

# **Navigating toward Sustainable Development: Conceptual maps of modes of governance vs. practical experiences in the Dutch fen landscape**

Navigeren richting Duurzame Ontwikkeling:  
Conceptuele kaarten van governance-vormen versus praktische ervaringen in het  
Nederlandse veenweidelandschap  
(met een samenvatting in het Nederlands)

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# Chapter 1                      Introduction

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I recently watched ‘*The Beagle*’, a Dutch television series first broadcast in 2009 (and now available online, <http://beagle.vpro.nl/>). Using a rebuilt historical sailing ship, the series retraces the voyage of the *Beagle* (1831-1836), the ship that carried the young Charles Darwin around the world. That voyage enabled Darwin to shape the foundations of his theoretical work. In one episode, Wubbo Ockels (1946-2014), a Dutchman, is invited onboard. Ockels was an astronaut in the 1980s, and later a professor of sustainable technologies. Ockels explains that when he was up in space, looking down on Earth, he realised that our planet is actually a kind of ship. Just as the *Beagle* was a ship travelling over the ocean, Earth is a ship travelling through the ocean of the universe, making us humans the astronauts of Spaceship Earth.

As the astronauts on a spaceship, we have become the crew members mainly responsible for what happens onboard. What does it mean that Spaceship Earth is powered by biophysical systems? And what if activities of human crew members have put these biophysical systems under great pressure, if the ship’s fuel and storage capacity is limited and the number of human crew members and their consumption of ship’s stores growing? What if there is increasing consensus that change is needed to avoid irreversible damage to the ship’s systems and depletion of stores essential to facilitate future crews? How much longer can we sail on Spaceship Earth?

We can take the metaphor further. Earth’s physical journey is set: we sail around the sun on autopilot and no steering is needed. Much of our work as astronauts also occurs on autopilot, but uniquely among the crew, we have the ability to study and deliberately manipulate our ship’s systems. We journey on board, steering paths through the immense extent of the systems that support its diverse crew. However, the changes observed in recent centuries have caused some of the ship’s system experts to call for a re-set of the autopilot for many human activities. Earth’s journey through space needs no change, but urgent discussions are taking place about how to navigate observed system changes in a desirable direction. Generally, this desirable direction is one in which the biophysical engines and onboard resources are not depleted, where positive and negative impacts are equally distributed among current and future crews, and all crew members are treated fairly. The work of human crew members needs to sustain as well as develop the ship’s resources and systems.

On this vast ship, there is not just one flight deck, but several. Humans make up crew groups whose activities influence our ship’s systems and control ship’s stores in

different ways and to different degrees. Some humans make up crew groups which are dedicated to the discussions about how to navigate system changes. They are organised into different control rooms and cabins on different flight decks, where they promote and/or study their own ideas about how to steer or manage Earth's systems and stores and which coordinates to use for orientation.

Three of those cabins where discussions are taking place about navigation are currently receiving much attention: the talk in one is based on the idea that human crew members need greater learning and cooperation to deal with unexpected and complicated circumstances. This way of navigating Earth's systems is known as 'adaptive management'. In a second cabin, discussion centres on the idea that radical change, technological renewal and innovation are needed in a way of navigating known as 'transition management'. In the third cabin, experts advise attaching trading value to the preservation of the goods and services with which Spaceship Earth comes equipped, such as its fresh water supply and biodiversity. This navigational path is referred to as 'payments for environmental services' (PES). Despite their differences, all three steering approaches take the same direction, aiming for 'sustainable development'.

However, whether an approach leads to improvement in onboard conditions depends on the viewpoint of the human crew members who experience and/or observe the conditions. This has led several scholarly crew members to construct different types of beacons, often advised to be used in combination, to guide the navigation whichever path is steered. These beacons help to ensure full assessment, acceptance, implementation and monitoring of interventions. They shed light on features that include: fair distribution of positive and negative impacts; unbiased decision making; acceptability of decisions; accountability of decision makers; broad representation and strong participation; consideration of the scale of activity in time and space and in level and type of organization; attention to uncertainties; and onboard learning.

Surprisingly, Earth's onboard logs show that the above three approaches have not yet been systematically and comparatively analysed and evaluated in terms of the extent to which they are orientated towards an agreed definition of sustainable development, or how they employ navigational beacons. Moreover, they have not yet been comparatively studied as applied in practice.

I am curious about the similarities and differences between these three means of systems and resource steering. I am not the first to use the Spaceship metaphor to help explore ideas related to sustainability issues. Some readers may be familiar with, for example, Dryzek's characterisation of the "survivalism discourse" (2005), which employs the metaphor somewhat differently. In my own work, I find the way environmental theories have become compartmentalized is captured well in the idea of crew member groups housed in different cabins and active on different flight decks. The specialised groups focus on the same issues, but how do they resemble or differ from each other in their diagnosis of the problems observed? Why do these groups emphasise different means of navigating

systems and system change toward sustainable development? Which issues are important and prominent in the expert discussions about the different ways to access, navigate and manage Earth systems and stores? What do the experts envisage as a ‘better course’ through Earth system change and to changes in consumption of its stores? What are the issues and aims and how are these articulated as concepts and ideals in discussions about and use of the navigational beacons? How are the beacons considered by experts in their different cabins and when are their approaches actually put to practical use?

By investigating (1) the discussions in the three cabins described above, (2) the experiences in practice with the interventions proposed in these discussions and (3) how the decision making procedures involved address the identified beacons, I aim to evaluate the perspectives offered by the routes proposed and to clarify key challenges encountered in navigating towards sustainable development. I aim also to contribute to our understanding of sustainable development and of which actions are helpful or not in attempts to achieve such development.



# Chapter 2                    Investigating Governance for Sustainable Development

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## 2.1            Introduction

Leaving the ship metaphor for now, and turning to real-world settings, it is important to consider that a series of warnings about how we use our natural resources and the environment have been issued prominently since at least the 1960s. At the time of writing, 52 years have passed since the publication of Rachel Carson's *Silent Spring* (1962), 42 years since the Club of Rome's *Limits to Growth* (Meadows et al., 1972) and 27 years since the World Commission on Environment and Development's (WCED) *Our Common Future* (1987, also known as 'The Brundtland Report'). The latter gives the most frequently quoted definition of 'sustainable development'.

An impressive number of publications raise concerns about how the global human population treats its natural environment and redistributes natural resources among economically strong and economically vulnerable countries and among current and future generations. More recent global warnings include those from the Millennium Ecosystem Assessment (MEA), which evaluates human well-being and threats to ecosystem services (MEA, 2005); a series of IPCC (Intergovernmental Panel on Climate Change) assessments reports (1990; 1995; 2001; 2007; 2014), which relate to climate change issues; the CBD (Convention on Biodiversity) outlooks (2001; 2006; 2010), which focus on biodiversity conservation; a series of Global Environmental Outlooks issued by the UNEP (United Nations Environmental Programme) (1997; 1999; 2002; 2007; 2012), which highlight environmental issues worldwide; and various UN (United Nations) reports on the Millennium Development Goals (e.g. 2008; 2009; 2010; 2011; 2012a), which are concerned with improving livelihoods and environmental sustainability. Similarly, around the world, local, regional and national sustainability concerns have been expressed (such as Dietz et al., 2003; Miranda, 2003; Lafferty, 2004; Kates et al., 2005; Rinzin, 2006; Ostrom, 2009; Clark and Clarke, 2011).

The MEA makes a key observation that in many world regions natural resources such as space, fresh water and fertile soil are likely to be used with ever-increasing intensity (MEA, 2005). Many natural resources are critical to human well-being both as goods in themselves and through 'ecosystem services', such as climate regulation, water purification and crop pollination. If human populations and their pressure on natural resources continue to increase, the available options to fulfil the needs of current and future generations will

diminish. Increasingly intensive use of natural resources will require increasingly intelligent and effective management of a wide range of socio-economic demands and biophysical constraints (MEA, 2005).

In summary, current trends in resource use have been diagnosed as unsustainable by numerous politicians, policy-makers, scientists and various interest groups: current usage and patterns of redistribution will lead to a depletion of resources and an irreversible deterioration of the natural environment (Meadows et al., 1972; WCED, 1987; MEA, 2005; Gore, 2007; IPCC, 2014; CBD, 2010; UNEP, 2012; UN, 2012a).

In its 1987 report, the WCED proposed that a radically different kind of resource management, manipulation and use was needed in the form of sustainable development, which was defined as: “..development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 1 of Chapter 2). The obvious stress here is on equity as the key beacon to light a path to sustainable development. Although there are earlier recorded instances of the term (e.g. Eckholm, 1979; Caldwell, 1984), it was the WCED’s “launch” of the concept that led it to become increasingly common and heavily discussed (Kates et al., 2005). In this study, the term ‘sustainable development’ is also referred to simply as ‘sustainability’.

Although governments and interest groups worldwide have identified sustainable development as the desirable direction (UN, 2012b; UNEP, 2012), it seems difficult to achieve. In cases where environmental problems could be solved technically, societal, political and institutional complications hinder progress. Explicit academic and political disagreement about causes and consequences of environmental issues (e.g. climate change) further complicate the process of finding solutions. The concept of sustainable development is itself the subject of continuing debate and diverse interpretations (Lafferty, 2004; Dryzek, 2005; Kates et al., 2005; Meadowcroft, 2007). Arguably, the reason for the lack of an uncontested prevailing definition of sustainable development lies in the dual ambition embedded in the concept: on the one hand, to *sustain* (i.e. to safeguard natural resources) while on the other hand to *develop* (i.e. to reduce poverty through economic measures). The direction connoted by sustaining is one of preserving and conserving, whereas developing connotes a direction that involves moving and changing; thus, for many, sustaining while developing implies different – even opposite – directions.

This study takes the original WCED (1987) definition as its starting point, and articulates the dimensions of biophysical surroundings and natural resources. Here, **sustainable development** is understood to mean **managing our biophysical surroundings and re-distributing and using natural resources equitably in ways that meet present human needs and ensure that those of future generations will also be met**.

Many argue that the move towards sustainable development is a collective activity, which requires fundamental changes in how we use natural resources for production, transport and consumption – changes, therefore, in our industries, technologies and

lifestyles and in how we redistribute natural resources among locations and generations (Lafferty, 2004; Meadowcroft, 2007). The concept of sustainable development yields a description of a goal to reach and also frameworks for decision-making processes necessary for its attainment and its continuation (cf. Lafferty, 2004; Adger and Jordan, 2009). Sustainable development concerns issues at and across local, regional and global scales. It involves the social environment (involving interhuman processes) and the biophysical environment (involving interactions among physical and biological processes). It affects economic, social and ecological processes, and involves issues of high complexity and uncertainty. Orientation toward sustainable development as a goal (rather than the processes involved in its continuation) refers to the intention to support the livelihoods of current and future generations worldwide by minimising irreversible extractions from, or interventions in, the global ecological system (Kates et al., 2005; Biermann et al., 2012). Some argue that the ideal of sustainable development involves the integration of the fields of economy, society and ecology as much as possible without prioritising one over the others, a process which would make the goal even more challenging (Kates et al., 2005; Biermann et al., 2012).

The conflicts of interest that arise among these three fields present a further challenge (cf. Jordan, 2008). Various options for sustainable development have been identified where negative impacts in one field could be compensated for by positive impacts in another. However, it has also been postulated that genuinely sustainable development can only be achieved when benefits are seen in all three fields. ‘Weak sustainability’ refers to the notion of selectively improving issues under pressure or substitution among different forms of capital; ‘strong sustainability’ is the notion that certain key elements, including forms of capital, are non-substitutable and must be conserved regardless of other issues (Pearce et al., 1989; Dietz and Neumayer, 2007).

Several critics argue that the concept of sustainable development has become too broad, too much of a container concept, that it has lost its power to indicate a social-ecological direction (cf. Gibbs, 2000; Morse, 2008), and has become unsuitable for present-day circumstances (Morse, 2008). Other authors maintain that the concept of sustainable development survives, and inspires by virtue of its elasticity and fluidity (Kates et al., 2005; Jordan, 2008). Meadowcroft (2007) observed that sustainable development was “designed as a normative point of reference”, and that the concept “helps to frame and focus debate, while being open to constant interrogation and re-interpretation” (p. 300). The concept has attracted diverse interpretations and interests, and has become a focal point for discussion of the development of human livelihoods and our biophysical surroundings (see recent contributions, e.g. Clark and Clarke, 2011; Van Zeijl-Rozema et al., 2011; Voss and Bornemann, 2011; Biermann et al., 2012).

Both the process of sustainable development and the concept’s orientation towards a goal involve the intentional steering of societal evolution (Lafferty, 2004; Meadowcroft, 2007). How to begin to move towards sustainable development when this means moving

away from our current dominant patterns? Such a steering endeavour and its collective goals require deliberation and cooperation among public and private actors at different institutional scales, including among different nations (Bressers and Rosenbaum, 2003; Lafferty, 2004; Meadowcroft, 2007; Jordan, 2008).

The literature also shows how steering towards sustainable development is further characterised by the linking of global impacts to local action, by the linking of expected long term impact to short term action and by the effects of the required changes on individuals, communities and economic sectors (Bressers and Rosenbaum, 2003; Lafferty, 2004; Meadowcroft, 2007, Jordan, 2008). As a result, it has been argued that moving towards sustainable development is not so much a technical challenge, but rather one of dealing with societal, political and institutional issues (Press, 1994; Lafferty, 2004; Meadowcroft, 2007; Jordan, 2008).

Accompanying the steering or directing aspects are societal and institutional criteria (the beacons in the spaceship metaphor) that scholars have indicated as essential and inherent to sustainable development, such as equity (WCED, 1987) (e.g. Meadowcroft, 2002; Adger et al., 2003; Lafferty, 2004; Meadowcroft, 2007; Jordan, 2008; Biermann et al., 2010). Given the involvement of so many factors, it is clear why sustainable development can be difficult to implement.

In line with others, this study regards the concept of ‘governance’ as useful for analysis of the movement towards and persistence of sustainable development as a steering challenge (Bressers and Rosenbaum, 2003; Lafferty, 2004; Meadowcroft, 2007; Jordan, 2008). Like the concept of sustainable development, governance is a contested term. As neither concept has a clear-cut, generally agreed definition, neither is easily studied. As for the term sustainable development, the academic literature gives various definitions of governance, and includes different research applications (Kjaer, 2004; Adger and Jordan, 2009). The definition of **governance** as adopted in the present study is: **the act or manner of steering societal processes by public and/or private actors towards collective goals** (cf. Kooiman, 2003; Kjaer, 2004; Meadowcroft, 2007). In the literature on governance for sustainable development, the term ‘management’ is used in reference to governance, as seen, for example, in the work of authors such as Voss et al. (2007) and Driessen et al. (2012) who include adaptive management and transition management as governance arrangements oriented toward environmental and sustainability issues.

In the governance literature, an increasing number of scholars are studying how actors, or configurations of actors, influence societal processes in order to realise objectives that benefit society or solve problems in the public sphere. The concept has rapidly gained popularity since the 1980s, (e.g. Rhodes, 1996; Jessop, 1998; Stoker, 1998; Pierre and Peters, 2000; Bressers and Kuks, 2003; Kooiman, 2003; Kjaer, 2004; Van Kersbergen and Van Waarden, 2004). The term is not only used in relation to sustainability issues, but among others also for the analysis of health care systems (Mitchell and Shortell, 2000),

military issues (Dillon and Reid, 2001) and the economy (Aguilera and Jackson, 2003). The actors studied are public (e.g. governmental bodies and politicians) and/or private (e.g. citizen groups, non-profit organisations, and companies) (Kooiman, 2003; Van Kersbergen and Van Waarden, 2004). Various types of interaction and various strategies may be devised and/or emerge to steer societal developments towards collective goals (Kooiman, 2003).

To identify or characterise governance, authors often distinguish it from government (Rhodes, 1996; Van Kersbergen and Waarden, 2004). However, authors differ in whether they identify a role for government in the concept of governance. For example, whereas Rhodes (1996, p. 652) identifies governance as “governing without government”, Pierre and Peters (2000, p.1) regard it as “the capacity of government to make and implement policy, in other words, to steer society”. In the present thesis, I follow the literature on governance for sustainable development, where government is typically included in governance and seen as one among multiple actors involved.

Several authors have distinguished patterns in the efforts of public and/or private actors that are intended to influence or steer societal processes towards collective goals, which has led to the identification and characterisation of types of steering arrangements. **A type of steering arrangement whereby public and/or private actors aligned in an institutional configuration intend to influence societal developments towards collective goals** is referred to as a ‘**mode of governance**’ (cf. Rhodes, 1996; Jessop, 1998; Peters and Pierre, 1998; Stoker, 1998; Kooiman, 2003; Kjaer, 2004; Van Kersbergen and Van Waarden, 2004; Driessen et al., 2012; Lange et al., 2013). In this context, the term ‘**institution**’ is used in a general sense to refer to **administrative and societal structures and settings – which may include public and/or private actors – that influence the public sphere or an issue therein** (cf. Van Kersbergen and Van Waarden, 2004; Swyngedouw, 2005).

In discussing and debating governance, authors tend to discern the following modes of governance: hierarchic steering with a central steering role for high-level governments, also referred to as top-down; network steering (also associated with interactive or cooperative steering), whereby public and/or private actors influence each other; and bottom-up steering (also associated with self-organisation), whereby usually local private and/or public actors influence larger scale processes (Rhodes, 1996; Jessop, 1998; Peters and Pierre, 1998; Stoker, 1998; Kooiman, 2003; Kjaer, 2004; Van Kersbergen and Van Waarden, 2004; Jordan, 2008; Driessen et al., 2012; Lange et al., 2013).

Some governance studies frame actors in public and private spheres in terms of their role in states, markets and civil society (e.g. Arts et al., 2006; Jordan, 2008). Some analyse the configuration of state and non-state actors in steering and decision making processes (Jessop, 1998; Peters and Pierre, 1998; Kjaer, 2004), trends in such configurations (Rhodes, 1996; Merrien, 1998; Kjaer, 2004; Van Kersbergen and Van

Waarden, 2004) and whether leading actors represent states, markets and/or civil society (Arts et al., 2006; Jordan, 2008). Dryzek (2005) examines various discourses on environmental governance and distinguishes between “leave it to the state”, “leave it to the market”, “leave it to the people” and “leave it to the experts”.

Some studies focus on specific types of cooperation between the different spheres in society; for example, exploring the role and functioning of public-private cooperation in what are referred to as partnerships (Davies, 2002; Teisman and Klijn, 2002; Backstrand, 2006; Bitzer, 2011). Other avenues of investigation include: the extent to which citizen participation, deliberative capacity and other aspects of democracy are included in governance processes (Blair, 2000; Fung and Wright, 2001; Swyngedouw, 2005; Buizer and Van Herzele, 2012); the role of power in governance (Swyngedouw, 2000; Rodriguez et al., 2007; Stirling, 2008; Griffin, 2012); the role of scientific knowledge or science-policy interfaces in governance (Haas, 2004; Van den Hove, 2007; Hegger et al., 2012); how governance may be implemented by employing different policy instruments (Bressers and Kuks, 2003; Jordan et al., 2005; Weber et al., 2013); and how institutional settings could be better equipped to deal with complex societal challenges (Healey, 1998; Healey, 1999; Bressers and Kuks, 2003; Dietz et al., 2003; Ostrom and Nagendra, 2006; Gupta et al., 2010).

Many authors are particularly interested in governance in relation to its substantive outcome (or output, impact, effect) in terms of contributing to sustainable development (e.g. Adger et al., 2003; Bressers and Rosenbaum, 2003; Lafferty, 2004; O’Riordan, 2004; Lemos and Agrawal, 2006; Meadowcroft, 2007; Jordan, 2008; Van Zeijl-Rozema et al., 2008; Adger and Jordan, 2009; Jordan, 2009). This genre of governance literature emerged in the 1990s, and has grown considerably since the year 2000.

Governance for sustainable development is generally regarded as necessary but complicated; it involves intervening in societal and biophysical processes in accordance with two concepts which, as described above, seem often to be in conflict in current and recent human history. Several authors articulate how governance for sustainable development is approached from various angles and conceptual levels (e.g. Adger et al., 2003; Bressers and Rosenbaum, 2003; Lafferty, 2004; O’Riordan, 2004; Lemos and Agrawal, 2006; Meadowcroft, 2007; Jordan, 2008; Adger and Jordan, 2009). Approaches to this field of study come from various disciplines, including geography, environmental sciences, sociology, ecology and political science, and from various research traditions and conventions, including the more observational and reflective on the one hand and the more strategic and instrumental on the other.

Many of the authors who have studied governance and sustainable development have done so from the perspective of strategy, navigating ability or influencing capacity (e.g. Rotmans et al., 2001; Driessen, 2005; Pagiola et al., 2005; Olsson et al., 2006; Engel et al., 2008; Olsson et al., 2008; Wunder et al., 2008; Rotmans and Loorbach, 2009; Brunner, 2010; Driessen et al., 2012; Lange et al., 2013). Several specific debates in the literature

distinguish modes of inducing change for sustainable development (cf. Dryzek, 2005; Adger and Jordan, 2009; Voss and Bornemann, 2011; Driessen et al., 2012). The published academic debates on modes of governance for sustainable development can be considered as “academic discourse” due to the involvement of a group of scholars applying shared perspectives, frames or concepts (cf. Dryzek, 2005).

To further explore how the debate on governance for sustainable development is organised, this chapter continues by considering which issues dominate the sub-debates in this field. It takes up two focal points in the relevant literature: *modes* of and *criteria* for governance for sustainable development. The following two sections examine important issues raised and observations made in the research on these two themes.

## 2.2 Modes of Governance for Sustainable Development

### 2.2.1 *Perspectives from the literature on modes of governance for sustainable development*

Several authors propose that governance for sustainable development may be studied and implemented according to various modes of governance (Treib et al., 2007; Voss et al., 2007; Driessen et al., 2012). A key notion in this research area is that modes of governance may induce change (Meadowcroft, 2007; Treib et al., 2007; Voss et al., 2007; Driessen et al., 2012). Following review of the literature, the present study defines a **mode of governance for sustainable development as a type of steering arrangement whereby public and/or private actors aligned in an institutional configuration intend to influence societal developments towards sustainable development.**

I employ a research perspective that identifies certain modes of governance that are particularly oriented towards sustainable development (Van Zeijl-Rozema et al., 2008; Adger and Jordan, 2009; Hysing, 2009; Arnouts et al., 2012; Driessen et al., 2012; Lange et al., 2013). How the governance literature characterises and organises these modes – i.e. in terms of hierarchical, network-oriented or bottom-up steering and whether driven by state, market or civil society actors – is reflected in the debate in this area. For example, Kooiman’s (2003) typology of modes of governance in terms of hierarchical, co- or self-governance is seen in the frameworks proposed by Van Zeijl-Rozema et al. (2008), Hysing (2009), Arnouts et al. (2012) and Driessen et al. (2012). Identification of the leading actor(s) as state or non-state is included in the frameworks proposed by Hysing (2009), Arnouts et al. (2012), and Driessen et al. (2012).

Although by far most of the research on governance for sustainable development has been single mode focused, some comparative studies do exist. One study by Voss et al. (2007) provides an overview of steering approaches for sustainable development. The authors identify approaches based on: crafting rules (i.e. command and control and economic instruments); providing vision (i.e. management by objectives and envisioning); learning approaches (i.e. adaptive management and disjointed incrementalism); negotiation in networks (i.e. argument in network governance and bargaining in network governance); and reflexive governance (i.e. transition management and decentralized steering).

Driessen et al. (2012) also identify multiple specific steering arrangements/modes of governance that are intended to induce change in the direction of environmental goals, including adaptive management, transition management, public-private partnerships, participatory environmental governance, interactive policy-making, self-regulation, reflexive governance, earth system governance and environmental policy arrangements. Other specific steering arrangements for sustainable development are characterised by their orientation to a particular scale, such as global environmental governance (e.g. Langley, 2001; Biermann et al., 2009; Gupta, 2010). Lange et al. (2013) propose a framework for conceptualising and studying modes of governance based on distinguishing among a dimension of political processes involving actors and resources, a dimension involving institutions and norms, and a dimension involving policy objectives and instruments.

Authors emphasise various aspects of governance for sustainable development, such as key intervention processes designed to move governance towards sustainability (Voss et al., 2007; Foxon et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011; Driessen et al., 2012) and variations in the conceptualisation of the goal of sustainability (Voss et al., 2007; Smith and Stirling, 2010). As noted above, the present study uses the distinction between an orientation towards achieving sustainable development as a goal, and an orientation towards the steering process needed to enhance sustainable development (cf. Meadowcroft, 2007; Voss et al., 2007; Van Zeijl-Rozema et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011).

In the literature on governance for sustainable development, the term ‘management’ has become almost interchangeable with ‘governance’ in several instances, especially in the case of modes of governance such as adaptive management and transition management. The term management applies in two of the three modes of governance most prominent in the discourse: adaptive management, transition management and payments for environmental services (PES). The high degree of attention paid to these three modes leads to their selection as the focus of this study. Their dominance is evident in the comparative and overview studies by Voss et al. (2007), Jordan (2009), Smith and Stirling (2010), and Voss and Bornemann (2011) and in attention to these three approaches in leading journals such as *Science* (Kinzig et al., 2011), *Nature* (Kleijn et al., 2001; McCauley, 2006), *PNAS* (Kelsey Jack et al., 2008; Olsson et al., 2008), *Global Environmental Change* (Folke, 2006;

Armitage et al., 2008; Satake et al., 2008; Armitage et al., 2011), and *Philosophical Transactions of the Royal Society B* (Folke, 2003).

All three modes include an orientation towards the goal of sustainable government and an orientation towards the steering needed to induce and enhance sustainable development; but what makes them distinct from each other? What comes to the fore when examining the academic debates about these modes? What may explain the extent to which these modes provide a pathway towards sustainable development?

### 2.2.2 *Adaptive management, transition management and payments for environmental services*

The discourse on adaptive management is based on the notion that scientific progress and cooperative learning-by-doing among groups support sustainable development. This notion originated in a concept developed by ecologists in the 1970s and 1980s (Holling, 1978; Walters, 1986), and is rooted in studies on complex systems and systems ecology (a system being a set or constellation of intertwined relations, distinguishable from other and/or exterior relations). Adaptive management is oriented towards enhancing the capacity of an ecological system to recover after drastic events, to cope with chronic stress and to reduce its vulnerability to collapse (Folke et al., 2002).

