An analytical understanding of the Water Framework Directive. Questioning its potential to enable sustainable management of water. SLIM (Social Learning for the Integrated Management and sustainable use of water at catchment scale). Case study monograph 9

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About SLIM

SLIM stands for *S*ocial *L*earning for the *I*ntegrated *M*anagement and Sustainable Use of Water at Catchment Scale. It is a multi-country research project funded by the European Commission (DG RESEARCH – 5th Framework Programme for research and technological development, 1998–2002). Its main theme is the investigation of the socio-economic aspects of the sustainable use of water. Within this theme, its main focus of interest lies in understanding the application of social learning as a conceptual framework, an operational principle, a policy instrument and a process of systemic change.

Social learning in recent years has attracted interest as another way of conducting public business, alongside regulation, compensation, stimulation and the operations of the (free) market. It has also been promoted as essential for the management of complex natural resource dilemmas and a key process in adaptive management. The SLIM project investigates these claims and expectations. A premise of SLIM is that it is very useful to view sustainability as an emergent property of stakeholder interaction, and not a technical property of the ecosystem. The introduction into national law of the Water Framework Directive, and the requirement for public participation in its implementation, adds relevance to the research.

The research partners are:

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Landwise Scotland, UK
Wageningen University Research, The Netherlands
Swedish University of Agricultural Sciences, Sweden
INRA–SAD, France
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The research teams are working with case study partners at various sites in England, Scotland, The Netherlands, the Atlantic coast of France and the Marche region of Italy. The research has been conducted in part as a process of co-learning and action researching. The contribution of all the project partners to the material presented in this paper is gratefully acknowledged. Contact can be made with researchers as follows.

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Contents

Abstract

The Water Framework Directive (WFD) adopted in October 2000 is the water policy guiding water management throughout Europe. The WFD requires that all European waters achieve good overall quality within 15 years.

The goal of this analysis is to generate a better understanding of the cognitive, normative and procedural content of the WFD from the perspective of its impact on local collective action in the course of its subsequent implementation.

As external observers, we analysed the WFD text in a systematic fashion, with particular attention to its semantics. We formulate several hypotheses regarding local implementation of the WFD based on our experience with such environmental policy implementation.

In its cognitive dimension, we find that the policy is strongly biased in favour of a purely ecological vision,despite the fact that the ecological knowledge used is deemed controversial even by scientists participating in its implementation. The normative dimension is characterised by conflicting visions of what water ought to be. On the one hand, an eco-centrist perspective focuses on the need for water to reach good ecological status and prescribes a set of actions for that purpose. On the other hand, the presence of a utilitarian perspective is revealed by the presence of many exemptions muddling the previous perspective. The conflict-ridden policy-making process resulted in an ambiguous compromise. The analysis of the procedural dimension shows evidence of strict ecological normalisation and centralised monitoring, coupled with a weak definition of water management actions at catchment level. The WFD is unclear regarding public participation and how water management institutions are expected to operate within a participatory process.

A key point regarding the WFD is the strong emphasis placed on expertise in contrast to the minimal attention given to participation. The WFD generates a major democratic problem that could be solved by a concerted action process enabling stakeholders to express their various perspectives.

Keywords: WFD, content analysis, knowledge, normative dimension; policy making, policy implementation.

1 Overview

This document presents an analysis of the content of the Water Framework Directive (WFD), in terms of the set of knowledge, norms, instruments, procedures and organisations associated with it. Our interest is to explain this content insofar as it impacts on local collective actions throughout Europe.

The SLIM project addresses local implementation of policies relevant to the sustainable management of natural resources at catchment scale. The project offers theories and methods useful in the investigation of the Directive's content. Indeed, SLIM has developed several variables that are relevant to question and analyse this kind of policy.

The first variable corresponding to SLIM's work is 'institutional framework'. It focuses on how the normative system (knowledge, norms, etc.) produced and prescribed by the policy affects local collective actions. It is important to understand what this normative system is, in order to analyse how it meets the local existing normative systems.

The WFD deals with the question of water and offers specific points of view on water by bringing and developing particular knowledge and norms. The 'ecological constraints' focus of SLIM questions the way people, institutions and law represent and describe parts of nature and practices relative to it. What are the objects, indicators, parameters and values used to represent the world?

The WFD also addresses the question of implementation procedures, including public participation. This aspect of the WFD reaches to the heart of the SLIM project, which aims to analyse social learning in the context of sustainable management of natural resources.

The paper begins with a presentation of the set of questions determining our approach and the theoretical framework we have chosen to address these questions. The second part of the document deals with the nature of the Directive text and the manner in which we analyse it. Then, we explore the WFD content following the methodology presented. Finally, this analysis is discussed in relation to this initial set of questions and theoretical framework. In the conclusion, the variables from the SLIM project are used as an exercise to assess the relevance of these variables in the analysis of the policy making and implementation processes.

2 Questions and theoretical framework

Faced with conditions of complexity and uncertainty, environmental policies aim to answer the need to change human activities affecting natural resources. These policies represent a process whereby ideas, political, social and/or scientific constructions, are put into a form intended to be translated into action (Fouilleux, 2000). They present expertise on the world through values, knowledge and models that collectively constitute a framework for action. Policies result from multiple designers' perceptions of stakes, activities, social systems, ecological systems and the relations between them (Brives et al., 2002). To manage controversies, policies often become compromises between specific visions of the world. So, what is this 'construction'? Does it permit a reduction of uncertainties and make action possible? Does it provide efficient answers to satisfy the goals set by the policy?

Policy making affects local social systems by constraining human activities and requires people and their practices to change. The vision of the world conveyed by the policy interacts with local perceptions and interests, and results in a particular translation of the policy's initial goals. This translation also reshapes local collective action. It is thus very important to gain a very good grasp of the policy content. Our objective is therefore to analyse the content of the WFD with a focus on its point of view on water and on how the policy provides rules and space for action on the management of water at a European scale.

We propose to structure this analysis on the approach developed by Muller (1995): '*l'analyse cognitive des politiques publiques*'. Surrounded by uncertainty, public policies become 'spaces of meaning', which involve all parties building from the policy design phase to implementation. Policies clarify visions of the world, of humans' relationship with reality, with nature and with themselves following normative, cognitive and procedural dimensions.

2.1 The normative dimension of a policy: 'what to do to make the world become what it ought to be'

The normative dimension relates to the construction and mobilisation of values and norms. The values provide a general framework for public action by setting the limits of what is good, bad, and desirable or not (Muller, 1995). In addition, the notion of norm covers multiple senses according to disciplinary points of view, which we are not able to explore here. For us, the norm, in the context of public policy, refers to legal and prescriptive norms. Thus, such norms, produced by a state, establish regulation of human behaviour by means of obligations ranging from hard commands (prohibition, permission) to soft commands (general recommendations, advice and principles) and from legal to negotiated policies. We are in the field of the 'ought to be', where the will to act of individuals is subjected to a higher and different will, associated with sanctions, defining an irreducible duty internalised by the actor (Berthoud and Serverin, 2000). This definition comes close to the one used by Muller (1995): the norm defines the mismatch between perceived reality and a desired state of reality. Relative to this gap, a set of principles for action are developed (Ollivier, 2000). A will for and a theory of social change are constructed, more or less explicitly, in relation to perceived reality, knowledge and values or

ideologies. The normative dimension can be broken down according to a number of purposes (aims or objectives) generating general guidelines for action and characterised by a more or less important obligation.

Additionally, these objectives are also broken down in terms of methods and instruments (rules of conduct, means, procedures and so on) providing practical means to achieve them.

2.2 The cognitive dimension of a policy: 'the knowledge used to describe how the world is'

For us, knowledge embodied in a policy is what allows us to describe the world, making it intelligible so that we can act upon it. Hence, knowledge proposed by a policy has the function of partly reducing uncertainty by constructing the reality of ecological, institutional and social objects and processes that allow the defining of action from theory (if … then …) (Muller, 1995). Moreover, in the case of environmental policies, intervention in complex systems forces the legislator to refer, at least partly, to scientific knowledge (ecology, economy, etc.). We have chosen to pay particular attention to the way the WFD makes use of ecological knowledge.[1] It is necessary to clarify briefly the ecological background: what are the main trends, objects, assumptions, concepts, models, uncertainties and controversies that characterise it?

One main trend, evolutionary and population ecology, considers humans as a destructive force separated from nature where species populations have their own life history and evolution (Darwinian influences).

Community ecology gives primacy to the relationship among biotic elements, defined by species abundance or composition (Wiebleg, 2001), thus forming an entity. It is also hypothesised that community structure expresses its functioning and its relationship with abiotic conditions (Barnaud, Lefeuvre, 1992; Lepart, 1997). A similar approach, but more dynamic, emerged in the USA. The botanist Clements considered the biotic community as an organism with homeostatic properties. The community, after a disturbance (possibly human), evolves on a linear and finalised way toward its climax through a process called succession (Kempf, 1998; Lepart, 1997). Natural equilibrium is thus constitutive of the scientific concept of climax, which is still a popular conception of nature, in spite of also being a highly controversial one (Blandin and Bergandi, 2000).

Ecosystem ecology, created in the 1930s, considers nature as an organism, i.e. an entity able to regulate itself to reach a state of stable equilibrium based on the balance between biotic and abiotic factors. The ecosystem concept had many theoretical developments, particularly in the field of modelling and systems theories based on the question of function and processes. Since the 1950s, it has dominated ecology and has become a point of reference for the public at large (Müller, 1997; Barnaud and Lefeuvre, 1992).

Nevertheless, since the 1970s, many controversies appeared on this major and unifying concept, prompting a review of its assumptions, particularly concerning stability, disturbance (and human place), time and space (Kempf, 1998; O'Neill, 2001). Theses controversies led to new theoretical developments: a certain reconciliation with evolutionary ecology (O'Neill, 2001), integration of time and space through the hierarchy theory (Müller, 1997; O'Neill, 2001), and application to ecology of chaos theory (Blandin and Bergandi, 2000). Ecology evolves from the paradigm of a stable, reversible and foreseeable nature separated from humankind to a new paradigm of nature seen as unstable, irreversible and thus unforeseeable, which corresponds to a certain return to complexity and uncertainty (Lepart, 1997; Larrère, 1997a). These changes

[1] For a precise analysis of economy in the WFD, see: 'Courtecuisse, A., Davy, T., Laurans, Y., Rideau, JP., Rinaudo, JD., Strosser P. 2002. 'Quel rôle pour l'économie dans la Directive Cadre sur l'Eau? Un processus, une approche, des outils, un guide.' *27èmes Journées de l'Hydraulique*', and 'Laurans Y., 2002. 'La négociation de la directive cadre sur l'eau: place et rôle des références économiques dans le processus'. Agence de l'eau Seine Normandie.

are associated with a severe crisis of the theoretical status of ecology concomitant with the environmental crisis.

Society calls on ecological sciences to produce knowledge for action, and therefore promotes the integration of humans and the disturbance they cause in ecological systems. Ecology is then in a paradox: whereas it appears today that ecology provides more questions than confident answers, policy makers often think that science produces certainties (Ost, 2003, p. 95) in such a way that some normative concepts are produced and 'institutionalized in national, international … policy and law' (Callicott et al., 1999). This situation elicits criticism from many scientists for whom ecology is not intended to provide general laws and therefore accurate norms for action. Some are aware of the theoretical uncertainties of their knowledge (Lepart, 1997; Cooper, 1998), and others consider that ecological concepts lose their meaning when transposed into the normative field (O'Neill, 2001).

