Policy Networks in Dutch Water Policy

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In addition to the well-known programme for flood protection, Dutch water policy consists of two main subsectors; water supply and ground water protection, and surface water quality management. In this contribution special attention is paid to the characterisation of these subsectors using two network variables; mutual commitment and interrelatedness. The dynamics of change of these features and their relation with policy opportunities are examined. The water supply sector was amalgated into larger companies and developed more cooperation as a result of the pressure of the environmental challenge, which made it impossible to continue pumping and billing. Though the sector in a sense became more integrated, this was accompanied by an increased need to do business with other interests, such as agriculture. The surface water quality subsector also moved from a very integrated community into a more open structure. This openness is, however, to a large extent organised by the sector itself, by incorporating other interests in their councils and committees. Both subsectors increasingly adopt a consensual approach in dealing with these other interests.

The most widely known water-management role of the Netherlands is surely the protection against flooding. Some other aspects of water management, however, have received more attention as a policy issue during recent decades. The history of water management in the Netherlands shows how the emphasis has shifted over the years and how this management has become more wide-ranging. In the course of time it has passed through four stages.

The first period is distinguished by protection against flooding from sea-water through the building of dikes. The main concern was keeping one's feet dry. This period started early in the Middle Ages. Safety has increased since then. In the second period protection against flooding remained a concern, but involvement in the control of the water level for the benefit of agriculture and

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shipping was added. In the third period the emphasis shifted to the protection of water quality.

Reconstruction and expansion of industry predominated after the Second World War. Agriculture was also swept along in this industrialisation process, leading to prosperity but also to a veritable surge of pollution. To combat this threat, the 1970 Pollution of Surface Water Act and the 1975 Pollution of Sea Water Act came into force. For a number of substances the result can be clearly shown.

The fourth period can be characterised as integrated care for the condition and use of water systems. This period started in 1985 with the memorandum 'Living with Water', in which the idea of integral water management based on an approach of water systems or water areas as a whole was introduced. Multifunctional and sustained use are prominent now. The question today is how these diverse interests can be reconciled.

The development of water management is analysed in these four periods, during which concern for water was repeatedly adapted to new social demands whilst retaining existing policy issues.

As suggested in the introduction of this volume, networks can be characterised on several dimensions [van Waarden, 1992]. In this article we concentrate on the dimension of *integration versus fragmentation*. At one end of this dimension networks are mere issue networks [Rhodes and Marsh, 1992: 183].

Kenis and Schneider [1991: 40–42] see networks as a specific class of policy-making structures beyond or between policy markets and characterised on the basis of three elements: actors involved, their linkages and the structure's boundary. In order to distinguish between policy communities and issue networks, Jordan [1981: 46] specifies these features of the following variables: the number of actors involved, the stability of the relations and the openness or closedness of the arena. Jordan and Schubert [1992: 25] combine the first and third variables and replace the second by the sectoral or trans-sectoral scope of the network. The background for this variable is that competing belief systems and interests hamper the networks' ability to act. Van Waarden [1992: 46] characterises issue networks, not only by their open boundaries and resulting high number of participants, but also by the difficulty in tracing the locus of decision-making and their diffuse dependencies and power relations as a principal characteristic.

In our view the number of participants as such is a risky variable to use in order to characterise a network. This variable depends heavily on the level of analysis, interpersonal or interstructural [Rhodes and Marsh, 1992: 185]. Only when a certain level of analysis is fixed can the number of participants be regarded as a relevant factor for the degree of fragmentation of decision-making. Van Waarden seems to imply that fragmentation of decision-making

is a main characteristic of issue networks. Dietz and Ryecroft [1987: 77–101] characterise policy communities with the variables ‘personal contacts’ (out-reach, prominence and the intensity of communication), ‘personnel flows across organisations’, ‘legitimacy’ (sympathy for a particular groups policy position) and ‘power’. The last variable is in fact not being used separately but to measure whether the estimated power of the participants matches the distribution of sympathy. In total these variables seem to measure a meta-variable which can be labelled as ‘integration’. Kingdon [1984: 123–125] stresses the importance of the degree of fragmentation. His description of transportation and health communities shows that he does not regard the number of participants as a key factor, but rather the degree of interaction between them and the degree to which participants share the same understanding of what the sector is about. The number of actors is important only in so far as it changes the type of interaction within the network.

The variables used by Dietz and Ryecroft and by Kingdon reflect structural, cognitive and affective aspects of the dimension of integration versus fragmentation. The structural variable is the intensity and stability of mutual interaction. This interaction may consist of written and verbal communication, but also of exchange of personnel and the existence of formalised meeting groups and active intermediaries, which aim at an improvement of the contacts within the network. In an earlier paper we referred to this variable as ‘interrelatedness’ [Bressers and Kuks, 1992: 10]. The affective aspect of the dimension of integration versus fragmentation can be termed ‘commitment’: the extent to which individuals, groups and organisations within the network sympathise with each others’ main objectives, as far as these objectives are relevant to the policy area [Bressers and Kuks, 1992: 11]. The cognitive aspect is not always easy to separate from the affective aspect and is for this reason excluded from the typology we introduce below. However it relates to the belief systems of the actors involved, and to the causal relationships they assume in the policy area.

The extent of interrelatedness and the extent of commitment can each be distinguished dichotomously, yielding a matrix with four cells. Of course we do not, by using these dichotomies, deny the fact that many institutions can be intermediate with respect to the distinguished variables. Policy communities are characterised by a combination of strong commitment and strong interrelatedness, issue networks by a combination of weak commitment and weak interrelatedness. Though both characteristics will tend to reinforce each other [Kingdon, 1984: 126], there is no reason to assume that the other two combinations will not occur.

What influences can we expect these different types of networks to have on policy formulation and policy implementation? Kenis and Schneider regard as one of the main applications of network analysis ‘cross-network

comparisons to develop (or test) hypotheses explaining the effect of aggregate characteristics of the policy network on specific interactions' [1991: 45]. Though the scope of this article does not allow testing hypotheses on these influences, some explicit expectations can serve as a useful backgrounds for the description in the following sections.

Our central hypothesis suggests that in the case of policy formulation the initial characteristics of the network will tend to reproduce themselves by means of the choice of goals and instruments [Luhmann, 1984; Mahoje, 1989: 116–144; Rhodes and Marsh, 1992: 198]. With respect to the policy objectives we simply assume that a strong commitment will result in a relatively strong resistance by policy-makers to objectives that require an extensive behavioural change of their target group. In this case the resistance is aimed at the outside world, which tries to force these objectives upon the network.

