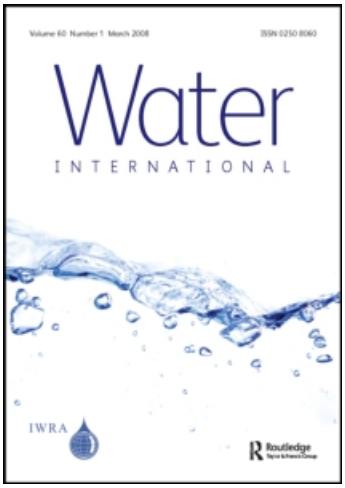

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Successful International Cooperation in the Rhine Catchment Area

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Successful International Cooperation in the Rhine Catchment Area

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Abstract*: The international cooperation to control the water quality of the Rhine river is widely rated as successful. By the turn of the century the cooperation has resulted in a well-elaborated international regime. This article reviews the development of the Rhine regime. Explanations for this development are found in the policies of the downstream Dutch government, the activities of NGOs, the efforts of upstream riparian states, and in the activities of the International Commission for the Protection of the Rhine. The gradual improvement of the water quality also helped the progressive regime development along.*

Keywords*: Rhine, water pollution, international water management, International Commission for the Protection of the Rhine, international regimes.*

Introduction

The 1,300 km long Rhine river is located in northwestern Europe and flows from Switzerland to the Netherlands (Huisman et al., 1998). Its basin of 168,000 km^2 not only covers these two countries, but also substantial parts of Germany, France, Luxembourg, and Liechtenstein and small parts of Austria, Italy, and Belgium (Figure 1). The basin includes major European industrial areas, such as the area near Mannheim, the Ruhr-area, and the Rotterdam port area. Due to an average discharge of 2,200 m^3/s and the canalization of parts of the river in France and Germany, the river could become an important traffic chain. The river is not only used intensively for shipping, but also for the disposal of waste from industry. For some 60 million people, the drinking water supply, especially in the Netherlands, a regional water supply for agricultural purposes (Mostert, 1999).

For the Netherlands, it is very important that the Rhine water is of a good quality. So, for years the issue of water quality has been the focus of negotiations with Germany, France, Switzerland, and Luxembourg, the most important upstream riparian states in the catchment area. These protracted negotiations resulted in the current international regime for the river, which so far is formalized by four international agreements. The central question addressed by this article is: Which factors have had a positive effect on the development of the regime? The analysis of materials in the archives of the Dutch Ministry of Transport, Public Works, and Water Management (Rijkswaterstaat), supplementary desk research, and interviews conducted with some of the key players involved in the process, show that the Dutch government, as well as a number of interest groups, had a major influence on the completion of this regime. Nevertheless, the regime development cannot be understood without taking into account the positions of the upstream riparian states in the Rhine catchment area and developments within the European Community. The International Commission for the Protection of the Rhine (ICPR) also played a stimulating role. Finally, the successful outcome – the gradual improvement of the water quality of the Rhine itself – proved to be significant for follow-up steps in the development of the Rhine regime. These factors are reviewed in the separate sections of this paper. Before this is done, a brief sketch is rendered of the historical development of the regime. The conclusions emphasize the importance of the existence of strategic visions and catchment organizations for the management of international catchment areas.

The Development of the Rhine Regime

The initial international exchange of views concerning the water quality in the catchment area of the Rhine river dates from the late 19th century. It was brought about by the decline of the salmon population. Overfishing, the construction of dams in the region of the Alsace, and the decline of water quality completely eliminated the salmon from the catchment area (Dieperink, 1997). A more specific concern over water quality arose in the early 1930s. High concentrations of phenol and the fear of progressively high salinity levels inspired the Dutch drinking water companies to establish contacts with upstream riparian states. In 1950, these contacts resulted in the beginning of informal consultations. A small group of researchers met once a year to discuss national reports about the quality of the river. In 1953, a monitoring net-

work was subsequently set up at a number of strategic locations in the catchment area. This action marked the completion of the first step in the development of the Rhine regime. Subsequent achievements (highlights from the history of the Rhine regime) are as follows:

- 1950: Informal consultations on the water quality of the Rhine
- 1963: Convention on the International Commission for the Protection of the Rhine against Pollution (the Bern Convention)
- 1969: Fish mortality as a result of an accidental spill of the pesticide endosulfan
- 1972: First Ministerial Conference of the Rhine riparian states
- 1976: Conventions on the Protection of the Rhine Against Chemical Pollution and Chloride Pollution; formalization of the involvement of the European Commission
- 1979: France refuses to ratify the Convention on the Protection of the Rhine against Chloride Pollution
- 1985: Ratification of the Convention on the Protection of the Rhine against Chloride Pollution
- 1986: Severe pollution and fish mortality caused by an accidental discharge of 10,000 m^3 of extinguishing water contaminated with pesticides at the Sandoz Company near Basle
- 1987: Rhine Action Program
- 1991: Additional protocol to the Convention on the Protection of the Rhine against Chloride Pollution
- 1995: Severe flooding in the Netherlands and Germany
- 1998: New Convention on the Rhine

The Bern Convention of 1963 provided a formal structure for the consultations. This treaty determined the composition and the jurisdiction of the International Commission for the Protection of the Rhine (ICPR). In 1972, the structure was changed when the riparian states initiated cooperation at the ministerial level. The ministers charged the International Commission for the Protection of the Rhine with the preparation of two treaties. In 1976, the negotiations within the ICPR resulted in the Rhine Chemicals and the Rhine Chlorides Convention.

The Convention on the Protection of the Rhine against Chemical Pollution expressed the agreement among the riparian states concerning the regulation of emissions. The discharge of dangerous substances, which were specified on the so-called "black list," was to be terminated and the discharge of suspected "grey-list" substances was to be reduced. The ICPR was charged with the preparation of detailed recommendations to regulate the discharges. During the 1980s, the ICPR issued recommendations concerning 17 chemicals from the black list.

The control over the dumping of chlorides in the catchment area is covered by the Convention on the Protection of the Rhine against Chloride Pollution. This treaty specifies norms for the loads and the concentrations of chlorides, and specifies how the discharges from the Alsatian potassium mines can be gradually reduced. Various options for the reductions were contemplated, and it was not until 1985 that the Rhine Chloride Convention was finally ratified. The plan of injections has never been implemented. The current method is to temporarily store part of the waste salt when the concentration of chloride at the Dutch border is 200 mg/l and forecasts predict a reduction in water level. Moreover, measures have been taken in the Netherlands to reroute the seepage of salt water in the Wieringermeer polder from the nearby drinking water inlet at Andijk to the Waddensea just to its north to keep the salinity of the water for the production of drinking water at an acceptable level. The costs for these two

Figure 1. The Rhine catchment area.

measures are shared among the riparian states. The details of these arrangements have been laid down in a protocol added to the Rhine Chloride Convention in 1991.

Four years earlier, in 1987, the riparian states in the Rhine catchment area had reached an agreement on the Rhine Action Program (RAP). This program was meant to promote the restoration of the ecosystems of the river. The return of the salmon by the turn of the century was introduced as the symbol of the RAP. In the 1992 Ecological Master Plan "Salmon 2000" this idea was further elaborated. To this end, the riparian states agreed upon far-reaching reductions of the discharges of chemicals and to take measures to improve the hydrology, the morphology, and the safety in the river basin.

An agreement on a new Convention on the Rhine was reached on January 22, 1998. This Convention is meant to replace the Bern Convention and the Rhine Chemicals Convention after its ratification. The broadening of the perceptions of the problems and the ambitions introduced by the Rhine Action Program will obtain a formal status through this new treaty. The goal to decrease the impact of wastewater discharges on the water of the Rhine as specified in the Rhine Chemicals Convention has now been augmented with new goals to increase the diversity of species, to improve the natural flow in the basin, and to reconstruct former biotopes. The intention is to work towards a formal agreement on cooperation to improve not only the quality of the surface water, but also of the aquifers and the ecosystems in the catchment area of the Rhine river. Flood control and bank restorations are also important issues on the agenda for the future.

The cooperation among the riparian states in the Rhine catchment area has resulted in the development of a progressive regime. The Dutch government has actively promoted this development.