Hence, a significant and problematic epistemological change emerges because it disturbs the traditional gap between science (facts, the 'what is') and politics (the 'what ought to be') (Deléage, 1992).

2.3 The relationship between normative and cognitive dimensions

For Blandin and Bergandi (2000) constructivism recognizes that 'knowledge does not result from "revealing" a pre-existent and hidden reality, but from the construction and active structuring of a universe of representations with contours drawn according to the interests and goals of the actors of knowledge'. In the face of uncertainty and complexity, knowledge is built on points of view and assumptions, more or less provisional and validated, implying particular perceptions on the world, nature and the relations to humans that are coming from the normative field.

As we saw earlier, science is obliged to answer social questions in such a way that the normative dimensions become constitutive of it.

Larrère (1997b) describes the main currents that deal with environmental crisis management. They make use of scientific knowledge, normative concepts, values and representations of the world. At first, coming from a modern point of view, anthropocentric utilitarianism considers nature as providing goods and services, and resources as a receptacle for human activities. Moreover, it deals with the effects of human activities on nature in terms of impact on humans and their interests. On the other hand, eco-centrism considers that nature has an intrinsic value such that humans have a moral duty towards it. Callicott et al. (1999) describe two distinct schools of thought related to evolutionist and ecosystemic ecology:

- *Compositionalism* Humans, as destroyers of pristine nature, have the moral obligation to remedy the disturbances so that nature can return to 'the integrity of the biotic communities', i.e., the initial species structure and composition present in the absence of human disturbance.
- *Functionalism* Mankind and its activities are part of the ecosystem. Humans have a moral duty to preserve the 'health of the ecosystem' defined as 'normal' functions and processes. This approach considers that human activities are an integral part of the system and don't necessarily imply dysfunction, as long as the system is able to preserve its self-regulatory capacity in the face of disturbances. Pristine nature no longer defines the norm; humans must act to adapt their activities to the functional requirements of the system.

Knowledge can have a function of policy and norm justification. One finds here the legal rational operating mode of modern Western societies as described by Weber (Serverin, 2000). Indeed, legal norms must always be justified to make the proposal reasonable and acceptable to the social body. Theses norms rely on references either to higher norms (equality, justice, …) or to social, psychological or technical knowledge (Troper, 2000). Nevertheless, Talathié and Rouzé (2000) note that legal norms are not built on relationships between facts in a causal way,

'X is, then Y is', but according to a relation of the type, 'X is, then Y ought to be'. The question is not the truth, but the obligation, constitutive of the legal norm (de Béchillon, 2000). As is the case in a policy, knowledge in a prescriptive context provides guidelines for action and therefore acquires a normative character.

Like Larrère (1997a), we recognise that descriptive and normative considerations are inseparable. We have chosen to discriminate between the two dimensions by pointing out the cues 'be'/'ought to be'. Regarding the cognitive dimension, we pay attention to how assertions are supported by stabilised facts and concepts. We also pay attention to the identification of the values, representations and prescriptive dimensions underlying knowledge. The normative dimension relies on general principles (not supported by arguments), an obligation to act, and ways of achieving the goal of the policy.

2.4 Policies generate uncertainties

The construction of a policy must answer the need to reduce the uncertainties of our complex world with the aim of acting and changing it. But, it can also leave or even generate some uncertainty. Thus, we need to understand what is built, how it is built and in what way it involves uncertainties. Our content analysis pays attention to uncertainties that are both cognitive and normative:

- *Cognitive uncertainty* How does the law address uncertainty not addressed by scientific disciplines? What are the inaccuracies not addressed by legislative texts? What precautions are taken to take account of knowledge gaps? What are consequences in terms of implementation?
- *Normative uncertainty* What is the framework for action created by the text and how much leeway is left to implementers? Are there conflicts between norms that generate contradictions, inconsistencies or ambiguities which render the norms either unclear or unenforceable? Do the instruments and procedures proposed make it possible to achieve the goals of the policy?

To understand the WFD content, it is necessary to pay attention to the policy-making process. Indeed, the design of a legislative text is a complex process which calls upon multiple negotiations in and between various forums and actors (political, professional, scientists, environmental NGOs, etc.) with their different values, ethics and contradictory knowledge that sometimes lead to compromises (Fouilleux, 2000). Regarding the WFD, Aubin and Varone (2002), Kallis and Butler (2001) and Kaïka and Page (2001) have described the policy-making phase. It appears to have been a particularly long process, punctuated by many debates and controversies, beginning in 1988 with a request from the European Council to work on ecological quality. This initial step failed to generate unanimity and led to more intense efforts after 1995. The design process became part of a new form of decision making. On the one hand, following the Amsterdam Treaty, the legislative power of the European Parliament was reinforced so that the policies were elaborated according to a joint decision between the Parliament and the Council. On the other hand, we witnessed the transition from government to governance that was supported by European authorities and characterized by the increasing use of the various non-elected bodies in decision making. The joint decision and governance processes are fraught with procedural and content-based conflicts originating from contrasting interests, perceptions and practices required to preserve water. In particular, on the one side, a powerful coalition of environmental NGOs (European Environmental Bureau, WWF, RSPB, Birdlife), the European Parliament and European Commission (in particular civil servants of DG ENV) as well as the water industry emerges. On the other side, a more traditional 'anti-environmental' block is structured around the member states (MS) represented by the Council of Ministers and the lobbying of industrial and agricultural representatives. Aubin and Varone (2002) note that major cleavages emerged among MS on some discussion points.

These stakeholders of the policy-making process exert varying degrees of control over different parts of the policy. For instance, environmental NGOs and Commission civil servants control

cognitive contents, whereas the normative and procedural aspects are subject to many conflicts among the other stakeholders. These cleavages generate contradictions, exemptions and uncertainties around the main purpose of the WFD. We will consider these aspects in detail in order to better understand and explain the WFD content.

3 Methodological approach

3.1 Methods used in analysing the WFD text

As outside observers, we have analysed the Directive in a qualitative way, i.e., by a reading of the text that pays attention to its language, grammar, and vocabulary and syntax. During this reading, we have grouped and classified meaningful text items in an analysis grid made up of concepts arising from our theoretical framework.

We have highlighted knowledge used in the text whenever it takes on an affirmative, descriptive or explanatory form. Moreover, we have tried to locate and expose the more or less implicit assumptions used in the Directive. By searching for expressions such as 'it is necessary to', 'one must', 'one can', 'it is desirable to', we have located in the text the objectives of each norm. In addition, we have emphasised their prescriptive character. The last step was the identification of the methods of action and instruments that make it possible to achieve the objectives.

We took a step back from this grid in order to locate uncertainties and contradictions in the text. Moreover, we have paid attention to relative importance and development of the different dimensions: the relative weight of obligations between norms, which norms or knowledge are ubiquitous and which ones remain anecdotal? We were also able to identify the values and schools of thought to which the norms and knowledge refer.

The work done is not comprehensive, it only deals with the main points relevant to our questions: what is the meaning brought by the WFD and what could this generate in terms of implementation and local collective action?

The analysis is structured around cognitive, normative and procedural dimensions. Each section provides the essential elements given by the text and a discussion of these elements in reference to context (policy design, scientific debates or implementation consequences). The discussions were built on our own experience of analysing similar collective action build during policy implementations (Natura 2000 and Agri-environmental schemes) as well on some bibliographic references on the WFD context.

3.2 General description of the WFD text

The corpus analysed is the founder text of the new European water policy, namely Directive 2000/60/EC of the Parliament and of the Council adopted on 23 October 2000.

The previous water directives – to sum up very briefly – focused on individual water use sectors (drinking, bathing, fish or shellfish waters, industry, agriculture, etc.), in particular on the harmonisation of public health or environmental market regulations, in terms of chemical and organic limit values for emission and water quality standards (Aubin and Varone, 2002). The WFD aims to protect all European waters (interior, coastal and groundwater) in ecological and sustainable development terms. It advocates a comprehensive approach in order to achieve a good overall quality of waters (ecological and chemical) within 15 years through coordinated management at catchment scale in qualitative and quantitative terms.

The text includes 53 *considérants* ('whereas'), and 26 articles with 11 associated annexes. The *considérants* refer to a set of previous decisions, treaties, seminars and communications from European institutions (Commission, Council, Parliament, etc.). They express general principles

and obligations providing normative orientations for actions to be implemented. The articles (see Figure 1 below) are more detailed and structured, and develop aspects explained above.

Article 2 deals with cognitive aspects, covering 41 definitions of hydro-ecological expressions later used in the Directive. Articles 1 and 4 state in detail the general and environmental purposes. The 23 other articles each develop specific means, instruments or procedures to reach the objectives announced in the *considérants* and the previous articles.

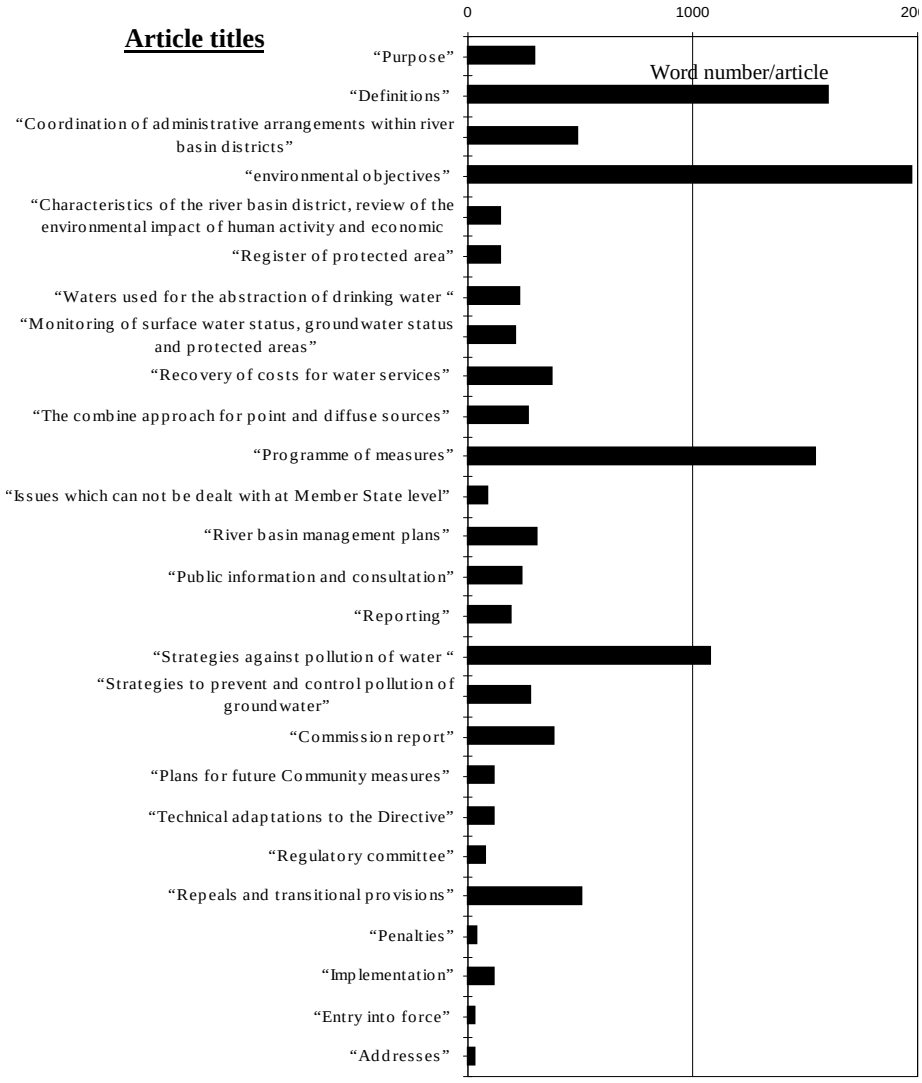

Figure 1 Article titles and their relative proportion (word number) presented in order of appearance in the text.