For policy networks with weak interrelatedness and a weak commitment (issue networks), we expect a preference for direct regulation. For the case of weak interrelatedness combined with strong commitment, we expect an emphasis on subsidies for investments and investigation and written information. A strong interrelatedness and a weak commitment will lead to an emphasis on responsibility (self-regulation) and the use of covenants and other negotiated instruments. A combination of strong interrelatedness and strong commitment (policy communities) will lead to a relatively pragmatic choice of instruments. Subsidies and personal information (education and advice) will be the most important instruments, although there also will be room for all other types of instruments when they seem to be necessary to restore 'law and order in our own house' [Bressers, 1993].

The relations between fragmentation in the network and *policy implementation* has been subject to extensive debate. Edwards views fragmentation as 'the dispersion of responsibilities for a policy among several organizational units' [1980: 134–141]. Though his conceptualisation of fragmentation is somewhat different from ours, the results of fragmentation he expects are nevertheless relevant: difficult coordination, duplication of services, agencies working at cross-purposes, functions that fall between the cracks, and agencies developing narrow *foci*, leading to inflexibility. Likewise, Mazmanian and Sabatier [1989: 11–12] use a concept of integration that is interesting for our purposes because they relate it to policy implementation. They operationalise integration in terms of, first, the number of veto/clearance points and, secondly, the extent to which supporters of statutory objectives are provided with power over those with a potential veto. Because the second is often absent, the first is extremely important in their view. They regard the difficulty of obtaining coordinated action as one of the best-documented findings in implementation literature. 'To the extent that the

TABLE I
ACTORS INVOLVED IN GROUND WATER MANAGEMENT AND SURFACE
WATER MANAGEMENT AT THE NATIONAL, REGIONAL AND LOCAL LEVEL IN
THE NETHERLANDS

	Ground Water Management	Surface Water Management
Management at the National Level	Ministry for Public Works Public Works Agency Ministry for Environmental Protection	
Consultation at the National Level	Main participants: - Association of Dutch Water Supply Companies - Agricultural Board - Ministry for Environmental Protection - Ministry for Agriculture - Interprovincial Consultation	Main participants (by representation in the CUWVO): - Union of Waterboards - Interprovincial Consultation - Association of Dutch Municipalities - Public Works Agency - Ministry for Environmental Protection - Associations of Industries
Management at the Regional Level	Provinces (nationally represented by the Interprovincial Consultation)	
	Water Supply Companies (private companies, nationally represented by the Association of Dutch Water Supply Companies)	Water Boards (public agencies, nationally represented by the Union of Water Boards)
Consultation at the Regional Level	Main participants: - Provinces - Water Supply Companies - Farmers Associations	Main participants (by representation in Water Board): - Industries - Farmers - Municipalities
Management at the Local Level		Municipalities (responsible for sewerage system)
Production at the Local Level	Drinking Water Production Units (managed by the Water Supply companies)	Waster Water Treatment Works (managed by the Water Boards)

system is only loosely integrated, there will be considerable variation in the degree of behavioural compliance among implementing officials and target groups as each responds to the incentives for modification within their local setting' [Mazmanian and Sabatier, 1989: 27]. Both Edwards and Mazmanian and Sabatier seem to agree that lack of integration poses a major threat to successful implementation.

As a possible contribution to a strategy of handling lack of integration, Winter [1990: 29–31] refers to Bardach's idea of creating a 'fixer' as a structuring device. More fundamental are the questions posed by Goggin and others. They relate the essence of network analysis to the 'bottom up' perspective on implementation [Goggin, Bowman, Lester and O'Toole, 1990a: 185]. They regard the idea that a uniform and hierarchically well

integrated administrative structure leads to a better implementation as a top down view. Several bottom up studies give examples of complicated structures actually encouraging success during implementation. They conclude that while simple and integrated structures are likely to produce a smooth process, it is important to keep in mind that prompt implementation does not always lead to optimal outputs and outcomes. Complicated and dynamic policy areas might benefit from complicated and dynamic implementation structures, not for realising planned action but for grasping any chance to enhance goal-attainment.

The way in which we operationalise the dimension of integration versus fragmentation, setting complexity aside and focusing on interaction and sympathy, links the concept to the notion that integration is good for implementation, including outputs. However, we also pay attention to complexity as a separate network characteristic.

This study concentrates on three sectors: surface water, groundwater and seawater. Seawater quality protection is partly dependent on surface water management. Another distinction is: legislation on quantity aspects, legislation on quality aspects and legislation on institutional aspects within each water sector. While quantity and quality are often integrated in the responsibilities of water management agencies, the division of surface water management and ground water management (including drinking water production) is reflected in the existence of separate agencies, with relatively few linkages. Water management in the Netherlands is therefore formulated and implemented in at least two separate policy networks. Table 1 gives an overview of the actors involved in groundwater management and surface water management at the national, regional and local level in the Netherlands

The next section of this study discusses groundwater protection and drinking water supply. The third section will focus on the policy network involved in surface water management. Both sections attempt to describe and characterise these networks in terms of complexity, commitment and inter-relatedness, give some of their history and assess their influence on relevant policy formulation and implementation processes and outputs. The conclusions compare networks both in relation to the theoretical concepts described in this section and in terms of the developments in their scope, approach and openness.

The Network of Organisations Involved in Groundwater Management

The Water Supply Sector Grows into a Policy Community

Environmental interests have only recently gained attention within Dutch groundwater management. Initially, groundwater was managed only for

reasons of supplying drinking water and for related reasons of health care. For that purpose the Ministry of Health Care introduced the Water Supply Act in 1957, not only to make demands on the quality of piped drinking water, but also to institutionalise the organisation of the drinking water sector. This act formalised an already existing practice in which provinces could allow or forbid the establishment of new, or the extension of existing water supply companies.

Until the turn of the nineteenth century, most of the water supply companies were local and private initiatives. At the start of the twentieth century local companies were established, often with the participation of municipalities. Municipalities and private sector companies were not willing to cooperate in all cases, however. To guarantee the efficiency of waterworks all over the country, several provinces developed their own regulations for water supply, a practice later strengthened by the Water Supply Act.

Since 1975, most of the provinces have made plans for a further concentration of water supply companies. The number of companies was reduced from 102 in 1980 to 49 in 1990. But there are plans for a further reduction to about 30. The provinces and the drinking water sector itself, as represented by the VEWIN (the Union of Dutch Water Supply Companies), agreed that the structure of the drinking water sector in its present form does not fit the demands for securing clean water supplies in the future. They think that water supply companies can maintain their role only if they have a strong organisation, which implies sufficient technological know-how and financial capacity.

