

RIVER BASIN MANAGEMENT AND PLANNING

ERIK MOSTERT

Centre for Research on River Basin Administration, Analysis and Management
Delft University of Technology, Delft, The Netherlands

ABSTRACT

This presents the results of the Eurowater project concerning river basin management (rbm). It discusses the rbm system in France, Germany, the Netherlands, Portugal and the United Kingdom. Furthermore, it identifies three different: the hydrological model (management by river basin authorities), the coordinated model (coordination at the river basin level) and the administrative model (management not based on river basins at all). One conclusion is that the hydrological model, as proposed in the draft Framework Directive (version 26 February 1997), is difficult to implement in transboundary river basins and in countries with decentralised water management, such as Germany and the Netherlands.

1: INTRODUCTION

On 26 February 1997, the Commission of the European Communities published a proposal for a "Council Directive establishing a Framework for Community Action in the field of water policy" [1]. The purpose of this directive is to bring more unity in the water policy of the EU. A central element is the requirement to manage river basins as a whole. "Appropriate administrative structures" have to be set up, including the establishment of "competent authorities." Furthermore, environmental and economic analyses of the whole basin have to be made and river basin management plans have to be prepared.

River basin management (rbm) is of course much older than the proposed directive. For centuries, humans have interfered in rivers and their basins to make them serve their interests better. Often, however, the carrying capacity of the basins was exceeded, as long term environmental concerns were not properly addressed, the relation between water use and land use was overlooked, and effects in other parts of the basin were not taken into account.

This paper present the rbm systems in the five Eurowater cuntries: France, Germany, the Netherlands, Portugal and the United Kingdom (section 2). Furthermore, it discusses the

management of the international Meuse basin (section 3). Three different models can be identified (section 4), but some are not feasible in some countries (section 5). The paper closes with some short conclusions (section 6).

Acknowledgement

Section 2 of this article is based on the work done by Ilja Betlem in the Eurowater project [2]. Furthermore, it uses some parts of the article by the author: "River basin management in the European union; How it is done and how it should be done", to be published in European Water Management in July [3]. This article contains much more details on international rbm, the advantages and disadvantages of the different models, and the requirements any rbm system should meet.

2: NATIONAL RIVER BASIN MANAGEMENT

France

In France there are river basin institutions and there is river basin planning. For groups of basins, *Agences de l'Eau* (Water Agencies) have been established, six in total. The *Agences de l'Eau* levy pollution charges and water intake charges, grant subsidies for reducing pollution, and formulate a so-called *SDAGE* plan (*Schema Directeur d'Amenagement et de Gestion de l'Eau*: Water Development and Management Master Plan). The *SDAGE* contains the fundamental principles for "balanced water resources management." It balances the principal plans and programmes of the administration with the users' interests and defines the principal objectives with respect to quantitative and qualitative aspects of water and the managerial instruments to reach these objectives.

An important limitation of the *Agences de l'Eau* is that they have no regulatory powers (permitting, sanctioning, etc.) and cannot construct infrastructure themselves. The main regulators are the regional directorates of the Ministry of Environment (22) and the departmental offices of the Ministry of Public Works, the Ministry of Agriculture, the Ministry of Industry and the Ministry of Public Health (4 times 95). The departmental offices are coordinated by the *Prefet*, the central government's representative at the departmental level.

The *Agence de l'Eau* has a two-way relation with the regulators. On the one hand, the *SDAGE* should take the major (national, regional or departmental) policies of the regulators "into account". On the other hand, the water management decisions of the regulators have to "comply with" the *SDAGE*. Decisions in other policy sectors only have to take the *SDAGE* "into account", which is much less strict.

Responsible for large-scale infrastructure are the bodies just mentioned and, for drinking water supply and sewage treatment, the municipalities. Also the municipalities have to “comply with” the *SDAGE* or take it “into account”.