Finally, the 11 annexes (Figure 2 below) refer to specific articles, covering in greater depth various aspects of implementation. In 3000 words, Annexes II and XI give cognitive elements of ecology and description of waters. Annex V (11,612 words) extends them with normative definition of water quality. Annexes I, III and VII develop procedural aspects on the structure of management plans to be produced: table of contents, information required, and so on. The remaining annexes deal with the practical instruments to implement in the management plan that are often referred to previous directives.

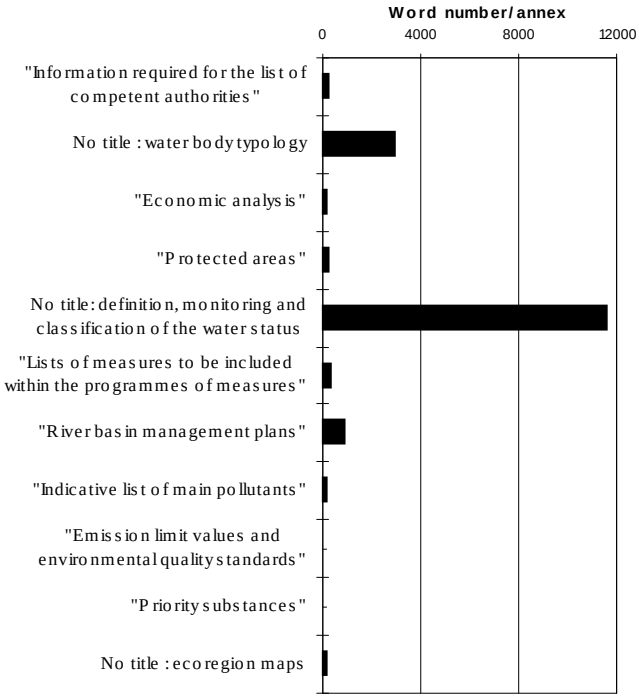

Figure 2 Annex titles and their relative proportion.

Normative, cognitive and instrumental aspects are developed throughout the text. The normative dimension prevails in just over half of text; then the procedures and instruments in approximately one-third of the text; and the cognitive aspects in the remaining parts of the text.

4 Content analysis of the WFD

4.1 A cognitive dimension conveyed by water ecology

4.1.1 The ecological cognitive definition of water in the WFD

The ecological definition of water is the main innovative and cognitive development of the WFD. Indeed, whereas water was previously seen in generic terms as a 'receptacle', the WFD defines it with new categories, boundaries and qualities by using new concepts, parameters and assumptions.

Water in an ecological interrelation system

First of all, water is considered as part of an ecosystem, a 'body' carrying life. Indeed, the definition includes the links and interdependencies:

- between parts of the water cycle: upstream and downstream; surface and groundwater;
- between 'aquatic ecosystems, and terrestrial ecosystems and wetlands directly depending on them' (*cons.* 23).

Furthermore, the *considérants* 8, 20 and 17 stress:

- the 'important functions they [wetlands] perform for the protection of water resources';
- the fact that 'the quantitative status of a body of groundwater may have an impact on the ecological quality of surface waters and terrestrial ecosystems associated with that groundwater body';

- ‘the vulnerability of aquatic ecosystems located near the coast and estuaries or in gulfs or relatively closed seas, as their equilibrium is strongly influenced by the quality of inland waters flowing into them’.

With respect to the first set of interdependencies, the WFD places these interrelations in a spatial dimension through the classical concept of ‘river basin’, defined as ‘the area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta’ (Art. 2).

The last set of interdependencies concerns the qualitative and quantitative dimensions of water: ‘Quantity is an ancillary element in securing good water quality’ (*cons.* 19) and ‘the quantitative status of a body of groundwater may have an impact on the ecological quality of surface waters and terrestrial ecosystems associated with that groundwater body’ (*cons.* 20).

The WFD as a classification system of water

After these general ecological considerations, the WFD states a categorisation and qualification system of ‘aquatic ecosystem’ that constitutes the main development of the policy (Art. 2, Annexes II and V). We retrace, in the following paragraphs, the hierarchical classification steps proposed by the WFD, and particularly the criteria used.

Step 1 The water bodies

The WFD splits water into ‘water bodies’, each defined as ‘a discrete and significant element of surface water’ (Art. 2); that is to say, a volume of water with distinct characteristics and integrity (spatial, structural and functional). Each ‘water body’ is categorised within one of the large classical types (‘lake’, ‘river’, ‘transitional water’, ‘coastal water’ and ‘ground water’) according to general abiotic parameters (geographic position, water flow dynamics, salinity, …).

Step 2 Definition and categorization of water body types

These ‘water bodies’ categories are ‘differentiated’ on the basis of two typological systems, both of which assume that ‘physical and chemical factors … determine the characteristics’ of the ‘water body’ and ‘hence the biological community structure and composition’ (Annex II). They place water bodies in geographical space and then differentiate some more precise ‘water body types according to the descriptors set out’ in Annex II.

- The first, called ‘system A’, can be qualified as an *a priori* typology. System A is characterised by the use of the ‘eco-region’ concept. Indeed, water bodies are included in 25 terrestrial ‘eco-regions’, and 6 others concerning maritime waters, previously defined at the European level, maps for which are provided in Annex XI.
- ‘System B’ is considered as an ‘alternative characterisation’ and is an *a posteriori* typology. System B is geographically more flexible because it uses only latitude and longitude to locate ‘water bodies’.

In each system, the ‘obligatory factors’ used are adjusted to each type of water body (rivers, lakes, …). The descriptors proposed are ‘physical and chemical’.[2] System A uses values from ‘fixed typologies’ for these ‘descriptors’, whereas system B keeps them open. With the constraints to ‘achieve at least the same degree of differentiation’, system B is in a position to use more accurate factors, called ‘optional’. These ‘optional factors’ correspond to morphological criteria (water body ‘shape’, ‘slope’, ‘depth’, …) or more dynamic and functional ones.[3]

[2] ‘altitude’, ‘size’ either ‘based on catchment area’ or ‘on surface area’, ‘geology (calcareous, siliceous, organic)’ or, for maritime waters, ‘tidal range’ and ‘salinity’

[3] ‘energy of flow ’, ‘mixing characteristics’, ‘residence time’, ‘transport of solids’, ‘current velocity’ or ‘wave exposure’…

Step 3 Definition of type-specific reference conditions for each water body type

The previous 'characterisation' is supposed to ensure 'that *type-specific biological reference* conditions can be reliably derived' from each water body type. The notion of 'type-specific reference', which is also applied to 'hydro-morphological and physicochemical conditions', is not defined along with the other scientific notions in Article 2, but only in Annex II 1.3. This annex on 'establishment of type-specific reference conditions for surface water body types', states that 'type-specific … conditions shall be established representing the values of the … quality elements specified in point 1.1 in Annex V for that surface water body type *at high ecological status*'. Thus, the 'type specific reference' notion is indirectly, and normatively alluded to through the 'high ecological status', which is itself roughly defined. Table 1.2 (Annex V) states that the 'high ecological status' is met when 'there are no, or only very minor, *anthropogenic alterations* to the values of the physicochemical and hydro-morphological quality elements for the surface water body type from those normally associated with that type under *undisturbed conditions*. The values of the biological quality elements … reflect those normally associated with that type under undisturbed conditions, and show no, or only very minor, evidence of distortion. These are the type-specific conditions and communities'. Even if the 'undisturbed conditions' expression is used many times, it is not defined with much precision. Indirectly, however, 'type-specific reference' is defined when the water body conditions are not affected by any human disturbance. In addition, the WFD recognizes that, for some quality element, 'high degrees of natural variability' may not permit establishing 'reliable type-specific reference conditions'.

Step 4 Determination of the 'ecological status' for each individual water body

The last step, already mentioned, allows for each 'water body' to determine its 'ecological status' defined as 'an expression of *the quality of the structure and the functioning* of aquatic ecosystems' (Art. 2.21). For each individual 'water body', 'ecological status' is built on a specific list of 'quality elements for classification' (Annex V), also used to define 'type-specific reference'. These parameters are composed of abiotic elements including dynamic aspects and especially 'supporting the biological elements':

- 'hydro-morphological elements' with 'hydrological regime'[4] and 'morphological conditions'[5]
- 'chemical and physico-chemical elements': temperature, salinity, specific pollutants, and so on.

The 'biological elements' prevail and reflect a taxonomic point of view with the 'composition and abundance' of main species categories (food network): 'aquatic flora', 'benthic invertebrate fauna', 'fish fauna' (+ 'age structure') and for marine 'water bodies' phytoplankton (+ 'biomass'). Therefore, the WFD relies on the bio-indication concept, which postulates that taxonomic structure, derived from abiotic conditions, reflects ecosystem functioning.

The whole classification system relies on the assumption that 'ecological status' is directly related to a deviation from the 'type specific conditions' because of 'disturbances', 'alterations' or 'impacts' mainly due to 'anthropogenic activity'. Despite the fact that the qualification of these human activities in relation to 'water bodies' is defined in vague and generic terms, the WFD provides very few elements on their effects and the indicators used to assess their effects. The five points listed below, together with Figure 3, demonstrate how the WFD configures the relationships between human activities and the various abiotic and biotic elements of water bodies:

- increase in the 'frequency and intensity' of 'planktonic blooms' or 'accelerated growth of phytobenthos';

[4] water flow', 'connection to groundwater bodies', 'river continuity' …
[5] depth, width, 'structure of the riparian zone' …

- ‘alteration’ of the ‘level of diversity of invertebrate taxa’ or of the ‘ratio of disturbance of sensitive taxa to insensitive taxa’;
- ‘undesirable disturbances’ ‘to the balance of organisms’ or ‘ in the values … of quality elements’;
- ‘changes in the composition and abundance of … taxa from the type-specific communities’ ‘attributable to anthropogenic impacts on physico-chemical or hydro-morphological quality element’;
- ‘age structures of the fish communities show little sign of anthropogenic disturbance’ leading to ‘failure in the reproduction or development of any particular species’.

