at presenting the voluminous world literature on the topic of institutional regime analysis. In appendix 1 some of this literature is briefly dealt with. Our main purpose here is to present the theoretical notions that we choose or developed – standing on the shoulders of many others – and used in this particular research project.

The central question of the EUWARENESS project is: “Which conditions lead to regime shifts towards sustainable water resource regimes?” As for the evolution of regimes, our main attention is to the transformation from complex into more integrated regimes, under the assumption that more integrated regimes tend to be more sustainable. Thus, an important question is: ‘What factors cause shifts towards integrated regimes?’ A second related question to support the above assumption is: ‘Which water resource regimes are sustainable?’ We will pay some (although less) attention to this question, as well. Below we will formulate our hypotheses about regime shift towards integration and about the sustainability implications of institutional resource regimes.

The framework of the EUWARENESS project interprets “regimes” as institutional resource regimes, which are made up of a public governance component and a property rights component. The combination of those components determines the sustainability of the given institutional resource regime. In turn, these regimes, or rather their property rights and governance components, are influenced by external change agents, which lead to regime change. The following figure illustrates these dynamics.

External Change Agents

Institutional Resource Regime



Readers that have no particular interest in the details of the theories explained here can skip most of this chapter and jump directly to the concluding section 2.5 where the basic model and hypotheses of the study are listed.

2.2 The public governance and property rights components

The public governance component developed in the theoretical framework consists of five elements (Bressers & Kuks 2001, 2002). These five elements provide answers to the five central questions of governance: Where? Who? What? How? and With what? Furthermore, a characteristic feature of modern 'governance' systems is that they have many aspects. They are multilevel, multi-actor, multifaceted, multi-instrumental and multi-resource-based.

The five elements of a governance pattern are:

- (1) Levels and scales of governance
- (2) Actors in the policy network
- (3) Problem perception and objectives
- (4) Strategy and instruments
- (5) Responsibilities and resources for implementation

The assumed relationships between these five elements are based on the basic principle that the elements of public governance each form the context of the other elements and that they will tend to adjust to each other.

¹ We acknowledge that the relationships indicated by the dotted arrows exist as well. They receive less attention in our discussion, though.

Property rights arrangements are the second important component of an institutional resource regime. In order to assess the role of property rights and especially the implications of property rights arrangements for sustainability later on, two fundamental propositions need to be accepted. First, property rights need to be considered as *bundles of rights* (Barzel 1989). Rather than viewing property ownership as the ownership of an entire good or resource, an analysis needs to scrutinise to which attributes of a resource the “property owner” actually holds rights. Thus, a land owner might own the right to use his property for farming or cattle grazing, but nowadays usually does not own the right to pollute the ground water or any river on or next to his property with toxic substances.

Secondly, the sustainability of a given distribution of property rights depends on the *de facto* property rights of the appropriators from the resource more than their *de jure* property rights (Schlager and Ostrom 1998). Thus, an analysis needs to consider which specific property rights actually can and are being used, rather than which property rights legally are being held. Of course, legal title might give some insight into possible future developments. At any given point in time, however, the *de facto* distribution of property rights is extremely important.

2.3 *Change toward integrated resource regimes*

Given our assumption that integrated regimes will be more sustainable than complex ones, the general hypotheses relating to regime change should reflect the following sub-questions of the main research question on regime transformation:

- Under which circumstances do regime transformations result in more complex regimes?
- Under which circumstances do regime transformations result in more integrated regimes?
- Which circumstances influence the characteristics of the changes that occur?

Before we turn to these questions, however, let us remind ourselves of the dynamics of change in and around institutional resource regimes perceived by our model.

In general, we expect the elements of the public governance model (and the regime in general, so including property rights) to exert a stabilising influence on each other. This stabilising 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 stabilising influence then 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.

In principle, external change agents can enter the scene through all of the elements that are discerned in the regime. There is, however, a difference. Property rights might be conceived as a bit 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 side, interventions from the governance side often have the specific and deliberate intent to change property rights.

Changes in property rights may develop from three sources: (a) changes in the general cultural and judicial conceptions of property and its meaning in terms of specific bundles of rights, stemming from general policy institutions and policy processes as a context, (b) economic changes, some with technological, demographic, cultural, or spatial developments as drivers, that change the value of certain uses and of the resource itself, and (c) specific and often deliberate influences from the governance pattern on water resource management to adjust property rights as a means of promoting policy goals.

External change agents for the governance pattern include 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. As examples, related to the subject of this project, below some specific and general external sources of change are linked to the five elements of governance (cf. Bressers & O'Toole, 1995):

Levels and scales of governance

- Rise of the European Union
- Tendency to multi-level governance

Actors in the policy network

- Rise of environmental and nature organisations
- Tendency to multi-actor governance: increased number of actors involved in relevant networks

Problem perception and objectives

- Rise of environmental degradation information
- Tendency to incorporate multiple perspectives

Strategy and instruments

- Rise of general ideological preference for indirect and procedural instrumental strategies
- Tendency to incorporate multiple instruments in policy mix

Responsibilities and resources for implementation

- Rise of proportion of (relatively) independent and businesslike organised implementation organisations, including privatisation of water management tasks

- Tendency to rely on more than only judicial resources and to clarify responsibilities

Let us now turn to the evolution of regimes into complex regimes and integrated regimes.²

CHANGE TOWARD COMPLEXITY

When we speak of complexity it means that regimes can be characterised by a multiple format in most of their elements. A regime becomes more complex when more layers and scales are involved, more actors are involved, more perceptions of the problem and accompanying goals are involved, more instruments are part of the policy mix and more organisations share responsibilities for implementation. 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 degree of 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.

Complexity as such is thus not wrong. Most of the time, growing complexity is an answer to real needs and developments. As a matter of fact, societies generally grew into more complexity during most of modern times. This sector is no exception to that general course of development. A growing complexity of its governance can be viewed as a logical adaptation to that. Many external change agents, like technological developments for instance, add new scales, new actors, new problem perceptions, new instruments and new responsibilities to the existing ones. This leads to the first hypothesis:

1. Most change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes).

CHANGE TOWARD INTEGRATION

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.

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. The reason for this is that in most policy papers the term integration (e.g. in 'integrated water management') is used in a sense that implicitly or explicitly includes an increase of the domain of the regime, the 'extent' to all relevant users and uses. Therefore we think that '*integration*' as it is used in the policy sphere is a combination of what we call *extent and coherence*. For sake of conceptual clarity and the possibility to adapt to the meaning of the term integration in policy practice, we will further use these terms when appropriate, and reserve 'integration' for the combination of the two.

² The governance concept used in our framework contains the assumption that the various elements of governance will tend to adapt to each other. So though empirically many intermediate forms can exist we assume now that the five elements will form patterns in which they will have more or less similar degrees of complexity and integration.

We discern three forms of coherence:

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

By (full) *coherence of the public governance* component we mean:

- that levels are more mutually interacting and are aware of their mutual dependencies,
- that actors belong more to 'policy communities' rather than 'issue networks', implying more interaction and consensus orientation,
- that interrelatedness of different aspects of the problem and their dependencies are recognised and intensely debated and goals are set accordingly,
- that the policy mix contains instruments that are mutually reinforcing each others incentives,
- that the implementing organisations share their resources and co-operate intensively to complement each other.

For EUWARENESS next to these possible forms of coherence in the public governance system also some extra forms of coherence come in: that of the internal coherence of the property rights system and the external coherence between the two systems of the resource regime.

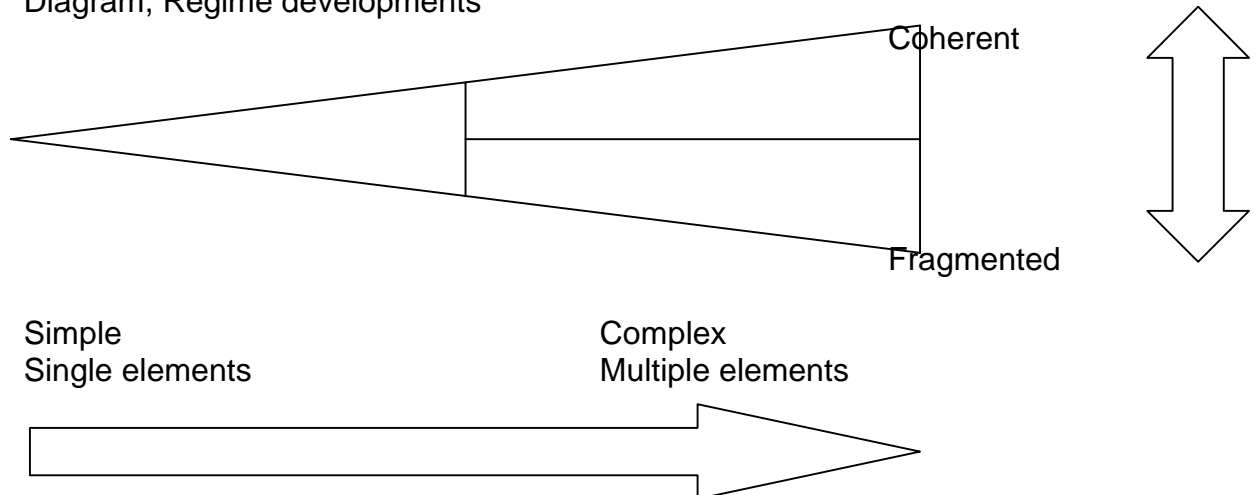
The *internal coherence of the property rights system* is threatened when property or use rights are given to actors for uses that decrease the possibility for uses that were already granted to others. This can have several backgrounds. Sometimes use rights that were long seen as non-rival and thus compatible 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 the one do not inherently or under the given circumstances make rival uses affecting the sustainability of the resource unavoidable, without external intervention.

The two systems of the resource regime lack '*external coherence*' when in the first place in case of a wrong match between the actors targeted by the public governance system and the actors with relevant rights in the regulative system (property and use rights). In the second place also a mismatch of the goods and services involved in both systems might lead to a lack of integration and thus a possible form of change towards more integration.

As in the research proposal (see section 1), the central assumption is that coherence will occur when the relevant actors acknowledge that coherence is necessary to prevent further deterioration of the resource. That means that coherence is not a spontaneous development, but has a deliberate character.

Furthermore, relatively singular (or simple) regimes (one level, one governing actor, one problem aspect – e.g. a certain use – one instrument, one implementing agency) will not be in need of coherence. Only after some growth into complexity, coherence becomes a relevant concept. But then, it is by no means a logical follow up. Complex but fragmented regimes are empirically quite common.³ While more complexity is part of a stream of societal developments, both coherence and fragmentation seem to be common developments.

Diagram, Regime developments



This means that coherence typically stems from discernible change agents that demand some form of coherence. An ‘coherence’-agent can, for instance, consist of the recognition of the interaction between multiple water uses or of a European Union directive that demands multilevel co-operation in water resource management planning. Also, international and inter-local learning is a possible change agent. Unlike an increase in complexity, then, developments in the direction of more coherence need some sort of deliberate attempt by motivated actors. The above leads to the next hypothesis:

2. Other external change agents of a specific nature (see above) can also lead to coherence in one or some elements of the regime, but only in combination with deliberate attempts of motivated actors (ultimately resulting in integrated regimes or in ‘failed’ regime shifts with encapsulated initial changes).

CONDITIONS FOR COHERENCE

Above, we stated that regime changes in the direction of more coherence are not spontaneous and typically will need deliberate attempts of motivated actors to occur. This leaves open the question under which conditions such

³ 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 at least initially transaction costs.

attempts or change agents will be relatively successful. Knoepfel (1995: 202-203), for instance, assumes that integration and co-operation between two or more agencies will work better when these agencies each have less separate tasks and goals and the agencies are matrix organisations.

We hypothesise the following relationships:

3. 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 chances*).
 - 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*)

Especially the last stimulating condition needs some specification. With these institutional interfaces (as opposed to institutional barriers), we mean, for instance, well functioning free mass media as a pre-requisite for a more integrated public debate on the various aspects of problem perception. Likewise, institutional interfaces can be provided by strong representative organisations that make it possible for large groups to act as a uniform actor in the policy network. Similarly, water laws or environment laws that enable and not effectively prohibit attempts to increase coherence in water resource management strategies can foster such institutional interfaces.

THE DEVIL IS IN THE DETAILS

Naturally, the dimensions of simplicity vs. complexity and coherence vs. fragmentation are characteristics of the regime that are of a rather general nature. Often, 'the devil is in the details'. When some actors find the network closed for them, it is important to learn who they are. And when new aspects of the problem gain recognition, it matters whether these are sustainability related ones or not. Etceteras. At a general level, no precise prediction can be made for these content matters. However, our proposition of mutual adaptation of elements of governance leads to the expectation that the balances in the initially unaffected elements of governance are reflected in the way in which the bigger or lesser 'seismic shocks' caused by the external

change agents are absorbed in other elements.⁴ This leads to hypothesis 4 specified below:

4. The more detailed characteristics of regime changes reflect to a large degree the balances in other elements of the regime that were not directly influenced by the change agent(s) initially (including property rights).

Causal explanations are often sought in the form of isolated factors that are labelled as the 'causes'. In reality this image of causality often reflects as much to what array of factors the analyst has been used as being the 'normal' status, than that these '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 (e.g. an electricity short circuit) of fire and exceptional forms of burning material (e.g. a leaking cooking gas container). That there is loads of inflammable material in a house and sufficient oxygen will be considered 'normal' or even not considered at all, while these factors are of course as essential as the previous ones.

In our cases the 'extraordinary' causes and the 'normal' conditions, that together form the 'causal set', are not as clear cut as in the example. Nevertheless also in the cases one might see on the one hand the factors that set the developments in motion, like national regime developments as described in the country screenings and natural resource sustainability problems that become apparent, to name the two most mentioned ones. While on the other hand similar change agents sometimes set a development in motion and sometimes they don't. Compare similar seeds sowed on different seedbeds. Here the 'conditions' enter the picture.

For the EUWARENESS project it is not the most interesting that problem pressure sets developments in motion, though of course it is mentioned when this is the case. The relations between national and EU developments and the developments in the case are interesting because of the relation with the country screenings and as far as the EU is concerned. But most of all the question why similar problem pressures all over Europe and similar EU and even national developments have dissimilar effects on regimes on case level is interesting. Again: here the 'conditions' enter the picture.

2.4 The sustainability of institutional resource regimes

The sustainability of a given institutional resource regime depends on its property component, the public governance component, and, most importantly, the interaction between these components. In the following discussion, we will therefore first delineate the sustainability implications of different property arrangements, then turn to the sustainability implications of

⁴ This idea stipulates that not only the degree of regime transformation, but also aspects like the distribution of costs and benefits might be important to explain. For the implications of the regime for a more sustainable use, these kinds of characteristics may be important too.

the public governance schema and finally connect the two components. In this discussion we will not deal with the ‘*extent*’ aspect again. We see a sufficient extent of the regime as a pre-condition for a benign effect on the sustainability of the use, since non regulated uses and users will tend to disrupt the regime effects on sustainable use.

2.4.1 *Sustainability and the property rights component*

Two “variables” influence the sustainability implications of the de facto distribution of different bundles of property rights. These variables are the extent of collective action problems between the appropriators from the resource (which influence the probability that they will be able to jointly manage the resource in a sustainable way), and the economic benefit of an unsustainable management of the resource vis-à-vis the economic benefit of its sustainable management.⁵

The extent of collective action problems between a group of appropriators depends on numerous factors well documented in the literature on common pool resources and collective action in general (Ostrom 1998, Sandler 1992). Among the important factors are the numbers of appropriators, the homogeneity of their interests, the presence of leadership, the technologies of appropriation, and, of course, the physical characteristics of the resource. The degree to which they are supported by the property rights arrangements we call the ‘*internal coherence of the property rights component*’

The *economic benefit of an unsustainable management of the resource vis-à-vis the economic benefit of its sustainable management* influences the probability that appropriators will be interested in its sustainable management. The difference between the two economic outcomes is a function of market prices⁶, of resource characteristics in terms of renewal rates, for instance, and of the discount rate applied by appropriators. In general, a substantially higher economic benefit of an unsustainable resource use vis-à-vis the economic benefit of a sustainable resource use is always likely to be associated with a less sustainable outcome.