The discourse on transition management is based on the notion that drastic, fundamental transformations of societal structures – assisted by technological development and innovation, and coordinated by public bodies – support sustainable development. The research on transition management has been developed since the 1990s by scholars studying historical technological developments and technology systems (Kemp, 1994; Kemp et al., 1998; Rotmans et al., 2001; Smith et al., 2005). It draws from bodies of thought on innovation and technology assessment studies, studies on demographic and population dynamics and from complex systems studies (Rotmans et al., 2001; Rotmans and Loorbach, 2009). Transition management is oriented towards preventing collapse by facilitating continual innovation to enable permanent technological and societal progress (Rotmans et al., 2001).

The notion that developing and reshaping economic structures and economic value systems for environmental and natural resources management supports sustainable development underpins the discourse on PES. Developed by economists, policy-makers and financial institutions in the 2000s (Pagiola et al., 2002; Miranda Quiros, 2003; Pagiola et al., 2005; Wunder, 2005), the concept of PES is based on economic theory and proposes a market-type solution to environmental problems (Vatn, 2010). PES are oriented towards reducing impacts of current processes on the biophysical environment and improving people's livelihoods (Wunder et al., 2008).

The orientation towards steering of these three modes can be characterised in governance terms: adaptive management is based on cooperation and long-term iterative learning, transition management on state-driven reform, and PES on market mechanisms. Some authors refer explicitly to the concept of governance – as in the debate on adaptive governance (e.g. Folke et al., 2005; Olsson et al., 2006). Other authors discuss interventions less explicitly in relation to governance, as in the debate on PES (Pagiola et al., 2002; Engel et al., 2008; Wunder et al., 2008). The categories formulated by Dryzek (2005) can be summarised as follows: adaptive management relies on cooperation between involved state, public and private actors, with an important role for scientific experts; transition management is based on governance by the state, with an important role for frontrunners from business and industry, academia, NGOs or other sectors where frontrunners can be found; PES leave it to the market, with an important role for intermediary organisations to bridge buyers and suppliers, and for the state as a buyer and for market corrections.

For the purposes of the present study, the three modes of governance for sustainable development are defined as follows:

- **Adaptive management: Enabling a social-ecological system to avoid collapse and sustain itself in the long term through learning-by-doing and cooperation, while enhancing the system's adaptive capacity to respond to changing circumstances** (Walters and Holling, 1990; Lee, 1993; Lee, 1999; Berkes et al., 2003; Olsson et al., 2004a; Armitage et al., 2008).
- **Transition management: Fundamentally altering the structure of an area or a socio-technological system to orient it towards a long-term vision on a trajectory stemming from learning, experimentation and innovation in order to prevent environmental crisis** (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Loorbach, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010).
- **PES: Making biophysical systems and landscape conservation economically viable through the reduction of negative environmental externalities, and thus contributing to sustainable livelihoods** (Pagiola et al., 2002; Miranda Quiros, 2003; Pagiola et al., 2005; Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008).

Several authors have studied adaptive management and transition management comparatively, although conceptually rather than empirically (Folke et al., 2002; Smith et al., 2005; Olsson et al., 2006; Geels and Kemp, 2007; Van der Brugge and Van Raak, 2007; Olsson et al., 2008; Foxon et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). Several studies have linked elements of adaptive management and transition management (Folke et al., 2002; Smith et al., 2005; Olsson et al., 2006; Geels and Kemp, 2007; Olsson et al., 2008).

Strikingly, no comparative studies have been conducted on all three modes of governance for sustainable development, a deficit this study aims to begin to address. Chapters 4, 5 and 6 provide further examination of each mode in terms of their respective

conceptual orientation and examples of their practical application, while Chapter 7 provides synthesis in the form of comparison of all three modes.

## **2.3 How to Evaluate Governance for Sustainable Development?**

### *2.3.1 Criteria for evaluation*

The intervention in current societal and biophysical processes entailed in governance for sustainable development (cf. Meadowcroft, 2007) leads to partly unknown outcomes and various implications for affected groups. This in turn leads to the articulation by many authors of various criteria that relate to such implications (the beacons on Spaceship Earth), and that ideally should be taken into account by the actors involved (Davies, 2002; Meadowcroft, 2002; Adger et al., 2003; Bressers and Rosenbaum, 2003; Lafferty, 2004; Zuindeau, 2006; Meadowcroft, 2007; Cooney and Lang, 2007; Huitema et al., 2009; Ostrom, 2009). Several authors rule out evaluation of governance for sustainable development according to a single criterion as insufficient to reveal the issues encountered in such a multi-faceted challenge both in theory and in practice (Adger et al., 2003; Jordan, 2008).

Thus, Adger et al. (2003) advocate a broad analysis of environmental decision making to cover efficiency, equity, effectiveness and legitimacy. Biermann et al. (2010) propose a set of five interdependent analytical problem categories to be included in studying governance for sustainable development: architecture, agency, adaptiveness, accountability, and allocation and access (Biermann et al., 2010). Use of sets of criteria of these kinds is comparable to the United Nations designation of ‘good governance’ characteristics which call for governance to be: participatory; law abiding; transparent; responsive; equitable; effective; efficient; accountable; and strategic (UNDP, 1997).

In practice, however, addressing all the criteria for governance for sustainable development that are defined in the literature may pose an insurmountable challenge. According to these criteria, a mode of governance needs to involve representative and participatory processes; it would need to be fair and transparent; cover the short and the long term and a range of institutional scales; deal with unknown factors, vulnerabilities and risks; produce outcomes equally advantageous or disadvantageous to the actors involved; be endorsed by all involved actor groups; improve the livelihood of the actors; and reduce the utilisation of non-renewable natural resources and benefit ecological systems.

It is possible that no one mode of governance could entirely fulfil such criteria. However, because studies show these criteria are associated with governance for sustainable development, it follows that careful attention in governance to issues related to

such criteria could be expected to contribute to sustainable development. Analysis of instances of their neglect may help to clarify and explain conflicts. Thus, I do not necessarily propose the particular set of criteria selected for this study to be applicable in real world settings. The research here is limited to determining whether and, if so, how certain aspects of selected criteria are addressed in the academic literature on modes of governance for sustainable development and in settings where such modes are applied.

This study examines how actors - policy-makers, practitioners and groups - involved in implementing the three selected modes of governance make choices and set priorities related to a particular set of criteria for sustainable governance. In doing so, it recognizes that the application of criteria may involve trade-offs (cf. Press 1994; Jordan, 2008; Jordan et al., 2010; Hildingsson et al., 2012). Indeed, Jordan (2008) finds that such elements “can and often do conflict sharply with one another” (p. 20).

The present study includes a set of five criteria – i.e. equity, democracy, legitimacy, handling of scale issues and handling of uncertainty issues – to evaluate governance for sustainable development. Why were these criteria selected, and which aspects of them are included in the present study? How do they apply to the evaluation of governance for sustainable development? The following subsection takes up these questions.

### 2.3.2 *Equity, democracy, legitimacy and issues of scale and uncertainty*

#### **Equity**

Identification by the WCED (1987) of equity as pivotal to sustainable development leads to its selection as one of the five evaluation criteria in the present study. The work of several authors who have examined the use of equity as a criterion for evaluation of modes of governance for sustainable government (Adger et al., 2003; Coenen and Halfacre, 2003; Zuideau, 2006; Biermann et al., 2010) reveals two key aspects.

The first comprises distributional features of equity in the form of intergenerational and spatial allocation of negative impacts, hazards or threats and of positive impacts, benefits and access to resources (WCED, 1987; Adger et al., 2003; Zuideau, 2006; Biermann et al., 2010). The WCED (1987) emphasises the intergenerational distributive aspect of equity in calling for the equitable distribution among current and future generations of the use of, access to and conservation of natural resources and the environment. The spatial distributive aspect of equity, emphasised by Adger et al. (2003), Zuideau (2006), and Biermann et al. (2010), also includes equitable distribution of use of and access to, the environment and natural resources, but among geographical regions – typically those considered either economically strong or economically vulnerable – and with the addition of environmental hazards and risks. In assessing whether intergenerational and spatial distribution is equitable, this study uses Stone’s (2001)

conception: equity occurs when distributions are generally regarded as fair by involved and affected groups, even though distributions may include both uniformity and unevenness (Stone, 2001).

Whereas these distributive aspects of equity refer to a relative outcome, the second aspect refers to procedural features of environmental decision making, particularly to the ideal of making unbiased decisions and applying regulations without discrimination (Syme et al., 1999; Coenen and Halfacre, 2003; Ikeme, 2003; Thomas and Twyman, 2005; Lee and Jamal, 2008). In this context, the present study again uses Stone's (2001) conception of equity, translating the ideal of unbiased decision making into decision making that is generally regarded by involved and affected groups as fair.

The present study reviews procedural features of the selected modes of governance and the equity of their impacts. In doing so, it defines **equity as the use of decision making procedures and the allocation in space and time of positive and negative impacts of decisions where both are regarded as fair by those involved and those affected.**

## **Democracy**

In terms of democracy, several scholars propose democratic representation and participation in decision making as a criterion for evaluating governance interventions for sustainable development (Coenen et al., 1998; Davies, 2002; Meadowcroft, 2002; Lafferty, 2004; Cooney and Lang, 2007; Meadowcroft, 2007; Jordan, 2008; Biermann et al., 2010). A number of researchers argue for representative and participatory processes particularly because governance for sustainable development entails normative goal setting and the steering of societal processes. Democratic representation and participation are typically advocated as successful ways of maximising consensus and public support and improving the quality and outcomes of decision making processes. For these reasons, this criterion is included in the present study, accepting the notion that democratic representation and participation contributes to decision making for sustainable development (Lafferty, 2004; Hendriks, 2009; Rauschmayer et al., 2009; Meadowcroft, 2009). In short, the present study understands democratic representation as ideal for decision making for societal goals (Lafferty, 2004; Hendriks, 2009) and democratic participation as the involvement of lawful non-state actor groups in decision making for societal goals (Rauschmayer et al., 2009).

When democratic processes lead to the selection of decision makers who believe that sustainable development is important and who take on the steering and normative goal setting, they determine what subsequently receives priority and which possible sacrifices are worthwhile. Related decisions, then, should likewise be representational and therefore made by: leading and non-leading groups; governmental and non-governmental groups; and groups that would profit and those that would lose from such decisions (Davies, 2002; Meadowcroft, 2002; Penker, 2009; Rauschmayer et al., 2009). Some scholars advocate that

citizen group participation in decision making on sustainability issues should extend also to goal setting (Davies, 2002; Meadowcroft, 2007).

Despite research showing that democratic representation and participation brings a greater likelihood of consensus and better decisions in relation to sustainability issues, friction or dilemmas may arise. Problems may occur, for example, when the process of arriving at a compromise through consensus or majority-supported decision takes so long that a natural resource becomes depleted, when the leading parties in environmental decision making do not invite certain affected groups to join the process and when certain groups have no voice (e.g. future generations). Therefore, some scholars encourage and conduct research to examine potential difficulties, advocating open and critical analysis with a view to determining how difficulties could be handled, what accompanying costs would be incurred and what the actual sustainability contributions of democratic representation and participation would be (Lafferty, 2004; Jordan, 2008).

Given the involvement and significance of groups of actors in collective action towards sustainable development **democratic representation and participation**, understood as **the representation of a plurality of involved groups and the participation of lawful non-state groups in decision making for public goals**, is included by the present study as a criterion for the evaluation of the three selected modes of governance.

### **Legitimacy**

The present study also accepts the proposal by Adger et al. (2003) and others that legitimacy should be included as a criterion of governance for sustainable development (Backstrand, 2006; Jordan, 2008; Jordan, 2009; Biermann et al., 2010; Schouten and Glasbergen, 2011; Biermann et al., 2012; Edelenbos and Teisman, 2013).

In the context of addressing sustainability issues, various aspects are found to contribute to or create legitimacy. Scharpf (1998), for example, relates legitimacy to input-oriented aspects such as participation and consensus in decision making ('government by the people') and to output-oriented aspects, such as the capacity to solve problems related to collective issues ('government for the people'). Scharpf (1998) warns that majority decisions are not necessarily legitimate. Backstrand (2006) defines input legitimacy in terms of representation, accountability and transparency, and output legitimacy in terms of realisation of environmental and developmental goals and of adequacy and functional operation of the assigned institutional design in facilitating desired outcomes. Cashore (2002) identifies three types of legitimacy: pragmatic; moral; and cognitive. Schouten and Glasbergen (2011) identify three dimensions that are found to contribute to legitimacy: legality (i.e. following formal regulations); the moral justifications by an institution for the actions it takes; and consent and acceptance by various audiences. Some authors emphasise that no universal set of rules or procedures can guarantee legitimacy because it is largely determined by cultural expectations and interpretations (Adger et al., 2003; Schouten and Glasbergen, 2011).

In the present study, **legitimacy** is understood as **a general perception that the actions of an institutional entity are appropriate according to shared formal rules and acceptance by the community** (cf. Backstrand, 2006; Schouten and Glasbergen, 2011).

Some aspects of legitimacy approximate to aspects of equity and democracy. The aspect of representation of interests in decision making (in the context of legitimacy) is similar to the aspect of representative decision making (in the context of democracy), and the aspect of adhering to rules (in the context of legitimacy) is similar to the aspect of procedural justice (in the context of equity).

To prevent overlap with the previously stated aspects of equity and democracy, this study focuses on accountability and acceptance. Here, the aspect of **accountability** is understood as **decision makers taking responsibility for and being able to explain and justify their decisions** (cf. Backstrand, 2006; Biermann et al., 2010; Schouten and Glasbergen, 2011). The aspect of **acceptance** is understood as a **community's general approval of decisions made according to those affected and/or to those charged with assessing acceptability** (cf. Cashore, 2002; Adger et al., 2003; Schouten and Glasbergen, 2011). The latter aspect of legitimacy may also be referred to as public or social support.

### **Handling scale**

Adger et al. (2003) propose that the handling of scale aspects should be a criterion for evaluating governance for sustainable development, regarding this as an “important analytical focus” (p. 1100), in line with Meadowcroft (2002), Bressers and Rosenbaum (2003), Lebel et al. (2005), Jordan (2008), Huitema et al. (2009), Ostrom (2009) and Termeer and Dewulf (2014). Scale issues can become important, for example, because actors may push issues likely to involve negative consequences further away in space, time or institutions, and/or draw issues likely to lead to positive consequences nearer (or to the scales where the actors have most power) (Meadowcroft, 2002; Lebel et al., 2005; Huitema et al., 2009; Biermann et al., 2010). There is academic discussion about which spatial, temporal and institutional scales are appropriate in addressing sustainability issues, for example, local and/or global level, medium and/or long-term, mono- or multi-institutional level. Sustainability challenges are expected to be addressed effectively when interventions are cross-spatial, reflect medium as well as long-term goals and engage multiple institutional levels (Meadowcroft, 2002; Lebel et al., 2005; Jordan, 2008; Biermann et al., 2010; Edelenbos and Teisman, 2013).

Scale can also be important because the biophysical scale of an environmental problem rarely coincides with a jurisdictional, institutional or governmental scale (Meadowcroft, 2002; Lebel et al., 2005; Huitema et al., 2009; Termeer and DeWulf, 2014). Some authors investigate the linking of institutional and ecological assets in ‘subsystems of a social-ecological system’ such as ‘resource systems’ (e.g. a designated protected park) and ‘governance systems’ (e.g. the government and other organizations that manage the park, the specific rules related to the use of the park, and how these rules are made)

(Ostrom, 2009). Aligning scale and sustainability problems involves attempting to match institutional and ecological assets, and may prove to be an impossible exercise. For example, Huitema et al. (2009) critically evaluated the river basin management approach, and found that “In complex social–ecological systems such as river basins, with interconnections between societal and ecological processes at multiple levels, it is impossible to determine the ‘right’ boundaries for management structures” (no page number).

Some researchers argue that to address scale adequately in environmental issues, an adaptable and evolving institutional context with a high degree of diversity and redundancy may be more effective than trying to introduce a new governing order tailored to specific biophysical dimensions (Meadowcroft, 2002; Huitema et al., 2009; Termeer and Dewulf, 2014). Likewise, Biermann et al. (2010) emphasise adaptiveness as a requirement of institutions to meet the complex challenge of scale in governance for sustainable development.

In agreement with Adger et al., recognizing the essential engagement of governance for sustainability with groups and biophysical issues at various scales, the present study includes the **handling of scale aspects** as an evaluation criterion understood as: **the tackling of a sustainability issue at the main spatial, temporal and institutional levels involved and immediately and/or directly affected in ways that enhance problem-solving and reduce negative externalities across scales** (Meadowcroft, 2002; Adger et al., 2003; Bressers and Rosenbaum, 2003; Lebel et al., 2005; Huitema et al., 2009; Biermann et al., 2010; Termeer and Dewulf, 2014). In the present study, the aspects of handling scale are reduced to the following evaluation criteria: addressing an environmental issue at the involved spatial, temporal and institutional scale levels (likely to be cross-spatial and to reflect medium as well as long-term goals and to engage multiple institutional levels); attention to matching societal and ecological assets (preferably at subsystem scale, and in a complex, “rich” institutional setting rather than a specially tailored governing order); and an institutional context adaptable to changing scale circumstances.

### **Handling uncertainty**

Governance for sustainable development involves a capacity to intervene in the biophysical surroundings and the distribution of natural resources while dealing with numerous uncertainties, unpredictable responses and the inability to know all the needs of the current and future generations. The handling of uncertainty issues therefore stands out for selection as a criterion for evaluation of governance for sustainable government because it plays a major role in anticipating possible knowledge gaps, vulnerabilities or risks (Aarts and Leeuwis, 2002; Meadowcroft 2002; Cooney and Lang, 2007; Meadowcroft, 2007; Biermann et al., 2010).

Uncertainties may be “due to behavioural and societal variability, value diversity, technological surprise, ignorance and indeterminacy” according to Van Asselt and Rotmans

(2002, p. 75) who state that although “it is difficult to define uncertainty” (p. 78), this can be achieved to some extent by classifying the type of uncertainty, i.e. whether it is due to variability or due to limited knowledge.

In the present study, the **handling of uncertainty issues** as a criterion is defined as the **explicit acknowledgement of uncertainties and the use of learning and insights gained in the processes of the governance** (Meadowcroft, 2002; Van Asselt and Rotmans, 2002; Lafferty, 2004; Cooney and Lang, 2007; Meadowcroft, 2007; Biermann et al., 2010; Renn et al., 2011). Uncertainties – in the sense of associated with variability – can be acknowledged by categorisation in terms of scenarios, indicating magnitude and source (Van Asselt and Rotmans, 2002; Middelkoop et al., 2004; Renn et al., 2011). Learning and insights – to address limited knowledge – can be gained through the management of knowledge (Lafferty, 2004) generated or discovered during and about the policy-making process (Lafferty, 2004; Cooney and Lang, 2007), including local knowledge employed in decision making (Collier and Scott, 2008), and from experimentation (Cooney and Lang, 2007; Huitema et al., 2009).

It should be noted that effectiveness is not included in the present study, although it is identified in the literature as a criterion for evaluating governance for sustainable development and is not sufficiently encompassed by the selected criteria. Effectiveness refers to an intervention attaining its goal as a result of a deliberate intention to do so (Adger et al., 2003; Backstrand, 2006; Cashmore et al., 2010; Huitema et al., 2011). Identifying a specific causal relationship between an intervention and attainment of its intended impact requires a research design that lies beyond the scope of the present study. The present study does, however, include an analysis of how the three selected modes of governance are oriented towards the goal of sustainable development in concept as well as in practice.

## **2.4 Why Focus on the Dutch Fen Landscape?**

Many studies with a focus on governance for sustainable development are based on empirical results from studies by other authors (e.g. Smith et al., 2005; Meadowcroft, 2007; Van Zeijl-Rozema et al., 2008; Biermann et al., 2010), and do not necessarily include new empirical data. The academic literature on adaptive management, transition management and PES includes many conceptual discussions and some empirical studies (cf. Jordan, 2008; Jordan, 2009). Some studies examine a single mode or aspect of governance for sustainable development in empirical contexts (e.g. Lebel et al., 2006; Wunder et al., 2008; Grin et al., 2010). Lebel et al. (2006), for example, analyse the ‘adaptive capacity’ to manage ‘resilience’ from a governance perspective in various empirical contexts (see definitions in Chapter 4 below of the concepts of adaptive capacity and resilience). Several

authors including Jordan (2008; 2009) emphasise the need for more empirical findings on modes of governance for sustainable development.

However, at the time of writing (December 2013), I have found no academic study that has examined, comparatively or otherwise, more than one mode of governance for sustainable development in the same empirical context. Comparative empirical study of such modes would show how they work in practice, and clarify the extent to which each may facilitate sustainable development. The aim here is to provide such a study by examining experiences in practice with the three prominent modes of governance as they are applied in the Dutch fen landscape. Here, I argue that this landscape is an exceptionally fertile empirical setting for studying application of these modes.

The Dutch fen landscape is a prime example of a multi-actor, multi-sector and multi-level challenge with a biophysical and socio-economic situation characterised by complexities and uncertainties. Here, the three modes of governance described and defined above can be identified in empirical cases, thus enabling comparative study. Several types of interventions have been adopted that are oriented towards sustainability in the fen landscapes (Den Uyl and Wassen, 2013). The setting yields fifteen cases in particular where each employs one of the three modes.

The frequently conflicting interests of the actors involved and the changing processes in the biophysical setting make this landscape an unsettled environment. The groups involved – including farmers' interest groups, nature conservation groups, policy-makers and scientists – have expressed multiple concerns about the future of this landscape. The various settings and challenges in this landscape may also serve as forerunner examples for other locations around the world where similar use intensification of rural and natural areas is expected.

Intense land-use with competition for soil and freshwater resources is putting pressure on Dutch fen landscapes (Best et al., 1993; Koerselman et al., 1993; Beltman et al., 1996; Van der Ploeg, 2001; Lucassen et al., 2005; Grootjans et al., 2006; Owens, 2008). The landscape is characterised by high population density, intensive economic usage, high pressure on spatial usage and natural resources, conflicting claims by involved actor groups and the involvement of numerous governmental bodies (Den Uyl and Wassen, 2013). In this landscape, several natural resources and ecosystem services (e.g. peat soil, water quality and biodiversity) are under pressure, and the economic viability of the main land-use (i.e. grassland farming) is under discussion. The sustainability challenge of this landscape, which is the focus of the present study, affects several public and private stakeholders at local and regional scale, includes a complicated technical assignment for water management, and involves several types of land-use. The challenge is characterised by uncertainties regarding causal relationships, mainly between farming and nature conservation (Kleijn and Sutherland, 2003; Verhulst et al., 2007), between water management and peat-soil preservation (Lucassen et al., 2005; Best et al., 1993; Joosten

and Clarke, 2002; Froelking and Roulet, 2007) and between market dynamics and dairy farming (Van der Ploeg, 2001; OECD and FAO, 2007; Rawlins and Morris, 2009).

The ongoing discussion about sustainable development of fen landscapes tends strongly to converge on water management, which is a pivotal issue in the planning and usage of such landscapes. A fen is a lowland landscape, usually groundwater fed, with a peat soil, which is accumulated organic matter from the remains of vegetation (Joosten and Clarke, 2002). Peat soils are naturally wet and vulnerable to drainage; when drained, they oxidize, mineralize and subside (Joosten and Clarke, 2002). As natural peat accumulation is a slow process (about 1 mm/year), loss of peat soil is extremely difficult, if not impossible, to reverse: once the peat is gone, the fen landscapes that resulted from centuries of peat accumulation are lost.

An environment heavily shaped by human activity, the Dutch fen landscape – which is surrounded by urban areas and comprises a western peatland area and another in the north (approximately 223.000 ha in total) – is mainly used for grassland farming. Water tables have been and continue to be artificially drained to create land for this purpose. Maintenance of the resulting cultural-historic open meadow landscape requires at least slight drainage; in the long term, however, this contributes to peat-soil subsidence and impedes conservation of the species-rich fen habitat. At the same time, this cultural-historic landscape is valued by many groups (including residents and recreationists), has an official preservation status in some locations and provides habitat for fen meadow species such as wading birds. Natural scientists have stated that the substrate of these fen landscapes, the peat soil, is under pressure (Best et al., 1993; Joosten and Clarke, 2002). The multiple uses and functions involved make water management pivotal to the planning and usage of these landscapes.

A wide variety of public and private actor groups are active in the Dutch fen landscape, including local, regional and national governments, farmers, nature conservationists, residential groups, recreationists, landscape conservationists, and scientists (Van der Ploeg, 2001; Van Calker, 2005; Buizer, 2008; Owens, 2008; Van Rij, 2008).

Nature conservationists (including both public and private nature conservation organisations) and government bodies (such as ministries and provinces) have warned that disappearance of the fen landscape's flora and fauna constitutes unsustainability (LNV, 2002; Stuurgroep Groene Hart, 2005). Governments have a formal public responsibility for oversight of the management of water quality, water quantity, flood protection and cost-efficiency of water management; poor water quality, too much or too little water, flooding and high costs are considered to contribute to unsustainability (LNV, 2002; Stuurgroep Groene Hart, 2005).

Economists and government representatives have voiced concern about the economic viability of the current land-uses – farming in particular – in this landscape (LNV, 2002; Stuurgroep Groene Hart, 2005; OECD and FAO, 2007). Such concern arises

due to the biophysical constraints imposed by peat soil on agricultural practices and given international market dynamics (Van der Ploeg, 2001; OECD and FAO, 2007). In the same way, scientists and government representatives also point to soil subsidence (Best et al., 1993; Joosten and Clarke, 2002; Stuurgroep Groene Hart, 2005) and greenhouse gas emissions from fens (Knorr and Blodau, 2009; STOWA, 2012).

Scientists focussed on the Dutch fen landscape have also expressed concern about the management of water tables and water quality (Lucassen et al., 2005), management of wet-fen and fen-meadow biodiversity (Kleijn and Sutherland, 2003; Grootjans et al. 2006), and flood protection (Goosen and Vellinga, 2004).

In addition, concern has been expressed by admirers of the cultural-historic landscape that it may disappear. Culturally and historically important uses of fen landscapes have resulted in a characteristic open landscape structure (Van der Ploeg, 2002) with aesthetic and recreational characteristics that are highly valued by many users and visitors (Williams, 1996). The vanishing of this landscape is also regarded as contributing to unsustainability (LNV, 2002; Van der Ploeg, 2002; Stuurgroep Groene Hart, 2005; Taskforce Financiering Landschap, 2008).