The supply companies that use surface water for the production of drinking water have more problems with guaranteeing good quality than those who use groundwater. The latter consider themselves to be relatively invulnerable, and that is why there is a lot of resistance among them to reorganisation plans. Their arguments are that they have never had problems with the supply of water, that it has always been of good quality, that their charges are reasonable and that their customers are still satisfied [*van der Knaap, 1987*]. The smaller companies especially – mostly without the participation of provincial authorities – try to maintain their autonomy. But they face the burden of demonstrating that they can still operate in an efficient way. The VEWIN is very cautious in taking a stand [*VEWIN, 1989*]. Actually, it supports the idea of developing more professionalism and efficiency in the drinking water sector. But the VEWIN tries to avoid confrontation with the smaller companies, since it wants to be an organisation that represents the entire drinking water sector.

We conclude that up to the 1950s the water supply sector may be seen as a rather fragmented network. Though the companies shared a common purpose, they acted separately. Water supply companies arose as local initiatives and for a long time they wanted to maintain their autonomy.

Even today, the smaller ones are still fighting against provinces in order to revise reorganisation plans. After 1957, the sector became more integrated because of two developments. First, reorganisations and mergers between companies created larger units in the sector and an increasing interrelatedness. Second, the interrelatedness and commitments within the sector increased because of the strengthening of organisations that were developed to support the collectivity of companies, like the VEWIN and the KIWA (a research institute for technological innovations in the water supply sector). The need for increasing efficiency in the sector encouraged a strong policy community with a technocratic approach to the problems that the sector was encountering. These institutional changes were thus generated from inside the policy community, based upon a common perception of the way forward.

The Water Supply Sector Encounters the Agricultural Sector in an Issue Network

A serious threat to drinking water supply is the presence of nitrates in groundwater. More than 50 per cent of Dutch groundwaters (especially in the east and south) are likely to become unsuitable as a drinking water source in the near future. They are situated in areas with a sandy soil and many intensive cattle breeding farms (which tend to spread more manure on the soil than is necessary). Although there were indications that excess manure was being produced in some regions in the Netherlands as early as the mid-1960s, it took until the 1980s – because of a struggle between the Ministry for Environmental Protection and the Ministry for Agriculture – before the government seriously began to deal with the manure problem. The Soil Protection Act, which came into effect in 1987, is the first Dutch legislation that aims at integrated protection of the soil and the underground water. It is primarily aimed at preventing excessive manuring, by regulating manure spreading on agricultural land. The Act contains a number of standards to fix the amount of manure which is allowed to be spread. These standards apply nationally.

The Soil Protection Act also provides additional protection for areas in which groundwater needs to be withdrawn for the supply of drinking water. Provinces are authorised to establish so-called groundwater protection areas and to enforce more restrictive manuring standards in these areas. The Act further provides that farmers within the protected area should be financially compensated for the losses (disposal costs for the surplus of manure) they suffer as compared to farmers outside the protected area. Requests by farmers for compensation will be dealt with by the provinces, which can collect funds for this by means of a charge paid by those who abstract groundwater (mainly the water supply companies). The levy is related to the amount of water abstracted. Water supply companies can charge the consumers of drinking

water through a levy. In effect, the consumers of drinking water pay for the production of a collective good.

The reason for the compensation provision was to prevent protests from farmers in groundwater protection areas who encounter more restrictions than farmers outside those areas. Legislators feared that the more restrictive standards in ground water protection areas could not be enforced without compensation. The political parties on the left opened the discussion on a motion to reject the provision because it would implicitly admit a right to pollute. The provision was felt to contradict the polluter-pays principle. In the event, the equality principle took precedence. The consumers of drinking water seem to have had no voice in this political debate. They pick up the costs of pollution caused by farmers, as they do in other countries such as Britain and Germany.

The drinking water sector thus encounters a very strongly organised opponent from outside the sector, as far as the farmers are concerned. Although the agricultural sector only forms five per cent of the active working population in the Netherlands, it has considerable influence in Dutch politics. Since 1954 the agricultural sector has been nationally organised through the Agricultural Board. The agricultural lobby is very effective, which is, for example, reflected by the fact that it is usually consulted at a very early stage of policy-making. The Agricultural Board also has regional boards in each province that consult with the regional or local authorities, particularly about planning and land use. The regional boards play an important role in determining the manure policy for groundwater protection areas. They negotiate with the provincial authorities and with the water companies involved concerning the manure restrictions applicable in these areas over the disposal of the resulting manure surpluses, and how farmers are compensated for the losses they incur.

While the agricultural sector is strongly developed both at the national level and the regional and local level, the drinking water sector for many years was not. Traditionally, water supply companies are organisations that are proud of their autonomy, as described above. The VEWIN always played a modest political role, and at best it was only active in emergencies. Normally, the VEWIN mainly has a service function with respect to the drinking water sector. At the end of the 1980s, the VEWIN became more politically involved and responsive, although the political discussion over the Soil Protection Act had already been concluded. Also, because of a presidential change (the presidency of VEWIN was taken over by the governor of the province of Zuid-Holland), the VEWIN succeeded in moving the negotiations concerning the compensation in groundwater protection areas from the regional level (where one negotiator from the Agricultural Board representing the whole of the country negotiated with each water supply company

separately) to the national level. Since then, the framework for regional negotiations is at the state level.

We conclude that external interests and pressure on the water supply sector in some sense strengthened the sector as a policy community. It became a more tightly organised policy community, especially in terms of an increasing commitment between the members of the community. Meanwhile, however, the issue of agricultural pollution of groundwater confronted the water supply community with another strong policy community, the agricultural sector. This sector is very experienced and has a long tradition of lobbying and negotiating strategies. The agricultural sector as a network is not only characterised by a strong commitment, but also by a strong interrelatedness. This strong interrelatedness forced the water supply sector to participate in negotiations on a more aggregated (regional and national) level. In fact, it strengthened the interrelatedness within the water supply sector.

Consultations between Water Supply Companies and Farmer Organisations as the Most Promising Strategy

The discussion of the compensation provision shows that the regulatory strength (control capacity) of the authorities is very limited in the case of groundwater quality management. Although they try to regulate by means of ordinances and prohibitions, the enforcement of these rules is difficult. Therefore, a system has been chosen in which private organisations (water supply companies) have to participate in the enforcement of the rules.

The drinking water sector is beginning to define its role, however. The director of VEWIN, T. Martijn, states that:

This is a considerable change for organisations which traditionally are engaged in pumping and presenting the bill. However, if you want to create groundwater protection areas, then others may have reduced opportunities to use the soil in these areas. If that is the case, groundwater protection can only be achieved by offering compensation to them. This is not a new phenomenon: the drinking water sector already contributes a third (about 20 million guilders) to the costs of the Rhine Salt Treaty. In the third National Water Management Directive this is called 'paying for quality' [Jehae and van Soest, 1990].