The combination of these two variables has interesting implications for the sustainability of different distributions of property rights. If one considers a case in which the economic benefit of an unsustainable use of a resource is smaller or relatively equal to the economic benefit of its sustainable use, a small extent of collective action problems among the appropriators will likely lead to a more sustainable outcome. An example of such a case is, for instance, the use of a fishing pond for fishing. Here, fewer appropriators,

⁵ This argument is based on the assumption that decision-makers behave as homo oeconomicus. This is not always the case of course. Individuals frequently behave in an environmentally conscious manner, even if it is not in their best economic interest. This willingness to behave altruistically, however, tends to diminish when it is associated with increasing costs (foregone benefit).

⁶ One of the (indirectly) relevant market prices is the price of money, i.e. the interest rate, which determines the opportunity costs of foregone economic benefit.

ceteris paribus, are more likely to be able to agree on sustainable harvesting rates than a large group of appropriators, which automatically faces higher transaction costs in terms of negotiating, monitoring, and enforcing rules.

If one considers a case in which the economic benefit of an unsustainable use of a resource is much larger than the economic benefit of its sustainable use, however, few and small collective action problems are likely to mean that the unsustainable use is most likely to be achieved. An illustration of such a case is, for instance, the existence of the fishing pond in Paris, where a small number of appropriators probably are going to be much more efficient in draining the pond and selling it to a developer. Thus, few and small collective action problems might actually lead to less sustainable outcomes of specific distributions of property rights if the unsustainable use of a resource is economically much more attractive than its sustainable use. Of course this would be a typical case where some interference from the public governance component would be important.

Nevertheless a certain degree of coherence of the property rights component can in many cases be an important asset for a more sustainable resource use.

2.4.2 Sustainability and the public governance component

On the public governance side of an institutional resource regime, its sustainability implications depend mainly on three variables; the validity of the 'policy theory', the degree and quality of implementation, and the degree of coherence.

Validity. The optimal mix between the public policy and property rights aspects of the regime mix could be regarded as an aspect of the validity of the policy theory ('policy design'). The concept of 'policy theory' (Hoogerwerf, 1990) builds on the idea that policy can be regarded as an attempt to attain certain goals with certain means in a certain time perspective. A policy builds, explicitly or implicitly, on sets of assumptions regarding the causal relationships between variables in the targeted policy field, relationships between 'chosen and newly induced causes' and 'desired effects' (sometimes called final relationships) and relationships between general values and more specific standards and objectives. These assumptions can be more or less valid from the perspective of a certain policy objective. In the context of the EUWARENESS project, this includes the perspective of sustainable use.

Furthermore, the aspects of the policy sector that the policy theory should reckon with include not only the causes, features and effects of the physical water resource use, but also the pattern of property rights that is connected to these uses. To design a policy that improves the use from a sustainability perspective, the policy has to reckon with what is already there as 'self-governing' capacity and what is lacking. An additional important aspect is the instrumental validity of the policy: Are the chosen strategies and instruments

in principle, when implemented correctly, capable of causing the desired results?

Implementation. The sets of incentives that are provided by the regime (including both property rights and public governance) are in many cases not self-executing. In order to be realised in practice, many need interaction processes in which they are applied. Often, these processes deal with the individualisation of general rules and subsidy or charge schemes or the enforcement of restrictions in resource use that are mandated by such rules or alternatively by the decisions of owners. When part of the foreseen incentives are not implemented or implemented incorrectly (meaning that the form in which implementation takes place decreases the incentive effect) even elements of the regime that in principle are complete and valid will prove to be insufficient to counteract unsustainable practices in resource use (cf. the 'policy instrumentation theory', Bressers and Klok 1988, Bressers 2001).

Coherence. In the EUWARENESS project, the most central condition for regimes to be successful in sustainable resource management is coherence. Therefore, this variable will be discussed at some length here and is the central component of four expectations. While coherence applies to both the public governance and the property rights components, coherence is likely to be first and foremost on the public governance side pivotal for sustainable resource use.⁷

First, we elaborate what forms the coherence of a governance pattern can take. When more than one layer of government is dealing with the same water resource (as is often the case), then coherence means among others that the activities of these layers of government are recognised 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 unsustainable problem situation, coherence means that the various resulting objectives are analysed 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 organisation of implementation means that responsibilities and resources of various persons or organisations that are to contribute to the application of the policy are co-ordinated or these actors themselves are co-ordinated.

All in all, coherence can take various forms that all can contribute to the coherence of the public governance as a whole, but not necessarily each provide decisive contributions to overall coherence on their own. To be able to judge what (combination of) aspects of coherence provides the stipulated condition for a sustainable resource management, it is important to make clear what is to be expected from coherence. In our opinion, the principal

⁷ Also, 'sufficient integration' can be conceived of as an aspect of the validity of the policy theory as for the design features concerned and as an aspect of implementation as for the process features concerned. But by doing so its emphasis would be lost.

benefit of coherence of the public governance component is to prevent negative side effects from some elements on the positive effects of other elements on a sustainable resource management and, simultaneously, to obtain extra opportunities for productive co-operation of various elements of the regime.⁸

On the one hand, this means that 'coherence' cannot be conceived of as a single best way of dealing with these interactions. For that the multiple possibilities are simply too overwhelming. Various forms of coherence might provide for various partial solutions to existing problems. On the other hand, it is clear that there are even more ways in which lack of coherence can be detrimental to the regime's effect on sustainable use. All in all, we predict that substantial steps toward more coherence will decrease specific forms of unsustainable use and that even in cases of a valid policy design and good implementation certain specified forms of lack of coherence will cause flaws in the sustainability of resource use.

For an additional impact of better coherence, we need to go back to the implementation condition. In a dynamic context and surrounded by uncertainties regarding the problem and possible solutions, an adaptive and learning form of policy implementation is important. Such a policy style depends on the uneasy combination of both pluralism (e.g. allowing complexity, openness, differentiation) to give room for challenging stimuli and on the other side co-ordination (e.g. coherence, consensus seeking devices) to be able to produce new solutions on the basis of these challenges (Arentsen, Bressers & O'Toole, 2000).

Cases in which consensus seeking devices are strong, but pluralism is restricted to 'insiders', like the 'iron triangle' of agriculture has been for a long time in many countries, are, however, vulnerable to become too closed for external stimuli that would provide the system with timely incentives to adapt and learn. Cases in which pluralism is strong, but no strong devices press for a co-ordinated agreement (like in some examples of US environmental policy) lack the incentives to explore win-win situations or at least profitable trade-offs.

For our analysis, this means that the role of coherence is connected to the ability to incorporate complexity in productive collective action. We assume that more coherence correlates with less unproductive constellations of goals, information and power of the actors involved in the implementation process.

⁸ As Ligteringen (1996, 1998) has shown, side-effects of policies can actually have a bigger impact on the attainment of certain environmental goals than the specific policies designed to influence that aspect of the problem. She states that part of these side effects occur indirectly through influencing major societal developments that have a substantial effect on sustainability themselves. Because of these indirect influences there is a multitude of possible effects of the various elements of the regime on the sustainability of the resource use. Also it is possible that the effects of one instrument are counteracted directly or indirectly by the effects of other regime characteristics.

With more coherence in the public governance component of the regime, the goals of the implementers and target groups involved in the implementation process can be expected to be less likely in discord. All elements of a more coherent regime can be assumed to contribute to a lesser degree of experienced uncertainty, an increase in information exchanges, and a lower degree of distrust. Coherence also means that typically there will be less possibilities for target groups to play implementers off against each other and more standard operation procedures for the solution of conflict.

This implies that a more coherent public governance component of the regime can outperform a regime with an equal degree of extent, but being more fragmented. This is expected to be the case, not only through the direct effects of more mutually reinforcing and less mutually destructive side effects on the resource use, but also through indirect effects on the quality of the implementation process.

2.4.3 Sustainability and the combination of the property rights and public governance components

Given this understanding of the implications of the property rights and the public governance components for the sustainability of institutional resource regimes, we now turn to the implications of public governance intervention in property rights. We base this discussion on the notion that (almost any) policy translates into an intervention and change in de facto private property rights. The sustainability of an institutional resource regime at any point in time, therefore, is determined by how policies structure, i.e. create and influence property arrangements.

To what extent is such public governance intervention in property arrangements necessary or desirable for the sustainability of an institutional resource regime? The answer to this question depends first, of course, on the potential for sustainability of the given property arrangement as discussed above in 2.4.1. In addition, the answer depends on the potential of governance intervention to improve the sustainability of the given resource management.

This potential of public governance intervention to lead to an improvement, in turn, depends on the sustainability potential of the governance pattern discussed above. Thus, the potential of public governance intervention in property rights to improve the sustainability of resource use depends on the validity of the policy theory, the probability of (correct) implementation of the policy, and sufficient coherence of a given policy. In general, we can see that the environmentally desirable degree of public governance intervention is higher, the higher the governance strategy scores on the three factors.

Combining the property rights side with the public governance side of an institutional resource regime, then, leads to the following statements:

1. The greater the validity of the policy theory, the higher the probability of correct implementation, and the better the coherence, the higher the environmentally desirable degree of public governance intervention.
2. The higher the economic benefit of an unsustainable resource use vis-à-vis the economic benefit of a sustainable one, the higher the environmentally desirable degree of public governance intervention.
3. In the case of a small economic benefit of an unsustainable resource use vis-à-vis the economic benefit of a sustainable one, large and numerous collective action problems imply a higher desirability of public governance intervention.
4. In the case of a large economic benefit of an unsustainable resource use vis-à-vis the economic benefit of a sustainable one, small and few collective action problems imply a higher desirability of public governance intervention.

Please note that although these statements are formulated in terms of higher desirability of public governance intervention, the opposite cases imply lesser desirability of public governance intervention and the expectations could just as well be formulated in that way too. In other words, this analysis does not imply that public governance intervention will always have a positive effect on the sustainability of an institutional resource regime and therefore is always desirable and necessary. Indeed, incidents combining a low validity of the policy theory, incomplete and incorrect implementation, and lacking coherence are the clearest cases where the opposite is true.

When we speak of the *external coherence between the public governance and the property rights components of the regime* we point not only to the appropriate degree of public governance intervention. Instead we mean also and foremost the degree to which the right connections are made between the elements of public governance (e.g. policy instruments) and the relevant aspects of the property rights arrangements (e.g. whether the right property right owners are targeted by the policy instruments).

2.5 Conclusion

There are three groups of variables. These are linked by the central relationships in the research questions.

- A. Change agents & conditions →
- B. Regime changes →
- C. Effects on sustainability aspects

Our hypotheses and expectations are as follows:

Hypotheses on regime change towards integration

1. Most change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes with a higher degree of **extent**).

2. Other external change agents of a specific nature (see above) can also lead to **coherence** in or between one or some elements of the regime, but only in combination with deliberate attempts of motivated actors (ultimately resulting in coherent regimes or in 'failed' regime shifts with encapsulated initial changes).
3. Attempts to change regimes into a more integrated 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 chances**).
 - 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**)
4. The more **detailed characteristics** of regime changes reflect to a large degree the balances in other elements of the regime that were not directly influenced by the change agent(s) initially (including property rights).

Expectations on the sustainability of institutional resource regimes

5. 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.
6. 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.

3 In search for integrated management: Methodological backgrounds

3.1 *Introduction*

The case studies and case study comparison is not the whole Euawareness study. Next to the case studies also 'country screenings' are made, describing and assessing policy and property right developments on the national level over a prolonged period. The methodological remarks below are however attuned to the case studies and the way the comparison is made in this report. First the case selection will be dealt with, then the design of the case studies. After that we will be re-visiting the variables of the theoretical framework described in the previous chapter to present a further operationalisation. The chapter will be concluded by some remarks about the way the variables are assessed by the case study researchers.

3.2 *Selection of cases*

In the Euawareness project two cases are studied in each of the six participating countries. In a first period of six months a first set of six cases (one in each country) was studied. In a next period of six months the second set of six cases followed.

These were the main criteria for the selection of the case:

- 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 / homogeneous 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 get 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 main three variable-groups, since these relations influence the inferences that can be made about the hypotheses that relate these variables (see 2.5).

There are various modes of sample selection, depending on the sort of inferences one wants to make (cf. Patton, 1980). Some modes refer to the dependent variable, some to the independent variable. Opinions about what is best differ and in any case there are different pros and cons involved. Most prefer the dependent variable as a basis for the sample selection. In EUWARENESS we have not one but two main links in the causal chain ($A \rightarrow B \rightarrow C$). We have chosen to connect the case selection to the second variable (dependent in the $A \rightarrow B$ relation, independent in the $B \rightarrow C$ relation).

On the surface the criterion looks the same as the other (similarity) criteria, 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. Nevertheless this criterion is a combination of an extreme case sampling strategy and a random variation driven strategy. 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 when we don't find improved factual ('real') integration in our cases, the chances are dim to 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 the success of it in close observation. On the contrary, we expect to see anything from major improvements to only symbolical 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 sowed, in the expectation that these will be shown to bear fruits in very divergent degrees. This gives 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 none 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.

The following cases were selected⁹:

Belgium

Case 1 - *The Vesdre River Basin*
The Vesdre is a tributary river in Wallonia. Its basin is 710 km² and it contains two rivers, de Vesdre (71 km long) and the Hoëgne (29 km long). It is an independent basin, since all rivers take their source inside the basin. Next to quality aspects, also

⁹ Of course, far more extensive information about these cases is provided in the 12 Euwareness case study reports, which form a separate and essential part of the reporting on the Euwareness research.

quantity aspects are relevant in this case. Since it is a 'wet' case, here the latter means the risk of flooding.

Case 2 - *The Dender River Basin*

The Dender is also a tributary river, but now in Flanders. Its basin is very similar (708 km²) in size. In fact it is larger (1384 km²), but half of it lies in Wallonia. The Dender flows only in its lower part into the basin. Both flooding and quality aspects are relevant. There is no drinking water production in the basin.

France

Case 1 - *The Audemarois Basin*, including the Aa River Basin and the Audemarois Marsh as its spreading area. The river Aa is 40 km long and is the main river of the region. The borders of the Audomarois Regional Park, encompassing some 550 km², best define the area. There are various rival uses at stake: agriculture and market gardening vs. navigation and nature, industrial pollution and nature and nature protection vs. extraction for drinking water and industry.

Case 2 - *The Sèvre Nantaise River Basin* is rather large, 2.493 km², but not very densely populated (290.000 in 1999). There are several smaller rivers in the area, but the Sèvre Nantaise itself is 135 km long. On its turn it is a tributary river to the Loire. The rivalries consist of agricultural drainage and irrigation vs. nature (because of floods and low water periods) and pollution from different sources and nature.

Italy

Case 1 - *The Idro Lake*, a natural basin artificially regulated, and the Chiese River, that is flowing across the regions Trentino and Lombardia, generating the Idro Lake and finally flowing down the Sabbia Valley into the River Oglio. The Chiese flows for 148 km. The whole water basin covers 934 km². The Idro Lake is a natural lake, artificially regulated. Its surface is 11 km²; its total catchment area covers 617 km². The main rival uses are agriculture, hydropower, tourism, nature and protection from floods, soil erosion and land sliding. The rivalry focuses on the maximum variation of the water level of the lake and a minimal flow of the river.

Case 2 - *The Marecchia-Conca Basin*.

Here the main rivalry is between water for drinking (residents, but also tourists) and irrigation for agriculture. But there are also some other rivalries and institutional conflicts. The basin covers 1347 km². The water basin includes the Marecchia cone, the biggest hydrological sink of the region.

The Netherlands

Case 1 - *The IJsselmeer* is a freshwater lake and former Inland Sea in the heart of the country. It covers about 2000 km², surrounded by about 600 km of shore. Rivalries in use concern fishery (a homogeneous use rivalry), between gas drilling and the

protection of water quality for nature and drinking water production, the rather Dutch issue of land reclamation vs. open water and between nature and recreation.

