

On-going evaluation of the WFD 2000/60/EC implementation process in the European Union, seven years after its launch: are we behind schedule?

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Abstract

Although the European Union (EU) has made some considerable progress regarding protection of water resources (tackling significant problems at national and at EU level), increased efforts are still needed to get and keep its waters clean. After 30 years of developing EU water legislation, all the involved stakeholders express this demand. In 2000, the Water Framework Directive (WFD) 2000/60/EC, establishing a framework for Community actions regarding protection of water resources, was adopted. Its implementation is now well underway, as most of the EU-Member States have fulfilled their current obligations of submitting their reports. An on-going evaluation of the WFD implementation process is attempted here, based on all available data seven years after its launch. Special focus is given to Greece regarding problems that have occurred.

Keywords: On-going evaluation; WFD

Introduction

The growing demand for cleaner water resources that has been evident for a long time was reconfirmed by a Euro-barometer (http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm) representative opinion poll in all 25 EU Member States (MSs). When EU citizens were asked to identify the most worrying environmental issue, 47% of them replied “water pollution” (in some countries figures reached 71%). This forced the EU to make water protection one of its top priorities. Thus, on 23/10/2000, “WFD 2000/60/EC establishing a framework for the Community actions in the field of water policy” was adopted. The WFD aims to get polluted waters clean again and ensure that clean waters are kept clean. The participation of EU citizens is considered by the WFD to be crucial in order to achieve these goals. The WFD is the most important legislative tool for freshwater protection

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across the EU. It obliges MSs to achieve good status (ecological, chemical, hydromorphological) for all water resources (water bodies) by 2015, using the River Basin (RB) as the main water management unit. The WFD has to be “translated” into concrete objectives and measures at RB level.

WFD 2000/60/EC in brief

The WFD suggests that water management should be based on the RB and not on administrative borders. The EU initiatives regarding the Maas, Schelde and Rhine RBs backed this suggestion, with their cooperation and joint objective-setting across the MSs borders (for the Rhine RB, even beyond EU territory). Only a few MSs have adopted this approach. For each River Basin District (RBD)—some of them affecting national borders—a river basin management plan (RBMP) has to be established and updated every 6 years, to provide the context for the coordination requirements identified above. The WFD sets specific objectives aimed to protect the water quality of the water bodies across the EU. The key ones at EU level are general protection of the aquatic ecology, specific protection of valuable habitats, drinking water resources, and bathing water. All these must be integrated for each RB. It is clear that the last three apply only to specific water bodies. In contrast, ecological protection should apply to all water bodies. The basic requirement of the WFD is that the environment should be protected to a high level in its entirety, although different objectives are introduced regarding surface and groundwater bodies.

The WFD implementation raises a number of shared technical challenges for the MSs, the EU Candidate and EEA Countries, stakeholders and NGOs. In addition, many of the EU RBs are international, crossing administrative or/and territorial borders. Thus, a common understanding and approach is crucial for effective implementation. To address the challenges in a co-operative and coordinated way, the MSs, Norway and European Committee (EC) agreed on a Common Implementation Strategy (CIS) for the WFD, five months after its enforcement. More details on the overall concept, the numerous activities and the mandates of the working groups under the CIS are given in the following agreed informal “strategic documents”: CIS (May/2001); Carrying forward the CIS for the WFD-progress and work programme 2003/04 (June 03); Moving to the next stage in the CIS for the WFD-progress and work programme 2005/06 (December 04) (see: http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/implementation_documents&vm=detailed&sb=Title). In the first phase of the joint process, a number of guidance documents were prepared and tested in pilot RBs across the EU in 2003/04. Working groups (focused on ecological status, integrated RB management, groundwater, and reporting) continue to address key issues for implementation in the forthcoming Annual Work Programmes. In addition, new groups on “WFD and agriculture” and “GIS” share their experiences in this area and a new pilot RB network supports the technical activities in all working groups. The CIS supports EC in delivering on its obligations for further policy development. Documents prepared in the CIS context and other useful ones are available at the WFD CIRCA Interest Group (an info-exchange platform set up for this process) (see: http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive&vm=detailed&sb=Title).

Reporting obligations and deadlines

The WFD sets a number of deadlines by which the EU MSs have to fulfil particular obligations and report to the EC. **Table 1** summarizes the key reporting obligations. To improve access to

Table 1. Water Framework Directive's implementation timetable.

Date	Action
22/12/00	Directive entered into force (art.22)
22/12/03	Bring into force the laws/regulations/administrative provisions necessary to comply with the WFD (art.24). For the 10 new EU Member States, the date was 01/05/04
22/06/04	Identify competent authority (CA) (art.3) Provide EC with list of CAs (art.3) Reporting of RBDS and CAs (art.3). According to Annex I this includes: RBD geographical coverage; CA's name/address/legal status/responsibilities; Membership, in case of acting as coordinating body for other CAs; a summary of the international relationship for international RBDs. Based on these, EC has produced draft maps of: a) RBDs: low resolution and high resolution; b) Large rivers and lakes: low resolution and high resolution; c) Submitted rivers and lakes: low resolution and high resolution
22/12/04	Art.5 states that all EU MSs had to, by 2004, analyze their RBDs' characteristics, including a review of human activity's pressures/impacts on surface-groundwater, and an economic analysis of the water use. Results provide data on which the RBMP and the Programme of Measures will be built. A summary of such reports should be reported to the EC by 22/03/05. CIS has elaborated a relevant document
22/12/05	Establish register or registers of protected areas (art.6 & 7) Lacking an agreement at EU level, of criteria for identifying and sustained upward trends in groundwater pollution and for the definition of starting points for trend reversals, EU MSs to establish appropriate criteria (art.17(4)). In the absence of criteria at national level, trend reversal is to start at 75% of quality standards applicable to groundwater in existing EU legislation (art.17, 5)
22/12/06	Operational monitoring programs should ensure a full view of water quality status in each RBD (art.8) Publish and consult on a timetable and work programs for the production of RBMP for each RBD (art.14) Lacking an agreement at EU level, for substances included on the first priority list (art.16), EU MSs to establish environmental quality standards for all surface water affected by discharges of those substances and controls on principal sources of discharges (same obligation to apply 5 years after subsequent inclusion of a priority substance in the list, in the absence of Community agreement) (art.16)
22/12/07	Publish and consult on an interim overview of significant water management issues for each RBD (art.14)
22/12/08	Publish and consult on drafts of the RBMPs (6 months public consultation period) (art.14)
22/12/09	Establish programs of measures in each RBD in order to deliver environmental objectives (art.11) Publish first RBMP plan for each RBD, including environmental objectives for each body of surface or groundwater and summaries of programs of measures (art.13)
2010	Ensure proper water pricing policies are in place (art.9)
22/12/12	Make operational programs of measures in each RBD to deliver environmental objectives (art.11) Interim progress reports on progress in implementing planned programs of measures (art.15)
22/12/15	Main environmental objectives to be met (article 4) Review and update plans (also in 2021 and 2027) (art. 13, 14, 15)

environmental information and availability of reports, the EC (Directorate General Environment, Joint Research Centre (Institute for Environment and Sustainability), Eurostat and the EEA are developing an electronic data and information system on water called WISE (Water Information System for Europe) (WISE, 2007).

Legal transposition

Legal requirements

Article 24 states that the WFD should have been transposed into national legislation by the end of 2003 in order to fully gain its legally binding nature. For the 10 MSs joining the EU, the deadline was 1/5/2004 and, for the two acceding on 1/01/2007, the date of accession was the deadline for the transposition of the WFD.

Reporting and legal action by the Commission

Whilst all new MSs (including Bulgaria and Romania) transposed the WFD on time, most EU15 MSs had problems doing it. Consequently, in 2004, the Commission launched ten legal infringement cases for “non-communication” (against Belgium, Luxemburg, Germany, Italy, Portugal, France, the Netherlands, Finland, Sweden and the United Kingdom). For the first five cases, applications to the European Court of Justice had to be submitted and the Court ruled against these MSs. The cases against Luxemburg and Italy are still open. All other cases have been resolved (CEC, 2007b). In the meantime, a preliminary analysis of the Greek case revealed that the WFD had been partially transposed. Thus, a “non-conformity” case was opened in 2005 and application to the Court was submitted. On 8/3/2007, a Presidential Decree was adopted which will have to be assessed.

