Chapter 9 Conclusions, reflection and recommendations

9.1 Water companies and sustainability

With the model developed in Chapter 8, we can answer the research questions of Chapter 1. Concise answers will be given in 9.1.1, based on the shared views in the water sector. In later sections the more controversial, unsolved issues will be discussed.

9.1.1 Answers to the research questions: shared views

The main question was: how is the concept of 'sustainable development' translated into business practices? This was divided into three subquestions, as shown below. The answers are based on interviews that were held in 2000, so they are about the companies as they were at that time.

What perceptions do people within Dutch water companies have of the concept of sustainability?
Water companies perceive sustainability as a concept that is in their own interests to use. They have struggled for many decades with water pollution, and they hope sustainable development will help to solve this problem. The concept also made them realize that the water companies themselves need to perform well on environmental issues so that they can rightfully ask other actors to behave responsibly.

The term sustainability has mainly become a cover term for all environmental issues in the water sector. The most important difference between this term and the term 'environmental' is that 'sustainable' also implies some kind of balance, a balance of environmental interests and economic interests, or a balance of nature and human interests.

Apart from this shared view, the companies each developed their own specific versions of sustainability. The concept tends to be adapted to the existing situation, for example, the surface water companies describe surface water as a more sustainable resource, and the groundwater companies describe groundwater as a more sustainable resource.

They divide environmental issues into green and grey aspects, and there is some debate on how to balance these aspects. The grey aspects themselves are no longer debated. Solutions such as reuse of waste sludge, saving energy, and building durable infrastructure are culturally accepted and mostly implemented. There is agreement about the sustainability of green energy as well, but there is some doubt about whether this is affordable. There is much debate about the green aspects, in other words, nature and desiccation. This is discussed further in the next section.

Which societal actors are involved in the process in which these perceptions are constructed?
Governments are the most important actors influencing the perceptions of sustainability, because they are the real carriers of the concept. Provincial governments have the most significant influence on the water companies. They have a groundwater licensing task and are often major shareholders. Each regional government has developed different perceptions of sustainability, and these perceptions can be recognized at the water companies too. In addition, the EU and the Dutch Ministries of the Environment and of Economic Affairs are influential, because they decide on the market structure for energy and water utilities. A switch from a public to a private structure would have had a profound impact on the

strategies of the water companies, but in 1998, it was decided not to liberalize the water sector. The influence of other societal actors, such as large industrial customers, water boards, and nature organizations, differs in every case, giving the perceptions of sustainability of each company a special flavour.

How do these perceptions influence company strategies and operations?
The estimation at the beginning of the research, that the environmental pollution of their resources has raised the environmental awareness of water companies, was confirmed by the data. This awareness has been present in the sector for more than seventy years. As a consequence of this long experience the concept of sustainability did not lead to a strategic turnaround in any of these companies. They see most of their present processes as sufficiently sustainable, because they build durable infrastructure and because the Vewin Environmental Plan of 1990 has been implemented. The switch to industrial water at Delta and the switch to surface water at PWN were strategic turnarounds, which were later labeled as sustainable, but they occurred before the concept of sustainability was used (1980 at Delta, 1985 at PWN). Though two companies (WMO and Nuon) see sustainability as strategic, this did not imply restructuring of their primary processes. Nuon started to use green energy for water production in 1998, but this had no consequences for its production infrastructure. WMO started a stakeholder debate in 1997, and at the time of the interviews, it was still looking for consensus on what should be done.

Water companies invest in clean surface water through membership of their lobby organization RIWA. They also continue to develop sophisticated purification technologies. The newest technology, membrane filtration, gets 'anything' out of the water, so it no longer matters how much the river Rhine is polluted, or with what. These technologies are expensive, compared to the use of clean water resources. The water companies see clean resources as the most sustainable solution.

9.1.2 Responsibility for nature and desiccation

All four water companies acknowledge the synergies between nature reserves and drinking water:

- The protection against pollution provided by the status of a nature reserve, and the resulting quality of groundwater resources.
- A combined defense against other land use pressures such as housing, industry, or waste disposal.
- A combined lobby for clean surface water.

They also acknowledge the negative impact of drinking water production on nature, because of desiccation and surface water infiltration. The consequences of this relation are interpreted differently. They vary from the sponsoring of nature organizations to large financial investments in nature development and close cooperation with nature organizations in order to optimize the biodiversity of an area. This means that the responsibility they accept for this impact differs widely, with near-zero responsibility on the one hand, to total responsibility, on the other. Apparently, there is no consensus within the water sector on this issue.

The underlying cause of the different views of water companies may be, that they conceptualize 'nature' in different ways. Macnaghten and Urry (1998) describe the evolution of the concept 'nature' in European history. The ancient Greeks started the discourse with the creation of a singular and abstract object called 'nature', a name for the total variety of phenomena that surrounded them. Nature became separated from humanity, and this object was personified as a Goddess. In the Middle Ages, nature was seen as God's Creation, a

spiritual body that communicated God's will to man. Nature had a natural, God-given order, that had to be respected.