Typically, grassland farmers and nature conservationists strive to protect their respective, opposing interests. Whereas grassland farmers in the fen landscape tend to favour moderate to deep drainage to facilitate their agricultural practices, nature conservationists generally advocate raising the water table to conserve the peat substrate and thus facilitate a fen or fen-meadow of high biodiversity (Wassen et al., 1996). Deep drainage typically leads to a water table 70 to 100 cm below the soil surface, moderate drainage to a water table 70 to 40 cm below the soil surface and slight drainage to a water table 40 to 10 cm below the soil surface (based on Morris et al., 2000; Janssen et al., 2005).

Preservation of the cultural-historic landscape could be combined with preservation of fen-meadow birds at the same location. However, preservation of swamp flora and fauna is not compatible with dairy farming at the same location. Thus, the challenge in this setting involves goals that are identified as part of sustainable development, but which are non-compatible (Den Uyl and Wassen, 2013).

Many of the actor groups involved (e.g. policy-makers, nature conservation groups, agricultural groups, other interest groups and scientists) advocate change (Owens, 2008; Rawlins and Morris, 2009). However, they have no shared vision of desired development as a general point of reference, and their viewpoints on urgency and priorities tend to differ substantially (Owens, 2008; Rawlins and Morris, 2009; Den Uyl and Wassen, 2013). The lack of a common vision or sense of urgency is particularly evident in the wide divergence of priorities set by the various stakeholder groups regarding the sustainable development of the fen landscape (Den Uyl and Wassen, 2013).

The involvement of multiple actor groups from several sectors is also seen in the variety of public policies applied to the Dutch fen landscape, as well as the variety of land-use practices occurring in it and the functions it fulfils (Van der Ploeg, 2001; Van Calker,

2005; Buizer, 2008; Owens, 2008; Van Rij, 2008). The applied public policies include agricultural policies, 'economic enforcement policies', rural development policies, water management policies, nature conservation policies, landscape conservation policies, housing policies, and tourism and recreation policies.

The Dutch fen landscape setting comprises interrelations among municipal, regional and national levels of government and among various actors, such as nature and landscape conservation groups and agricultural, recreation and residency interest groups. The multi-level character of the setting is evident in the fact that while most of the decision making processes take place at local and regional institutional levels (e.g. municipal or provincial zoning schemes for land-use), they are strongly influenced by decision making on national sectoral policies (e.g. on water management and environmental pollution), European Union policy directives (e.g. on agriculture and nature conservation) and international market dynamics (e.g. in dairy products). European Union (EU) policies which partly address the Dutch fen landscape's sustainability issues include the *Water Framework Directive* (Janssen et al., 2005), the *European Spatial Development Perspective* (Zonneveld, 2005; Sykes, 2008), the *Natura 2000 Directive* (Rauschmayer et al., 2009) and agri-environmental schemes (Wilson and Hart, 2000; Baylis et al., 2008). However, at the EU and national level there are no policies specific to multifunctional fen landscapes (Den Uyl and Wassen, 2013).

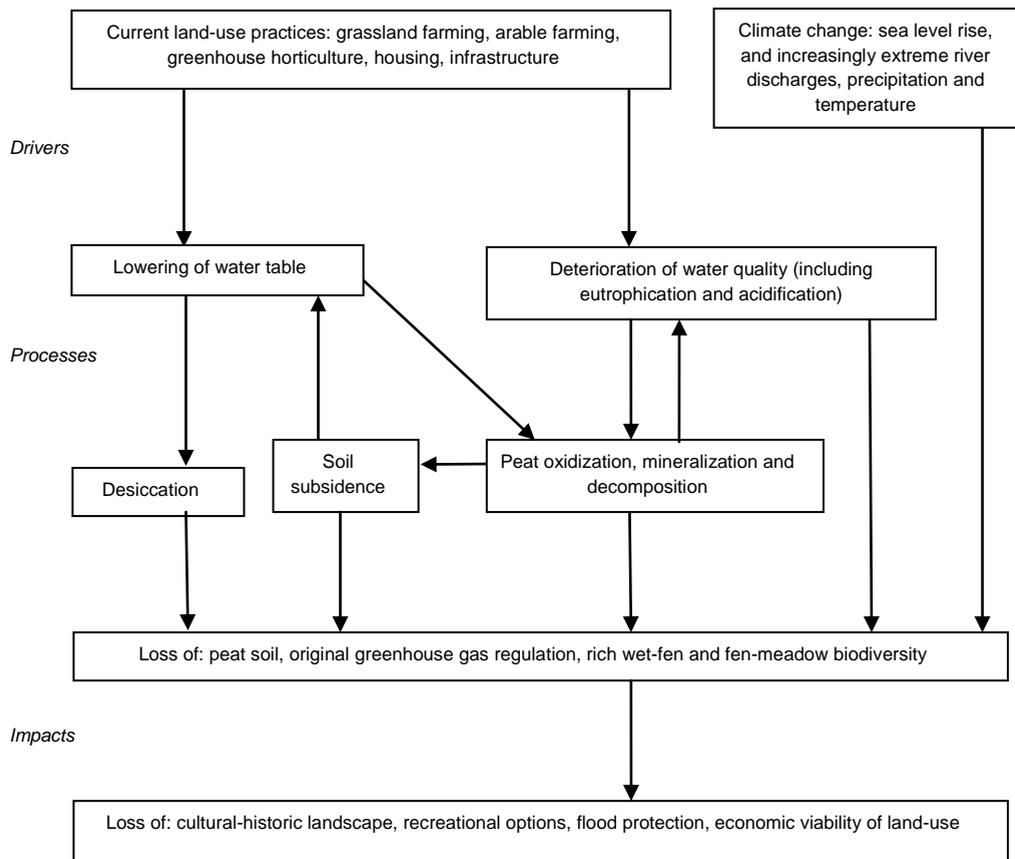
Nevertheless, various local and supra-local interventions – i.e. steering initiatives that involve intervening in societal and biophysical processes in order to achieve progress towards a desired development – have been adopted specifically to address the sustainability challenges in the fen landscape (Trepel, 2007; Buizer, 2008; Owens, 2008; Rawlins and Morris, 2009; Den Uyl and Wassen, 2013). Although a limited number of fen-specific initiatives have been analysed and documented in Germany, the Netherlands and the UK (e.g. Trepel, 2007; Buizer, 2008; Owens, 2008; Rawlins and Morris, 2009; Den Uyl and Wassen, 2012), comparative analysis of such cases in the fen landscape setting barely features in the academic literature.

For the purpose of this study, it is important to characterise the complexities and uncertainties related to the biophysical and socio-economic aspects of these fenlands. For at least two millennia, humans have used them mainly for low-intensity agriculture and, for relatively shorter periods (200-300 years), for peat excavation (Joosten and Clarke, 2002; Trepel and Kluge, 2002; Schleyer, 2004; Van Diggelen et al., 2006; Owens, 2008; Rawlins and Morris, 2009). These and other forms of human intervention have changed the landscape through successive historical periods. In the current situation, the landscape has largely been shaped by human intervention (including maintenance of nature conservation areas), though also by biophysical responses. These gradual change processes contribute to the absence of a clear state or stage as a reference point in discussion about maintaining these landscapes. Nevertheless, the long history of human usage has given the Dutch fen

landscapes great cultural and historical value with features including traditional windmills, allotment patterns, lakes and canals, which are highly appreciated by recreation-seekers, and are generally considered to merit preservation.

Most locations in the Dutch landscape have a varied history of policy interventions (Van der Ploeg, 2001; Buizer, 2008; Owens, 2008; Van Rij, 2008). At some locations, for example, until about the mid-1990s, public policy was mainly oriented towards upscaling and intensifying agricultural practices (Grin et al., 2010); since then, however, emphasis has been increasingly placed on other practices including nature conservation (Van Rij, 2008). This is a landscape in which human and biophysical aspects have become so closely entwined over the centuries that even prolongation of present ecosystems has become directly dependent on intensive human management. As a result, the sustainability challenge here entails intertwined technical and institutional complexities (Van der Ploeg, 2001; Van Calker, 2005; Buizer, 2008; Owens, 2008; Van Rij, 2008).

Figure 2.1 (below), which sets out the relations between current land-use practices and their impacts on fen landscapes, highlights the pivotal role of quantitative and qualitative aspects of water management. As the present study clarifies, the biophysical aspects are essential for maintaining fen landscapes, whereas the socio-economic aspects are mostly services that result from these fen landscapes.



**Figure 2.1: Current land-use practices and their impacts on fen landscapes.** An arrow indicates a direction of influence. To various extents, these influences include uncertainties. Here, for reasons of clarity, impacts are summarised in two boxes. Not all arrows carry equal influence, and direct process influences on the lowest box are omitted to enable readability. The relationship between human-induced climate change and impacts on fen landscapes in particular includes many uncertainties and complexities (Roulet et al., 1992; Weltzin et al., 2000; Whittington and Price, 2006); further clarification of this relationship lies beyond the scope of this study. Source: adapted from Den Uyl and Wassen (2013).

## 2.5 Research Aim and Questions

In the preceding sections, I have set out the three main modes of intervention in societal and biophysical processes that are discussed in the literature on governance for sustainable development (Dryzek, 2005; Voss et al., 2007; Adger and Jordan, 2009; Driessen et al., 2012). The existence only of the few comparative conceptual studies noted above led to the

decision to analyse these modes together as possible trajectories and to provide supporting empirical data.

The focus on examining a single mode of governance on sustainable development typically seeks to understand how a mode operates or to identify elements that may enhance its contribution or problem-solving capacity. For example, Walters and Holling (1990) and Armitage et al. (2008) focus on adaptive management, Avelino (2009) and Grin et al. (2010) focus on transition management, whereas Engel et al. (2008) and Pagiola et al. (2010) focus on PES. The basic assumption of this study was that one mode of governance is not necessarily more appropriate than the other possible modes that are discussed in the literature and applied in practice. The research design of the present study made it possible to transcend the single-mode approach and attain an overview of how various modes function and how they compare to one another.

In this sense, the present study complements the comparative studies on adaptive management and transition management by Smith and Stirling (2010) and Voss and Bornemann (2011). Through its adopted research approach, the present study also supplements these two studies in several ways: (1) by making a more explicit distinction between orientation towards the goal (i.e. sustainable development) and orientation towards steering; (2) by including a third mode of governance for sustainable development (i.e. PES); (3) by including practical experiences with all three modes (i.e. new empirical findings); and (4) by including a structured evaluation according to five criteria on governance for sustainable development.

By studying three selected modes of governance from a comparative (meta) perspective and within a structured framework, in terms of the extent to which they are oriented towards inducing change and stimulating sustainable development, the present study aims to gain greater insight into what each mode specifically addresses and why there are various diagnoses not only of the 'sustainability challenge' but also of promising interventions. Studying a mode in comparison to other modes is an opportunity to identify (1) multiple understandings of what causes a sustainability challenge, (2) what the associated aims may entail, and (3) how change may be induced.

In addition, several authors have concluded that further empirical knowledge is needed in order to understand how governance for sustainable development works in real-world settings (Jordan, 2008; Jordan, 2009). The present study aims to contribute to the body of empirical examples of these three modes and to provide greater insight into their practical implications.

Several authors propose that modes of governance for sustainable development should be evaluated comprehensively, according to multiple criteria (Adger et al., 2003; Biermann et al., 2010). The present study identifies which criteria found to be relevant to governance for sustainable development receive priority in the literature on these modes. However, the literature includes few comprehensive evaluations of the various modes. The present study therefore aims to provide greater insight into how the selected modes address

a set of criteria drawn from the literature. This set of five criteria enables a normative analysis based on an external yardstick, i.e. a type of measurement enabling comparison.

The central aim of this study is to provide greater insight into the key challenges arising in steering towards sustainable development. It achieves this aim by:

- Analysing three modes of governance – i.e. adaptive management, transition management and PES – according to their steering mechanisms and orientation towards sustainable development;
- Evaluating the three modes according to a set of criteria for governance for sustainable development; and
- Analysing practical experiences with the selected modes in the setting of the Dutch fen landscape.

The central research aim is pursued using the following four research questions, which are considered in the chapters below:

- To what extent are the three selected modes of governance – i.e. adaptive management, transition management and PES – oriented towards sustainable development and inducing change needed to achieve sustainable development?
- What has been experienced in practice with such an orientation, i.e. in empirical examples of the application of each mode in the setting of the Dutch fen landscape?
- How does the conceptual discussion about the three selected modes of government address a set of five criteria for the evaluation of governance for sustainable development, and what has been the practical experience relating to these criteria?
- What does a comparison of the three modes reveal about the extent to which they provide a pathway towards sustainable development in a multi-actor, multi-level and multi-sector setting with uncertainties, complexities and disagreement about priorities for the future development of the setting?



# Chapter 3                      Research Approach

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## 3.1 Introduction

In order to answer the research questions as stated above, the research approach comprised several steps, which are explained in the following sections of this chapter. Table 3.1 provides an overview of the structure of the research approach, indicating the subject matter of Chapters 4, 5 and 6. The research steps concerning the conceptual and empirical analysis of orientation towards sustainable development and steering, and those concerning evaluation according to the five criteria are further elaborated in the subsequent sections.

**Table 3.1: Overview of the research structure.**

		Mode of governance for sustainable development		
		<i>Adaptive management</i>	<i>Transition management</i>	<i>Payments for environmental services</i>
<b>Analysis</b>	<i>Orientation towards sustainable development and steering</i>	Studied in concept and in practice		
	<i>Set of five criteria on governance for sustainable development</i>			
		↓	↓	↓
		Chapter 4	Chapter 5	Chapter 6

## 3.2 Approach to Conceptual Analysis

As noted above, analysing orientation towards sustainable development and steering is complex and challenging (Bressers and Rosenbaum, 2003; Lafferty, 2004) because the concepts of sustainable development and governance are contested (Kates et al., 2005; Meadowcroft, 2007; Jordan, 2008) and no generally agreed methodology is available for analysing such orientation. The present study uses aspects identified in the literature as

relevant in order to analyse qualitatively how the three selected modes of governance are oriented towards sustainable development and steering.

These aspects concern, firstly, what is considered to be the alignment toward a sustainable development goal as conceptualised in the discourse on a particular mode of governance (Dryzek, 2005; Meadowcroft, 2007; Jordan, 2008; Van Zeijl-Rozema et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011). Secondly, aspects are studied that relate to what is considered within the discourse to be the cause of the main problem related to the sustainability goal (Meadowcroft, 2002; Dryzek, 2005; Voss et al., 2007; Jordan, 2008; Van Zeijl-Rozema et al., 2008; Smith and Stirling, 2010).

Thirdly, aspects are taken up that are identified in the literature as relevant to steering in terms of what is emphasised as the core conceptual assumption about how to intervene and move in a more sustainable direction and how to induce change (Dryzek, 2005; Meadowcroft, 2007; Voss et al., 2007; Jordan, 2008; Biermann et al., 2010; Smith and Stirling, 2010; Voss and Bornemann, 2011, Driessen et al., 2012).

Lastly, aspects examined include the key process elements identified as necessary for the design and organisation of an intervention (Meadowcroft, 2007; Voss et al., 2007; Jordan, 2008; Van Zeijl-Rozema et al., 2008; Biermann et al., 2010; Smith and Stirling, 2010; Voss and Bornemann, 2011; Driessen et al., 2012).

The aspects studied are listed in Table 3.2. Taken together, they provide a framework for analysing the concepts of adaptive management, transition management and payments for environmental services (PES) as discussed in the literature.

**Table 3.2: Aspects of orientation towards sustainable development and steering** – as used for analysis of adaptive management, transition management and payments for environmental services.

Orientation towards sustainable development	Orientation towards steering
<ul style="list-style-type: none"> <li>• Substantive alignment toward a sustainable development goal</li> <li>• Main idea of the cause of the sustainability problem</li> </ul>	<ul style="list-style-type: none"> <li>• Key conceptual assumption about how to intervene and induce change</li> <li>• Key process elements for the design and organisation of an intervention</li> </ul>

For the purpose of this analysis, the Scopus search engine was used to gather literature, using the search terms ‘adaptive management’, ‘adaptive governance’ and ‘adaptive co-management’; ‘transition management’; and ‘payments for environmental services’ and ‘PES’. The present study includes literature published prior to or early in 2013 that introduced or originally articulated the concept of each respective mode of governance, and that has achieved a relatively high number of citations, and/or contributed a specific

additional observation about how a mode of governance is orientated towards sustainable development or steering.

Discourse on each of the selected modes of governance also includes several empirical cases which are frequently referred to in the literature, serving as examples of the modes (Dryzek, 2005; Jordan, 2008; Voss and Bornemann, 2011). These cases also inform the present study.

### **3.3 Approach to Empirical Analysis**

This section describes how analysis of empirical cases in the setting of the Dutch fen landscape was approached and how data were collected in order to learn about how the three selected modes of governance may work in practice.

In the empirical contexts of the cases studied, sustainable development is not usually comprehensively conceptualised. Therefore, the orientation towards sustainable development in each case is analysed in terms of: 1) its main aim; 2) the main idea in each case about what causes the sustainability problem encountered within it; and 3) how each case intends to influence aspects of the Dutch fen landscape which are identified as of concern in the debate about its future. Evaluation of effectiveness in achieving the aims of the selected cases lies beyond the scope of the present study; hence analysis here aims to enable their comparison only in terms of orientation towards sustainable development.

The landscape aspects of concern were used to establish a framework for analysing the goal orientation, and are listed in Table 3.3. This table provides some explanatory comments, and includes references. The present study reviews the practical measures scheduled for use in each case and how each addresses the sustainability issues of concern as listed in Table 3.3. These measures are examined on the basis of information reported by interviewees and information from the documentation on the cases. Details of the analysis are included in Appendix A for the adaptive management cases, Appendix B for the transition management cases and Appendix C for the PES cases.

Analysis revealed that disappearance of the peat soil substrate poses the greatest threat to the fen landscapes. The available literature refers to greenhouse gas emissions from fen landscapes as a related problem also to be considered in regard to the sustainable development of the landscapes. Decomposition and subsidence of peat soil may lead to carbon dioxide emissions; methane emissions from wet peat soil may be even greater. Both carbon dioxide and methane are greenhouse gases. The net impact of greenhouse gas emissions from peatland may vary with location and time. In addition, climate change, peat soil decomposition and peat soil accumulation may influence each other (Roulet, 2000; Whiting and Chanton, 2001; Minkkinen et al. 2002; Frolking et al., 2006; Frolking and Roulet, 2007; Knorr and Blodau, 2009). In these ways, the problem of greenhouse gas

emissions (and similarly, greenhouse gas regulation as an intervention) involves large uncertainties (Roulet, 2000; Minkkinen et al. 2002; Frolking et al., 2006; Frolking and Roulet, 2007; Knorr and Blodau, 2009) that put this aspect outside the scope of the present study.

Some actors involved consider the cost efficiency of water management to be an aspect of concern in the fen landscapes. In particular, Dutch policymakers emphasise that increasingly varied demands on water quantity and quality, in combination with the probable effects of climate change, are driving up the costs of water management (Veerman et al., 2004; Stuurgroep Groene Hart, 2005). However, because this aspect has yet to be reported in the academic literature, it, too, is not considered in the present study.

**Table 3.3: Aspects of the Dutch fen landscape articulated in the literature as of concern.** Table based on Den Uyl and Wassen (2013).

Aspect	Comment	References	
<b>Biophysical aspects</b>	<i>Qualitative and quantitative water management</i>	<ul style="list-style-type: none"> <li>In the present study, sustainable water management is regarded as key to sustainable development of fen landscape;</li> <li>Entails raising water tables where necessary to reduce soil subsidence, and improving water quality to reduce peat decomposition.</li> </ul>	(Lucassen et al., 2005)
	<i>Peat soil subsidence</i>	<ul style="list-style-type: none"> <li>Peat soil subsidence is an issue of concern because even slight drainage and decreasing water quality lead to a continuous process of decomposition and subsidence of peat soil.</li> </ul>	(Best et al., 1993; Joosten and Clarke, 2002)
	<i>Wet-fen biodiversity</i>	<ul style="list-style-type: none"> <li>Fen biodiversity is affected by water quality and quantity.</li> <li>Deterioration of water quality affects wet-fen biodiversity.</li> <li>Moderate drainage negatively affects typical fen plant biodiversity.</li> </ul>	(Koerselman et al., 1993; Beltman et al., 1996; Joosten and Clarke, 2002; Grootjans et al., 2006)
	<i>Fen-meadow biodiversity</i>	<ul style="list-style-type: none"> <li>Deep drainage negatively affects typical fen-meadow plant biodiversity.</li> <li>Conservation of meadow birds in fen meadow areas is also an important concern.</li> </ul>	(Joosten and Clarke, 2002; Kleijn and Sutherland, 2003; Grootjans et al., 2006; Verhulst et al., 2007)
<b>Socio-economic aspects</b>	<i>Culturally and historically valuable landscape elements</i>	<ul style="list-style-type: none"> <li>'Culturally and historically valuable fen landscape' generally refers to an open landscape with low-intensity grassland farming characterised by small-scale ditch patterns, green meadows, pollard willows, cattle and meadow birds.</li> <li>Deep drainage, large-scale intensive housing, and agriculture negatively affect maintenance of culturally and historically valuable landscape elements.</li> <li>Slight drainage that is required for low-intensity grassland farming eventually leads to loss of peat soil.</li> </ul>	(Van der Ploeg, 2002)
	<i>Recreational options</i>	<ul style="list-style-type: none"> <li>Culturally and historically valuable fen landscapes are often used for recreational activities such as hiking, cycling and bird watching.</li> <li>Many fen areas with a history of peat excavation have been transformed into landscapes with numerous lakes of various sizes, which are highly attractive for recreational purposes such as fishing, boating and luxurious summer residencies.</li> <li>Deep drainage, large-scale intensive housing, and agriculture negatively affect conservation of culturally and historically valuable fen landscape and restrict its recreational options, though water management targeted at conserving wet-fen flora and fauna and peat soil may also negatively affect such options.</li> </ul>	(Williams, 1996; Schleyer, 2004; Owens, 2008)
	<i>Flood protection</i>	<ul style="list-style-type: none"> <li>Ongoing subsidence of peat soil and expected higher frequency of peaks in precipitation and river discharge, most probably due to climate change, increase the probability of flooding.</li> </ul>	(Goosen and Vellinga, 2004; Owens, 2008)
	<i>Economic viability of land-use, in particular farming</i>	<ul style="list-style-type: none"> <li>Future viability of farming in such fen landscapes may be uncertain due to biophysical constraints imposed on intensive farming by peat soil, changing environmental and agricultural policies and global market dynamics.</li> <li>Economic viability, however, is not restricted to dairy farming, and may result from new activities that support the valued landscape.</li> </ul>	(Van der Ploeg, 2001; OECD and FAO, 2007; Rawlins and Morris, 2009)

The present study looks at how the landscape aspects are addressed in the selected empirical cases. It attempts to gain insight into the struggles, lessons learned and/or solutions that were referred to as such by the involved groups. The study also focuses on the aspects of governance as described in the literature on adaptive management, transition management and PES of particular relevance to steering in an empirical context. Such aspects typically differ for the three selected modes of governance, and the literature varies in its treatment of these aspects. The paragraphs below briefly indicate which aspects are discussed in the present study and elaborated in the corresponding chapters (i.e. Chapter 4 for adaptive management, Chapter 5 for transition management, and Chapter 6 for PES).

In the context of adaptive management, the literature typically emphasises learning and experimentation (e.g. Holling, 1978; Walters, 1986; Walters and Holling, 1990; Lee, 1993; Gunderson, 1999; Jiggins and Rölöing, 2000; Gunderson and Light, 2006), and cooperation among the involved actors as essential to an orientation towards steering in a real world setting (e.g. Lee, 1993; McLain and Lee, 1996; Lee, 1999; Pulwarty and Melis, 2001; Olsson et al., 2004a; Plummer and Armitage, 2007). Therefore, the analysis in the present study focuses on identifying practical experiences with learning-through-experimentation and cooperation. This is achieved by identifying adaptations made, lessons learned and problematic issues indicated in the context of learning-through-experimentation and cooperation as articulated by the involved actors themselves. The problematic issues are indicated in terms of those obstacles to future implementation in each case that were foreseen as such by the actors, and that are either within or beyond the influence of the stakeholders.

In the context of transition management, the literature articulates aspects relevant to intervening in practice as including: envisioning an essential change in the character (i.e. transformation) of a system or setting, and the creation of learning experiences including experiments and/or pilot schemes (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). The transition management literature considers as particularly important to steering in practice the three themes of: democracy (e.g. Shove and Walker, 2007; Foxon et al., 2009; Voss et al., 2009; Voss and Bornemann, 2011); legitimacy (e.g. Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Smith and Stirling, 2010); and learning and experimentation (e.g. Van de Kerkhof and Wiczorek, 2005; Meijer et al., 2007; Shove and Walker, 2007; Foxon and et al., 2009). It can be noted that these three themes correspond to three of the five evaluation criteria on governance for sustainable development used in this study, possibly supporting their selection.

In respect of the steering dimensions used in PES, academic discussion has focused on aspects such as types of agreement, types of buyer and supplier and types of service (Pagiola et al., 2002; Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010). These aspects are included in the present analysis of PES cases. The PES literature has so far mainly focused on characteristics for evaluating single cases

in a specific area (e.g. Pagiola, 2002; Dobbs and Pretty, 2008; Wunder, 2008). However, in some areas, including the Dutch fen landscape, several PES schemes have been introduced in parallel. As these parallel cases may influence each other in their orientation towards steering, the present analysis looks at interrelations between different cases in the Dutch fen landscape. For this purpose, the analysis introduces the characteristic of ‘interrelations’ among individual cases. Such interrelations are analysed by identifying: incentives to initiate a PES case in addition to national agri-environmental schemes; options for providers to combine PES schemes or limits on doing so; and adaptations of schemes for PES as a result of exchanging lessons learned. The present analysis identifies obstacles to improved functioning (internal or external) that were reported as such by those consulted about the PES cases. To identify the extent to which the PES cases contribute to the economic viability of land-use, the PES cases’ intended contributions to the economic viability of land-use were examined in greater detail than those of the adaptive management and transition management cases; these were identified in terms of payments per hectare or other unit and the perceived contribution to providers’ income. In this way, the analysis is roughly comparable to that of Miranda Quiros (2003), who analysed perceived socio-economic effects of PES’ contribution to farmers’ incomes.

