

Effectiveness of sectoral Voluntary Agreements

A bottom up perspective

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Abstract

The IVM project *changing interactions between heterogeneous companies and environmental authorities* focused on business-government interactions in environmental policy. It investigated the effectiveness of Voluntary Agreements (VA) in the Dutch paper, textile finishing and fertiliser industries.

We followed a bottom up approach, in that we tried to explain VA effectiveness from changes in behaviour at local level (plant management, local authorities). The bottom up approach contrasts with most other studies, which chose a top down policy perspective and consider local behaviour as a black box.

Some of our results confirm earlier conclusions from others:

- Effectiveness of VAs is acceptable or good. After four years, most VA targets have been accomplished. However, we know of several examples that cast doubt on the ambition levels of VAs. Such examples include VA targets that are lower than state-of-the-art technology allows and VA targets that do not challenge business strategies.
- VAs do not stimulate frontrunners in a sector of industry to pursue their course.
- VAs stimulate more regular contacts between companies and authorities. Regular contacts in combination with VA obligations such as planning and reporting, improve the transparency and accountability of companies.
- VAs cause some homogenisation of environmental performance. Dissemination of state-of-the-art technology and Environmental Management Systems (EMS) secure a basic level of compliance.

Two results, only partly related to the VA, deserve attention:

- One of our propositions is that VAs do not work in sectors dominated by Small and Medium sized Enterprises (SME). However, in the SME dominated textile sector we find innovative pilot projects to solve the industry's most pressing problem, waste water pollution by dyes. Provisional water permits, issued in 1995, acted as a trigger. Additional explanations are that the textile industry has a capable trade organisation and that business-authority arrangements are still unsettled, thus being open for creativity and unexpected results.
- Fertiliser plants do not improve towards state-of-the-art technology, some even do not have an EMS. This is really surprising for an important part of the chemical industry. Evidently, economic pressures resulting from declining markets have more influence than the aim of *responsible care*.

From our evidence, it may be concluded that sector VAs are insufficient to support an *action learning network*. In action learning or learning by doing the focus is on testing and upscaling of potential innovations. In the Dutch textile industry action learning has - somewhat surprisingly- come into being, in the paper and fertiliser industries it has not.

What is a proper place for sectoral VAs in the policy mix? In our opinion sector VAs have earned a position of their own because they improve business-authority contacts, streamline procedures and increase transparency of business environmental performance.

All the same, their role in the pursuit of sustainable development seems limited because sector VAs influence business strategy and action learning to a small extent only.

1. Introduction

Corporate environmental performance can largely differ between companies from different industrial sectors and also within sectors. These differences are the result of the history of specific products and production processes in combination with the geographical distribution of the companies involved, their business strategies and their regulatory context. One of the consequences of these differences is that, in a given sector, some companies will be able to address environmental issues against far lower costs than others.

Several incentives may stimulate companies to improve their environmental performance. These incentives depend on various kinds of societal pressure, showing the interest of government agencies, shareholders, customers, business associations, environmental and social non-governmental organisations. In varying degrees these actors have the ability to raise and sustain pressure on certain companies and to turn environmental issues into economic ones that affect the companies' profitability. Again these pressures are not the same in all sectors and industries. Moreover, in addition to differences in the type and the strength of the pressures, there are very different reactions of the companies involved. This report especially focuses on the incentives that are provided by public authorities to improve environmental performance by business and the resulting interactions between the two players.

This chapter is structured as follows. Section 1.2 introduces the instrument of sectoral VAs and their regulatory context. Section 1.3 describes our methodology of embedded case studies and presents the three sectors of industry we chose for further research. Section 1.4 gives an outline of the report.

1.1 Key research questions

In the context of the DynEmics 1998-2002 Research Program on Dynamics in Business Environmental Management (Roome *et al.*, 1998), the IVM project investigated how various governmental policy approaches interact with heterogeneous environmental performance of companies. Based on a detailed analysis of company-authority interactions, the project aimed to formulate lessons for public authorities and companies to improve the effectiveness and efficiency of their policies. In an abstract sense, the IVM subproject addressed the following research questions:

1. How do specific policy instruments influence companies with divergent environmental performances?
2. How and why do interactions between companies and authorities develop over time?

For the empirical part of the IVM project, we decided to focus on changes in business-government interactions as a result of sectoral Voluntary Agreements (VAs). A sectoral Voluntary Agreement is a signed agreement between government and a sector of industry aiming at a broad range of environmental improvements within a specified time frame. We chose sectoral VAs because they are a new, only partly tested, policy instrument.

1.2 Dutch sectoral voluntary agreements

Since 1985, VAs blossomed in some countries of the EU. The Netherlands is in a leading position with more than 100 VAs (Lieverink and Mol, 1998), varying widely in focus, ambition level and parties involved. The first National Environmental Policy Plan (NEPP) of 1990 introduced the sectoral VA as part of the target group approach that was meant to deal with industrial pollution from specific industrial sectors.

During the 1990s, about 80 percent of Dutch industrial pollution became covered by 10 sectoral VAs. Table 1.1 lists these VAs being signed in the period 1992-2000. According to official policy documents, the following deal between authorities and companies is envisaged: authorities can rely on the cooperation of companies in the implementation of government policies, and in return companies will be informed about future environmental demands, in order to make their planning more efficient (VROM, 1989). Such a deal is not uncommon in policy-making (Doorewaard, 1990): Both parties can benefit from this arrangement, because forecasting is a weak spot in market organizations, while know-how (technological and practical knowledge) is a weak spot of environmental authorities.

Table 1.1 Dutch voluntary agreements with sectors of industry 1992-2000.

Sector of industry	Year of signature
Basic metals industry	1992
Chemical industry	1993
Printing industry	1993
Dairy industry	1994
Metal and electronic industry	1995
Textile finishing	1996
Paper and pulp industry	1996
Meat industry	2000
Brick industry	2000
Plastic processing	2000

Source: VROM, 1996, and FO-Industrie, 2001.

Sectoral VAs contain fixed targets for 2000 and indicative targets for 2010. By definition, all targets are set at sector level. The targets are based on the National Environmental Policy Plan (NEPP). However, sectoral VAs contain a clause which says that “targets can be renegotiated if unexpected economic events appear”. This VA wording and also the ALARA-principle (as low as reasonably achievable) that is incorporated in legislation both imply that policy implementation agencies should not put demands that risk business continuity. These examples show that policy implementation based on VAs operates at the edge of public and private interest.

Dutch sectoral VAs follow a common pattern. At plant level, companies are obliged to make a four-yearly Business Environmental Policy Plan (BEPP) and to produce progress reports annually. Within sectors of industry, BEPPs are combined to see whether sector targets can be met. Progress reports are combined annually to monitor progress at national level (VROM, 1989). In fact, the basic elements of environmental management systems (EMS), planning and reporting, are also the basic ingredients of sectoral VAs. In any case, operational EMS at signatory plants are a necessity for this VA structure to

work properly; EMS have become part of the *pledge and public review* procedure (Van der Woerd, 1997).

In Section 2.4 we will discuss design criteria for effective VAs. Anticipating the presentation of four design criteria by Biekart (1998), we conclude that three criteria (quantitative targets, threat of direct regulation, transparent implementation) seem to be adequately provided for in the Dutch sectoral VAs. The fourth criterion, a legally binding agreement, is problematic.

Since 1997, the first evaluations of sectoral VAs have become available. Results for the environment seem to be mixed. In industries dominated by large companies progress is demonstrated (e.g. chemical industry), in sectors dominated by small companies progress is disappointing (e.g. metal construction) (Lieverink and Mol, 1998). Section 2.4 will present more evidence.

Sectoral VAs should be considered as part of the regulatory context in which companies operate. In the Netherlands, the Environmental Management Act of 1993 (Wet Milieubeheer) performs a central role in defining the legal framework for Dutch environmental policy. One of its instruments is the integral environmental permit that is in fact a 'license to operate' for each individual industrial plant and that contains plant-specific conditions under which the activities may take place. Emissions to water are regulated by a separate law, that in most cases requires an additional permit. The conditions in both permits have to meet the criterion that environmental harm will be 'as low as reasonably achievable', the so-called ALARA-principle. The responsibility for the stipulation of environmental permit conditions and their enforcement usually lies with the provincial authorities, that for water permits mostly lies with specialised regional water authorities. Both types of authorities have the obligation to regularly examine whether existing permits are still adequate with a view to the state of the environment and the technical possibilities for its protection, and if deemed necessary, to actualise their content. This provision can also be used to include VA obligations into the environmental and water permits of the companies involved.

The Dutch environmental and water permits are still in an evolution process with regard to form and content. A relatively recent phenomenon is that authorities responsible for permitting are experimenting with so-called flexible or generic permits. Such permits have as most important features an orientation on the main environmental effects caused by a specific plant in combination with goal-oriented permit conditions. Enforcement of generic permits should be limited to controlling if the goals are achieved. To qualify for such a permit, it is necessary that the responsible authorities have the well-founded confidence that the company involved is willing and able to comply with the goals set (cp. Van der Woerd, 1997, and De Haan & Van Smeden-Abrahamse, 1998). Therefore, only companies with a progressive environmental policy should be in the position to obtain a generic permit.

The Environmental Management Act does not deal with the instruments of the horizontal policy approach, such as VAs, and does not even contain provisions on the relationship between vertical and horizontal instruments. Following recommendations related to the future of the Dutch environmental legislation, though, it will be explored how to embed

the horizontal instruments in the framework of environmental law (Drupsteen et al, 1998, VROM, 2001).

1.3 Cases in paper, textile finishing and fertiliser industries

At the start our empirical research, we had to make two choices:

1. The number of case studies to perform;
2. The sectors of industry to choose.

With regard to the number of case studies, four to ten cases are considered sufficient to make analytical generalizations conceivable (De Groene, 1995). This number presupposes a certain homogeneity in the business population. But in fact, the number of industrial sectors in a modern economy is large, and numbers thirty at least. These sectors differ in products, markets and production processes. A major intention of the IVM project is to offer insight in business heterogeneity. That is why it is useful to select our case companies in several sectors of industry.

As an optimum, we planned to conduct field work in cooperation with about *15 companies within three sectors of industry*. The choice of three sectors of industry gives appropriate insight in heterogeneous business reality. An average of five companies within each sector of industry enables analytical generalizations *within* each sector. As will be explained in Chapter 3, we succeeded to conduct four and five cases in paper and textile finishing, respectively. Due to recent restructuring in the fertiliser industry, only two cases could be completed.

With regard to the *three sectors of industry*, a prime demand is the presence of operational VAs. Table 1.2 shows the 1998 situation. A secondary demand is availability of generic information at sector level. The 1998-2000 EU-project Measuring Environmental Performance of Industry (MEPI, see: www.environmental-performance.org) offers readily available technical, environmental and economic information about six sectors of industry: electricity production, fertiliser industry, computer industry, paper industry, printing and textile finishing. All MEPI sectors appear in the VA list except one, electricity generation. Computer industry is but a minor part of the metal and electronics industry and is therefore less suitable for our research. This implies we had to make our choice among four sectors: fertiliser, paper industry, printing and textile finishing.

We chose the following three sectors for our research: *the pulp and paper industry, textile finishing and the fertiliser industry*. Therefore, our research includes sectors dominated by both large companies (fertiliser, paper) and SMEs (textile finishing). Appendix I gives more details about the research format we used in studying the three sectors of industry. Our business questionnaire is presented in Appendix II. The authorities' questionnaire can be found in Appendix III.