The Role of the Dutch Government

Because of its location downstream, the Netherlands was the main victim of the pollution of the Rhine. Discharges from densely populated and highly industrialized areas upstream (the regions of Basle and Mannheim, and the Ruhr area) inflicted damage especially to the drinking water sources and the horticulture in the Westland region, the western part of the Netherlands (Wibaut, 1952). There was also ecological damage. Migrating fish and species like water fleas almost disappeared. Much polluted silt settled in the flat Dutch segment of the catchment area. Silt dredged in the Rotterdam port area was considered so toxic that it could no longer be discharged in the North Sea (Rotterdam Public Works, 1990).

Chloride Pollution

It is difficult to reach solutions that are satisfactory to all parties in asymmetrical situations. Generally speaking, the interests of the downstream and upstream parties are fundamentally opposed. This was shown especially by the protracted negotiations on the dumping of salt from the Alsace. During these negotiations which went on for many years, the Dutch government kept looking for openings to maintain the discussion with its upstream neighbors and to promote cooperation.

The Netherlands initiated informal consultations with the other riparian states in 1950 for fear of the increasing salinity of the water of the Rhine river (Brief van het Rijksinstituut voor Drinkwatervoorziening, 1952). But the demand on France in 1954 to curb the salt discharges from the Alsace was parried by its position that the International Commission for the Protection of the Rhine was not authorized to deal with this issue. This was followed by negotiations on a formal mandate for the ICPR. The Netherlands proposed a text for a treaty, which was accepted in an amended form as the Convention of Bern (1963). The Netherlands also tried to convince France that damage was inflicted by the increased dumping of salt on the horticulture of the Westland region. Research was started with this aim.

To speed up the negotiations, the Dutch government declared itself prepared in the late 1960s to make a financial contribution to French research concerning facilities for the storage of the waste salts and for the measures to be taken in the Alsace (Dieperink, 1997). The official working groups of the ICPR investigated the benefits of several alternatives to reduce the discharge of salt in the Alsace. When at the instigation of the Dutch government the negotiations were lifted to the ministerial level in 1972, it seemed that a solution was approaching. The ministers reached a consensus on the normative ceiling for the concentrations of chlorides at the Dutch border (200 mg/l of chloride) and on a staged storage of salt in the Alsace. The negotiations subsequently shifted to the questions of the location, the financing, and the mode of storage. Finally it was agreed that the waste salts would be injected deep in the Alsatian subsoil (Briefwisseling, 1976).

The Dutch government has long attempted to avoid getting into an open conflict over the salt issue with France. The difference of opinion, however, escalated when the French government refused to submit the treaty to parliament for ratification in December 1979. The French government feared that parliament would not accept the proposal, as a growing resistance in the Alsace region against the top-down policy making style of the French government resulted in a lot of commotion and in a parliamentary majority against the injection of waste salts. The Dutch government reacted by calling its ambassador back to the Netherlands for consultations (Franse weigering, 1979). But because the course of action did not yield any positive result, the negotiations within the ICPR were subsequently continued. Earlier proposals for reductions were carefully re-evaluated. The official and the ministerial attempts to break the deadlock were supported by two parliamentary Rhine conferences, which were

convened specifically for that purpose in 1977 and 1979.

The position of the Dutch government proved to be of great significance for the development of the Rhine Chloride Convention. Dissatisfied by the implementation of the first reduction of the discharges after the ratification of the Rhine Chloride Convention in 1985, the Dutch government, on the initiative of Minister Smit-Kroes, refused to agree to French proposals for further reductions. France has implemented the first reductions by temporarily storing the salts. The fact that the stored salts would be discharged later on was unacceptable for the Dutch (Verslag Nederlandse Delegatie, 1988). Besides, new technologies had made the Dutch horticulture less dependent on chloride free Rhine water. Subsequently, the Netherlands formulated a new proposal that eventually succeeded in removing the salt problem from the agenda. At low water levels in Lobith on the Dutch border, the dumping of chlorides in the Alsace would be stopped. In addition, the salt concentration at a drinking water inlet in the IJssellake is reduced by diverting brackish seepage from this inlet to the Waddensea.