Results of the conformity assessment

Assessments revealed significant and widespread shortcomings regarding the transposition (CEC, 2007b). *Environmental objectives* (Article 4) have been poorly transposed and 19 MSs seem to be facing major problems:

- (a) lack a proper transposition of Article 4: the objectives and exemptions, in particular the conditions in which and how to apply them, are often not in conformity;
- (b) lack of a proper transposition of Article 4.7: the authorisation for new modifications and developments which affect the water environment (e.g. new hydropower plants or new industry allocations in pristine areas) are often not transposed and thereby are creating legal uncertainty for project developers;
- (c) several national laws fall short of introducing the cost recovery obligations (Article 9) and the related definition of “water services”, which is crucial for the application of any cost recovery policy;
- (d) some MSs fail to properly transpose the obligation regarding the participation of the public (Article 14).

Only three MSs appear to have an overall satisfactory transposition (Austria, Malta, Portugal) (Table 2). For some MSs, there are non-clarified issues, based on screening assessment.

Open issues and next steps

The Commission is decisively addressing the above-mentioned issues. Any MS falling into group 1 of possible non-conformity with Articles 4, 9 and 14 was targeted as a top priority in 2007.

Table 2. Overview of key results of conformity assessment of transposition.

MS	Transposition date	Infringement linked to transposition	Consultant report available	Overall result of initial conformity analysis	Transposition of key provisions				Definition of water services
					4	4.7	9	14	
AT	2003		Yes	+	+	+	+	+	+
BE	2002–2006	2004/0005	Partly	–	–	–	–	–	–
BG	2005–2006		No	<i>See notes</i>					
CY	20/2/2004		Yes	±	+	+	±	+	+
CZ	2001–2004		Yes	–	–	–	–	–	–
DE	2003–2006	2004/0017	Yes	–	+	+	–	+	–
DK	17/12/2003		Yes	–	–	+	–	+	–
EE	2001–2005		Yes	–	–	–	–	–	–
EL	2003–2007	2005/2226	No	<i>Non conformity infringement case on-going</i>					
ES	31/12/2003		Yes	–	–	–	±	+	+
FI	31/12/2004	2004/0108	No	–	±	+	–	±	–
FR	21/4/2004	2004/0048	Yes	–	–	–	±	+	±
HU	2004		Yes	–	–	+	–	±	+
IE	2003–2005		Yes	–	–	–	–	±	–
IT	May 2006	2004/0059	No	–	–	–	+	+	+
LT	25/9/2003		Yes	–	–	+	–	+	+
LU	Not transposed	2004/0073							
LV	12/9/2002		Yes	–	–	+	–	+	–
MT	23/4/2004		Yes	+	+	+	+	+	+
NL	2005	2004/0086	No	–	–	–	±	+	±
PL	3/6/2005	2004/2309	Yes	–	–	+	±	+	+
PT	29/12/2005	2004/0120	No	+	+	+	+	+	+
RO	2004–2006		No	±	+	+	+	±	+
SE	1/8/2004	2004/0142	Yes	–	–	–	–	+	–
SI	2003–2006		Yes	–	–	–	±	±	±
SK	2002–2005		Yes	–	–	+	–	+	+
UK	2003–2004	2004/0152	Yes	–	–	–	–	+	+

Note 1: All infringement cases are non-communication cases except 2005/2226 against EL which is non-conformity. Infringement cases for EL, IT and LU are still opened. The rest of the non-communication cases are closed. For Bulgaria it was not possible to make a complete conformity analysis at this stage. An amendment of the water law was adopted in 2006 and the information available indicates that this may overcome some of the shortcomings identified in the analysis of the previous transposition legislation. (Source: CEC, 2007a, b); *Note 2:* ‘+’ means fully transposition; ‘±’ means partly transposition; ‘–’ means no transposition.

The Commission also elaborates supporting activities (in the context of the CIS or bilaterally) to provide feedback and support any MS which is willing to address the identified issues (non-conformity with Articles 4, 9 and 14).

Administrative arrangements (Article 3)

Legal requirements

The next step was to set up the administrative arrangements in order to “ensure that the requirements of the WFD for the achievement of the environmental objectives established under Article 4, and in particular all programmes of measures are coordinated for the whole of the RBD” (Article 3). To this end, Article 3 provides for a number of concrete actions, in particular:

- identification of RBDs within the national territory;
- assignment of groundwater bodies (inland and coastal aquifers) to the nearest or most appropriate RBD;
- establishment of the appropriate administrative arrangements including the identification of an efficient Competent Authority (CA). If more than one CA are designated for the same RBD, one of them shall be designated as a coordinating body. MSs are able to use existing national or international bodies as CAs;
- establishment of international RBDs between MSs and an endeavour to establish an international RBD where the hydrographic boundaries extend beyond the EU territory;
- the administrative arrangements should have been put in place by 22/12/2003 and a report should have been sent to the Commission by 22/06/2004.

Should MSs change any of the above-mentioned administrative arrangements, they are required to notify the Commission about such changes within three months of the change coming into effect.

Reporting and legal action by the Commission

After transposition, the next step was to set up RBDs and to designate CAs (under Article 3). Most MSs reported to the Commission on time. The Commission launched nine infringement procedures of “non-communication” for delayed reporting against Belgium, Denmark, France, Greece, Italy, Malta, Poland, Spain and Sweden, since they failed to submit any report in time. All cases, apart from Spain, have been resolved, most of them by 2004. For Spain, the formal designation of RBDs has not yet been completed. In accordance to water law, a Royal Decree should set up the administrative arrangements. This Decree was recently launched and the Commission is currently analysing its contents. No cases of “non-conformity” or “bad application” have been launched to date (CEC, 2007b).

Facts and figures from MSs’ reports

Article 3 implementation is largely complete across EU27, resulting in the establishment of 110 RBDs across the EU (CEC, 2007b). For each of these RBDs, the RBMPs will have to be finalised by December 2009. Since 40 RBDs are international, there are 170 national or national parts of international RBDs.

The international RBDs cover more than 60% of the EU territory making the international coordination a significant issue and challenge for the WFD implementation. The size of the RBDs varies considerably from very small ones (below 1,000 km²) to the largest one, the Danube (over 800,000 km²). The international RBDs are generally larger. The average size of a national part of an international RBD is about 50,000 km² (Figure 1). The set up of CAs also differs across the EU. All combinations have been found: a) one CA for one RBD; b) one CA for several RBDs; c) several CAs for one RBD. Different approaches result from differences in: a) the national legal/institutional framework for water management; b) existing administrative structures; c) the distribution of competences of water management within the governments. No MS has designated an international body as CA for WFD implementation. In most cases, international bodies have been charged with the task of coordinating the implementation of the countries sharing an international RBD and to produce an internationally agreed overview report to complement the national reporting to the European Commission. The co-operation with non-EU MS is less developed (apart from the cooperation with third countries in the Danube and Rhine RBs) (CEC, 2007b).

Results of compliance assessment and performance checking

Overall, the results are good and all the MSs have established the necessary structures and administrative arrangements. As there are significant differences among the MSs, some may have to address shortcomings to ensure that administrative structures deliver the results under the WFD. Comparing the EU15 to EU10, it is noticeable that, on the basis of the assessment criteria, the new MSs have implemented Article 3 in a more appropriate way, due to the fact that they have to comply with the obligations set by any EU directive as part of their accession process in order to become full EU Member States. They seem to consider the WFD as a guide for reforms. The EU15 MS were usually struggling to re-direct their national set-ups, which often had been in place for decades, to meet the new challenges (CEC, 2007b). The relative performance of the MSs is presented in Figure 2.