- Case 2 – The *Regge River Basin* is a tributary river in the Province of Overijssel, joining the Vecht River, which is flowing at the end into the IJsselmeer. It is a small rain river with only 20 meters of height difference in a 900 km² large basin. The main rivalries are between protection against flooding (mainly for agriculture) and nature and landscape and between pollution and nature.

Spain

- Case 1 - The *Matarraña River Basin*, a tributary of the river Ebro located in the north east of Spain. The Matarraña is a tributary to the Ebro river and has an extension of 97 km. The basin is 1.727 km² large. In this case irrigation – using 90% of the available water flow! – is rivalling uses for population supply, tourism and environmental protection.

- Case 2 - The *Mula River Basin*, where irrigation by itself is already pushing to the limits, but also rivals uses for population supply, tourism and environmental protection. The Mula is a tributary of the Segura and has an extension of about 25 km. Its basin is 695 km².

Switzerland

- Case 1 - The *Maggia Valley*, which is a mountain river basin situated in Ticino, the southern part of Switzerland, south of the Swiss Alps. The river flows into the Maggiore Lake, a large part of which is situated on Italian territory. The water basin is about 930 km² big. Main problems were with hydroelectric production, quarrying and flood protection, rivalling with uses like recreation drinking water production and nature and landscape.

- Case 2 - *Lake Baldegg and Lake Hallwil*, where the problems stem from wastewater from settlements, diffuse pollution by agriculture and the need to protect the lake shores. The first mentioned lake is 5 km², mainly supplied by river Ron. From lake Baldegg flows river Aabach that feeds the second lake of 10 km². The water basin of the two lakes is relatively small, some 138 km².

The 12 cases display a large variety of rivalries that include most of the common ones in the European Union at this level. They are similar however in their approximate scales.

3.3 Case study design

In many case studies normally two parts have their place. 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 build an answer on the research questions of the project (Dente, Fareri & Ligteringen 1998).

Some of the cases contain more than one more or less independent development or 'story'. In these cases there are *sub-cases* 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 hold true, we discerned separate subcases when analysing the variables and hypotheses in chapter 4. A subcase is than a set of observations for which of the above criteria *do* hold true¹⁰. In many instances this also meant that not only regimes on the water resource, but also regimes on land use, nature protection and other natural resources (e.g. fish) were at stake.

The descriptive part of the case study follows mostly a historical logic. If there is more than one important story lines or sub-cases, these are dealt with separately. From the beginning though, the stories are selected ones. Only those developments that are relevant in the light of the variables and theories of the project are worth to be elaborated. Though the readability of the case studies may involve also other considerations, nevertheless it is attempted to use as much as possible the terms that fit those of the variables or indicators of them. This makes it easier for the second part of the case study to be linked with the descriptive part. Since all teams have extensive experience with case studies as such, the case study protocol used did not further elaborate on the descriptive part.

The analytical part consists of the assessment of relevant variables (translating 'real life' observations in theoretical language) and the inferences and conclusions that can be based on these variables and their relationships. For the case study protocol the identification of the key variables to be assessed and their indicators was most important. Since subcases are treated as equal cases in the analysis of the assessments of the relevant variables, cases that are split into subcases are in a sense over-represented in the data for the comparative analysis that is presented in chapter 4. 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 subcases but analysed as a single case, that case was included fourfold in the '*weighted database*'. All the analyses presented in chapter were also done with this '*weighted database*'. Commonly the results did not differ, though.

In order to answer the research questions and analyse the hypotheses, all the case studies have addressed the following items:

¹⁰ 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 discern them into subcases, 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.

-
1. Case demarcation
 - general description of the water basin (geographical and hydrological aspects)
 - description of water uses involved (goods and services)
 2. Regime development during last two decades
 - general historical description of regime development
 - paying attention to water rights, policy concepts, actors involved, rivalries
 3. Identifying transitions towards coherence
 - based on previous regime development description
 - concluding what transitions are being found: is there more than one sub-case?
 4. Detailed analysis (if necessary for each transition / subcase)
 - describing what happened and what kind of rivalry/ies has/d been at stake
 - analysing what forms of extent and coherence changes can be recognised: extent, internal coherence public governance, internal coherence property rights, external coherence between public governance and property rights
 - analysing the relation between regime change (coherence) and sustainability; relation with hypotheses
 - analysing the conditions for regime change; relation with hypotheses
 5. Conclusions
-

While in our case studies it was seldom possible to give a complete overall assessment of the status of the regime (too many aspects would require attention), it was possible to assess the changes that have occurred in the research period of the case study. Do they simply add uses or users to the domain of the regime (extent), or are they also 'repairing' one or more mismatches (coherence), and if so which ones? Then the choice of 'issues' or 'rivalries' determines what changes are relevant in the context of the case story/ies. In our case studies it has proven that there is no escape from more or less artificial boundaries of the case as studied, boundaries that are set by the researchers. These boundaries are not only in terms of geographical area or time period, but also may exclude certain issues. An example of a change that is not as relevant for the case story is when national law sets general minimal quality standards when studying a clear mountain river where quality has never been any problem. Or when an existing but minor issue about water quality has been deliberately set outside the realm of the case study, while concentrating the study on other more important rivalries. This happened for instance with the rivalry between kayakists and fishers in both French cases. By viewing from the perspective of the rivalries under study it is possible to assess the impact of the changes on the regime's status in as far as it is relevant for the (sub-)case (more or less extent, more or less of various kinds of coherence).

We'll now return to an overview of the variables assessed in order to discuss their operationalisation in the empirical case studies.

3.4 *Re-visiting the variables for further operationalisation*

There are three groups of variables. These are linked by the central relationships in the research questions.

- A. Change agents & conditions →
- B. Regime changes →
- C. Effects on sustainability aspects

'B. Regime changes' is the central variable. A should provide explanations for it. C should show the results of it. Therefore we'll start with explaining C.

Sustainable use

Though an overall assessment of the sustainability of the regime is for various reasons hard to give, the assessment whether the concrete regime changes lead in the direction of more or less sustainability was less hard to give. The expectation that more integrated regimes will *ceteris paribus* perform better for sustainability is part of European and many member states political ideology on water management. A more theoretical reasoning to base this expectation on is given in the previous section.

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 – see Appendix 4). It is not the purpose of the EUWARENESS research to assess the overall sustainability of the resource use. The approach to deal with this variable (-group) is the following. We start with the rivalries that are at stake in the case story/ies. In 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. In second instance also the social and economical development consequences of the changes in these indicators and / or the measures taken for this purpose are taken into account. In last instance also a marginal check is made whether the observed changes have important side effects on other natural resource / environmental indicators and whether these have indirect social and economic consequences in their turn.

Regime changes towards coherence

The central key variable in the EUWARENESS project is: changes of the regime towards more integration (extent and coherence). This variable is the dependent variable in our most important research question and the independent in the other. It consists in first instance of three dimensions: change, regime and integration. We will deal with these dimensions successively.

Change

Change is placed at the foreground here, because in the case studies the transitions (towards more integration) themselves are the focus of attention. This means that it was not always important to sketch all aspects of the

regime, but only those that are necessary to understand what the changes that are studied mean in the context of the rest of the regime.

In many cases the case study will not contain only one story of regime change, but more than one. This may imply developments that can be seen as partial integration in only geographical sub-units of the case study territory or only between certain aspects of the resource use and 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.

We expected on beforehand non-trivial changes (even if they involve changes towards “consensual management” or the like) to often involve some kind of conflict, struggle or manipulation, with also losers involved. So, though it is not impossible that changes in problem perceptions (in combination with the existing ‘regulative system’ of property and use rights) invoke a real consensus that everybody is better off with more integration, this certainly needs not to be the case. (It is even likely in such a case that there has been some previous struggle about the problem perception itself.)

So, all in all: there can be more than one relevant changes described in the case studies, and even though these changes are heading towards integration, the change process itself will often involve overt or hidden conflicts¹¹.

Regime

The resource regime consists of two systems and their mutual relationships: the regulative system (including property and use rights) and the governance system (including public policies).

Concerning the regulative system it consists of the property rights (not only including the property titles, but also management rights and exclusion rights), use rights and disposal rights (a special kind of use right, but special in the sense that disposal directly affects water quality and its protection). In the EUWARENESS research proposals the following property rights were discerned: property title, exclusion rights, access & use rights, management decision rights.

Concerning the public governance system we think it is important to have a broader conception than just public policy. We use a public governance model that consists of five dimensions or ‘elements’, with an extensive list of indicators operationalized with the help of a survey of policy analysis literature. Together they form a more or less complete picture of the public governance system.

The coherence of the regime can be distinguished between internal coherence of the public governance, the internal coherence of the property rights and the external coherence between the two. For the last two, see section 2.3.

¹¹ As could be observed in several of the case studies.

As for the internal coherence of public governance six forms of coherence may be distinguished:

- a. *Coherence of levels and scales of governance*
- b. *Coherence between actors in the policy network*
- c. *Coherence of problem perception and objectives*
- d. *Coherence of strategy and instruments*
- e. *Coherence of responsibilities and resources for implementation*
- f. *Coherence between the two subsystems of the resource regime*

We repeat them here in order to link them to the concepts that are used by the European Union.

This division is supported by the definitions of “integrated water management” as being adopted by the EU. In that context, an important source for us to consult might be the new European Water Framework Directive, which is defining and advocating coherence by:

- Administrative co-ordination at the level of a river basin as a whole (*“the best model for a single system of water management is management by river basin – the natural and hydrological unit – instead of according to administrative or political boundaries”*). This element is supporting the form of coherence focusing on levels and scales of governance.
- Involvement of all actors having an interest in water services (*“increasing public participation and balancing interest of various groups”*). This element is supporting the form of coherence focusing on actors in policy networks.
- Development of a water vision for a river basin (*“co-ordination of objectives – good status for all waters by 2010; the objectives for a river basin must be set out in a river basin management plan, based on analysis of the river basin characteristics, a review of the impact of human activity on the status of waters in the basin, estimation of the effect of existing legislation and the remaining ‘gap’ to meeting these objectives”*). This element is supporting the form of coherence focusing on problem perception and objectives.
- Streamlining legislation (*“the framework directive will take over operative provisions of several water directives”*) and getting the prices right by full cost recovery pricing (*“to ensure that the price charged to water users integrates the true costs”*). This element is supporting the form of coherence focusing on strategy and instruments.
- Co-ordination of the application of measures for a river basin (*“analysing if existing legislation solves the problem well and good, and if it does not, identify why and design whatever additional measures are needed to satisfy all the objectives established”*). This element is supporting the form of coherence focusing on responsibilities and resources for implementation.

Integration

The term “integration” is used as a label for the regime changes that might improve the sustainability record of water resource regimes. The term relates to the term “integral water management” that is in the core of attention now in

the European Union and member states water policies and thus to the policy relevance of the research project.

For EUWARENESS next to these possible forms of integration (extent and coherence) in the public governance system also an extra focal point comes in: that of the internal coherence of the property rights system and the external coherence between the two systems of the resource regime. Such a possible incoherence is sought in the first place in a wrong match between the actors targeted by the public governance system and the actors with relevant rights in the regulative system (property and use rights). In the second place also a mismatch of the goods and services involved in both systems might lead to a lack of integration and thus a possible form of change towards more integration. Though this form of integration is hardly included in ideas about integrative water management in the EU and its member states, it is a typical and logical extension of the concept in the context of the EUWARENESS project, of which the combined attention to both systems of the regime is a characteristic feature.

Thus, the three main change variables are:

1. Extent
2. Internal coherence
 - a. within the public governance system
 - b. within the property rights system
3. External coherence (between a and b)

'Extent' reflects the domain of uses and users that are regulated by the regime. If a certain use of the water resource (e.g. fishing) is not regulated or considered by any of the regime elements, it does not belong to the extent. Likewise if only professional fishing is regulated, but not sports fishing, the sportsmen involved do not belong to the extent.

Change in extent will often mean that more uses and/or users are incorporated. Typical for many cases is that nature gets recognised as a use/user and considered in the regime. A larger extent makes the regime more 'meaningful' for the use of the resource. But there is also a danger. If the incorporation of additional uses/users in the regime takes place by new separate property rights and/or public governance aspects, this might lead to a decline of the coherence of the regime. In this way simple regimes evolve into complex ones. Therefore in we have also spoken of 'complexity' and 'fragmentation' in relation with this variable.

'Coherence' is the degree of 'fit' of the property rights, of the public governance elements and of their combination. When the European Union speaks of 'integral water management', it means - in our terms - a combination of an increased extent and more coherence in the elements of public governance. In the EUWARENESS project we are however also interested in the coherence of the property rights (2b) and in the coherence *between* public governance and property rights (3).

An example of a misfit in the elements of public governance is when a new problem perspective is accepted, but no new targets are formulated for that

newly recognised problem or it is not recognised that the new targets are contradictory to the existing ones¹². It would thereby create the risk that ‘the left hand is undoing what the right hand is doing’. These are examples of a mismatch within an element. When the new objective is not followed by instruments to attain it, that is a mismatch between elements of governance. An example of a misfit in the property rights system is when new users are granted use rights without recognising that this may harm existing use rights¹³, for instance when water scooters are allowed in a lake where a sports fishing association holds an exclusive fishing right. An example of lack of coherence between property rights and public governance occurs when policy instruments address other actors than the ones that hold relevant use rights.

Change agents and conditions

The second question of the EUWARENESS project asks for the change agents and conditions for change. We elaborated that in three directions: the change agents, the conditions for successful changes and the more detailed form of the changes.

The general idea is that regime changes in many cases are the result of processes not intending to produce a change in water management, or to do so, but in many cases for other reasons than water management purposes (alone). The interactions of actors with their resources and within an institutional context produce the initial change. Behind these dynamics often more external change agents can be recognised which in their turn affect motives and resources of the actors involved. In the project proposal recognition of developments in the problem situation was mentioned as such a factor. We listed also some other ‘major societal developments’ as candidates when one asks oneself the question “why was this process triggered there and then?” Since many of these circumstances could trigger processes of changes affecting (ultimately) the water management regime, we don’t want to include only these in the comparative analysis.

For the specific kind of changes that can be labelled ‘moves towards more coherence’, the expectation is that these changes will not occur unless there is some deliberate attempt by motivated actors towards coherence. Examples from the French cases are the Regional Park in the Audomarois case and a regional State administration SREA, in the Sèvre Nantaise case. The reason is that real coherence implies not only a reshuffle of power etceteras (that can be produced also at random by various external developments) but precisely that this reshuffle is NOT at random, but leads to the (in a world of randomised pressures) unlikely effect of more coherence. In our perspective coherence will often meet resistance, like any other major change in relationships. So, next to ‘losers’, probably also ‘proponents’ should

¹² In the Audomarois case nature protection was added, while the groundwater extraction did only reckon with industrial use and drinking water production and resources for that, but not with the needs of the natural area.

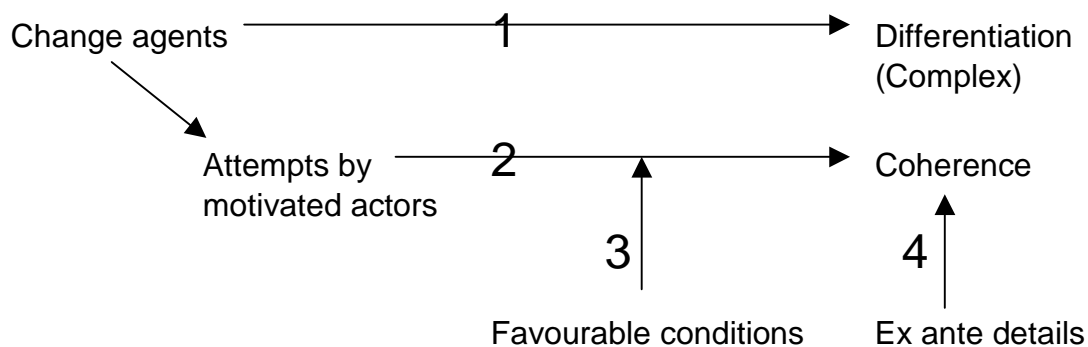
¹³ In the Audomarois case the water level in the canal was raised by the State company holding the management rights to allow for bigger boats, but without reckoning the rights of the users of the water for market gardening.

be identifiable (hypothesis 2). Otherwise changes will lead more often to only an increased extent and thus increased complexity (hypothesis 1).