Data for empirical analysis were mainly collected through interviews with key persons and reviews of documentation. The interviewees were from leading and non-leading groups, and represented various positions and/or interests, including various stakeholder groups, such as governmental bodies, agricultural interest groups, non-governmental organisations (NGOs) for nature conservation, and process-management consultancies. These individuals were asked to identify other key researchers, practitioners, policymakers or actors in the field of fen landscape management. In total, 48 individuals were consulted for the purposes of Chapters 4, 5 and 6, and are listed in the corresponding appendices (i.e. Appendix A for Adaptive Management, Appendix B for Transition Management, and Appendix C for PES), which include information on their affiliation and their role in the respective case.

The interviews, usually lasting about one and a half to two hours, were semi-structured, conducted face-to-face or by telephone and, in some of the PES cases, partially by email. A standard list of questions was used to obtain specific information about each case and about aspects of its orientation towards sustainable development and steering. The list included open questions to enable the respondent to identify elements (such as problematic issues encountered, obstacles expected or lessons learned) not revealed by responses to closed questions. The list of questions was slightly adjusted to fit the details of each case and each interviewee. The interviews were preceded by a short introduction, and at the end of the interview, the respondent was given the opportunity to provide any further information they considered relevant to the case in question. A report of the interview was sent back to the interviewees for confirmation, which they could amend if necessary. The appendices include a translated version of the question list used for each type of case (i.e.

Appendix A includes the list used for the adaptive management cases, Appendix B includes the list used for the transition management cases and Appendix C includes the list used for the PES cases).

Project documentation includes internal documentation (including minutes of meetings, formal correspondence between societal groups and leading governmental bodies, brochures and policy documents) and documentation prepared by external parties (including newspaper clippings and reports written by third parties). In some instances, external information on the cases was found in peer-reviewed academic publications. Both internal and external documentation provided data for the cases studied. Since project documentation may be biased, where possible, external evaluation material was used in addition to the documentation provided by actors directly involved in a case. An overview of all the documentation is provided in the appendices.

### **3.4 Approach to Evaluation Based on the Set of Criteria**

As described in Chapter 2, the criteria for evaluation as used in the present study, are regarded as overall principles of governance for sustainable development, and comprise a mix of substance- and process-oriented elements. The primary aim of the evaluation is to determine how the three modes studied deal with these criteria in concept and in practice. Per Chapter 2 (2.3), the five criteria (i.e. equity, democracy, legitimacy, handling of scale issues, and handling of uncertainty issues) are operationalised in terms of those aspects which the literature indicates make it possible to substantiate the criteria. The evaluation aspects of the criteria are listed in Table 3.5.

**Table 3.4: Summary of criteria of governance for sustainable development.**

<b>Criterion</b>	<b>Evaluation aspects</b>
<i>Equity</i>	<ul style="list-style-type: none"> <li>• Fair intergenerational and spatial distribution and access</li> <li>• Striving for unbiased decision making</li> </ul>
<i>Democracy</i>	<ul style="list-style-type: none"> <li>• Representative decision making for societal/public goals</li> <li>• Participation of societal groups in decision making, particularly in goal-setting</li> </ul>
<i>Legitimacy</i>	<ul style="list-style-type: none"> <li>• Public acceptability of decisions made according to those affected and/or to those charged with assessing acceptability</li> <li>• Ability of decision makers to explain and justify their decisions</li> </ul>
<i>Handling of scale issues</i>	<ul style="list-style-type: none"> <li>• Addressing an environmental issue at relevant spatial, temporal and institutional scales (likely cross-spatial, medium- and long-term, and multiple institutional levels)</li> <li>• Attention to linking of societal and ecological assets</li> <li>• An institutional arrangement adaptable to changing scale circumstances</li> </ul>
<i>Handling of uncertainty issues</i>	<ul style="list-style-type: none"> <li>• Explicitly acknowledging uncertainties: preferably categorising and indicating magnitude of the uncertainty range and sources driving uncertainties</li> <li>• Learning and use of insights gained (including knowledge management; learning during policy-making; using local knowledge in decision making; and using experimentation)</li> </ul>

The present study reviews the way the collected bodies of literature on the three selected modes of governance address the five criteria. In addition to a broad literature search, additional terms specific to each mode and the criteria were used. For example, ‘adaptive management’ was searched successively with ‘equity’, ‘democracy’, ‘legitimacy’, ‘scale’ and ‘uncertainty’.

The selected empirical cases in the Dutch fen landscape were qualitatively evaluated according to the five criteria by examining how they were addressed in plan making and decision making. For this purpose, the data gathered on the selected cases were reviewed to determine whether the five criteria were considered by the leading stakeholders in the process or goal orientation of these cases, and if so, how the various aspects of these criteria were addressed and discussed.

### **3.5 The Selected Empirical Cases**

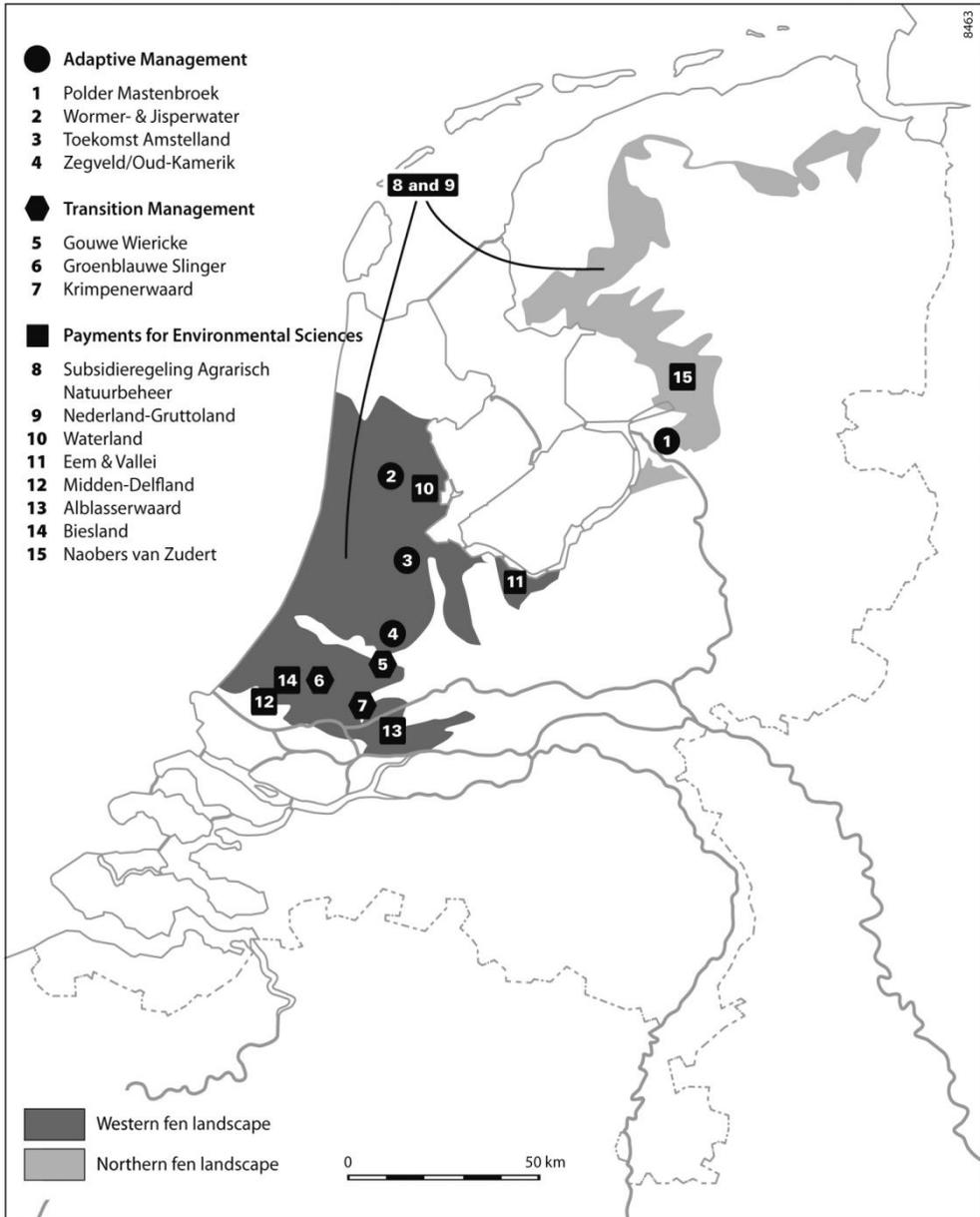
The three selected modes of governance were recognisable in several empirical cases of governance intended to enhance the sustainable development of the Dutch fen landscape through their involvement of an explicit focus on:

- an incremental, learning-by-doing and cooperative approach;

- an approach based on a transformation of a certain area; or
- an approach based on alternative economic transactions for selected land-use practices.

The above three steering mechanisms correspond to the conceptual perspectives emphasised in the literature on adaptive management, transition management and PES, leading to respective consideration of the empirical cases as practical examples of the three modes of governance. The present study focuses on cases that were either in the implementation phase or in an advanced decision making phase nearing implementation. It should be noted that the cases selected as practical examples of these modes may not necessarily be labelled as such by the actors involved.

The relative prominence of the three approaches was confirmed by consulted experts in the field (participants in various leading and non-leading, public and private, and scientific and non-scientific groups). The cases studied include several innovative and experimental cases proposed by the regional governments involved as interesting to follow (Jorna, 2006; Stuurgroep Groene Hart, 2010). Area-based transformations are considered as ‘icon cases’ by regional governments involved (Stuurgroep Groene Hart, 2005). PES in the fen landscapes are strongly indicated as an interesting option by the national government (LNV, 2002), by private parties (Kloen et al., 2007) and by experts (Vogelzang et al., 2004; Van Bommel et al., 2007). For the purposes of the present study, identification of the approaches led to the selection of four adaptive management cases, three transition management cases, and eight PES cases. For an overview of the fen landscape in the Netherlands and the locations of the cases studied, see Figure 3.1.



**Figure 3.1: Overview of the fen landscape in the Netherlands and the locations of the cases studied.**

### 3.5.1 *Selected adaptive management cases*

A set of cases of adaptive management in the Dutch fen landscape was identified by first creating an inventory of cases that were oriented towards:

- learning-through-experimentation; and
- cooperation among the involved actors.

The inventory yielded an initial set of 33 candidate cases. According to local experts in the field, this set was not all-inclusive, but represented the vast majority. In practice, these cases were not referred to as ‘adaptive management’ by the practitioners and other parties involved. A second inspection of these cases produced a smaller number (20) explicitly oriented toward learning-through-experimentation and cooperation among the involved actors. From these cases, the spatially largest cases were selected (2400 ha – 8350 ha) in order to ensure a broad scope of societal and biophysical assets. To facilitate analysis, cases were further selected on the basis of inclusion of sufficient available information and documentation about the case itself and its context. These filtering steps eventually narrowed the field down to four adaptive management cases: Polder Mastenbroek, Toekomst Amstelland, Wormer- and Jisperwater and Zegveld/Oud-Kamerik.

In these four cases, the adaptive management process was considered necessary because various, often conflicting, claims and interests were imposed on the area in question, biophysical and socio-economic issues had become increasingly complex, uncertainties had mounted, and the initiating groups involved sought a non-conventional approach to address the challenges and expected that a cooperative learning-by-doing approach would assist in solving the sustainability issues.

In three cases (i.e. Polder Mastenbroek, Wormer- and Jisperwater and Zegveld/Oud-Kamerik), the water board was the leading actor. Experimental practices were mainly oriented towards learning about the water and soil system. In the fourth case (i.e. Toekomst Amstelland), a municipality took the lead, and the experimental practices were mainly oriented towards “new landscape management concepts”. In all four selected cases, the plan making process was considered innovative in its participatory approach by the groups involved because it moved away from previous applied approaches, particularly in that it asked for input from local, non-state actors. Additional background information, characteristics, and data sources are presented in Appendix A.

### 3.5.2 Selected transition management cases

Cases in the Dutch fen landscape were identified as empirical examples of transition management if they included:

- a focus on long-term sustainability objectives;
- envisioning of an essential change in the character of the area to enable more sustainable land-use, for which the initiators themselves used the word ‘transformation’;
- experiments and/or pilots; and
- provision for learning.

This filter led to the identification of three area-based transition cases and their inclusion in the study: Gouwe Wiericke, Groenblauwe Slinger and Krimpenerwaard.

Experimental and learning aspects feature in both adaptive management and transition management. In the present study, cases with a transformation focus were identified as distinct from the adaptive management cases because they were explicitly oriented towards transforming the area as envisioned in new spatial planning and rearrangement of land-use practices rather than being oriented towards an open-ended, iterative, cooperative trajectory. All three selected cases contain several long term sustainability visions for the future, though without an exact time-horizon. Each of the visions anticipates increasing and changing demands on the area, the development of ‘robust’ qualities and the intention to offer the area the “prospect of a sustainable future”. Although the documentation does include a few instances of the term ‘transition’, ‘transformation’ is the term mainly used.

Strikingly, the actors interviewed reported differently on the use of envisioning and alternative solutions in the process of planning: some indicated that these *were* used in planning, others reported that these were not considered at all despite the existence of such visions.

The transition cases studied all include experiments or pilots, and scheduled evaluations, although these differ greatly in type, purpose and arrangement. The Gouwe Wiericke and Krimpenerwaard cases, for example, are monitored and evaluated by a governmental bureau that is assigned to monitor and evaluate a high number of cases in the fen landscape in the Western part of the Netherlands, whereas Groenblauwe Slinger is not. However, the three cases do not include experiments and pilots as comprehensively and essentially as called for in transition management theory (Rotmans et al., 2001; Kemp et al., 2007; Rotmans and Loorbach, 2009; Loorbach and Rotmans, 2010). Further characteristics, background information and data sources are presented in Appendix B.

### 3.5.3 *Selected payments for environmental services cases*

The PES cases in the Dutch fen landscape selected for study were identified according to the inclusion of the following design characteristics:

- identification of an environmental service to be subject to pricing;
- identification of buyers and suppliers; and,
- use of a pricing agreement.

The present study was particularly aimed at discovering more about the dynamics and struggles in cases where local individuals act as suppliers, i.e. those with direct control over management of their land-use, e.g. farmers and residents. Analysis did not include nature conservation organisations as suppliers because payment of individual practitioners corresponds more closely to the PES model as articulated in the literature, which identifies the improvement of, and increase in, livelihoods as one of the main goals of PES. Payments to organisations for providing environmental services tend to lead to the money ending up in the organisation rather than with the individual land-use practitioners. Payments to organisations correspond more closely to traditional nature conservation management that tends not to operate on a market basis.

The eight selected PES cases are: Subsidieregeling Agrarisch Natuurbeheer, Nederland-Gruttoland, Waterland, Eem & Vallei, Midden-Delfland, Alblasserwaard, Biesland and Naobers van Zudert. The present study identified, examined and analysed all seven PES cases in the Dutch fen landscape that were operational at the time alongside the national agri-environmental programme (i.e. Subsidieregeling Agrarisch Natuurbeheer; as applied by individual practitioners). Some of these cases have been studied by other academics: Biesland, for example, by Buizer (2008) and Buizer and Van Herzele (2012); Midden-Delfland by Van Rij (2008), Van Rij et al. (2008a) and Van Rij et al. (2008b); SAN by academics including Kleijn and Sutherland (2003), Kleijn et al. (2004), Verhulst et al. (2007), Smits et al. (2008) and Swagemakers et al. (2009).

All eight PES cases aimed to achieve biodiversity conservation; seven of these also set landscape conservation as a goal; five sought water regulation, and one was also geared to soil conservation. Overall, biodiversity and landscape conservation receive relatively large-scale contributions (mainly under the national agri-environmental scheme). Water regulation and soil conservation services are relatively small-scale and new additions to PES schemes. Suppliers typically include grassland farmers, while buyers are a mix of public and private actors. The selected cases, the first of which was implemented in 1997, have gradually become operational in the intervening years. At the time of study, the suppliers intended to continue with them. Further characteristics and information about the PES cases is given in Appendix C.

### 4.1 Navigating by Adaptation

The concept of adaptive management is based on the premise that an ecosystem often responds unpredictably to our attempts to manage it (Holling, 1978; Walters, 1986; Walters and Holling, 1990; Berkes et al., 2003). This unpredictability is due to non-linear responses and to complex interactions within the ecosystem and between it and factors resulting from interventions. According to Berkes et al. (2003), renewal cycles that continually occur, and which can be recognised at various levels in biophysical and social systems, lead to ever-changing circumstances. Consequently, the originators of the concept of adaptive management emphasised that ecosystems cannot be “managed” simply.

In order to “manage” an ecosystem, strategies must be developed to deal with unpredictable responses to interventions in that system. To deal with such responses, other uncertainties and complexities, adaptive management offers a trajectory based on: ongoing investigation of its objectives, organization and process; experimentation; and cooperation between policy-makers, scientists and practitioners (Walters and Holling, 1990; Johnson, 1999; Gunderson and Light, 2006; Foxon et al., 2009; Voss and Bornemann, 2011). Actors may not necessarily wait until interactions between possible management interventions and elements of an ecosystem are entirely understood; rather, they actively search for “better” possible interventions in the ecosystem through learning-by-doing. Moreover, uncertainties and complexities are expected to continue to feature in many of the ecosystem/intervention interactions.

Adaptive management proposes to develop a specific capacity of both the social structure and the ecosystem involved to cope with the uncertainties and complexities arising. In the literature, this is referred to as enhancing the ‘resilience’ of a social-ecological system.

Holling (1978) introduced resilience into the debate on adaptive management as the capacity of a system to absorb and utilise change or even to benefit from change. Resilience is, then, the adaptive capacity to cope with changing circumstances and to regenerate based on learning-through-experimentation and a redundancy of experiments and contexts for learning (Gunderson, 2003; Folke, 2006; Plummer and Armitage, 2007; Gunderson et al., 2006; Lebel et al., 2006; Walker et al., 2006).

The term ‘social-ecological system’ refers to the idea of social and ecological systems as closely coupled (Berkes et al., 2003). According to Folke et al. (2005) the notion

of a social-ecological system emphasises “the integrated concept of humans in nature” and stresses that “the delineation between social and ecological systems is artificial and arbitrary” (p. 443). Examples of social-ecological systems subject to study include the Florida Everglades (Lebel et al., 2006; Olsson et al., 2006) and Kristianstads Vattenrike (Olsson et al., 2004b; Lebel et al., 2006; Olsson et al., 2006). Enhancing the resilience of a social-ecological system entails making it less vulnerable to shock and perturbation and more capable of being reorganized, of dealing with uncertainty and complexity, and of adjusting to change and surprise (Holling, 1978; Walters, 1986; Lee, 1993; Berkes et al., 2003).

The usual unit of analysis in the relevant literature is an adaptive management case in a social-ecological system (Berkes et al., 2003; Folke et al., 2005; Folke, 2006; Smith and Stirling, 2010; Voss and Bornemann, 2011). It stands out, however, that few publications include a precise definition of adaptive management: i.e. a description using “adaptive management is” instead of, say, “adaptive management uses” or “adaptive management emphasises”. As a mode of governance, adaptive management is characterised by learning and networking, particularly learning-through-experimentation, based on cooperation among policy-makers, scientists, practitioners and other local stakeholders (Walters, 1986; Walters and Holling, 1990; Lee, 1993; Lee, 1999; Berkes et al., 2003; Olsson et al., 2004a; Armitage et al., 2008); it brings a relatively important role for scientists and an explicit focus on cooperation (Lee, 1993; Lee, 1999; Berkes et al., 2003; Olsson et al., 2004a; Armitage et al., 2008).

One group of scholars discusses a closely related form of governance known as ‘adaptive governance’; indeed, ‘adaptive management’ and ‘adaptive governance’ are sometimes used synonymously (Folke et al., 2005; Olsson et al., 2006; Brunner, 2010; Armitage et al., 2011; Clark and Clarke, 2011; Hahn, 2011; Huntjens et al., 2011). Brunner (2010) identifies adaptive governance in a broad context by relating it to information technology, national security, development aid, and health care. It should be noted that as a result of a focus on dimensions of flexibility and responsiveness, the original intention of coordinated and monitored learning-through-experimentation loses its prominence. Clark and Clarke (2011), however, identify adaptive governance as an approach that “prioritises collaborative learning between individuals, organisations and ... institutions as a means of instilling behavioural adaptation among them” (p. 314). By emphasising learning and adaptation, Clark and Clarke position the meaning of adaptive governance closer to what is meant by adaptive management.

Although use of the term ‘adaptive governance’ has increased in the academic literature since 2003, the term ‘adaptive management’ is still more frequently used. For example, for the year 2011, a literature search using the search engine Scopus, performed on 26 November 2012 in the subject area “Social Sciences & Humanities”, found 646 publications that included the term ‘adaptive management’ and 65 publications using ‘adaptive governance’.

Elaborating and emphasising the element of cooperation, some authors have related adaptive management to concepts such as cooperative management and collaborative management, resulting in the concept of ‘adaptive co-management’ (Olsson et al., 2004a; Olsson et al., 2004b; Plummer and Armitage, 2007; Armitage et al., 2008). Some authors emphasise the polycentric, flexible and responsive character of adaptive governance (Folke et al., 2005; Olsson et al., 2006; Brunner, 2010), and use the term ‘adaptive co-management’ to refer to the operationalization of adaptive governance (Folke et al., 2005). Here, the prefix “co” refers to the sharing of management power and responsibility with regard to learning and to decisions on natural resources among multiple actors (i.e. practitioners, governments and other organizations) and at multiple levels (i.e. local, regional, supra-regional) (Olsson et al., 2004a; Olsson et al., 2004b). Consequently, adaptive co-management emphasises horizontal and vertical linking functions (Armitage et al., 2008). It should be noted that Huitema et al. (2009) explain that the interpretations of adaptive co-management closely approach the vision of adaptive management as described by Lee (1993; 1999). Lee (1993; 1999) discusses adaptive management as a non-technocratic strategy, which “already contained both the learning and the linkage dimensions now seen as typical for adaptive co-management” (Huitema et al., 2009, art. 26, no page number).

The literature documents many contributions to the development of the concept of adaptive management by scholars who tend to advocate this mode of governance (e.g. Holling, 1987; Walters, 1986; Walters and Holling, 1990; Gunderson, 1999; Johnson, 1999; Berkes et al., 2003; Folke et al., 2002; Olsson et al., 2004a; Walker et al., 2006; Folke et al., 2005; Gunderson et al., 2006). The literature also includes more neutral contributions (e.g. Lee, 1993; Pinkerton, 1999; Lebel et al., 2006; Walkerden, 2006; Armitage et al., 2008; Foxon et al., 2009; Huitema et al., 2009; Brunner, 2010; Hahn, 2011). Some scholars study and evaluate the concept more critically (e.g. McLain and Lee, 1996; Lee, 1999; Jiggins and Röling, 2000; Clark and Clarke, 2011). Others provide critiques that compare the concept to that of transition management (Smith et al., 2010; Voss and Bornemann, 2011).

In general, the literature on adaptive management follows two main themes: 1) issues related to learning-through-experimentation (e.g. Lee, 1993; Walters and Holling, 1990; Pulwarty and Melis, 2001, Plummer and Armitage, 2007; Armitage et al., 2008; Armitage et al., 2011); and 2) issues related to cooperation among the actors involved (e.g. Lee, 1999; Olsson et al., 2004a; Olsson et al., 2004b; Walkerden, 2006; Plummer and Armitage, 2007; Armitage et al., 2008; Clark and Clarke, 2011).

The present study primarily examines the capacity of iterative learning-through-experimentation and cooperation among the actors involved rather than that of polycentrism and flexibility. It does so in order to contrast it effectively with transition management and PES. Learning-through-experimentation is explored as a strategy for stakeholder groups that struggle with the complexities and uncertainties of their land-use system. Thus, the present study conforms more closely to the framing of adaptive management by Armitage

et al. (2008) than to that by Lee (1993; 1999) who emphasises that, from the outset, adaptive management has incorporated a strong dimension of negotiation and collaboration.

Cases featuring adaptive management are distinct from other initiatives in their inclusion of: learning-by-doing as a key process element; the development of new procedures; and the adaptation of practices in line with what is learned (Holling, 1978; Walters, 1986; Walters and Holling, 1990; Lee, 1993; Lee, 1999; Berkes et al., 2003; Olsson et al., 2004a; Armitage et al., 2008). The literature typically refers to the three empirical cases noted below; the first two as illustrations of a focus on the capacity to perform and learn from experiments, and the third as an example particularly of the emergence and key role of the configuration of local actors:

- Florida Everglades (USA), where adaptive management was prompted by declining populations of wading birds (Walters and Holling, 1990; Gunderson, 1999; Gentile et al., 2001; Roe and Van Eeten, 2002; Gunderson and Light, 2006; Gunderson et al., 2006; Lebel et al., 2006; Olsson et al., 2006);
- Columbia River Basin (USA and Canada), prompted by declining salmon populations and the construction of hydro-electro power dams (McLain and Lee, 1996; Pinkerton, 1999; Peterson, 2000; Roe and Van Eeten, 2002); and,
- Kristianstads Vattenrike (Sweden), prompted by the prospect of an abandoned wetland area (Olsson et al., 2004b; Gunderson et al., 2006; Hahn et al., 2006; Lebel et al., 2006; Olsson et al., 2006).

## **4.2 Orientation of Adaptive Management**

This section further examines adaptive management by specifically considering its orientation towards sustainable development and towards intervening and inducing change, and its relationship to the five selected criteria for evaluation of governance for sustainable development.

### *4.2.1 Orientation towards resilience, learning and cooperation*

#### **Resilience**

The discourse on adaptive management mainly proposes that the cause of sustainability problems lies in inadequate preparation for and response to uncertainties and complexities, which leads to the collapse of social-ecological systems (Gunderson, 2003). Adaptive management aims partly to prevent such collapse (Gunderson, 2003) and partly to increase a system's capacity to cope with and respond to change and to deal with uncertainties and complexities (Gunderson, 1999; Berkes et al., 2003; Gunderson, 2003; Folke, 2006;

Gunderson et al., 2006; Lebel et al., 2006; Walker et al., 2006; Plummer and Armitage, 2007). In this context, dealing with uncertainties and complexities typically means coping with unpredicted ecosystem responses to human interference (Folke, 2006).