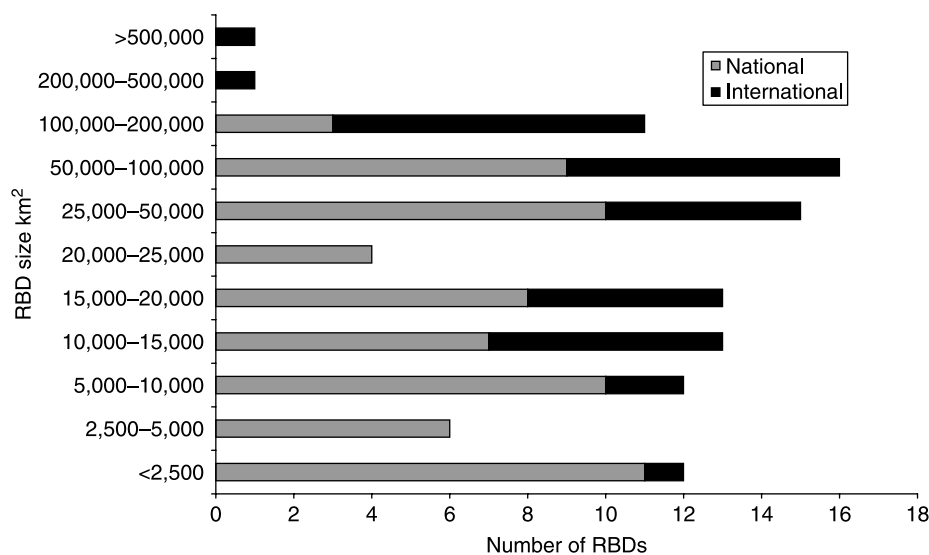


Fig. 1. Size distribution of River Basin Districts (RBDs) across the EU27 Member States. Source: CEC, 2007b.

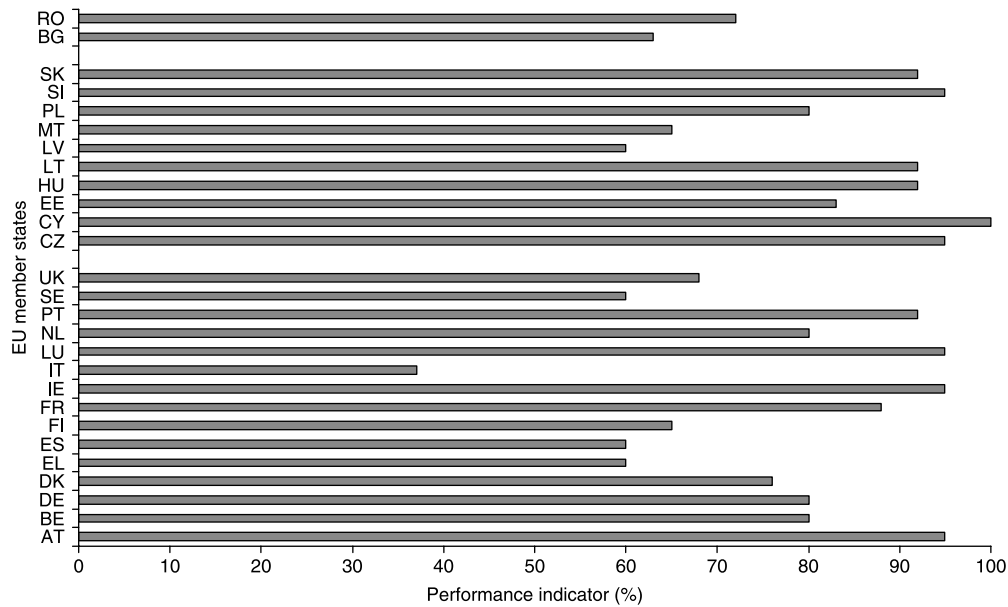


Fig. 2. Performance indicator per MS regarding implementation of Article 3. Source: CEC, 2007b.

Open issues and next steps

The WFD requires the MSs to set up the appropriate administrative arrangements to apply its provisions and meet its objectives. However, the WFD allows each MS to decide how to best set up these arrangements based on its own needs. Article 3 does not force a change in the competences distribution among administrations within an MS, nor the creation of new RBD administrative bodies. What is necessary is to set up effective coordination mechanisms in order to deliver properly. The guiding principle for setting the above arrangements is to meet environmental objectives set by Article 4. Hence, it is now only possible to check the compliance of the provisions from a formalistic point of view. In the future, the Commission may have to revisit the compliance check, if and when the objectives are not met due to poor administrative arrangements. Apart from Italy, most of the open issues related to Article 3 can be addressed using constructive feedback, support and cooperation mechanisms through the CIS. The Commission will engage in bilateral contacts with the MSs to this end, to clarify open issues on international cooperation and identification of international RBDs (CEC, 2007b).

Environmental and economic analysis (Article 5)

Legal requirements

The second step regarding the implementation of the WFD was to undertake an environmental and economic analysis by December 2004, the so-called “Article 5 analysis”. This analysis provides a base line on which to build the RBMPs and the cost recovery of the water services. This analysis was, in a way, the transition point of MSs’ water management towards applying the WFD. Article 5 requires

that “each MS shall ensure that for RBD or for the portion of an international RBD falling within its territory:

- an analysis of its characteristics
- a review of the impact of human activity on the status of surface and on groundwater resources
- an economic analysis of water use

is undertaken according to the technical specifications and that it is completed at the latest four years after the date of entry into force of the WFD”. (Article 5, WFD 2000/60/EC; CEC, 2007c).

The analysis of the characteristics includes, for surface water bodies, the identification of rivers, lakes, transitional waters and coastal waters and the identification of heavily modified and artificial surface water bodies. Furthermore, for each category of surface water body, the relevant surface water bodies within the RBD shall be differentiated according to type. In addition, for each surface water body type characterised in accordance with section 1.1, type-specific reference conditions shall be established.

The review of the impact of human activities on the status of the surface water resources includes an estimation of significant point source pollution, diffuse source pollution, water abstraction, water flow regulations and morphological alterations. For groundwater resources, the review concerns diffuse sources of pollution, point sources of pollution, abstraction and artificial recharge. Water bodies being at risk of failing the environmental quality objectives should be identified. For those bodies, further characterisation shall, where relevant, be carried out to optimise the design of both the monitoring programmes required under Article 8 and the programmes of measures required under Article 11.

The economic analysis of the water use shall contain information in sufficient detail for the calculation of cost recovery of the water services and information to make judgements on the cost-effective combination of measures in the programme of measures in 2009.

According to Article 15(2), all MSs shall submit summary reports of the analysis required under Article 5 within three months of their completion. Furthermore, the results of the monitoring shall be used in combination with the impact assessment procedure (described in Annex II of the WFD) to determine the requirements of the monitoring programmes in the current and subsequent RBMPs.

In addition to the requirements of Article 5, all MSs were obliged to establish a register of Protected Areas in accordance with Article 6, by 22/12/2004. This register should include all water bodies identified under Article 7(1) and all protected areas covered by Annex IV of the WFD. This register will be kept under review and up to date (Article 6(3)).

Reporting and legal action by the Commission

Many MSs submitted one national report covering all their RBDs, while some MSs submitted one report for each RBD. More than 90 reports were submitted. Eight EU25 MSs submitted their Article 5 report in time; nine MSs sent their reports three months later. Italy and Greece submitted their reports with one year delay, while Bulgaria and Romania voluntarily submitted theirs on time. To support the national or regional Article 5 reports, eight international RBDs (Danube, Rhine, Elbe, Odra, Scheldt, Meuse, Ems and Eider) led to a coordinated international Article 5 report. Regarding Article 5 reports, the Commission started legal action on “non-communication” against Spain, Portugal, Greece and Italy. The cases against Greece and Italy are not resolved yet. Reports submitted showed that considerable

effort was put in the first environmental analysis, for the first time forming an EU-wide information base that can be regarded as a “starting point” (CEC, 2007b).