The second thing that we want to test in the EUWARENESS project is whether attempts to integrate need the same sort of favourable preconditions as some other forms of co-ordinated collective action. We stipulated five of these in hypothesis 3 (by the way: a process goal oriented intermediate actor is regarded here as a form of ‘institutional interface’). In the comparative analysis thereafter we will try to discern patterns that are maybe not necessary but in any case sufficient to accompany ‘successes’ in regime change towards more coherence.

The third and last idea that we want to test stems from our scepticism regarding the nature of many developments that are ‘sold’ as integrated management. We want everybody to be aware of the possibility that what at the surface looks as coherence has in fact not much promise for sustainability in use, since the more detailed form that the changes took, can be even harmful. Here the division between use-driven changes and protection driven changes is extremely important. If new aspects of the problem gain recognition and are included in the weighting of objectives, it matters whether these are sustainability related ones (often protection driven) or not. The characteristics of the regime elements not initially affected can encapsulate the initial changes, even to the extent that these are effectively neutralised: “plus ça change, plus ça reste la même chose”. This aspect is not so much a variable than a point of attention.

The operationalisation of the causes for regime change follows the four hypotheses on regime change. In the diagram below the position of the four hypotheses is shown.



1 & 2. The first two hypothesis state that normally change agents will lead to more complexity and that it will need ‘deliberate attempts of motivated actors’ to turn change agents’ influence into a change towards more coherence. The conclusion whether or not this is true has political relevance. For it would mean that even when circumstances seems to demand more coherence, by no means one can trust this to evolve as a sort of automatic adaptation. Background of this is that real coherence will tend to ‘hurt’ somewhere in the system. For the case study these hypotheses are relative easy to assess. Is it true or not that in the case (in fact in each of the ‘story lines’) changes towards

more coherence always involved some of these 'attempts by motivated actors'?

4. The fourth hypothesis demands in the case study attention for not only the degree of integration, but also the details of its elaboration. The expectation here is that these details can be understood on the basis of the characteristics of the regime elements that are not directly affected from the beginning. The assessment of this hypothesis can only be done on the basis of the historical descriptions of the changes involved. The number of possible aspects (details) is simply too big to make a uniform list of indicators for all case studies. *So this expectation is not dealt with in this comparative analysis, but forms the theoretical background of many of the observations made in the case studies.*

3. The third hypothesis specifies the 'favourable conditions' for 'regime changes towards more integration'. This hypothesis will be at the heart of the comparative analysis of the cases. Per case (story line) the degree and form of integration on the one hand will be linked with the status of the specified conditions as assessed by the researchers on the other hand.

The indicators for the relevant conditions used are:

3a 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

3b 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

3c Joint chances

- 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 with the actors involved

3d 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

3e Institutional interfaces

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

- clarity of assigned responsibilities (to prevent territorial battles)
- free and alert mass media to induce awareness of challenges into 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 small N 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 (part of link with country screenings!)
-

3.5 *Case study facts and assessments sheets*

As an aid to the comparative analysis, forms were used that the case study researchers filled in. These “case study facts and assessments sheets” (see Appendix 2) represent the variables and indicators of the theoretical model. Their purpose is to summarise the information in a uniform format so that the case information is comparable along the lines of the theoretical variables and hypotheses. Per variable the researchers were asked to mention the few most important facts of their case study (‘key facts’). The exercises of filling in the forms proved also very helpful to get grip on the case analysis itself. Also the assessment of the variables in terms of values or ‘scores’ was this way not (as often in case study comparisons) done implicitly by the maker of the comparison, but put deliberately in the hands of the researchers themselves.

The advantage is that the assessments are made by people that have extensive knowledge about the cases at hand, often more than described in the reports. The possible disadvantage is that different researchers could interpret the items each a little differently. We tried to counter this possible disadvantage by providing the researchers with two ‘pilot’ completed ‘case study facts and assessments sheets’ as examples, namely on the two Italian case studies. Also we presented an additional explanatory paper.

Still sometimes, after the receipt of the filled-in electronic forms from the case study researchers, the makers of the comparative analysis had some doubt whether a variable was interpreted precisely correct (always partly on the basis of the key facts presented by the case researchers themselves). These hesitations were then communicated with the case researchers. Sometimes this resulted in changes in the assessments. Many times however a further clarification and underpinning by additional ‘key facts’ could be given as an adequate response.

As said, 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 the score is not a fact, but a judgement, much like marks are with school test papers. Therefore we also wanted to know also the most relevant facts they observed 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 the case study researchers an influence on the way the case study comparison is made. For when comparing cases one makes always, explicitly or implicitly, these kinds of judgements on the rating of variables. We choose to do so explicitly.

In this way, we try to combine the better of two worlds: the depth of information realised 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 risk is diminished of the bias that the comparative analyst is misled by surprising, but anecdotal evidence of only one or two cases that is not representative for the relationships in the whole sample of cases. On the other hand one might question whether the case study researchers are not tempted to 'fix' the case by assessing the variables not really independently from each other but having the scores on dependent variables influenced by their assessment of independent variables or vice versa. 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 is paid to the various change agents than to the conditions. This is even often a large part of the story in the reports. If the suspected form of bias would be real, than one could expect the degree of regime change variables and the force of change agents variable 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 is by far not correlated with regime changes than the conditions prove to be (see section 4.4). This attests that the researchers assessed the variables independently at their own merits.

All scores are from 0 to 4. In general 0 indicates that regime changes, sustainability changes and change agents are absent or even negative, and that conditions for regime change towards more coherence are unfavourable. Of course 4 indicates the positive other extreme: much more integrated regimes, much more sustainable resource use, forceful change agents in the 'good' direction and very favourable circumstances.

The more precise meaning of the scores was explained per variable as help for the case study researchers. We will present the same operationalisations as in these explanatory notes to the researchers and in the 'facts and assessments sheets', when we present the results of the comparative analysis in the next chapter.

4 Integrated water management in practice: Results

4.1 *Introduction*

In this chapter the results of the comparative analysis will be presented. This analysis is based on the categorisation of their cases (including subcases) by the researchers on the different dimensions (theoretical variables). The 24 (sub)cases and 13 assessments (categorisations along the lines of different variables) per case are of course too many to be handled in a purely qualitative way. Therefore we present most of the description and analysis below by using descriptive and analytical statistics that are apt for ordinal level variables.

4.2 *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).

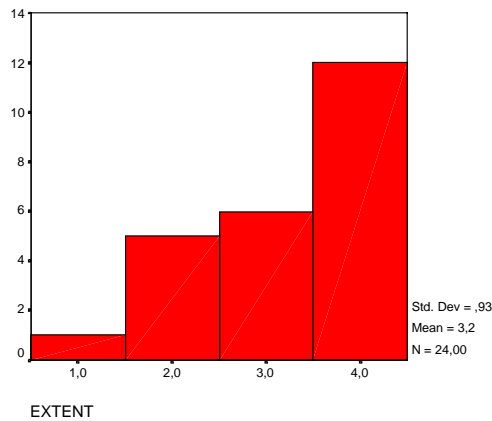
Extent:

This is the degree of completeness of the domain of the regime in terms of relevant uses and users¹⁴. While the description of the variable is static, in this study the regime *change* is crucial, therefore the values are phrased in terms of change, also with the other regimes aspects.

Meaning of the values:

- 0 the extent has not changed while incomplete or has even decreased
- 1 the extent has only increased on minor aspects
- 2 the extent has increased on only a few of the important aspects or only somewhat on more of the important aspects
- 3 the extent has considerably increased on many important aspects
- 4 the extent has been completed or was already complete

¹⁴ Almost always the introduction or the increase in valuation of the protection of 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 and be incorporated, like diffuse agricultural pollution.



In most of the cases and subcases in the study the extent of the water resources regime changed positively, in many cases even to include more or less completely all relevant uses and users.

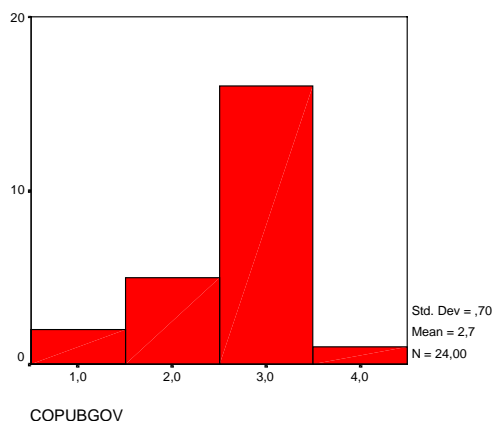
Internal coherence public governance:

This 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 governance¹⁵.

Meaning of the values:

- 0 the internal coherence of public governance has not changed or has even decreased
- 1 the internal coherence of public governance has only increased on minor aspects
- 2 the internal coherence of public governance has increased on only a few of the important aspects or only somewhat on more of the important aspects
- 3 the internal coherence of public governance has considerably increased on many of the important aspects
- 4 the internal coherence of public governance has been completed or was already complete

¹⁵ The changes in the internal coherence of public governance in most cases included aspects of all five element of public governance: levels and scales, actors and networks, perspectives and objectives, strategies and instruments, and responsibilities and resources for implementation.



The internal coherence of public governance generally increased also, but less. Almost nowhere a ‘full coherence’ statement could be made and in several occasions only small improvements occurred.

Internal coherence property rights:

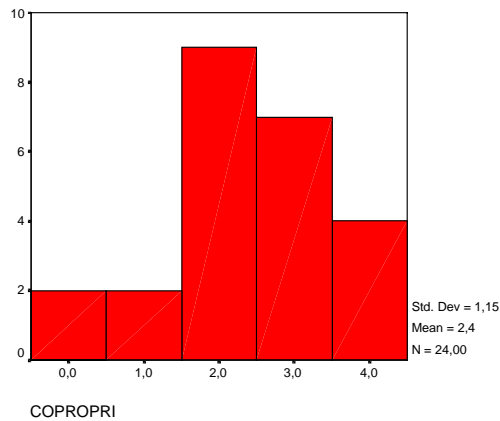
This is the degree to which, the interdependencies in the water system and its management that occur in reality, are reflected within and between the property and use rights. The essence of this variable is that property and use rights of the one do not inherently or under the given circumstances make rival uses affecting the sustainability of the resource unavoidable, without external intervention¹⁶.

Meaning of the values:

- 0 the internal coherence of the property and use rights has not changed or has even decreased
- 1 the internal coherence of the property and use rights has only increased on minor aspects
- 2 the internal coherence of the property and use rights has increased on only a few of the important aspects or only somewhat on more of the important aspects

¹⁴ Here for instance developments were reported like the passing of shares in relevant private and public companies, privatisation, gradual acceptance of the water body as a common good, 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, like 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’, like in Spain), regulatory unification of the property of land and water, the organisation 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. *Generally when absolute limits of the resource are at stake (water, fish) the property and use rights are more used 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 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 often property and use rights are restricted and must give way to public governance in order to improve the sustainability of the resource use. At least, this is observed as common practice.

- 3 the internal coherence of the property and use rights has considerably increased on many of the important aspects
- 4 the internal coherence of the property and use rights has been completed or was already complete



Here 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.

External coherence between pr and pg:

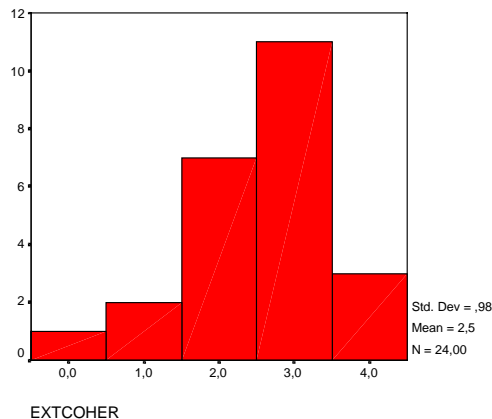
This is the degree to which, the interdependencies in the water system and its management that occur in reality, are reflected in the interdependencies between public governance and the property and use rights¹⁷.

Meaning of the values:

- 0 the external coherence between public governance and the property and use rights has not changed or has even decreased
- 1 the external coherence of the property and use rights has only increased on minor aspects

¹⁷ Here among others the following developments were reported: expired use rights were gradually transferred to other (public or semi-public) institutions, the aim of a minimal water flow is incorporated as a sort of use right for environmental protection, an EU inspired programme gives compensation to farmers for not exerting their use right to part of their farm land, some technical measures require new responsibilities and resources for implementation that demand 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 Belgian cases), the localisation of drinking water industry is problematic but not really considered as a question per se, subsidies allow the regional administration to influence nature management by owners, modification of property rights by creation of zones that are liable to flooding, concessions 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 that 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.

- 2 the external coherence between public governance and the property and use rights has increased on only a few of the important aspects or only somewhat on more of the important aspects
- 3 the external coherence between public governance and the property and use rights has considerably increased on many of the important aspects
- 4 the external coherence between public governance and the property and use rights has been completed or was already complete



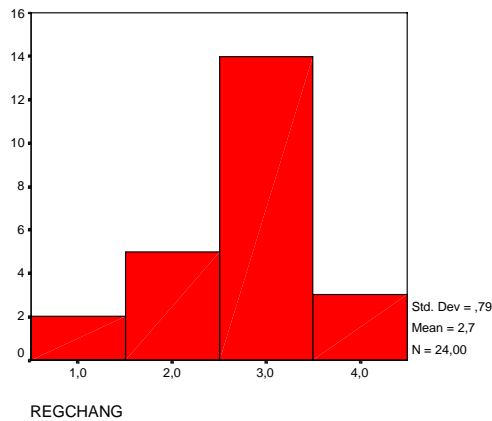
The external coherence between public governance and property rights changed in half or the cases considerably for the better and in the other half only modestly or less.

Total assessment regime change:

Here the mark is not necessarily the average of the four previous scores. It is quite possible that the three coherence indicators to a certain degree compensate each other, so that a decreased coherence in the property rights sphere is made unimportant since the regime became more public governance oriented or the other way around.

Meaning of the values:

- 0 the extent and the coherence of the regime have not changed or have even decreased
- 1 the extent and the coherence of the regime have only increased on minor aspects, or an increased extent has led to less coherence
- 2 the extent and the coherence of the regime have increased on only a few of the important aspects or only somewhat on more of the important aspects, or an increased extent has partially led to less coherence
- 3 the extent or in any case the coherence of the regime have considerably increased on many of the important aspects
- 4 the extent and the coherence of the regime have been completed or was already complete



The over-all assessment of the regime change is clearly in most cases that there were considerable improvements on many of the important aspects. Nevertheless also seven worse and 3 better situations occurred.

While 7 of the cases were analysed as single cases and the other 5 split into 17 subcases, one might suspect that the subcases are on average more coherent than the single cases, while each subcase only deals with a part of what is relevant. So 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 subcases in the sample of 24¹⁸.

The relationships between the assessments of the various aspects of the regime change were calculated with Kendall’s Tau b, a correlation coefficient for ordinal variables.

¹⁸ In two subcases the main issue was the purification of wastewater. Since there is a very clear and proven technical solution (building and exploiting treatment plants) all kinds of coherence aspects were hardly problematic when the political will to invest was present. Though this might be seen as an artefact of splitting the case in subcases, it can also and probably more rightfully be viewed as a characteristic of situations where a technical solution is possible (though the *siting* of these plants often *does* involve complex interactions). In the other cases there was a lot more social interaction involved and hence relevance for the coherence of the regime.