The compensation provision formally implies that farmers can claim their losses against the province, which in its turn may charge the water supply companies that abstract groundwater in that area. Water supply companies prefer to settle the matter in a friendly atmosphere. They also want to control the disposal costs of manure surpluses and to avoid unnecessarily high bills. For both reasons, several water supply companies have become involved in

the disposal of manure surpluses. Also, an increasing number of companies are trying to buy out farmers in areas that are most vulnerable.

Although methods exist for the purification of groundwater in the case of pollution with nitrates, the drinking water sector strongly opposes this option as a long-term solution. The Director of VEWIN explains:

If the water supply companies started with complete purification tomorrow, the polluters could no longer be forced to change their behaviour. We want to use the drinking water, and with that the consumer, as a crowbar for improving the environment [*Veleva et al., 1989*].

The strategy of consultation, chosen by the water supply companies to deal with agricultural pollution of groundwater, had already been tested by the companies needing to use surface water for their drinking water production. Those companies are mainly located in the western part of the Netherlands. They have huge problems with maintaining good water quality. A great part of the pollution in these rivers stems from foreign industries, which means that they are dealing with extra-territorial actors. The director of VEWIN indicated that VEWIN only reluctantly develops new techniques for analysing water for the purpose of tracing polluters. However, the data can often be used to exert pressure on polluting industries. For example, the City of Rotterdam has chosen to talk to polluting industries, even when they are abroad, rather than take judicial action. Mr F. Feith, of the City of Rotterdam, stated:

We try to handle the collected data very carefully, just because we want to get in conference with the discharging industries. Negative publicity will be applied only when the polluter is really unwilling. However, threatening publicity has proved to be a very strong instrument [*Jehae and van Soest, 1990*]

This demonstrates that the drinking water sector realises that it has its own role in water management, and that it can often be more effective than other authorities. This seems to be true for the case of point source pollution. But is this also true for non-point source pollution? Consultation with polluters was seen to be the only solution to the problem, since the national and provincial authorities were unable to guarantee strict enforcement of regulations. However, the case of groundwater protection areas also demonstrates that the possibility of using a consultation strategy heavily depends on the extent to which non-point source polluters are organised. The agricultural industry is very well organised and that may be one of the reasons why it became the first target group addressed by the Soil Protection Act in 1987.

In practice, the approach seems to have been based largely on self-

regulation. Thus, when the General Secretary of the Ministry for Agriculture signed an agreement with the Agriculture Board concerning the use of pesticides, he argued that for reduction in the use of pesticides by farmers, consultations with the target group should be held.

One can prohibit the use of pesticides, but the need for them will not disappear. Such a measure has hardly any effect, because the farmers would use other, even illegal, means which could be worse if used on a large scale. In practice, the reason for using too much pesticides today is that farmers have too little knowledge about how to use them and use excessive quantities 'just in case'. A more effective strategy might be to increase expertise within the agricultural sector itself.

However, it remains very difficult for authorities and water supply companies to address the problem of non-point source polluters who are not very well organised. One of the reasons why it is difficult to trace polluters is that pollution reaches the groundwater only after a long period. Even if farmers stopped all manure spreading, it would still take 15 to 30 years before the current nitrate pollution is extracted with groundwater used for the production of drinking water.

Finally, we may formulate some conclusions about the way in which the water supply community dealt with external threats. On the one hand, water supply companies reacted in a very technocratic way by searching for technological innovations to satisfy the demand for drinking water of an acceptable quality. On the other hand, they tried to oppose the Soil Protection Act which ignored the polluter-pays principle. They did not succeed in their opposition, although they were strongly supported by environmental groups. The water supply sector and the environmental groups have in common the fact that they support the polluter-pays principle. In this sense, the strong relations between the water supply sector and environmental groups can be conceived as the existence of a broader policy community. However, the interrelatedness in this community is weak: no strong or intensive interactions exist between both sets of actors. In the end, the polluter-pays principle was not applied, due to a successful lobby by the agricultural sector and the lack of political organisation and influence of drinking water consumers. The most feasible political outcome appeared to be to saddle customers with the costs of pollution prevention.

Another indication of the existence of interests that are common to the water supply sector and environmental groups is that they both stress the importance of strict rule enforcement. However, water supply companies do realise that it is very difficult to control the spreading of manure. The control capacity of the regulatory agencies (provinces) is limited with respect to this. That is why the water supply sector expects better results through direct negotiations with farmers' organisations. After the settlement of the com-

pensation provision in the Soil Protection Act, consultation with target groups was left as the most promising strategy in the issue network in which the water supply sector and the agricultural sector both participate.

The Network of Organisations Involved in Surface Water Management

In this section we will focus on management of surface waters in the Netherlands. As described earlier, there are two aspects to this matter: quantity and quality. We shall focus mainly on the quality network in this section, with certain exceptions. However, since the two networks for water quality and quantity overlap, we also describe much of the quantity network.

First we describe the authorities in the surface water quality network. The governmental organisations in the network have a different relationship with the outside world when managing their two main tasks; collective wastewater treatment and reducing industrial emissions. Then we deal with some aspects of these 'extended networks'. All sections focus on the consequences of institutional and other network characteristics on interorganisational processes.

Water Quality Management Authorities

In 1970 the Pollution of Surface Waters Act (acronym in Dutch: WVO) came into force. The law was proposed in 1964 after serious deterioration of surface water quality in large parts of the Netherlands had emerged and after widespread recognition of the problem. However, the Act was not passed until 1969. It took so long because all kinds of government authorities lobbied to become the principal authority in this field: central government agencies, provinces, water boards and municipalities.

The law introduced the first general water quality regulations applicable to all surface waters in the Netherlands. The law distinguishes between national surface waters that are managed by the national government and other waters that are under the responsibility of other sub-national level governments. The national waters include the main rivers, the Waddensea and the North Sea. The water quality task of the national government consists of giving management directives, planning water management, granting permits to dischargers into state waters (including the discharges of effluent from treatment plants of adjacent water boards), collecting charges from the same category of dischargers, measuring surface water quality and subsidising abatement measures, typically the building of treatment plants by waterboards. The authorities responsible for regional waters have the same function, with the exception of subsidies, but with the important addition of building and operating water treatment plants [CUWVO, 1990].