Facts and figures from Member States' reports

Characteristics of River Basin Districts. Throughout the EU, more than 70,000 surface water bodies were identified (80% rivers; 15% lakes; 5% coastal/transitional) excluding Denmark and Greece where data was either unavailable or unclear (CEC, 2007b). Regarding the size of river water bodies, it is difficult to provide information at an EU level, as average length has not been provided by all MSs and RBDs. Large differences exist among or even within countries for different RBDs or regions. A rough approach can be calculated by dividing the total number of water bodies by the total surface. This provides an estimated average drainage area per river water body of 93 km² for the entire EU (excluding Bulgaria, Denmark, Finland, Greece and Italy), that greatly vary among MSs (19 km² in Ireland to 312 km² in Latvia) (Figure 3). The average size of groundwater bodies is 900 km². Denmark, Ireland, Malta, the Netherlands and Sweden identified small groundwater bodies (Figure 3). Smaller water bodies might better address the ecological variation in an area as larger ones imply administrative burden. However, no conclusion regarding the influence of the water body size on meeting WFD environmental objectives or administrative consequences can be drawn at this time. A MS may designate a body of surface water as artificial (pond/canal) or heavily modified (enlarged rivers for navigation or reservoirs). The percentage of such water bodies greatly varies across the EU. In some MSs (the Netherlands, Belgium, Slovak Republic, Czech Republic and parts of Estonia and the UK) it is more than 50%, in Ireland and Latvia less than 2% and in the rest EU 16%. In The Netherlands only 5% of the water bodies are natural (CEC, 2007b).

Pressure and impact analysis and risk assessment for surface and groundwater resources

In the EU, 40% of the surface water bodies and 30% of groundwater ones were identified as being at risk of failing WFD objectives by 2015, while 30% and 25% respectively seem to be OK. For the rest, 30% and 45% respectively poor data can not support a final decision (Figure 4) (CEC, 2007b). The causes of these high figures are:

- (a) the WFD establishes new environmental objectives addressing pressures and impacts that were not considered in previous water policies (e.g. hydro-morphological changes);
- (b) the limited information on how these pressures affect the ecosystems may have led to a precautionary approach, increasing the number of water bodies at risk or with insufficient data;
- (c) during the assessments, a precise operational definition of WFD water status classes was not available, increasing the uncertainty for several water bodies;
- (d) some MSs have often not taken environmental measures that were already in the pipeline into account during their risk assessment process, and this may influence the possibility of achieving the WFD goals.

Most of the MSs based their risk assessment process on current impact data and did not consider the further implementation of environmental legislation and predictions of economic trends up to 2015. Information from Article 5 reports can not safely show which pressures/impacts cause the high number

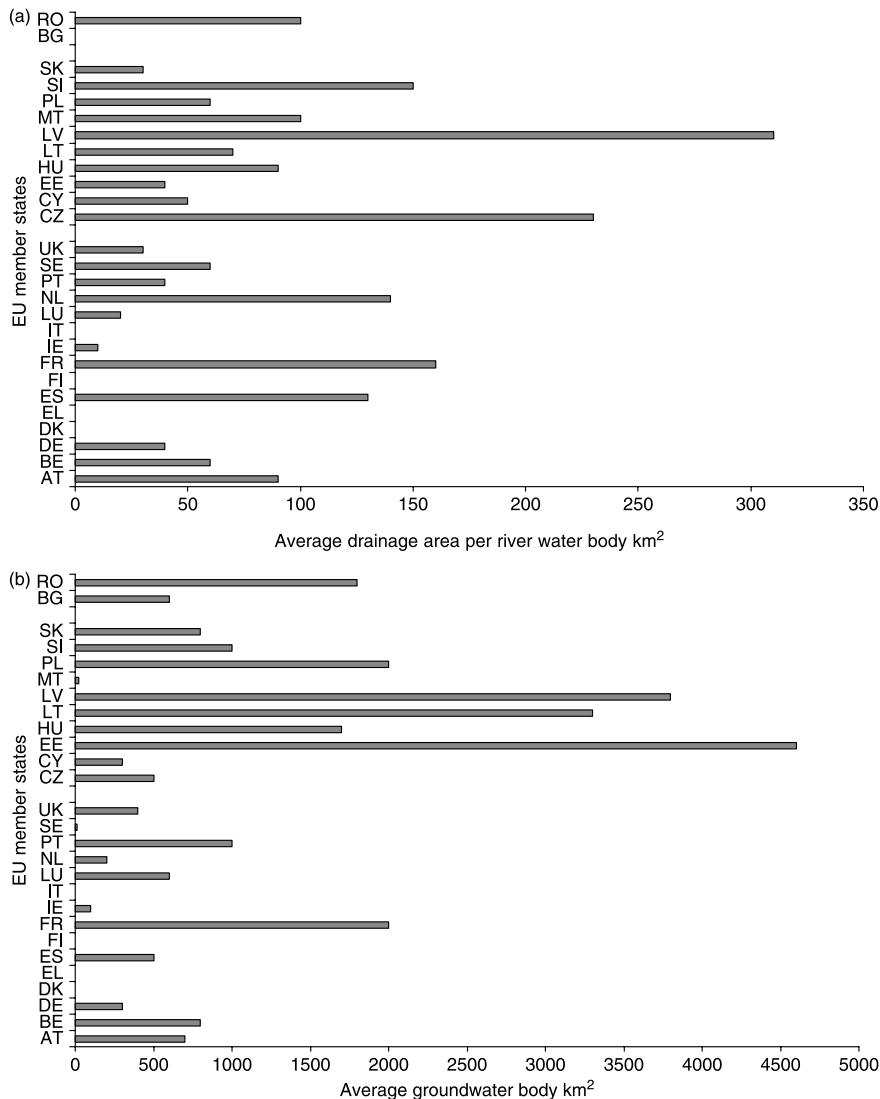


Fig. 3. (a) Average drainage area per river water body; N.B. Denmark, Italy and Belgium reported unclear data for river water bodies, while Finland and Greece did not report number of river water bodies). (b) Average size of groundwater bodies (based on data from WISE except for Bulgaria, Malta, Poland, Romania and Slovenia, for which values were calculated by dividing the total surface of the country by the number of groundwater bodies; Finland and Greece did not report number of groundwater bodies while Italy reported unclear data). Source: CEC, 2007a, b.

of water bodies at risk. Only 12 MSs provided data on the importance of different pressures/impacts for surface waters, while 5 MSs gave full data on specific pressures (water flow regulations/morphological alterations; point and diffuse source pollution; water abstraction) (Figure 5). The first three are now considered important ones, while the fourth is of rather less importance. For groundwater, the identification of water bodies at risk was mainly related to diffuse sources of pollution and quantitative pressures. Their basic causes are agriculture, navigation, hydropower, flood protection and industrial/municipal wastewater discharges (Figure 5) (CEC, 2007b).