Table 1.2 Important features of the Dutch sectoral voluntary agreements.

Sector of industry	No. of plants	Sector typology
Basic metals industry	30	Large, heterogeneous comp.
Chemical industry	120	Large, heterogeneous comp.
Fertiliser industry*	7	Large, homogeneous comp.
Printing industry*	>1000	Small, homogeneous comp.
Dairy industry	40	Large, homogeneous comp.
Metal and electronic ind. (*)	>1000	Small, heterogeneous comp.
Textile finishing*	40	Small, heterogeneous comp.
Paper and pulp industry *	28	Large, homogeneous comp.
Meat industry, brick industry, plastic processing	>100	Diverse Only to be signed in 2000

* = sector included in EU MEPI project.

Source: VROM, 1996 and FO-Industrie, 2001.

1.4 Outline of the report

The outline of the report is as following. Chapter 2 discusses relevant theories related to public governance, business-authority interactions and VAs. It ends with six propositions we tested in the paper, textile finishing and fertiliser industries. In Chapter 3 we present results for each industry separately. The final Chapter 4 summarises results, presents overall conclusions and discusses implications for policy making.

2. Theoretical framework

This chapter focuses on theories related to the environmental behaviour of companies, the behaviour of environmental authorities and the interactions between them. Section 2.1 describes changes in business-government interactions since the 1980s. Broadly speaking there has been a gradual shift from command-and-control towards consensual policy making. However, this shift is far from uniform and brings new challenges. Section 2.2 introduces an economic theory to analyse institutions and governance structure, *new institutional economics*. *Transaction costs theory* and *principal-agent theory* want to explain why institutions arise. A shift from environmental regulation to voluntary agreements can be rational considering information and enforcement costs. Section 2.3 describes the generic model for business-government interactions we want to use as a basis for our empirical work in Chapter 3 and 4. We distinguish between companies, *policy-devising agencies* and *policy implementation agencies*. Section 2.4 describes the body of knowledge that emerged around application of VAs. It should be noted that most of this knowledge has been developed parallel to the cases studies in DynEmics. Based on the foregoing sections, Section 2.5 introduces 6 propositions to be tested in Chapters 3 and 4.

2.1 Trends in behaviour of companies and authorities

In the past few decades the emphasis in environmental policy shifted from a purely command-and-control, or vertical, approach, towards a more consensual, or horizontal, approach. Starting around 1980, national and European initiatives started to remedy the drawbacks of existing regulatory approaches and to involve private actors in the policy process. As a consequence, the relationship between industry and public authorities has significantly evolved in the direction of increased corporate responsibilities and a more interactive style of policy making. This policy shift was accompanied by the introduction of new policy instruments, including environmental management systems, VAs, environmental reporting, environmental labelling and waste removal contribution schemes.

The wish of authorities to engage in a more interactive style of policy making has to do with the wider trends of deregulation, decentralisation and privatisation as opposed to state regulation. Among these trends, deregulation has especially been at the focus of attention in the environmental policy debate. Advocates of deregulation stress that companies have more knowledge about production processes and products, and consequently are able to plan their policies and measures more efficiently (Doorewaard, 1990). However, the deregulation trend in environmental policies is ambiguous. Several authors prefer to speak about re-regulation: new rules replace existing ones (Levecque, 1996; Liefkerink and Mol, 1998).

As is already suggested by the term “shift in emphasis”, the new developments do not imply that the “old” regulatory instruments, such as permitting and planning, have lost their meaning. It more likely comes down to finding a balance between the vertical and the horizontal approach. In this context, it is important to notice that again and again re-

search confirms that environmental authorities remain a dominant stakeholder in corporate environmental policies (De Groene, 1995; Wijen, 2001).

The practice of corporate environmental performance takes many forms. This multi-formity is connected with different aspiration levels of environmental management. Often the following three levels are being distinguished: reacting to government rules, anticipating future government rules, and devising own company standards that go beyond government rules. But how can heterogeneity of corporate environmental performance be explained? One of the theories available is the capabilities perspective which focuses on human resources. In the capabilities perspective, firms are viewed as holding different bundles of human resources, notably knowledge, skills, experience and organisational routines which offer opportunities as well as constraints to the range of activities a company may undertake. Capabilities are not static resources, because learning may change individual capabilities and also stimulate the development of organisational routines (Den Hond, 1996).

In correspondence with diverging corporate environmental performance, the behaviour of environmental authorities may also take different forms. Traditionally, business-government interactions especially focused on technical options to abate environmental pollution during permitting procedures. Consequently, government officials gathered much experience about technical and legal aspects. A technical background of many officials supported such a focus. However, a horizontal and more flexible policy approach requires a different behaviour of the regulatory officials involved (Fineman, 1998). Nowadays the regulatory official should be able to negotiate customer-oriented, and to think strategically and integrally. This broadening of scope implies the acquaintance of new skills.

Linked to the requirement of strategic thinking, it has repeatedly been argued that responsible authorities should make a more clear division between companies in the forefront and those who lag behind (ECW, 1996; Drupsteen et al, 1998). In the Netherlands, researchers developed a model of policy styles based on the idea that companies have different styles of environmental management, and therefore need a differentiated approach (ECW, 1996). The model distinguishes the following three policy styles relating to both permitting and enforcement: prescriptive, negotiating/coaching, and co-operative. It was concluded that in practice there is often a “mismatch” between the environmental behaviour of companies, and the attitude of public authorities: the approach of companies in the forefront has often a relatively imposing character while the approach of laggards is of a more coaching or co-operative style (Neumann, 1995).

2.2 New institutional economics

Changes in interactions between companies and environmental authorities have attracted attention from several disciplines. Sociologists speak about *ecological modernization* (Lieverink and Mol, 1998), lawyers discover a *negotiating government* (Aalders and Wilthagen, 1995), while economists develop *new institutional economics* (Williamson, 1998). Such theories want to shed new perspectives on why changes occur in a certain direction. We present here interesting notions of the new institutional economics. In ge-

neric terms, it is possible to explain why command-and-control often fails and why a framework like sectoral VAs offers opportunities.

The *new institutional economics* (NIE) originated in the 1970s. The basic question of NIE is: *why do institutions emerge the way they do and not otherwise?* In the 1980s, application of the NIE framework has been extended from business optimization issues to public policy issues, for example to the development of regulatory regimes (Williamson, 1998).

NIE assumes that management decisions are characterised by the aim to economise on *transaction costs*: for each specific situation, management chooses an organisational option with minimal transaction costs. Transaction costs are the costs of contact (information), contract and control (monitoring). According to the transaction costs theory, various institutions (market, hierarchy, agency, VAs) differ in information, co-ordination and enforcement costs. In consequence, each problem has an optimal mode of organization, supported by a distinctive form of contract law.

What can transaction costs theory tell us about business-government interactions? At the level of *effective institutions*, the basic question is how to develop an optimal governance structure for corporate environmental performance. A governance structure focuses on the play of the game: What actors are accepted and what rules govern their interactions. This is the realm of transaction costs proper, for example when one compares command-and-control enforcement with several kinds of self-regulation (Williamson, 1998). Other examples are the development of EMS within companies and the choice among policy instruments.

At the lower level of *individual transactions*, the question is how to develop optimal incentives and control. The incentive and control structure around individual transactions are often referred to as 'agency theory' or *principal-agent theory*. Principals are all persons/organizations who issue orders, while agents are all persons/organizations who should obey orders. In Figure 2.1, agency theories are most relevant for interactions between policy implementation agencies and companies. According to agency theories, incentive and control mechanisms have to be optimised in a trade-off between costs and hazard of non-compliance. Agency theory can be used to assess control mechanisms within EMS and enforcement programs of permitting authorities. Core element in agency theories is asymmetry in information, i.e. the agent (in case of sectoral VA: a company) possesses information which the principal (in case of sectoral VA: an authority) needs for optimal control but does not possess.

Principal-agent theory and information asymmetry can also be applied to agency-agency interactions, for example in the so-called *new economics of regulation* (Levecque and Nadai, 1995). According to the new economics of regulation, policy-making takes place within a complex set of relations between policy-making agencies and policy implementation agencies. Laffond and Tirole (1993) distinguish between the government and the regulatory agency, which is comparable to the distinction we will make in Section 2.3 between policy-devising and policy implementation agencies. The former act as a principal, the latter as an agent. When making decisions, the policy-devising agency relies on information from the policy implementation agency, which in turn relies on information from industrial associations and/or individual companies. The policy implementation

agency becomes self-interested. There is a risk that the agency collides with interest groups and even that it is corrupted.

To limit manipulation of information, policy-devising and policy implementation agencies have to design incentive systems to make firms disclose true information and to exchange information. An efficient incentive system tends to be sophisticated and costly. Therefore, a balance of costs and benefits for all parties is looked for. *Dutch VAs for sectors of industry* aim at such a balance by a bilateral reduction in uncertainty: for the firm long term targets become more certain, while companies get freedom to integrate environmental measures flexibly in their overall business plan. For authorities, business cooperation in the implementation of government policies becomes more certain (Doorewaard, 1990). For companies, reductions of uncertainty are of growing importance as globalisation brings increasing turbulence (De Groene, 1995).

In this section we presented *transaction costs economics*, *principle-agent theory* and *new economics of regulation* as an explanatory tool to analyse institutional changes in business-government and government-government interactions. However, they remain too abstract for our research. That is why we developed a practical framework for our empirical investigations. Section 2.3 describes the generic model.

2.3 Policy devising and policy implementation agencies

In modern organisational theory it is generally acknowledged that firms do not operate in isolation and governments cannot implement policies without the co-operation of firms. *Firms* are considered as open systems, having contacts with various actors in society. Stakeholders are a generic term to define such a set of actors. Business' stakeholders can be defined as those individuals or groups who can affect or are affected by the actions, decisions, policies, practices and goals of the company (Kast, 1980). Theoretical and empirical studies suggest that stakeholders are essential for the performance of companies. These studies show that every company has different stakeholders and that they influence organisational decisions in many different ways. Concrete stakeholders, in direct contact with a company, are often summarised as the task environment of a company (Kast, 1980). The task environment includes customers, suppliers, shareholders, competitors, government agencies and neighbours.

The *government* has a special position in the task environment of firms. The government is the embodiment of legal and political matters. Regulating agencies transform political demands from groups in society into concrete demands on companies. In the field of the natural environment, governmental regulation showed a tremendous increase since the 1970s. In a classical command-and-control approach, it was assumed that prescriptions of agencies would "automatically" be implemented by companies. Experience shows that practice is more complicated. Government policies are not always effective, resulting in implementation gaps. Moreover, targets and instruments of government policies are discussed and often criticised by business' representatives. From an organisational point of view, two aspects explain why a simple command-and-control approach does not work in practice (Van der Woerd, 1997):

1. In many cases, authorities will not be able to impose demands on firms unilaterally. Like firms, governments are open systems, having contacts with different actors in

society. Via political and lobbying mechanisms, policy stakeholders influence political decisions. Firms and groups of firms (e.g. trade organisations) are major players in the political game.

2. Authorities are only partly autonomous, because responsibility for environmental policies is shared by several levels of government. For our purpose, it is useful to distinguish between two levels of government: *Policy-devising agencies*, mostly at (inter)national/sector level and *policy implementation agencies*, mostly at local/plant level. Effective policies demand at least proper co-ordination between policy-devising and policy implementation agencies. Based on the *new economics of regulation*, discussed in Section 2.2, it is naïve to expect that local authorities will *automatically* implement national standards, let alone national VAs. Co-ordination between agencies, or lack of it, is a topic of research which is often overlooked.