In the sixteenth and seventeenth centuries, the Enlightenment took the myth out of nature: it was dead matter, a machine that was created by God. It could be understood through empirical research. Human domination was a natural step in the history of the earth, and the state of nature prior to human intervention was seen as poor and nasty. As a reaction to the enormous interference with nature that took place in the eighteenth century, Romantic ideas evolved. The Romantics described the pre-human state of nature as peaceful and cooperative, and the present, industrial developments as 'unnatural'. In the nineteenth century, the market was identified as a creator of prosperity and liberal democracy. The laws of the market were viewed as a specific set of natural laws, an 'invisible hand' that had to be respected. Humans were fundamentally different from other species, and nature was a hostile environment that had to be dominated. Romanticism did not react with a re-integration of humanity into nature, but with escapism. Nature was a spatial realm that existed outside industrial society. The first nature reserves were established in the USA: nature was regarded as wilderness, physically separated from the human world.

In the present time, Macnaghten and Urry signal several other conceptualisations[7]. One of them is a limiting nature: nature sets limits to what humans can achieve. Sustainable development is one of the discourses that uses this conceptualization, they state, because its project is "to identify ways to limit human activity so that economic and social development can proceed within the finite ecological capabilities of the planet". Their critique is that nature is not only limiting, but also enabling. To see the enabling aspects, the dichotomy of humans and nature needs to be abandoned.

However, as was described in Chapter 1, there are many versions of 'sustainability'. They fall into two large categories: those of weak and strong sustainability. Macnaghten and Urry seem to describe the strong, or nature-oriented view on sustainability. In this view, humans are part of a complex global ecosystem with objective, physical limits to which humans have to adapt. What these limits are needs to be researched, and from this, the maximal human population as well as the individual 'environmental space' can be deduced. In the case studies the 'strong' version of sustainability was found at several governments: the Ministry of VROM, provincial governments, and a water board, who all mentioned the theme of staying within the natural water system. The problems with this version of sustainability are that the limits of the natural system are often hard to calculate, and that it is unacceptable for most other societal actors.

The human-oriented view drops the limits, as Macnaghten and Urry suggest. However, in the human-oriented view no reintegration of humanity into nature is sought. Sustainability mainly concerns the accomodation of human needs, now and in the future. Nature is one of those human needs: for recreation, for ecological functions such as water purification, and for all other reasons humans can formulate.

The human-oriented view of sustainability seems to be a follow-up on the Enlightenment ideas, coined eco-modernism by Hajer (1995). According to this view, humans have no option other than to dominate, because this improves our lives enormously. It causes damage to nature, but if we operate in a more sophisticated way, total welfare is better. Björn Lomborg is an adherent of this view. He is probably right in his estimate that the situation of humanity on earth is improving. It's only destructive for species that cannot cope with human

[7] According to Macnaghten and Urry, a second contemporaray conceptualization is a threatened nature, for example, because of endangered species, exhaustible resources, or pollution. The third conceptualization is nature as a "realm of purity and moral power, to be enjoyed or worshipped". Examples are nature as a recreational space and the Gaia hypothesis of Lovelock.

influences. But this is not really a problem, because the human species is what really counts, according to the human-oriented view.

The weakness of the 'weak' approach to sustainability is that the economic and social aspects are likely to prevail when times are more difficult. This is shown in the case studies by the influence of the liberalization debate: sustainable activities are postponed or canceled. From the case material, it also seems that 'grey' issues, and especially those concerning an efficiency gain, are likely to be solved when this conceptialization is used. The 'green' aspects, such as nature and desiccation, are likely to remain unsolved. The voluntary character of the ecological aspect of the 'weak' form of sustainability gives the companies too little guidance on what to do. This vagueness also makes the negotiations with other societal actors difficult, as is shown in the WMO case. As Pezzey (1992) concludes, there is no guarantee that such an open process will eventually lead to a sustainable future: a real balance between the economic, social, and ecological aspects.

Neither the weak nor the strong version of sustainability seem to be a solution for the problems sustainable development was meant to solve. Maybe a third form of sustainability needs to develop, that bridges the human and the nature interests. As said, Macnaghten and Urry think it has something to do with emphasizing the enabling aspect of nature. Humans have to start seeing themselves as an integral part of nature again, instead of as being outside and above nature. An author and architect who goes a step further is Bill McDonough. He urges us to celebrate the abundance of nature, instead of seeing it as limiting (McDonough, 2000).

The ideas of Macnaghten and Urry, and of McDonough, seem to have been put into practice by PWN. It tries to find a balance between the interests of nature and the human interest of water production. A 'strong sustainability' option was demanded by the Foundation for Dune Conservation, namely, to move all water production out of the dunes. This would have emphasized the limiting character of nature. Instead, PWN combines human and nature goals and tries to improve them both continuously. It trusts that this is possible and is surprised at what it has managed to achieve so far. This could be a new, more promising model for the interaction of humans and nature.

9.1.3 Groundwater or surface water

An important dilemma that surfaced in this research was the choice between surface water and groundwater. Because the companies use the resources, available within a region, serve this region, and are steered mainly by regional actors, company views are defined by a regional context. This is why different companies come to different conclusions.