The law assigns the responsibility for the regional waters to the provinces. However, the provinces are authorised to delegate these tasks to water boards

or municipalities. This resulted in a delegation of the task by nine provinces to water boards. In 1993, however, one of the three remaining provinces delegated its task to a newly established water board and the other two are expected to follow soon. Nearly all treatment plants are managed by these provinces and water boards. Municipal treatment plants hardly exist and are regarded as an anachronism. The prime responsibility of municipalities in water quality management is the management of sewage systems, and to some extent, as we shall show later, pollution control of discharges into their sewage systems.

This complex configuration was a compromise in a long-running battle between provinces, water boards and municipalities over the issue. They were all eager to undertake this work. Not only the delegation arrangements, but also the relations between provinces and waterboards were subsequently influenced by the legal changes. Provinces have general tasks in supervising some of the policies of municipalities and water boards. The way they supervise the water policies of the water boards varies widely. In cases where the delegation was forced by the water boards rather than granted willingly by the provincial water agency, supervision is much more intense.

Since 1970, several extensive debates on the future of the Dutch water board system have taken place, in which not only the desirability of the water quality delegation was questioned, but also the existence of the water boards themselves. Organisations with wide powers, such as provinces and the Department for the Environment, challenged the assignment of these tasks to separate single-issue agencies, such as water boards. These discussions did lead to an extensive modernisation effort by the water boards, but not to a real weakening of their position. At the outset, it was a closed network of people with an interest in water quantity management. The water boards were considered a separate world, although they were formally government organisations. Also the scale on which they operated was very local. Because of their new tasks, water boards are now operating on a larger scale; many of them have merged. This means that water boards are now more like government organisations than previously. To a large extent, professionalisation has occurred, and more and more administrative and highly educated employees now work for water boards.

Also new interests are now represented in the councils of the water boards. These include renters of agricultural property, inhabitants of the area in which the water boards operate, domestic polluters, and industrial polluters. This, combined with a new policy planning structure, has led to a situation where water boards now have to consult and coordinate with others more intensively than previously. As the former chair of the Union of Waterboards put it:

The water board organisation that existed not so long ago had, although it consisted of government organisations, few contacts with other administrative organisations. The water boards had their own problems, which created a strongly closed character. The others were not very interested ... it was considered to be the business of a limited group of interested parties ... This has changed as a result of the developments that the water boards have gone through. The water boards no longer stand alone, but are part of the Dutch administrative system, with all due consequences [*Kienhuis, 1987: 423–424*].

In addition to the challenge from other governmental organisations claiming parts of their tasks, the water boards were also forced to integrate in the system and 'open up' to some extent. This was because of the features of these new tasks themselves, demanding much more cooperation with others, than had been the case with the older engineering tasks.

These changes did not decrease the overall importance of the 'Union of Waterboards'. This is a private association which unites all Dutch water boards in defence of their common interests and coordinates their policies on a voluntary basis. The way in which the Dutch surface water management is organised calls for much coordination. The association of water boards plays an important role in this respect, without being dominant. A common sense of togetherness is felt in the entire water management world against the threat of a takeover of water quality responsibilities by the Ministry of Environmental Affairs. This is a threat to the water-oriented national level authorities and agencies, to the provinces, to water boards, and even to environmental departments at the provinces (and to public works departments of the same provinces). There is very little animosity between water quality managers at the national and the water board levels. A further binding mechanism is cultural coordination, provided by a common education and training system. These factors explain why there are coordination mechanisms with a high degree of legitimacy in the eyes of individual water boards, which are consensus oriented, while having a broad array of participants. An example is the Commission on the Implementation on the Pollution of Surface Waters Act (CUWVO: see below).

Our conclusion is that the institutional and administrative structure of surface water management in the Netherlands is very complex, but that within the group of agencies directly involved there exist a common belief system and a substantial degree of commitment and interrelatedness. This concerns only the inner core of the administrative actors, however. To characterise the broader network we should see it in action. Those actions imply contacts with people and organisations outside the inner water community. The water community meets different groups of organisations under

different circumstances when carrying out its two main tasks: wastewater treatment and reducing industrial emissions. These fields will be discussed in separate sections below.

The Building of Wastewater Treatment Works

In this part of our text we focus on the network activity of building Wastewater Treatment Works (WTWs). The building process includes several stages, such as financing the project, designing the plant, siting and obtaining permits for the plant, and actual construction. Because construction and design of plants is not problematic administratively, this section focuses on financing, siting, and licensing of the plant, in that order. For analysis of the processes of acquiring the site, the licence and the planning permission, we conducted several interviews with representatives of municipalities, water boards and others.

One of the most distinctive features of Dutch water quality policy is the effluent charge which is used to finance nearly 100 per cent of expenditures, including the construction and operation of WTWs [Brown and Bressers, 1986]. The charge follows the rule that the polluter pays. The money raised by the charge has been used to build many WTWs.

In the Netherlands, WTW construction is typically a water board task. In some cases, national waters benefit from WTW construction, after which a subsidy from the Public Works Agency is available, but usually the water board pays all costs from the charge. For the water board, the charge system ensures that the costs of the treatment plant do not have to compete with other financial demands. On the other hand, those who pay are represented in the council of the water board. These representatives, although committed to the policy of their board, also consider it their task to avoid rapid increases in charges. Water board employees report that, because of the direct representation of groups with an interest who ultimately have to pay for the improvements, the water boards cannot freely tax and spend. This negative feedback mechanism is much weaker, though, than the constraints provided by the need to choose between a WTW and, for instance, a new leisure pool. Dutch practice has shown that municipalities invest too little in their sewage systems, and instead invest in visible projects like luxury swimming pools.

Two other aspects of WTW construction are the siting and the permitting procedures. Work by Bressers [1992: 160–161] indicates that these are the most problematic parts of WTW construction in the Netherlands in terms of delay involved. There are two aspects to siting: one is the actual acquisition of a site, and the other is the changing of the zoning ordinance that is necessary in most cases. The process of obtaining permits involves four separate permit procedures in the Netherlands. Let us start with the site.

Land-use regulations in the Netherlands are such that municipalities have to make land-use regulations for the non-urban areas. In most municipal zoning ordinances, the non-urban area is zoned as agricultural land, or as an industrial zone. WTWs are incompatible with almost any other use, except for industrial and public utilities or literally 'WTW'. WTWs are usually not built in industrial zones for several reasons. What this means is that the proposed site is usually in an agricultural zone, and that the existing zoning ordinance has to be amended in most cases. The procedure for amendment is the same as the procedure for an original zoning ordinance. In fact, the amendment is considered to be a zoning ordinance itself. The procedure for the enactment of a zoning ordinance by municipalities is generally considered to be very difficult and time-consuming. The planning regulations still reflect the post-1960s 'participation in planning' fashion, although several amendments were made in the 1980s. The procedures involve consultation with organisations, firms, and individuals. It also involves public hearings, and consultation periods for the public. Once the city council has taken a final decision on the ordinance, the ordinance has to be approved by the province. People who objected at the city council stage can also object at this earlier stage. The province also hears the provincial planning commission, which has representatives of several governments, agencies, and interest groups as its members. After this, people with objections can file them with the minister of planning, and after that with the highest administrative court. The procedure, if followed all the way, may take five years or more.