For (groups of) subbasins *SAGE* plans can be formulated (*Schema d’Aménagement et de Gestion de l’Eau*: Water Development and Management Plan). Responsible for these are the so-called *Commissions locales de l’Eau* (Local Water Commission). The *SAGE* plans are more detailed than the *SDAGE*, which act as a framework for the *SAGE* [2, 4].

Within the *Agences de l’Eau* and the *Commissions locales de l’Eau* several government bodies and water users cooperate. In the *Agence de l’Eau* national government, local governments and the different user groups are represented. The *Commissions locales de l’Eau* consist of 50% local government representatives, 25% national government representatives, and 25% user groups' representatives. In addition, there are several consultation and approval requirements in the planning process for the *SDAGE* and the *SAGE*.

It is too early to assess the results of present French rbm. The present system dates only from 1992 and the *Agence de l’Eau* had to complete their first *SDAGE* only in January 1997. The system offers big opportunities for integrated rbm, but there are still some problems. These include getting the users involved (for many planning is too technical and the direct interest for them is not always clear), reaching consensus, and the interest in water management issues of the *Prefets*.

Germany

German rbm presents a quite different picture, with less reliance on planning, more reliance on informal cooperation, and more variation, due to the much higher degree of decentralization. Generally speaking, water management is influenced by the concept of rbm, but not totally based on river basins [5]. Most competencies are at the *Länder* (States) level, and within the *Länder* tasks and competencies are often decentralised to regional governments. The main task of federal government, apart from concluding water treaties, is to issue framework acts, such as the *WHG* (*Wasserhaushaltgesetz*: Act on Water Management). The *WHG* provides for river basin planning, but (at least in 1994), the *WHG* was implemented only imperfectly on this point. Several *Länder* have doubts about the usefulness of planning or having other priorities.

River basins figure most prominently in Nordrhein-Westfalen. In the Ruhr area river basin associations (*Wasserverbände*) have been set up at the beginning of this century to deal with the urgent problems of infrastructure, water quality and quantity. Based on the river basins of tributaries of the Rhine, membership of local authorities, industry and water supply and water treatment companies is compulsory. The main preoccupation of the river basin associations is the level of pollution coming from point sources.

Long before the river basin associations were set up, there were already common or collective resource management structures, usually at the local level, based on voluntary

cooperation. These cooperative structures could or could not follow river basin boundaries, depending on their specific task (e.g., drainage and flood protection), the local circumstances and the infrastructure built. The inheritors of these structures are the present-day water management associations (*Wasser und Bodenverbände*).

Apart from that, rbm is based primarily on informal cooperation and more formalised coordination platforms. For instance, for the Rhine a working group of the Rhine-*Länder* exists (*ARGE Rhein*) and a commission in which the *Länder* cooperate with federal government (German Commission for the Protection of the Rhine Against Pollution: *DK*). At the international level there is the International Commission for the Protection of the Rhine. Similar bodies exist for the Elbe and the Weser. Furthermore, the *Länder* cooperate in the *Länder Water Working Group (LAWA)*.

The Netherlands

As in Germany, but in a different way, also Dutch water management is influenced by the concept of rbm, but not totally based on river basins. The most important water management bodies are national government (especially *Rijkswaterstaat*, the State water management agency, and its regional branches), the 12 provinces, and the 88 waterboards, independent regional water management bodies [6, 7]. *Rijkswaterstaat* and the provinces are not (the provinces) or only partly (*Rijkswaterstaat*) based on river basins. The waterboards are based on "water management units." In the southern and eastern parts of the Netherlands these water management units are one or more sub-basins. In the very flat northern and western parts, where no natural river basins can be distinguished, these units are groups of polders.

Planning plays a central role at all government levels, and not only in the water sector, but also in for instance land-use planning and environmental management. Most planning, however, is not based on river basins or comparable water management units. *Rijkswaterstaat* coordinates the formulation of the strategic national water management plan and prepares the operational management plan for the "State waters" (e.g. the main rivers), which *Rijkswaterstaat* manages. The provinces make a strategic water management plan for all waters within their area. This plan is at the same time as the operational management plan for groundwater quantity, managed by the province. The waterboards, who manage the regional surface waters, make operational management plans for their area. The strategic water management plans at the national and the provincial level are coordinated with the strategic land-use plans and environmental management plans at these levels.