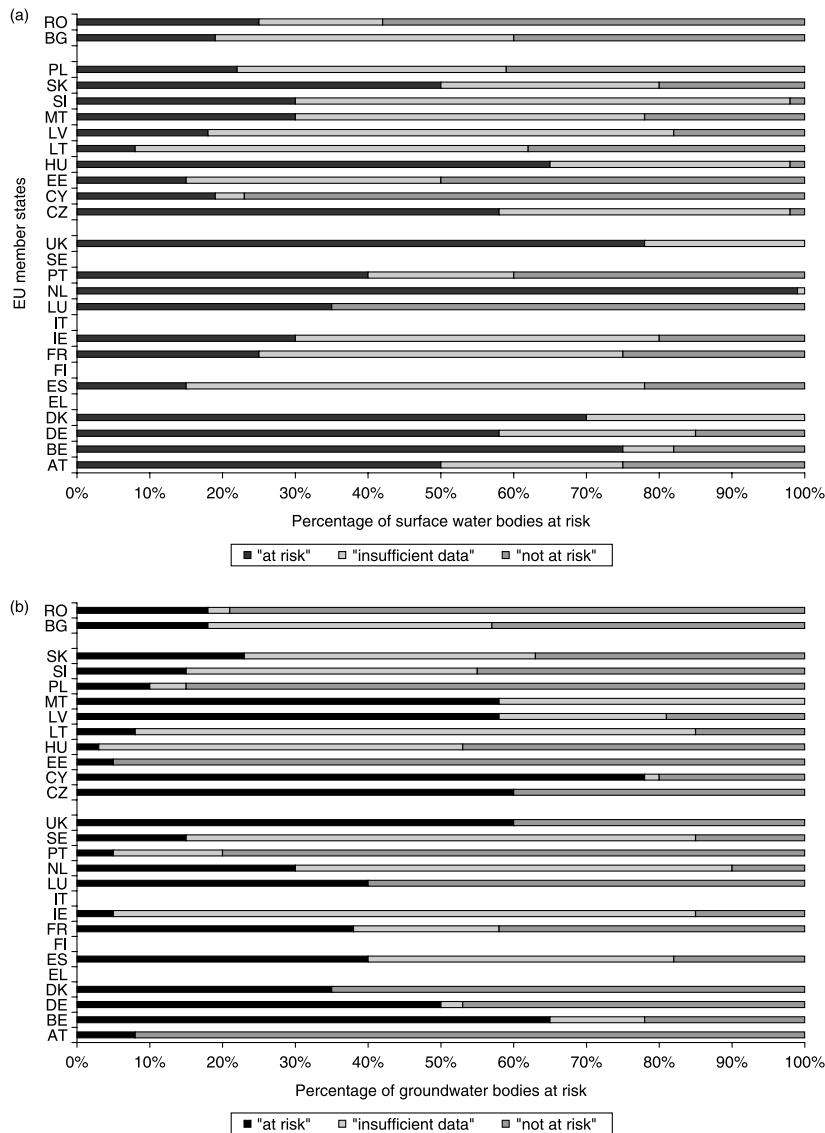


Fig. 4. Percentage of (a) surface water and (b) groundwater bodies at risk of failing WFD objectives, per MS. NB₁ Surface water bodies: no risk assessments reported in Finland, Sweden, Greece and Italy; data for risk assessment for the Slovak Republic do not cover all surface water bodies—water bodies not assessed have been allocated to the “insufficient data” category. NB₂ Groundwater bodies: no risk assessments reported in Finland, Greece and Italy; data for risk assessment in Germany, Sweden, France and Lithuania do not cover all groundwater bodies—bodies not assessed have been allocated to the “insufficient data” category (Source: CEC, 2007a, b).

Economic analysis

As most of the MSs provided incomplete Article 5 economic analysis reports, it is difficult to draw conclusions on the results across the EU. Regarding the sectors related to cost recovery, households were addressed most often, followed by industry and agriculture (Figure 5). As half of the MSs have not

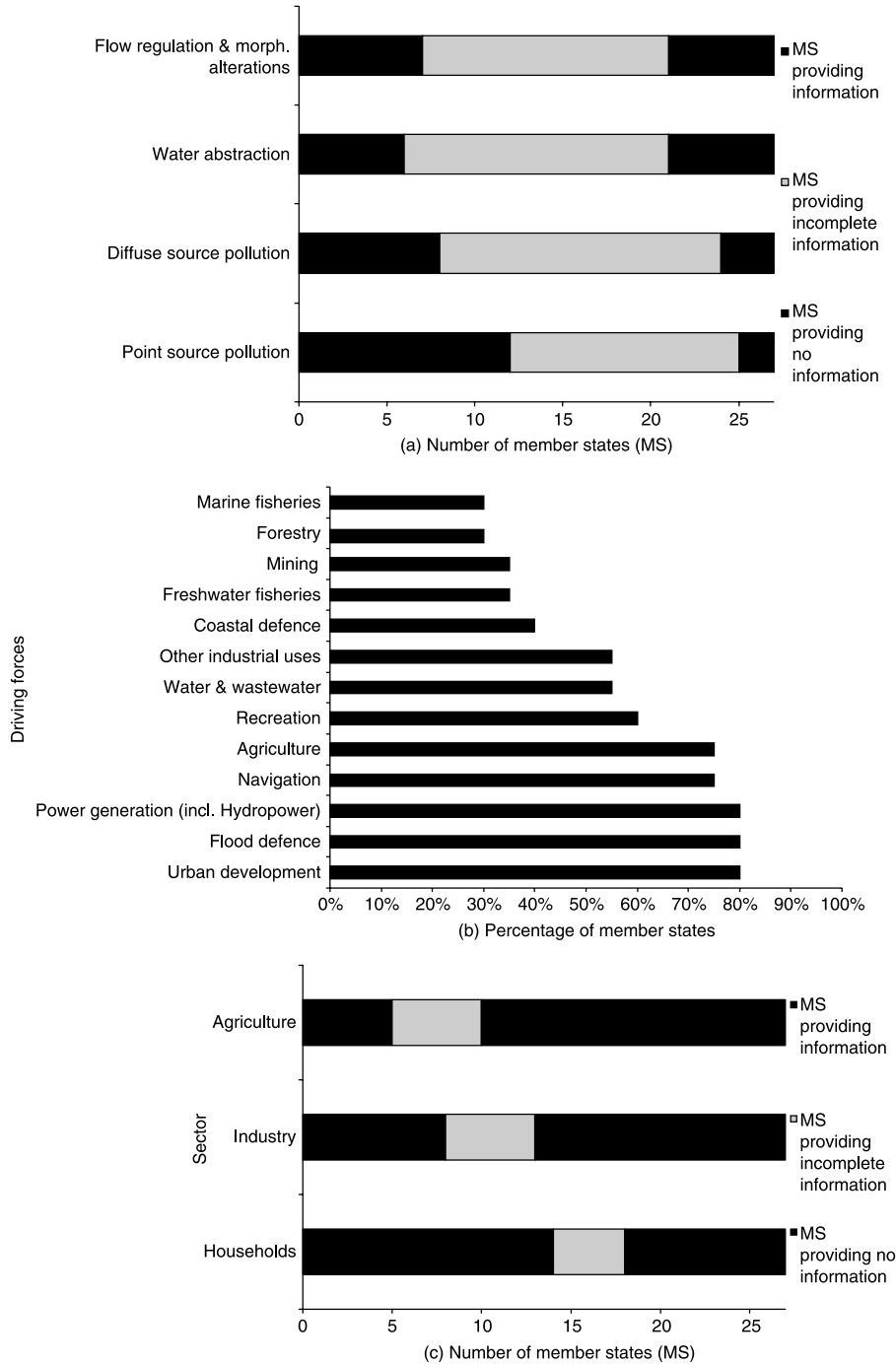


Fig. 5. (a) Information level provided by MS regarding the environmental pressures on water bodies; (b) Percentage of MSs indicating a driving force related to hydro-morphological pressures as significant (Article 5 reports from only 20 MSs were taken into account, due to a lack of data in the other MSs or non-availability of other reports); and (c) sectors to be covered in cost recovery of water services (Source: CEC, 2007a, b).

supplied data on cost recovery, it is not possible to give an average on the percentage of cost recovery across the EU. MSs that provided data indicated a cost recovery rate of services between 70–100% for households, 40–100% for industry and 1–100% for agriculture. Regarding cost types considered in the analysis, most MSs have not considered environmental costs and were not able to clearly identify water services (CEC, 2007b).

International coordination

It is clear that the highest level of international co-operation in Article 5 implementation was achieved regarding the international RBDs that submitted a joint international report. The co-operation had to do with the characterisation of water bodies and risk assessments. On the contrary, limited data is available regarding the international co-operation related to economic analysis. In more than 10 international RBDs, transboundary surface water bodies were identified and, in 5 RBDs, transboundary groundwater bodies were identified. The typology has been harmonised in very few cases, whilst in some others typology was elaborated at national level, followed by comparisons at international level. Although the risk assessments were carried out at national level, some attempts at subsequent comparison/harmonisation have been made.