The view that surface water is more sustainable, is supported by actors at the national level. This argumentation has been picked up by PWN and Delta. It is based on the Dutch water balance (see Table 1.1 in Chapter 1). Does it apply to every part of the Netherlands? According to a respondent from Delta, both groundwater and surface water can be sustainable resources, as long as the extractions remain within their recharge rates. The recharge rate has been calculated in Delta's and PWN's vulnerable seashore regions. The data indicate that both Nuon and WMO collected hydrological information. Such information is often collected for only one extraction site. There seems to be no overall calculation of the recharge rate of the larger hydrological systems. WMO and Nuon are working with complex hydrological systems, compared to the small, isolated systems in the dunes. This makes it harder to calculate the carrying capacity. Here lies an important task for hydrological science: to strive for an aggregate level of knowledge that matches the physical water systems.

The main complicating factor is that water companies are not the only ones who interfere with the groundwater system. Estimates were made that water board drainage on behalf of agriculture causes 60% of the desiccation problems. Only 20% is related to drinking water production and 20% to drainage for other purposes. These impacts are part of the context in which WMO and Nuon are working. The respondents from WMO were quite explicit about this, and so was a respondent from PWN in speaking about an extraction further inland, in 't Gooi: 'If these other human practices are changed to restore water systems, we'll cooperate, but if we are the only ones who have to sacrifice our interests, it won't solve the problems. Our customers will get water of a worse quality, and the good water will be pumped towards the sea by the water boards.' Solution of the desiccation problems would be in the interest of water companies, because they would then have more resources. However, they lack the power to change the Dutch water management in this direction.

Groundwater companies are proud of their product, and it is valued highly by their customers. With surface water, achieving a high quality is more difficult, especially using the chemical purification methods. By using the methods of infiltration in the dunes, the quality comes near to natural groundwater quality. By using infiltration in higher areas in Netherlands, the quality difference could, in principle, be solved. This may require a lot of space in nature reserves that is not available. It would also be expensive, but not more expensive than PWN's drinking water. PWN customers still see the price as acceptable, so why not the governments that represent the citizens in the higher areas of the Netherlands? This is a matter of economic choice.

Another difference between groundwater and surface water is the low energy impact of groundwater use compared to surface water use. At the same time, surface water use means less desiccation. In the benchmark, PWN turned out to be the worst performer, and Nuon the best. Most respondents ascribed this to overweighting of the energy aspects, and under-weighting of the desiccation and nature effects. How should this weighting problem be solved? This is a profound problem that pervades all sustainability debates. One solution may be that water companies work seriously on both of these problems.

9.1.4 The effect of liberalization on sustainability

Economic questions related to sustainability are framed in different ways. WMO sees the economic component as inherent to sustainability: 'If it is not financially healthy, it is not sustainable'. The other three companies see sustainability as mostly environmental and maybe also social. Either way, the question is how to balance social and environmental interests with economic interests. At the macro-level, the framework is the public-private dilemma: should water companies function in a governmental or in a commercial structure?

At the heart of these views lies the question of allocation of resources: how should resources be spent to achieve the highest welfare level? Is it better to use cheap groundwater or should money be spent on surface water purification to spare nature from desiccation? Can dunes be used for infiltration or should an expensive membrane facility be built? Then it must be decided, which market structure is best to achieve the political goals: is a free market, a not so free market, or a governmental monopoly the best option to safeguard a low price, or nature conservation, or consumer demands?

If companies are in a monopoly position, drivers for higher costs become more important. Well-paid people work enthusiastically to produce a high quality infrastructure and a high quality product. Monopolistic companies are controlled by external actors, provincial governments and municipalities, who have a non-commercial set of norms. To them, all political goals are more important than money. The PWN case gives us a good insight into how a purely governmental ethic leads to rising costs. A politician is not supposed to make a

profit, but to defend the public interest. If a politician makes a statement that something is important, then money has to be found, and not the other way round. Secondly, a risk-avoiding culture among government officials causes them to choose the safest solutions, regardless of costs.

Empirical results show that drivers for low costs are also present, both within companies and among societal actors (see Figure 9.1). Company goals have an economic character: to invest sensibly and gradually, to keep customers, and in general, to have a healthy business. Political goals are a low price, a high product quality, security of supply, and protecting nature and the environment. The combination of drivers is in a sort of balance, with a slowly rising price as a result. Compared to other countries, the average price of water in the Netherlands is high (Dijkgraaf, 1997), but the price/quality ratio is generally regarded as acceptable by the Dutch public (NIPO, 1999).

	Company goals	External actors' goals
lower costs	to invest sensibly to keep customers to have a healthy business	a low price for citizens
higher costs	to innovate to do a good job to have high salaries	product quality security of supply protection of nature and the environment

Figure 9.1: Matrix of drivers for lower and higher costs

Societal interests are imposed on the companies by external actors, such as governmental agencies and customers. These actors often do not consider the costs of a request right away, either because their moral rule says money is not as important as this specific request, or because they lack knowledge of operational consequences. The companies have to develop the technologies and work out the financial consequences. After a period of debate, workable solutions emerge, and then the water companies get permission to invest. Once the investments are made, the company internalizes the societal goal. This happened with product quality. At PWN, the societal goal of nature development has been internalized in a similar way.