The term ‘sustainable development’ is referred to as an objective of adaptive management by authors including Lee (1999) and Folke et al. (2002). More frequently, the term ‘sustainability’ is used to describe the objective (e.g. Lee, 1999; Berkes et al., 2003; Armitage et al., 2008; Clark and Clarke, 2011). ‘Enhancing resilience’ is often articulated as key to establishing the sustainable development of a social-ecological system (Gunderson, 1999; Gunderson, 2003; Folke, 2006; Gunderson et al., 2006; Lebel et al., 2006; Walker et al., 2006; Plummer and Armitage, 2007). While resilience may be enhanced incidentally through adaptive management, some researchers hold that increased resilience should be a direct aim of this mode of governance (Gunderson, 2003; Folke, 2006; Plummer and Armitage, 2007; Gunderson et al., 2006; Lebel et al., 2006; Walker et al., 2006).

The concepts of both resilience and sustainable development articulate the linkages between social and ecological systems, and entail the intention of preventing the collapse of a system. Resilience, however, focuses specifically on increasing a system’s capacity to cope with severe fluctuations or shocks. The emphasis of sustainable development, on the other hand, is seen as the fulfilment of the needs of human well-being, combined with the prevention of resource depletion and irreversible damage to ecosystems.

The orientation, then, of sustainable development is mainly towards increasing desired impacts (i.e. human well-being) while reducing undesired impacts (e.g. poverty and environmental destruction). Resilience is oriented towards enhancing the capacity of a social-ecological system to cope with changing circumstances in ways that facilitate the sustainable development of the system. The focus on resilience in the adaptive management discourse leads to an exploration of the complexities and uncertainties of relationships and interactions within the coupled social and ecological systems. Focusing in this way, the discourse has helped to advance conceptualisation of sustainable development.

According to several authors, a social-ecological system that has been diagnosed as vulnerable to collapse may eventually be transformed into a more resilient system (Gunderson, 1999; Folke et al., 2002; Olsson et al., 2004a; Berkes et al., 2003; Folke, 2006). The type of change envisioned involves iterative interventions. The complexity and scope of the process of change towards a more resilient and therefore sustainable situation differs from case to case, and may include non-linear phases (Gunderson, 1999; Folke et al., 2002; Olsson et al., 2004a; Berkes et al., 2003; Folke, 2006). Some scholars refer to this process as “navigating transitions” (Olsson et al., 2006; Olsson et al., 2008).

### **Learning-by-doing**

The use of pilot projects or experiments and flexibility are identified as key elements of learning-by-doing (Walters and Holling, 1990). The case of the Florida Everglades National

Park, for instance, included implementation of experimental, alternative – “more natural” – water-delivery plans in the 1980s. Since the 1940s, much of the natural habitat of this wetland area has been converted to agricultural land. The plans were tested for their effectiveness in halting the decline in the population of wading birds which resulted from the land-use change. When the test found unsuccessful results, the experiment was halted and no further implementation occurred (Walters and Holling, 1990; Gunderson and Light, 2006; Lebel et al., 2006).

Ideally, practices should be adaptable to include lessons learned and to changing circumstances, and long-term continuity should be ensured for facilities in order to pave the way for effective learning-through-experimentation and negotiation among scientists, policy-makers and practitioners (Lee, 1993; Lee, 1999; Pulwarty and Melis, 2001; Olsson et al., 2004a; Plummer and Armitage, 2007; Armitage et al., 2008; Armitage et al., 2011). To give an example, in the case of the Columbia River Basin, several long-term experiments were conducted in the fisheries sector, using three different models to examine alternative practices, experiments and management options. It was expected that results would be available only after many years (McLain and Lee, 1996). Therefore, McLain and Lee (1996) argued that a sufficient budget should be available for monitoring and evaluating long-term experiments and that the short-term appointments of the council members should not impede the required long-term planning horizons of the adaptive management process. Fifteen years later, a study showed that still more time was needed for findings on at least one issue (the appropriate fishing quota to establish a balance between catches and a healthy salmon population) (Paquet et al., 2011).

The focus in the discourse on management that experiments with the use of tools to facilitate learning has from the start included biophysical models and the implementation of a variety of management practices (Holling, 1978; Walters, 1986; Walters and Holling, 1990). More recent discourse on adaptive management elaborates that this form of governance involves the use of accessible and readily understandable tools (McLain and Lee, 1996; Jiggins and Röling, 2000; Henriksen and Barlebo, 2008). In the case of the Columbia River Basin, for example, a model used by a council to compute fishing quotas and locations for fishing passes was distrusted by tribal and fisheries groups whose members suspected that the model favoured the hydroelectric power companies affected. In response, the council opened the model-building process to input from stakeholders who could submit their comments on the model, and test and use it themselves. In addition, staff support was offered to those stakeholder groups who were unable to run the model. Nevertheless, the situation proved too complex for the model to compute an “optimum”, so it was instead used to identify alternatives and scenarios (McLain and Lee, 1996), serving as an example also of options and limitations that may arise when using models.

The appropriate scale for experimentation with management practices is debated. Findings show recommendations of both large spatial scale (Holling, 1978; Walters, 1986; Lee, 1993) and small spatial scale (Gunderson, 1999; Jiggins and Röling, 2000). Roe and

Van Eeten (2002) observed a trade-off between spatial scale and experimental design, where a large spatial scale is usually accompanied by a “low” (i.e. relatively unambitious) level of experimental design and a small spatial scale by a ‘high’ (i.e. ambitious) level. However, the available literature makes no explicit reference to options or suggestions for the scale or ambitiousness of experimental designs in relation to the biophysical and institutional complexity of their context. Huitema et al. (2009) propose that small-scale may be preferred to large-scale experiments due to high costs and risks that are likely to accompany the latter. They also articulate that further insight is needed into how the complications of experimentation in real-world settings should be handled.

### **Cooperation**

Ideally, the cooperative and mutual learning processes of adaptive management enable shared understanding and increased insight among policy-makers, scientists, practitioners and other local stakeholders (Lee, 1993; McLain and Lee, 1996; Lee, 1999). The discourse on adaptive-co-management finds that participation and collaboration are key to inducing change (Olsson et al., 2004a; Olsson et al., 2004b; Plummer and Armitage, 2007; Armitage et al., 2008). To enhance cooperation and knowledge exchange, several scholars emphasise local stakeholder participation (Lee, 1993; McLain and Lee, 1996; Jiggins and Röling, 2000; Olsson et al., 2004a; Olsson et al., 2004b).

Whereas adaptive management is seen as contributing to the development of shared understanding and local, participatory initiatives, conversely, a lack of shared understanding (McLain and Lee, 1996; Lee, 1999) and a lack of creative, decentralised opportunities and efforts to generate them have been indicated as aspects that hinder the establishment of adaptive management (Jiggins and Röling, 2000). The adaptive management literature makes little reference to understanding how the inclusion process occurs, or how to handle possible complications relating to participation and collaboration. Investigation is still needed, for example, into how to deal with situations where certain groups of actors find non-participatory strategies more attractive (cf. Huitema et al., 2009).

Corresponding to Lee’s (1993; 1999) earlier argument that the adaptive management process requires attention to negotiation, dispute resolution and decision making, more recent literature emphasises the need to study the ‘political dimension’ of adaptive management (Smith and Stirling, 2010; Voss and Bornemann, 2011). In this context, Smith and Stirling (2010) and Voss and Bornemann (2011) refer to the influence of the positions, power and agendas of the actors involved.

A few scholars investigate the relationship between adaptive management and conflicts. Some argue, for example, that adaptive management may contribute to the resolution of conflict. Disagreement and conflict in themselves may serve as a positive influence, eventually advancing the process by clarifying positions and interests (Lee, 1993). Hahn et al. (2006) found, for example, that an organisation which emerged during an adaptive management process was instrumental in bridging between conflicting parties, and

contributed to the resolution of conflicts over environmental issues. Walkerden (2006) finds that conflict resolution tends to succeed when it includes: early, frequent and on-going involvement of representatives and experts; genuinely substantive involvement; and consensual decision making. Arnold et al. (2012) found that leaders and facilitators in an adaptive management process may play a key role in contributing to conflict resolution by being open-minded in their own convictions and critical about the role of expert knowledge and by acknowledging the status and power of the actors involved.

On the other hand, Lee (1999) argues that a collaborative structure should be developed and conflicts resolved *before* the process of adaptive management starts: “adaptive management should be used only after disputing parties have agreed to an agenda of questions to be answered using the adaptive approach” (Lee, 1999, art. 23, no page number). Notably, the proposal to settle on the necessity or appropriateness of an adaptive management process before entering into it has received fairly little attention in the literature.

#### 4.2.2 *The set of evaluation criteria as addressed in the adaptive management literature*

This subsection looks at how the literature on adaptive management addresses the five selected criteria for evaluation of governance for sustainable development. In summary, the adaptive management literature research is relatively strong on aspects related to scale issues and to handling uncertainty, intermediate on aspects of democracy, and relatively weak on aspects of equity and legitimacy.

##### **Equity**

Given that adaptive management aims to enable a social-ecological system to continue for many generations, it inherently seeks to achieve fair distribution, and thus includes an equity component. However, equity is not addressed explicitly in the discourse, and most of the research on adaptive management does not treat it as a central issue. Exceptions include a study by Lee (1999) on ethical concerns, which particularly identifies the need to acknowledge and address conflicts between actors. Hatfield-Dodds (2006) indicates that it is important for stakeholders in a particular ecosystem area to share the financial burden.

##### **Democracy**

By contrast, the discourse addresses several aspects of participation, an aspect identified in the present study as signifying the criterion of democracy. Studies include, for example, increasing references (particularly in regard to adaptive co-management) to ‘citizen participation in decision making on sustainability issues’ (e.g. Lee, 1993; McLain and Lee, 1996; Jiggins and Röling, 2000; Olsson et al., 2004a; Olsson et al., 2004b). The main developers of the concept of adaptive management emphasise the collection of knowledge

about a social-ecological system from local groups rather than the participation specifically of vulnerable groups in making strategic choices or in goal setting (Smith and Stirling, 2010; Voss and Bornemann, 2011).

In terms of representation as one of the most relevant aspects signifying democracy, the adaptive management literature emphasises involvement of an array of interests including scientists, public officials, practitioners and other local stakeholders, and shows how this may contribute to unbiased decision making.

### **Legitimacy**

Despite the focus on representation and participation, the aspects of legitimacy included in this study – acceptance and accountability – are not central concepts in the literature on adaptive management. No explicit reference is made to the question of the extent to which decision makers are, or should be, able to justify and explain their decisions and actions. The question of how or to what extent the process of deciding who is responsible for the interventions is, or should be, made acceptable to the general public is similarly neglected.

### **Scale issues**

Strong consideration in the adaptive management literature is given to the handling of scale issues. This is seen in a focus on the suitability of the spatial and temporal scales of interventions. Typically, a long-term temporal scale is proposed (Lee, 1993; Pulwarty and Melis, 2001). Spatial boundaries are usually easily identifiable and considered to cover spatial scales from small to large. Some authors propose that adaptive management is appropriate at small spatial scales; others recommend its use at large spatial scales (Holling, 1987; Walters, 1986; Lee, 1993; Gunderson, 1999). The coupled nature of social and ecological systems as a key starting point for adaptive management (Berkes et al., 2003) leads to a strong focus on the bioregional scale (Huiteima et al., 2009), a level of scale that is typically large.

The question of dealing with higher and multiple institutional levels has been relatively less explicitly addressed, but arises particularly in discussion of the complexities seen in a bioregional context (Hahn et al., 2006). Some researchers argue that the need to align institutional scale and environmental issues in adaptive management calls for polycentric, flexible and responsive institutional settings with a high degree of diversity and redundancy (Folke et al., 2005; Olsson et al., 2006; Brunner, 2010). However, the alignment of issues and higher and multiple institutional levels in particular appears not yet to have been studied in relation to adaptive management (cf. Hahn et al., 2006). It would therefore be interesting to further investigate how adaptive management functions or could function in the linkage of local and higher or wider institutional levels, i.e. in the linking of the level of experimental management to the level of regional and/or national policy-making. Some exploration of this may be seen in the connection by some scholars of the

adaptive management concept to the multi-level elements of the transition management concept (e.g. Van der Brugge and Van Raak, 2007).

### **Uncertainty issues**

As discussed in Chapter 2, the handling of uncertainty issues serves as the fifth selected criterion for the evaluation of governance for sustainability and also as one of the starting points of the adaptive management concept. The literature is strong in addressing learning as the aspect of this criterion that is most relevant to this mode of governance. Scholars emphasise the importance of acknowledging and anticipating unknown interactions and responses in a social-ecological system (Gunderson and Light, 2006; Lebel et al., 2006; Cooney and Lang, 2007). The adaptive management literature typically includes discussion on knowledge management and social learning (McLain and Lee, 1996; Jiggins and Røling, 2000; Pahl-Wostl et al., 2007; Henriksen and Barlebo, 2008), where social learning refers to processes of developing shared understandings, meanings and practices within a social entity as a whole (McLain and Lee, 1996; Pahl-Wostl et al., 2007); the promotion of learning in policymaking processes (Huntjens et al., 2011); the use of local knowledge in decision making (Olsson and Folke, 2001; Klooster, 2002; Olsson et al., 2004a; Olsson et al., 2004b); and experimentation and learning (Johnson, 1999; Gunderson and Light, 2006; Foxon et al., 2009; Voss and Bornemann, 2011).

Here, it is important to note that Armitage et al. (2008) articulated that exchange of knowledge should not be advocated unconditionally, and that attention must be given to aspects such as: specificity of learning goals, approaches and outcomes; systematic evaluation in order to monitor and measure learning outcomes; capacity building; recognition of the role of risk; use of incentives to encourage learning; and power relations.

There may be issues involving uncertainties that cannot be understood or addressed through learning because they are too complex to comprehend or essentially disputed (e.g. in relation to climate change). It may be argued, though, that decisions on related issues should be taken in the short-term, in accordance with the precautionary principle (e.g. in the case of declining bee populations). In order to reduce vulnerability to unknown responses and impacts, the concept of adaptive management emphasises redundancy and variability in practices (Berkes et al., 2003), but it does not address how to take a learning-by-doing approach in a context of contested uncertainties and extreme complexities (cf. Lee, 1999; Meadowcroft, 2007).

### **4.3 Adaptive Management in Practice**

The following subsections analyse and evaluate adaptive management cases in the Dutch fen landscape in order to learn more about how the cases selected are oriented in practice

towards steering and sustainable development, and how they deal with the five criteria on governance for sustainable development. The four cases studied are briefly summarised. More information on these cases and an overview of those consulted and project documentation is provided in Appendix A.

In the cases of Polder Mastenbroek and Zegveld/Oud-Kamerik, the actors involved struggled with renewal of water table decrees, mainly due to challenges presented by conflicting claims on the water table from agricultural groups and nature conservation groups. Actors in Polder Mastenbroek and Zegveld/Oud-Kamerik applied innovative, participatory processes and experimental water table regimes to learn about the functioning of the water and soil systems, and to deal better with the sustainability challenges in their areas.

The initiatives taken by the actors involved in the case of Toekomst Amstelland were prompted by the vulnerability of the agricultural economy of that area and a demand for more recreational options from a nearby urban area. Initially, Toekomst Amstelland attempted to develop ambitious new landscape management concepts, applied a transparent and highly participatory process, and eventually narrowed management down to implementation of a selection of proposed measures.

In the case of Wormer- and Jisperwater, the actors involved struggled with deteriorating water-quality, relatively high slurry production and decomposition of the peat soil. Cooperation among the water board, the local nature conservation NGO, the province and the municipality has led to an adaptive learning process about water and soil management. Experimental management regimes are applied and evaluated to learn about flexible water tables, nutrient cycles and peat soil preservation. A few farmers participate in this learning process, although, in general, support for this project from farmer groups in the area was low. Local residential groups were active, and demanded that the water board prioritise dredging near their houses.

**Table 4.1: General information on the adaptive management cases studied**

	Main aim	Main actors involved	Duration (start-planned end date)	Plan making phase	Size of project area
<b>Polder Mastenbroek</b>	<ul style="list-style-type: none"> <li>- To update the water level decree;</li> <li>- and to learn more about suitable water tables to facilitate the different land-use functions in the area (different nature conservation uses, different agricultural uses).</li> </ul>	<ul style="list-style-type: none"> <li>- Water board (decision making actor);</li> <li>- an agricultural group and a nature conservation group (representing interests and affected by the implementation);</li> <li>- a consultancy assisted in identifying possible water table regimes and accompanying effects;</li> <li>- a consultancy experienced in agricultural issues supported the plan making phase and negotiated with the local farmers.</li> </ul>	2001 – not available	7 years	8350 ha
<b>Toekomst Amstelland</b>	<ul style="list-style-type: none"> <li>- Initially to develop new landscape management concepts, and to experiment with water tables and new types of land-use practice;</li> <li>- later the aim was adjusted to implementation of a set of selected measures.</li> </ul>	<ul style="list-style-type: none"> <li>- Six municipalities (decision making actors);</li> <li>- water board and province (sideways involved in plan making);</li> <li>- a range of local agricultural, residential and biodiversity conservation groups (representing interests and affected by the implementation);</li> <li>- a small consultancy supported and coordinated the plan making process.</li> </ul>	2002 – 2033	2 years	3500 ha
<b>Wormer- &amp; Jisperwater</b>	<ul style="list-style-type: none"> <li>- To realise a more sustainable water system, and to realise a reduction of peat decomposition and slurry production by improving the water quality;</li> <li>- and to learn about the relationship between fertilization, soil and water management in fen meadow areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Water board (decision making actor);</li> <li>- a nature conservation NGO, a municipality, the province, and a process coordinating consultancy (all involved in plan making);</li> <li>- residential group (representing interests and affected by the implementation);</li> <li>- a semi-academic consultancy involved in monitoring and evaluation.</li> </ul>	2000 – 2010 / 2015	6 years	2400 ha
<b>Zegveld/Oud-Kamerik</b>	<ul style="list-style-type: none"> <li>- To update the water level decree and to develop a new way to update the expired water-level decree;</li> <li>- and to enhance social support for an updated water table decree, and to create a more sustainable water system.</li> </ul>	<ul style="list-style-type: none"> <li>- Water board (decision making actor);</li> <li>- a consultancy assisted in developing and identifying possible water table regimes;</li> <li>- university-affiliated organisations advised on possible impacts on agricultural practices;</li> <li>- during the plan making stage, a consultant supported the process and negotiated with farmers and residents.</li> <li>- an agricultural group and a nature conservation NGO (representing interests and affected by the implementation).</li> </ul>	2003 – 2009 and beyond	3 years	2700 ha

#### *4.3.1 Experiences with sustainability in adaptive management*

The actors involved in all four selected cases initiated experimental practices to learn about possible approaches to organise the process as well as about possible ways to realise sustainability goals. They referred to their orientation towards sustainable development in relatively practical terms, and emphasised a shift from deep to moderate drainage as an important sustainability goal. They considered outdated water table decrees, conflicting claims on water- table management, soil subsidence and slurry production due to decomposition of the peat soil as causes of the sustainability problems. The formal renewal period for water table decrees is five to ten years; an expired decree usually leads to illegal drainage in an area. Actors in the selected cases did not propose causes using abstract terms, such as inadequate handling of uncertainties, complexities and vulnerability. Nevertheless, practical issues considered as causative involved aspects of landscape vulnerability and uncertainties, uncertain dynamics (in the dairy sector), and decision making complexity. Thus, the actors refer indirectly to such aspects.

In this way, although the actors did not use the academic concept of ‘resilience’, their focus on a general shift from deep drainage to moderate drainage indicates a practical concern to reduce the vulnerability of the fen landscape and to prepare it for changing circumstances. It demonstrates the aim of the actors involved to prepare this social-ecological system to cope with increased complexity of the water system due to soil subsidence, possible extremes in droughts and floods, and increasing and conflicting claims on the water table.

The four cases show actors applying different approaches and formulating different sustainability ambitions. Two of the cases studied illustrate adaptation in the form of a change in the sustainability goals, but in different directions. Toekomst Amstelland, adapted by adjusting sustainability aims to address effects instead of causes. Initially, land-use change was envisioned, but the plans evolved to making contributions to several practical sustainability aspects of the fen landscape, while excluding a measure to increase the level of the water table. The sense of urgency in the area may have given impetus to the initially envisaged land-use change, accelerating the plan making phase, which took (only) two years, and minimising conflicts. The adjustment of the initial aim appears to have been the result of several cumulative factors: lack of high level political support; lack of support from the local community; budgetary constraints; and possibly the planning procedure followed in the case.

The second example of a change in the central aim of governance arose in Wormer- and Jisperwater, and occurred in the opposite direction – from a focus on effects to moves to address causes. Here, the shift appears to have occurred as a result of learning from experimental water and soil management schemes conducted in the test areas in cooperation with a few local farmers, and which included measures aimed at reducing decomposition of the peat soil and slurry production.

All four cases contributed to a number of sustainability aspects of the Dutch fen landscape. However, none included major measures aimed at raising the water table. The favoured intervention to address water table management was reduction of illegal drainage, which in these cases did not entail a substantial increase in the water table level. In some locations covered by the cases, reduction of illegal drainage even meant formal acceptance of a lowering of the water table. In three of the cases studied (Polder Mastenbroek, Wormer- and Jisperwater, and Zegveld/Oud-Kamerik), the intention was to enhance the sustainability of the fen landscape, while maintaining the existing agro-economic framework of grassland farming. To facilitate grassland farming, the actors involved in the cases applied a water table allowed to reach the ‘highest’ possible level to maintain profitable grassland farming (e.g. a level approximately 50 cm below the soil surface). The resulting drainage regime contributes to the conservation of the cultural-historic landscape and species-rich fen meadows.

All four cases sought to enhance recreation through measures that would improve accessibility and water quality. Examples include facilitating canoe routes in Polder Mastenbroek and Toekomst Amstelland, providing information about accessibility in Toekomst Amstelland, and improving water quality for boating, fishing and swimming in Wormer- and Jisperveld. Measures to improve water-quality were not major, although Wormer- and Jisperwater included dredging. Some cases intervened by reducing ingress of what is referred to as ‘alien’ water in order to reduce decomposition of the peat soil. Management in Wormer- and Jisperwater actually maintains dairy farming, which is the major source of eutrophication. Although the actors involved in these cases intended to decrease the rate of soil decomposition and subsidence, in practice the issues of conservation of peat soil and species-rich fens were barely addressed. Toekomst Amstelland and Zegveld/Oud-Kamerik addressed flood protection by facilitating water storage in the event of calamity and by increasing seasonal water storage. For a detailed overview of these contributions to sustainability aspects see Appendix A.

In summary the selected adaptive management cases address socio-economic aspects of the sustainability challenge, such as conservation of the cultural-historic landscape, enhanced recreation options, and economic viability of land-use, to a greater degree than biophysical aspects such as water table levels, water-quality, and species diversity. Rather than prioritising the issues driving the pressure on the substrate of the Dutch fen landscape, the actors involved in adaptive management were oriented more towards compensating for the impacts of current practices.

#### 4.3.2 *Experiences with steering in adaptive management*

The following paragraphs give an account of experience with learning-through-experimentation and cooperation among actors involved in the four selected cases of adaptive management. For an overview of related information, see also Appendix A.

The emphasis of the four cases in application of learning-through-experimentation is again on socio-economic rather than biophysical aspects. A few practical issues, such as insufficient financial resources, were noted as obstacles to further implementation of experimental management by those consulted in all four cases. In the case of Zegveld/Oud-Kamerik, it was unclear who should bear the costs, whereas in Wormer- and Jisperwater, the local governmental bodies feared financial claims. Complexity and uncertainty hindering governmental action was considered another obstacle to experimental management in the case of Wormer- and Jisperwater. In some cases, complications arose in organisation of the experimental management. In the cases of Polder Mastebroek and Zegveld/Oud-Kamerik, for example, a delay due to the lengthy procedure for obtaining a legal permit meant that plans had to be revised. Conversely, in Wormer- and Jisperwater, changes were made to the local permit system in order to prevent further delay.

Generally, the cases arranged to evaluate and learn from their own process and experiments. Toekomst Amstelland was included in several larger programs and networks, such as the EU-funded programme ‘Sustainable & Accessible Urban Landscapes’ and the policy programme ‘Belvedere’, coordinated by the national government. However, overall, hardly any structured exchange of lessons learned occurred among the ongoing cases or with previous cases at the same location.

A notable adaptation based on experimental management was the cancelling of the measure to introduce a ‘flexible water table’ in Wormer- and Jisperwater. This measure was expected to cause reduction of soil subsidence, peat decomposition and slurry production. However, it was eventually cancelled because the results were considered disappointing. Those consulted about this case identified as a lesson learned that changes in fertilization affect peat-decomposition rates more strongly than a flexible water table. Subsequent adaptation in experimental management to use measures to lessen or switch fertilization did not occur in this case. This shows a result of a lack of adaptive capacity in that no automatic reorientation occurred to find ways to contribute to the goal when the flexible water table measure did not make such a contribution.

What issues were articulated by the groups involved, regarding experience with cooperation? Three types of issues can be observed: (1) conflicts, disagreements, and possible opposition of important actors; (2) complex institutional contexts; and (3) facilitation of the cooperative learning process. To facilitate the cooperative process, adaptations were made in two ways: a) to the negotiation process, which was split up by the water board for the whole area into separate processes for sub areas (Zegveld/Oud-

Kamerik); and b) to the consensus-building process, which a nature conservation NGO attempted to enhance by exploring options with farmers outside the case and without involvement of the water board (Wormer- and Jisperwater).

The cases of Polder Mastenbroek and Zegveld/Oud-Kamerik saw public support for the intended interventions, but those consulted on the cases reported that conflicts also arose. In particular, several stakeholders contested the adjustment of water tables as an intervention crucial to sustainable land-use. In these cases, conflicts occurred about water management in the buffer zone between an agricultural area and a nature conservation area. In the case of Wormer- and Jisperwater, a disagreement arose between the project group and the agricultural interest group; although a few farmers participated in the experimental management, the agricultural groups generally offered no support. In this case, support from groups of residents was at first limited, and the water board and the residents disagreed over the priority of dredging. This disagreement was resolved as soon as dredging near the residents' houses received priority. In the case of Toekomst Amstelland, the intended interventions received public support, and no conflicts were reported by those consulted.