Central in planning are consultation between different government bodies, extensive policy analysis and, increasingly, user involvement. User involvement at the waterboard level is already centuries old, as traditionally the real-estate owners (primarily farmers) formed the board. Recently, representation in the waterboards has been broadened to include all inhabitants, also those not owning real estate. At the provincial level and at the national level user involvement has increased, especially in the seventies and again since around 1992 [6].

The system has many strong points, but there are also some problems. These include the often paramount position of land-use planning in relation to water planning. In practice desired land use in an area determines water management, while the hydrological possibilities hardly influence land-use planning [8]. Increasingly, however, hydrological relations are taken into account in planning [9]. Another problem is the amount of planning and the relation between the water management planning, land-use planning and environmental planning. Coordination is difficult as the legal status and the planning procedures differ, the plans are adopted at different times, and (at the national and the regional/local level) different government bodies have primary responsibility.

Portugal

In the last decade, the institutional development in Portugal concerning rbm has been rather turbulent. Since 1994, the main governmental actors in rbm are the Institute for Water (*INAG*), a sectoral institute of the Ministry of Environment and Natural Resources, and the five Regional Directorates of Environment (*DRARNs*) of the same ministry. The *INAG* is responsible for drafting the National Water Plan and river basin plans for the four transboundary river basins. In addition, the *INAG* it is the permitting authority for many water uses. The *DRARNs* are responsible for drafting and implementing the river basin plans for the 11 national river basins. Furthermore, they are responsible for the implementation of the policies set forth by the *INAG*. The *DRARNs* do not only have competencies in the field of water management, but also in land-use planning.

The 15 river basin plans (the four transboundary and 11 national ones) deal with all aspects of water management, including groundwater, and equip the water sector with a comprehensive inventory of water-related problems. The river basin plans also pay attention to land use, as they define the adjacent areas of for instance reservoirs and the sea that are subject to specific land-use planning. There are, however, separate Regional Development Plans. Several NGOs participate in the planning process through river basin councils.

The National Water Plan is structured as a kind of coordination mechanism for the river basin plans. It diagnoses the issues raised in the river basin plans, defines objectives, includes measures for coordinating the different river basin plans and for coordinating with Spain, defines priority areas at the national level, and considers programmes and projects of a national scale such as interbasin water transfers. The National Water Plan pays attention to the relation between the water objectives and the objectives of economic and social policies. However, the National Plan has neither the scope nor the function to integrate social and economic considerations fully in water policies. Several NGOs participate in the planning process through the National Water Council

As in the French case, it is too early to assess the present rbm system. Compared to for instance France, rbm seems more "technical" and less "financial." Furthermore, Portuguese

rbm is potentially more integrated as the *INAG* and *DRARNs* have policing power and the *DRARNs* also competencies in regional land-use planning. Neither the *INAG* nor the *DRARNs* are based on river basin boundaries, but there are consultative river basin councils.

United Kingdom

The United Kingdom is well known for its Catchment Management Plans (CMPs), developed in the past by the NRA (National Rivers Authority). On 1 April 1996, the NRA merged with several environmental institutes to form the Environment Agency (EA). The EA is a quasi-independent agency, subordinate to the Department of Environment. Its task with respect to water is to protect and improve the water environment and provide protection against flooding from rivers and the sea. Its statutory duties and powers relate to the planning and management of water resources, water quality, flood defence, fisheries, recreation, conservation and navigation. It operates a system of abstraction licenses and discharge consents. The EA's competencies in land-use planning are limited and fall well short of formal powers to intervene in land-use planning [4].