The issue of balancing financial and quality interests has been present in the sector since the beginning. The liberalization issue sharpened the intensity of this debate. Liberalization is often presented as a form of progress. But if we consider history, it looks more like a cyclical process. The municipality of Den Helder started a company in 1856, which was privatised in 1876. It was bought back by the municipality in 1901, because the municipality was not happy with its performance.

In about 1995, a debate started about liberalization of the water sector. In 1998, the Ministry of the Environment decided not to liberalize the water sector, using sustainability as one of its main arguments ("to allow the water companies to take care of their environment in a sustainable way"). The pro-monopoly companies argue that their market position allows them to behave responsibly. The data indicate that a pro-liberalization company (Delta) and a pro-monopoly company (WMO) can behave in a comparable way as regards sustainability issues, namely, always judging options using a financial cost-benefit analysis and trying to avoid all costly solutions. They behave in this way because of the liberalization debate. Delta wants liberalization to happen, and WMO thinks it will happen anyway, so they both anticipate by adopting a more commercial strategy.

The liberalization debate introduced a dynamic of its own to the drinking water sector, which may have begun to reduce governmental control. Companies have become less willing to invest in risky or unrewarding projects. They have started to worry about their solvability and

are using their financial results to increase their bank accounts. They postpone activities that would lead to a higher price.

The result of liberalization for sustainability would be, that commercially viable options such as small-scale membrane filtration, cascading, and water recycling for large industries would have a good chance of being developed. Measures that cost money but offer no return, such as switching from groundwater to surface water, or nature-friendly management of infiltration areas, would be avoided.

Liberalization of the water sector would lead to the externalization of measures which cost money. It would not be possible to counteract the externalization process by regulation, because this would result in an antagonistic relationship between companies and government, instead of constructive bargaining. Economic instruments, such as subsidies and taxes, would lead to superficial compliance with governmental goals, which would fall apart when the economic instrument was withdrawn. The small customers can not steer either, because they are totally dependent on their water company. When they disagree with the choices of the water company, a boycott like that of Shell's Brent Spar is unlikely. On the contrary, consumers *spilled* water on a large scale during a drought in Yorkshire, to bother the water company they disliked (Bakker, 2000).

Another effect of the liberalization debate is the reduction of available information. Nuon and Delta strive for a more business-like relationship with their shareholders. Nuon has stopped sharing operational knowledge with the shareholders. Delta has minimized investment in collective research because it wants to be the single owner of a new technology. Delta also chose not to cooperate in the Vewin benchmark. Most likely, the reduced openness will have an adverse effect on sustainable development, because innovation is no longer a combined effort, and it will become harder for other actors to judge water company performance.

Liberalization would also lead to a national or European orientation, which in turn would lead to neglect of regional relations. Because provincial governments and water boards are essential for water resource policy, a national or European focus may lead indirectly to neglect of local resources.

The observed relation between economy and nature is especially interesting. Does exploitation of nature provide us with cheap resources, and does protection of nature always lead to extra costs? Is nature, therefore, incompatible with the market mechanism? Or is this a temporary social construction and are there more creative ways to support our lifestyle?

9.1.5 What about water saving?

Water saving is not a priority at water companies, but it is important enough to mention in our conclusions. From the viewpoint of an LCA researcher, water saving is one of the most obvious ways to achieve sustainability: less material and energy use per functional unit is better than more material and energy use. How did the respondents look at it?

The historical material shows that all water companies were motivated to promote water saving around 1990, because restricted governmental groundwater policy made it more and more difficult to keep up with the growing demand. In 2000, when the interviews were held, water saving was still popular among governmental respondents, but not among respondents from the water companies. Many did not mention it at all, others mentioned it as controversial because it adversely affects company income. One company decided to stop all water saving promotion (WMO), another lowered it to a level just acceptable to its shareholders (Delta), and one continued even though there was some internal disagreement about it (PWN).

Two things happened between 1990 and 2000. Firstly, the demand for drinking water leveled off. No one had expected this much success from the saving campaigns. The consequences for the companies themselves became clear: no growth meant less investments, less innovation and less interesting jobs. This was shocking experience for the companies, which had been on a fast growth curve since the nineteen thirties. For groundwater companies, the additional market loss, owing to the farmers who started their own wells, even led to a shrinking market. The companies were designed to accomodate growth: each company has a special department for new projects, a planning cycle looked ten or twenty years ahead, and so on. Suddenly, all of this had to change.

The second event was the liberalization debate. Growth is a must on a commercial market, so this made the stabilization of demand extra worrisome. A saturated or shrinking market would weaken the companies, and with their low solvability, they were likely to become targets for take-overs by half-interested financial giants from far away. The liberalization debate made it less attractive to follow governmental orders. Therefore, water saving went overboard.

Water companies cannot be expected to promote water saving beyond the point of stabilized demand, because it is against their direct interests. It could be picked up by other actors, for whom water saving does have advantages: consumers, governments, and NGOs. It may be asked if further water saving is really necessary in a country with sufficient water resources. Why not enjoy the abundance of nature? Sustainability does not have to be synonymous with ascetism. Besides, water use is related to health and hygiene. On the other hand, an average daily use of 130 liters per person per day can be considered luxurious (see Table 9.1) and it is likely that this can be reduced to a lower level without affecting the standards of health and hygiene. The NIPO survey, for example, indicated that the group of most conscious water savers used only 120 liters per person per day on average (see Table 9.2).