Irreconcilable views on management of the buffer-zone between the nature conservation and agricultural areas were noted as challenging and possibly obstructive in the cases of Polder Mastenbroek and Zegveld/Oud-Kamerik. The interaction with agricultural groups was also reported as challenging because it entailed dealing with a strong agricultural lobby that was expected to block implementation (Polder Mastenbroek, Zegveld/Oud-Kamerik). Tackling uncertainty over the cooperation of farmers with management experiments was viewed in the same way (Wormer- and Jisperwater). Although external process expertise was highly valued in dealing with conflict situations in three of the cases studied (Polder Mastenbroek, Wormer- and Jisperwater, Zegveld/Oud-Kamerik), there was no guarantee that it would be incorporated in future cases.

In all four cases, the actors consulted identified difficult issues concerning the capacity to deal with complex institutional contexts. These included: diffuse responsibilities for sustainable water management and the allocation of land-use function between provinces and water boards (Wormer- and Jisperwater, Zegveld/Oud-Kamerik); unclear priority of sometimes incompatible EU policies such as the Water Framework Directive and the Bird and Habitat Directive (Wormer- and Jisperwater, Zegveld/Oud-Kamerik); the withdrawal of required permits (Polder Mastenbroek, Wormer- and Jisperwater, Zegveld/Oud-Kamerik); and a lack of administrative support by public boards designated in the future (Toekomst Amstelland).

The issues that surfaced concerning cooperation in the learning process relate mainly to participation and leadership. In two of the cases, the former were articulated by those consulted as a need for earlier and closer involvement of local stakeholders (Polder Mastenbroek) and as the possibility that a highly participatory process might lead to a feasible project plan (Toekomst Amstelland).

In all four cases, those consulted identified various lessons learned about seeking the most appropriate form of leadership. The leading role was assigned to different institutions, and could be switched over time, while a balance was established between central leadership and participatory processes. Actors in the case of Zegveld/Oud-Kamerik, for example, learned that the greater the experience of a project team, the better it is equipped to handle complex problems. In Wormer- and Jisperwater, leadership lay initially in the hands of a nature conservation NGO, then switched to the water board, and then again to joint project management by the municipality, the water board, the province, and the nature conservation NGO. Although joint management was co-initiated by the water board, it eventually considered more central leadership to be more efficient. The process for determining the organisation of leadership in adaptive practices shows that it can be approached in different ways, and does not have to be associated with any particular form, whether orientated more toward a more centralised or more participatory style.

#### *4.3.3 Adaptive management experiences with the set of evaluation criteria*

##### **Equity**

Findings from the present study show that equity (i.e. fair distribution and striving for unbiased decision making) and legitimacy (i.e. accountability and acceptance) were not explicitly addressed as criteria to be taken into consideration by the leading actors. None of the leading actors in the four cases studied strove to base their decisions on an equitable distribution of impacts, or explicitly considered or publicly discussed compensation for possibly disadvantaged groups. Although consensus-building among the actively involved parties was typically addressed in all four cases, three (Polder Mastenbroek, Wormer- and Jisperwater and Zegveld/Oud-Kamerik) involved no development of general public acceptance of the applied and scheduled interventions. At the same time, conflicts about equitable distribution of an intervention's negative impacts – i.e. the issue of whether farmers in the Dutch fen landscape should bear the brunt of production loss due to raised water table levels or if nature conservationists should bear the brunt of habitat loss due to low water table levels – tended to limit the scope of the adaptive management practices studied.

##### **Democracy**

Elements of participation, as an aspect of the evaluation criterion of democracy, were specifically addressed by decision making actors in the cases studied. One case (Toekomst Amstelland) enabled a transparent design process with a high degree of non-state stakeholder input; the other three (Polder Mastenbroek, Wormer- and Jisperwater, Zegveld/Oud-Kamerik) included some stakeholder input and joint decision making.

Overall, all four cases included input from multiple stakeholder groups and some degree of joint decision making.

The notion of adopting a cooperative learning-by-doing approach as a way to achieve representation of interests, also part of the criterion of democracy, when making decisions related to societal goals was not articulated by the actors involved. The intention of the coordinating and leading parties to include participation of non-governmental groups was in fact mainly based on the underlying idea that development of shared knowledge through experimentation (on water and peat soil management in relation to land-use practices) would help to reduce resistance and conflicts, and would increase support and willingness for adaptation of land-use practices.

As could be expected, inclusion of non-state actor participation in design and decision making did not mean that no issues and struggles were encountered in the implementation stage. Indeed, the actors consulted identified several issues and challenges relating to such participation, including a strong agricultural lobby that was able to obstruct the implementation process (in the cases of Polder Mastebroek and Zegveld/Oud-Kamerik), and uncertainty over whether farmers would cooperate in the field experiments (in the case of Wormer- and Jisperwater). The experiences in practice show that non-state actor participation in the design and decision making stage does not necessarily result in the subsequent development by leading (typically state) actors of solutions or ways of dealing with challenges of non-state actor participation in the implementation stage.

### **Legitimacy**

The actors involved reported various complicated issues in the decision making context, such as: diffuse responsibilities for sustainable water management and land-use allocation between provinces and water boards; unclear priority of EU policies; the withdrawal of required permits; and a lack of support by boards designated to take over administration. Though, the decision making actors in these three cases did not indicate how to deal specifically with the encountered issues, and also did not formally prepare to explain and justify decisions to a wider audience.

In general, the actors consulted about Polder Mastebroek, Toekomst Amstelland and Zegveld/Oud-Kamerik emphasised the necessity of an experienced team and professional process guidance to be able to deal with uncertainties and complexities in the decision making process. Some of those consulted about the cases of Wormer- and Jisperwater and Zegveld/Oud-Kamerik proposed that accountability of the decision makers could be increased by reducing administrative uncertainties, increasing more effective governmental coordination and ensuring a clear division of responsibilities.

### **Scale issues**

In terms of the criterion handling of scale issues, the actors involved in the adaptive management cases studied based the spatial scale of their interventions on the existing

biophysical and cultural-historic boundaries of the area or clustered sub-areas, corresponding in some degree to a 'regional identity'. The possible mid-term (i.e. approximately 15 years) and long-term (i.e. longer than 25 years) effects of land-use practices contributed to initiation of the cases studied. Actors involved in initiation had concerns, for example, about the economic viability of the land-use and about peat soil subsidence. Monitoring and evaluation of the planned measures was expected to occur mid-term, although the possibility of changing budgetary constraints and policy priorities meant that this could not be guaranteed.

The four cases studied included experimental practices that did not necessarily entail changing existing land-use practices, and in that sense, were not far-reaching. To experiment beyond the scope of existing practices – i.e. to experiment with land-use types in the areas in question – would have required involvement of higher governmental bodies and cooperation of local groups at a larger institutional scale than those directly involved in the case locations. The present study found that the cases studied lacked the capacity to deal with such wider-scale institutional contexts and therefore could not fully address related issues.

### **Uncertainty issues**

Actors in the cases studied did not address the fifth evaluation criterion of handling uncertainties in terms of explicitly acknowledging variability in biophysical and socio-economic processes. Analysis shows, however, that uncertainties in terms of lack of knowledge were addressed implicitly by facilitating lesson-learning from management of the biophysical system and from the implementation process. Three cases (Polder Mastenbroek, Wormer- and Jisperwater, Zegveld/Oud-Kamerik) included experimentation in management interventions in the field, with varying extents of lesson-learning (e.g. on water table management and the relationship between fertilisation and peat decomposition). The actors involved in the fourth case (Toekomst Amstelland) intended to include experimental management relating to water tables and peat soil preservation, but had to adjust that intention during the process; this appears to be as a result of the cumulative effects of high-level political and local social pressure, budgetary constraints and the planning procedure applied in this initiative. Although the cases studied included local civic knowledge in designing the intervention scheme, none did so explicitly in subsequent decision making. And, although monitoring, evaluating, lesson-learning and exchanging lessons-learned were facilitated in the implementation phases of the cases studied, learning was not explicitly promoted during and about the design and decision making process.

#### 4.4 Discussion of an Adaptive Course

What do the above empirical findings on adaptive management cases in the Dutch fen landscape reveal about adaptive management as a mode of governance for sustainable development? The cases showed a limited scope for experimentation with water tables and land-use practices due to disagreements among the actors about priorities for water management and due to procedural and technical complications. Land-user conflicts of interest regarding distribution of impacts also tended to impede the process. The actors emphasised that more professional mediation and process guidance and greater knowledge of negotiation approaches (than was applied in the cases studied) are expected to be helpful to clarify such conflicts (cf. Hatfield-Dodds, 2006; Walkerden, 2006; Voss and Bornemann, 2011).

In general, how to strive for a fair distribution of impacts among actors, and how to deal with various actor positions and power relations when doing so, is not discussed in the adaptive management literature. However, several scholars also indicate the importance of process guidance (e.g. Lee, 1999; Walkerden, 2006; Arnold et al., 2012) and observe that this is scarcely addressed in the literature (Lee, 1999; Arnold et al., 2012). The present findings indicate it may be worthwhile to study further the role of process guidance, mediation and negotiation approaches in addressing a fair distribution of impacts.

Uncertainty was reported in the cases studied about whether some of the actors involved would continue to cooperate. A focus on consensus-building among only a selection of affected parties and exclusion in the decision making process of those groups expected to stop cooperating may make decisions more acceptable to those who were involved in the process, but reduce acceptability for those groups affected but not involved (cf. Meadowcroft, 2002; Cooney and Lang, 2007). Further research into why and how actors involved in adaptive management deal with the aspects of striving for unbiased decision making and fair distribution of impacts could provide greater insight into how the criteria of equity, democracy and legitimacy could be better related to the concept of adaptive management; research might also show whether an aim to satisfy these criteria could facilitate adaptive management as a mode of governance for sustainable development.

The emphasis placed by the groups involved in the Dutch fen landscape on decision makers' experience and the inclusion of professional process guidance in order to be able to deal with the uncertainties and complexities encountered is in line with Lee's (1999) and Meadowcroft's (2002) point that actors need to be particularly attentive to decision making when it concerns uncertainty issues and normative goals. The struggles between groups involved in the situation in the Dutch fen landscape partly resemble those in the Florida Everglades, where water management conflicts of interest between agricultural and nature conservation groups strongly influenced the adaptive management

process, and where decision making on the intended adaptive management plans was disputed (Lebel et al., 2006).

The cases studied showed that when other factors such as conflicting interests and the scope of experimentation are more prominent in driving a sustainability challenge than a lack of knowledge about the social-ecological systems, then a learning-by-doing-based approach may be limited in its potential to influence the sustainability challenge. Thus, in the Dutch fen landscape, clarity on how to deal with the institutional complexity and conflicting interests may assist adaptive management in moving toward sustainable development better than enhanced quantitative and detailed knowledge about the functioning of the social-ecological system. This finding is in line with the proposal for further study of the political dimension of adaptive management (Smith and Stirling, 2010; Voss and Bornemann, 2011). The present research adds to these findings that more explicit attention to and a better understanding of equity, democracy and legitimacy are expected to be helpful in addressing the political dimension in adaptive management.

The cases studied show that small scale experiments appear more likely to be implemented and evaluated. Findings from the cases can be interpreted as an indication that an intensively exploited and biophysically and institutionally complex social-ecological system presents opportunities only for small-scale and relatively unambitious experimentation. This supports the association noted above of large spatial scale with low experimental ambition and vice versa (Roe and Van Eeten, 2002), and suggests, too, that complexity of context also appears to reduce the possibility of highly ambitious experimental design and redundancy of experiments. This observation is notable given that the adaptive management literature proposes that complex social-ecological systems are expected to benefit especially from learning-through-experimentation (Gunderson, 1999; Berkes et al., 2003; Gunderson, 2003; Folke, 2006; Gunderson et al., 2006; Lebel et al., 2006; Walker et al., 2006; Plummer and Armitage, 2007).

The existence of several adaptive management cases in the Dutch fen landscape may nevertheless offer potential for learning as part of the management of such a landscape. Cases could benefit from a learning facility that collects and systemizes experiences, and enables the active exchange of lessons learned (cf. Plummer and Armitage, 2007). However, as an exchange of lessons learned was not yet taking place in the setting studied, and insight from experiences with other practices was not expressed as needed by the actors consulted, it is speculative whether actors involved would actually use such a facility. Lee (1999) likewise warns that creating and maintaining the structural storage of findings from monitoring and lessons learned requires not only social stability and long-term funding, but also the curiosity of future groups. The present findings suggest that further research is needed to understand under which conditions such a facility for the exchange of lessons learned would be possible and workable and when it would not (cf. Armitage et al. 2008; Armitage et al., 2011).

Societal and political support for an open Dutch fen-meadow landscape could lead to continuing dependence on grassland farming practices (Van der Ploeg, 2002). Current grassland farming practices have set conditions for water table management. The continuation of these practices limits the range of possibilities for experimental water table management. Continuation of nature conservation practices that entail a specific water table management also produces constraints. The multifunctionality of fen landscapes, then, makes it far from straightforward for management to include an experimental change in land-use practices. This tendency for the dominant land-use types to limit the range of experimentation makes the setting comparable with that of the Florida Everglades (Walters and Holling, 1990, Gunderson and Light, 2006; Lebel et al., 2006).

The present study shows, then, that the biophysical constraints of land-use practices, conflicting stakeholder interests and spatial claims, existing power structures oriented towards continuation of current practices and a complex institutional structure each limit the range of experimentation. Such limitation is in line with the observation by Huitema et al. (2009) that problems can be expected with adaptive management in a real-world context.

Because the range of possibilities for experimentation is so limited in settings such as the Dutch fen landscape, the contribution of adaptive management to sustainable development may be similarly limited. With enhanced capacity to increase the experimentation range, adaptive management might be better able to address sustainability issues in multifunctional fen landscapes and similarly constrained settings. In addition, a more fundamental unravelling of the position or function of experimentation in a situation involving multiple stakeholders, multiple levels and complex biophysical and socio-economic issues may yield greater insight into the capacity of adaptive management to contribute to sustainable development in such contexts (cf. Huitema et al., 2009).

Attempts so far to shift in settings like the Florida Everglades and the Dutch fen landscape have appeared to stagnate due to accumulated institutional and biophysical issues. Observations from the present study imply that the change from common to adaptive practices may require advantageous circumstances, such as a relinquishment of resentment over past actions, consensus on the need for an experimental strategy together with acknowledgement of the political dimension and conflicting interests, and the biophysical and technical possibility of implementation of the desired experimental practices. This aligns strongly with Lee's (1999) observation that adaptive management "is difficult to initiate and to sustain" (art. 3, no page number), and that it should only be applied after a collaborative structure among the involved groups has been established.

## Chapter 5                      Transition Management

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### 5.1            Navigating by Transformation

The concept of transition management originated in academic thinking about the dynamics of technology development and how these could be influenced. To understand such dynamics and also obstacles to more sustainable technologies, an ‘evolutionary perspective’ was introduced (Kemp and Soete, 1992). The evolutionary perspective made it possible to identify spaces – referred to as ‘niches’ – that function as learning environments for new, more sustainable technologies and to ‘regimes’ that determine the process whereby such new technologies are selected.

In the context of studying transitions, the concept of a regime refers to a configuration or context of rules, policies, established actors and activities that have a dominant influence on societal processes (cf. Smith et al., 2005). In niches, new developments may start and then spread, influencing and transforming the regimes within the ‘socio-technological system’ in which they exist. Here, a socio-technological system is understood to be a set of arrangements providing technology-based functions for humans, whereby societal and technological dynamics are linked, and the arrangements are distinguishable from other types of exterior relations (cf. Smith and Stirling, 2010; Voss and Bornemann, 2011). In the literature on transition management, a transition is understood as a transformation process that unfolds gradually but eventually leads to a radical shift from a socio-technological system that is unsustainable (e.g. fossil fuel based) to one that is more sustainable (e.g. renewable-energy based) (Kemp, 1994).

After the introduction of an evolutionary perspective, other perspectives and concepts were borrowed from ecosystem and biological fields of study, such as population dynamics (Rotmans et al., 2001) and complex systems (Kemp et al., 2007; Rotmans and Loorbach, 2009; Grin et al., 2010).

A key notion was introduced assuming that the development of new, more sustainable technologies can be activated and stimulated, a process understood as niche management (Kemp, 1994; Kemp et al., 1998). As in the concept of adaptive management, learning and experimentation play an important role in thinking about inducing change (Smith and Stirling, 2010; Voss and Bornemann, 2011). According to Kemp et al. (1998), strategic niche management is intended to stimulate the creation and development of new promising technologies through experimentation, to build knowledge about the desirability of the new technology and to enhance its further development and implementation.

Strategic niche management was expected eventually to lead to shifts in the regimes that influence and determine the development of new technologies. The concepts of influencing and even managing technological innovation processes were used as input to develop the concept of management of transitions.

Various scholars have developed a concept of transition management that involves the navigation of fundamental change processes towards sustainable development in societal systems (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Loorbach, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). Underlying their conceptualisation is the focus on drastic renewal of institutional structures in society, with a relatively important role for the state and a group of frontrunners (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). Transition management is seen by many scholars as entailing the coordination of system innovations and development of visions or scenarios through multiple rounds of learning and experimentation in order to achieve fundamental shifts towards more sustainable development in, for example, energy use, agriculture and water management (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Loorbach, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010).

Rotmans et al. (2001) introduced a specific terminology and classification of phenomena related to transition management, including the level of 'landscape' as additional to the levels of niche and regime. This is regarded as a 'macro-level' that consists of aspects such as material infrastructure, political culture, social values and worldviews, macro-economy, demography and global environmental issues. Niches are seen to exist at the 'micro-level' of individual actors and technologies and local practices. Variations and 'deviations from the status quo' are expected to take place at this level. Regimes are regarded as occupying the 'meso-level', which takes in the dominant rules, practices and beliefs that guide private actions and public policy. Rotmans et al. (2001) also introduced 'dynamic equilibrium' as another element of transition management and its core theme of transformation; this is a type of system state that has the potential to shift to another state where such shifts occur in phases according to a certain pattern. The term 'dynamic equilibrium' appears to have been borrowed from ecosystem science, though the literature on transition management does not state this explicitly.

Transitions are mostly studied and understood in the context of transformation of a sector, industry or technology (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). The literature highlights several historical examples of transitions, such as from animal-driven to motor-driven vehicles and from wind to steam energy— although without consistent regard to sustainability in terms of consequences such as pollution and climate change, nor

to the prevention of environmental crisis. Demographic shifts within a population are also seen as transitions (Rotmans et al., 2002; Foxon et al., 2009). Identified as a prime example of transition management is the change in the Netherlands in the 1960s from coal to gas as the main fuel supply of its energy system (Rotmans et al., 2001). Use of this example to introduce a prescriptive model for such management marked an important step in developing the concept of transition management (Rotmans et al., 2001). The modernisation of Dutch agriculture – i.e. intensifying production through economies of scale, artificial fertilizers and technological innovations – has subsequently been framed as an example of a coordinated transition, further grounding the concept of transition management (Grin et al., 2010).

Since its introduction, the concept of transition management has been explored in the context of several socio-technological systems. Attempts have been made to apply the concept in practice, for example, in the field of Dutch public policy-making in sectors such as waste management (Kemp et al., 2007), sustainable energy (Kemp and Martens, 2007; Smith and Kern, 2009), transport (Avelino, 2009) and health care (Loorbach and Rotmans, 2010). Elsewhere in Northwestern Europe, the concept has been incorporated in policy-making in sectors such as waste and resource management in Belgium (Loorbach and Rotmans, 2010) and sustainable technologies in the UK (Shove and Walker, 2007). Other examples of transition management include the integration of CO<sub>2</sub> reduction in urban planning processes in several European cities (Frantzeskati et al., 2011) and the transformation in the southernmost province of the Netherlands of the former mining area that came to be known as Parkstad Limburg (Van Buuren and Loorbach, 2009; Loorbach and Rotmans, 2010; Grin et al., 2010).

In the latter case, the area's formal governmental organisation, economic sectors and spatial organisation were restructured (Van Buuren and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). Since the mine closure of the 1970s, the area had been declining in economic viability and population density. In 1998, eight municipalities – which, reportedly, had been previously uncooperative towards each other – started to share their problem definitions and to develop visions for the area. This move by the municipalities resulted in their participating in a 'transition arena' in the period 2001-2004, where innovation-oriented participants developed a shared understanding of a problem, a vision and a 'transition agenda' (Van Buuren and Loorbach, 2009). Eventually, the supra-municipal body known as Parkstad Limburg was created, and a joint policy programme developed to revitalise the area with attention to economic development, spatial planning, green space, health care, housing, education and tourism (Van Buuren and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010).

Due to the stagnation of the mining industry as the main sector of the area, the transition in Parkstad Limburg was not focused on transforming only one specific sector. Instead it aimed to transform multiple interconnected activities in the area. In this way, the case illustrates a focus of this type of transformation on geographical scale, a focus that is

not yet reflected in the literature. Smith et al. (2010) argued that the geographic and spatial aspects of transitions provide a key research challenge. They proposed that it is necessary to understand how transitions work in settings with specific spatial boundaries and how to address possible specificities in local circumstances (Smith et al., 2010). In accordance with the research agenda proposed by Smith et al. (2010), this chapter analyses the conceptualization of transition management in relation to transformations in specific geographical areas, thus tying the concept to a spatial dimension.

The present study examines practical experience in three cases of area-based transformation in the Dutch fen landscape. Here, an area-based transformation is understood as an initiative intended to enhance sustainable development in an area where the land-uses – such as nature conservation, agriculture, housing and recreation – are closely interconnected. The transformations are aimed at re-ordering and redistributing the existing spatial configuration of land-uses in order to create new starting conditions for a sustainable multifunctional landscape. As such, the transformations are not based on regulation or adjustments of existing land-uses, but on explicitly integral and major change.

## **5.2 Orientation of Transition Management**

The introduction of the concept of transition management prompted many reflections and critical comments in the literature. The discourse features a discussion between, on the one hand, those scholars who can be regarded as the developers and proponents of the concept (e.g. Rotmans et al., 2001; Kemp and Martens, 2007; Kemp et al., 2007; Van der Brugge and Van Raak, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010) and, on the other hand, those who can be seen as its critics (e.g. Shove and Walker, 2007; Dewulf et al., 2009; Hendriks, 2009; Meadowcroft, 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). (For informative critical discussion of the concept, see Shove and Walker (2007), Rotmans and Kemp (2008) and Shove and Walker (2008).)

The following subsections analyse the literature on transition management in terms of how it is oriented towards sustainable development and steering and how it addresses the set of five criteria on governance for sustainable development. The extent of the discussion of several of the five criteria for evaluation of such governance stands out in the transition management literature. It is argued, for example, that it is necessary to identify clearly who the actual decision makers are or should be in a transition management process in order to hold them accountable (Shove and Walker, 2007; Hendriks, 2009; Voss et al., 2009; Smith and Stirling, 2010). Issues relating particularly to democracy and legitimacy in transition management have also received considerable attention in the literature as explained below (in Section 5.2.2) (Smith et al., 2005; Shove and Walker, 2007; Avelino, 2009; Hendriks,

2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011).

### *5.2.1 Orientation towards transformation and steered experiments*

#### **Goal orientation**

The transition management discourse articulates the essential cause of sustainability problems as an inadequate use of technology and innovation and insufficient adaptation of a system's structure – especially to the depletion of resources and to the availability of new resources, both of which can cause a crisis in a socio-technological system (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010).

Kemp and Martens (2007) describe sustainable development as a subjective and indefinable concept. Hence, they regard participation and consultation of local groups as necessary for the formulation of sustainability goals (Kemp and Martens, 2007). Grin et al. (2010) regard sustainable development in relation to transition management as an open-ended orientation towards change. Mainly, however, sustainable development is conceptualised as the creation of new conditions in order to prevent environmental crisis in a system and to enable it to shift to another state (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010). Transition management is seen as aiming to alter the entire state of a socio-technological system in order to prevent collapse (i.e. a sudden and complete breakdown of a social-ecological structure) and to enhance sustainable development. The transition management literature does not explicitly define practical, concrete aspects of sustainable development; it appears that these are understood to be common knowledge or self-evident.

#### **Orientation toward steering**

In general, stimulating or steering changes or shifts in 'regimes' is seen as the most important process in transition management (Kemp and Soete, 1992; Kemp, 1994; Kemp et al., 1998; Rotmans et al., 2001; Smith et al., 2005). Transition management promotes a fundamental shift at large scale and focuses on a fundamental change process in order to achieve structural changes to the socio-technological system (Rotmans et al., 2001; Rotmans and Loorbach, 2009; Grin et al., 2010). Grin et al. (2010), for example, postulate that persistent problems are related to what they refer to as the 'value-system' and that such problems can only be solved by radically transforming that system. The creation of transition objectives and visions is regarded as central to the steering process (Rotmans et al., 2001; Kemp and Martens, 2007; Loorbach and Rotmans, 2010). Transition management is based, then, on the assumption that it is possible to prevent environmental crisis by managing or accelerating societal processes in the direction of preferred pathways (Grin et

al., 2010), and that policy-makers and other stakeholders can steer the functioning in related niches in order to stimulate innovations that can induce large-scale fundamental societal change towards an envisioned goal (Rotmans et al., 2001).

Transition management is expected to go through cycles comprising steps or stages that may take place in sequence, in parallel or in random order (Rotmans and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010). In terms, however, of transition itself in a socio-technological system from one kind of ‘dynamic equilibrium’ to another, this is understood to take place in four different phases: ‘predevelopment’, ‘take-off’, ‘breakthrough’ and ‘stabilisation’ (Rotmans et al., 2001). Rotmans et al. (2001) explain dynamic equilibrium as a situation with a certain balance but “no status quo, because a lot is changing under the surface” (p. 17). The transition takes place through developments in long-term ‘stocks’ or undercurrents and short-term ‘flows’ or relatively quick changes (Rotmans et al., 2001). The fundamental change of the system’s state as envisioned in the transition management literature results from what is referred to as ‘gradual radical change’, which eventually leads to a drastic, but iterative alteration (Rotmans et al., 2001; Grin et al., 2010). However, the transition management literature does not clarify when a transition process is finished and the stabilisation of a more sustainable state has been achieved, nor how a shift to an undesired state is to be understood.