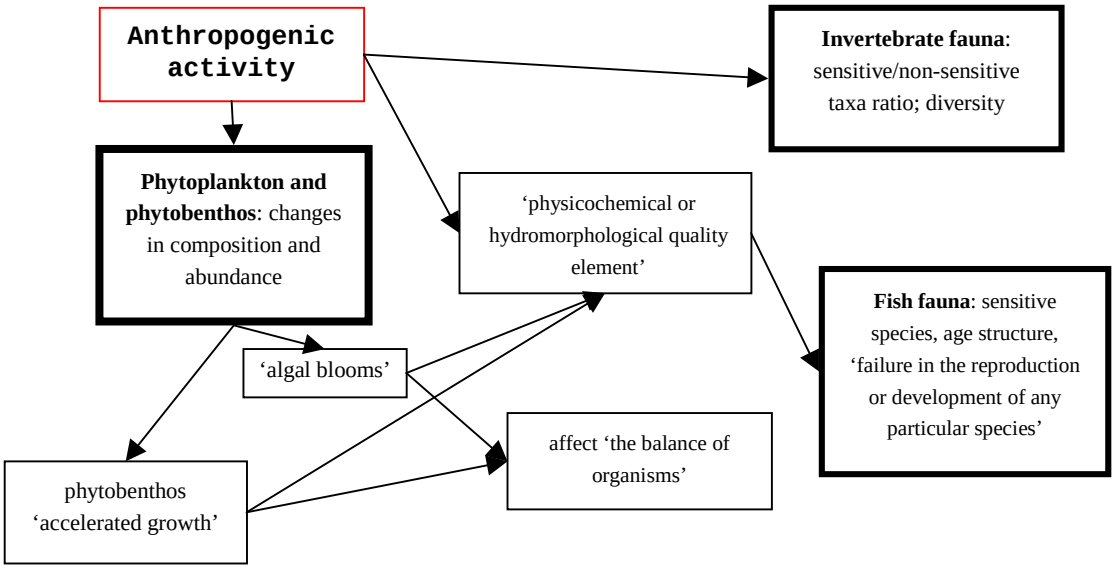

Figure 3 Configuration of causal links between parameters of ‘aquatic ecosystem’ according to the WFD.

Apart from these few cognitive developments, the WFD provides very little definition of what the human activities are, at least not with respect to ‘ecological status’ or to its impact. The policy mentions very few elements to qualify activities: point and diffuse pollution, from ‘the different water uses, disaggregated into at least industry, households and agriculture’ (Art. 9). It cites also ‘navigation’, ‘drinking-water supply’, ‘power generation’, ‘irrigation’ and ‘land drainage’.

To sum up, the classification rationale of water relies on a hierarchical, inductive and determinist approach. ‘Water bodies’ are mainly characterised by and assessed in relation to:

- biotic, taxonomic and static parameters, assumed to derive from abiotic conditions,
- ’type-specific conditions’, defined in unclear and very normative terms
- ’anthropogenic disturbances’ mainly undetermined.

4.1.2 Discussion: a cognitive frame controversial in the scientific field

At the beginning of the policy-making process, ‘ecological status’ was broadly defined: ‘rich, balanced and sustainable ecosystem’ (Kaïka and Page, 2001). Environmental NGOs such as WWF, the Commission and, most significantly, their experts in aquatic ecology, advocating the ecological point of view, incorporated scientific knowledge in the policy (Aubin and Varone, 2002; Barraqué, 2003). From the opposite point of view, agricultural and chemical industry

lobbies fought this ecological point of view that they perceived as a threat to their activities. This conflict could explain the level of precision given to the cognitive frame – no absolute precision (with regard to quantitative values) but no complete haziness about ecological quality.

In addition to this compromise between the conflicting points of view, this intermediate level of accuracy of ecological knowledge can be explained in other ways. We can show that the cognitive frame used to build the policy is quite uncertain. We can do so by examining general ecological literature and with recourse to scientists integrated in scientific and technical European programs for the WFD implementation.

The WFD content we have been considering has shown the use of specific concepts, postulates and parameters. They belong mostly to community ecology (composition, abundance, …) (Barnaud and Lefeuvre, 1992; Wiegleb, 2001), and thus specifically to the conservation biology school of thought, that of compositionalism (Callicott et al., 1999). They all deal with the integrity of the biotic community and ecosystem ('reference conditions') in a state of stable, balanced and pristine nature where humans are the external disturbing agents. As in succession theory, they rely on the capacity of the 'body' (i.e. use of organic metaphor) to return to its stable and homeostatic status, which is similar to the 'climax' concept. But, since the 1950s, the scepticism of the plant ecologist Gleason, and later deconstructivists and chaos theorists, have 'found no homeostasis in nature, only confusion and flux' (Shallat, 2000; O'Neill, 2001).

Indeed, the idea of pristine nature is native to the USA where it is 'supposed to be a characteristic of the pre-Columbian environment' (Tusseau-Vuillemin and Wasson, 2002). Nevertheless, this position may not be applicable to the 'old Europe' where humans have for a long time and over all areas, affected landscape and the 'wilderness' of nature. Looking at it through the lens of evolutionary and population ecology, 'pristine Nature' appears as nonsense. Is it really conceivable to determine these 'type-specific conditions'? What is the temporal reference point and what data are to be used? Faced with these difficulties, the European Network of Freshwater Research Organisations (EurAqua, 2001) proposes to redefine the 'type-specific reference condition' to 'a situation with a hydro-morphological and physiochemical regime sustaining a healthy ecosystem functioning with natural biodiversity'.

The assumption of a linear restoration of ecological status towards a unique biological type-specific reference doesn't take into account the potential existence, debated for three decades, of many succession trajectories towards many stability domains (Hirst et al., 2003) or even toward none (Lepart, 1997; Muller, 1997), or of irreversibility thresholds.

Similarly, the postulates that taxonomic parameters (diversity and structure) translate disturbances and functions have been strongly questioned: for instance, species are substitutable to ensure a same function (O'Neill, 2001) or, according to May, the more complex and diverse the systems, the more unstable they are (Lepart, 1997). In this connection, Noble and Cowx (2002) note that 'there is an inconsistency in the WFD as the river types/reference conditions are defined by abiotic criteria and the assessment is conducted by using biotic metrics'. Moreover, these taxonomic biotic indicators may have shown their limits when applied to disturbance type sensibility and natural, temporal and spatial variations (Charvet, 1999). According to Charvet (1999) and Wasson (2003), present research shifts towards functional concepts of 'biological traits' or 'ecosystem health' – more specifically the functionalism described by Callicott, et al. (1999).

Finally, the eco-region concept, underlying assumptions of which are central in the WFD classification, is also analysed. Eco-region is defined as a spatial and homogeneous unit (climate, geology and relief) which houses specific and characteristic groups of species and ecological communities that are supposed to have the same sensitivity and response to disturbances (Charvet, 1999; Noble, Cowx, 2002; Wasson, 2001; WWF, 2000). According to Wasson (2001), this concept was proposed in the USA in the 1980s, and integrated in US government agencies to define regional quality objectives (Omernik and Bailey, 1997). Concerning the WFD, 'the member states … agreed to accept the zoogeographic regions of Europe, compiled by Illies (1978), as a geographic typology comparable to the ecoregional

approach' (EurAqua, 2001). Omernik (1995) states that: 'the general consensus is that … eco-regions exist. However, disagreement in how the regions should be constructed continues to be a scientific issue'. Moreover, Wasson (2001) recognises a weak link between chemical conditions and invertebrate fauna, whereas Noble and Cowx (2002) state that the link with fishes 'is implicitly untrue, as many of the ecoregions are large, and there may be variations in the natural biological communities within an ecoregion'. Indeed, Cardoso (2003) states that 'system A' based on eco-regions 'lacks ecological realism, choosing this typology could prevent improvement of ecological quality assessment in the long term'.

In fact, the WFD itself reflects and recognises some of these cognitive uncertainties and weaknesses. The ambiguous, even normative, definition of 'type-specific reference' may show this. In addition, while it relies on the same assumptions, the classification alternatives testify some flexibility: 'system B' with its 'optional factors' or the three methods for the establishment of 'type-specific reference conditions'.

Moreover, as we saw previously, the WFD doesn't define human activities in relation to the largely described 'water body status'. In fact, it's the same situation in ecological science. This science, in spite of many statements on humans as a component of the ecological system, always had difficulties in integrating humans in its analysis field (Barnaud and Lefeuvre, 1992). It goes through the comfortable recess on non-anthropogenic systems or else through the leak in modelling abstraction far from ecological reality (Deléage, 1991).

WFD implementation requires substantial knowledge development, especially on the link between water and human activities. For instance, EurAqua (2001) points out the need for 'more knowledge on the response of each biological element along the gradient of human impact (degradation and recovery process)' and of a focus 'more on causes of alteration processes than on status variables'. This point may constitute a major innovation, and issue, for ecologists.

According to Tansley, the reluctance to take humans into account confers on ecology the character of a simple academic exercise without concrete range and practical use. Moreover, the ecological concepts provided (i.e. ecosystem) are not concrete realities on which it is possible to intervene but heuristic abstractions of it made to understand, or just as here, to classify. It would be hazardous to confuse the reality and abstraction (O'Neill, 2001).

This problem is increased by the uncertainties that pervade ecological knowledge. Indeed, for the last few decades, many ecologists tread warily by recognizing that ecology doesn't supply universal theory and general laws (O'Neill, 2001). For instance, it cannot provide *a priori* models and precise standards to characterise ecosystems and human action by how far they are from a natural status used as reference (Lepart, 1997; Larrère, 1997a).

To conclude, we have seen that this new water policy proposes an important ecological categorisation of water far beyond the previous generic conception. Nevertheless, the WFD makes use of knowledge that is not universally accepted in the scientific field. According to some scientists, it appears that the WFD takes into account an outdated and controversial cognitive frame from which implementation appears to be difficult. These scientists challenge taxonomic and static visions and strive to redefine the WFD in functional terms. The next sections deal with the consequences of integration of such a cognitive categorisation into the normative dimension.

4.2 Normative dimension

The WFD relies on a few general principles from Union treaties which define the criteria for an appropriate environmental European policy, as for instance the polluter-pay principle or sustainable development. The political will here is to define a general framework for European water policy.

Beyond these assumptions, the WFD provides many details on its prescriptions to build its concrete and operational character.

4.2.1 The consequences of the cognitive definition of water on the normative dimension

The previous cognitive dimension advances the role of human activities as 'disturbance' of the 'water bodies' status. The WFD recommends that humans assume their responsibility towards the 'aquatic ecosystem' by reducing their impact in order to get closer to pristine nature.

The main operational purpose, for surface and groundwater, is to 'prevent further deterioration' and 'enhance and restore all bodies … with the aim of achieving good … status at the latest 15 years after the date of entry into force of this Directive' (Art. 4). The 'surface water body' is considered in generally 'good status' 'when both its ecological status and its chemical status are at least good', whereas for groundwater, it is 'determined by the poorer of its quantitative status and its chemical status' (Art. 2).

The 'chemical status' relies on previous policies defining 'emission limit values' or 'chemical quality standards'. Nevertheless, if necessary, the WFD recommends developing new 'environmental quality standards for pollutants … for the protection of aquatic biota' (Annex V 1.2.6.)