Correlations

			REGCHANG	EXTENT	COPUBGOV	COPROPRI	EXTCOHER
Kendall's tau_b	REGCHANG	Correlation Coefficient	1,000	,481**	,674**	,498**	,741**
		Sig. (1-tailed)	,	,004	,000	,002	,000
		N	24	24	24	24	24
	EXTENT	Correlation Coefficient	,481**	1,000	,501**	,194	,315*
		Sig. (1-tailed)	,004	,	,004	,137	,041
	N	24	24	24	24	24	
	COPUBGOV	Correlation Coefficient	,674**	,501**	1,000	,488**	,433**
		Sig. (1-tailed)	,000	,004	,	,003	,010
	N	24	24	24	24	24	24
	COPROPRI	Correlation Coefficient	,498**	,194	,488**	1,000	,507**
		Sig. (1-tailed)	,002	,137	,003	,	,002
	N	24	24	24	24	24	24
	EXTCOHER	Correlation Coefficient	,741**	,315*	,433**	,507**	1,000
		Sig. (1-tailed)	,000	,041	,010	,002	,
	N	24	24	24	24	24	24

** . Correlation is significant at the .01 level (1-tailed).

* . Correlation is significant at the .05 level (1-tailed).

The general assessment is as expected positively correlated with all the four aspects, though public governance and external coherence seem to have made the strongest difference for the total assessment. Also most aspects are correlated among each other, the least so with the extent variable. This makes sense since it is not one of the set of coherence aspects. Though most of the regime aspects' assessments are significantly correlated among each other, the correlations are by no means so strong that it raises doubt whether the different aspects were assessed independently from each other.

If one treats the variables for a moment at interval level¹⁹ and uses multiple regression to estimate the relative contribution to the overall assessment of the four aspects, the regression formula "explains" three quarters of the general assessment of regime change and is statistically significant (adjusted R² of .767 with significance p = .000). The Beta coefficients of public governance and external coherence are significant. They are .417 and .457

¹⁹ Most analyses are done with ordinal level statistics. The use of some ratio scale statistics with this kind of data has been debated among statisticians. Puritans claim that it is an over-use of the data, while many others claim that in general the incurred bias from that is very small and that it is no problem as long as one handles those statistics with care. Our position is what we regard as a 'common sense' one. What is important are the two assumptions for ratio level data: first that there is a zero point among the values (which there is) and secondly that the steps between the values are more or less equal. The latter assumption can of course not be proven with these verbally phrased values. But on the other hand we phrased the formulation of the values carefully in such a way that in any case there is not a clear UNEquality, e.g. a small improvement from 1 to 2, a giant leap from 2 to 3 and a small improvement again from 3 to 4. To treat these data at a ratio level is about as (un)justified as computing averages etceteras on the basis of students school marks. All in all we rely predominantly on ordinal level analysis. But for multivariate analysis we decided not the loose information by creating dichotomic 'dummy' variables (which is a rather common practice in those cases), but to use the full data as they are. This keeps all the information in and will create only limited bias.

respectively. The extent (.100) and internal coherence of property rights (.072) are statistically not significant and their removal even slightly increases the adjusted R^2 (to .782) with Beta's for the remaining factors of .492 and .511 respectively.

Since subcases are treated as equal cases in this analysis, cases that are split into subcases are in a sense over-represented in the data. 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 subcases but analysed as a single case, that case was included fourfold in the '*weighted database*'. All the analysis presented in this chapter are also done with this weighted database. Only when there are important deviations from the original results these will be reported. Generally this is however not the case and are the results on the basis of the weighted database very similar to the original results.

Compared to the analyses above only the relation between the regime change and the internal coherence of property rights is weaker (.243 in stead of .498). With the regressions the differences are very marginal.

The conclusion on regime change is that in this study in most cases considerable improvements were signalled. But there were also several occasions of more or less failed attempts to regime change. Remember that such attempts were one of the selection criteria for the case selection.

4.3 *Implications of regime changes for sustainable use*

The over all sustainability of the 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. So the assessment was concentrated on the *implications of the observed regime changes* for indicators that are relevant for sustainability. That is also the reason that the variable is called that way. Developments in sustainability of use that have clearly nothing to do with the observed regime changes, but for instance with climate change or fast economic development are excluded from the judgement.

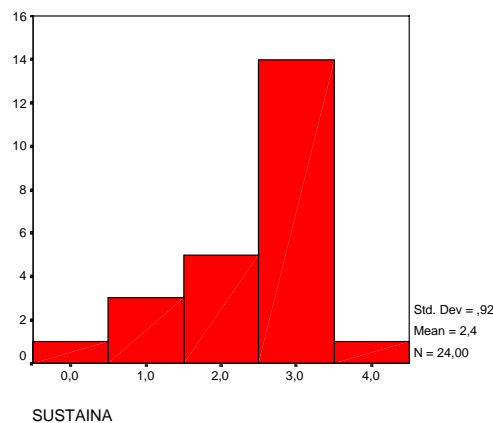
Further is the weighting between the environment, natural resource protection & risk avoidance on the one hand and the economic and social implications of these ecological changes and / or the measures taken to achieve them on the other hand a hard nut to crack. We weren't inclined to judge in favour of an increased sustainability without some ecological improvements²⁰, even though economic or social indicators might have improved²¹. Here we also paid attention to the relevant EU 'good status' indicators (see Appendix 4).

²⁰ Naturally the reported ecological improvements reflect the rivalries mentioned (see section 3.2).

²¹ Often the picture for the **economic consequences** is somewhat mixed. As negative economic consequences the financial costs and/or restrictions for the sectors involved (agriculture, fishery, resource extraction or industry) and in some cases higher water prices

Meaning of the values:

- 0 the sustainability of the regime has not changed or has even decreased due to regime changes
- 1 the sustainability of the regime has only increased on minor aspects due to regime changes
- 2 the sustainability of the regime has increased on only a few of the important aspects or only somewhat on more of the important aspects due to regime changes
- 3 the sustainability of the regime has considerably increased on many of the important aspects due to regime changes
- 4 the sustainability of the regime has been completed or was already complete



Our expectations (expectations 5 and 6) regarding the relation between the regime (change) and the sustainability of institutional resource regimes were:

- 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.
- 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.

are mentioned. On the positive side the following economic phenomena were also often mentioned: gains for tourism, avoidance of future costs, job creation and job safeguarding, and an improved natural resource basis for further economic development. Sometimes also lower water costs and an increase in productivity was reported. While the economic consequences were mixed, the **social consequences** were often very positive and remarkably varied. As the only negative social consequences were mentioned a limitation of land ownership rights and a negative impact on the landscape, both mentioned once. On the contrary the positive social consequences include: modernisation of agriculture, development of new associations of people, more open public debates and more information for the people in general, better feeling of safety, stop to decline of population 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.

The relation between the extent and the sustainability estimates is rather weak and hardly significant (Kendall's Tau b is 0,297 with one-tailed sign. p = 0,051 and Spearman 0,342 with sign. p = 0,051).

A possibility could be that the relation between extent and sustainability becomes apparent when aspects of coherence are kept constant. When we control for regime change in general the partial correlation is however still weak (.249 with p = .126). Controlling for the three separate coherence aspects together gives about the same result (.176 with p= .223)

The cross tab is:

SUSTAINA * EXTENT Crosstabulation

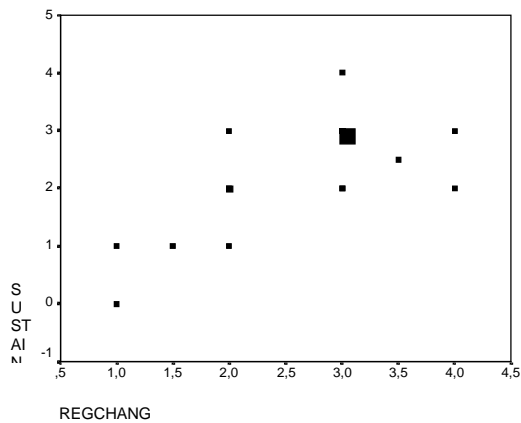
Count		EXTENT				Total
		1,0	2,0	3,0	4,0	
SUSTAINA	,0	1				1
	1,0		3			3
	2,0			1	4	5
	2,5				1	1
	3,0		2	5	6	13
	4,0				1	1
Total		1	5	6	12	24

The relation between the general assessment of regime change and the assessment of sustainability is however much stronger (Kendall's Tau b is .459 with sign. .005 and Spearman .533 with sign. p = .004).

SUSTAINA * REGCHANG Crosstabulation

Count		REGCHANG					Total
		1,0	1,5	2,0	3,0	3,5	
SUSTAINA	,0	1					1
	1,0	1	1	1			3
	2,0			2	2		5
	2,5					1	1
	3,0			1	11		13
	4,0				1		1
Total		2	1	4	14	1	24

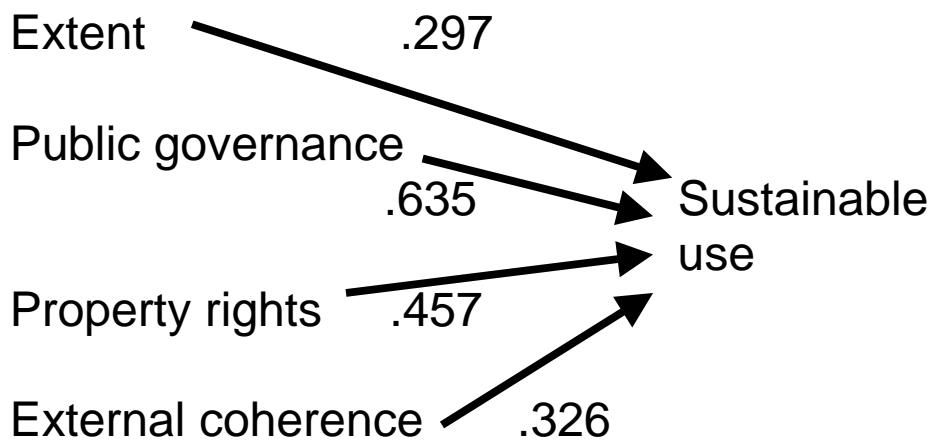
In a scatterplot this is made visual. Remember that several (sub) cases share their values in this plot. This is made visible by the size of the dots.



The relationships between the sustainability assessments in our (sub) cases and the three separate aspects of coherence is as follows:

Kendall's Tau b		Coefficient	Sign.
Sustainability with	Coherence public governance	0,635	0,000
	Coherence property rights	0,457	0,005
	External coherence both	0,326	0,035
Spearman correlation		Coefficient	Sign.
Sustainability with	Coherence public governance	0,686	0,000
	Coherence property rights	0,527	0,004
	External coherence both	0,380	0,034

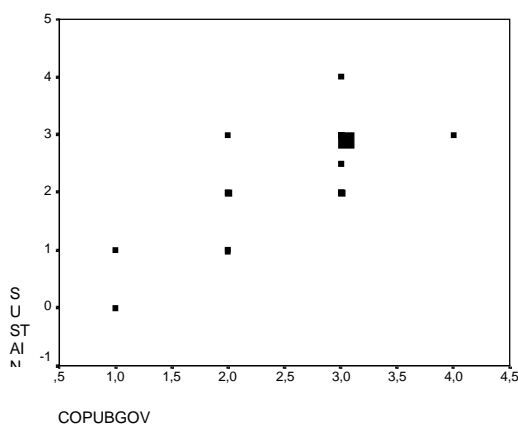
To summarise these results in a figure:



If one treats the variables for a moment at interval level and uses multiple regression to estimate the relative contribution of the various forms of regime changes on the improvement of the sustainability of the use, then the following picture emerges. Though the 'general assessment of regime change' was included in the list of independent factors, it was quickly removed in a backward regression. The best fit (R^2 .63, adjusted R^2 .58) was a model that includes the extent, the coherence of public governance and the coherence of property rights. Also the external coherence was left out of this equation. By far the most important factor was the coherence of public governance. A model with just that factor has a slightly lower R^2 of .59, but also an adjusted R^2 of .58.

When we analyse the '*weighted database*' the results are more or less similar. Here the differences between the various models of explanation are however very small. A model with all four aspects included has R^2 .65, adjusted R^2 .61. When excluding 'extent' the remaining three account for R^2 .64, adjusted R^2 .62. The next exclusion here is the internal coherence of property rights. Only the coherence public governance and the external coherence also account for R^2 .64, adjusted R^2 .62. Again the most important factor was the coherence of public governance. A model with just that factor has a slightly lower R^2 of .62, but still an adjusted R^2 of .61.

A scatterplot illustrates the relation between the coherence of public governance and the assessment of the sustainability of the water resources regime.



The conclusion is here that there is only weak support for our first expectation: that an increased extent contributes as such to a more sustainable resource use. The support for the second expectation, that increased coherence contributes to a more sustainable resource use, is much stronger.

To this conclusion some warnings should be added. Indeed, in our cases, a higher degree of sustainable use is correlated with a more integrated regime at the water basin level, just like expected by both the Euawareness theory and the 'practical policy theory' underlying the WFD. But, it should be considered

that this isn't a sort of 'mechanic' causal relationship. Under certain circumstances it can even be envisioned that more integration leads to deterioration of sustainable use. Also protection of resources could be realised by granting rights to only a 'happy few', harming economic and social aspects of sustainability. So, it still holds true that 'the devil is in the details'. Nevertheless our findings can be regarded as supportive evidence.

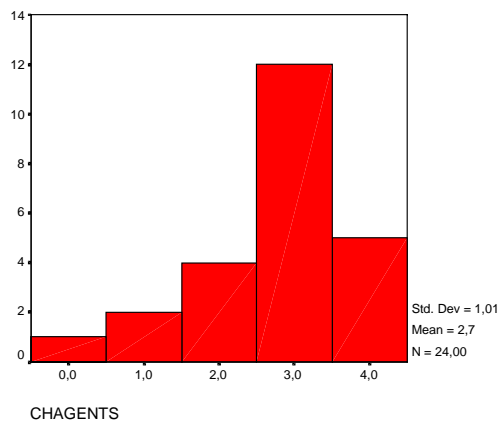
4.4 Explaining regime changes by change agents and conditions

Force of change agents:

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

Meaning of the values:

- 0 There were *no* new of changed factors setting change in the direction of more integration in motion or even the contrary, evolving factors that further blocked such regime change
- 1 There were *only minor or rather weak* new of changed factors setting regime change in the direction of more integration in motion
- 2 Taken together there was a *moderate* impetus of the combined new of changed factors setting regime change in the direction of more integration in motion
- 3 Taken together there was a *strong* impetus of the combined new of changed factors setting regime change in the direction of more integration in motion
- 4 Taken together there was a *very strong* impetus of the combined new of changed factors setting regime change in the direction of more integration in motion



The joint force of the identified change agents in the cases is often considerable. Only in 7 (sub) cases it is assessed as rather weak.

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

relevant²². In all but two cases national policy and regime changes were²³. Only in five cases there was not much problem pressure²⁴. In 10 cases various other circumstances were mentioned²⁵.

Whether or not each of these types of change agents was mentioned as relevant is mostly not correlated with the general assessment of the force of change agents. Only the national policy and regime was correlated significantly with the general assessment (Kendall's tau .365, $p = .028$). But this means only that the two cases where such influence was not reported had a very low overall force of change agents. Maybe national policy support is a necessary, though not a sufficient condition.

That the various types of change agents were not correlated with the general assessment (and neither was how many of the four types were mentioned) signals that 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 (expectations 1 and 2) regarding the relation between the general force of the change agents and regime change were:

- Most change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes with a higher degree of **extent**).
- Other external change agents of a specific nature can also lead to **coherence** in or between one or some elements of the regime, but only in combination with deliberate attempts of motivated actors (ultimately resulting in coherent regimes or in 'failed' regime shifts with encapsulated initial changes).

²² 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.

²³ Apart from various 'normal' water (and some nature) policies also some more regime oriented pressures were 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 be not independent from the relevant EU policies!

²⁴ 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.

²⁵ 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.

In the assessments based on our case studies the relationships between the force of the change agents and the changes in extent and other regime changes appear as follows:

Kendall's Tau b	Coefficient	Sign.
Change agents with Extent	.393	.015
Coherence public governance	.112	.270
Coherence property rights	.067	.349
External coherence both	.127	.237
General regime change	.171	.168
Spearman's Rho	Coefficient	Sign.
Change agents with Extent	.446	.015
Coherence public governance	.128	.275
Coherence property rights	.072	.369
External coherence both	.153	.238
General regime change	.200	.175

As expected (expectation 1) 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 be dependent on several conditions.