The conceptual model we use as a framework for this paper comprises three actors: a policy-devising agency, a policy implementation agency and a company (Figure 2.1). We consider all actors to be open systems, i.e. they both affect other actors and are affected by other actors. Interactions between actors can both be unilateral (e.g. from policy implementation agencies to companies in case of traditional command-and-control) and bilateral (e.g. negotiations between firms and policy-devising agencies about the targets of VAs). Thus, the arrows of influence in Figure 2.1 can point in both directions.

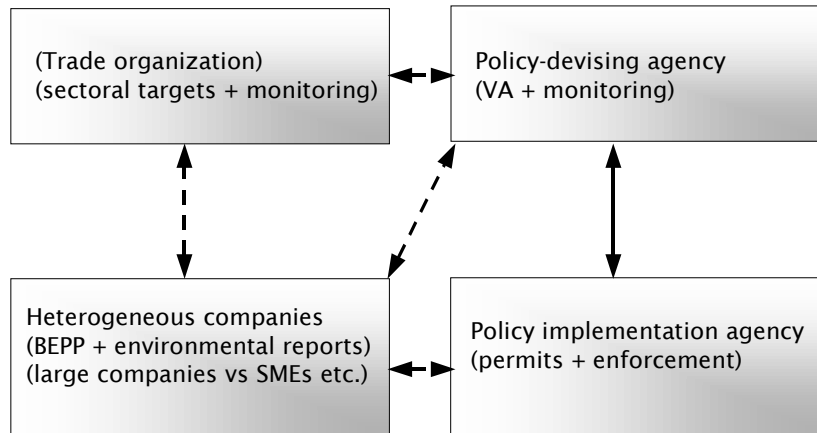


Figure 2.1 The playing field of Voluntary Agreements.

A distinction between company, policy-devising agency and policy implementation policy is apt to represent a classical policy of command-and-control. In case of sectoral VAs, a fourth actor enters the game: a *trade association* as a representative of a group of companies. Because trade organisations have no formal powers over their members, their

role by definition is a negotiator. In our research format (Appendix I), we do not pay explicit attention to trade organisations because we decided to focus on business-government interactions at local level. That is why trade organisations are represented between brackets in Figure 2.1.

Therefore, in our case format we distinguish between three types of actors, connected by several linkages. Because we follow a bottom up perspective, our emphasis in the following chapters will be on the linkage between company and policy implementation agency. Because the actors last mentioned do not operate in isolation, we will pay adequate attention to the higher levels of policy making.

At the business side, things can become more complicated if a specific plant is part of a larger company, because this usually implies that the plant management is not fully independent in its decisions. Interactions between plant and corporate level are important to explain actual decisions at plant level (Neumann, 1995). In our case analyses in Chapter 3 we pay attention to the role of corporate headquarters.

What will expectedly be dominant influences in various situations? It seems to be useful to distinguish between large companies and Small and Medium sized Enterprises (SMEs). It is regularly conceded that for SMEs the standard is unilateral regulation. For large companies, however, it is generally acknowledged that unilateral regulation is a fiction. Instead, the regulatory process is characterised by consultations and negotiations taking place in so-called *arenas for bargaining* (according to economic sciences) or *action arenas* (according to policy sciences). Similarly, SMEs are regulation-takers, large companies are regulation-makers (Leveque, 1996). Table 2.2 provides an overview of causes and results. The distinction between SMEs and large companies will play a role in proposition 3 and in Chapters 3 and 4.

Table 2.2 Differences between large companies and SMEs.

Large companies	Small and Medium sized Enterprises (SME)
<i>Causes</i>	
Environmental Management System available	No EMS available
Environmental specialists	No environmental specialists
Environmental reporting	No environmental reporting
Trade organisation active	Trade organisation passive
<i>Effects</i>	
Regulation bilateral	Regulation unilateral
Generic permits	No generic permits
VAs effective	VAs not effective

Source: Levecque, 1996 (adapted)

2.4 Body of knowledge on VAs

At the end of the 1990s, the EU projects CAVA (Concerted Action on Voluntary Agreements) and NEAPOL (Negotiated Environmental Agreements: Policy Lessons to be learned) brought together research from several European countries. NEAPOL analysed 12 VAs in 6 European countries. In addition, the European University Institute

(EUI) in Italy organised workshops about VAs. This section presents key findings, based on EUI discussions (Golub, 1998; Biekart, 1998) and on the NEAPOL Closing Conference (De Clercq *et al.*, 2000; Aggeri, 2000).

VAs can be defined as deals between government and industry whereby an industry sector or a group of individual companies agrees to reach certain environmental objectives within a defined time frame (De Clercq *et al.*, 2000). VAs are based on civic law, i.e. a bilateral agreement between contract partners. Objectives vary between binding targets (we promise) and a declaration of intentions (we try). Theoretical advantages are their flexibility and relatively rapid implementation. Drawbacks are their uncertain legal status and lack of sanctions (gentlemen's agreement). Unresolved are the legitimacy of VAs, the relation between VAs and legislation and their effectiveness and efficiency (Borkey and Nadai, 1996).

Most authors agree that VAs are in fact not voluntary at all. VAs originate under some threat of government regulation. VAs are a means for companies to shape their regulatory framework. In the words of *transaction cost economics*, VAs can be considered an optimal governance structure in specific situations. As such, VAs are generally considered to be an aspect of international trends towards re-regulation (not deregulation). NEAPOL research found no unsuccessful agreements where there was a strong stick behind the door. Surprisingly, in a few cases such a stick seemed not be necessary for success (De Clercq, 2000)

First of all, effectiveness of VAs depends on proper design (De Clercq, 2000). According to Biekart (1998), effective VAs share four design characteristics. First, they must contain substantive commitments - quantifiable environmental targets and timetables rather than ambiguous industrial promises to eventually reduce pollution. Second, there must be a "stick behind the door" to deal with free-riders - the threat of direct regulation if industry fails to meet the VA's environmental objectives. Third, both the negotiating process which leads to an agreement and its subsequent implementation must be transparent in order to guarantee enforcement as well as legitimacy amongst the maximum number of concerned parties. Fourth, VAs should be legally binding.

Thus, key-words for effective VAs are credibility of agreements, strong commitment of the parties involved and transparency of monitoring. However, even if these demands are met VAs in themselves are but a minor step towards sustainable production (Biekart, 1998). That is to be expected, because the actual balance of power between government and industry will not allow more ambitious objectives than would be reachable through legislation and permits.

VAs exist in a large variety. Biekart (1998) distinguishes between *single-issue* VAs, whereby the deals relate to a single environmental topic, and *integral* VAs, whereby a whole set of environmental parameters of a particular sector of industry are covered. Examples of *single-issue* VAs are product-related VAs (e.g. batteries, packaging materials) and VAs related to environmental problems (e.g. CFCs and the ozone layer). Sectoral VAs (covenants between environmental authorities and sectors of industry) are examples of *integral* VAs. In the words of *transaction costs economics*, integral VAs relate to the governance structure of business-government interactions.

So far, *single-issue* VAs have been predominant (Golub, 1998). Several countries and the EU now show an interest in the development of *integral* VAs like sectoral VAs. With regard to sectoral VAs, NEAPOL research concludes that VAs tend to be more effective in industries that are more homogeneous and that are able to negotiate in a climate of trust, built on tradition in environmental policy (De Clercq, 2000).

Aggeri (2000) uses another difference. He distinguishes between on the one hand *low ambitious agreements* (BAT diffusion oriented; continuous improvements; low uncertainties) and on the other hand *high ambitious agreements* (change of technological trajectories; innovation; high uncertainty). Most VAs belong to the *low ambitious* group, including the Dutch sectoral VAs. For this category, Aggeri expects compliance with the targets unless SMEs dominate the scene (Aggeri, 2000). So far, examples of the *high ambitious* group mainly relate to waste recycling initiatives. Because high ambition VAs aim at innovation, resource development is crucial for their effectiveness, at the same time very difficult to predict (Den Hond, 1996).

Do VAs contribute to organisational learning? In other words, do companies and authorities increase their knowledge on how to tackle environmental problems? The meta-theory of learning assumes that organisational learning and change is mediated through the interaction of actors both inside and outside focal organisations (Roome and Dieleman, 1998). Actor interactions take place around ‘learning and change events’ and ‘learning and change sequences’, which are made up of a series of events over time. At their simplest, events involve stimuli, which act to question current thinking and/or practice; the emergence of conceptualised reactions to these stimuli; and the development and implementation of responses. On a more concrete level, Aggeri (2000) agrees that *resource development* is a crucial issue for both private and public partners in a VA. In a dynamic perspective, he considers resource development the predominant criterion for success.

VAs can be considered as *multi period* (=learning), *multi agency* (=integrating) arrangements. In the context of VAs, both companies and authorities can be considered as focal organizations. VA-targets can be considered as stimuli for change. Conceptualised reactions are developed by means of research and pilot projects. Dissemination of results should help implementation of ‘good business practices’. Therefore, our conclusion is that VAs include many provisions to foster learning. A bottleneck may occur in the learning of new routines and new institutional structures, which tend to be much more demanding (Van der Woerd, 1997). VAs *can* provide a network for action-learning. However, organisation, implementation and monitoring of VAs decide whether the network is effective. VAs are but one of many governance structures, thus do not have any intrinsic or universal efficiency *per se*. Action-learning is less likely, the more SMEs are involved in the process (Aggeri, 2000).

2.5 Propositions about company-authority interactions within VAs

Based on the preceding sections, we finish this chapter with six propositions about development of business-authority interactions within a realm of sectoral VAs. The propositions will be addressed in Chapters 3 and 4.

Proposition 1: *Voluntary agreements with sectors of industry are not able to bring about changes in corporate business strategies.*

Explanation: By *strategic business changes* we mean a change in the product-market mix or a fundamental innovation of production processes. Traditional regulation has limited influence on corporate strategies. If trade organisations try to use VAs for regulatory capture and authorities do not want to put a credible threat on business continuity this implies that VAs can be considered a codification of existing practice. Proposition 1 is in line with Biekart, 1998, when he states that VAs are but a minor step towards sustainable production.

Proposition 2: *VA objectives are reached too late, reached only partially or not reached at all.*

Explanation: A substantial body of knowledge argues that in many cases VA targets will not be reached, at least not in the time schedule as agreed upon. Lack of sanctions and problems of free riders are the core of this problem.

Proposition 3: *Sectoral VAs in sectors dominated by SMEs do not work.*

Explanation: SMEs are difficult to reach and difficult to monitor (Section 2.3). Introduction of VAs will not change this phenomenon. Proposition 3 is in line with Aggeri, 2000. This proposition is a specification of proposition 2.

Proposition 4: *By forcing annual contacts between company and authority, VAs limit mismatch in time between authorities' demands and business' corporate planning, because contacts about 'events' are changed into regular contacts.*

Explanation: Traditional regulation is characterised by a mismatch between government impulses and decision procedures within companies (Neumann, 1995). Regular contacts will expectedly improve strategic access of authorities into companies.