Acquisition of the land is usually less problematic. The sound financial position of water boards usually enables them to meet the demands of landowners (costs of land acquisition are small as compared to the costs of WTW construction). Water boards usually ask a member of their council who lives in the neighbourhood of the proposed site to negotiate with the landowner. Many council members are farmers themselves, so they know the value of the property, and they can communicate with the landowners very effectively. This mechanism also plays a role in objections or appeals against zoning ordinances and permits. A member of the council goes and talks with the objectors or plaintiffs. In some cases water boards hire a negotiator who assesses the value of the land, and does the negotiating; the water board informs the appraiser of its own price limits.

The process of acquiring a licence involves several procedures. Depending on the type of water that the WTW will be discharging into (national or regional) waters, a water quality manager will have either to issue a discharge permit to the WTW itself or apply for a permit with the Public Works Agency. Also, a building permit has to be issued by municipalities, a nuisance permit is required (a nuisance permit states limits to noise and odour

levels at certain reference points), and a groundwater abstraction permit has to be issued by the province.

In most procedures the network of participants is potentially wide. This is a consequence of the philosophy of the Dutch government in the 1970s, which favoured public participation. In practice we found that the number of third parties actually participating in the process is small, and is largely determined by personal interests. Interestingly, our data indicated that the length of the licensing and siting processes for WTWs was determined not so much by citizen participation as by the need to gather information and to communicate this information to the agencies granting the permissions, and by the lack of (skilled) personnel at the agencies [See *Huitema, 1993*]. The Dutch government is currently revising many of these procedures, based on the assumption that citizen participation is too great a burden.

It appears that there is considerable interaction between the water boards and municipalities. Water boards and municipalities interact when zoning ordinances are drafted, and on the issue of the sewage system that is operated by the cities. These interactions may have a high frequency, but their goal is usually only consultation. One water board went so far as to meet the municipalities on a regular basis in order to keep all of them informed of each others' plans. The relation between municipalities and water boards has been described by several interviewees as one of mutual dependence; water boards need municipalities for the siting of their WTWs (and for several permits); but municipalities, which have become increasingly environmentally conscious, have to have their wastewater treated, and in most cases this is exclusively a task of water boards. On the other hand, municipalities often oppose concrete suggestions for sites because they want to protect neighbouring citizens from nuisance or want to use the site or its immediate surroundings for housing development.

There is a difference between financing, on the one hand, and granting the different permissions, on the other. The financing of WTW construction is an issue that is determined by the water authorities themselves, and requires little external interaction, except when subsidies from the Public Works Agency can be obtained. Thus it is an example of integrated policy-making. The other two issues, licensing and siting, require coordination with other actors. On the other hand, issuing a permit and finding a site are by definition temporary and local issues. The actors involved are geographically confined and once the licence has been issued, and a site has been found for a WTW, the interactions cease. It is therefore debatable whether we can speak of a network that is involved in allowing WTWs to go ahead, or whether we should analyse each building process as a separate *ad hoc* network. Nevertheless, in so far as these networks share common characteristics, we can speak about the treatment plant building networks in general.

Licensing and siting are not especially complex as tasks, yet the distribution of responsibilities and stakes among the participants involved is often restricted to a specific case, and cannot be regarded as interrelated in general. The degree of commitment, both general (sympathy with each others' main objectives) and specific (commitment to the job), varies considerably from case to case. On this basis, most of these *ad hoc* networks can be labelled as issue networks rather than policy communities.

Reducing Industrial Wastewater Emissions

One of the main threats to surface water quality is the discharge of pollutants in industrial wastewater. We have already shown that for the main rivers, the coastal seas and the main waterways, the national government has the responsibility for water quality policies and their implementation. All other waters are under the responsibility of regional water managers (the provinces or the water boards to which most provinces delegated their tasks). It is obvious that in the implementation process these organisations are not alone. There is a web of evolving interactions, which is often – and rightly – seen as the essence of the process. This section describes some aspects of these relationships.

In the case of state waters, the national government is the responsible actor. This responsibility is mandated to the Public Works Agency. This agency has a decentralised structure. It consists of a central directorate, an important research institution (RIZA), some service departments and regional directorates. They coordinate in an informal working group called FWVO, although this coordination is regarded as unsatisfactory [*Algemene Rekenkamer*, 1987: 11]. The existence of regional directorates means that the regional water authorities of a province often interact with a sub-agency of the Public Works Agency covering the same territory as the province.

When granting and enforcing permits the Public Works Agency and its sub-agencies deal with the industries that discharge into their waters, as do the required water boards. There are some differences, however. One difference is that generally the direct dischargers into state waters are much larger companies than the dischargers into regional waters. Many of the country's largest industries are direct dischargers into state waters, especially the river Rhine and its various estuaries. The second difference is that the sub-agencies lose the responsibility for indirect dischargers (into sewage systems that discharge into state waters) once a treatment plant has been built. That is because only the regional boards are entitled to build sewage treatment plants. Consequently these regional water boards themselves become dischargers into state waters with the effluent of their treatment plants, and are subject to permit granting from the Public Works Agency. Another consequence is that the permitting of some categories of indirect dis-

charge becomes the responsibility of the regional water boards instead of the Public Works Agency.

This complex constellation of actors calls for strong coordination. By 1973 the Committee on the Implementation of the Pollution of Surface Waters Act (in Dutch: CUWVO) was established by the Minister of Traffic and Public Works, which has the responsibility for water policies and whose ministry includes the Public Works Agency (RWS). This committee developed into '*the common consultation organ of all parties involved in water quality management*' [CUWVO, 1990]. The CUWVO currently has three functions: coordination, guiding research and giving advice on subjects such as administrative and judicial matters, implementation aspects of collecting effluent charges, the measurement of water quality and emission standards. It no longer confines itself to the water quality aspects which are regulated by the WVO. Other topics such as river beds and the finance of water quality management, unrelated to abstraction point sources, are now viewed as issues the CUWVO may address.