The CMPs do not have a statutory basis. They have no binding force and are strictly a form of systematic policy formulation. They do, however, form a point of reference for decision making and ensure that the rationale for decision making becomes transparent. Important elements in CMP are the analysis of the state of the waters (quantity, quality, demands) and consultation with both user groups and government bodies. To coordinate land-use planning and water management, the EA consults the local governments. Furthermore, it issued "guidance notes for local planning authorities on the methods on protecting the water environment through development plans", based on a "partnership approach".

CMP offers an interesting approach to rbm, as it combines the use of expertise, public participation and consultation of the relevant government bodies. It is based on a consensus approach because, to fulfil its statutory task effectively, the EA needs the cooperation of other parties. CMP does not yet result in an integration of land-use planning and water management, as both spatial fit and policy priorities differ. Interestingly, CMP follows a voluntary, non-statutory approach. These characteristics make CMP an interesting approach for transboundary river basins.

Gradually, the CMPs are being replaced by LEAPs (Local Environment Agency Plans). The LEAPs reflect the broadened scope of the Environment Agency, but they are based on the same principles as the CMPs [10].

3: THE MANAGEMENT OF THE MEUSE BASIN

The Meuse basin extends over France, Luxembourg, Belgium, Germany and the Netherlands. Until recently, cooperation was rather limited. The main unresolved issues were water pollution from the Walloon region in Belgium and the distribution of Meuse water in periods of low flows between Belgium and the Netherlands. In 1967, these issues were linked to negotiations on the Scheldt river. Belgium wanted to improve the access to the port of Antwerp through the Dutch part of the Scheldt river. The Netherlands was willing to discuss this, but only if also the water quality problems in the Scheldt river and the Meuse issues would be discussed. In this way the Netherlands tried to strengthen its negotiation position.

Negotiations were not easy. An important complication were internal differences in Belgium. Since 1980, Belgium was even in a process of federalisation. Most competencies in water management, including the competency to conclude international treaties, went to the three "Regions": Flanders, Wallonia and Brussels. This made the linkage of the Meuse issues with the Scheldt issues rather inappropriate. Wallonia could not be persuaded to reduce pollution of the Meuse in return for improving the access to the port of Antwerp, which is in Flanders [11].

Additional complications were the disparity in staff and cultural differences. The Netherlands had relatively much staff, and Wallonia very little, which made it difficult for Wallonia to cope with all technical reports produced in the Netherlands and to staff working groups and proposed commissions. An important cultural difference is the degree of "uncertainty avoidance". This refers to the degree to which persons in a culture feel uncomfortable with uncertain or unfamiliar situations [12]. In Flanders, Wallonia and France uncertainty avoidance is relatively high, while in the Netherlands this is somewhat below average. Consequently, Dutch negotiators often got more freedom to manoeuvre from their superiors than the other negotiators. Especially for the negotiators from Wallonia the negotiations were unfamiliar, because the French and the Dutch negotiators knew each other from the International Commission for the Protection of the Rhine against Pollution.

Despite these complications, important improvements have been made. In 1994, two agreements on the Meuse have been concluded: one on the allocation of Meuse water and one on the protection of the Meuse [13, 14]. This was reputedly stimulated by the UN-ECE treaty of the non navigational use of transboundary water courses [15, 16]. The first agreement contains mainly operational provisions on the allocation of Meuse water between Flanders and the Netherlands. Wallonia, where most of the Meuse water originated from, is no party to this agreement.

The agreement on the protection of the Meuse was signed by France, Wallonia, Brussels, Flanders and the Netherlands. The aim is to improve water quality in the main stream of the Meuse only. The agreement states, however, explicitly that measures in the whole basin may be needed to reach this aim. To coordinate the measures, an "International Commission for the Protection of the Meuse" has been set up, of which all signatory states and

regions are member. This commission will make a (non-binding) action programme. Brussels does not lie in the basin and is a member of the commission only because of its dependence on Meuse water for its drinking water supply. Consequently, it can only vote in the commission when its drinking water interests are at stake. Germany and Luxembourg, both in the basin, are not members of the commission, but they can get observer status [17].