'Good ecological status' appears as the major objective conferring on the policy its eco-centrist character. The 'normative definitions of ecological status classifications' (Annex V 1.2.) prescribe for each 'water body type' (river, lake, …) the parameters that the MS shall use to define it (see earlier 4.1.1). However, the discrimination between the five categories ('high', 'good', 'moderate', 'poor' and 'bad') is not defined using absolute values. Thus, the WFD uses qualitative and subjective terms to define 'good ecological status', in reference to 'type-specific conditions', which are themselves defined using non-quantitative non-absolute terms. For instance, 'good ecological status' is defined in terms of 'slight changes' and by the following general definition: 'the values of the biological quality elements … show *low levels of distortion* resulting from human activity, but deviate only slightly from those normally associated with the surface water body type under undisturbed conditions'. 'Moderate ecological status' is defined as 'moderately disturbed' or having 'moderate signs of distortion resulting from human activity'.

In addition to the subsidiarity principle, the cognitive definition of water, recognising ecological and spatial interdependencies, justifies that the MS shall manage water at the 'river basin district' level. The policy defines this district as 'the area of land and sea, made up of one or more neighbouring river basins together with their associated ground and coastal waters' and considers that it is 'the main unit for management of river basins', the proper and efficient geographic level for intervention. Indeed, 'to take account of … environmental conditions in the various regions of the Community' (*cons.* 12) 'decisions should be taken as close as possible to the locations where water is affected or used' (*cons.* 13), 'the success of this Directive relies on close cooperation and coherent action at … local level' (*cons.* 14) and finally 'the objective of achieving good water status should be pursued for each river basin, so that measures in respect of … waters belonging to the same ecological, hydrological and hydrogeological system are coordinated' (*cons.* 33). Moreover, this perspective calls for a definition of 'competent Authority' (see procedural points for more details).

The normative consequences of the eco-centrist perspective occupy a minor place in the normative dimension developed by the WFD. Indeed, most of the normative dimension involves conflicts and relies on compromises between eco-centrism and other points of view on water.

4.2.2 Some normative definitions of water

In addition to the main cognitive definition of water, the WFD defines other points of view on water. These definitions are normative and have significant consequences on WFD prescriptions.

The 'heritage' point of view

The WFD states in the first *considérant*, and nowhere else that 'Water is not a *commercial product like any other* but, rather, a *heritage*, which must be protected, defended and treated as such'. This notion of 'heritage', not really defined but close to the ecological prescription discussed earlier, is built on an antagonism with a human development point of view.

The human development point of view on water

To protect water, the WFD relies on a category other than the justification of the 'ecosystem' for itself. The text is punctuated by expressions reminding the reader that the policy also promotes utilitarian objectives where water is acknowledged as a resource for human development. Water in many instances is seen as 'fresh water resource', 'water resource' or 'available groundwater resource' and is 'in principle renewable natural resources'. Thus, the justification is not only on an eco-centred point of view.

The WFD argues that water protection has many virtues for humans. The aim of 'sustainable, balanced and equitable water use' is to 'safeguard and *develop* the potential uses of Community waters' (*cons.* 23) and 'will provide *economic benefits*' (*cons.* 17). The policy is supposed to 'safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water' (Art. 11). Finally, the definition given to 'pollution' illustrates this anthropocentric point of view: 'introduction, as a result of human activity, of substances … into … water which may be harmful to *human health* or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, which result in damage to material property, or which *impair or interfere with amenities* and other legitimate *uses* of the environment'.

These few examples show how water is also qualified by expressions of economic character, without explaining the underlying rationale, i.e., without making explicit its cognitive dimension. In addition, the WFD insists on principles arising from economic rationality. It particularly concerns 'the principle of recovery of the costs of water services' which, 'in accordance with … the polluter-pays principle', states that 'water-pricing policies provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives' and to 'an adequate contribution of the different water uses' (Art. 9). These economic elements appear in policy instruments (see 4.3 below.) and are implicit in the exemptions discussed under exemptions 1–3 below.

Normative definitions associated with exemptions to the core environmental objective

The utilitarian point of view is not an inconsequential reference to general principles. Its implementation has practical consequences that interfere with the previously mentioned environmental objectives that the policy highlights.

Exemption 1: the 'artificial or heavily modified water body' as an alternative and dispensatory category for 'surface water body'

The first exemption or loophole comes from the creation of a new surface water body type: the 'artificial or heavily modified water body'. This water body category appears to be completely different from the others, in terms of its definition given in vague expressions, and in terms of environmental objectives, which are unclear and less ambitious.

The WFD defines it in two ways. First, Article 2 states that 'artificial water body means a body of surface water created by human activity' and 'heavily modified water body means a body of surface water which as a result of physical alterations by human activity is substantially changed in character'. Furthermore, in Article 4 ('environmental objectives'), the WFD states, in a less objective and simple way, that MS may designate a body of surface water as artificial or heavily modified, when:

> (a) the changes to the hydro-morphological characteristics [that] would be necessary for achieving good ecological status would have significant adverse effects on: (i) the wider environment; (ii) navigation, including port facilities, or

recreation; (iii) activities for the purposes of which water is stored, such as drinking-water supply, power generation or irrigation; (iv) water regulation, flood protection, land drainage, or (v) other equally important sustainable human development activities;

(b) the beneficial objectives served by the artificial or modified characteristics of the water body cannot, for reasons of *technical feasibility or disproportionate costs*, reasonably be achieved by other means, which are a significantly better environmental option.

In fact, this previous definition (on artificial or modified water bodies) is no longer built on the assessment of 'ecological status', but on new criteria based on an assessment of the effort required to achieve good ecological status, or an assessment of the negative effects that such an effort would have on human activities. Indeed, these water bodies are designated prior to the categorisation of 'ecological status'. Next, they are qualified using 'the descriptors for whichever of the surface water categories most closely resembles the heavily modified or artificial water body concerned' (Annex II). Nevertheless, these specific 'water bodies' are assessed through their 'ecological potential'. The WFD only defines this notion at the end of the WFD (Annex V) in the 'Normative definitions of ecological status classifications'.

The qualification for this 'water body' doesn't rely on a 'reference conditions' definition. Indeed, the classification reference is the 'maximum ecological potential' which is defined in ways such as 'the values of the *relevant biological quality elements* reflect, *as far as possible*, those associated with the closest comparable surface water body type, given the physical conditions which result from the artificial or heavily modified characteristics of the water body' (Table 1.2.5. Annex V). Concerning the hydro-morphological conditions, it adds that they 'are consistent with the only impacts on the surface water body being those resulting from the artificial or heavily modified characteristics of the water body once all mitigation measures have been taken to ensure *the best approximation to ecological continuum*, in particular with respect to migration of fauna and appropriate spawning and breeding grounds.'

This 'ecological potential' is used to define specific environmental objectives. Indeed, for these water bodies, MS '*shall* protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status at the latest 15 years' (Art. 3, iii). This 'good ecological potential' is then defined in ways such as the existence of 'slight changes in the values of the relevant biological quality elements as compared to the values found at maximum ecological potential'. Moreover, other parameters shall be 'consistent with the achievement of the values specified … for the biological quality elements' or 'within the ranges established so as to ensure the functioning of the ecosystem' and, for pollutants, in respect with standards set in previous directives.

Exemption 2: the criteria, consequences and minimal obligations relative to other exemptions

From *considérant* 32, the WFD states that 'there may be grounds for exemptions from the requirement to prevent further deterioration or to achieve good status under specific conditions'. Furthermore, most of Article 4 ('environmental objectives') is dominated by the listing of the exemptions applicable to all surface water bodies. It develops a complex system of criteria defining consequences and minimal obligations from which we have extracted the main characteristics.

The redundant criteria justifying why one would not attain the primary environmental objectives include:

- 'disproportionate costs';
- 'technical feasibility';
- unfavourable 'natural conditions';
- 'unforeseen or exceptional circumstances' such as '*force majeure*' or 'accident';

- ‘new modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater’ relative to new ‘sustainable human development activities’ and where ‘benefits to the environment and to society’ of alteration outweigh the benefit of achieving the WFD objectives;
- when the water bodies ‘are so affected by human activity’ that ‘environmental and socioeconomic needs served by such human activity cannot be achieved by other means’;
- these acceptable human activities are relative to ‘overriding public interest’, ‘human health’, ‘maintenance of human safety or to sustainable development’.

The above-mentioned criteria and the vagueness with which they are stated reveal a contradiction in the WFD’s primary environmental objectives. The exemptions allow extensions of deadlines (Art. 4.4), making it possible for MS to ‘phase implementation of the programme of measures in order to spread the costs of implementation’ (*cons.* 29). It also goes through the application of ‘less stringent environmental objectives’ (Art. 4.5), possibilities of ‘temporary deterioration’, the lack of penalty in some failure case (Art. 4.7) or, even, in such circumstances, the possible powerlessness recognition of measures used (Art. 11.5).

Nevertheless, guidelines are provided through minimal but generic obligations that we can summarise with the following points where MS have to:

- anticipate, declare and justify each exemption case in the management plan (cf. infra): this implies indicators, appropriate measures and even the forecast and explanation of ‘exceptional and unforeseeable circumstances’(!);
- implement mitigation measures to balance negative effects of activities;
- do their best to achieve the ‘highest ecological and chemical status possible’ and at least ‘to prevent further deterioration’.

Exemption 3: soft prescriptions for groundwater and quantity issues

The WFD claims to be based on a holistic and integrated approach taking all water bodies, and quality and quantity into account. Nevertheless, behind these generic principles and the environmental purpose regarding chemical and quantitative status, the prescriptions made actually underestimate problems related to groundwater and to water quantity in general.

First, contrary to the previous principles, *considérant* 19 states that the WFD is ‘primarily concerned with the quality of the waters concerned. Control of quantity is an ancillary element in securing good water quality and therefore measures on quantity, serving the objective of ensuring good quality, *should* also be established’.

Furthermore, concerning environmental objectives, the WFD defines only two categories for groundwater (the ‘good’ and the ‘poor’) classified according to groundwater level and chemical status. The ‘good’ groundwater level must be ‘such that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction’ and ‘not subject to anthropogenic alterations such as would result in: failure to achieve the environmental objectives …, for associated surface waters: any significant diminution in the status of such waters, any significant damage to terrestrial ecosystems which depend directly on the groundwater body, and alterations to flow direction resulting from level changes may occur temporarily, or continuously’. For us, this definition remains broad, open to many interpretations, and makes it difficult to prove that the required conditions are effective.

Moreover, many of the previous exemptions are applicable to groundwater. Article 11.3.j, while it specifies the objective ‘to prevent or limit the input of pollutants’, also adds a new exemption. It states 6 exemption cases related to human activities where the ‘prohibition of direct discharges of pollutants into groundwater’ is allowed, for example: ‘construction, civil engineering and building works and similar activities on, or in the ground which come into contact with groundwater’.

To conclude this part, we can qualify the level of legal enforceability as an obligation to implement particular means rather than an obligation to achieve particular results. It is, at the very least, quite ambiguous. Indeed, in all cases, the WFD expresses the purposes (Art. 4) following two directions: MS 'shall implement the measures necessary to prevent' and 'shall protect, enhance and restore … with the aim of achieving good … water status'. On the one hand, the obligation relies on the measures, on the other hand the WFD is about acting with an 'aim' but not an obligation.