The CUWVO has three layers. These are the committee itself, its working groups and their subgroups. The committee consists of two members each for the Union of Water Boards, the Public Works Agency and the Interprovincial Consultation (the association of Dutch provinces), and one member each for the Association of Dutch Municipalities and the Ministry for Environmental Protection.

From a policy network point of view Working Group VI and its subgroups are the most interesting. They consist not only of governmental organisations but also of representatives of the target groups: representatives of branches of industry and chambers of commerce. The working group has prepared by far the largest number of recommendations. They are named reports, but are referred to by many water quality members and others as policies, even in written documents [Dommel, 1992: 49] or guidelines [Algemene Rekenkamer, 1987: 16], and even sometimes by the CUWVO itself [CUWVO, 1992: 2]. Working Group VI is one of the most important sources of new emission-oriented water quality policies. This means that Group VI is the main platform for the development of new water quality policy. Due to its leading position it has been thought sensible to refer issues as general as enforcement of permits to Group VI. Working Group VI consists not only of representatives of governmental organisations, but also of representatives of trade associations. In the subgroups, the representatives of the relevant governmental organisations and representatives of firms of branch organisations of the industry involved, meet and negotiate emission standard-guidelines, schedules for compliance, and so on. The secretary general of the CUWVO, Eric Kraaij, stated in an interview with us that he did not

want to hide the fact that the different interests involved mean that often firm negotiations are inevitable. But with a good dose of common sense it is often possible to come to an agreement. In practice, problems are solved rather effectively. When it proves to be impossible to reach full agreement in the subgroup, the issue is taken to the working group level, wherein representatives of industries play a part. In the working group the remaining questions are solved 99 per cent of the time.

This decision-making style of the working group resembles much of the target group consultation that the Ministry for Environmental Protection organised in implementing the National Environmental Policy Plan for 1989/1990. The Secretary General of the CUWVO stated that he often comments to public officials of Environmental Protection, who have just discovered this strategy, as follows: 'Very good that you have started to extend to all other sectors of the environment the approach we have been using for a long time in the water sector. It works!'.

That it works is certainly true in terms of its effects on the policies of provinces and water boards. The reports are accepted by the water quality managers and the latter hardly ever deviate from them [*Strikker, 1988: 40, 48–49*]. Firms of the same branch all over the country generally face the same demands, regardless of the water quality manager involved. Furthermore it is difficult for these firms to reject those demands as unreasonable, simply because their representatives in the subgroup agreed to them. According to the CUWVO Secretary General, there is even a growing case law on this matter. Judges point to the reports in their verdicts. The firm has to have a really strong case before being allowed dispensation. On the other hand, it is more difficult for water quality managers to demand more than the CUWVO agreement. They too will win the case in court only if it is a very convincing one.

In practice, the CUWVO provides a very important arena for the Dutch surface water quality network in which almost all network organisations participate in consensus building. The consensus building orientation in the formulation of policies reflects a pre-existing orientation in daily implementation. An important background for this is the Dutch effluent charge system (see for example Brown and Bressers [*1986*]). Here, we limit ourselves to some implications of the charge system for interorganisational relationships. A very important aspect of the charge system is that it directs the nature of the interactions into a much more constructive form of consultation because it lets pollution prevention pay. Furthermore, it provided the water boards with an *entrée* to the firms, even when permit-granting responsibilities did not provide that in the numerous cases of firms discharging to a municipal sewage system.

The position of indirect dischargers leads us to the relationship between

water managers (both regional and national) and municipalities. The water manager originally only had an indirect relationship with the industries that discharge into a sewage system. They granted permits to the municipalities who discharge their sewage into the surface water and had, of course, the opportunity to formulate conditions. But it was unclear how far they could go in their requirements.

This was not so much a problem in relation to the oxygen-demanding pollutants. From early on it was decided that the effluent charge, which has this type of pollution as its main basis, could be levied directly by the water managers in the firms (and households). That not only implied that these firms had a strong incentive to decrease their discharge of organic pollutants, but also that water board officials had an *entrée* into those companies with indirect discharges. They could legitimately discuss with these firms the organic pollution of their wastewater and the possibilities of decreasing it. Because this also offered firms the possibility of reducing their charges (through reducing their discharges), this facilitated the consultation process. On that basis, water board officials also often tried to discuss pollution from heavy metals and other pollutants. Indeed, they often claimed that certain discharges would not be allowed in the near future. Legally they had no basis for such statements. The water boards also introduced an effluent charge on heavy metals on the basis of the extra costs of operating treatment plants. Heavy metals polluted the remaining sludge of the plants which often has to be treated as chemical waste instead of being sold as fertiliser. Although these activities, including the assessment of the charge, did succeed in approximately halving the heavy metal content of industrial wastewater, the situation was still considered unsatisfactory.

For this reason the Pollution of Surface Waters Act was changed in 1981 in order to give the water managers direct responsibility over a number of substances or categories of firms that were to be listed in a governmental decree. This was again some sort of victory over the municipalities for the water boards which had always wanted that responsibility. Apart from the difficulties mentioned above, international agreements and treaties, for instance on grey list and black list substances, made such a change inevitable. For practical reasons it was decided to list not substances, but categories of firms, as the new responsibility of the regional water boards. The CUWVO played an important role in selecting the branches of industry that were to be subject to the new regulations.

Strikker [1988] concluded that some confusion remained regarding the selection of firms that should be included in the categories. Water boards often tried to interpret the categories as broadly as possible in order to expand their jurisdiction. Stikker also found that while for black list substances zero discharges were the official goal, in practice this was translated into 'best

available means' – which more often than not was further eroded into 'best practicable means'. One has to remember that it was originally a deliberate choice not to use the latter criterion for black list substances.

The negotiation-oriented approach of the water managers should not be seen as a cultural phenomenon only, but also as a rational use of scarce powers [Bressers, 1992: 173–174]. Respondents of Strikker [1988] claimed that a stricter interpretation would not lead to a better environment, but only to more violations of requirements. Such a claim rests on a judgement of the possibilities of enforcing the regulations. While the opportunity for enforcement by the water manager was greatly improved by the shift in responsibilities from municipalities to water managers, in practice they are still weak. This is due to the dependence on other actors such as judges and public prosecutors – a feature that remained largely intact.

In order to reduce these dependencies, policy documents of water managers state that they prefer to use the option of administrative sanctions wherever possible instead of opting for penal sanctions, which are also possible under the law [Groningen, 1990]. In practice they try to avoid imposing sanctions altogether. Whenever they can they try to reach the goal of compliance by issuing exhortations or, as a respondent in the Bressers 1983 study put it, by 'talking, talking, talking'. Illustrative of this is the recent CUWVO report [1992] on enforcement. This report is a sort of instruction guide organised around a flow chart. Starting with an observed offence, few paths lead to actual sanctions. The text contains many warnings about the difficulties that occur when following these paths. This approach can lead to a decision to issue only a warning, to legalise or even to tolerate illegal action. In essence, the emphasis is on bargaining, not on compulsion.