Chemical Pollution

The Dutch government adequately played on the public commotion following various disastrous conditions. This commotion facilitated the transformation of dormant ideas into changes of the regime. The American political scientist Kingdon designates such situations metaphorically as "the opening of a policy window" (Koppenjan, 1993). Kingdon derived this concept from the field of space exploration. In order for a satellite to reach set interplanetary targets, there must be a specific constellation of celestial bodies, which occurs only during a brief period. Calculating back to the moment of the launch, a rocket can only be launched during a limited period. Such a period is dubbed the "launch window." The registration of the presence of high concentrations of mercury and cadmium and the widespread awareness of the threat these signify, in combination with the massive fish death caused by the 1969 endosulfan spill, resulted in the opening of such a "policy window." The Dutch government reacted immediately and intensified the contacts with the other riparian states about a cleaning program for the Rhine. During the subsequent ministerial conference in 1972, the ministers of the riparian states promoted this program.

The framework for a more systematic approach was subsequently elaborated in the Rhine Chemicals Convention. These agreements included the stipulation that the International Commission for the Protection of the Rhine was authorized to propose further anti-pollution measures. In exchange for this stipulation, the Netherlands agreed to extend the geographic coverage of the Rhine Chemicals Convention to include the port area of Rotterdam (Dieperink, 1997). With this decision, the Netherlands gave in to the pressure of the upstream countries to impose on itself to take the necessary action to reduce water pollution.

When the ICPR actions based on the Rhine Chemicals Convention were in an impasse in the mid-1980s, a disastrous fire at the Sandoz factory near Basle in Switzerland offered the Dutch government another "policy window" to take the initiative to carry the negotiations further. Extinguishing water containing colorants and pesticides not only turned the water red, but also eradicated the eel population over a distance of over 200 km. Improvements in the water quality seemed to disappear completely. Immediately following the disaster, the highly involved Minister of Transport and Public Works Smit-Kroes went to the other riparian states and successfully converted dormant ideas on the improvement of the ecosystems in the Rhine catchment area into the Rhine Action Program (Perdok, 1992). The high water levels reached in 1995 underlined the importance of a broader perspective on water quality by taking into account hydrological and morphological measures. Following the initiative of the Dutch Minister of the Environment, the ministers of the riparian states agreed that the upstream retention of water, the enlargement of the storage capacity of the floodplain, and the restoration of the riverbank forests need to be closely matched (Meuleman, 1995).

Innovative Research

The Netherlands has always maintained its high profile in the ICPR. New knowledge was continuously presented to the delegates of the other riparian states. The Institute for Inland Water Management and Wastewater Treatment (Rijksinstituut voor Integraal Zoetwaterbeheer en Afvalwaterbehandeling, RIZA) was most innovative in the field of quality monitoring. New measuring and monitoring techniques were typically first introduced at Lobith, before they were gradually disseminated to the measuring sites in the other riparian states (Dieperink, 1997). The frequency of sampling and the number of quality parameters included in the monitoring protocol increased steadily over the years, thanks to the introduction of the technique of gas chromatography, and the SIVEGOM system. SIVEGOM is a Dutch acronym for signalizing elevated levels of organic micro pollutants. This system significantly reduced the complexity of the demonstration of the existence of elevated levels of organic micro pollutants (Internationale Kommission zum Schutze des Rheins, 1986). Within two hours, the concentrations of seventy types of organic micro pollutants could be established.

In the framework of the Rhine Action Program, the measuring of biotic parameters was also started. Together with the National Institute of Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieuhygiene RIVM), and the Netherlands Institute for Fisheries Research (Rijksinstituut voor Visserijonderzoek, RIVO), the RIZA embarked upon a concerted research program. Bio-monitoring yielded insight in the diversity of species and the quality of the natural habitats in the

Dutch part of the Rhine catchment area. By this attempt at expanding the knowledge, the Dutch government attempted to increase its power of persuasion.

The Role of Interest Groups

In addition to the important role of the Dutch government, the contributions of interest groups were also important for the creation of the Rhine regime. In the national context, they influenced the viewpoints of the Dutch government. Internationally, they used their networks to influence the governments of the riparian states upstream.

Dutch drinking water companies proved to remain actively involved throughout the long period of negotiations. Since the 1930s they have warned the Dutch government about the effects of the increased dumping by the potassium mines for the salinity level of the IJssellake and about the risks entailed by other substances for the drinking water supply in the western part of the Netherlands (Brief van de Gezondheidsraad, 1932; RIWA, 1951; IAWR, 1981). In periodic consultations, the participants in the Rhine Commission of Drinking Water Companies (Rijncommissie Waterleidingbedrijven, RIWA) expressed their concerns to the Dutch government. Moreover, the RIWA started several lawsuits against the French potassium mines in the early 1980s.