4.2.3 Discussion: causes and consequences of a multi-purpose policy

The WFD content expresses tensions between different, and even contradictory, points of view on water and human activities:

- *Eco-centric focus:* based on the moral obligation for humans to protect pristine nature for the sake of nature, by cancelling the 'footprint' of humans.
- *Utilitarian focus:* addressing the protection of water as the maintenance of resources that serve human interests.

These tensions are a translation of those that emerged during the policy-making process. In fact, the first policy draft only addressed ecological quality. Not until the inclusion in the text of human development terms in 1995 and after, did the process become unblocked (Aubin and Varone, 2002).

A main cleavage line was the 'heritage'/'commercial product' issue. Parliament promoted the 'heritage' position in spite of opposition from the Commission who judges it only rhetorical and opposed to the promotion of the 'full-cost pricing' (Kaïka and Page, 2001). In fact, one only needs to recall the general liberalisation context where Maastricht principles, MS such as the UK and France (traditionally holding the financial responsibility of water) and water industries promoted deregulation and privatisation of the water sector through water markets (Kaïka and Page, 2001; Petit, 2002). These institutions, like some environmental NGOs, consider these liberal economic principles as a panacea for efficient regulation of water uses. However, agricultural and industrial lobbies and other MS in the Council opposed deregulation and privatisation because of the increasing production costs and the impact on countries that are mostly agricultural. As a result of this conflict, the WFD made a compromise by asserting the 'heritage' principle while at the same time recognising water as a 'commercial product', with the caveat that it is not 'like any other'. In addition, the application of the 'full-cost recovery' principle is only promoted under state authority.

The defence of human activity interests, directly targeted by the 'good status' objective, was a key point of negotiations. For the southern MS, especially concerned with water scarcity, the water policies are considered more in terms of infrastructure and development policies than in environmental terms (Kallis and Butler, 2001). It explains the strong MS will to control, which is translated into the exemptions and is expressed in the groundwater and quantity issues.

The question of weak legal enforceability is also the result of such mechanisms (Kallis and Butler, 2001; Kaïka, Page, 2002). The institutional negotiations were organised around:

- 'pro-environment' centralisation advocates (Parliament, Commission and environmental NGOs), who promote the 'shall achieve' option, setting high goals and tight deadlines and reducing the possibility of exemptions;
- 'pro-subsidiarity' advocates (MS and Council), who managed to impose the 'shall aim to achieve' option where obligations focus on the efforts to be made (i.e. procedures).

Behind these issues, the MS legal responsibility is questioned. As the WFD has been set, the MS sheltered themselves from any implementation failure. This might be linked with the awareness MS have of the weakness of the cognitive underpinnings on which the policy is built.

The existence of two justification domains (eco-centrism/utilitarianism) and the arbitration rules resulting from it, lead to a 'space of meaning' interference which has strong implication

for implementation. First, there are discrepancies between the cognitive developments and the general normative developments (overall water policy, 'good ecological status' for all water bodies) compared with their concrete treatments (ground water, quantity, exemptions). In addition, whereas the ecological objective appears to be quite blurred, these rules introduce uncertainties through a multitude of exemption cases, unclear definitions and complex justifications. During the implementation, these elements are not objective and become open to many interpretations. There is a serious risk of its leading to legal problems requiring a justification contest between, on the one hand, MS advocating national and user interests and, on the other hand, the Commission, whose mission is to ensure appropriate application of the policy.

A pessimistic interpretation of the text, at least from the point of view of the policy's environmental objectives, would conclude that the policy has within it the seeds of its own disempowerment. Indeed, it has many loopholes allowing any member state not to achieve 'good water status'. Following up on this aspect, Greenpeace (Lanz, 1998) considered that 90 per cent of European water bodies could be under the exemption regime. A more optimistic view is to consider that, since the situation is characterised by cognitive uncertainties, normative uncertainties provide welcome leeway for efficient intervention. As Ost (2003) says: 'the Law has to transform ecological uncertainties into social certainties. It will only succeed if it increases its own flexibility'. This question remains open, depending on the political determination of MS and the Commission to apply either the core eco-centrist approach or the marginal and utilitarian one.

Indeed, following Larrère (1997b), there is no possible consensus between these different ethical and justification orders. It is necessary to establish a hierarchy between the beneficiaries of moral duty: nature or humans (which doesn't imply the lack of nature). The WFD hasn't managed to impose the eco-centrist ethic and, as often, has returned to the utilitarian conception. It isn't convinced that this is not a 'reasonable discord', satisfying all the positions and leading to an efficient decision.

4.3 Political procedures and instruments

We discuss here the procedures and instruments proposed by the WFD according to its implementation timeline. They result from both previous cognitive or normative considerations.

Procedure of ecological standardisation and monitoring of waters at European scale

The procedure results from the steps of cognitive classification and the normative prescription for water status considered earlier. The operational procedure is strongly guided by the scientific ecological classification steps, methods and descriptors (Annex II): 'Characterisation of surface water body types', eco-region classification, and 'establishment of type-specific reference conditions'.

The WFD provides MS with three methods of defining 'type-specific reference' for each water body type. The first one is directly derived from the previous eco-region model to which a reference site network is added. It 'shall contain a sufficient number of sites of high status to provide a sufficient level of confidence about the values for the reference conditions'. The second alternative method relies on 'either predictive models or hind-casting methods' and 'shall use historical, palaeontological and other available data'. Finally and 'where it is not possible to use these methods, Member States may use expert judgement to establish such conditions' .

These elements are constitutive of a monitoring system design (Annex V 1.3.) allowing MS to 'establish a coherent and comprehensive overview of water status' (Art. 8). It allows 'supplementing and validating the impact assessment procedure' which is based on the obligation for MS to 'collect and maintain information' for the 'identification of pressures' and 'assessment of impact' of human activities (Annex II 1.4. and 1.5.). This information deals with the qualification of 'the type and magnitude of the significant anthropogenic pressures to which

… water bodies … are liable to be subject' and to the 'assessment of the susceptibility of the surface water status of bodies to the pressures identified above' and 'the likelihood that … waters bodies … will fail to meet the environmental quality objectives'. Moreover, MS 'may utilise modelling techniques to assist in such an assessment'. Thus, a 'surveillance monitoring', based on a monitoring network, 'shall permit classification of water bodies into five classes consistent with the normative definitions' with 'adequate confidence and precision in the classification of the quality elements', upstream of the management plan elaboration step. The WFD prescribes the use of standard methods for the monitoring of quality parameters (ISO), some sampling criteria, as well as the monitoring frequencies for each of the quality elements and water body type.

Moreover, following the same European standardisation process, the WFD sets an 'intercalibration exercice' in order to ensure 'comparability of biological monitoring result' between MS. Thus, 'to set the numerical values for the relevant class boundaries in each member state monitoring system', the 'Commission shall facilitate an exchange of information between Members States leading to the identification of a range of sites in each ecoregion in the Community; these sites will form an intercalibration network' (Annex V 1.4.). The process of standardisation continues up to the prescription of 'presentation of monitoring results and classification of ecological status and ecological potential': use of comparable status ratio and maps with codes of colours or stripes.

Procedure to plan, act and assess at river basin district scale

As many cognitive and normative considerations justified it, the MS 'shall ensure that a river basin management plan is produced for each river basin district' (Art. 13). First, MS 'shall identify the individual river basins' and thus 'assign them to individual river basin districts'. Article 3 specifies that 'small rivers', 'groundwaters' and 'coastal waters' are 'assigned to the nearest or most appropriate river basin district'. When this has been done done, the MS 'shall ensure the appropriate administrative arrangements' in order to identify the 'Competent Authority'. MS 'shall provide the Commission with a list of their competent authorities' and a list of required information: name, geographic coverage of the district with main rivers, 'legal status', 'a description of the legal and administrative responsibilities', the authority's role within the district and 'membership, where the competent authority acts as a coordinating body for other competent authorities, a list is required of these bodies together with a summary of the institutional relationships established in order to ensure coordination' (Annex I). The 'competent authority' contribution is not fully detailed, it is expressed only in terms of coordination and 'application of the rules of this Directive within each river basin district' (Art. 3.3.) and above all subordinated to the MS authority.

Thus, MS shall oversee the river basin management plan production and its report to the Commission (Art. 15). The plan content is framed with the binding inclusion of 'information detailed in Annex VII' which reflects its elaboration procedure in terms of calendar and partly of methods. Once more, it follows the ecological classification steps by providing 'a general description of the characteristics of the river basin district' with the mapping of the location of 'water bodies' within the river basin and according to the eco-regions and the 'identification of reference conditions for the surface water body types'. The second step is to identify the 'significant pressures and impact of human activity on the status' of waters (estimation of point and diffuse source pollution of land use, abstractions, …). Then, the 'monitoring programmes' permit to define for each water body its status and thus its assigned 'environmental objectives'.

Following the utilitarian point of view, an 'economic analysis of water use' (Art. 5 and Annex III) is then required. It allows 'taking into account … the principle of recovery of the costs of water services' by making 'the relevant calculations' based on 'long term forecasts of supply and demand for water in the river basin district' or 'the volume, prices and costs associated with water services'. The second purpose is to 'make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures'

and to estimate 'the potential costs of such measures'. The analysis also takes into 'account the costs associated with collection of the relevant data'.

Then, 'each Member State shall ensure the establishment for each river basin district … of a programme of measures, taking account of the results of the analyses required'. The WFD adds that 'river basin management plans may be supplemented by the production of more detailed programmes and management plans for sub-basin, sector, issue, or water type, to deal with particular aspects of water management'. Each measure has to be summarised in the management plan, 'including the ways in which the objectives are thereby to be achieved'. The proposed and prescribed measures are presented further. Moreover, the MS shall justify and explain all the exemptions it may have designed.

In terms of deadline, Article 11 adds that 'river basin management plans shall be established (and published) at the latest nine years after the date of entry into force of this Directive and all the measures shall be made operational at the latest 12 years after that date'. Moreover, they will 'be reviewed and updated at the latest 15 years after the date of entry into force … of this Directive and every six years thereafter'. These updates shall take into account 'any changes … since the publication of the previous version'. It includes particularly:

- 'an assessment of the progress made towards the achievement of the environmental objectives' through the increase of status 'resulting from the programmes of measures';
- 'an explanation for any environmental objectives which have not been reached';
- 'an explanation for any measures foreseen … which have not been undertaken'.

Thus, the 'monitoring systems', initially designed (Annex V 2.4.), are a key point of policy assessment and improvement. Indeed, 'surveillance monitoring' is supposed to assess 'long-term changes in natural conditions' and 'resulting from widespread anthropogenic activity', whereas 'operational monitoring' focuses on the status of 'those bodies identified as being at risk of failing to meet their environmental objectives'. The monitoring system is completed with 'investigative monitoring' in case of exceptional circumstances.

Measures and instruments proposed to enhance the water status

The WFD proposes to MS a wide range and register of actions on water to achieve the WFD purpose. Articles 10 and 11 and Annex VI list all the measures or instruments proposed, but without cognitive explanation.