Proposition 5: *VAs are well suited for action learning networks, because they bring together policy-devising and policy implementing actors on a regular basis.*

Explanation: Co-ordination between policy-devising agencies and policy implementation agencies is problematic (Section 2.3). Learning, *i.e.* knowing better how to tackle certain problems, takes place while implementing decisions. In *action learning* or learning by doing the focus is on testing and upscaling of potential solutions (Iansiti and Clark, 1994). During the implementation phase of VAs both policy-devising agencies and policy implementation agencies remain involved on a regular basis, just as firms and trade organisations are. In such a network, dissemination of improved practices gets more likely than in the situation prior to the VA.

Proposition 6: *Sectoral VAs homogenize efforts of companies working in that sector by securing a basic level of compliance.*

Explanation: For trade organisations, it is difficult to discipline company behaviour. VAs provide a good instrument to assess good behaviour and to discover free riders. In consequence, we expect VAs can improve the basic level of compliance within a sector.

3. Results of three case studies

This chapter describes the three case studies that we conducted in respectively the paper industry, the textile finishing industry and the fertiliser industry. For each sector, we start with a sector description. Next, we contrast experiences from business and authorities as they appeared from written documents and interviews. These experiences are the starting point for answers on the propositions presented in Section 2.5. Readers who want to have fast access to the results, can jump immediately to the sections with answers on the propositions. The Annexes IV till VI contain names and major characteristics of the actors we interviewed.

3.1 The Dutch paper industry

3.1.1 Sector description

Table 3.1 compares the Dutch paper industry with EU-15 totals. As can be seen, the Dutch industry is relatively small and consumer oriented. Production of virgin pulp is almost absent, not a surprise in a country virtually without forests. In contrast, use of waste paper as raw material is highly developed, a result of high concentration of population and high recycling rates. Imports of pulp for the Dutch paper industry are high. With regard to paper production the Netherlands are 90% self-supporting.

Table 3.1 Comparison between paper industry in EU-15 and in the Netherlands.

Characteristic	Numbers EU-15	Numbers the Netherlands	
Number of production sites	1039	27	(3%)
<i>Among which pulp production</i>	200	2	(1%)
<i>Among which paper production</i>	922	27	(3%)
Volume of pulp production	30.900 kilo tonnes	119 tonnes	(0%)
Volume of paper production	68.800 kilo tonnes	3.180 kilo tonnes	(5%)
Volume of paper consumption	64.300 kilo tonnes	3.491 kilo tonnes	(5%)
Paper exports (% of production)	+ 7%	- 10%	
Value added	8060 million Euro	577 million Euro	(7%)
Employment	371.503 (?)	6.800	(2%)
Use of recycled fibres	57%	75%	
Waste paper collection	43%	66%	

Source: EU Commission, 1997 and VNP, 1999.

In 2000, 27 paper plants were in operation in the Netherlands. Two of these paper plants had integrated processes for the production of virgin pulp in operation, while 20 paper plants (75%) applied integrated processes to recycle waste paper (Table 3.2). There were no separate wood pulping or recycling mills in the Netherlands.

Table 3.2 Raw material inputs for Dutch paper plants.

Number of plants	Raw material inputs	Main products
7	Only virgin pulp	magazine & fine paper
7	Partly virgin, partly recycled	Newsprint, hygienic paper
13	Only recycled fibres	board, packaging paper
TOTAL: 27		

Source: BEPPs of Dutch paper plants.

Paper industry is a process driven industry. Innovations focus on process improvements (ATKearney, 1997). Production is very capital intensive and little labour intensive. The process orientation is also dominant in relation to environmental issues. Manufacturing of paper demands large inputs of energy and water. The main environmental issues associated with pulp and paper manufacturing are:

- Energy consumption and related emissions of CO₂ and NO_x (In the Netherlands SO₂ is less relevant, since natural gas is the common fuel and SO₂ emissions are negligible therefore);
- Water consumption (some card board manufacturers use surface water, most plants use groundwater);
- Discharges of COD (Chemical Oxygen Demand) and BOD (Biological Oxygen Demand) in waste water;
- Discharges of micro pollutants, mainly AOX (chlorinated substances) that result from the use of chlorine chemicals in wood pulping and micro-pollutants that result from de-inking;
- Solid waste.

The Voluntary Agreement 1996-2000

In 1996 the government, representative organisations of the regional and local authorities and the business association of the Dutch paper industry concluded a voluntary agreement aimed at the reduction of environmental impacts resulting from paper production. The VA has been signed by all 27 paper plants in the Netherlands (Convenant papier, 1996). In conformity with the usual environmental priorities in the paper industry, the main objectives of the 1996-2000 VA included energy and water use (Table 3.3).

Table 3.3 Environmental objectives in 1996-2000-2010 paper VA (extract).

Topic	2000 sector target	2010 sector target
Energy efficiency (CO ₂)	+ 20%	NA
Groundwater use	- 25%	NA
NO _x to air	- 55%	-90%
CO to air	- 50%	-90%
Formaldehyde to air	- 50%	-90%
Phosphorus (P) to water	- 75%	-95%
Zinc (Zn) to water	- 65%	-80%
Chromium (Cr) to water	- 85%	-85%

NB: Reduction targets are related to the base year 1985.

Source: Convenant papier, 1996.

The 2000 progress report on the paper industry VA shows promising results. At sector level, most of the 2000 targets have been accomplished (FO-Industrie, 2000). Some bottlenecks occur. Most pressing problem is the NO_x problem: A 19% reduction has been reached compared to a target of minus 55%. The lack of success can be attributed to a standstill with co-generation, in turn caused by vanishing profitability on the waves of electricity liberalisation. Other bottlenecks are rather plant related. Examples are the emissions of chromium to water (two plants; minus 38% instead of target minus 85%), zinc to water (two plants; minus 40% instead of target minus 65%) and ammonia (two plants; increase instead of target minus 38%).

Regulatory framework

During the 1990s, the regulatory framework for Dutch paper plants has remained unchanged. Plants need an environmental permit issued by provincial authorities and a water permit issued by specialised water authorities. In 1996, all plants possessed the two permits mentioned. Since then, some permits have been renewed.

3.1.2 Comparison of experience from companies and authorities

We analysed BEPPs and conducted interviews with representatives of five paper plants and the public authorities involved (Appendix IV). This section provides an overview of the results.

VA involvement of companies and authorities

Contact persons of both the industry and the authorities declared to have a good knowledge of the VA targets. Most of them have been working in/with paper plants for more than five years. One paper plant official had been personally involved in the VA negotiations. None of our government spokesmen was directly involved in the negotiations. About the feasibility of the VA targets the interviewees from business and local government shared the opinion that most of these were relatively easy to accomplish. Perceived bottlenecks were identical: NO_x emissions, groundwater use and CO. Differences in opinion existed on details, including the implementation of arrangements on NO_x and groundwater use (industry) and VA water targets that were not considered state-of-the-art (one *WVO* official).

Core elements of BEPP 1996-1999

Opinions differed substantially between business and authorities whether priorities have been set in individual BEPPs. All plants, except one, state that they deliberately chose to concentrate on topics like energy, groundwater use or waste and rejects. In contrast, the authorities did not discern that specific priorities were established, except for a few measures 'that were financially profitable as well'. An explanation for this difference in perception may be that energy and water are traditional priorities in the view of authorities, but that companies are more aware of the efforts it takes to make the next steps ahead. The opinion of authorities on the lack of priorities runs parallel with their opinion that paper plants are active in environmental policies, but not pro-active.

Companies and authorities agreed that corporate headquarters did not exercise direct influence on the BEPP process. In most cases the mother companies have formulated limiting conditions within which individual plants have relative freedom to operate. Some authorities experienced a negative influence on implementation, because headquarters delayed approval of investments.

With regard to the implementation of the BEPP measures, paper plants mentioned dilemmas such as water re-use/ water temperature and NO_x emissions versus CO emissions. This last dilemma was also recognised by the authorities. Fortunately, win-win options were mentioned as well, like increased use of surface water and use of rejects in the cement industry.

Authorities' involvement in BEPPs

What has been the authorities' influence on BEPPs? Both parties agree that direct influence of authorities on BEPPs has been limited. Authorities' demands were site specific (noise) or related to specific equipment (e.g. a waste incinerator).

The influence of BEPP on the content of environmental and water permits has so far been limited. The establishment of the individual plans has not led to the revision of permits, but most authorities envisage to include BEPP measures in future permitting procedures, as far as meaningful. One public official stated that it would be out of all proportions to start every four years a new permitting procedure.

Relation between EMS and permits

Headquarters in the paper industry stimulate certification based on ISO 14001. As a result, the paper industry has become a frontrunner for EMS certification in the Netherlands.

Do EMS result in more flexible permits? Business' experience has been quite diverse; in some cases there has been a strong relation between EMS and generic permits, while in others there was no relation. A reason for such diversity may be that EMS certification and permits are time and person dependent. Furthermore, authorities stated that a certified EMS will never be the only argument to start a procedure for a generic permit. In fact, authorities consider a proven endeavour for continuous improvement of environmental performance as the most important trigger for a generic permit.

Expectations about second BEPP 2000-2003

Companies' and authorities' opinions about priorities in BEPP-2 diverged less than in relation to BEPP-1. The companies' lists of priorities for BEPP-2 seemed rather identical those for BEPP-1 (water use, waste/rejects, energy use), but rankings had changed. In addition, a *WVO* authority mentioned salts and heavy metals in waste water.

Companies expect bottlenecks in the implementation of groundwater use and rejects. A decrease in groundwater use is directly related to the technical feasibility of closed water loops in the paper industry. Recycling of rejects is awaiting new equipment and processes. Authorities agreed on the uncertainties surrounding closed water loops and rejects recycling. Moreover, they stressed that ambition levels for NO_x must increase. Emis-

sions trading for NOx, recently approved in principal by Dutch business' representatives and government officials, could provide the answer.

Concluding remarks

All arguments so far bring us to the conclusion that companies and authorities broadly agree on opportunities and bottlenecks of the VA in the paper industry. There is also a general agreement about the feasibility of VA targets, the lack of headquarters influence on BEPP, the limited influence of authorities on BEPPs, and the lack of direct effects of BEPPs on environmental permits, and the priorities and bottlenecks for BEPP-2.

Opinions differ whether clear priorities were stated in BEPP-1, about which the plants are more positive than the authorities. Business' experiences with EMS and generic permits are divergent, but this can be explained because authorities consider *continuous improvement* as more important than EMS *per se*.

This brings us to the conclusion that the communication between companies and authorities in the paper industry is at an adequate level, which is confirmed by the actors' own assessments of communications. Moreover, all companies and most authorities did perceive an improvement in relations as a result of the BEPP process. Evidently, regular contacts between companies and authorities pay off.

What about the future of the VA/BEPP system in the paper industry? Based on the positive assessment of improved communication as a result of the BEPP process, one would expect a bright future. Pilot schemes with closed water loops and recycling of rejects may open up new opportunities. Authorities also perceive an increase in business accountability and transparency. However, some authorities expressed critical notes on VA achievements, because the VA did not lead to an increase of the number of pro-active companies. Related to this, it has not been possible - as agreed on in the VA - to include long-term strategies in BEPPs. Lack of strategic vision not only manifests itself in the paper industry, but is generally absent in BEPPs (FO-Industrie, 2000). In this respect, the VA system did not come up to expectations.

What does this mean for the future of VA/BEPP? Most spokesmen expect that some type of VA will continue because of advantages in relation to communications, accountability and transparency. However, some spokesmen foresee a replacement by EU regulations or by agreements that are more topic specific.

To conclude, positive aspects of the VA/BEPP system are that:

- The VA increases awareness inside companies and brings environment at management level;
- BEPPs provide a basis for pilot projects (technical; organisational) with front runners;
- VAs bring about more regular contacts (= process improvement) and more openness from both sides (= content improvement).