4: THREE MODELS

Comparing the different systems of national and international rbm, three archetypes or "models" emerge: the "hydrological model", the "administrative model" and the "coordinated model" [cf. 18].

In the hydrological model the organizational structure for water management is based on hydrological boundaries and there is extensive river basin planning. In an extreme form all water management is in one hand: the "river basin authority." Of all systems studied in this article, the French, the British and the system of the draft Framework Directive (version 26 February 1997) approximate the hydrological model most. The French *Agences de l'Eau*, however, only do the planning and financing; they have no regulatory powers and do not own or operate infrastructure. The Framework Directive strictly speaking does not require that the organizational structure should be based on hydrological boundaries: the task of the "competent authorities" could be limited to coordination. If, however, the rbm plans are going to be binding on the operational managers, coordination may not suffice.

The administrative model is in many respects the opposite of the hydrological model. In this model rbm is part of environmental management, conducted by provinces, municipalities and other bodies not based on hydrological boundaries. There is no river basin planning. The German system and the system in the Meuse resemble the administrative model most. Both in Germany and in the Meuse basin, however, there are coordination mechanisms at the river basin scale. Both systems have therefore important elements of the third model: the coordinated model.

The "coordinated model" falls somewhere between the hydrological and the administrative model. In this model water management is not performed by river basin authorities, but there are river basin commissions with a coordination task. Coordination by these commissions will typically include strategic river basin planning. In these plans strategic goals are set, such as a reduction of emissions of substance x by y percent before the year z. The choice and application of the measures to reach these goals are left to different bodies that are not based on hydrological boundaries.

Examples of the coordinated model are the Dutch rbm system and the Portuguese rbm system. In the Netherlands and Portugal the organisational structure is not (Portugal) or only partly (The Dutch waterboards) based on river basins, but there is coordination. In the Netherlands coordination is provided in the many planning procedures, although the planning areas usually do not coincide with river basins, and in Portugal there is river basin planning

and there are river basin councils (see figure 1). Furthermore, after the adoption of an effective action programme, also the transboundary Meuse management will resemble the coordinated model.