The first group gathers all the 'basic measures' (measures required, i.e. having a binding character) following previous directives (Bathing Water (1976), Urban Waste-water Treatment, Nitrate, Dangerous Substance Discharges Directives, …) listed in Annexes VI and IX. Moreover, Article 10 and Annex IX are specifically committed to the 'combined approach' for the treatment of point and diffuse pollutions, from which the water directives have arison. Indeed, they rely on the standardisation and control approach either with 'emission limit values' or 'environmental quality standards'. Finally, this approach is supported by other 'minimum requirements':

- national legislations;
- control measures such as 'best environmental practices', registration, 'prior authorisation' for 'abstraction and impoundment', 'artificial recharges' or pollutant emissions;
- some prohibition 'of direct discharges of pollutants into groundwater' (with exemption in certain circumstances) and for a list of 'priority substances' given in the empty Annex X;
- and measures to implement 'full cost recovery' principles 'having regard to the economic analysis'.

The second group includes 'a non-exclusive list of supplementary measures' that can be used 'to provide for additional protection'. Following Article 11, the recourse to them can occur,

particularly but not exclusively, 'where monitoring or other data indicate that the objectives … are unlikely to be achieved'. In this case, after examination, reviewing and adjustment of the protection system, supplementary measure 'may be necessary in order to achieve those objectives'. Annex VI proposes different types of such measures. First, there are some generic and classical regulation instruments: legislative, administrative, 'economic or fiscal' instruments, 'negotiated environmental agreements', 'emission controls'. Concerning the economic tools, we have seen previously that the WFD explicitly encourages using water pricing as a regulation instrument, even if 'nothing … shall prevent the funding of particular preventive or remedial measures' (Art. 9).

Other measures are very specific to some activities: 'codes of good practice', 'demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought' and 'abstraction controls'. The next measures correspond to technological answers or even heavy ecological engineering: 'recreation and restoration of wetlands areas', 'rehabilitation projects', 'efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques', 'construction projects', 'desalination plants' or 'artificial recharge of aquifers'. The last type could qualify as cognitive measures: 'educational projects' and 'research, development and demonstration projects'. This list of 16 supplemental measures is concluded with 'other relevant measures'. This broadening of intervention options is confirmed with Article 20, which points out the need of adaptations to 'scientific and technical progress'.

Public participation

The directive states, in Article 14 ('public information and consultation') that MS 'shall *encourage* the active involvement of all interested parties … in particular *in the production, review and updating of the river basin management plans*'.

Considérant 14 provides the only justification for this instrument: 'the success of this Directive relies on close cooperation and coherent action at … local level as well as on information, consultation and involvement of the public, including users'.

There is a strong procedural development initially mentioned in *considérant* 46: 'to ensure the participation of the general public including users of water in the establishment and updating of river basin management plans, it is necessary to provide proper information of planned measures and to report on progress with their implementation with a view to the involvement of the general public before final decisions on the necessary measures are adopted'. In order to allow 'active involvement and consultation', Article 14 defines more precisely this procedural principle in terms of binding modalities. MS shall 'publish and make available for comments to the public, including users' information at different steps of plan elaboration: 'a timetable and work programme', then 'an interim overview of the significant water management issues' and 'draft copies of the river basin management plan', respectively 'at least' 3, 2 and 1 'years before the beginning of the period to which the plan refers'. Moreover, for each step, the 'public' has 'at least six months to comment in writing on those documents', and 'on request, access shall be given to background documents and information'. Besides, in the management plan, MS shall report on 'the public information and consultation measures taken, their results and the changes to the plan made as a consequence' to the Commission.

And lastly, hidden in the depths of Annex V (1.2.6), resorting to public consultation (accompanied by peer review) is compulsory at the end of the 'procedure for the setting of chemical quality standards'.

The WFD doesn't develop the idea of public participation elsewhere in the document. Neither is the 'public' defined, even though 'users' are repeatedly referred to. Similarly, there is no explanation regarding participation methodology.

4.4 General discussion

The procedural and instrumental dimension can be summarised as an opposition between a strong procedural framework concerning the question of ecological standardisation or monitoring, and a broader framework on other issues, particularly concerning practical actions and actors.

What is striking in both cases is the considerable amount of data and knowledge (ecological and also economic) the implementation process will and must generate at the European and river basin scale. Implicitly, these also call for massive intervention of expert and scientific authorities during the ecological standardisation and the management plan production. These scholarly authorities, enrolled in the implementation procedure, are expected to reduce the cognitive uncertainties surrounding water and its link with human activities. This testifies to the belief in the scientific rationality behind the funding decisions.

Concerning the ecological aspects, we have already noted the implementation difficulties encountered by scientists due to weaknesses in the cognitive framework. These difficulties will probably increase because of the mandatory character of the classification procedures, which leave little room for adaptation. Concerning the link between water status and the impact of human pressure, which is not developed to any great extent in the cognitive dimension of the WFD, the procedure refers back once more to modelling tools to resolve these uncertainties. For instance, Wasson (in Le Meur, 2003) states: 'among the multiple disturbances, which is the one leading to degradation? On which must one act with the most urgency to return to 'good status'? Nobody knows today. This is the real challenge!' One notes also the emergence of economic analysis (water service costs, cost-benefit analysis of actions or alternative projects). Once more, as noticed by Laurans (2001) and Kallis and Butler (2001), this constitutes a major technical and scientific difficulty, particularly with respect to adapting old optimisation tools to environmental issues. Do these scientific and technical fields have the ability to respond appropriately to this cognitive challenge? In any case, the WFD doesn't make explicit the financial and human means and scientific institutions that would allow challenging these issues.

Concerning the 'programme of measures', the ecological cognitive dimension in the WFD simply defines an objective without contributing and allowing building measures and practices to achieve it. By leaving behind a large choice of measures, the WFD permits the application of the subsidiarity principle so that measures can be adapted to local realities. Overall, this broad approach respects the various and distinct water management traditions and ideologies among MS. For instance, the recourse to a 'combined approach' for pollutions comes from a compromise between Germany and the UK who advocate, respectively, emission and quality standard approach (Aubin and Varone, 2002). The WFD has not established hierarchies on the efficiency or the fairness of the various action and regulation modes (legislative, economic, …) which rely, elsewhere, on strong theoretical and ethical debates (subsidies, market, property rights, …). The question of 'full-cost recovery', for instance, has just been added, in addition to the previous action modes. However, the co-existence of many action modes may be contradictory and unproductive, for instance taxes versus subsidies. The final rational choice will result from the implementation of cognitive developments and, above all, from the MS point of view.

What is striking is the omnipresence in the implementation process of the 'member states' figure, and its accountability to the Commission, particularly compared with the 'competent authority'. Indeed, the WFD doesn't clearly build up and define the role and identity of the local 'competent authority'. This lack of clarity could be a consequence of the opposition of local government during the policy-making period (Aubin and Varone, 2002). Indeed, some of them feared that local planning at the river basin district scale could reconfigure the previous local institutions whose administrative territories don't match ecologically defined territories. The local approach may also be opposite to that of centralised governments.

To our minds, the question of definition and creation of such 'competent authority' is a crucial issue. Indeed, is an institution able to be competent enough to deal with expert or scientific

appraisal about ecological status or economic analysis and, at the same time, to have political authority to coordinate actors, to resolve their potential opposition to the policy and to ensure the 'application of rules'? It seems to us that the WFD needs separate interventions of expert and political authorities. In fact, the WFD has not clarified the question of coordination between institutions and stakeholders. Considering the standardisation and planning procedures, this could lead to a strong asymmetry between experts, political institutions and the public. Concerning public participation, despite strong procedural obligations the WFD again lacks precision on the nature of intervention and methodology. As shown by experience such as the SAGE in France, methodology constitutes a major weakness for participation (Douguet and Petit, 2003). The WFD proposition defines only a minimum requirement, which doesn't mean that more integrated public intervention would happen. However, the minimal modalities may correspond to the 'public instruction model' defined by Callon (1998). This model of relationship between science and the public is the simplest and most widespread model. It is characterised by a clear separation between science and society. Science is expected to enlighten a confident and undifferentiated public. In the WFD, 'users' are however highlighted, showing that they too are expected to intervene in the implementation process.

A key issue for the WFD regards the relationship between science, policy and the public, through the opposition between centralised standardisation and subsidiarity. This is a democracy problem around the incorporation of natural sciences in policies whose purpose is to act on, and for, human entities. Indeed, in these conditions, ecologists and their science carry 'a huge responsibility' in the determination of how humans shall behave. There is a real risk of 'ecocracy', leading to a 'discretionary power', to invoke 'scientific authority on an ecological point of view'. Indeed, science, as we saw earlier, raises more questions than answers and thus should remain in a modest position (Deléage, 1991). Thus, ecological scientists, maybe on account of their fear of taking sides on value-laden issues (Barnaud and Lefeuvre, 1992), seem to establish a distinction between scientific and political work: 'there is a need to distinguish between setting reference conditions, which is a scientific process, and goal-setting, which is part. of a political process' (Euraqua, 2001) and 'whether the reference condition and bio-indication methods concern scientists, the assessment of 'good ecological status' logically return to administrators and politicians' (Wasson in Le Meur, 2003).

However, this responsibility is shared with policy makers. Above all, the political and administrative constraints may have determined the choice of a controversial compositional conception of water. Indeed, 'the Law is accustomed to use definitions with clear outline, stable criteria, … boundaries which segment reality' (Ost, 2003). The prescribed static parameters and the determinist logic underlying the 'ecological status' give the illusion of a foreseeable, achievable, checkable and assessable objective. It would be less obvious for a chaotic, and even dynamic, point of view of 'aquatic ecosystem'.

The WFD eco-centrist view of nature and its prescriptive, normative, and procedural character has powerful consequences for people concerned about the policy. There is a certain degree of violence associated with the imposition of this perspective that precludes any speaking about water in any other way. Although the myth of a balanced and pristine nature is a popular and widespread idea, there are many other ways to think about water that make sense to a broad diversity of people. The eco-centrist vision may cause distrust on the part of the 'public', and even opposition, particularly when considering the weakness of its foundations. As Callon (1998) says, people 'fear, above all, that one decides for them what is good and that these decisions are taken in a deep ignorance of their needs and desires'. This is applicable to the eco-centrist vision of the Directive, which neglects the social world upon which it acts. That is why implementers may choose the utilitarian alternative and all the exemptions to ecological quality that can be justified. This choice would make the policy more realistic and feasible. Indeed, speaking of resources rather than pristine nature allows implementors to acknowledge what makes sense to people in terms of their activities and the environmental issues they build.

To avoid implementation blocking, there is a major stake in allowing the expression of the plurality of conceptions to really 'make questionable the questions' around water. According to

Callon (1998), 'the light doesn't come from a radiant and self-confident science; it comes from the confrontation of points of view, learning, judgment which, separate and distinct, enrich themselves mutually'. This takes the mobilisation of the participation procedure far beyond the minimum requirements to complete – and even overtake – the ecological standardisation. In this connection, Euraqua (2001) states, it is necessary to 'initiate a continuous dialogue between water managers and scientists to define common perception of class boundaries'. It's a question of social acceptability and adhesion, but also of efficient action definition through the reduction of uncertainties by means of more concrete and local knowledge than by prescribed modelling.