Disappointing aspects in the VA/BEPP system include:

- VAs are not strategic (targets easily achievable; no strategic vision of companies; number of pro-active companies is constant; do not bring about technical leaps like closed water loops);

- Little influence of headquarters and little push inside corporations to become proactive. Local management can manage without recourse to advanced methods.

3.1.3 Answer on propositions for the Dutch paper industry

Section 3.1.2 ended with conclusions about advantages and disadvantages of the VA for the paper industry. With this in mind, we will now answer our propositions about VAs that were introduced in Section 2.5.

Proposition 1:

Voluntary agreements with sectors of industry are not able to bring about changes in corporate business strategies.

Answer: Affirmative.

The lack of strategic content in BEPPs is a regular complaint of public authorities. Companies are not able or willing to elaborate strategic visions on future environmental objectives. At the same time, VA targets have such a rather limited ambition level that they do not provide a sufficient impetus for companies to come up with technological breakthroughs.

For the 2000-2003 period, innovative solutions may be around the corner. Examples are experiments with closed water loops and with reject recycling. In our opinion, these innovations cannot be attributed to the VA. Rather, some frontrunners take initiatives in spite of lean VA targets. Because the paper industry is a well-organised sector, positive results can spread quickly to other plants in future.

Proposition 2:

VA objectives are reached too late, reached only partially or are not reached at all.

Answer: Rejected.

Most VA targets for the paper industry, as agreed on in 1996, have been reached. Some bottlenecks need attention. A question behind this conclusion is whether targets have been ambitious enough. Some authorities have doubts, and miss a state-of-the-art assessment.

Proposition 3:

Sectoral VAs in sectors dominated by SMEs do not work.

Answer: Not possible to give an answer.

SMEs in the paper industry are rare. This proposition is therefore not relevant in relation to the paper industry.

Proposition 4:

By forcing annual contacts between company and authority, VAs limit mismatch in time between authorities' demands and business' corporate planning, because contacts about 'events' are changed into 'sequential' contacts.

Answer: Affirmative.

Both companies and authorities appreciate the value added of regular, structured contacts. Such contacts increase accountability and transparency.

Proposition 5:

VAs are well suited for action learning networks, because they bring together policy-devising and policy implementing actors on a regular basis.

Answer: Little evidence.

In the 1996-1999 period, we met with little innovative options. Introduction of co-generation for example can be considered as state-of-the-art technology. Contacts between officials involved in VA negotiations and officials involved in BEPP assessment are loose.

Proposition 6:

Sector VAs homogenize efforts of companies working in that sector by securing a basic level of compliance.

Answer: Affirmative.

Since 1996, the paper industry saw some spreading of state-of-the-art technology among its members. The paper industry has a well-organised trade association. This results in effectively two-way information between sector level and plant level.

3.2 The Dutch textile finishing industry

3.2.1 Sector description

Textile finishing process textile products in order to improve performance and appearance. Typical operations are bleaching, dyeing and printing. In most processes, textile products are submerged in water (EU Commission, 1997).

The number of companies and, with that, the number of employees in the overall textile industry decreased in recent years in the Netherlands, in conformance with EU developments. However, in the textile finishing sub-sector employment increased, whereas the number of companies decreased (Table 3.4).

Table 3.4 Core data of Dutch textile finishing

	1995	1997	1999
TEXTILE INDUSTRY			
Plants with ≥ 20 employees	224	187	185
Number of employees	16,500	14,400	14,000
TEXTILE FINISHING			
Plants with ≥ 20 employees	28	25	20
Number of employees	2,500	2,800	2,800
Production value (million NLG)	527	731	769

Source: CBS, 2000.

In textile finishing, wastewater is the primary environmental concern. Important environmental pressures are related to the use of harmful auxiliaries and dyes in large quanti-

ties along the whole chain, i.e. in the production of raw fibres, in processing and in textile finishing. Environmental impacts from textile finishing mainly fall in three categories:

1. Chemical substances (dyes, auxiliaries)
2. Water consumption & wastewater
3. Air pollution & energy consumption

The Voluntary Agreement 1996-2000

In 1996 the Government and the textile and carpet industry have signed a voluntary agreement to stimulate the reduction of environmental impacts resulting from textile finishing. The VA is signed by textile finishing companies with at least 20 employees.

The 1996-2000 VA contained sector targets for climate change (energy efficiency improvements), groundwater depletion, dispersion to air, dispersion to water (heavy metals and chlorinated organic compounds), eutrophication (N and P in wastewater) and waste (Table 3.5). 2000 Targets are binding, 2010 targets are indicative. The VA mentions no objectives for the effluents from dyes.

Table 3.5 Environmental objectives in 1996-2000-2010 textile finishing VA (extract).

Topic	2000 sector target	2010 sector target
Energy efficiency (CO ₂)	+ 20%	NA
Groundwater use	- 40%	NA
Copper to water	- 50%	- 80%
Chlorophenoles to water	- 50%	- 90%
Nitrogen (N) to water	- 70%	- 75%
Phosphorus (P) to water	- 75%	- 95%
Waste to landfill	-100%	-100%

NB: Reduction targets are related to the base year 1985.

Source: *Convenant textiel*, 1996.

Assessment of the 1996-2000 VA and follow-up

The 1999 Progress Report on the Textile Finishing VA shows rather disappointing results (FO-Industrie, 1999). VOC emission reductions have been achieved. However, by 2000 not all companies will have an operational environmental management system. 5-7% of the promised 20% energy reduction still has to be achieved in the year 2000.

Waste from the textile and carpet industry has grown more than foreseen. The objectives of the voluntary agreement, i.e. no more landfilling, and those stated in the BEPPs lie far apart.

The strategic content of most BEPPs was not sufficient. Therefore, a strategic approach on issues involved in dyeing processes, water management, waste disposal and prevention will be part of the BEPP-2 in the next 2000-2004 evaluation round.

As for dye processing and water management, each company should have a remediation plan for effluents from dyes and an implementation plan on top of that. The deadline for this latter plan was January 1, 2001. As an alternative, companies are allowed to make an overall water management plan, which includes next to dyes effluents, the use of water,

reuse of (waste) water, water related energy use and the quality of processing water. The deadline for an integral water management plan is January 1, 2002.

As for waste disposal and prevention, it seems that many companies are ill-informed on reuse of waste products. Not all options have been optimally utilised concerning treatment of dye concentrates, sewage sludge, cutting waste etc. Therefore companies are asked to develop a waste disposal plan before January 1, 2002 (*not an obligation; remark authors*).

Regulatory framework

In 1995-1996, the regulatory framework for Dutch textile finishing changed considerably. Before 1995, plants needed only an environmental permit issued by municipal authorities. Water pollution was catered for by local by-laws on the sewerage system.

From 1995 on, an additional water permit has become compulsory. In a co-ordinated action, water authorities issued provisional water permits to textile finishing plants. The main target was to eliminate 90% of dyes from wastewater. Because it was far from clear how to accomplish the target, pilot projects have been conducted. Till 2001, pilot projects brought promising results. However, concrete solutions to the dye problem are discussed but not implemented yet. Therefore, all but one plant still possess a provisional water permit.

The 90% reduction target for dyes does not figure in the VA. Since 1996, VA monitoring and water permit procedures ran parallel without formal interactions. Fortunately, the VA Implementation Manual does pay attention to dye elimination as well.

3.2.2 Comparison of experience from companies and authorities

We analysed BEPPs and conducted interviews with representatives of four textile finishing plants and the implementation agencies involved. Appendix V provides their names. This paragraph presents key results.

VA involvement of companies and authorities

None of our spokesmen has been directly involved in VA negotiations. Nevertheless, VA knowledge of all our interviewees is fair to good. An explanation may be that almost all business spokesmen are active in the trade organisation *KRL*, while water authorities cooperate closely in expert groups. Wm authorities lack such a platform for discussion.

Companies claim that during VA negotiations larger companies forced smaller ones to join. Our information from authorities can confirm nor deny this claim.

VA targets are considered reasonable and feasible. However, companies and authorities agree that the VA has a fundamental shortcoming in that the most pressing problem, dyes in waste water, is not a part of the VA. Fortunately, removal of dyes from waste water is explained in the VA implementation guide book.

Assessment of current BEPP 1996-1999

Generally speaking, companies made well considered choices about priorities in BEPP-1.

Priorities range widely, between energy, waste water and toxic substances. Cost effectiveness is a criterion used in every investment decision.

On the procedure towards prioritisation opinions differ: companies state the process ran smoothly and authorities' involvement was low. Authorities state the process was cumbersome, that they played an active role as an advisor and that external consultancies sometimes hampered agreement.

In respect to results of BEPP-1 all companies state that they are satisfied. Especially pilot projects on water purification are promising. Bottlenecks remain for dyes, employee involvement and EMS certification. In contrast, authorities are critical because three out of four case companies did not reach their own BEPP-1 targets. One of these companies openly accepts, the other two are silent about this. Authorities try to monitor companies, but delays are common. Still, most companies have not implemented yet their water purification intentions.

Authorities' involvement in BEPP

Overall, the authorities consider the textile finishing industry as being traditional and conservative. Exceptionally, two of our four cases are considered to have changed towards an active stance in environmental policies. According to business spokesmen, the change was brought about by management imperatives in one case, by personnel engagement in both cases.

Authority -company contacts are regular, in fact several times a year. All companies state that the BEPP process has improved their relationship with authorities. Keywords are mutual understanding and openness. Half of the authorities agree on improved relations, others conceive no change.

Environmental permits are old (dating from 1987 - 1993) and have not been changed during BEPP-1. However, two companies probably get *Vergunningen Op Maat*, with a maximum of target oriented prescriptions, based on their BEPP-2.

Parallel to the VA but unconnected, a 1995 initiative to diminish water pollution by means of provisional water permits has brought much confusion on contents and targets in BEPPs. In 2001, one company succeeded in implementation of its water purification scheme and got a permanent water permit. Based on the critical assessment of the 1996-2000 VA period, water purification plans and implementation have become imperative in BEPP-2 of the other three plants.

Relation with Environmental Management Systems

None of the companies have certified EMS so far, mainly because there is no stimulation whatsoever from authorities or customers to do so. Two companies plan to certify EMS shortly in order to secure their environmental performance.

In line with business experience, authorities think that certification does not work in absence of enforcement. Authorities put emphasis on actual behaviour of companies. Authorities are prepared to reward proven performance with a *Vergunning Op Maat*. In their view, the real reward of the VA system lies in the fact that companies can state their own priorities.

Expectations about BEPP-2 2000-2003

One company will not join BEPP-2 because production will be relocated to a nearby facility. Relocation of production will go hand in hand with a modernization of production facilities.

In 2001, BEPP-2 procedures started in accordance with the predetermined time path. Authorities remark the process runs smoother because of BEPP-1 experience.

For companies, expected priorities are closed water loops and energy efficiency. All companies intend to make water management plans and waste prevention plans. Authorities consider a broader range of priorities, like EMS certification, soil sanitation and toxic substances.

Companies and authorities agree that bottlenecks will be water related.

Concluding remarks

In textile finishing, the VA has brought several useful results:

- consciousness of environmental problems has grown, especially in small companies;
- more regular contacts between companies and authorities increased openness and mutual understanding;
- pilot schemes have been initiated to develop cost effective solutions for the most pressing problem, water pollution caused by dyes;
- Improved EMS performance enables a renovation of the permit system towards *Vergunningen Op Maat*. Generic permits are one step too far.