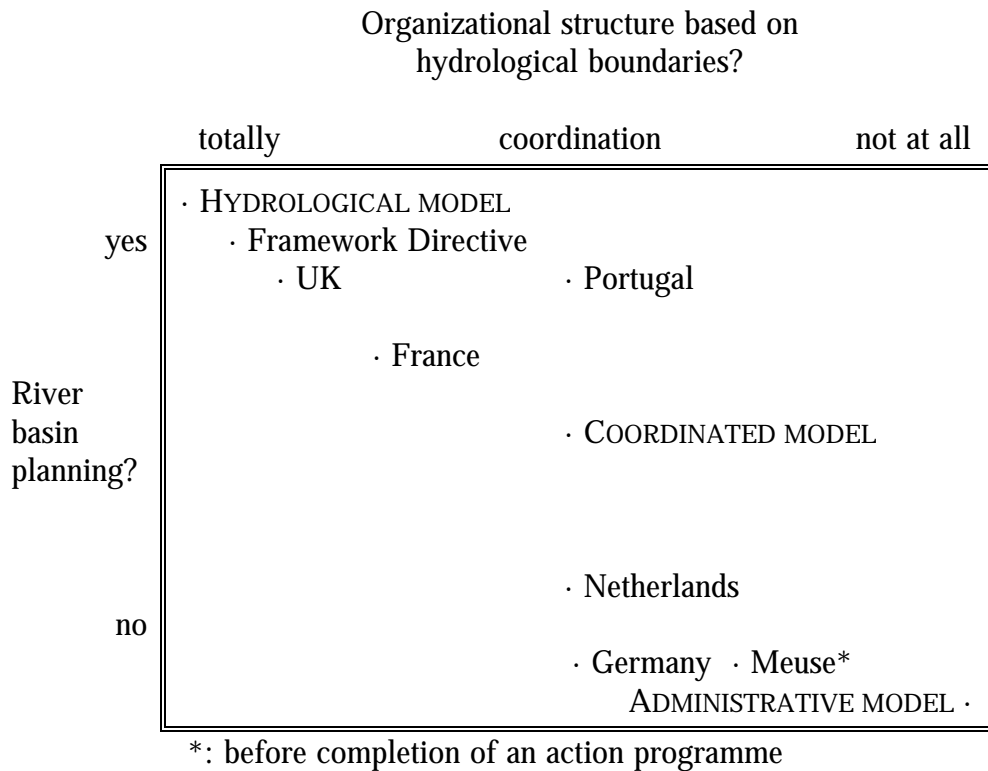


Figure 1: River basin management characterized

5: FEASIBILITY

Models may function quite differently in different countries. For instance, the coordinated model is more likely to be effective in a country with a "feminine culture" (e.g., The Netherlands) than in a country with a "masculine" culture (e.g., the USA). In the latter assertiveness and competition have a positive value and conflicts tend to be solved by a "good fight", while in the former conflicts tend to be solved through negotiations and compromise [12].

Moreover, models may sometimes not even be feasible. This refers especially to the hydrological model. In countries with a high degree of decentralization (e.g., Germany and the Netherlands), introduction of this model would require a major centralization of water

management. This can potentially decrease the contact between the water managers and the water users and increase bureaucracy [18], and furthermore may not be politically feasible. Moreover, constitutional problems may occur if competencies between government levels are laid down in the constitution, as in Germany.

Additional problems occur in transboundary river basins. Implementing the hydrological model in such basins requires a very high level of international cooperation. While desirable, this is also very difficult, if not impossible. National sovereignty of the basin states over their territory would decrease as competencies would shift to a supranational river basin authority. Moreover, coordination problems would occur between the river basin authority and the national governments, who will always keep competencies that are relevant for river basin management (agricultural policy, environmental management, land-use planning, etc.).

Because of the high level of centralisation and the absence of transboundary river basins, the conditions in for instance the United Kingdom are ideal for the hydrological model. In the EU as a whole the situation is different. Several member states have highly decentralised water management and there are many transboundary river basins, some, such as the Rhine and the Danube, even extending beyond the borders of the EU.

6: CONCLUSIONS

This article described and compared the different systems of river basin management in the Eurowater countries. Many differences exist, but three main models can be identified: the hydrological model (management by river basin authorities), the coordinated model (coordination at the river basin level) and the administrative model (management not based on river basins at all). Elsewhere [3], I argue that each model has advantages and disadvantages, but in this article I made the point that especially the hydrological model may not be feasible in some countries. This is very relevant as the rbm system in the EU Framework directive presently proposed [1] resemble the hydrological model closely.

While models are important, the different instruments and approaches used (regulatory instruments, economic instruments, etc.). are also important. Within each model different instruments and approaches can be used, and the choice influences the results of rbm at least as much as the model. Detailed knowledge on the different instruments and approaches (other than planning) is, however, still lacking. Presently, the Water 21 project, which studies the same countries as the Eurowater project with the same research teams, tries to fill this gap. Water 21 does so by comparing the instruments and approaches used in the five countries and selected transboundary basins, by analysing the degree of cooperation, user involvement and use of expertise achieved, and by assessing the results of rbm in terms of sustainability.