The RIWA could embark upon this trajectory because of the activities through which the Clean Water Foundation (Stichting Reinwater) gained a high profile since its inception in 1974. Because of its disenchantment over the repeated moves in the intergovernmental negotiations on the salt issue, Reinwater started a lawsuit with financial backing from the Dutch government. The foundation joined forces with several horticulturists from the Westland region whose cucumbers and other products had suffered damages from the high salt load. These long drawn-out suits eventually had some success. First of all, the option to claim compensation through legal procedures was in 1976 boosted by a court ruling that within the European Community, the courts at both the location where the damage was incurred and where it originated had jurisdiction on the matter. This ruling offered new opportunities for starting lawsuits. Moreover, in 1988 the horticulturists actually received financial compensation from the potassium mines (Dieperink, 1997).

Once this favorable outcome had taken place, the Dutch government was in a position to stop defending the interests of the horticulturists. The issue of the dumping of salt was thereby narrowed down to purely a drinking water issue. Within this narrow context, the Provincial Water Control Agency of the province of North Holland (Provinciale Waterstaat van Noord-Holland, PWN) managed to have its specific problem – a too high concentration of sodium in the drinking water source at Andijk – incorporated into the Dutch position in the negotiations. After some further intergovernmental negotiations and in a move to link various issues, this integration was in 1991 effectuated. One part of the deal was the already mentioned diversion of the salt seepage from the Wieringermeer polder to the Wadden Sea. PWN thus successfully prevented excessive concentrations of sodium in the drinking water intake at Andijk. In combination with the temporary storage of waste salt in the Alsace, this option proved to be less expensive than the permanent reduction of discharges from the Alsace, on which agreement had already been reached earlier. A win-win situation could hereby be attained.

The city of Rotterdam also benefited from the judicial opportunities created by Reinwater. Through the Rhine Research Project (Project Onderzoek Rijn, POR) the city managed in 1984 to trace the companies which could be held accountable for the heavily polluted silt that settled in the Rotterdam port (Peels, 1995). The city's threat to sue the upstream companies which were dumping the waste resulted in the closing of several contracts with those upstream parties that promised to cut their dumping practices drastically. The Rotterdam threat to sue was joined by the Dutch government. During the negotiations on the Rhine action program, in 1987 Minister Smit-Kroes threatened to bill the upstream countries for the removal of the silt, that is to pass the cost of the construction of a special depot, the Slufter works, on to them (Verslag delegatieleidersoverleg, 1987). This proved to be an incentive for the German government to agree to the Dutch proposals for an action program with ambitious ecological goals.

Both the drinking water companies and the environmental movement repeatedly argued the need to intervene in the problems of the Rhine. The drinking water companies opted for the initiation of joint umbrella organizations, the Internationale Arbeitsgemeinschaft der Wasserwerke im Rheineinzugsgebiet (IAWR), and the French-inspired Eureau. The IAWR attempted to influence public opinion in the riparian states concerning the pollution of the river through the publication of white papers containing policy statements, and the convening of conferences. Eureau initiated similar initiatives within the European Community. Since 1974 the environmental movement channeled its lobbying efforts in Brussels through the European Environmental Bureau (EEB). Throughout the entire catchment area, environmental organizations collaborated as the International Rhine Group.

The Positions of the Upstream Riparian States and the European Community

With respect to the pollution problems of the river Rhine, the Dutch government has always been very proactive. The Netherlands was behind most of the initiatives, yet it was certainly not the only state focusing on the quality of the river. In spite of the sometimes troubled

negotiations, various clean-up initiatives were taken at the national level in the upstream riparian states. Also outside the Netherlands, the politicians were fully aware of the importance of the Rhine. It may be concluded that in this respect, the Netherlands is surrounded by "good neighbors."

Even before World War II, throughout the Rhine catchment area there were legislative initiatives, and clean-up measures were implemented and research was carried out. Even though it is located downstream, the Netherlands was in this sense not always the most progressive among the riparian states. That honor belongs rightly to Germany and Switzerland. The first sewage treatment plant was built in the Ruhr area (Karnap) in Germany by the end of the last century (Van der Zee, 1959) and measures against eutrophication were first introduced in the Swiss lake district (Wetgeving en organisatie, 1962).