Table 9.1: Main uses of water within households in 1998 (Source: NIPO, 1999)

	Number of liters per day	**%**
Bath	6.7	5
Shower	39.7	31
Washstand	5.1	4
Toilet flushing	36.2	28
Clothes washing, hand	2.1	2
Clothes washing, machine	23.2	18
Dish washing, hand	3.8	3
Dish washing, machine	1.9	1
Food preparation	1.7	1
Other	7.6	6
Total	*127.9*	*100%*

Table 9.2: Self-reported behavior of consumers (Source: NIPO, 1999)

Behavior:	*Average number of liters per person per day*
Very careful	120,5
Not really careful	131,5
Not at all careful	160,2

9.2 The social construction of sustainability

The findings of this research have a number of implications for the concept of sustainable development. Firstly, conclusions can be drawn concerning the general meanings of sustainability and how they may develop in the future. Secondly, the findings provide information on the translation of sustainability ideas into practice. Thirdly, we need to find a way to deal with the differences in opinion on sustainability, and the findings provide some clues as to how this can be done. In the following three subsections, these implications are discussed in more detail.

9.2.1 Processing a concept: Meanings in the course of time

Although the Brundtland report was a best-seller, most of the respondents in this research probably never looked at it. The book was first used by a group of governmental actors. They adopted the term 'sustainability', because it seemed to match the goals they already had. They interpreted it within their own frameworks and tried to influence other actors by word of mouth and by policy documents. The water companies were open to this appeal, because it seemed to be in their interest. They, in turn, gave the concept their own cultural meanings.

The concept of 'sustainable development' entered a society that was already overwhelmed with meanings, actors, activities, and coalitions, and was given these existing meanings. For example, for most respondents in this research 'sustainable' is a label for all issues and activities previously labelled as 'environmental'. This is not entirely beside the point, because the concept of sustainability is related to the environmental debate. To understand its meanings, we have to go back in time.

The phrase 'environmental crisis' was first used in the nineteen sixties, to make society aware of its dependence on the natural environment. Separate problems like pollution of water and air had been described since the Middle Ages, but had never before been labelled under one heading. This label was intended to signal that there was a pattern: humans were systematically destroying the environment on which they depended. This notion sank in slowly, starting with environmental groups, and later, governments, some farmers and companies, and finally, the large political parties.

The environmental reform of society was difficult. One of the reasons for this was that 'environmental' was generally seen as opposed to 'economic'. Environmentalists blamed the 'capitalist system' and the paradigm of economic growth for the problems. They envisioned a fundamental reform of society. This revolutionary point of view was unacceptable to the rest of society, and environmentalists were marginalized as unrealistic dreamers.

Meanwhile, the environmental problems persisted, so the search for a new, more attractive conceptualization began. The United Nations participated in this search. It had a global view and sought to solve the combined problems of poverty and environmental degradation. In 1987, the Brundtland Commission came up with the concept of sustainable development. The concept included social and economic aspects as well as ecological aspects. The main social aspect the Brundtland commission had in mind was a shared responsibility for the poor. The economic aspect meant that the process of change was supposed to happen within the existing market paradigm.

Another new notion was that this was a gradual process, not a sudden change or revolution. Hence, the term '*development*'. It was a search, a process of trial and error, an ongoing debate. There was no description of an imaginary end goal or utopia: who could predict the needs of future generations? By defining the concept of sustainability in this way, it was

given an optimistic, reassuring and even soothing character. The term helped greatly in creating a new consensus about environmental problems (Hajer 1995 p1).

The Brundtland Commission had tried to settle the controversy on economic growth by including it in the concept, but this did not silence the debate. Two 'schools' of sustainability developed: 'weak' and 'strong' sustainability. The 'weak', or human-oriented school remained close to the original conceptualization of the Brundtland report. In this school, economic growth was allowed, human interests had priority, and nature and the environment had to be spared as much as possible. This is the view that is found at three of the four water companies: Delta, WMO, and Nuon. This is understandable, because water companies have a human-oriented task: to provide the public with drinking water. At PWN, a new way of dealing with the human-nature relationship has developed, as was already argued in 9.1.2.

9.2.2 From consensus to action and back

The result of the research shows that there are processes in which the concept of 'sustainability' is or is not put into practice. The first requirement for this is consensus on what needs to be done. At three of the companies (PWN, WMO and Delta), there was consensus about the meaning of sustainability. Several companies had also achieved a state of consensus with some of their most important network partners (PWN and Delta). At least three conditions for achieving such consensus emerge:

- There must be a structural relation between people, such as being involved in a project together, or a power relation. Otherwise, a difference in opinion leads to a loss of contact, as seems to be the case between Delta and the water boards of Zeeland.

- There must be an ongoing debate about sustainability. If organization members only discuss other issues such as price or product quality, individuals will form personal views on sustainability, but their opinions will not converge.

- The sustainability debate must be related to practical problems, or actual projects, that force participants to discuss all aspects of issues, until the point of realization (and after). At the abstract level, consensus on sustainability is easy, but everyone can still have different end goals in mind. Once these goals have to be realized, the different value systems surface, and partners are forced to debate.