REFERENCES

1. Commission of the European Communities, *Proposal for a Council Directive establishing a Framework for Community Action in the field of water policy*. COM(97) 49 def., 1997.
2. Betlem, I., "River basin management and planning.", in: F.N. Correia (ed.), *Water Resources Management in Europe: Institutions, Issues and Dilemmas. Volume 2*. Balkema, Rotterdam, 1998/ idem, "Gewässerbewirtschaftung auf der Grundlage von Flußeinzugsgebieten" in: R.A. Kraemer; F.N. Correia (eds.), *Eurowater; Institutionen der Wasserwirtschaft in Europa. Band II*. Springer Verlag, Berlin etc., 1997.
3. E. Mostert, "River basin management in the European union; How it is done and how it should be done", in: *European Water Management*. July 1998.
4. Buller, H., "Towards sustainable water management; Catchment planning in France and Britain." *Land Use Policy*, Vol. 13 (1996), No. 4, 289-302.
5. Krämer, R.A. "Economic Instruments and River Basin Institutions in Germany." *Seminaire: Les Contraintes de la Politique de l'Eau dans l'Union Européenne*, Comité National Français de la CCI & Agence de l'Eau Seine-Normandie, Paris, 15 March 1995, unpublished paper.
6. Mostert, E., *Water policy formulation in the Netherlands*. RBA Series on River Basin Administration, Research Report no. 6., RBA Centre, Delft, 1997.
7. Perdok, P. "The Netherlands.", in: F.N. Correia (ed.), *Water Resources Management in Europe: Institutions, Issues and Dilemmas. Volume 1*. Balkema, Rotterdam, 1998/ idem, "Die Niederlande" in: R.A. Kraemer; F.N. Correia (eds.), *Eurowater; Institutionen der Wasserwirtschaft in Europa. Band II*. Springer Verlag, Berlin etc., 1997.
8. Witteveen + Bos, *Onderzoek knelpunten waterbeleid en ruimtelijke ordening* (Research on the problems in the relation between water policy and land-use planning), Projectteam vierde Nota waterhuishouding, The Hague, s.d.
9. Kamphuis, H.; R. Kuiper; Y. van der Laan; A. van Dortmont, *Plannen met Stroom; Ideeën voor de afstemming van ruimtegebruik, water en milieu* (Planning with streams; Ideas for the coordination between land use, water and environment), Studierapport Rijksplanologische Dienst, Programma Ruimte Water Milieu, 2nd, slightly revised impression, VROM, The Hague, 1996.
10. Rudge, L., *Local Environment Agency Plans (LEAPs)*. Unpublished draft paper, Water 21 project, 1997.
11. Meijerink, S.V., "Strategic River Basin Management. The Case of Scheldt Water Pollution" to be published in: *Proceedings of the IXth World Water Congress*, IWRA, Montreal, Canada, 1997.
12. Hofstede, G., *Allemaal andersdenkenden; Omgaan met cultuurverschillen*, 5th impression, Uitgeverij Contact, Amsterdam, 1995 (translation by the author of: *Cultures and Organizations, Software of the Mind*, McGraw-Hill, London etc., 1991).
13. *Verdrag inzake de afvoer van de Maas* (Agreement concerning the discharge of the Meuse), Charleville-Mézière, 26 April 1994. Published in *Tractatenblad* 1995, nr. 50 and *Water* nr. 95, November-December 1995.

14. *Verdrag inzake de bescherming van de Maas* (Agreement concerning the protection of the Meuse), Charleville-Mézière, 26 April 1994. Published in *Tractatenblad* 1994, nr. 149 and *Water* nr. 95, November-December 1995.
15. United Nations Economic Commission for Europe, *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*. Published in (a.o.) *Tractatenblad van het Koninkrijk der Nederlanden*, nr. 199, 1992.
16. Zijlmans, R., "Het verdrag van Helsinki; wegbereider voor de waterverdragen" (The Helsinki convention; paving the way for the water treaties) in: *Water*, nr. 85, November/December 1995, 242-243.
17. Bouman, N., "A New Regime for the Meuse", *Review of European Community and International Environmental Law*, Vol. 5 (1996), No. 7, 161-168.
18. Kraemer, R.A., "Subsidiarity", in: R.A. Kraemer; F.N. Correia (eds.), *Eurowater; Institutional Mechanisms for Water Management in Europe. Part II*, Springer Verlag, Munchen 1997.