However, this history was not always reflected in the negotiations. The specification of the Rhine Chemicals Convention in international norms by elements and by industries moved ahead very slowly because Germany insisted on linking it directly to the elaboration of the European Framework Directive for Surface Waters (Böhmer, 1990). Since 1976, the European Commission has been a formal member of the International Commission for the Protection of the Rhine, to enable the coordination of the specification of the norms in the official consultations. In the International Commission for the Protection of the Rhine, the Germans were only willing to formalize the norms after a consensus on this had been reached by the Member States of the European Community in Brussels. This consensus building was complicated because the United Kingdom on the one side and the other Member States on the other side had fundamentally opposing views on the approach to be chosen. The United Kingdom opted for a formalization of water quality standards, by which a maximum allowable concentration of substances in surface water was specified, while the other European countries preferred uniform emission standards to harmonize the conditions of competition. So, the negotiation between the riparian states of the Rhine during the 1976–1986 period resulted in emission norms for only six elements (mercury, cadmium, DDT, HCH, PCP, tetra). In spite of this paucity of formal results, substantial clean-up results were attained at the level of individual companies.

During the 1980s, support for an international concerted effort to improve the ecosystem of the Rhine increased. Initiatives were taken not only in the Netherlands, with the plan Ooievaar concerning the possible return of the black stork to the catchment, but also in Germany with the plan Naturnahe Gewässer in the state of Hessen, and independently from these initiatives, a more ecological model of water management had emerged in the French Agence de Bassin Rhin-Meuse. Because of such initiatives, there was almost always a ground for the exchange of views within the ICPR.

The Role of the International Commission for the Protection of the Rhine

The most important conditions for a successful development of the regime for the river Rhine were perhaps found in the combination of a downstream party which showed much initiative and cooperative upstream parties. Nevertheless, the International Commission for the Protection of the Rhine has also provided strong incentives. The ICPR has proved to be especially helpful with respect to the development and exchange of knowledge concerning the quality of the Rhine. Furthermore, it offered a setting for conducting the negotiations.

The ICPR was able to assume the role of the pivot of the international knowledge community, because it managed to fill the gaps in the knowledge base. It promoted the insight in the nature, the development, and the origin of the pollution by harmonizing measuring and analysis methods, the development of a network of measuring stations, and of a signaling and alert system. The insight was greatly boosted by the collection and exchange of information on area-specific details. Within the ICPR there was a lively exchange of the knowledge needed for the correct interpretation of the sampling results. This promoted the growth of unanimity on the exact effects of the concentration of certain substances for the various functions of the water system. Agreement grew on such issues as the need to deal with specific problems. Moreover, the ICPR activities yielded a greater insight in the technical and financial options to diminish the pollution. The principle that the "best available technology" should be used to reduce the pollution was thus given concrete form in certain sectors. Furthermore, the development of ecological knowledge was promoted through the activities of the ICPR. One example of this is the inventory that was made by organizations of the ICPR members of the potential spawning sites for migratory fish and of the barriers which these fish might encounter on their journeys upstream. The results of this inventory were published in a special Rhine Atlas (International Commission for the Protection of the Rhine, 1999a).

The ICPR offered the riparian states a setting for meetings to discuss the problems and elaborate the strategies for their resolution. To this end, the permanent secretariat of the ICPR provided for the necessary support. It prepared the minutes of the meetings, the translation of submitted documents, and the draft versions of reports and treaties. Moreover, it was instrumental in the attempts to increase the political and public participation in dealing with the pollution of the Rhine, which were promoted especially by the Netherlands. It tackled this task by the publication of annual reports and by issuing many reports on various aspects of the issue of quality (approximately 100 such publications since 1987), as well as by circulating its periodical Rhine-Aktuell. Through easily accessible publications about the salmon and its own website,

the secretariat also supported the popularization of the ecological approach (International Commission for the Protection of the Rhine, 1999b).

The Improvement of the Water Quality

The development of a progressive regime was also facilitated by the declining urgency of many of the problems over the years, as various forms of restructuring took effect.