Results of the performance checking process

Overall, the quality of Article 5 analyses varies greatly across the EU and between RBDs within a MS. Some MSs presented high overall performance assessment scores (Figure 6). A high score on a certain issue does not mean that the implementation is compliant to the WFD. Although most MSs performed well on RBD characteristics analysis (surface/groundwater bodies delineation, heavily modified/artificial ones designation, rivers/lakes/coastal/transitional water differentiation), they failed on pressures/impact/risk analysis for surface/groundwater bodies (Figure 7). Large variation in performance was indicated among MSs, related to the level of detail of data provided. Economic analysis was the weakest part (Figure 7). Thus a comparable performance analysis was done regarding the sectors for which the cost recovery level was supplied, an overview of the water uses in a RBD socioeconomic importance related to the significant pressures, and a summary of the work done to establish a base scenario. Most MSs provided data on a register for protected areas (Sweden and Cyprus did not; Denmark, Germany and Estonia did it partially) (CEC, 2007b).

Open issues and next steps

Article 5 reports revealed that for many water bodies in most MSs the risk assessment was not conclusive (CEC, 2007b). In addition, detailed data on the types of pressures leading to the identification of water bodies at risk was often not provided, and thus a complete relative risk analysis is usually missing. To refine the risk assessments is now a top priority task, particularly considering the data collected through monitoring programmes during 2007–08. This refinement is crucial for the development of the RBMPs and the programmes of measures in 2009. In this sense, the data available for the development of biological monitoring methods in many MSs is very worrying too. There are still important gaps in the development of the assessment methods at MS level for some biological quality elements. This causes uncertainty on to what extent the monitoring networks will bring in complete and

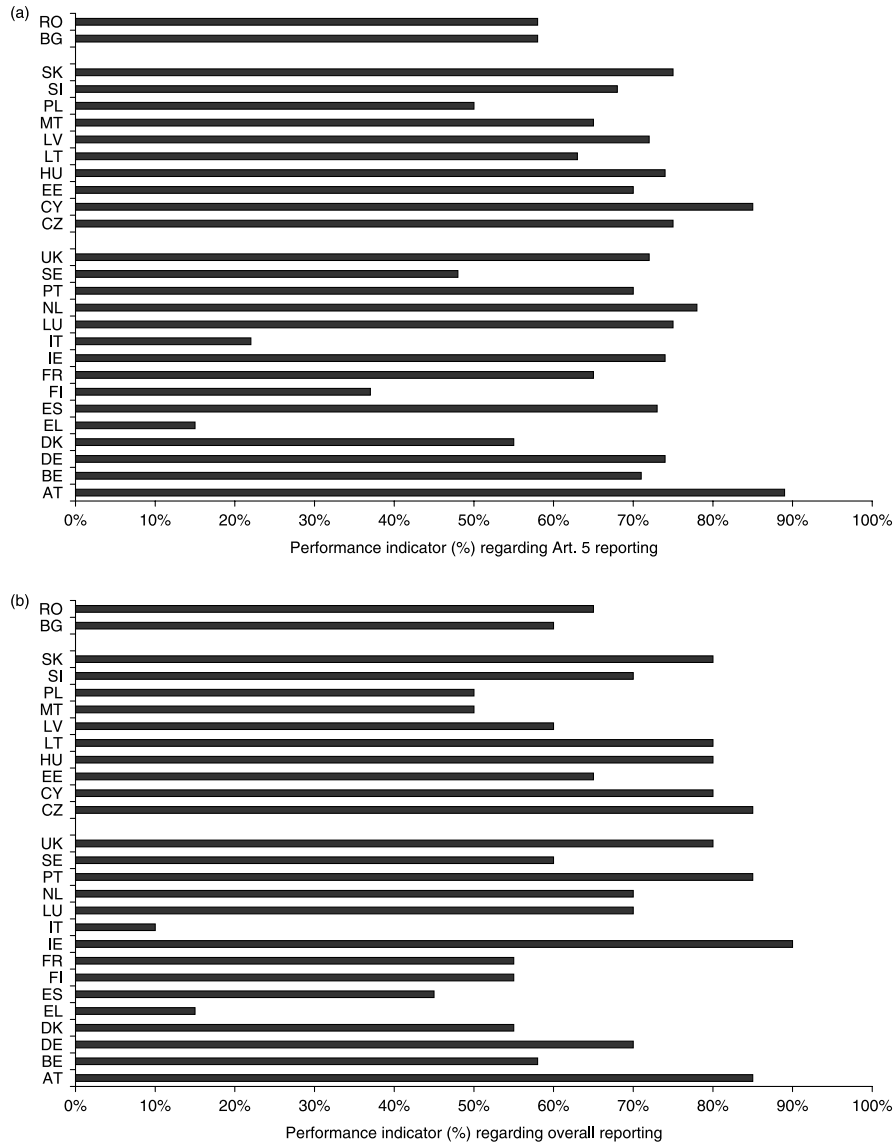


Fig. 6. Performance indicators per MS regarding (a) the Article 5 analysis and (b) the overall reporting; scores for BG and RO are based on preliminary assessments. Source: CEC, 2007a, b.

comprehensive data on the status of water bodies. It is well known that the investment in monitoring can be extremely cost-effective as it helps decision-making in the programme of measures, preventing bigger amounts from being invested in the wrong places.

Delineation of groundwater bodies has been discussed among the MSs in order to follow common principles utilizing experiences from the Pilot RB net. The report stressed that groundwater bodies scale will affect the monitoring and quality/quantity management. This strengthens the need to refine water body delineation before the first RBMP is published. The data on pressures/impacts on groundwater will need to be complemented in the light of the requirements of the New Groundwater Directive, as a more

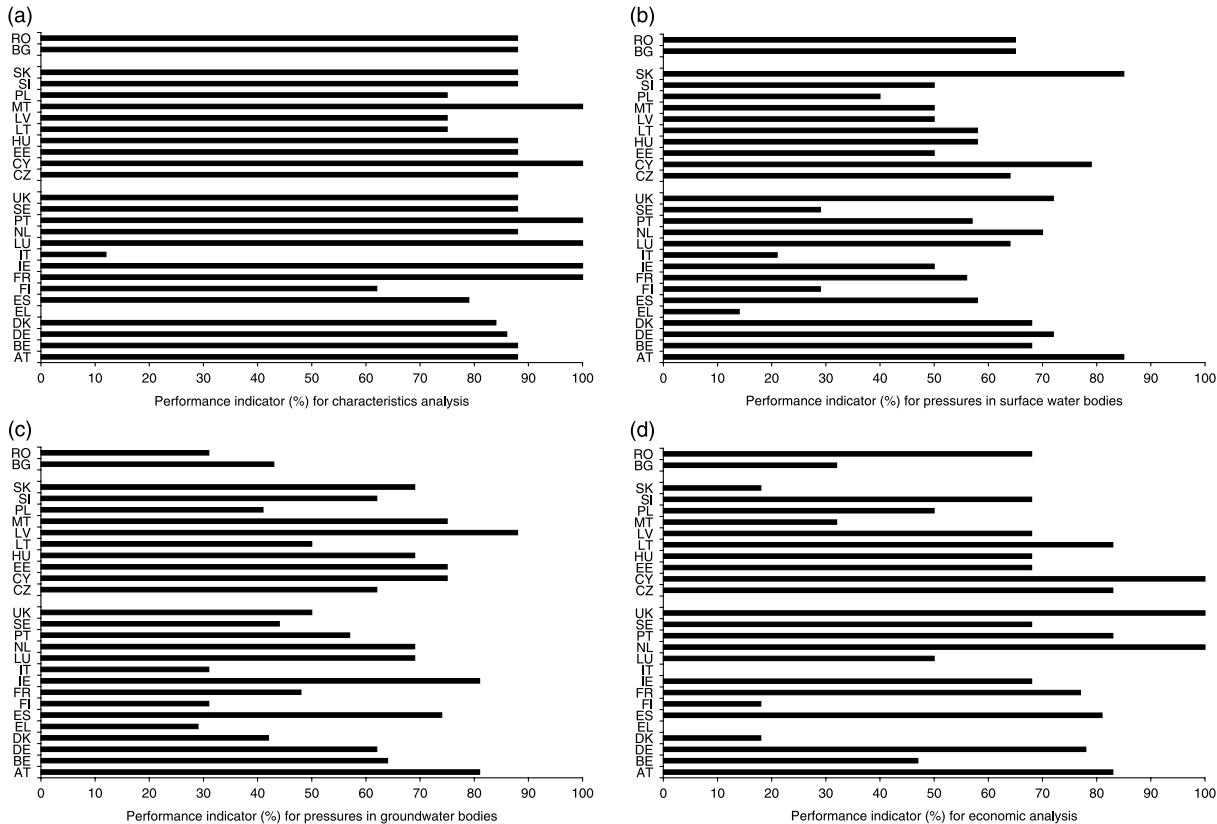


Fig. 7. Performance data for (a) characteristics analysis, pressures/impacts/risks analysis, (b) surface bodies, (c) groundwater bodies, and (d) economic analysis; scores for BG and RO are based on preliminary assessments. Source: CEC, 2007a, b.