Governments are seen as playing a central role in initiating, coordinating and stimulating the intended steps and stages of transition management (Rotmans et al., 2001; Kemp et al., 2007; Loorbach and Rotmans, 2010). However, as this governmental role is not further elaborated in the concept of transition management, several aspects remain unclear, including how to handle government actors who have interests counter to the desired transition or who have no interest in performing experiments and stimulating creative platforms; and how a government actor who is a regime member – typically oriented towards maintaining a status quo rather than facilitating change – can steer an innovative change process that is full of uncertainties towards a state that is fundamentally different from a present state.

Some authors have also identified the relevance of ‘transition arenas’ (see 5.1). Further articulated, though not as a key process element, is that public support for the transition process facilitates its realisation, and can be created through participatory decision making, education and inclusion of techniques and practices that are developed bottom-up (Rotmans et al., 2001; Kemp and Martens, 2007).

In the transition management discourse, the unit of analysis and intervention is a socio-technological system, with an emphasis on a technology or sector (Rotmans et al., 2001; Foxon et al., 2009; Grin et al., 2010; Loorbach and Rotmans, 2010; Smith and Stirling, 2010; Voss and Bornemann, 2011). The spatial or geographical scale of a socio-technological system is rarely articulated in the transition management literature (Foxon et al., 2009; Smith et al., 2010). Parkstad Limburg, described in Section 5.1 above, stands out

as a clear case of the transition management of an area where the spatial and geographical dimensions are expressed as key (Van Buuren and Loorbach, 2009; Grin et al., 2010; Loorbach and Rotmans, 2010).

The literature includes few critical reflections on the crucial underlying assumption that transitions are a priori *manageable*. Examples are those of Shove and Walker (2007), Dewulf et al. (2009), Meadowcroft (2009) and Voss and Bornemann (2011). Dewulf et al. (2009) argue that, in practice, discussions and decisions about sustainability issues occur in numerous venues and contexts where transition management cannot be isolated from daily policy-making, and can hardly be considered the only avenue towards sustainable development.

### **Experimentation and learning**

Transition management focuses on the development and implementation of new methods and technologies developed through transition experiments. The importance of learning and experimentation as an element of transition management is agreed by several scholars (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010). Experiments are likely to take place at niche level, and are performed in order to learn about options for implementing the envisaged sustainability goals and identified pathways (Kemp et al., 2007; Rotmans and Loorbach, 2009; Grin et al., 2010). Stimulation and facilitation of developments at niche level – what is referred to as ‘empowerment’ – is considered essential to transition management (Rotmans and Loorbach, 2009; Grin et al., 2010).

It is postulated that monitoring, evaluation and learning occur in interim rounds. Evaluation is made by the participants in the transition process of the objectives, of the transition process itself and of what has been learned from the transition experiments (Rotmans et al., 2001; Kemp et al., 2007; Grin et al., 2010). The transition management concept includes scaling up from niche to regime level experiments that have proven to be ‘suitable’ or ‘successful’ (Rotmans et al., 2001; Grin et al., 2010). Although it is emphasised that elements of learning and experimentation occur at niche level, it remains unclear at which level(s) (i.e. niche, regime, landscape) the elements of envisioning or pathway development should occur.

Some scholars advocate that transition management should include several – preferably many – alternatives, pathways or scenarios orientated towards the developed visions and objectives. The transition objective and visions are not seen as the realisation of quantitative levels or standards, but as the sketching of ambitions that can be re-evaluated and adjusted. The visions are long-term, should be inspiring as well as realistic and should guide short-term objectives (Rotmans et al., 2001; Kemp and Martens, 2007; Loorbach and Rotmans, 2010).

Many scholars argue that the element of learning and experimentation should be further studied and specified (Van de Kerkhof and Wieczorek, 2005; Meijer et al., 2007;

Shove and Walker, 2007; Foxon and et al., 2009; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011). They propose mainly that clarity is needed about: indicators for monitoring experiments; the frequency of selection from experiments; identification of early signs of fruitful and unfruitful trajectories; and the extent to which selection criteria for evaluation of the experiments should be grounded in the debate on sustainable development (Shove and Walker, 2007; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011). It is also argued that experimental diversity should receive greater attention as a factor regarded as advantageous to an envisaged evolutionary selection process (Foxon et al., 2009).

Some authors emphasise that special attention should be given to decision making on experiments and in the learning process (Van de Kerkhof and Wieczorek, 2005; Shove and Walker, 2007; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011). The dual ambition of transition management – to be creative and innovative as well as focused on directed long-term planning – raises questions: a) how and by whom a transformation process explicitly based on creativity and experimentation should be organised; and b) how experimenters are to determine which experiments to design and perform, and which to continue or abandon. Therefore, some scholars advocate greater attention to normative and political aspects of organising the process of learning and experimentation and to the selection of experiments and pathways (Van de Kerkhof and Wieczorek, 2005; Shove and Walker, 2007; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011).

### **In between planning and incrementalism?**

Stepwise learning towards fundamental change, learning in niches and transition experiments are seen by some scholars as key process elements of transition management (Rotmans et al., 2001; Kemp et al., 2007; Rotmans and Loorbach, 2009; Loorbach and Rotmans, 2010). Kemp et al. (2007) propose that transition management offers a trajectory towards long-term sustainability objectives based on: incremental steps of change; ‘laboratories’ for the development of new options and solutions; and markets and network management. Kemp et al. (2007) argue further that transition management provides an avenue between ‘incrementalism’ and ‘planning’. In their view, ‘incrementalism’ as a model of a policy-making process refers to small, iterative changes towards a fairly open goal, whereas ‘planning’ refers to a kind of blue-print policy-making or social engineering towards a specified objective. Grin et al. (2010) also portray transition management as a mode of governance that is guiding yet not coercive; one that is established and adapted by multiple state and non-state actors.

Transition management has an ‘open character’ in that it intends to avoid blue-printing or prescriptions for social engineering, and in its explicit reliance on learning and experimentation to develop sustainability goals and the pathways towards them (cf. Rotmans and Kemp, 2008). The open-ended work of transition management nevertheless occurs in alignment with the set elements of an implied navigational course, such as: ‘shifts

to other states of the system' in several 'phases'; the ambition to change the current 'state of a system'; and determination to achieve drastic change – albeit gradually. Furthermore, transition management is prescriptive in the sense that it requires structural changes in a socio-technological system in order to stimulate sustainable development (cf. Shove and Walker, 2007; Shove and Walker, 2008). Viewed this way, transition management comes closer to planning than to 'open incrementalism'.

It can be seen that the concept of transition management involves two key process elements: learning and creativity; and steering and directing developments towards a predetermined goal. The process of transition is explicitly based on the development of new knowledge, functions, technologies, etc., which means that instruments and means are generated while a route unfolds during the process. Hence, questions arise about: a) the extent to which such a creative process is manageable; b) whether it is possible to navigate away from the current state or stage and towards a new fundamental state or stage given that the new state – per definition – cannot be known beforehand; and c) more specifically, how the goal of sustainable development is to be pursued when the path is open and unknown. The transition management discourse does not explain how an unknown creative process can be reconciled with a known steering process (cf. Smith and Stirling, 2010).

### 5.2.2 *Transition management literature and the set of evaluation criteria*

#### **Equity**

Equity aspects are occasionally articulated in relation to transition management, but from quite different viewpoints. The ambition, for example, of transition management to incorporate long-term sustainability goals and the rights of future generations (Kemp et al., 2007) may enable it to deal with equity aspects. However, Shove and Walker (2007) indicate that discussions on transition management give little attention to the question of who wins and who loses when transitions are guided in a specific direction. Equity, in the sense of fair distribution and unbiased decision making, is not addressed in the transition management literature as a key consideration.

#### **Democracy**

Several scholars highlight important weaknesses in the democratic representation and participation of transition management in terms of how its organisation and process have so far been proposed in the literature (Shove and Walker, 2007; Avelino, 2009; Foxon et al., 2009; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). In essence, they argue that the concept of transition management should give greater attention to how decision makers for transitions represent public interests, firstly, because deliberately and purposefully attempting to

stimulate transition in order to achieve a fundamental, large-scale, structural – and therefore irreversible – shift in a socio-technological system affects large sectors of society, and intervenes in public goals.

Secondly, the envisioned ‘other state of the system’ is not an objective state, but a normative and conceptual construction, which should be decided upon with broad representation and collectivity (Shove and Walker, 2007; Avelino, 2009; Foxon et al., 2009; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011).

Thirdly, because transition management implies making choices between a number of alternative pathways, these choices should be made by a larger representation of society than just the participants invited to join the decision making platforms (Shove and Walker, 2007; Avelino, 2009; Foxon et al., 2009; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011).

Lastly, several scholars have proposed that there should be greater recognition and anticipation of power imbalances among participating actors, especially between policy-makers and large corporate actors, on the one hand, and smaller civil groups or groups whose interests run counter to mainstream policy on the other hand (Van de Kerkhof and Wiezcorek, 2005; Shove and Walker, 2007; Avelino, 2009; Foxon et al., 2009; Hendriks, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). These scholars indicate that not all actors affected by a transition management trajectory have sufficient resources to participate in (i.e. to “fight their way into”) the decision making platforms (Smith et al., 2005; Shove and Walker, 2007; Avelino, 2009; Hendriks, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). Furthermore, according to Smith and Stirling (2010) and Voss and Bornemann (2011), the concept of transition management neglects the issue of how to handle conflict, which they find is in parallel with the concept of adaptive management.

However, positive reflections on transition management acknowledge its potential to incorporate participation of citizens and non-state stakeholder groups in the development of transition pathways and innovations (Kemp and Martens, 2007; Grin et al., 2010). Kemp and Martens (2007), for instance, emphasise the potential of transition management to include ‘heterogeneous local understandings’ through ‘participatory integrated assessment’ and ‘social deliberation’, although they do not specify how.

Some transition management proponents have responded to the criticism that the concept of power has been insufficiently addressed in the relevant literature (Avelino and Rotmans, 2009; Avelino and Rotmans, 2011; Grin et al., 2011). Avelino and Rotmans (2009), for example, proposed a framework for making power more explicit and integrated in transition management. They define power as the ability to mobilise resources and emphasise that the dynamics between niches and regimes embody the most important

power relation in transition management. They propose to “redefine transition management as a governance model that aims to enable the attainment of resources, strategies, skills and willingness (empowerment) *and* to influence the willingness of actors to exercise power for a specific goal (leadership), this goal being ‘a more sustainable societal system’” (Avelino and Rotmans, 2009, p. 562). It should be noted that these responses are based on conceptual propositions, and focus on conceptual categorisations of types of power; they do not stem from the study of empirical situations where actors may have conflicting interests, and where democratic and legitimate decision making processes may point in different directions than those envisaged by a transition agent.

### **Legitimacy**

Legitimacy in transition management merits greater attention according to several authors (Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010). Scholars express concerns about the ability of transition management (Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010) or policies for area-based transformations (Boonstra and Frouws, 2005) to properly address legitimacy issues. These scholars argue firstly, that it is necessary to clearly identify who the actual decision makers are or should be in a transition management process, otherwise they cannot be held accountable (Shove and Walker, 2007; Hendriks, 2009; Voss et al., 2009; Smith and Stirling, 2010). Secondly, some propose that the transition management concept should better address the extent to which decisions on transitions are acceptable to the affected groups and the general public (Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010). Lastly, it is argued that it should be clear how the decision making process for transition management relates to the formal and everyday public policy process (Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Voss et al., 2009; Smith and Stirling, 2010).

### **Handling scale issues**

The transition management literature focuses on the handling of scale issues in the sense of the dynamics among the ‘functional levels’ – i.e. niche, regime and landscape – making them a key component of the transition management concept (Rotmans et al., 2001; Kemp et al., 2007; Grin et al., 2010). Transition management is argued to be especially suited to dealing with cross-scale and multiple-level issues (Rotmans et al., 2001). It attempts to deal with scale issues by finding connections between the niches, regimes and landscapes and, for example, by finding ways to diffuse local experiments from niches to the dominant regimes (Foxon et al., 2009). However, Smith et al. (2010) stress the need for more research on transition management and spatial scale, and indicate that further understanding is needed of the relationship among these ‘levels of transition’ and other kinds of scale levels such as geographical, administrative, and network-oriented. Similarly, Foxon et al.

(2009) observe that transition management is generally discussed in the context of industry, technology and sectors such as energy, water and waste management, though rarely in the context of a spatial scale (Foxon et al., 2009; Smith et al., 2010). Furthermore, the concept is not linked in the literature to biophysical or ecological dimensions.

The main contributors to the development of the transition management concept agree on its long-term time orientation, and distinguish between short, medium and long-term orientations for developing the envisioned transition (Rotmans et al, 2001; Kemp et al., 2007; Grin et al., 2010). Transition management is regarded as a concept that, while oriented towards a long-term goal, should be flexible and reflexive in order that its approach to a goal can be adapted (Rotmans et al., 2001; Grin et al., 2001). In practice, however, long-term programmes for area-based transformation may lack the flexibility to respond and adapt to changing circumstances such as societal change, evolving insights, shifting societal and policy priorities, changes in available budgets (Boonstra and Frouws, 2005; Van Dijk, 2006) and dynamics in a specific sector (such as livestock farming) (Driessen, 2005). According to Van Dijk (2006), this lack of adaptability may be caused by changing views on the necessity of the steering intervention itself, by unidentified shortcomings and adaptations and by the need for approval and implementation of legal changes. According to Van Dijk, (2006), less hierarchy, less governmental involvement and sufficient flexibility of land consolidation plans may make area-based transformations more adaptable.

In addition, the literature identifies several other cases of transformation in a specific spatial or area-based context, including the Netherlands' 'area-based rural policy', which involves reaching consensus among an area's stakeholders. This policy has been applied for various purposes, including conversion of a grassland farming area to a nature conservation area (Boonstra and Frouws, 2005). Other Dutch plans such as the 'restructuring of intensive livestock farming' have been implemented in sandy soil areas of the eastern and southern Netherlands (Driessen, 2005). A third example is 'land consolidation' plans in the Netherlands and Germany for the re-allocation of rural lands in order to enable economies of scale and production enhancement in the agriculture sector (Van Dijk, 2006). Although these area-based transformations were not explicitly studied from a transition management perspective, their analysis may provide relevant lessons or comparative material for the study of transformations with a spatial and geographical dimension.

### **Handling uncertainty issues**

Rotmans and Van Asselt – authors of the influential paper on transition management in 2001 – have explicitly studied uncertainties; they did so by reflecting on and proposing different sources of uncertainties (i.e. uncertainties due to variability and due to lack of knowledge) (Van Asselt and Rotmans, 2002). Yet, explicit acknowledgement of uncertainties does not feature prominently in the transition management literature such as

work by Kemp et al. (2007) and Grin et al. (2010). The primary goal of learning and experimentation in transition management is to stimulate innovation; yet it could also enable transition management to deal with limited knowledge (Rotmans et al., 2001; Kemp et al., 2007; Grin et al., 2010; Smith and Stirling, 2010; Voss and Bornemann, 2011). However, several critics counter that the concept of transition management is too vague regarding the handling of uncertainty issues, such as dealing with the normative and political aspects in organising learning and experimentation, monitoring and evaluation and selection of experiments (Van de Kerkhof and Wieczorek, 2005; Shove and Walker, 2007; Foxon et al., 2009; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011).

### **5.3 Transition Management in Practice**

To consider practical experiences with orientation towards sustainable development and steering and with the criteria on governance for sustainable development, three transformation cases in the Dutch fen landscape were studied. All three cases envisaged transformation of current land-uses into multifunctional and/or different spatial organisation, which included transformation of relatively large parts of dairy farming areas to other land uses. Transformations were initiated and steered by the regional governmental body (province of Zuid-Holland). The cases are summarised below. Further characteristics and background information are provided in Appendix B.

The case of Gouwe Wiericke initially concerned a transformation plan for the whole area that was intended to be approved by many local actors. In general terms, the plan was to transform dairy farming into multifunctional land-use, including fen-meadow and wet-fen biophysical conservation, water storage facilities and enhanced recreation options. Subsequently, the area was divided into five sub-areas, including some adaptation areas and transformation areas, which are currently in various stages of implementation.

The case of Groenblauwe Slinger concerned an area surrounded by urban development and facing increasing demand for recreational options. When the initiative started, Groenblauwe Slinger mainly featured dairy farming and glasshouse horticulture and (as later in Gouwe Wiericke) five sub-areas, including adaptation and transformation areas. In the transformation areas, glasshouse horticulture has been removed to other locations, allowing these areas to be transformed to fen-meadow and wet-fen biophysical conservation areas with facilities for recreation and water storage. At the time of writing, Groenblauwe Slinger was in a relatively advanced stage of implementation.

In the case of Krimpenerwaard, a plan was developed to transform a cultural-historic grassland farming area into three zones: one with wet-fen and fen meadow conservation, a second with a mix of biophysical conservation and extensive grassland farming, and a third with intensive grassland farming. Many parties, including

governmental bodies and local and regional interest groups signed an agreement on this plan. However, after the signing, enthusiasm for the initiative dwindled, and the national government imposed budget cuts on the nature conservation measures. At the time of writing, the various measures were in different stages of implementation.

**Table 5.1: General information on the transition management cases studied.** \*From start to planned end date.\*\*Varying per sub area.

	Main aim	Main actors involved	Duration*	Plan making phase	Size of project area
<b>Gouwe Wiericke</b>	<ul style="list-style-type: none"> <li>- Initially, the ambition was to realise a transformation for the area as a whole (similar to the one in the Krimpenerwaard);</li> <li>- Eventually, the formal aims were stated as to increase climate change resilience through more sustainable water and soil management system, to improve fen nature conservation; to enhance economic viability of agriculture, to conserve cultural-historic valuable landscapes and to develop economic viable recreation options.</li> </ul>	<ul style="list-style-type: none"> <li>- Province (decision maker);</li> <li>- Five municipalities and two water boards (closely involved in plan making process and in decision making);</li> <li>- Four agricultural interest groups, five nature and landscape conservation groups, and a cultural-historic group (in an advisory position);</li> <li>- Public Bureau of Rural Affairs (involved in implementation).</li> </ul>	2006 – 2014 / 2018 / not yet known**	4 years	<ul style="list-style-type: none"> <li>- Size unknown; -1400 ha. reserved for new nature conservation area.</li> </ul>
<b>Groenblauwe Slinger</b>	<ul style="list-style-type: none"> <li>- To develop nature conservation areas, to enhance the agricultural landscape and recreation facilities, and to create and improve water storage facilities.</li> </ul>	<ul style="list-style-type: none"> <li>- Province (decision maker);</li> <li>- Several municipalities (affected by and involved in the plan making and implementation);</li> <li>- Several agricultural and nature conservation groups (representing interests and affected by the implementation);</li> <li>- Public Bureau of Rural Affairs (involved in implementation).</li> </ul>	1993 / 1994 – 2013 / 2015**	5 / 11 years**	<ul style="list-style-type: none"> <li>- Adaptation areas: 20.000 ha. (1600 ha. new nature)</li> <li>-Transformation areas: +/- 1190 ha.</li> </ul>
<b>Krimpen erwaard</b>	<ul style="list-style-type: none"> <li>- To transform the area into a zone with nature conservation, a zone with viable agriculture combined with fen meadow conservation, and a zone with production agriculture with a relatively deeper drainage.</li> </ul>	<ul style="list-style-type: none"> <li>- Province (decision maker);</li> <li>- Several municipalities (affected by and involved in the plan making and implementation);</li> <li>- Several agricultural and nature conservation groups (representing interests and affected by the implementation);</li> <li>- Public bureau for implementation of rural affairs (involved in implementation).</li> </ul>	1999 / 2005-2021	1 / 6 years (depending on starting point)	13.500 ha. (2450 ha. new nature)

### 5.3.1 *Experiences with sustainability in transition management*

The transformations studied were intended to contribute to most of the aspects of the fen landscape that were identified as under pressure by focusing on: restructuring the spatial organization of an area; relocating land-use functions; creating new land-use functions; and implementation through spatial measures. In particular, measures were applied in the landscape that may benefit both sustainable water and peat-soil management and wet-fen biophysical conservation. The creation of wet-fen nature conservation areas and the realisation of a more efficient water-management system may, after relocation of the land-uses, benefit peat-soil conservation and water quantity and quality aspects. However, drainage of the peat soil will occur or be continued in areas of existing or future grassland agriculture, leading to soil decomposition and subsidence. Appendix B gives an overview of the intended contributions of the area-based transformations to sustainable development of the targeted fen landscapes.

In the cases studied, the sustainability orientation can be regarded as an image of the area with a new structuring of the existing land-use practices rather than as an ‘open-ended’ process. What the three cases have in common is the emphasis by the involved groups that the area’s sustainability challenge is mainly characterised by water and soil management becoming too complex, and by conflicting claims on land-use, in particular demands for wildlife and landscape conservation and commercial agricultural uses. Further elements of the sustainability challenge include: expected climate change impacts, recreation needs and the necessity of reducing water management costs. In two cases (Gouwe Wiericke and Krimpenerwaard), additional issues were articulated as: diversion of governmental policy priorities; a demand for wet-fen nature conservation and peat-soil subsidence reduction; and a need to support local agriculture mainly through better plot-allocation.

The two main issues (i.e. conflicting claims on the scarce land space and natural resources, as well as water and soil management becoming too complex) were not explicitly formulated in terms of inadequate use of technology and natural resources and of insufficient adaptation of the system’s structure leading to a crisis of the system. However, both these concepts are implied in the idea expressed by the leading actor group (i.e. the regional governmental body) that a structural transformation of these areas would be essential to address the sustainability challenge.

The cultural-historic landscape may benefit from small-scale measures such as conservation of certain woodlands, maintenance of broad ditch-banks and maintenance of pollard willows. However, an original fine-mesh allocation structure that has gradually developed over centuries and has remained intact at a large scale (as was the case in Krimpenerwaard) would be damaged by drastic reorganisation of area’s spatial structure. As a consequence, the original cultural-historic meadow landscape and accompanying fen-meadow conservation are not likely to benefit from such a transformation.

The three cases are oriented towards intervention in the drivers of the pressure on the area (e.g. by reducing the complexity of the water and soil management) and towards mitigating the impacts of current practices (e.g. through small-scale contributions to conservation of the cultural-historic landscape). Hence, the area-based transformations are intended to contribute to the sustainability challenge. By altering and relocating land-uses in the targeted area, the leading actor groups intend to create new conditions in the area, which can be interpreted as an aim to prevent an environmental crisis of the area as a system. It is less clear that the aims expressed for these cases included an intention to shift the system to another state.

Although the transformations include contributions to wet-fen conservation and water management in the long term, they will contribute to peat-soil conservation only in the short term due to continuing drainage for commercial grassland farming. Therefore, a transformation based solely on changing an area's spatial structure and not on a wider spectrum of drivers of the pressure on the area (e.g. diverging policy priorities, conflicting claims and economic viability of the dairy sector) appears limited in its ability to enable new starting conditions for more sustainable development of landscapes such as those studied.

### 5.3.2 *Overlapping transition management experiences with steering and the 'beacons'*

The themes articulated in the transition management literature as relevant to its orientation towards steering – i.e. legitimacy and democracy, and learning and experimentation – overlap considerably with the criteria for governance for sustainable development. For this reason, experiences with steering and with addressing the criteria are presented together in this subsection.

#### **Equity**

Although equity aspects were not explicitly articulated or addressed in the studied transformation cases, the interventions intended for long-term sustainability objectives could benefit future generations, and indirectly address a fair intergenerational distribution of resource uses. However, the large-scale restructuring of an area's land-uses may have substantial negative impacts on current local communities.

The aspect of explicitly striving for unbiased decision making was also not addressed by the leading actor in each of the cases studied. In two of the cases studied (Gouwe Wiericke and Krimpenerwaard), general public protests and protests from multiple affected public and private actors, lack of public acceptance and no support from several local governmental bodies (i.e. municipalities) indicated widespread questioning of whether the decision maker (i.e. the provincial authority) was appropriate to the area-based transformation plans. In terms of the aim of unbiased decision making as an aspect of

equity, none of the three cases appears to have succeeded. Signs were clear that public support for the intended transformations was weak, and affected societal groups protested against the intended area-based transformations both during and after the formal public decision making process.

### **Aspects of democracy overlap with observations on ‘selection process’**

In terms of democracy, the practical experiences with the transformations studied show that although the intention was to include local societal groups in the plan making, the decisions were taken mainly by the executive regional governmental body (i.e. the provincial authority). In all three cases, input from non-governmental groups was considered by the leading actor, demonstrating some degree of representation. Each case used input from advisory groups to develop possible goals and implementation pathways for the transformation plan. The advisory groups mainly represented public and private nature conservation organisations, landscape conservation groups and agricultural groups. However, in all three cases, it was clear that government bodies were the main formal decision makers, with the regional government taking the lead. In other words, the degree of participation of non-state actors in the decision making process was not high.

In all three cases, alternatives to the plan making were considered by the leading actor, although reports of usage, coverage or selection from these alternatives differed. For example, some of those consulted indicated that it was unclear whether and which alternatives were considered; others indicated that no alternatives were considered. For Krimpenerwaard, the responses on the use of visions and alternatives were more coherent, indicating that the visions and alternatives developed were indeed considered during design of the plan. However, Krimpenerwaard decision makers did not consider an alternative proposed by an agricultural group. Apparently, the development of and selection from spatial alternatives was approached in all three cases as a technical issue rather than as a normative, political and mutual decision making process. Overall, democracy did not feature strongly in practice as an element either of steering or orientation toward sustainable governance.

### **Aspects of legitimacy overlap with observations on ‘steering by governments’**

Certain trust issues illustrate both public protest and support. In the case of Gouwe Wiericke, the level of trust between most of the actor groups was reported to be generally low. In Groenblauwe Slinger, the leading actor assessed trust relations with societal groups as generally neutral, while a local nature conservation interest group reported trust in the leading actor to be extremely low. In the third case, Krimpenerwaard, the transformation plan appeared to have public support in the area around the time the agreement was signed. However, shortly after implementation began relations between the executive regional governmental body (i.e. the provincial authority) and several societal groups deteriorated,

leading to postponement of cooperation by two of the farmers' groups involved and the municipality.

The cases studied show how local government bodies can play a major role in settings like the Dutch fen landscape in establishing legitimacy for envisaged transformation plans. The municipalities in question, which are in charge of translating the planned area-based transformation into municipal and legally binding zoning schemes, did not automatically agree to the targets set by the executive regional government body in charge (i.e. the provincial authority). Indeed, they were inclined to support local stakeholder interests, which were in opposition to provincial interests. In this way, the municipalities may contest the legitimacy of area-based transformation plans, and make it a reason to obstruct their implementation. Indirectly, then, legitimacy can become essential for transformation when it is key to steering by local government.