From the four cases, we discovered that some other things are needed in a company to make the switch from talking to doing:

- a management vision, drive, and/or wish to innovate, to be the first or the best;
- cooperative research and development, combining forces inside as well as outside the company;
- a technological attitude in order to translate a problem into a possible solution;
- communicative capacities to defend or 'sell' innovations to governments and other network partners, and to win their trust;
- a societal mandate to act: the task to realize solutions;
- financial resources to invest in new infrastructure.

In the process of putting sustainability ideas into practice, the ideas are confronted with reality. This creates a feedback loop and causes the ideas about sustainability to be refined. Such an experimental phase also includes failures, an example of which is household water. A failure is more constructive than doing nothing, because it makes clear to all that the solution is not viable.

The term sustainability is not only a mobilizing concept, but also a *selling* concept. Once a decision is made, a plan written, or a facility built, it can be recommended, defended, and explained by using the term sustainability. If an effort to innovate is successful, this becomes a very powerful part of the debate. It can be used by other actors as a convincing argument. In some cases this happened even with infrastructure that was built a decade before the term 'sustainability' appeared in the Brundtland report. Because the term is generally embraced, it has a power of its own in a debate. This strategic use of the term is unavoidable. At the same time, it will lead to degradation of the term, because now literally anything that can be seen as desirable can be labelled as 'sustainable'.

In sum, the term sustainability is used in debate to

- steer, influence
- negotiate, communicate
- analyze, weigh, decide
- justify, sell

Working with the concept of sustainability is not easy. It touches upon the most basic problems of humanity: our lack of knowledge about the natural environment, our diverging opinions on the quality of peoples' lives and on nature, our limited ability to communicate across cultures, and our doubtful ability to share resources with other people, let alone other species. If we run into problems of this magnitude because of using the concept of sustainability, one of the possibilities is to throw the term overboard: "Ah well, it's just another fashionable term. We'd better move on to more concrete terms, such as desiccation and climate change."

The term is especially likely to be abandoned if people are not aware of the *process* aspect of sustainability. Whereas the 'future generations' phrase is well known, the process definition of Brundtland is not. According to the social construction literature, this process is longer than the Brundtland commission may have suspected: not one generation (25 years), but probably two or three will be needed to arrive at a societal consensus about sustainability. In comparison, the period between the first cholera epidemic in 1832 and the final discovery of the cause in 1883 was about fifty years (see Chapter 3). The debate that began with the arrival of Columbus on the coast of the Americas in 1492 and ended with the societal consensus that this was a new continent and not India, lasted fifty years (Sismondo, 1993). The period between the development of the very first prototype of a bicycle and the final version of 1880 that contained all the main elements, also lasted about 50 years (not counting Leonardo da Vinci's drawings) (Bijker, 1987).

It remains uncertain whether the issue of sustainability can stay on the agenda for the long period that may be needed. We already saw how the concept was overruled by the liberalization debate in the water companies. This effect is described by Dryzek (1997 p 136): "the ten years which have seen sustainable development establish itself as the leading transnational discourse of environmental concern have seen very little (...) of the wholesale movements (...) which its advocates regard as imperative. Those same ten years have seen a more effective global movement in a very different direction (...) Free trade, capital mobility, and governments all over the world committed to market liberalization and ordinary (unsustainable) economic growth (...) no real battle has been fought. But even if combat were to be engaged, sustainable development would surely still lose against these massive structural forces and powerful institutions now directing the global economy."

Sustainability is an issue with a slow character, without a deadline. It has been superseded by the liberalization debate, which is considered a matter of survival. Therefore, the liberalization issue can bring discussion on a slow issue to a halt before any consensus is

reached. Sustainability will only stay on the agenda if societal actors keep it there. Sustainability is in accordance with the general mission of governments, namely, to find compromises between the goals of all other societal actors. They are the most likely actors to keep the debate alive.

9.2.3 The continuing story of divergence and consensus

In the conclusions until now, the development of a more acceptable model of sustainability was proposed, and it was stressed that consensus is necessary in order to put sustainability into practice. This may lead to the false impression that sustainability is all about consensus. The case studies show that expressing different opinions is equally important. Sustainability has a broad and multifunctional meaning, and every organization and person needs to apply it to his or her own situation. In this process, people use their own frameworks of views of reality, and because the frameworks differ, everyone comes to different conclusions. This is clearly illustrated by the case studies, in which four companies with the same end product, within the same legal framework, come to four different conclusions about what is sustainable, for understandable reasons.

A first reason for a divergence in the opinions on sustainability is that the physical circumstances of the companies are different. Though they function within the same legal framework, and though they share knowledge and technology on a regular basis, they have different problems to solve. It is logical that this leads to different views of what needs to be done. In general, the conceptualization of sustainability should allow people to adapt it to local circumstances. Unthoughtful implementation of sustainability rules, which are true at a global or national level, but not at a regional or local level, may even be destructive.