Disappointing results so far have been:

- The most pressing environmental problem, dyes in waste water, still does not figure officially in the VA;
- Most companies did not stick to their own BEPP-1 targets;
- Many companies have not developed yet a systematic approach to solve their environmental problems. As a consequence, water management plans and waste prevention plans have become imperative in BEPP-2.

According to our interviews, opinions of business and authorities correspond in many aspects. However, an important difference in perceptions remains. Overall, authorities consider the sector as traditional and conservative. In contrast, all companies state that they are moving well ahead. The discussion about water purification provides a nice illustration. Companies consider that problem as basically solved, pointing at successful pilot projects. In contrast, authorities consider the problem far from settled, as long as most companies do not invest in purification equipment themselves. In fact, the BEPP-2 period will show whether a breakthrough is nearby or whether another round of delays will occur.

3.2.3 Answers on propositions for Dutch textile finishing

Based on the research done, we will answer our six propositions about VAs for the textile finishing industry? While reading the proposition one thing should be noticed: a topic not included in the VA is the removal of dyes from waste water. This topic how-

ever is considered one of the environmental priorities in textile finishing, both by authorities and companies joining the VA.

Proposition 1:

Voluntary agreements with sectors of industry are not able to bring about changes in corporate business strategies.

Answer: Affirmative.

Topics and targets in the VA meet with reluctance in a traditional and conservative sector of industry. Cost effectiveness is the most important criterion to test technical improvements. The VAs do not have a direct influence on the strategy in the manner that new markets and products have risen or installations based on a new technology are being used. As a consequence projects concerning the environment are not implemented unless they are cost-effective. Thus the effects are mainly noticed at the operational level.

What did happen on a strategic level however is that the effort put in R&D has grown, resulting in innovative projects at the few large plants in the sector. Advanced water purification and -to be tested- closed water loops could bring a strategic process of improvement in the sector. The next five years must show whether or not these promises bear fruit.

Proposition 2:

VA objectives are reached too late, reached only partially or are not reached at all.

Answer: Affirmative.

Overall, VA targets for 2000 have not been reached. Authorities' spokesmen confirm that many 1996-1999 business targets have not been reached, thus will reappear in the 2000-2003 BEPP. This conclusion is confirmed in the textile industry where only one company has been able to reach all the objectives and in time.

Certification of the EMS is a bottleneck. Not one of the companies has a certified EMS although the larger companies do have regulations and procedures or in some cases an EMS that is hypothetically speaking "ready" to be certified. Slow progress is caused by a lack of incentives from the authorities and customers.

What is more, also in the succeeding BEPP-2 water problems and capacity problems of the authorities are expected to cause delays. The latter because authorities simply got a lack of employees and time to handle all requests.

Proposition 3:

Sector VAs in sectors dominated by SMEs do not work

Answer: Limited evidence.

At a sector level, VA targets for 2000 have not been reached. The one SME included in our interviews was not able to implement improvements it had mentioned in its BEPP. Moreover the company is so busy surviving that the environment is not a priority. In fact during a reorganisation the environmental co-ordinator was to lose his position. According to some of the authorities, however, some SMEs are innovative.

Proposition 4:

By forcing annual contacts between company and authority, VAs limit mismatch in time between authorities' demands and business' corporate planning, because contacts about 'events' are changed into 'regular' contacts.

Answer: Affirmative.

Both contacts between companies and authorities, and in between authorities themselves increased somewhat as a result of BEPP procedures. Nowadays, contacts have become regular. All companies and half of the authorities note that contacts have become more open and better informed.

An advantage of the VA's according to the authorities is that the companies can formulate their own priorities. Besides that some companies state that the request procedure for the permits has shortened considerably because of the preparations done in forehand for the BEPP-2. It is planned to draw new permits based on BEPP-2.

Combining these statements we can conclude that the mismatch in time has decreased.

Proposition 5:

VAs are well suited for action learning networks, because they bring together policy-devising and policy implementing actors on a regular basis.

Answer: Affirmative

Two institutions brought about pilot projects and dispersal of knowledge among members: the project groups for environment of KRL trade association and the VA contact group of the Water Authorities. They gave substantial impetus to the topic 'dyes and waste water'. It must be acknowledged that availability of technology subsidies assisted this endeavour.

The caveat is that evidently this network does not reach out to the Wm authorities, and thus does not cover all of the VA topics.

Proposition 6:

Sector VAs homogenise efforts of companies working in that sector by securing a basic level of compliance

Answer: Negative.

A characteristic of the BEPP-1 process has been that the large companies forced the small companies to join the agreement. Besides that almost all companies agree about the fact that the topic "dyes" is a priority in the textile industry. As so it has become part of the BEPP-2. In this respect a basic level of compliance has been reached about the intentions of the different companies.

However, there is a world of difference between showing the intention to do something about environmental problems and actually implementing measures. Our investigation shows that many companies were not able to implement their BEPP. Their device was *wait and see*. As explained under proposition 3, an important group among them exists of SMEs. On the other hand, some larger companies attained substantial improvements

on wastewater. Therefore it is our impression that since 1996 differences within the sector have increased rather than decreased.

3.3 The Dutch fertiliser industry

3.3.1 Sector description

Fertilisers provide nutrients to crops in agriculture. There are three mono or straight fertilisers: nitrogen (N), phosphate (P) and potash (K). Multinutrient fertilisers contain a combination of N, P and/or K. In the EU, N fertilisers are most important (55%), while P (24%) and K (21%) score almost equal (European Commission, 1997).

Till 1999, 9 fertiliser plants operated the Netherlands: 4 N producers, 2 P producers and 3 multinutrient producers. In 2000, three plants closed completely, one N producer and two P producers (Table 3.6). This means that the Netherlands has to import all P and K fertilisers in future. The three plants that closed were all located in the Rotterdam area. The remaining six plants are located in other regions of the Netherlands. At the start of the 1990s, employment in the Dutch fertiliser industry showed a sharp decline. During the 1990s this process continued.

Table 3.6 *Plants and employees in the Dutch fertiliser industry.*

Year	1988	1992	1996	2000
Plants (No.)	9	9	9	6
Employees	4693	3413	2600	2200

Source: CBS [www.cbs.nl/statline].

Being bulk commodities, fertilisers are sold on a world-wide market. The combination of decreasing demands in EU markets and more competition from abroad has brought the EU fertiliser industry in a difficult position. Basically, countries like India and China opted for own production instead of imports. Around 1990, the EU position shifted from being a net exporter into being a net importer. As a result, a massive restructuring, concentration and downsizing of EU fertiliser production took place. As Figure 3.6 shows, the Dutch industry got its part of the concentration process.

In the EU fertiliser industry, cost leadership is the only feasible strategy. Only large, modern plants will survive. Being at the end of their live cycle, corporations try to operate fertiliser plants as *cash cows*: Produce as much as possible with as little of investments as possible.

The fertiliser industry is energy and capital intensive, extensive in labour use. Because of falling demand, profits have been unsatisfactory in the 1990s.

The main environmental issues associated with fertiliser production are:

- Emissions of NO_x in nitric acid production;
- Emissions of SO₂ in sulphuric acid production;
- Emissions of cadmium into coastal waters (in waste gypsum from phosphoric acid production);
- Emissions of radio active materials (from phosphoric acid production);

- Gypsum as a waste material (from phosphoric acid production with sulphuric acid);
- Fluoride emissions to air (phosphoric acid production);
- Energy consumption in ammonia production;

The first and last topics originate in production of nitrogen (N) fertiliser, the other topics originate in production of phosphate (P) fertiliser.

The voluntary agreement for the chemical industry 1993-2000

In 1993 the Dutch government and the chemical industry have signed a voluntary agreement to reduce environmental impacts resulting from the production processes of this branch. The VA has been signed by the corporations that operate fertiliser plants (Convenant chemie, 1993).

Target subjects of the agreement for the chemical industry, which also includes the fertiliser industry, are changes in climate, acidification, dispersion, eutrophication, waste disposal, disturbance and groundwater depletion of priority substances. Reduction targets of the priority compounds with respect to the fertiliser industry are presented in Table 3.7.

Table 3.7 Environmental targets of the chemical VA (extract)

Topic	2000 sector target	2010 sector target
Energy efficiency (CO ₂)	+20%	NA
NO _x to air	- 60%	-90%
SO ₂ to air	-77%	-90%
Fluoride (F) to air	-95%	-99%
Cadmium (Cd) to water	-90%	-90%
Gypsum waste	-90%	-90%

NB: Reduction targets are related to the base year 1985.

Source: Convenant chemie, 1993.

In a paradoxical sense, all targets related to phosphate production (SO₂, fluoride to water, cadmium to water and gypsum waste) have been over-accomplished, because the two Dutch phosphate plants closed in 2000. Energy efficiency and NO_x emissions to air remain dominant themes in the production of nitrogen fertilisers. At national level for the whole chemical industry, 2000 targets for energy efficiency and NO_x have been accomplished (FO-Industrie, 2000). In our interviews we got more information about contribution of fertiliser plants to the overall results.

Regulatory framework

In the 1990s, the regulatory framework for fertiliser plants remained stable. Plants need an environmental permit issued by provincial authorities and a water permit issued by specialised water authorities. In 1993, all plants were in possession of the two permits mentioned. In due course, existing permits have been renewed.

3.3.2 Comparison of experiences from companies and authorities

We analysed two BEPPs, conducted an interview with representatives of one fertiliser plant and had interviews with representatives of two implementation agencies (Appendix

VI). Having in mind the limited number of companies in our research, the following overview must be read with caution.

VA involvement of companies and authorities

Business representatives had a fairly good knowledge of VA targets, authorities' knowledge of VA targets was good. Authorities' representatives had a long tradition in working with the fertiliser industry.

None of our interviewees was directly involved in VA negotiations. From business side, the negotiations have been conducted by corporate specialists. From authority side, colleagues in the environmental department conducted negotiations.

Because the fertiliser industry operates under the umbrella of the VA for the chemical industry, goal accomplishment is discussed at the latter level. The chemical industry as a whole was able to reach its 2000 targets. NO_x emissions, an important topic in the fertiliser industry, have been lowered according to schedule. However, a critical remark of both agencies is that the chemical industry was able to reach NO_x targets without full implementation of state-of-the-art technology in fertiliser plants.

Core elements of BEPP-1 (1993-1996) and BEPP-2 (1997-2000)

BEPP targets have not been identical to VA targets. Prioritisation has been based on cost-effectiveness of measures, magnitude of emissions, quality of the local environment and political priorities. In fact, NO_x targets in the BEPP were higher than national targets.

Two of the three Rotterdam plants where production stopped in 2000 did not write a BEPP-1 or a BEPP-2. According to our interviewee, the other Rotterdam BEPPs -except one- were merely consolidative, just repeating permit requirements. Looking backward, weak BEPPs indicated a state of decay in these plants. It will be no surprise that our Rotterdam interviewee considers fertiliser plants as reactive and conservative.

On the other hand, the two BEPPs we analysed showed acceptable efforts. For example, inventarisations of the greenhouse gas N₂O -not mentioned in the chemical VA- were included in BEPP-2. The fertiliser industry is a major emitter of N₂O.

Corporate headquarters did not take a direct influence on BEPP.