detailed evaluation of pressures/impacts will be required for the establishment of groundwater threshold values, trend identification and prevent/limit measures. For several aspects of the characterisation and impact analysis, methodologies need to be refined, become more comparable, even to the point of becoming harmonised, helping: a) water bodies to be identified; b) heavily modified ones to be designated; and c) risk analysis of water bodies. The economic analyses by most of the MSs are incomplete, being the biggest shortcoming in the WFD implementation so far, mainly affecting the definition of water services and data for calculating water services costs recovery regarding environmental cost sectors affected. Towards the RBMP, the international cooperation aspect needs improvement. Arrangements and implementation are still inadequate. This also concerns enhanced coordination/cooperation with the non-MSs, aiming at meeting WFD's goals throughout RBDs which are partly outside the EU. As climate change impacts may enhance the risk of non-attainment of the WFD's objectives, further steps are needed to include climate change as an additional pressure on the EU waters. It is clear now that all hydrological processes are affected by climate change. Variables of primary importance in water management (river discharges, water levels in rivers/lakes, ground/soil moisture) are determined by climate driven precipitation, evaporation and snowmelt. Long-term trends in precipitation have already been observed in many regions.

WFD implementation in Greece

Missions accomplished

The WFD transposition was done on time (law 3199/2003), adopting the existing division of Greece into 14 Water Districts (WDs) and establishing 5 administrative units:

- (a) National Committee on Water (NCW); consisting of five ministers and responsible for proposing water policy and supervising/controlling its implementation;
- (b) National Water Council (NWC); 24 members from political parties, Water Utilities etc. responsible for consulting about the programs for water resources management/protection;
- (c) Central Water Agency (CWA); Ministry of Environment department to coordinate public entities involved in water management and supervise/consult all relevant administrative/monitoring/economic processes;
- (d) Regional Water Offices (RWOs) responsible to locally implement regulations/measures;
- (e) Regional Water Councils (RWCs), responsible for the RBMP (proposed by the RWOs) consultation.

EC has taken legal action against Greece since its national law has been judged deficient because: (a) it omitted to transfer important definitions for WFD implementation and the expected environmental targets included; (b) the integrated procedure of briefing and consultation on the RBD management plan was not predicted; and (c) the needed executive decisions (for RBDs characteristics determination; cost recovery for water departments; analysis of measures programs and management plans contents) were not being issued.

Problems

The law integrating WFD was found to be “deficient to meet integrated political protection and water management demands, diffident for its administrative/organizational changes, fruitless for its public participation, weak for its scientific validation” (Hydromedon network, 2006). Hydrological data and the up-to-date scientific and socio-political approaches of integrated water management are not being considered. Delays resulted from the organizational and economic weaknesses of the central administration and they forejudge violations of the WFD timetables. No preparation has been done for the compilation of a program of measures and a monitoring system for the water state (surface/ground water). No improvement has been made in the water quality control infrastructure. A water demand management process has not yet started. There has been no effective public awareness campaign to inform the public and mainly the farmers (who use 86% of the total water supply in Greece) regarding the WFD and the obligation for a pricing policy based on full water cost recovery. The central administration is facing many organizational problems. The NWC has not been sited yet. The CWA exercises a minimum of its competences regarding the WFD application. There are deficiencies in organization and a lack of basic infrastructures (e.g. SCADA systems for water resources quality/quantity monitoring). Greece is divided into 14 Water Districts (WDs) but their management was given to RWOs that do not share the same territorial limits; this encumbers the management/decision-making process (Table 3). The fact that most RWOs are not operating properly (or even at all), being severely under-staffed (Table 4), makes things worse.

Table 3. Characteristics of the 14 Water Districts (WDs) and their corresponding administrative regions.

No.	Name	Area (Km ²)	Population (2001)	Administrative regions
01	West Peloponnesus	7,301	331,180	West Ellada/Peloponnesus
02	North Peloponnesus	7,310	615,288	West Ellada/Peloponnesus
03	East Peloponnesus	8,477	288,285	Attica/Peloponnesus
04	West Sterea Ellada	10,199	312,516	Epirus/Thessaly/Ionian islands/West Ellada/Sterea Ellada
05	Epirus	10,026	464,093	West Macedonia/Epirus/Ionian islands/West Greece
06	Attica	3,207	3,737,959	West Ellada/Attica/Peloponnesus
07	East Sterea Ellada	12,341	577,955	Thessaly/West Greece/Attica
08	Thessaly	13,377	750,445	Central Macedonia/West Macedonia/Thessaly/Sterea Ellada
09	West Macedonia	13,440	896,891	Central Macedonia/West Macedonia
10	Central Macedonia	10,389	1,362,190	Central Macedonia/Sterea Ellada
11	East Macedonia	7,280	412,732	East Macedonia & Thrace/Central Macedonia
12	Thrace	11,177	404,182	East Macedonia & Thrace
13	Crete	8,335	601,131	Crete
14	Aegean Islands	9,103	508,807	North Aegean/Crete

The main reasons causing problems in the rational management of water resources in Greece are:

1. the spatial allocation of water resources, which are “gathered” in the Northern and Western parts of Greece, while the major needs appear along the coasts and in the big valleys during the summer;
2. the fact that Greece experiences heavy rainfalls during winter and practically no rain during summer; this water supply pattern is exactly the opposite of the water demand one;
3. the geo-morphological characteristics of the country which contribute to the fresh water being rapidly “flushed” into the sea;
4. the fact that Northern Greece depends greatly on river discharges from neighbouring countries in the north;

Table 4. Regional water department staff. (Source: Hydromedon, 2006).

Region	Work Places	Member of staff currently placed	%
East Macedonia	23	7	30
Central Macedonia	23	21	91
West Macedonia	23	*	
Epirus	23	1	4
Thessaly	23	7	30
Ionian islands	23	3	13
West Ellada	23	6	26
Sterea Ellada	23	*	
Attica	23	6	26
Peloponnesus	23	7	30
North Aegean	23	3	13
South Aegean	23	*	
Crete	23	5	22

*Data not available.

5. the extended coast line (about 15,000 km) in combination with the lithological composition of the bed rock, which is conducive to salination in the coastal aquifers (used to the limits of exhaustion in order to satisfy growing water demands);
6. the fact that many Greeks suffer from lack of adequate water resources;
7. environmental (quantitative and qualitative) degradation of many water resources.

WFD implementation in Greece

The identification of all Greek case characteristics expected to cause problems in the future (Table 5) was a way to provide helpful suggestions. To overcome deficiencies/disadvantages, new measures should be introduced including supplementary regulations. The Presidential Decrees and Joint Ministerial Decisions that the law anticipated, clarifying operational details, must be launched since no progress can be otherwise achieved. Such clarifications include:

- (a) proper set-up and empowerment of CWA and RWOs;
- (b) determination of the measures that the monitoring programmes will include; the exact content of the MP that each region has to construct; the technical details of the report that CWA has to submit;
- (c) determination of effective fines for polluters and mechanisms to enforce them;
- (d) set-up of a research network to support the CWA providing the needed scientific basis.