A second reason is that the concept of sustainability is charged with moral values. A moral content is also signalled in the literature, for example, “A concept that (...) provides a social goal for guiding behaviour that is strongly normative” (Springett 2003 p72). The empirical data indicate that the moral value of sustainability can differ across levels of scale:

- at the personal, individual level, the concept is appreciated. It is a good thing;
- at the company level, it is inconvenient, impractical, too vague, or corrupted;
- at the regional or national level, it is convenient. An organization can argue a case with it, or get a subsidy with it.

These contradictions can be explained by different value systems. In the four cases, we saw a difference between commercial and governmental value systems. In the commercial value system, financial efficiency has a moral value, connected with honesty and responsibility. Having goals other than those of price and quality is seen as dishonest. In the governmental system, the ideas are the opposite to this: money is not supposed to be a goal in itself. If goals such as health, nature, and helping Third World countries are morally appreciated, then money should be found for them.

The difference in value systems is a fundamental aspect of human society. It results in a variety of human insights. The human mind is limited, and this variety is an advantage, because it generates more knowledge and more practical solutions than if there was no variety. If we try to understand people with different views as well as we can, we can make optimal use of other insights (Tukker, 1999).

In Chapter 1 it was argued that the concept of sustainable development is in a controversial stage. What does the future of this concept look like? Will the environmental problems be solved after research and debate during 50 years, like the cholera epidemics? Or is

sustainability an essentially contested concept, like those of 'democracy' and 'the family', and will a solution never be found? The problem behind the concept of sustainability is the relation between human society and nature. There is no doubt that 'nature' is an essentially contested concept (Macnaghten and Urry, 1998). The term sustainability itself stands for a specific conceptualization of the human-nature relationship, which may not last.

Is this process of creating and discarding concepts in some way inconstructive? Is it a barrier to implementation, because it means we can keep talking about it and do nothing? Or is this fast turnover simply a characteristic of a new field where norms change so quickly that it becomes irritating? If the last explanation is correct, then this turnover is promising. It shows that the area is alive and developing quickly.

9.3 Recommendations and suggestions for further research

9.3.1 Recommendations

1. A commercial strategy is made for the short term, and sustainability is for the long term. This conflict between time frames is a barrier to the implementation of sustainability ideas. Even if resource problems are too difficult to solve within the short-term financial possibilities, they should not be put aside as unrealistic. Water companies have a tradition of planning for the long term, and this is also the way to deal with the implementation of expensive sustainability ideas. It may be useful to try the backcasting method, for example, a household may need only 50 liters of water per person per day in 2050. How can water companies anticipate such a future?

2. The relationships between the physical environment, water companies, governments, and customers within a region should be conserved and strengthened. Water companies should not grow to such a size that they lose interest in regional water systems. The provincial level seems to work well in this respect, also because of the provincial tasks in water management and spatial planning. If companies merge to a size above the provincial level, the problems in the physical environment, technical solutions, and financial arrangements need to be integrated at the regional level.

3. The view of the Dutch Parliament, that a monopoly structure allows water companies to take better care of nature and the environment, was confirmed by this research. Liberalization will not automatically make everything better: it will make some things better (service to large customers) and other things worse (nature management). From the viewpoint of sustainability, it is better not to liberalize the water sector.

4. Most water companies could develop much closer relationships with nature and with nature organizations. Water companies and nature organizations have much to learn from each other, and they can put their ideas about an abundant nature into practice. This deserves to be raised up from the operational to the strategic level, because it involves the long-term improvement of water resources. Ideally, this coalition should also involve water boards, but in the short-term, many water boards may not be nature-oriented enough.

5. Wherever this has not been done, efforts should be made to calculate the carrying capacity of larger groundwater systems. Not knowing the carrying capacity is acceptable today, but not to work to attain the knowledge is irresponsible. This should be a combined effort of all groundwater users who are involved with the same water system, and should be coordinated by a government at a level that corresponds with the size of the water system. After a consensus has been achieved on the carrying capacity, the

actors should plan to improve the functioning of the water system. It may take 50 years, but that is no reason to give up.

6. The weighting problem in the benchmark of grey and green environmental issues is not so important. Each of these problems deserves serious attention. Priorities should not be set by a disputed index, but by intimate knowledge of the regional context of each company.

7. The promotion of water saving should not be the task of water companies, even in a monopoly structure. It is likely that a significant reduction is possible in the medium term, and at the moment, no one is interested in achieving this (except for a group of consumers). Water users should be made aware of the consequences of their water use in their direct surroundings. The provincial governments, who are responsible for the groundwater licenses, are a possible candidate to pick this up. Nature organizations have a stake in it too, and could ask the provincial governments to invest more time in this issue.

8. Nature organizations throughout the Netherlands which worry about desiccation can learn from the strategies of the Foundation for Dune Conservation. This organization acquired enough knowledge about alternative technologies for their opponents that they became respected partners for debate.

9. The various elements of the Dutch drinking water sector should continue to communicate and cooperate closely with each other. This gives the sector a strong position in negotiations. The liberalization debate seems an attempt to split the sector and reduce its power: to divide and rule. It would be a real pity if the cooperative culture was lost. If other actors want something from the water sector, they should ask for it directly, and not try to achieve it in an indirect way, by restructuring the market. The sector should, of course, be open to external demands.