Authorities' involvement in BEPPs

What has been the authorities' influence on BEPPs? Opinions diverge. Business interviewees state that the influence has been limited. Influence concentrates on local impacts like dust and salt concentrations in waste water. Authorities state that they press to implement state-of-the-art technology at all fertiliser plants. Authorities do so in both BEPP negotiations and permit procedures. An explanation of the different opinions may be that the business interviewees work in a plant where business prospects are considered as normal, while the officials had to do with plants under severe economic pressure.

In ongoing plants, BEPP measures are included in new permits in due course. Companies and authorities agree that a BEPP as such has never been a reason to renew a permit.

As for the ill-fated Rotterdam plants, in the official's experience it worked the other way round: prescriptions in the renewed permit were repeated in the BEPP.

Companies and authorities in the chemical industry have regular contacts. The company states that contacts have become more efficient as the BEPP provides the framework for discussion. One official states that contacts have not changed after introduction of BEPPs. The other official states that contacts with chemical companies have improved as a result of the VA, but that improvements do not apply to fertiliser plants.

Relation between EMS and permits

The *Responsible Care* program of the chemical industry puts emphasis on a well functioning Environmental Management System (EMS). Therefore it is surprising that EMS in the Rotterdam plants were highly underdeveloped, while the ongoing plants operate a low profile EMS. Their explanations are that customers don't care and that corporate headquarters don't require them to certify EMS. Nevertheless, for reasons of internal management a procedure towards EMS certifications can be expected some years from now.

In absence of EMS certification, there have been no steps towards *generic permits*. All the same, one of the officials had enough confidence to issue a 2000 *Vergunning op Maat*, dominated by target prescriptions. In contrast, the 1990s permits for the Rotterdam plants provided detailed prescriptions, partly at request of the plants themselves.

Expectations about third BEPP 2002-2005

BEPP-3 will be prepared in the spring of 2002. Business representatives can speak about contents in general terms only. Following national guidelines, well-advanced topics will only be dealt with marginally. In contrast, BEPP-3 has to deal with new, encompassing topics like product stewardship, risk communication, logistics and raw materials. A major bottleneck is to provide a strategic view towards 2010. For chemical businesses, the maximum planning horizon nowadays is 3 to 5 years. For fertiliser, predictions are even more problematic as long as the market situation remains difficult.

Concluding remarks

Two aspects make the fertiliser industry different from the paper and textile finishing industries. In the first place, the fertiliser industry is part of the chemical industry, not only according to the sectoral VA but also in ownership and management control. Consequently, environmental improvements are balanced in relation to the chemical industry as a whole. In the second place, the market for fertilisers has been steadily decreasing. This implied a shrink in production and low profits.

In our opinion, the aspects above explain two specific results we found in the fertiliser case:

- Environmental improvements did not always aspire for state-of-the-art technology;
- Environmental management systems are weakly developed.

As long as cost-effective measures in other parts of the chemical industry were available, it was not necessary to invest in fertiliser plants with their insecure future. In fertiliser

plants struggling for survival, organisational investments like an EMS were not a priority. Anyhow, planning horizons in the fertiliser industry are extremely short.

What will be the future of VA/BEPP? As we saw already under *expectations for the third BEPP*, emphasis will shift from 'easy' end-of-pipe results to more advanced topics like *product stewardship*. Specifically for fertilisers, the greenhouse gas N₂O certainly becomes a core topic. In general terms, our spokesmen expect the VA/BEPP system to continue. Our business spokesmen stress BEPP brings better structure and more efficiency in their contacts with officials. Officials perceive more openness and more business initiatives as a result of the VA.

To conclude, positive effects of the VA/BEPP system are:

- VA brings more openness from both sides (=process improvement);
- BEPPs cause some improvements in structure and management involvement of environmental policies.

Disappointing aspects of the VA/BEPP system include:

- It remains impossible to include a strategic vision in BEPP, in fertiliser plants even more pronounced than in other chemical plants.
- Little push from headquarters to strive for pro-active policies.
- Economic problems preclude investments in equipment and organisation, in itself desirable, as long as non fertiliser plants can compensate.

3.3.3 Answers on propositions for the Dutch fertiliser industry

Section 3.3.2 ended with conclusions about advantages and disadvantages of the VA in the fertiliser industry. With these conclusions in mind, how can we answer our propositions about VAs that were introduced in Section 2.5? Because results depend on a limited number of interviews please interpret the answers with care.

Proposition 1:

Voluntary agreements with sectors of industry are not able to bring about changes in corporate business strategies.

Answer: Affirmative.

BEPPs lack strategic content. Related to their weak economic position, BEPPs in the fertiliser industry tend towards cost minimising, doing little more than has been prescribed in permits.

Proposition 2:

VA objectives are reached too late, reached only partially or are not reached at all.

Answer: Rejected.

VA 2000 targets in the chemical industry, as agreed on in 1993, have been reached. This positive result has been possible although equipment of fertiliser plants cannot be considered state-of-the-art everywhere.

Proposition 3:

Sectoral VAs in sectors dominated by SMEs do not work.

Answer: Not possible to give an answer.

Fertiliser production takes place in large plants.

Proposition 4:

By forcing annual contacts between company and authority, VAs limit mismatch in time between authorities' demands and business' corporate planning, because contacts about 'events' are changed into 'sequential' contacts.

Answer: Affirmative.

Both companies and authorities appreciate the value added of regular, structured contacts. Such contacts increase transparency. Regular contacts have a long tradition in the chemical industry. Therefore, changes for the chemical industry are probably less pronounced than for the paper or textile finishing industries.

Proposition 5:

VAs are well suited for action learning networks, because they bring together policy-devising and policy implementing actors on a regular basis.

Answer: Rejected.

The same specialists that were active before now operate under the umbrella of the VA. The VA did not introduce new forms of co-operation. However, existing contacts among specialists continue.

Proposition 6:

Sector VAs homogenize efforts of companies working in that sector by securing a basic level of compliance.

Answer: Not by definition.

Each fertiliser plant deliberately chose its own level of EMS and its own level of equipment. Because VA targets offered sufficient space to manoeuvre at corporate level, fertiliser plants could postpone investments in state-of-the-art equipment.

4. Summary and conclusions

4.1 Summary of answers on propositions

In Table 4.1 we compare answers on our propositions in the three case studies.

Two propositions, proposition 1 (VA does not result in change of business strategy) and proposition 4 (VA limit mismatches between companies and authorities) are supported in all sectors.

The answers on the other propositions diverge between industries. In the two sectors dominated by large companies -paper, fertiliser- VA targets have been reached (proposition 2), in the SME dominated textile finishing not. This seems to imply that VAs and SMEs are not compatible (proposition 3). However, we think that textile finishing shows enough initiatives to expect improvements in the near future. Of course, such an assessment is risky.

With regard to learning networks (proposition 5), we found positive evidence where we least expected it, in textile finishing. In fertiliser and, to a lesser extend, in paper industries technical development remained at business-as-usual level. In the paper industry we found the expected homogenisation of efforts (proposition 6). In textile finishing and fertiliser not, but for two completely different reasons. Textile finishing lacked (as yet?) implementation and follow-up to pilot projects. The fertiliser industry could refrain from state-of-the-art technology because measures in other parts of the chemical industry were sufficient to reach VA targets.

Table 4.1 Answers on propositions in three sectors of industry.

Proposition	Paper industry	Textile finishing	Fertiliser industry
1. No change in strategy	Yes	Yes	Yes
2. VA targets not reached	No	Yes	No
3. VA and SME do not work	Not applicable	Limited evidence	Not applicable
4. VA limit mismatch	Yes	Yes	Yes
5. VA promote learning networks	Limited evidence	Yes	No
6. VA homogenise efforts	Yes	No	No

4.2 Conclusion

Conclusions from a business' perspective are:

- Effectiveness of VAs is acceptable or good. After four years, most VA targets have been accomplished. However, we know of several examples that cast doubt on ambition levels of VAs. Such examples include VA targets that are lower than state-of-the-art technology allows and VA targets that do not challenge business strategies.
- VAs stimulate more regular contacts between companies and authorities. Regular contacts in combination with VA obligations such as planning and reporting, improve transparency and accountability of companies.

- VAs cause some homogenisation of environmental performance. The dissemination of state-of-the-art technology and of Environmental Management Systems (EMS) secure a basic level of compliance.

Conclusions from a regulator's perspective are:

- VAs have little impact on business strategies.
- VAs do not stimulate frontrunners in a sector of industry to pursue their course.
- The status of BEPP in relation to environmental permits is not at all clear. Contrary to intentions expressed in VAs, renewal of permits follow established pathways parallel to BEPP schemes. Interactions are merely a coincidence.

Two results, only partly related to the VAs itself, deserve special attention:

- One of our propositions is that VAs do not work in sectors dominated by Small and Medium sized Enterprises (SME). However, in the SME dominated textile sector we find innovative pilot projects to solve their most pressing problem, waste water pollution by dyes. The provisional water permits, issued in 1995, acted as a trigger. Additional explanations are that this sector has a capable trade organisation, that Dutch Water Authorities operate in close co-operation and that technology subsidies were available.
- Fertiliser plants do not improve towards state-of-the-art technology, some even do not have an EMS. This is really surprising for an important part of the chemical industry. Evidently, economic pressures have more influence than the aim of *responsible care*.

In our evidence, sector VAs are insufficient to support an *action learning network*. In Dutch textile industry action learning has -somewhat surprisingly- come into being, in paper and fertiliser industries not.

4.3 Discussion

Most of our conclusions are in line with other research on VAs. In words of Aggeri (2000) our cases can be considered as *low ambition/low scope of co-operation VAs*, or '*BAT diffusion oriented' agreements*'. In such cases, Aggeri expects compliance with the targets, an emphasis on information diffusion and a low intensity of collective learning. In fact, all three aspects figure in our results.

Results that do not match overall conclusions we find in textile finishing and fertiliser industries. The low effectiveness of VA in the fertiliser industry is most easily to explain: in a sector in economic crisis, financial arguments prevail over environmental arguments. Because production plants for fertilisers are highly dedicated, a change in the product/market mix is no alternative.

The emergence of action learning networks in SME dominated textile finishing is more difficult to explain. We think two reasons in combination account for this result:

1. The topic of environmental management is relatively new in this sector. Before 1995, only few companies made significant efforts. In contrast to paper and fertiliser industries where institutions were in place before the VA started, everything had to start from scratch. Uncertainly about the feasibility of waste water purification was

high and shared by plants and authorities. *High ambition/shared uncertainty* problems are able to bring about open, flexible discussions (Aggeri, 2000; Den Hond, 1996).

2. Both companies and authorities were able to establish personnel networks at short notice. From business side, the trade association played a decisive role. Water authorities intensified existing contacts into a dedicated project group.

Our results shed light on an ongoing discussion about the proper place of sectoral VAs in the policy mix. Recently, the Dutch Minister of Environment spoke critically about VAs, arguing that they are too vague, insufficiently ambitious and do not prevent free riders. The Dutch Federation of Industry *VNO/NCW* reacted furiously, stating that VAs have been effective and ambitious. (*Milieumagazine*, 8-2001). From our results we conclude that both parties have some points, at the same time that they argue at a different level. The Minister is right that VA targets are non strategic thus often insufficient for sustainable development; he argues at the level of *ambition levels* of VA. Binding of VAs on individual companies and free riders remain an unresolved issue. However, VAs are not by definition too vague, as our case studies showed.

Dutch Industry is right that VAs bring environmental improvements; they argue about effectiveness of VAs. However, industry is too optimistic about ambition levels of VAs.