In terms of the characteristics of this broader network in action we conclude that its complexity has not led to fragmentation. Although the degree of commitment is limited, due to the natural tension between the polluters and the surface water quality managers, there is a rather high degree of inter-relatedness. The polluters are represented on the board of the water authority, the actors involved participate in well-developed negotiation platforms, and the implementation process involves regular contacts between authorities and industries, partly guaranteed by the existence of the effluent charge system.

Conclusions

In this study we have considered the role of policy networks in Dutch water policy. In the Netherlands two rather separate networks of water institutions can be identified: one for soil protection and the provision of drinking water (the groundwater network); and one for the treatment and discharge of waste-

water (the surface water network). Before we compare these networks in terms of the concepts presented at the outset, we shall use this concluding section to compare the developments in the scope, the general approach and the openness of both networks.

Scope

The surface water network originated from the need for protection against flooding and the need to create an adequate system of waterways for draining. Later (since 1970) the tasks of the existing organisations (water boards) were extended to surface water quality management, because they already had knowledge of surface water. In other words, the network had to broaden its scope to include also the quality of the input of water into surface water systems, and – in order to do that properly – to include also aspects of the consumption of drinking water (to affect the amount and composition of polluted wastewater).

The groundwater network started with the production and supply of drinking water by water supply companies. These companies were increasingly confronted with the limitations of the amount of groundwater that can be abstracted without encountering other interest groups. Therefore they became involved in the protection of the quality of groundwater. The drinking water companies also had to broaden their scope to include several aspects of soil pollution. It is interesting to see that for both networks, environmental quality issues were the main factors causing the extension of the scope of the network.

Approach

The networks are also similar in their dominant engineering approach to water problems. The surface water network started with the establishment of a body that could undertake the building activities necessary for the protection against flooding and the development of waterways. There was no need for a behavioural change of target groups at that time. However, the task of water boards extended to the management of water quality. It was the Pollution of Surface Waters Act that created the possibility of stimulating polluters to meet the policy standards through behavioural changes by means of permit giving. It took some time before the water boards used this policy option with the same energy as they exerted on the 'technological' approach. As far as industries as target groups are concerned, the water boards are making more and more efforts to legitimise their goals through consultations with branch organisations.

A similar development can be seen in groundwater management. Initially, water supply companies tried to satisfy the need for drinking water through technical measures. Later on, however, they encountered the limits of growth

because of other interests involved (especially agriculture). The agricultural pollution of groundwater through fertilisers and pesticides became a major concern. In the end, it would be possible to provide enough drinking water only through expensive technical measures such as purification. To protect the quality of groundwater for drinking water production, financial compensation for farmers and consultation with farmers are the main policy instruments. This turned out to be a considerable change for organisations which traditionally were engaged in pumping and presenting the bill.

Openness

The overall view in both networks today is that a greater openness can be perceived: the traditional organisations are incorporating or developing more expertise in consultation with other interest groups on which they depend. Although initially the dominant engineering approach was the main source of stability in both networks, instability arose because of the confrontation with interests of environmental protection and agricultural production. This caused a shift towards an approach in water management that is more directed at influencing the behaviour of other interest groups involved.

Also, a tendency can be perceived towards an aggregation of interests on a more central (national) level. In the surface water network, the Union of Water Boards tried mediation with representatives of industries within the national Commission on the Implementation of the Pollution of Surface Waters Act. In the groundwater network the Union of Dutch Water Supply Companies tries to mediate with the Agricultural Board which is the main national representative of farmers in the Netherlands.

Besides the developments described, two other factors are accelerating the opening up of both networks. One factor is the initiative of the national authority – begun in 1985 – to enforce integration in Dutch water policy. Water institutions are pressed to consider the relationship of their activities with other sectors of water management and even with other policy sectors (especially environmental protection, nature conservation and urban and rural planning). Another factor is the general tendency – stimulated by provincial authorities – to increase the efficiency of water boards and water supply companies. In both networks, mergers and reorganisations are very common.

Commitment and Interrelatedness

The water policy networks described above have complexity in common. Nevertheless the inner cores of the networks combine a high degree of commitment with a high degree of interrelatedness. In the surface water policy community this tightness has a long history. In the case of the drinking water sector the character of the policy community developed more recently. However, these linked communities encounter other interests whenever they

start to act. The networks described incorporate these other interests in very different ways.

The surface water network is fragmented into rather separate issue networks when building treatment plants. The complex division of responsibilities is reflected in often difficult administrative processes. Though the building of treatment plants as such is a more or less straightforward task, these processes can take many years. Perhaps this kind of task would benefit from a simpler network structure, as evidence from the privatised facilities in the US seems to indicate [Heilman and Johnson, 1992].

In the case of the efforts to decrease industrial wastewater pollution the surface water network managed to remain intact to a greater degree. The centrifugal influence of complexity is counteracted by all sorts of centripetal mechanisms that foster regular interaction and consensus building. The case shows that complexity does not always lead to fragmentation: a type of network emerged that had weak commitment and strong interrelatedness. The high degree of interrelatedness in the policy formulation stage leads to a relatively smooth implementation process, actually showing the expected emphasis on responsibility and the use of negotiated instruments, rather than relying on a strict judicial enforcement of regulations. Viewed against the background of the enormous variety and complexity of the changes in industrial production processes involved – when decreasing the pollution of industrial wastewater with a variety of substances – and also compared to the environmental policy sectors of air pollution and waste prevention, the surface water sector produced very positive outcomes.

In these observations we see support for our view that the integration *versus* fragmentation dimension should not be based on mere complexity variables; and support also for the view of Goggin *et al.*, that complex tasks may be better off with complex network structures.

The drinking water network presents yet another situation. Its core became integrated more recently and developed into an even tighter community under outside pressure. The background to this is that the participants in their activities were not only confronted with various outside actors, but with another, strong and long established policy community: the agricultural network. Though the various negotiation processes involved can be viewed as *ad hoc* issue networks, the opponents (the farmers) were supported by their general network relationships. This forced the drinking water companies to seek similar support in their own community, thus strengthening their union, even though this union supports strong reforms in the sector's structure. A coalition with the environmental groups is based more on commitment than on interrelatedness and is still too weak to be considered as a part of the 'network' in the proper sense of the term.

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