Conditions:

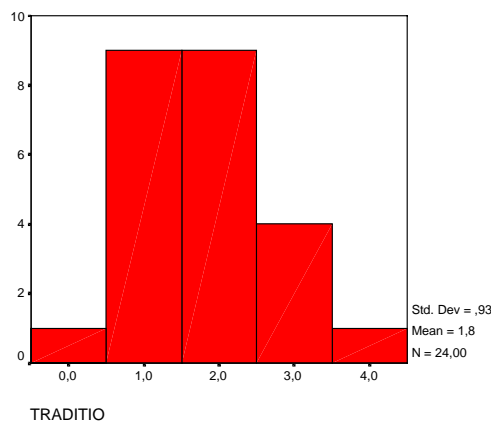
This is the degree to which the listed conditions provide, separately and as a set, favourable or unfavourable conditions for regime changes in the direction of more integration (extent and coherence) Please note that the various conditions mentioned in the fact sheet are abbreviated. They have a more specific meaning as stipulated earlier in this report. Though still in brief, their meaning is stated with each condition below. The sub-aspects that are mentioned for each condition provided further help with the assessment of the conditions. Unlike the previous variables, these are no change variables, in which the difference between the initial situation in the case and the ultimate one is the essence of the variable. Therefore in the values the possibility of changes during the period is included. Of course it was up to the researcher to assess whether an improvement during the case period came to late to have a substantial effect until now (often resulting in a 1) or that its results can be counted for in the assessment.

Tradition

This is the degree to which there is already a longer tradition of thinking in terms of co-operation, or such a thinking is build during the case early enough to influence later stages of the case history.

Meaning of the values:

- 0 There was and remained a tradition of thinking opposed to co-operation
- 1 There was no tradition of thinking in terms of co-operation, or only evolving at the latest phase of the case history
- 2 There was some tradition of thinking in terms of co-operation, but only on a part of the relevant aspects or only with a part of the relevant actors
- 3 There was some tradition of thinking in terms of co-operation, for most of the relevant aspects and most of the relevant actors
- 4 There was a strong tradition of thinking in terms of co-operation, for most of the relevant aspects and most of the relevant actors



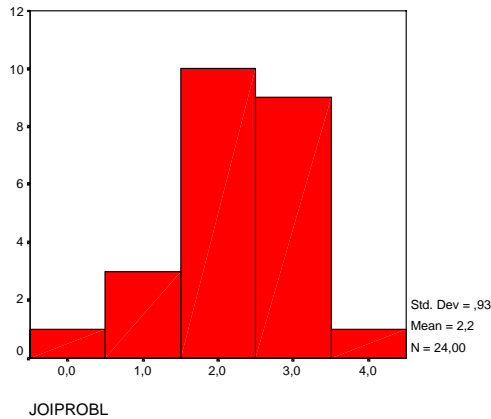
Generally the researchers assessed that in their (sub) cases there was not a very stimulating tradition of earlier co-operation between the actors involved in the rivalry/ies.

Joint problem

This is the degree to which 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.

Meaning of the values:

- 0 There was and remained a fundamentally divergent (conflictual) understanding of the problem
- 1 There was a fragmented understanding of the problem, or a more common one evolved only at the latest phase of the case history
- 2 There was some common understanding of the problem, but only on a part of the relevant aspects or only with a part of the relevant actors
- 3 There was some common understanding of the problem, for most of the relevant aspects and with most of the relevant actors
- 4 There was a strong common understanding of the problem, for most of the relevant aspects and with most of the relevant actors



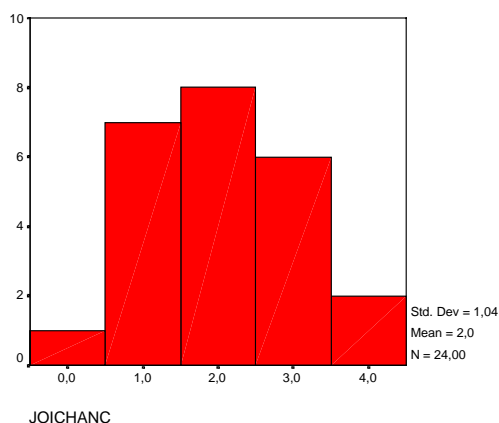
Joint problem awareness has been present to some extent in several cases, though often only on a part of the relevant aspects or only with a part of the relevant actors.

Joint chance

This is the degree to which there is a notion of possible joint gains from integration.

Meaning of the values:

- 0 There was and remained a dominant notion of possible losses from integration.
- 1 There was no notion of possible joint gains from integration, or it only evolved at the latest phase of the case history
- 2 There was some notion of possible joint gains from integration, but only on a part of the relevant aspects or only with a part of the relevant actors
- 3 There was some notion of possible joint gains from integration, for most of the relevant aspects and with most of the relevant actors
- 4 There was a strong notion of possible joint gains from integration, for most of the relevant aspects and with most of the relevant actors



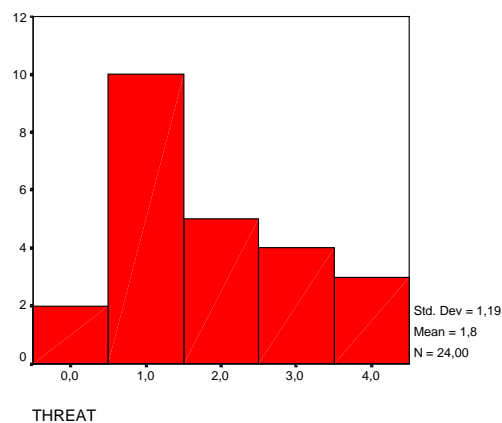
There has been considerable differentiation between the cases in terms of the degree to which the actors involved saw chances to actually gain together from solving the rivalry by a more integrated regime. In one case there was even a sense of joint loss.

Credible threat

This is the degree to which there is a credible threat of a (potentially) dominant actor to accumulate power and to alter the governance pattern in his own way and to his own benefit if no solution is reached.

Meaning of the values:

- 0 There was and remained a credible threat of interventions by a dominant actor to discourage integration.
- 1 There was no credible threat of interventions by a dominant actor to solve the disputes to his own benefit, or it only evolved at the latest phase of the case history
- 2 There was some credible threat of interventions by a dominant actor to solve the disputes to his own benefit, but only on a part of the relevant aspects
- 3 There was some credible threat of interventions by a dominant actor to solve the disputes to his own benefit, for most of the relevant aspects
- 4 There was a strong credible threat of interventions by a dominant actor to solve the disputes to his own benefit for most of the relevant aspects



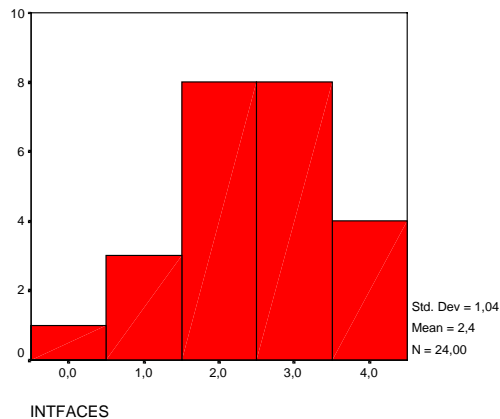
With this condition too there has been a considerable differentiation among the cases.

Institutional interfaces

This is the degree to which there are well functioning institutions that provide fertile ground for integration attempts.

Meaning of the values:

- 0 There were and remained strong institutions that frustrated integration attempts
- 1 There were no well functioning institutions that provide fertile ground for integration attempts, or it only evolved at the latest phase of the case history
- 2 There were some institutions that provide fertile ground for integration attempts, but only on a part of the relevant aspects or not functioning very well
- 3 There were some well functioning institutions that provide fertile ground for integration attempts, for most of the relevant aspects
- 4 There were strong and well functioning institutions that provide fertile ground for integration attempts, for most of the relevant aspects and with most of the relevant actors



Generally speaking the condition of institutional interfaces was somewhat better than most of the other conditions. Nevertheless in many cases these were only on a part of the relevant aspects or not functioning very well.

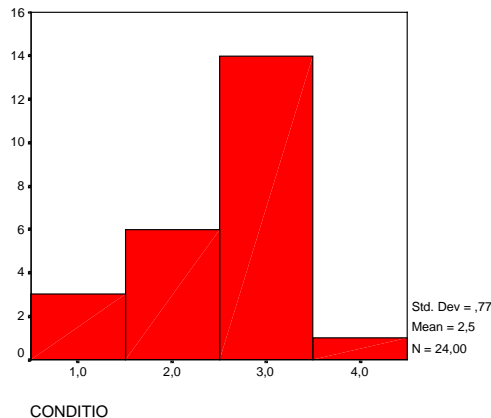
Total assessment of conditions

The various conditions provide, separately and as a set, favourable or unfavourable conditions for regime changes in the direction of more integration.

Meaning of the values:

- 0 Taken together the conditions were very unfavourable for regime changes in the direction of more integration
- 1 Taken together the conditions were rather unfavourable for regime changes in the direction of more integration, or somewhat more favourable ones only evolved at the latest phase of the case history
- 2 Taken together the conditions were somewhat favourable for regime changes in the direction of more integration, but only on a part of the relevant aspects

- 3 Taken together the conditions were rather favourable for regime changes in the direction of more integration, for most of the relevant aspects
- 4 Taken together the conditions were very favourable for regime changes in the direction of more integration, for most of the relevant aspects and during most of the period of the case history



All in all, in many cases the assessments of the conditions for regime change taken together are regarded as rather favourable. In nine cases the conditions are viewed less favourably.

The general assessment of the conditions does not necessarily reflect the average of the separate conditions. It can be that some are dominantly positive or negative. Therefore it makes sense to see what the relation is between the assessment of the separate conditions and the overall estimate of the researchers.

The correlations (Kendall's tau b) of the general assessment of the conditions and the separate conditions is as follows:

Tradition of co-operation: .365 p=.022
 Joint problem awareness: .194 p=.138
 Joint chances: .457 p=.005
 Credible alternative threat: .148 p=.202
 Institutional interfaces: .611 p=.000

This means that especially the awareness of joint chances and good institutional interfaces – and to a lesser extent an existing tradition of co-operation were seen as important positive conditions for regime change.

Expectation 3 was that attempts to change regimes into a more integrated status would 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*).

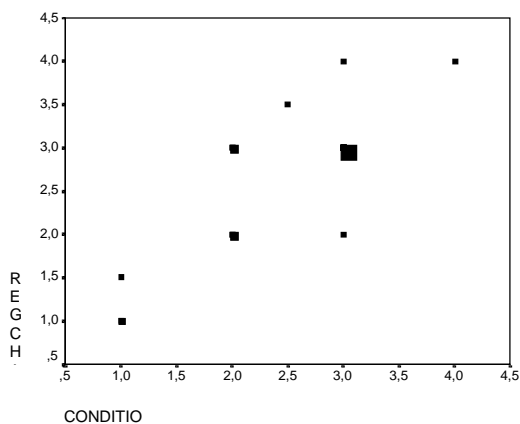
- There is a notion of possible joint gains from coherence, so-called ‘win-win-situations’ (*joint chances*).
- There is a credible threat of a dominant actor accumulating power and altering the public governance pattern in his interest when no solution is reached (*credible alternative threat*).
- There are well functioning institutions that provide fertile ground for coherence attempts (*institutional interfaces*)

REGCHANG * CONDITIO Crosstabulation

Count		CONDITIO					Total
		1,0	2,0	2,5	3,0	4,0	
REGCHANG	1,0	2					2
	1,5	1					1
	2,0		3		1		4
	3,0		3		11		14
	3,5			1			1
	4,0				1	1	2
Total		3	6	1	13	1	24

The cosstab above shows that generally the lower assessments of conditions correlate with smaller regime changes, as expected in expectation 3. The correlation is Kendall’s tau b .633 with $p = .000$ and Spearman’s rho .687 with $p = .000$.

The figure below shows this relationship in a visual way:

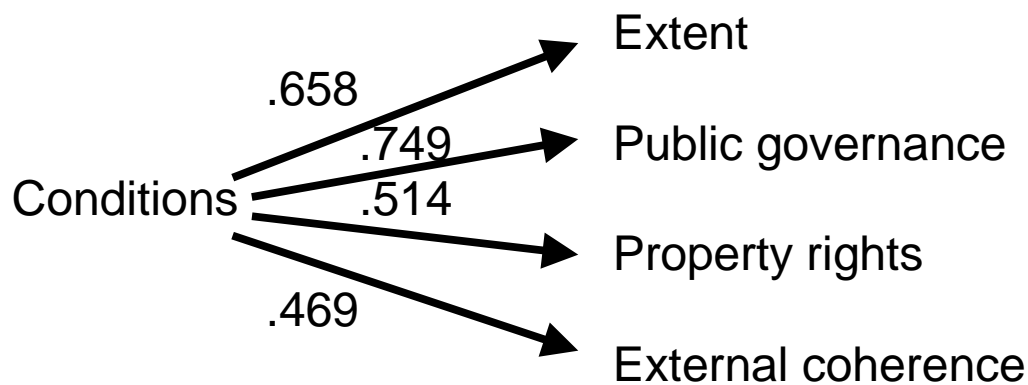


The research expectation suggests possible different effects of different conditions being more or less favourable. We investigated this by correlation analysis between all the conditions and all the aspects of regime change.

As usual the correlations by the tau and the rho were very similar, the Spearman's rho's being slightly higher, Therefore we give only the significant correlations in Kendall's tau b.

The *general assessment of the conditions* did not only correlate with the general regime change, but also with all other aspects of regime change: the extent (tau .658, $p = .000$), the internal coherence of public governance (tau .749, $p = .000$), the internal coherence of property rights (tau .514, $p = .002$) and the external coherence between public governance and property rights (tau .469, $p = .005$).

When looking for the different influences that the conditions have for various aspects of regime change, this picture emerges.



The *tradition of co-operation* in the water management sector showed only significant correlations with the internal coherence of public governance (tau .360, $p = .026$) and almost with the extent (tau .277, $p = .064$).

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 (tau .273, $p = .067$).

The notion of possible joint gains from coherence, so-called 'win-win-situations' (*joint chances*) again correlated with some regime indicators: the internal coherence of public governance (tau .452, $p = .007$), the external coherence between public governance and property rights (tau .531, $p = .001$) and with the general regime change (tau .486, $p = .003$). 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: tau .261, $p = .071$.

Last but not least, the existence of well functioning institutions that provide fertile ground for coherence attempts (*institutional interfaces*) correlates with the extent (tau .668, $p = .000$), internal coherence of public governance (tau .397, $p = .014$) and with the general regime change (tau .339, $p = .027$).

The conclusion is that the conditions play an important role in explaining the regime changes observed in our cases.

Now an additional question is whether our model in which the conditions modify the influence of the change agents fits. If so, the relation between the *force of the change agents* and the *regime change indicators* should become stronger when the *general conditions* are held constant. This proves not to be the case. In fact they all become even less significant, while sometimes also becoming negative (insignificant) correlations. This we see as an indication that the conditions might better be conceptualised as separate causes that only as modifications of the influence of the 'change agents'.

When we try to explain the various regime change indicators with several of the separate conditions and the change agents together, than the following regressions show the best fit (highest adjusted R^2):

The *extent* is best-explained (R^2 .63, adjusted R^2 .57) by a formula in which the change agents, tradition of co-operation, joint chances and institutional interfaces are included. Of these the institutional interfaces are by far most important. The weighted database gives very similar results.

The *internal coherence of public governance* is best-explained (R^2 .53, adjusted R^2 .46) by a formula in which the joint chances, alternative threat and institutional interfaces are included. Of these the alternative threat however has a negative load, indicating that when one reckons with the other two variables the threat variable correlates negatively with an increased coherence. Without it the adjusted R^2 becomes .37. The influence of the alternative threat is however almost significant ($p = .052$). If we take this serious it could indicate that, given the values of the joint chances and institutional interfaces, the occurrence of a threat could even harm the chances for more coherent public governance. The weighted database gives very similar results. Due to the increased number of cases the alternative threat is significant when using this database.