What is a proper place for sectoral VAs in the policy mix? Sector VAs have earned a position of their own because they improve business-authority contacts, streamline procedures and increase transparency of business environmental performance. All the same, their role in the pursuit of sustainable development seems limited because sector VAs influence business strategy and action learning to a small extent only.

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Appendix I. Research format: embedded case studies

In our empirical research, we follow an approach of *embedded case studies*. What do we mean by this? To start with, we study developments at sectoral level (especially VAs and annual progress reports). Next, we embark on case studies of individual companies. By developing a sectoral framework in the first place, it becomes possible to put company performance into perspective. Does a specific company belong to the pro-active group within a sector of industry, or is it a laggard? Is a case company pro-active in all VA targets, or is it concentrating on specific targets? Thus, the sectorial overview makes it possible to assess the relative position of a company within an economic sector: *what* a company is doing, in absolute and relative terms. Next, the case studies will concentrate on the *how and why* of change in environmental performance. Following this approach, we want to combine the strong points of two different methods. *How* and *why* questions have been discussed with business and governments actors in semi-structured interviews based on pre-sent questionnaires. As much as possible, questions to companies and authorities were identical in order to make comparisons easier. The business questionnaire is presented in Appendix II. The authorities' questionnaire can be found in Appendix III.

Table I.1 Standard format of sector and case studies.

Sector studies	Company case studies
A. Study written documents (VA)	
B. Determine environmental priorities and bottlenecks	<ol style="list-style-type: none"> 1. Study written documents (BEPP) 2. Prepare questionnaires 3. Interview actors 1999 - 2001 4. Compile draft reports and -conclusions 5. Send draft report for comments 6. Write final case report
C. Analyse patterns at sector level	
D. Draw generic/sector specific conclusions	

Results of the case studies (Stage C) are presented in Chapter 3. In Stage C, we followed a two step approach. In a first step, we listed and compared business' and authorities' answers on identical questions in their questionnaires. In a second step, we combined answers on related question to answer the six propositions. Overall results and conclusions (Stage D) can be found in Chapter 4 of the report.

Appendix II. Questionnaire companies

Engagement with the sectoral VA

- Do you know the targets of the VA?
- How do you assess VA targets? Will it be easy to accomplish them?
- Was your company actively involved in negotiations about the VA within the trade organisation? If yes, what role did you play?
- Was your company actively involved in negotiations about the VA between trade organisation and authorities? If yes, what role did you play?

About the BEPP 1996-1999

- Are BEPP targets identical to VA targets? If not, why?
- Did your company define own priorities among the VA targets? If yes, what priorities did you choose and why? How did you define priorities?
- Did the authority responsible for the *Wm* permit influence BEPP measures?
- Did the authority responsible for the *WVO* permit influence BEPP measures?
- Did corporate headquarters issued guidelines or prescriptions for BEPP?
- Did you define internal priorities for BEPP? What persons in the company were actively involved? Who made the final choices?
- Looking back, what BEPP targets have been easy to accomplish?
- Looking back, what BEPP targets gave rise to bottlenecks?

About the environmental permits

- Can you describe the procedure that resulted in the current *Wm* permit? Came permit prescriptions unilaterally from the authority or have they been negotiated. Ditto for *WVO* permit.
- Did the BEPP result in a new permit? If yes, how? Who initiated the procedure? Do all BEPP targets and measures figure in the new permit? Ditto for *WVO* permit.
- When was your last contact with the *Wm* contact persons? What was the topic of conversation? Ditto for *WVO* permit.
- Did the BEPP result in another type of contacts with the authorities?

About consequences of your (certified) EMS

- Have you got a certified EMS?
- Why did you certify your EMS? According to ISO 14001? According to EMAS?

- Do authorities remunerate your (certified) EMS by changing their enforcement efforts? If not, why?
- Do authorities remunerate your (certified) EMS by issuing a generic permit (*Vergunning op Hoofdzaken/ Vergunning op Maat*)? If not, why?
- Has there been a change in your permits from measure oriented prescriptions into target oriented prescriptions?

About the future BEPP 2000-2003

- How far are you with the preparations of BEPP-2?
- What will expectedly be priorities in BEPP-2?
- What bottlenecks do you expect in BEPP-2? Do these bottlenecks relate to your own plant? Or do the bottlenecks relate to all companies in the industry?

Final question

- Do VA and BEPP have value added for corporate environmental policies?

Appendix III. Questionnaire authorities

Knowledge about the sector of industry

- What are your responsibilities? Do you issue permits, are you an enforcement officer, or both?
- What relation do you have to VA companies in your jurisdiction?
- Have you directly been involved in BEPP procedures of these companies?

Engagement with the sectoral VA

- Do you know the targets of the VA?
- How do you assess VA targets? Will it be easy to accomplish them?
- Were you actively involved in negotiations about the VA between trade organisation and authorities? If yes, what role did you play?

About the BEPP 1996-1999

- Did you influence the type of measures included in BEPP?
- Did corporate headquarters issued guidelines or prescriptions for BEPP at plant level?
- Did you supervise the implementation of BEPP?
- Looking back, were companies in your jurisdiction successful in accomplishing their BEPP targets?

About the environmental permits

- How do you assess current *Wm* (or: *WVO*) permits of the plants concerned? Are these permits traditional or generic (*Vergunning op Hoofdzaken/Vergunning op Maat*)?
- Can you describe the procedure that resulted in the current *Wm* (or: *WVO*) permit? Came permit prescriptions unilaterally from the authority or have they been negotiated?
- Did the BEPP result in a new permit? If yes, how? Who initiated the procedure? Do all BEPP targets and measures figure in the new permit? If no, will BEPP-2 result in a new permit? Ditto for *WVO* permit.
- When was your last contact with the company? What was the topic of conversation?
- Did the BEPP result in another type of contacts with the companies?

About consequences of a (certified) EMS

- Do authorities remunerate a (certified) EMS by issuing a generic permit (*Vergunning op Hoofdzaken/ Vergunning op Maat*)? If not, why?
- Do authorities remunerate a (certified) EMS by changing their enforcement efforts? If not, why?
- Has there been a change in your permits from measure oriented prescriptions into target oriented prescriptions?

About the future BEPP-2 2000-2003

- How far are preparations of BEPP-2? Have procedures been comparable to BEPP-1 (length of procedure, parties involved, parties' attitude)?
- What were major bottlenecks in preparation of BEPP-2?
- What will expectedly be priorities in BEPP-2?
- What bottlenecks do you expect in BEPP-2? Do these bottlenecks relate to individual plants? Or do bottlenecks relate to all companies in the industry?

Final question

- Do VA and BEPP have value added for environmental policies at local/regional level?

Appendix IV. Overview case studies paper industry

In the Dutch paper industry we conducted five case studies. In selecting the plants, we aimed to contact a cross section of the Dutch paper mills. As can be seen from Table III.1, three plants are in the sub-sector graphic paper (VHP-Ugchelen, Sappi- Nijmegen, Parenco - Renkum) and two plants in the sub-sector packaging paper (Kappa Attica-Oude Pekela, SCA De Hoop-Eerbeek). Two plants (VHP, Sappi) use virgin fibres only, two plants (Kappa Attica, SCA De Hoop) use recycled fibres only, while one plant (Parenco) uses both virgin and recycled fibres. This means that the three types of raw materials use (see Section 4.1.1) are present in our sample.

The sub-sector hygienic paper is missing. In the Dutch paper industry there are only three plants that produce hygienic paper (from a total number of 27). As their raw materials and production processes are rather similar to the sub-sector packaging paper, this missing link is acceptable.

Table IV.1 Overview of paper plants.

Plant	Ownership	Products	Size
VHP-Ugchelen	Gelderse Papiergroep	Fine Paper (banknotes)	Small (4.900 tons/year)
Sappi-Nijmegen	Sappi-South Africa	Graphic Fine Paper	Large (200.000 tons/year)
Parenco-Renkum	Haindl-Germany	Graphic Paper News- print	Large (400.000 tons/year)
Kappa Attica-Oude Pekela	Kappa	Packing Board	Median (120.000 tons/year)
SCA De Hoop- Eerbeek	SCA-Sweden	Packing Paper	Large (300.000 tons/year)

We contacted environmental authorities involved in permit and enforcement activities of the five plants. As Dutch legislation requires separate permits based on the Water Pollution Act (in Dutch: *WVO*) and on the Environmental Policy Act (in Dutch: *Wm*), each production facility has at least two environmental permits. Because the Dutch paper industry is clustered in some regions, there was a synergy in contacting the provinces of Gelderland and Groningen and the Water Boards. As can be seen in Table IV.2, we investigated relevant authorities except for VHP-Ugchelen.

Table IV.2 Overview of environmental authorities.

Plant	Wm permit	WVO permit	Others
VHP	Apeldoorn (municipality) <i>PM</i> <i>No interview</i>	Veluwe (water board) <i>PM No interview</i>	Groundwater use: Gelderland (province)
Sappi	Gelderland (province)	<i>Rijkswaterstaat Oost</i> ¹	Water purification plant: Beuningen (municipality)
Parengo	Gelderland (province)	<i>Rijkswaterstaat Oost</i> ¹	
Kappa Attica	Groningen (province)	Hunze en Aa's (water board)	
SCA De Hoop	Gelderland (province)	<i>Rijkswaterstaat Oost</i> ¹	Gronwater use: Gelderland (province)

¹ *Rijkswaterstaat Oost* = Eastern Department of the State Water Authority

Appendix V. Overview case studies textile finishing

In the Dutch textile finishing case studies were conducted in four companies. The companies represent a wide variety. Two of them are subsidiaries (Vlisco, Ten Cate Technical), the two others are independent. All companies belong to a class of large and medium-sized businesses, excluding KTV which is a small to medium-sized business.

Plant	Ownership	Products	Size
Vlisco Helmond bv	Gamma Holding NV	Imprecise batik textile prints	Very large (650 employees)
Ten Cate Technical Fabrics bv	Ten Cate NV	Cotton fabrics for tents and sunblinds	Large (250 employees)
Bv Textielabrieken H. van Puijenbroek (HaVeP)	Independent	Professional clothing; protective clothing	Large (220 employees)
Koninklijke Textiel Veredelingsindustrie NV (KTV)	Independent	Contract finishing	Middle sized (85 employees)

For each company, two environmental authorities have been contacted. Due to sickness it was not possible to interview Hellendoorn Municipality.

Company	Wm permits	WVO permits
Vlisco	Noord-Brabant (Province)	Aa (Waterboard)
Ten Cate Technical	Hellendoorn (Municipality)	Regge en Dinkel (Waterboard)
HaVeP	Goirle (Municipality)	Dommel (Waterboard)
KTV	Eibergen (Municipality)	Rijn en IJssel (Waterboard)

Appendix VI. Overview case studies fertiliser industry

In the Dutch fertiliser industry we analysed two BEPPs and conducted interviews at one plant. Names of the companies remain anonymous.

We contacted two authorities responsible for the environmental permit (*Wet Milieubeheer*). As shown in Table VI.1, the three Rijnmond plants closed prior to our interview.

Table VI.2 Interviews with environmental authorities.

Plant	Wm permit	Remarks
DSM Agro IJmuiden	Noord-Holland (province)	
Hydro Agri Rotterdam BV	DCMR Rijnmond (province)	Plant closed 2000
Kemira Agro Pernis BV	DCMR Rijnmond (province)	Plant closed 2000
Kemira Agro Rozenburg BV	DCMR Rijnmond (province)	Plant closed 2001