It advocates other ways of conducting science: a science for and in society, real anthropocentrism of ecology, invention of theories and concepts for and in action, assuming and explaining its points of view and value judgements, opening to the plurality of points of view from other disciplines and knowledge types.

It also argues strongly for alternative European policy-making practices that rely on interpretation efforts which acknowledge a variety of points of view, diversity of knowledge, and which can significantly contribute to the meaning intended to be conveyed by the policy. Such a policy-making approach is not about institutionalisation, juxtaposition or negotiation of points of view, but rather, it involves delving deeper into and connecting the ideas circulating in the various epistemic communities or fora (Fouilleux, 2000). This approach could achieve closure on controversies prior to decision making and most importantly, prior to implementation.

Although our framework analysis differs slightly from the SLIM framework, it is relevant to analyse the policy processes, policy-making and policy implementation, using the SLIM variables. In the following section, we try to advance the implications of our analysis for policy makers and for those in charge of WFD implementation.

5 Conclusion

5.1 Using SLIM variables to understand the policy-making process

History of the situation

The design of the WFD is part of a long list of European environmental policies, many of which address water. This history reveals the various perspectives on water – as a medium, a resource to be used, a public health factor, etc. – which represent milestones in the various sectoral directives on water. It also reveals the evolution of the relationships among the various stakeholders taking part in the design of the directives, as well as the power asymmetry causing the building of institutional arrangements.

Thus for example, one person interviewed as part of the 'Scottish policy context' case study mentioned the following:

> You have to be aware that all this (the construction of the WFD) took place against a background of a Commission that was being pushed by a UK-inspired wave to deregulate to an extent in the field of environment … and the Commission was pushed into having a conference in the early 90s on water policy, which I duly addressed and said that we were in favour of re-regulation not deregulation, which the Commission was very happy about because I was saying things that they would like to say but couldn't.

An analysis of the historical process of environmental policy design provides a better understanding of the emergence and role of environmental NGO lobbies, which already include those which defend socio-economic interests. The particular point of view defended by these NGOs with respect to nature protection (see the section below on stakeholders and ecological constraints) explains many contradictions found in the WFD. Often, these contradictions result

from negotiations between this particular point of view – defended by the Commission – and the utilitarian perspective – shared by most of the MS.

Stakeholders and stakeholding

As usual, the policy-making process is made up of confrontation between multiple lobbying groups built around the defence of special interests based on various worldviews. To sum up, two major blocks conflicted: on the one hand the traditional 'anti-environmental' and 'pro-subsidiarity' block structured around the MS represented in the Council of Ministers and the industrial and agricultural representatives; and, on the other hand, the 'pro-environment' centralisers composed of the Commission, the Parliament and the environmental NGOs. The power opposition led to substantial fights, explaining some of the lack of clarity and ambiguities criss-crossing the WFD, most notably the differences between cognitive content, based on scientific knowledge, and the procedural content, based on MS requirements. This last point is explained by procedural stakes around the co-decision process where the Parliament's power becomes enforced. The analysis of the weight of each stakeholder (economic, influence, etc.) in the negotiation field of power can help to explain the final WFD content.

Ecological constraints

The WFD adopts an 'eco-centrist' ethic leading to prescriptions of ecological standardisation procedure for all water bodies at European scale. Water bodies are supposed to, and shall, reach a 'good ecological status' close to pristine biotic community integrity, exempted of human disturbance. This view on water is related to ecological epistemologies considering water bodies as ecosystems with a strong paradigm of 'equilibrium state'. This appears to be controversial in the scientific field, and shows that a policy reifies environmental objects according to one or some points of view, while simultaneously excluding others (see 'Ecological constraints' policy briefing).

Moreover, as a result of negotiation during the policy-making process, the WFD is complemented by a utilitarian view on water. Here, humans are the beneficiaries of water preservation. It implies the use of other means to deal with water, particularly economic ones. It also leads to creating exemptions to and softening of the initial environmental objectives through alternative categories, justifications, calendar or procedures. It is a major source of loopholes introducing flexibility to the previous eco-centrist perspective characterised by uncertainties and constraining character for human uses.

Policy makers could find benefit in understanding where these various conceptions come from, on what kind of values, ethics and knowledge they are based. Most of the time, the dialogue occurring through negotiation leads to 'first order loop' changes (the knowledge domain leading to change in conceptions and practices): for example, the shift in the WFD between water considered as a 'container' characterised by chemical and physical composition and water considered as a 'life milieu' characterised by biotic indicators. Looking at the epistemologies underlying these conceptions would lead to 'second order change' (the ethical domain leading to changes in values), in other words exploring and sharing the values and purposes held by each partner of the negotiation.

Institutional frameworks

Understood as organisations and as sets of rules framing human activities and behaviours, the institutional framework seems to be relevant to explain the policy-making process. A long tradition of policy making has been built up at the EU level, related to the structure of sectoral directions, elected groups, etc. These have all developed skills, tools and means to support their own activities, built on long experience of negotiation and power relations. The WFD is announced as an 'integrated' policy, passing through a lot of institutional arrangements between diverse decision levels. For an external observer, even if the WFD aims to be integrated, it remains sectoral in the environmental field. Human uses, economical interests, are only considered with regard to the 'good ecological status' of water, leading to the proposing of exemptions for the WFD implementation.

We can hypothesise that a greater consistency would have been obtained if the policy-making process had broken in some way the structural organisation of the EU services in a more overlapping procedure, bringing various kinds of interests, like agriculture, forestry, industry and environment, to meet from the starting point of the process to its end.

Facilitation

This variable isn't relevant without some awareness of the need to partly move away from a long tradition of negotiation among various interests and powers, and of the need to implement new ways of policy making, based on co-construction and participatory approaches among policy makers and on networking among various decision-making fora. What was exposed earlier were some claims for implementing a social learning approach at the policy-making level. Facilitation means, tools and activities could have the purpose of involving policy makers in a reflective task, in order to explore how their own practices and worldviews frame the policies they conceive. In other words, facilitation is needed when people involved in concerted action are as fully interested in the process of doing as in the product that comes out of this process.

5. 2 Using SLIM variables to produce a hypothesis on WFD implementation

History of the situation

The implementation of WFD at the local level (i.e., river basin and watersheds) will involve an interpretation by stakeholders included in the design of management plans. This interpretation takes place at the interface between what is proposed by this new policy and the action situations it generates with the historical context of these local societies (relationship, participants, knowledge, practices, and institutions). For example, recent history is marked by the multiplication of environmental policies and the implementation of deliberations on approaches around stakes as diverse as water, nature protection, landscape protection, etc. These deliberative structures, the networks built around these actions, the deliberation habits acquired through this experience or the agreements made are called upon and only partially transformed by the WFD. These elements can represent a set of resources contributing to the implementation of the WFD, or otherwise obstacles to the strict application of what the Directive proposes. In any case, understanding why and how the WFD is implemented requires an in-depth look into the history of the action situation it generates.

Stakeholders and stakeholding

The eco-centred point of view of the Directive is not an *a priori* factor favouring its successful implementation. The clear opposition that prevailed during the WFD design among MS and the Commission will doubtless be replicated at the local implementation level between the policy spokespersons and those who will be compelled to change their water use. Thus, for example, the perspective that human activities are external to the functioning of ecosystems, and the use of water bodies that are very lightly affected by humans for the reference status, will not only present scientific and technical problems for the definition of this status, but may cause local stakeholders to commit themselves to a systematic opposition to the Directive as well.

In addition, the complexity of the Directive and the significant recourse to instrumental means for its implementation can create entirely new situations. Whereas participatory approaches are considered by the Directive itself as an essential ingredient for success, the increased reliance on experts, scientists and expertise tools may cause the social exclusion of stakeholders whose skills and knowledge are not sufficient to understand the law. As in other situations, such as in the implementation of Natura 2000, participation will have more to do with gaining social acceptability rather than obtaining a genuine commitment from stakeholders via a process of change of their understanding and water management practices.

Such a foreseeable evolution can have dire consequences whose emergence can already be seen, particularly after ten years of deliberations around environmental policies. The difficulty in implementing participatory approaches, as well as the apparent weakness of these deliberation structures to produce expected technical change, causes many experts, scientists or policy makers to assert that the urgency of environmental problems calls for a strengthening of the political regulatory system based on sanctions and taxes. From our point of view, it would be more constructive to study the ability of environmental policies to create the conditions of implementation of a participatory democracy that allows all stakeholders to express their social concerns and to commit themselves to the type of change that will better satisfy the objectives of these policies.

Ecological constraints and practices

Are the ecological norms proposed by the Directive compatible with local knowledge associated with the various water uses? It is important to highlight the key concept of disturbance because, according to the Directive and the concept of 'good ecological status', any human use of water is considered a factor of degradation. This eco-centred vision of water is probably in total contrast to that of local stakeholders for whom water is above all a resource of economic value that is to be used either in the context of production, recreation or consumption.

But the Directive in its procedural dimension proposes a set of exemptions that participants in the deliberations will probably make use of as a way to have their knowledge and practices recognised. Interestingly, the Directive, as a product of negotiations between two perspectives (eco-centrism and utilitarianism), contains many uncertainties, creating the potential for an exploration of the various points of view of users and water managers in so far as the procedure and the organisations responsible for its implementation allow.

Similarly, while the Directive's instrumental dimension can be understood as calling for a significant and increasing reliance on experts and scientists, it can also be seen as an opportunity to engage water users in learning processes. There is substantial experience revealing that the involvement of stakeholders in monitoring or in conducting trials generates situations favourable to innovation (e.g. experiential learning).

All these points again highlight the issue of the translation of the WFD into practices, uses and local customs. This relates to the role played by facilitation and the institutional framework in this translation process, and to the capacity of the policy to integrate local innovation.

Institutional framework

The institutional framework is only weakly considered in the WFD and institutions are mentioned only from a legal standpoint.

The complex nature of the Directive and its strong focus on instrumental practices at a very large geographic scale will doubtless direct institutional organisations toward deliberation forms that are very institutional and over-reliant on technical expertise. Even though the designers of the Directive wished to avoid overly bureaucratic implementation, the policy's techno-centred content will probably strengthen social asymmetries originating from differential access to the knowledge and skills required for the building of management plans. The level and efficiency of user participation depend on the way in which competent authorities interpret the Directive, on the deliberation process and structure they will implement, and on the role played by facilitation.

Facilitation

Facilitation implies emphasising the process leading to a management plan rather than the actual product that it generates. From this point of view the WFD proposes very little in terms of methods and human or financial means. From our standpoint, it is as important to design and produce indicators of the quality of this collective process as it to produce biophysical or economic indicators for water.

Policies

The observations and hypotheses above question the WFD's ability to generate learning situations likely to engage stakeholders in a transformation of their understandings, uses and practices.

Uncertainties and contradictions could be considered as opportunities for the creation of learning situations for concerted actions. However, the outputs from such situations may not correspond to the Directive's requirements. What will be the capacity of those who design the policy to learn lessons from the experience gained at the EU scale to subsequently adapt and transform the policy? This question is linked to the evaluation methods and indicators used to assess processes, as well as to the procedures required to take full advantage of this experience.

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