The *internal coherence of property rights* is not explained at all by the separate change agents and conditions together in the normal database. When using the weighted database the same factors as with public

governance account for R^2 .26, adjusted R^2 .21. Again, threat has a negative load here. When excluding this variable the two remaining factors account for R^2 .21, adjusted R^2 .17.

The *external coherence between public governance and property rights* is again best explained (R^2 .41, adjusted R^2 .35) by a formula in which only the joint chances and the institutional interfaces are included. When using the weighted database the conclusion is the same while the variance accounted for is a little higher: R^2 .51, adjusted R^2 .48.

The same holds for the *general regime change*. A formula, in which only the joint chances and the institutional interfaces are included accounts for R^2 .49, adjusted R^2 .44. When using the weighted database the conclusion is the same while the variance accounted for is a little higher: R^2 .54, adjusted R^2 .52.

All in all of the separate conditions (and the force of change agents) the joint chances and the institutional interfaces conditions stand out in the explanation of regime changes. The 'general assessment of the conditions' alone is about equally fitting the various regimes changes observed.²⁶

²⁶ For this comparison the regressions should be and are compared with the squared Pearson correlations.

5 Conclusions and outlook

5.1 Conclusions

The Euwareness research has had some specific characteristics. While we did not look only from the perspective of immissions or emissions of the protection of habitats, but took a resource perspective, a greater variation of uses and users was drawn into the analysis. Also we did not restrict ourselves to a public policy perspective or a property and use rights perspective, but combined the two, both theoretically and empirically. In this section we summarise the conclusions from the analysis in section 4. Some of the conclusions are illustrated by real life examples from the case studies.

5.1.1 Regime change

In most of the cases and subcases in the study the *extent* of the water resources regime changed positively, in many cases even to include more or less completely all relevant uses and users.

The *internal coherence of public governance* generally increased also, but less. Almost nowhere a 'full coherence' statement could be made and in several occasions only small improvements occurred.

Remaining difficulties with non river basin jurisdictions

In France the SAGE process has generated a collective dynamic. Among others the extent of the regime that was slowly built before, was quickly enlarged. The SAGE process could build on the gradually increased openness for 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 help them to keep their power. They proceed actually in behind the scene negotiations. Therefore, often the participation is only to defend one's own interests. Some powerful actors, like industrialist, 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 to participate anymore since they cannot really get more assets).

The main problem remains that there can be lack of coordination 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 Dziejicki & Corinne Larrue, Sèvre Nantaise Euwareness case study

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 more used 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 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 often property and use rights are restricted and must give way to public governance in order to improve the sustainability of the resource use. At least, this is observed as common practice.

The *external coherence between public governance and property rights* changed in half or the cases considerably for the better and in the other half only modestly or less.

The *over-all assessment of the regime change* is clearly in most cases that there were considerable improvements on many of the important aspects. Nevertheless also seven worse and 3 better situations occurred.

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 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 mobilises 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 disadjustments between legal aspects and real practices of the CHE and the Central Users Community increases 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.

Joan Subirats, Nuria Font & Meritxell Costejà – Matarrana River Euawareness case study

The general assessment of regime change is as expected positively correlated with all the four aspects, though public governance and external coherence seem to have made the strongest difference for the total assessment. Also most aspects are correlated among each other, the least so with the extent variable. This makes sense since it is not one of the set of coherence aspects.

In two subcases the main issue was the purification of wastewater. Since there is a very clear and proven technical solution (building and exploiting treatment plants) all kinds of coherence aspects were hardly problematic when the political will to invest was present. Though this might be seen as an artefact of splitting the case in subcases, it can also and probably more rightfully be viewed as a characteristic of situations where a technical solution is possible (though the siting of these plants often does involve complex interactions). In the other cases there was a lot more social interaction involved and hence relevance for the coherence of the regime.

The conclusion on regime change is that in this study in most cases considerable improvements were signalled. But there were also several occasions of more or less failed attempts to regime change.

5.1.2 Implications of regime changes for sustainable use

Naturally the reported *ecological improvements* reflect the rivalries mentioned (see section 3.2 and Appendix 4).

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 Euawareness case study

Often the picture for the *economic consequences* is somewhat mixed. As negative economic consequences 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 also often mentioned: gains for tourism, avoidance of future costs, job creation and job safeguarding, and an improved

natural resource basis for further economic development. Sometimes also lower water costs and an increase in productivity were reported.

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 subsidises 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 & Frédérick Varone, Dender River Basin Euawareness case study

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 industrialised 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. At 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. At 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 a take off of tourist activities in the valley.

David Aubin & Frédérick Varone, Vesdre River Basin Euawareness case study

While the economic consequences were mixed, the social consequences were often very positive and remarkably varied. As the only negative social consequences were mentioned a limitation of land ownership rights and a negative impact on the landscape, both mentioned once. On the contrary the positive social consequences include: modernisation of agriculture, development of new associations of people, more open public debates and more information for the people in general, better feeling of safety, stop to decline of population 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.

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 and 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 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 Euwareness case study

Our expectations (expectations 5 and 6) regarding the relation between the regime (change) and the sustainability of institutional resource regimes were:

- 5. 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.
- 6. 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. The relation between the general assessment of regime change and the assessment of sustainability is however much stronger. Of the separate regime aspects, by far the most important factor was the coherence of public governance.

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 loses, 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.

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

The conclusion is here that there is only weak support for our first expectation: that an increased extent contributes as such to a more sustainable resource use. The support for the second expectation – that increased coherence contributes to a more sustainable resource use – is much stronger. Though this can be regarded as supportive evidence, 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' (expectation 4).

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 important rainfalls. The two actors have endorsed the risk of water shortages in drought periods. The dams do not threaten the downstream part of the basin anymore. 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 mobilisation 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 Euwareness case study

5.1.3 Explaining regime changes by change agents and conditions

The joint force of the identified change agents in the cases is often considerable. Only in 7 (sub) cases it is assessed as rather weak. The types of change agents mentioned²⁷ 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. In all but two cases national policy and regime changes were. Only in five cases there was not much problem pressure. In 10 cases various other circumstances were mentioned.

²⁷ See notes 22-25 for a summary of the specific change agents reported.

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 Modernisation 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.

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

Maybe national policy support is a necessary, though not a sufficient condition²⁸. 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 (expectations 1 and 2) regarding the relation between the general force of the change agents and regime change were:

- 1. Most change agents (in the period and context of our cases) will lead to more differentiation in the regime (resulting in more complex regimes with a higher degree of extent).
- 2. Other external change agents of a specific nature can also lead to coherence in or between one or some elements of the regime, but only in combination with deliberate attempts of motivated actors (ultimately resulting in coherent regimes or in 'failed' regime shifts with encapsulated initial changes).

As expected (expectation 1) 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 be dependent on several conditions.

²⁸ Often the national government provided crucial resources like formal rules and money.

Finding political will

In Verviers, drinking water consumption has led to lead-poisoning for more than a century. Poisoning was due to pipes in lead 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 has initially been built for industrial uses. The network has later been extended to private housings and water declared as 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 sets up constraining standards for lead concentration in drinking water. The commune of Verviers has to adapt but misses both the political will and the financial means. Finally the building of a treatment plant is taken at charge of the Region and a deviation of the main pipe does not counteract the interest of the industry. Works begin only when industry has guarantees on the unchanged properties of its water. The public health problem is 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 Euwareness case study

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 "legitimation" 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 – Euwareness reports on Swiss case studies

Expectation 3 was that attempts to change regimes into a more integrated status would 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 chances).

- 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)

Generally the researchers assessed that in their (sub) cases there was not a 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 a part 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 together from solving the rivalry by 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 too 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 on a part of the relevant aspects or not functioning very well.

All in all, in many cases the assessments of the conditions for regime change taken together are regarded as rather favourable. In nine cases the conditions are viewed less favourably. Especially the awareness of joint chances and good institutional interfaces – and to a lesser extent an existing tradition of co-operation were seen as important positive conditions for regime change. Generally the lower assessments of conditions correlate with smaller regime changes, as expected in expectation 3.

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 contradicted with the need to create buffer zones. The competent authority for water quantity management on the Dender faces frequent floods of rising importance. As the problem pressure is growing, solutions brought 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 sparing basins. It only builds dikes to divert the flood. It is not confronted to claims from the *polders* and *wateringues* that come under flow as a matter of tradition. More it exists 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 brought consists in building a huge pump station at the mouth of the Dender.

David Aubin & Frédérick Varone, Dender River Basin Euawareness case study

Of the separate conditions (and the force of change agents) the joint chances and the institutional interfaces conditions stand out in the explanation of the various forms of regime changes. The 'general assessment of the conditions' alone is about equally fitting the various regimes changes observed.

Sometimes rival uses can nevertheless be turned into win-win situations. The shores of the Dutch IJsselmeer (Lake IJssel) have rival uses of among others nature (bird habitat) and tourism (boating marinas). Of course tourism on the other hand benefits from a beautiful nature. Seeking the balance between the two uses therefor can 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 therefor may favour 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 organisation on fishery, environmental impact procedures (gas drilling) and land use planning procedures with open participation. Such institutions catalysed 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 Euwareness case study

5.2 Outlook: our conclusions in the perspective of the WFD

European water policy has developed along two lines – water quality and emission standards – that reflect different national views. The new water framework directive (WFD) is an attempt to reconcile the two approaches and to integrate water quantity aspects (*Euwareness report on EU*, Aubin & Varone, 2002, p. 2). The purpose of the WFD is to reach a 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 for 2015, a 'good status' for all ground- and surface waters, in quality and quantity, according to an eco-centred logic. In order to reach 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 an important 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.' (*Euwareness report on EU*, Aubin & Varone 2002, p. 18).

The main concepts of the Euwareness study are in close relation with the central themes of the WFD. The '**good status**' of the WFD is related to the ultimate dependent variable in the Euwareness research, the degree of 'sustainable use', especially to the ecological aspect of sustainable use. However, already in the 1996 communication leading to the WFD also due

attention is paid to the *'evaluation of costs'*. This aspect is reflected in the *'economic consequences'* aspect of sustainable use in the Euawareness research. We observed that next to costs also other negative, but often also positive economic consequences could be observed. A third aspect that was included in the Euawareness research was that of the social consequences. Here remarkably numerous 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 like expected by both the Euawareness theory and the *'practical policy theory'* underlying the WFD. Though this can be regarded as supportive evidence, it should be considered that this isn't a sort of *'mechanic'* 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 resource shows to correspond with the ideas guiding the WFD.***

The main venue by which the WFD seeks to improve the good status of European waters is by *'integrated water management at water basin scale'*. In the Euawareness research the cases that are studied are 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 endeavour. 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 a coordinated management, but only that for impacting many uses and users also sub-regimes at a tributary river basin level are needed. This idea is in accordance with the principle of subsidiarity that is explicitly endorsed in the WFD. The Euawareness case studies concentrated on this level (with areas of some 500 to 2500 km²) and found many interesting experiences with (attempts to reach) more integrated water management. These illustrate the assumption of the WFD that it is necessary to accept some variation of the institutional arrangements that are used to promote integrated management. ***Though the organisation 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 is in the Euawareness research conceptualised 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. In the Euawareness research 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 *'coherence'*. See in

section 3.4 of this report, the operationalisation of ‘the coherence of public governance’ in relationship with elements of the WFD, including the measures, problem perception and resources for implementation, e.g. monitoring. As a special feature of the Euawareness 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 Euawareness project has shown that special attention for 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 WFD 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. But, what we did encounter were a number of cases in which 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 to coordinate.

The Euawareness project did spend much effort in getting a better insight in a variety of ***change agents and conditions that stimulate more integrated water management***. For we learned that integrated management regimes are not something that one can ‘proclaim into reality’. Deliberate attempts by motivated actors are surely needed to realise 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 often national policies that are mentioned as leading to regime changes were in their turn triggered or in any case related to EU directives.

Even more important than the mentioned change agents 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 NGO’s and other actors with little formal power and

of course when they want to move in the same direction as the mentioned EU policy involved. Even when these policies are non-obligatory they have in this way 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 stimulate the chances for regime changes in the direction of integrated water management.**

Appendix 1: “State of the art” statement Euwareness proposal²⁹

In this project a theoretical framework on institutional regime analysis will be used that combines property rights theory and institutional rational choice with approaches from political science (policy analysis, in particular policy design theory), innovating thereby the institutional regime theory.

State of the art: Policy analysis and the policy-design approach

Policy analysis has mainly focused on the (federalist, unitary) implementation of state measures and the resulting effects. In contrast to these implementation and evaluation studies, little research has been done in the area of policy design. No coherent and empirically founded theory has been developed to explain why a particular instrument was selected under a specific policy (Linder and Peters 1989; Varone and Landry 1997). This observation is even more applicable when it comes to the question of ‘institutional design’ (Weimer 1995; Goodin 1996). In the case of institutional resource regimes, the main question to be addressed is why various instruments and institutional actor constellations have been selected or omitted in water resource protection or use policies.

Political scientists working in an international context (international relations) have been considering the issue of natural resources in the context of regime research since the 1980's (e.g. Krasner 1983; Young 1994; Keohane and Ostrom 1995; Young 1997; Underdal 1998) and have tended to concentrate on global environmental commodities. Thus, in-depth analyses have already been carried out for example on river management (Marty 1997). As part of our study, we will be working with the tools of policy analysis and will try to integrate the relevant theoretical elements from international regime theory while concentrating on national regimes.

State of the art: Political guidance theory

Public steering capacity has been subject to critical scrutiny in political-scientific research for some time now. The hierarchical guidance mechanisms which characterised the actions of sovereign states would appear to be increasingly failing - at least in the case of in excess emissions levels (Scharpf 1993; Jänicke and Weidner 1997). Governments and authorities have reacted to this by creating new instruments: negotiation solutions, discursive processes, mediation, network solutions etc. are all gaining in significance (c.f. e.g. Marin and Mayntz 1991; Scharpf 1993; Knoepfel 1995). However, the actual use of these instruments is still based on an outdated paradigm: limit values are defined for the emission of pollutants from specific sources like industry, cars and agriculture. This paradigm leads to selective intervention which only occurs when there is the danger of the limit value being exceeded and is thus predominantly focused on individual cases. The new direction in environmental policy arising from the sustainability debate has seen this finely-tuned management of emissions replaced by the paradigm of *general steering* of the acceptable levels of pollution for given

²⁹ The authors thank Ingrid Kissling-Näf, Peter Knoepfel and Frédéric Varone for their valuable input.

spatial units defined in terms of ecosystems on different systemic levels (local, regional, national, continental, global). The maximum global pollution levels are then primarily conceived as a result of the *use* of certain quotas (renewable and non-renewable) of identifiable natural resources (cf. WCED 1987; UNEP 1995:902ff.; Jäger et al. 1995; Knoepfel et al. 1997). As a result of the global biodiversity and climate debates, a broad range of literature is currently emerging on the concrete implications of this change of paradigm for the management requirements of political-administrative instances (UNEP 1995). Specific examples of this include the discussion of resource use quotas and the debate surrounding questions of the governance of sustainable policies. The proposed project will deal with the governance of sustainable public policies and will attempt to develop concepts for the management of natural resources a stage further.

State of the art: Political and economic theory of institutions

The field of institutions theory is now very broad and includes approaches such as the new economics of organisation, the property-rights approach and transactions cost theory (Hall and Taylor 1996). Institutional approaches can now be found in most disciplines. In the context of resource research, the property rights approach or regime research is worthy to mention particularly (Bromley 1989, 1990, 1991; Burns 1996; Feeny et al. 1990; Schlager 1992; Libecap 1993; Devlin and Grafton 1998), specifically the common-pool resources theory (Ostrom 1990; 1992a; 1992b; 1994; 1997; Ostrom et al. 1994; 1996). In our research, we will be linking up with the decades of research in the area of property rights and will try to integrate ideas from Scharpf's (1997) actor-centred institutionalism as well as the more recent resource regimes research. According to Ostrom, regulative systems 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. Another integral part of the regulative system are mechanisms for the alteration of rights of action, including the relevant monitoring.