The pollution of the Rhine has declined significantly. In the early 1970s, the Rhine was a dead river; it was the sewer of Western Europe. Currently, the concentrations of chemicals carried by the river have declined to levels that many consider to be acceptable (International Commission for the Protection of the Rhine, 1999c). Even its salt load, for years the dominant issue of the Rhine, has been declining in recent years. Consequently, the Dutch drinking water companies and the Foundation Reinwater have gradually shifted their attention to the quality of the river Meuse, as well as to problems that are less typical for specific regions areas, such as the pollution from diffuse sources.

These considerations were acknowledged by the Conference of Ministers in January 1998 (International Commission for the Protection of the Rhine, 1999d). This conference showed a broadly shared agreement that the goals of the Rhine Action Program had been largely attained. Although the program had been only politically and not legally binding, it yielded an active tackling of the discharges in the catchment area. The discharges of most of the substances specified in the Rhine Action Program from industrial and communal sources have been reduced by more than half (and in some cases by even 80 percent). No less than 95 percent of the fifty million inhabitants in the catchment area have been connected to largely third-stage sewage treatment plants. Consequently, the load of nitrates has been diminishing since the early 1990s. Moreover, the incidence of accidental spills has been diminished substantially, because extensive safety measures have been put in place.

The effect is noted in the apparent recovery of the ecosystems in the catchment area of the river Rhine. In 1996, some 20 salmon have been reported to return to the upstream spawning grounds in Germany (International Commission for the Protection of the Rhine, 1999c). Fish ladders constructed in the Rhine and several of the tributary streams have made this possible. This indicates that the Rhine is considered as a major axis for animal migration and leisure. In 1998 some 44 species of fish populated the river in addition to the salmon. Also the development of plankton, crustaceans, and waterfowl point to the improvement of the quality of the waters.

Conclusions

A strong involvement of downstream parties, in combination with condescending upstream parties, proved to be crucial for the development of the Rhine regime. But a consensus of downstream proposals could only be attained at the moment that all parties would benefit. For this, the time had to be ripe. The salt issue could be removed from the agenda because after years of open conflict a more flexible and advantageous solution came within reach. The Rhine Action Program was considered attractive because the time had come for a more ecologically-inspired approach and because the Sandoz disaster had clearly revealed the vulnerability of the Rhine ecosystem to the public at large.

The Rhine Chloride Convention, the Rhine Chemicals Convention, and the Rhine Action Program expressed strategic visions (goals and instruments) that offered the riparian states a framework for change. Within and outside the ICPR, these visions stimulated a broad involvement in the issue of the Rhine river. Due to the ICPR, contacts were established among national research organizations. Within the ICPR, the visions promoted the discussion of the quality parameters and the measuring methods, the norms for emissions and immissions, the prevention of calamities in the catchment area, the implementation of measures for the management of the river, and the construction of fish passages. Beyond the ICPR, the visions stimulated the self-regulation of the private sector that was revealed in the development of environmental technology and the formation of some joint public-private initiatives. These visions also contributed to the increase of the public involvement in the issue of the quality of the Rhine. This became especially obvious when a recognizable goal was selected in the form of the return of the salmon. To be meaningful, a strategic vision must be connected to dormant national initiatives.

The case of the Rhine river also shows that an organization at the level of the catchment area can serve to collect information on such initiatives. The participation of high-ranking officials in the organization is needed to develop an optimal interaction of national and international developments. Where necessary, the ministers themselves should resolve impasses. The negotiations on the Rhine have revealed that a constructive dialogue does not need an organization with supranational features. The recommendations issued by the ICPR were always unanimous.

The existence of an organization at the level of a catchment area as an important condition for the development of a progressive regime has not only been underlined in the literature (LeMarquand 1977; Trolldalen 1992; Wessel 1996; Mostert, 1999) but also in daily practice. The European Commission has specified the catchment area as the only logical scale for the management of a river in its new Framework Directive (Commissie van de Europese Gemeenschappen, 1996). This is underlined by the Commission by granting funds to the Danube states to set up a catchment area organization (Danube Programme Coordination Unit, 1995). In addition, commissions were es-

tablished for the Elbe, Oder, Meuse, and Scheldt rivers during the 1990s. Currently, these commissions are elaborating experimental action programs.

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