10. Many respondents from the provincial governments ascribe the reduced water demand to prudent behaviour of consumers. NIPO research shows that consumers did indeed reduce their daily use between 1995 and 1998 (NIPO, 1999). The lack of interest of consumers in the water price indicates that they do not save water for financial, but for moral reasons. Consumer behaviour probably accounts for only half of the demand reduction. The other half of the groundwater is still being extracted with private pumps by medium users such as farmers, however, without payment of ecotax. 'Small' groundwater pumps with a capacity of less than 10m^3/hour are excluded from the licensing procedure. With a pump like that, it is possible to extract 87,600 m^3 per year, which comes close to the 100,000 m^3 per year above which customers are considered 'large' according to the new Drinking Water Law. The reason why these 'small' extractions are excluded from the licensing procedure is that it would require too much enforcement capacity. The enforcement of this is likely to be comparable to the dog tax enforcement, so it should be possible. Without this measure, the ecotax has a perverse effect.

9.3.2 Suggestions for further research

1. A survey should be developed to compare the perceptions of sustainability of the Dutch water sector with those of the water sectors in other countries with diverging market structures, such as the UK, France, Germany, and Sweden. This would provide more answers to the question of how state monopolies and privatized market structures influence these perceptions.

2. More comparative research should be done into the perceptions of sustainability, for example, into the perceptions of the national governments of EU member states. It is likely that these perceptions are different and that nations can learn from each other.

3. In order to determine where we are in the sustainability debate, it can be compared with other grand societal debates. This may answer questions such as what stages can be discerned, and what eventually led to these other debates being solved. It is likely that the social construction literature describes the processes of several of these grand debates, so maybe the questions can be answered by studying the existing literature.

4. The research raises a more general question about the relationship between the global ecosystem and the market economy: is the economy always exploitative and, therefore, damaging, or are there possibilities for a more integrative interaction between the two? Can a profitable economy lead to a higher biodiversity and abundantly sustainable development? There seem to be possibilities for integration in the water sector, but not if the goal of making a profit is added. This can be investigated in other sectors, such as agriculture and construction.

5. Though sustainability can be driven off the agenda by other issues, and even if the term itself may prove to be of temporary value, the problem of the relationship between humanity and natural resources will not disappear. Research into this fundamental problem needs to continue, in two directions:

    - The global ecological system: how does it works, and what are its limits or conditions?
    - How do people make sense of their physical environment; more specifically, how do they interpret and then deal with natural resources?
    - Research by Veenhoven (2002) shows that material resources are not what makes people most happy. How can this finding help to achieve a more sustainable society?

9.4 Personal reflections on sustainability

A norm that is often used for scientific reports is that is that they should avoid bias. Their purpose is to show the facts, and the researcher is supposed to make every effort to prevent her own opinion from colouring the results and the conclusions. It is a useful norm, because it allows us to learn new things. However, total absence of bias is impossible from a social constructionist viewpoint. Both the researcher and her context are an intrinsic part of the research itself. Therefore, the introduction included the context in which this dissertation was written. In this section I want to make my personal views more explicit, so that the reader can calibrate my conclusions.

I am a good example of a human being processing a concept. Before I started this thesis, I felt uneasy about economic growth, and I see in hindsight that I was an adherent of the strong sustainability view. The three ‘pillars’ of sustainability, ecological, social, and economic development, seemed contradictory to me. If I had to choose, I would have chosen ecological plus social development. The lack of democracy that followed from this option was difficult to accept, and I became curious about whether anyone had solved these fundamental problems.

I wanted to find a solution that had been tested by reality, and not a theoretical solution. Therefore, I decided to do an empirical research into a promising sector in the Netherlands. During the research, I encountered so many arguments for the human-oriented, weak sustainability view that I almost started to believe in it myself. The human population is not only growing in number, we also live longer and grow taller. Why worry all the time, why not

enjoy myself and become a frequent flyer? I also considered another, more fatalistic line of reasoning: we humans exist for only a moment in the history of the universe. Though our practices may lead to ecological disaster, nature will correct itself in due time, so why try to be smarter than we are?

One thing prevented me from accepting these ideas: the thought that this would lead to the destruction of many known and unknown species. This destruction is not just a matter of 0.7% of the species becoming extinct, most of which are insects and bacteria we never laid eyes on, as Bjorn Lomborg presents it (Lomborg, 2001). If the whole world develops like Western Europe has done, it will also mean a vast reduction in the geographical space for other species, a vast reduction in their numbers, and a vast reduction in the genetic variation in most species. Wildlife will become like the indigenous peoples of the United States: poorly functioning relicts of the past, residing in the least inhabitable parts of the world. Wildlife will exist, but its natural ways of life and social cultures will be lost.

I do not see humans as fundamentally different from other species. We function according to the same biological principles as the rest, starting with a single cell. We are an outcome of evolution. ‘Every time a rule that differentiates humans from animals is proved false, humans think of a new rule, so that they can go on treating other species as they please’, Jane Goodall complained in a documentary, and I agree with her.

What does a society that gives animals and plants equal rights look like? Should we start treating plants and animals like human beings, or should we start treating human beings like animals? These are difficult questions to answer from our existing cultural framework, but in my view, sustainable development should be a process in which the answers are sought.