Appendix 2: Facts and assessments sheet for case studies

Title of case: XYZ

Rival uses & users at stake

- The case is analysed as a single / multiple case
- Rivalry 1: XYZ
- Rivalry 2: etc.

Main variable B. Regime changes

1. Extent changes

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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2. Internal coherence public governance changes

a. Levels and scales

Key facts:

- XYZ
-

b. Actors and networks

Key facts:

- XYZ
-

c. Perspectives and objectives

Key facts:

- XYZ
-

d. Strategies and instruments

Key facts:

- XYZ
-

e. Responsibilities and resources for implementation

Key facts:

- XYZ
-

General assessment internal coherence public governance

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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3. Internal coherence property rights changes

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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4. External coherence between public governance and property rights changes

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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General assessment regime change

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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Main variable C. Implications for sustainability

1. Natural resources & environment

Key facts:

- XYZ

-

2. Economic development consequences

Key facts:

- XYZ

-

3. Social development consequences

Key facts:

- XYZ

-

General assessment implications for sustainability

Key facts:

- XYZ

-

Scoring:

0	1	2	3	4
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Main variable A. Change agents and conditions

1. Change agents

a. National regime changes

EU policies originated:

Key facts:

- XYZ

-

Other:
Key facts:
- XYZ
-

b. Problem pressure
Key facts:
- XYZ
-

c. Other
Key facts:
- XYZ
-

General assessment of force of change agents

Key facts:
- XYZ
-

Scoring:

0	1	2	3	4
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2. Conditions

a. Tradition
- Ideology:
- Examples:
- Respect and trust:

Scoring:

0	1	2	3	4
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b. Joint problem
- Knowledge bases:
- Information symmetry:
- Responsibility for the future:

Scoring:

0	1	2	3	4
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- c. Joint change
- Knowledge bases:
 - Information symmetry:
 - Respect for others actors interests:

Scoring:

0	1	2	3	4
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- d. Credible alternative threat
- Dominant actor:
 - Information on alternative options for dominant actor:
 - Negative effects of option for other actors:

Scoring:

0	1	2	3	4
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- e. Institutional interfaces
- Clarity of responsibilities:
 - Alert mass media:
 - Protection of agreements:
 - Brokers:
 - Small n, or good representatives of stakeholders:
 - Legal path for integration:
 - Stimulating policy guidelines:

Scoring:

0	1	2	3	4
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General assessment of conditions

Key facts:

- XYZ
-

Scoring:

0	1	2	3	4
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Appendix 3: Table of assessments

Table here

Appendix 4: Ecological sustainability and the EU Water Framework Directive

Introduction

The Euwareness project is considering rival uses of water resources and the way in which regimes try to balance these rival uses in a sustainable way. The question then is: what do we mean by sustainable water use? Since this project aims to contribute to the implementation of the EU-WFD, we prefer to stay close to the way in which a sustainable status of water resources (water bodies, water basins) in the EU-WFD has been defined. Key aims of this directive are the following:

- expanding the scope of water protection to all waters, surface waters and groundwater;
- achieving 'good status' for all waters by a set deadline;
- water management based on river basins;
- 'combined approach' of emission limit values and quality standards;
- getting the prices right;
- getting the citizen involved more closely;
- streamlining legislation.

Looking at these aims, we could make a first distinction between criteria for ecological sustainability, for social sustainability and for sustainable management. In this appendix we will elaborate on ecological sustainability.

Ecological sustainability refers to achieving a 'good status' for all waters by a set deadline. It is addressing the status of water quality and water quantity in terms of its availability and good shape for present and future demands (uses). There are many EU Directives setting standards for such a good status. The EU-WFD aims to integrate these standards. Ecological sustainability especially aims to protect the way in which water resources are needed for the ecosystem (ecological uses) or for human health (like the Drinking Water Directive).

Ecological sustainability depends on social sustainability and sustainable management as preconditions. In the Euwareness project we are especially interested in the interaction between property rights and public policy and how this interaction could contribute to more ecological sustainability. We will look at institutional arrangements or regimes that have been developed through the years to manage conflicting water uses and to guide these uses in a sustainable way. Part of the regimes is that they do establish property rights and use rights towards water resources, in order to clarify the ownership, but also to restrict the owner's water use by allowing others to make use of the same water resources. The possession of titles, the exclusion of uses, and the access of users are organised by this. Another part of the regime is that supplementary policies are formulated to help these property and use rights work in the targeted directions.

Ecological sustainability

Water use

In the Euawareness project we are focusing on rival uses of water resources and on improving the sustainability of water use. The EU-WFD is defining the use of water as:

- abstraction, distribution and consumption of surface water or groundwater;
- emission of pollutants into surface water and waste water collection and treatment facilities which subsequently discharge into surface water;
- any other application of surface water or groundwater having the potential of a significant impact on the status of water.

On the basis of this general distinction we created a list of more specific uses.

Water resources: water bodies and river basins

Water appears in nature as part of a natural entity. In the Euawareness project we call such an entity a water resource. This could be a body of water. The EU-WFD defines a water body as 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. The status of water refers to the status of a body of water.

Due to the interconnection between water and land, a water resource could also be a river basin. According to the EU-WFD a river basin 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 at a single river mouth, estuary or delta. The EU-WFD also distinguishes sub-basins. A sub-basin means the area of land from which all surface run-off flows through a series of streams, rivers, and, possibly, lakes to a particular point in a water course (normally a lake or a river confluence). In our project we will be considering sub-basins as unit of analysis for the case studies.

Good status criteria

The EU-WFD is focusing on the good status of water, while addressing both quality and quantity aspects of water resources. There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. All these objectives must be integrated for each river basin. It is clear that the last three – special habitats, drinking water areas and bathing water – apply only to specific bodies of water (those supporting special wetlands; those identified for drinking water abstraction; those generally used as bathing areas). In contrast, ecological protection should apply to all waters: the central requirement of the Treaty is that the environment be protected to a high level in its entirety. For this

reason, a general requirement for ecological protection, and a general minimum chemical standard, was introduced to cover all surface waters. These are the two elements "good ecological status" and "good chemical status".

I. Surface water: ecological protection

Good ecological status is defined in terms of the quality of the biological community, the hydrological characteristics and the chemical characteristics. As no absolute standards for biological quality can be set which apply across the Community, because of ecological variability, the controls are specified as allowing only a slight departure from the biological community which would be expected in conditions of minimal anthropogenic impact. A set of procedures for identifying that point for a given body of water, and establishing particular chemical or hydromorphological standards to achieve it, is provided, together with a system for ensuring that each Member State interprets the procedure in a consistent way (to ensure comparability). The system is somewhat complicated, but this is inevitable given the extent of ecological variability, and the large number of parameters, which must be dealt with.

II. Surface water: chemical protection

Good chemical status is defined in terms of compliance with all the quality standards established for chemical substances at European level. The Directive also provides a mechanism for renewing these standards and establishing new ones by means of a prioritisation mechanism for hazardous chemicals. This will ensure at least a minimum chemical quality, particularly in relation to very toxic substances, everywhere in the Community.

III. Surface water: other uses

As mentioned above, the other uses or objectives for which water is protected apply in specific areas, not everywhere. Therefore, the obvious way to incorporate them is to designate specific protection zones within the river basin which must meet these different objectives. The overall plan of objectives for the river basin will then require ecological and chemical protection everywhere as a minimum, but where more stringent requirements are needed for particular uses, zones will be established and higher objectives set within them.

There is one other category of uses which does not fit into this picture. It is the set of uses which adversely affect the status of water but which are considered essential on their own terms – they are overriding policy objectives. The key examples are flood protection and essential drinking water supply, and the problem is dealt with by providing derogations from the requirement to achieve good status for these cases, so long as all appropriate mitigation measures are taken. Less clear-cut cases are navigation and power generation, where the activity is open to alternative approaches (transport can

be switched to land, other means of power generation can be used). Derogations are provided for those cases also, but subject to three tests: that the alternatives are technically impossible, that they are prohibitively expensive, or that they produce a worse overall environmental result.

IV. Groundwater: chemical status

The case of groundwater is somewhat different. The presumption in relation to groundwater should broadly be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach, as it gives the impression of an allowed level of pollution to which Member States can fill up. A very few such standards have been established at European level for particular issues (nitrates, pesticides and biocides), and these must always be adhered to. But for general protection, we have taken another approach. It is essentially a precautionary one. It comprises a prohibition on direct discharges to groundwater, and (to cover indirect discharges) a requirement to monitor groundwater bodies so as to detect changes in chemical composition and to reverse any anthropogenically induced upward pollution trend. Taken together, these should ensure the protection of groundwater from all contamination, according to the principle of minimum anthropogenic impact.

V. Groundwater: quantitative status

Quantity is also a major issue for groundwater. Briefly, the issue can be put as follows. There is only a certain amount of recharge into a groundwater each year, and of this recharge, some is needed to support connected ecosystems (whether they be surface water bodies, or terrestrial systems such as wetlands). For good management, only that portion of the overall recharge not needed by the ecology can be abstracted – this is the sustainable resource, and the Directive limits abstraction to that quantity.

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.
- BARZEL, Yoram (1989), *Economic analysis of property rights*. Cambridge: Cambridge University Press.
- BRESSERS, Hans & Pieter Jan KLOK (1988), Fundamentals for a theory of policy instruments, in *International Journal of Social Economics*, Vol. 15, No. 3/4, pp. 22-41.
- BRESSERS, Hans & Laurence O'TOOLE (1995), Networks and water policy, Conclusions and implications for research, in Hans BRESSERS, Laurence O'TOOLE and Jeremy RICHARDSON, *Networks for water policy: A comparative perspective*, London: Frank Cass, pp. 197-217.
- BRESSERS, Hans (2001), *Implementation of instruments for sustainable development*, paper international SUSGOV working group meeting, November 8-11, Ronda, Spain.
- BRESSERS, Hans, and Stefan KUKS (2001), Governance patroness als verbreding van het beleidsbegrip, in: *Beleidswetenschap*, Vol. 15, No. 1, pp. 76-103; also to be published as: What does governance mean? From concept to practice, in: Hans Th. A. BRESSERS and Walter A. ROSENBAUM (Eds.), *Achieving sustainable development: The challenge of governance across social scales*, New York-Westpoint-London: Praeger (forthcoming 2002).
- BROMLEY Daniel W. (1989). 'Property Relations and Economic Development: The Other Land Reform', *World Development* 17: 867-877.
- BROMLEY, Daniel W. and Ian HODGE (1990). 'Private property rights and presumptive policy entitlements: Reconsidering the premises of rural policy', *European Review of agricultural economics* 17(1990) 1: 197-214.
- BROMLEY Daniel W. (1991). *Environment and Economy. Property Rights and Public Policy*. Oxford UK /Cambridge USA: Blackwell.
- BURNS, Tom R. and Thomas DIETZ (1996). 'Cultural Evolution: Social Rule Systems, Selection and Human Agency', *International Sociology* 7: pp. 259-283.
- DENTE, Bruno, Paolo FARERI and 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 and Quentin R. GRAFTON (1998). *Economic Rights and Environmental Wrongs. Property Rights for the Common Good*. Cheltenham: Elgar.

- FEENY, David; BERKES, Fikret and Bonnie McCAY (1990). 'The tragedy of the commons. Twenty-Two years later', *Human ecology* 1: pp. 1 - 19.
- GOODIN, Robert E. (1996). 'Institutions and their design', in GOODIN, Robert E. (eds.). *The Theory of Institutional Design*. Cambridge: Cambridge University Press, pp.1-53.
- HALL, Peter and Robert TAYLOR (1996). *Political Science and the new institutionalism*. Köln: Max-Planck-Institut.
- HOOGERWERF (1990). Reconstructing policy theory, in *Evaluation and program planning*, Vol. 13, No. 3, pp. 285-291.
- JÄGER, J.; LIBERATORE, A. and K. GRUNDLACH (eds.) (1995). *Global environmental change and sustainable development in Europe*. European Commission, Directorate General XII Science Research and Development, Luxemburg (Office for Official Publications of the European Communities).
- JÄNICKE, Martin and Helmut WEIDNER (eds.) (1997). *National Environmental Policies. A Comparative Study of Capacity Building*. Berlin/New York etc.: Springer.
- KEOHANE, Robert and Elinor OSTROM (1995). *Local Commons and Global Interdependence*. London: Sage.
- KNOEPFEL, Peter (eds.) (1995). *Die Lösung von Umweltkonflikten durch Verhandlungen, Beispiele aus dem In- und Ausland*. Basel: Helbing & Lichtenhahn.
- KNOEPFEL, Peter (1995). New institutional arrangements for a new generation of environmental policy instruments: Intra- and interpolicy cooperation, in Bruno DENTE (ed.), *Environmental policy in search of new instruments*, Dordrecht: Kluwer, pp. 197-233.
- KNOEPFEL, Peter; KISSLING-NÄF, Ingrid and Daniel MAREK in Zusammenarbeit mit BUSSY Claire and Pierre GENTILE (1997). *Lernen in öffentlichen Politiken*. Basel/Frankfurt a. Main: Helbling & Lichtenhahn.
- KRASNER, S. (1983). *International Regimes*. Ithaca/London: Cornell University Press.
- 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 & 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.
- LINDER, Stephen H. and Guy B. PETERS (1989). 'Instruments of government. Perceptions and contexts', *Journal of Public Policy* 9(1): 35-58.
- MARIN, Bernd and Renate MAYNTZ (eds.) (1991). *Policy Networks*. Frankfurt/M: Campus Verlag.
- MARTY, Frank (1997). *International River Management. The Political Determinants of Success and Failure*. Zurich: Institut für Politikwissenschaft.

- 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; GARDNER, Roy and James WALKER (1994). *Rules, Games, & Common-pool Resources*. Michigan: The University of Michigan Press.
- OSTROM, Elinor (1997). 'Private and Common Property', *The new Plagave Dictionary of Law & Economics* 3: pp. 424-432.
- OSTROM, Elinor (1998). A Behavioral approach to the rational choice theory of collective action. In: *American Political Science Review*, 92(1): pp. 1-22.
- PATTON, Michael Quinn (1980), *Qualitative evaluation methods*. Beverly Hills / London: Sage.
- RHODES, R.A.W. and D. MARSH (1992). 'New directions in the study of policy networks', *European Journal of Political Research* 21 (1992) No 1-2, S. 181-205.
- SANDLER, Todd (1992), *Collective action. Theory and applications*, Ann Arbor: The University of Michigan Press.
- SCHARPF, Fritz W. (1993a). 'Positive und negative Koordination in Verhandlungssystemen', in HERITIER, Adrienne (eds.). *Policy-Analyse - Kritik und Neuorientierung*, in: *Politische Vierteljahresschrift* 34 (1993) Sonderheft 24: S. 57-83.
- SCHARPF, Fritz W. (1993b). 'Coordination in hierarchies and networks', in SCHARPF, Fritz W. (ed.). *Games in hierarchies and networks*. Frankfurt u.a.: Campus/Westview, S. 125-165.
- SCHARPF, Fritz W. (1997). *Games real actors play*. Boulder: Westview Press.
- SCHLAGER Edella and Elinor OSTROM (1992). 'Property Rights Regimes', *Land Economics* 68: pp. 250 ff.
- UNDERDAL, Aril (1998). *The Politics of International Environmental Management*. Kluwer.
- UNITED NATIONS ENVIRONMENTAL PROGRAMM (UNEP) (1995). *Global Biodiversity Assessment*. Cambridge: University Press.
- VARONE, Frédéric and Réjean LANDRY (1997). *The Choice of Policy Tools. Toward a Deductive Theory*. Paper presented at the European Consortium for Policitical Research Joint Sessions of Workshops, Bern.
- WEIMER, David L. (eds.) (1995). *Institutional Design*. Boston: Kluwer Academic Publishers.
- WORLD COMMISSION OF ENVIRONMENT AND DEVELOPMENT (1987).

Our Common Future. New York: Oxford University Press.
YOUNG, Oran (1994). *International Governance. Protecting the Environment in a Stateless Society*, Itaca: Cornell University Press.
YOUNG, Oran (1997). *Global Governance. Drawing Insights from the Environmental Experience*, Cambridge: MIT Press.