Greece's pro-active participation in the ongoing process of MSs cooperating to interpret WFD requirements and produce generic guidance is also crucial, requiring a solid national strategy to promote the national interests and ensure that Greece's specific conditions are properly considered. A Regulatory Impact Assessment (RIA) is recommended to be undertaken in order to determine the most cost effective set of measures. RIA should have been in place at an earlier stage to demonstrate WFD transposition. However, even now it can be very useful. In order to implement WFD's provisions, a cost-benefit analysis of the impacts that may occur when applying regulations can support future decisions and

Table 5. Special features and characteristics of Greece that complicate the implementation of the Water Framework Directive (WFD).

Physical characteristics	Significant number of small river basins— <i>difficult to organise in RBDs</i>
Social characteristics	Current public perception (means what the public accepts today): “excessive use of various goods, including water, indicates welfare” What the directive suggests: the Directive sets that water is not a commercial product but a heritage which must be protected, defended and treated as such
Technical infrastructure	Poor technical infrastructure—inadequate and unreliable field data. May prove to be an obstacle for effective implementation: it is time consuming to overcome it whereas the time schedule of implementation is very tight
Legislative framework	<i>Law 3199/03</i> was characterised by the European Environmental Bureau as inadequate and incomplete to transpose the Directive (EEB, 2004)
Administrative infrastructure	No holistic confrontation of various problems. Competing stakeholders are trying to circumstantially and excessively utilise the water resources reserves not following an integrated water resources management plan (basic principle of sustainable development)
Economic characteristics	Very low pricing of residential and industrial use, and almost free of charge provision of water for agriculture. Essentially opposed to the WFD's principles

measures. A significant stage of implementation is also the public involvement in the decision-making process. Many MSs have good track records in public participation and may provide useful examples (e.g. UK's Government "Code of Practice on Consultation" provides helpful guidance, presents the important principles that must be considered and identifies the crucial phases when promoting public participation). Such a plan is effective when it respects society's characteristics and culture. The Greek public is not well-informed and perhaps not sensitive enough towards environmental issues and their effect on everyday life. Hence, it is proposed to promote the future benefits that are expected and focus on the environmental protection value. Greece is currently separated into 14 WDs (RBDs). This number may look large considering its limited surface area (132,000 km²) but can be explained by its special geo-morphological characteristics, including the large number of small RBs which makes it hard to aggregate them into larger RBDs. The consequence of identifying so many RBDs is an increased administrative burden. Hence, it is recommended that RBDs identification is reviewed and alternative solutions are re-examined, including but not restricted to e.g. the division of the country into 7 RBDs (Mimikou, 2002). The administrative arrangements envisaged by law seem to be problematic as the responsibilities of the competent authorities are quite blurred or overlapping. The administrative units involved include a large number of decision makers which, despite its pluralism, may complicate and delay the decision-making process. Thus their effective operation is doubtful and a more centralised administrative model with a clear decision-making tree and hierarchy, similar to the UK's one, may be more appropriate. The UK Environment Agency is the competent authority and its responsibilities are similar to the ones of the CWA, although the UK Environment Agency has a mandate which stretches beyond water. This is clearly an advantage in terms of the possibility of the agency to address holistic environmental management. The absence of an equivalent independent agency is a serious handicap for environmental management in Greece, beyond WFD implementation. It will be helpful to compare the UK Environment Agency with CWA and adopt best practices when ever needed for Greece.

The next stage of implementation is the RBDs characterisation and the review of the human activity pressures and their impacts. Given the country's physical characteristics, the RBD water bodies' delineation process and characterisation costs a lot in terms of time and money. The coordination of all agencies involved is crucial to the success or failure of this endeavour and clear regulations should be put in place to ensure full cooperation of all relevant state agencies with CWA, especially regarding the available data provision and expansion/update of the national environmental database. Due to the short available time, it may be essential to enforce urgent measures/programmes in order to cover the technical infrastructure deficiencies. A detailed cost-benefit analysis of alternative implementation strategies employed in the UK and other MSs, including but not restricted to alternative agency set up, alternative mechanisms for the field data collection/assessment and alternative water bodies' identification/characterisation, will be helpful as a way to learn from experience and turn current delays into an advantage. The law does not clarify whether CWA or RWOs are responsible for pressures/impacts estimation. WFD requires a water use economic analysis to be undertaken by the end of 2004. Since this deadline has already passed, it is urgent to gather environmental/resource costs data. In Greece, only the local Water Utilities may have such data. This data must be compiled to support long-term forecasts of water demand/consumption. In order to do this, it may be helpful to give RWOs the responsibility to collect and analyze the data related to their region from the corresponding corporation. Also, CWA should be charged to issue statutory guidance to the RWOs and other relevant bodies, including methods/procedures to be followed. Throughout this exercise, the application of the "polluter pays principle" and water service costs recovery is expected to encounter severe opposition.

As water rates for any use (especially agriculture) are very low in Greece, it is crucial to inform the public about the aims of a rational water policy, and apply transparent procedures to ensure that the additional water charges will be used to fund environmental protection projects. Although the set-up of the Programme of Measures and the RBMPs is also required by 2009, the responsibilities for designing/approving/implementing them are not clearly segregated/allocated. Each RWO is obliged to provide a draft RBMP to the corresponding RWC that discusses its deficiencies and suggest improvements needed. CWA must be informed about the RBMP and if all administrative units agree with it, then the region's Secretary General is responsible for its final approval. It is obvious that the procedure is complicated, and the fact that all administrative units have to agree on the RBMP is precarious and may result in delays.

Conclusions

The first stage of the WFD implementation is now concluded with mixed results. All MSs have made quite some progress since WFD was launched and most of them were able to report in time, giving the feeling that the EU Member States will be able to meet all WFD's deadlines. Its implementation brought new impetus to water management, and progress is observed in the MSs regarding several aspects (administration restructuring, data/assessments compilation, public awareness campaigns). Article 5 reports provide a good starting point for preparing RBMPs. The international cooperation on WFD implementation among MSs and with some neighbouring countries is inspiring and encouraging.

There is a negative side though. The legal transposition of the WFD is poor. Article 5 analyses have been carried out with different levels of detail. One of its main goals is to identify the water bodies being at risk of failing to meet WFD objectives. This is a crucial input for the RBMPs development, as these water bodies will be subject to the programme of measures or to the application of exemptions to the goals, if applicable. Insufficient data has prevented MSs to present a final risk assessment for many water bodies. A lot of water bodies have been identified as at risk in all MSs. Some MSs did not provide any evidence that they are committed to address this lack of data in the run up to the RBMPs. Some MSs find systematic serious problems regarding the WFD implementation, resulting in great delays. These MSs need to change their attitude and speed up to make up for lost time. All MSs, no matter how advanced in implementation they are, will have to make additional efforts to meet WFD ambitions and deliver on the RBMPs. It will be essential to address these problems to achieve WFD goals. The recently established monitoring networks offer a chance to bring in the missing data. The active involvement of the public can strengthen the approaches. The ultimate aim is to finalise a comprehensive RBMP by 2009, judging whether and to what level WFD can give results for the water environment.

With regard to Greece, the national law is considered to be deficient and needs to address all missing issues to meet the WFD obligations. Further documentation needs to be issued, to help the law be applicable and effective. It is crucial to form appropriate administrative infrastructures and long-term integrated MPs. Decentralization of competences and proper set-up of departments is crucial. The scientific/academic potential must be utilized by the State through proper planning and utilization of funds. The central administration must consider setting up an Institute (which should operate as an independent consultancy body), setting the RBMPs quality standards and evaluating them. Administrative restructuring must focus on RB integrated management mechanisms and efficient operation, making the best out of the other MSs' experience. Effective coordination is needed for the

interregional (especially transnational) RBs management. The RWOs must be adequately staffed (as the national law foresees). The preparation of the RBMP seems to fail, due to the lack of hydrological and river flow data. The national water quality/quantity monitoring networks planned to be developed (although not in time), include very few data collecting points (stations). The number of these stations is not even close to being able to monitor all 235 identified national RBDs. As agricultural water use represents 86% of total water use (Hydromedon network, 2006), it is obvious that a successful water resources management policy must act in accordance with agricultural policy.

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