### **Aspects of handling uncertainty issues overlap with observations on 'learning and experimentation'**

A few instances of specific attention to the organisation of monitoring and evaluation can be found in the cases studied, but they reveal only minimal emphasis on the handling of uncertainty issues. In the case of Gouwe Wiericke, for instance, an evaluation of the intended goals occurs every two years in order to assess whether cooperation between the government bodies is suitable and whether sufficient financial means are available. In Groenblauwe Slinger, the intention was to develop a strategy for dealing with uncertainties and risks associated with political and administrative changes, financial and legal risks, and uncertainties. It seems, however, that this intention has not become reality. In each of the cases, no attention has been given to the development of monitoring and evaluation in terms of choosing indicators, deciding on frequency of selection, identifying early signs of fruitful and unfruitful trajectories, and relating evaluation criteria to the broader debate on sustainable development.

Some small-scale innovative practices have been stimulated in the areas of transformation. These include, for example, a new type of farming in Krimpenerwaard explicitly, which is referred to as a pilot scheme, and a transformation in one of the sub-areas in Groenblauwe Slinger, which is regarded as a pilot scheme by external actors). Such pilot schemes could function as 'niches' for developing new kinds of landscape management concepts possibly for application at other locations (e.g. the sub-area transformation involved glasshouse farming, which is not a major land-use in the Dutch fen landscapes). The transformations studied have not shown the typically envisaged pattern of innovations and changes dispersing from 'niche' to 'regime' level. In Groenblauwe Slinger, for example, the changes were initiated, developed and coordinated at 'regime' level, with a high budget for land acquisition and coercive steering by the regional public body in order to realise the envisaged transformation.

The cases studied did not include elaborate facilities or a comprehensive schedule to enable learning or exchange of insights. The absence of a focus on learning and experimentation may reflect how the leading actor in each case perceived uncertainties. Participants have indicated that several uncertainties, risks and unpredictable changes may influence the further implementation of the transformations. In the case of Groenblauwe Slinger, for instance, the Public Bureau of Rural Affairs indicated that the relatively major dependency on land acquisition creates uncertainties for implementation when available budgets change. In the case of Krimpenerwaard, the Public Bureau of Rural Affairs reported uncertainty about the willingness of some parties to cooperate with implementation. Despite such acknowledgement of uncertainties, the leading actor in all three cases did not consider it necessary to equip the interventions with instruments designed to resolve or cope with issues of this kind.

### **Handling scale issues**

In Krimpenerwaard, the targeted transformation area corresponds to biophysical and cultural-historic boundaries. In the other two cases, the envisaged transformation area is composed of several sub-areas, with various backgrounds, combined in a plan proposed by the leading actor. The leading actor in all three cases clearly focused on the regional administrative level, whereas the local administrative levels (i.e. municipalities) were more involved in the latter cases. Supra-regional administrative levels were not addressed. In general, the leading and coordinating groups did not articulate the functional scales of the transition management discourse (i.e. niche, regime and landscape) in relation to their initiative. However, the niche level is recognisable in the facilitation of certain small-scale experiments and pilot schemes and in some drastic changes in sub-areas, although the leading actor in each case did not focus on enhancing these innovative practices or extending them to a larger spatial and/or administrative scale.

Overall, although a significant number of issues were identified that related to the spatial scale dimension of the three cases, the actors involved did not express how these could be dealt with by the intended transformation.

Each case intended to transform the targeted areas in order to adapt them to future circumstances. Medium- and long-term changes in circumstances were expected, such as changing European Union policies on water and environmental management. In Krimpenerwaard, judgements by high-level legal bodies and decisions by the European Union on payment levels for land acquisition by the province were expected to influence the transformation. In all three cases, actors consulted indicated that the plan making processes had to deal with the market dynamics affecting plot prices. Market dynamics in the dairy sector were reported to be of possible influence in the cases of Krimpenerwaard and Gouwe Wiericke. These dynamics largely depend on liberalisation of European Union agricultural policies, national policies for the dairy sector, fluctuations in milk prices, the world market position of food production, and development of production methods.

However, the cases studied included no indication of how the targeted transformation could specifically deal with these long-term and changing circumstances.

The division of the planned transformation into sub-areas in the cases of Gouwe Wiericke and Groenblauwe Slinger served as an adaptation to the local context. This may have enabled customisation of the plans. There are indications also, however, that local circumstances were actually excluded from the plan making. In Krimpenerwaard, for example, it was articulated that the area's traditional closed-community character was inadequately acknowledged and addressed in the plan making process. Strikingly, in all three cases, it was reported that the influential positions of the municipalities and local agricultural groups were insufficiently acknowledged and addressed in the plan making process; in addition, solutions were not explicitly considered by the leading actor.

The cases studied show that the transformation of an area has depended heavily on the implementation of a spatial planning instrument as a mechanism to steer towards the intended sustainability goals. The plans of each case incorporated, or considered a range of such instruments, including: land exchange; voluntary land acquisition; expropriation of lands; and development of new, specific payment schemes. In practice, however, as described below, these spatial planning instruments have encountered serious complications or are expected to do so, and, may therefore be limited in their potential to realise change towards sustainable development in a setting such as the one studied.

Several actors consulted regarded the potential options for land exchange as limited, an expectation confirmed by documentation. In general, public opinion in the Krimpenerwaard and Gouwe Wiericke areas does not favour land exchange due to the sometimes painful legacy of a major land-exchange plan that has stagnated. In the Groenblauwe Slinger area, the land-use targeted for exchange (i.e. glasshouse horticulture) is difficult to relocate through land exchange due to its high costs.

Implementation of land acquisition entails a particular uncertainty: it depends not only on plot prices and the buyer's available budget, but also on willingness to sell by land owners. Plot prices are highly dependent on commercial and speculative trade and on the planned land-use designation. Willingness to sell on the part of land-owners, mostly farmers, depends highly on market dynamics in the dairy sector: if the economic situation is expected to be viable and attractive, farmers will be less inclined to sell their land; conversely, if the economic situation is expected to be unprofitable, farmers may opt to sell. Also, when the transformation plan is to be implemented within a fixed time frame, the available budget may limit the options and raise land prices. In the cases studied, the extremely high budget required for voluntary land acquisition is reported to be unavailable. In light of all this, land acquisition may have several disadvantages as an instrument for realising the spatial reorganisation of land-uses in an area.

Expropriation of lands is increasingly preferred by implementers. However, the national government stipulates that no more than 10% of such initiatives may be

implemented by means of expropriation because of the severe social consequences, leaving 90% to be realised using other instruments.

Furthermore, in the three cases it was also considered to develop new specific payment schemes for private individuals, mostly farmers, to achieve wet-fen conservation aims. However, the options for such schemes are also considered limited because almost all the farmers concerned have no interest in participating. According to several interviewees, this lack of interest is due to the financial unattractiveness of the payments and the farmer's distrust of the government. Such payment schemes are therefore of limited application, unless the payments are drastically increased and the communication and agreements between the involved governmental body and the scheme's users greatly improve.

Finally, the decision makers in these area-based transformations approached the sustainability challenges of the targeted areas in what approximates a 'closed system': In order to induce change, the leading actor took an approach at the level of individual farmers rather than at that of the agricultural sector as a whole. However, the main land-uses in these targeted areas – i.e. dairy farming and glasshouse horticulture – do not operate only at a local scale, but also within a national and international context. The planned implementation instruments included options for relocating glasshouse horticulture – but not dairy farming – outside the area. Attempted implementation of the area-based transformations has revealed how the lack of suitable relocation options for dairy farming has proven to be a significant obstacle.

#### **5.4 Discussion of a Transition Course**

As shown above, the transformations studied have tended to be based more on the 'management' dimension of transition management (i.e. steering towards a certain envisaged direction and intending to prevent development in a certain undesired direction) than on the 'open' dimension (i.e. providing as much space as possible to develop innovations and new options while gradually adjusting the envisaged perspective and appropriate means to achieve it) (cf. Smith and Stirling, 2010; Voss and Bornemann, 2011). This is evident, for example, in heavy dependence on spatial instruments (including land acquisition, expropriation and land exchange) to steer the envisaged transformations, and the relatively limited attention to learning and experimentation. Experimentation with the spatial structure and organisation itself is practically impossible in the landscape of these cases. This basically ruled out pilot schemes or small-scale innovative practices that could serve as examples, and be applied at other locations, and may account for the limited attention to learning and experimentation.

The present study has shown that, at least in the empirical context of the Dutch fen landscape, learning and experimentation is regarded as less pivotal to practical

transformation than it is to the concept of transition management. Several contributions to the transition management literature emphasise how the role of learning and experimentation could be enhanced as part of the concept. It is argued that particular attention should be given to the normative and political aspects of learning and experimentation (Van de Kerkhof and Wieczorek, 2005; Shove and Walker, 2007; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011) and to monitoring, evaluation and selection processes (Shove and Walker, 2007; Foxon et al., 2009; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011). These arguments may assist actors like those in the transformations studied in increasing the degree of learning and experimentation. However, greater insight would still be needed into *why* actors involved in contexts such as the Dutch fen landscape tend not to focus on the learning and experimentation dimension and whether a greater focus on these elements would help actors to move further towards sustainable development.

A key finding of research for the present chapter is that the multifunctional fen landscapes are characterised by intensive land-use, by a variety of actors claiming the spatial domain (i.e. farmers, nature conservationists, recreationists and residents), by several governmental bodies with responsibility for a task in the landscape (e.g. through the provincial authority's nature conservation policy, the water board's flood protection measures and the municipalities serving local communities) and by a complex formal procedure for establishing provincial and municipal spatial zoning schemes (i.e. regular – and problematic – renewal every 30 years). It is the combination of these factors and the resulting 'regime' that makes experimenting with the spatial structure almost impossible. Furthermore, all of the scheduled spatial instruments already present serious complications or are expected to do so. Hence, the relevance of the spatial dimension to transition management in settings such as the Dutch fen landscape may merit further research (cf. Foxon et al., 2009; Smith et al., 2010).

The difficulties involved in implementing and adapting long-term plans for area-based transformations highlighted by the present study correspond to findings by Boonstra and Frouws (2005), Driessen (2005) and Van Dijk (2006). The cases studied show the importance of the spatial scale dimension for the envisaged transformations, and confirm its relevance to transition management as articulated by Foxon et al. (2009) and Smith et al. (2010). In this connection, it would be interesting to learn more about where the 'niches' to develop innovations for landscapes could be situated and how innovations resulting from such niches could 'travel' from one location or functional level to another (cf. Foxon et al., 2009; Smith et al., 2010).

The research summarised in this chapter shows that the implementation of transitions in a spatial context depends on vital support from local governmental bodies such as municipalities. Thus, findings from the cases studied support the proposal made by several scholars in the transition management discourse that, when intending to initiate transitions in a particular area, the relationship of that transition with the existing policy-

making setting should be considered and included (Boonstra and Frouws, 2005; Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010).

Several authors claim that transition management requires careful and thorough democratic representation and participation of, for example, local and societal groups in planning and decision making (Shove and Walker, 2007; Avelino, 2009; Foxon et al., 2009; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). Despite this, decision making in the empirical cases studied does not explicitly address representation and participation. Given the theoretical consideration of representation and participation as crucial to interventions for sustainable development as well as in transition management, it would be helpful to gain greater insight into why they are not given the same weight in actual cases of transformation. The need for such insight seems clear considering that the transformations examined are particularly susceptible to stagnation.

Although the explicit long-term perspective of transition management may enable the rights of future generations to be incorporated in present decisions (cf. Kemp et al., 2007), the leading actor in each of the cases studied did not explicitly address fair distribution of positive and negative impacts among current and future generations. This suggests that little attention has been given so far in general to fair distribution of impacts – not only in developing and discussing the transition management concept as stated by Shove and Walker (2007) – but also in practice.

Involved and concerned scientists and policymakers are currently debating issues relating to the long-term future of the fen landscapes, but a broad societal and public debate on the future of these landscapes has yet to be initiated. Such a debate could provide ground in which to embed transformations, and could also serve to enhance their legitimacy (cf. Hendriks, 2009; Meadowcroft, 2009; Voss et al., 2009). The proposal by the transition management literature to develop long-term visions and scenarios might inspire such a broad societal debate on the future of the fenlands, and help to identify trajectories for development and interventions. However, the literature has not yet indicated how such a debate should be organised and stimulated.

The practical experiences analysed above seem to indicate that transformation of a geographical area on a strongly coordinated trajectory is not feasible in landscapes such as those of the Dutch fens. Furthermore, the cases studied do not appear directly to contribute to any great extent to the sustainable development of these landscapes. Implementation, for example, of a transformation that results in loss or deterioration of a large-scale culturally and historically valuable fen meadow landscape actually reduces contributions to sustainable development. Particularly in transition management cases in settings with multiple, sometimes competing sustainability issues, it follows that careful consideration should be given to the prioritisation of sustainability goals and to the assessment of drastic

interventions that are likely to have irreversible consequences (cf. Meadowcroft, 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011).

All in all, it seems that the potential of stimulating transitions to provide a reliable mode of governance for navigating towards sustainable development in settings such as the Dutch fen landscape is limited. The transition management concept appears – at least in the setting studied – to be insufficient to handle multi-actor, multi-sector issues and biophysical and administrative complexities and to open an avenue towards sustainable development. For these reasons, the concept warrants further development aimed at least at the inclusion of the specificities and sensitive issues encountered when dealing with actual locations.

### 6.1 Navigating by Payments for Environmental Services

In parallel to the previous two chapters, this chapter presents an analysis of payments for environmental services (PES) as a concept and in the empirical context of the Dutch fen landscape. PES are a mode of governance based on market mechanisms that target specific environmental services – i.e. ecosystem benefits to human beings. Underlying PES is the notion that trading based on the quantitative valuation of environmental services can help resolve sustainability issues (Vatn, 2010). PES depend not only on regional environmental circumstances but also on providers' willingness to manage environmental services and buyers' willingness to pay for them (Pagiola et al., 2002; Miranda Quiros, 2003; Pagiola et al., 2005; Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008).

PES can be regarded as agreements whereby buyers financially reward providers or facilitators of environmental services (Pagiola et al., 2002; Engel et al., 2008; Wunder et al., 2008). According to Wunder (2006, art. 23, p. 2), PES are “1) voluntary transaction[s] in which, 2) a well-defined environmental service (ES), or a land-use likely to secure that service, 3) is ‘bought’ by at least one ES buyer, 4) from at least one ES provider, 5) if and only if the ES provider secures ES provision, i.e., conditionality”. PES are typically focused on watershed and aquifer protection, biodiversity conservation, carbon sequestration, scenic beauty and improved water quality (Wunder et al., 2008). As PES are frequently applied in a programme or scheme, the terms ‘PES programme’ and ‘PES scheme’ are also used.

Three points of focus can be distinguished in the literature on PES, the first in the form of agri-environmental schemes (AES) and ecological effectiveness (Kleijn and Sutherland, 2003; Dobbs and Pretty, 2004; Glebe, 2007). AES are government-funded national schemes to which farmers (usually arable and dairy farmers) voluntarily apply for compensation for measures they take to reduce environmental impacts (Wilson and Hart, 2000). AES are a type of PES typically arising in the context of European Union regulation (Dobbs and Pretty, 2008). In Europe, until recently, the concept of AES was applied and discussed more prominently than the more general concept of PES. The two concepts tended to be discussed separately in the academic literature. Wunder et al. (2008) took an integrative approach in incorporating the Environmentally Sensitive Areas and Countryside Stewardship Schemes of UK AES in an overview of PES programmes. Since 2007, policy-makers in the Netherlands have treated AES as a kind of PES, an approach followed in the analysis presented in this chapter. AES were introduced in the mid-1980s in the

Netherlands (Kleijn et al., 2001) and the UK (Dobbs and Pretty, 2008), and are currently applied throughout the European Union (Kleijn and Sutherland, 2003; Kleijn et al., 2006; Smits et al., 2007). The AES programmes in the Netherlands and the UK have received considerable attention in the literature (Kleijn et al., 2001; Dobbs and Pretty, 2004; Kleijn et al., 2004; Verhulst et al., 2007; Dobbs and Pretty, 2008; Smits et al. 2008; Wunder et al., 2008).

The second point of focus in the literature on PES is their contribution to poverty alleviation (Kerr, 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; Sunderlin et al., 2005; Kelsey Jack et al., 2008; Pagiola et al., 2010). PES have been developed as one of the primary tools to integrate poverty alleviation and biodiversity conservation. So far, such PES schemes have been discussed mainly in the context of the developing world (Kerr, 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; Sunderlin et al., 2005; Pagiola et al., 2010). International institutes, including the World Bank and the Center for International Forestry Research (CIFOR), have been considering and advocating the twofold potential of PES since about 2002 (Pagiola et al., 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; Sunderlin et al., 2005; Pagiola et al., 2010).

The third point of focus is economic effectiveness and efficiency (Pagiola et al., 2002; Bayliss, et al., 2005; Engel et al., 2008; Norgaard and Jin, 2008; Smits et al., 2008; Wunder et al., 2008), particularly in regard to the design and appropriateness of PES (e.g. Engel et al., 2008). To examine the economic effectiveness and efficiency of PES programmes, some scholars use advanced calculation and models (Norgaard and Jin, 2008; Börner et al., 2010; Pascual et al., 2010).

Several PES programmes can be found in Latin and North America, where they range in focus from watershed protection and biodiversity protection to carbon sequestration (Pagiola et al., 2002; Pagiola et al., 2004; Wunder et al., 2008; Pagiola et al., 2010). A national programme in Costa Rica identified as successful encompasses water management, biodiversity conservation, carbon sequestration and scenic beauty (Pagiola et al. 2002; Miranda Quiros, 2003; Wunder, 2006). Another programme considered a success runs in New York State (USA), and centres on watershed protection (McCauley, 2006). Other PES programmes implemented in the USA aim, for example, to improve water and soil management and wildlife protection (Pagiola et al., 2002; Wunder et al., 2008). In addition to the European Union's AES programmes, various European countries have implemented PES programmes, including a scheme in France to improve water quality and a scheme in Germany to increase agrobiodiversity (Wunder et al., 2008). Further afield, countries such as Australia have implemented PES programmes for groundwater salinity control (Wunder et al., 2008). While such efforts appear laudable, Kinzig et al. (2011) raise serious doubts regarding the effectiveness of many PES schemes, in particular those for carbon sequestration in China and the UK, watershed protection in South Africa and Mexico and biodiversity conservation in the USA, Costa Rica and Nicaragua.

In the Netherlands, public policy increasingly emphasises maintenance of the rural landscape and the potential of environmental payments to achieve this (LNV, 2002; Braaksma and Bos, 2007; Taskforce Financiering Landschap Nederland, 2008). Since 1997, in addition to a large-scale national AES programme, the Netherlands has seen the implementation of an increasing number of PES programmes, all obligated to conform to the AES programme.

The following sections analyse the PES concept as discussed in the literature and practical experiences with PES in the Dutch fen landscape in terms of orientation towards steering and sustainable development and how the criteria on governance for sustainable development are addressed.

## **6.2 Orientation of Payments for Environmental Services**

The three points of focus in the discourse on PES – i.e. AES, poverty alleviation and economic effectiveness and efficiency – account for differences in orientation towards steering and sustainable development. All three points of focus are the subject of analysis by developers of the concept, most of whom are proponents of this mode of governance (e.g. Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010), and by some its critics (e.g. Kleijn et al., 2001; McCauley, 2006). How the discourse from these vantage points examines the orientation of PES towards steering and sustainable development and the criteria for evaluation of governance for sustainable development is explored below.

### *6.2.1 Steering through environmental trade to achieve poverty alleviation and reduce negative environmental impacts*

#### **Goal orientation**

The PES discourse generally considers the main cause of sustainability problems to be the exclusion of negative environmental externalities (i.e. unintended and/or undesired side-effects of human activities) and lack of reward for efforts by local resource managers. These can lead to depletion of biodiversity and eventual exhaustion of natural resources, as well as an increase in poverty (Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010). In contrast with the literature on adaptive management and transition management, the literature on PES focuses not on a system's capacity to regenerate or transform, but on increasing positive impacts and mitigating negative impacts (McCauley, 2006; Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010). Kelsey Jack et al. (2008) claim that a “rationale

for the PES approach is that the recipients of [environmental] services have some measurable value or ‘willingness to pay’ for those services” (p. 9468). In other words, these authors identify that a PES approach is based on the assumption that there is a latent demand for ecosystem services, and that it is possible to convert that latent demand into actual payments and environmentally beneficial activities.

In the PES discourse, the notion of what constitutes sustainable development is based on enhancing livelihoods and reducing poverty while reducing negative environmental externalities and impacts (Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010). However, the literature on PES does not indicate what sustainable development entails in the long term or how market mechanisms will enable current users to use natural resources and ecosystem services without inflicting irreversible damage in the long term. Although lacking discussion of these aspects, the discourse identifies increased income of the providers and increased preservation of ecosystem properties as key indicators of movement towards sustainable development. These are thought mainly to be achieved by replacing land-use practices that exhaust the land with conservation practices (Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010). Contributing to economic viability and poverty alleviation is considered a primary target of the PES approach, and receives significant attention in the PES discourse (Kerr, 2002; Pagiola et al., 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; Sunderlin et al., 2005; Pagiola et al., 2010).

Various orientations towards sustainable development are evident in the PES literature. Firstly, it is evident that AES programmes are designed by the EU to stimulate more sustainable agriculture (Dobbs and Pretty, 2008). AES typically address landscape conservation (e.g. in the UK) and biodiversity conservation (e.g. in the Netherlands). AES are applied to protect the countryside, stabilise agricultural markets and maintain farming populations in rural areas (Wilson and Hart, 2000).

Secondly, the focus on poverty alleviation reveals that one of the driving forces to initiate and advance PES has been the notion that economic development and biodiversity conservation can go hand in hand (Kerr, 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; Sunderlin et al., 2005; Pagiola et al., 2010). For example, a community can be financially rewarded for conserving a nearby forest area instead of exploiting it, thus enabling longer-term economic benefits and conservation of biodiversity in the region while benefiting both people and the forest.

Even in developed countries, financial situations in some rural areas may be challenging. As applied with the aim of poverty alleviation in developing countries, and similar to the way a form of AES in Europe has created schemes that pay farmers to set-aside land for conservation purposes, PES may offer a way forward in the fen landscapes of north western Europe, where farmers may face financial difficulties, and families may struggle to generate sufficient income (De Lauwere, 2005). The economic future of farming

in these areas seems uncertain (Van der Ploeg, 2001; De Lauwere, 2005). As most farmers are entrepreneurs, they are expected to develop their businesses in new directions, for example, by intensifying, automating and upscaling, by diversifying farming practices or by switching to an entirely different sector (De Lauwere, 2005). Several authors discuss PES as an approach that addresses economic as well as biophysical issues associated with farmers who provide a characteristic and appreciated landscape for which they have not received financial reward (Grieg-Gran et al., 2005; Pagiola et al., 2005; Pagiola et al., 2010).

In contrast, the literature also reports instances of unintended consequences such as PES programmes benefitting landholders rather than landless people (Kerr, 2002; Satake et al., 2008); meaning that payments only go to providers who own land rather than to landless people responsible for the management of the land. Kinzig et al. (2011) advocate that income support for providers should be uncoupled from environmental protection: “Poverty reduction is a laudable goal, but it should not prevent PES schemes from signalling the scarcity of ecosystem services.” (p. 604). They advocate that payments should be strictly based on actual, verifiable provision of certain ecosystem assets based on results rather than efforts. According to Kinzig et al. (2011), market mechanisms involving payments that go beyond rewarding actual provision carry the risk that resources and ecosystem assets may not be valued according to their scarcity, and may therefore go unprotected.

Thirdly, in the focus in the literature on the calculation of economic effectiveness and efficiency, the goal could be summarized as the “net private profitability from the perspective of land-users” in relation to the “net value of the environmental services they generate to others” (Engel et al., 2008, p. 670). Examination of economic effectiveness and efficiency may also include calculation of transaction-costs (Grieg-Gran et al., 2005; Smits et al., 2008; Pagiola et al., 2010; Vatn, 2010) and opportunity costs (Börner et al., 2010; Sommerville et al., 2010).

### **Orientation toward steering**

In terms of steering and inducing change, a basic assumption of the PES literature is the possibility of steering societal and biophysical processes by addressing externalities through a market approach (Dobbs and Pretty, 2008; Engel et al., 2008; Pagiola et al., 2010; Vatn, 2010). This premise refers to the attribution of monetary value to the provision or management of ecosystem assets in order to include negative environmental externalities and to pay local resource managers.

The unit of analysis – and intervention – is identified in the PES discourse, as a programme or contract for PES (Dobbs and Pretty, 2008; Engel et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010), where the spatial and geographical dimensions or boundaries are usually made explicit. Besides economic transactions and making landscape management and biodiversity conservation economically viable (Dobbs and Pretty, 2008;

Engel et al., 2008; Pagiola et al., 2010; Vatn, 2010), other key process elements in enabling the intended change include:

- Identifying the buyer, the provider, the service, the payment unit, the payment structure and, usually, an intermediary (Dobbs and Pretty, 2008; Engel et al., 2008; Kelsey Jack et al., 2008; Wunder et al., 2008; Pagiola et al., 2010);
- Developing and agreeing a programme or contract (Engel et al., 2008; Ferraro, 2008; Kelsey Jack et al., 2008; Wunder et al., 2008; Pagiola et al., 2010; Vatn, 2010);
- Guaranteeing provision of the environmental service and payment for it (Dobbs and Pretty, 2008; Engel et al., 2008; Smits et al., 2008; Wunder et al., 2008). This implies a need for a monitoring and performance tracking arrangement (Kinzig et al., 2011).

The PES discourse shows some difference in regard to the orientation towards steering. In the discussion on AES, some authors argue that issues relating to monitoring and performance contribute to steering. Although Dutch and other European AES programmes aim at biodiversity conservation, several authors emphasise that they do so with mixed results (Kleijn and Sutherland, 2003; Kleijn et al., 2004; Kleijn et al. 2006; Verhulst et al., 2007).

It has been proposed that the ecological effectiveness of an AES programme may be increased by: a) tailoring it to preferences and predominant farming styles in the regions concerned (Schmitzberger et al., 2005); and b) by applying a spatially explicit approach to the selection of the most viable sites for biodiversity conservation (Bayliss et al., 2005). However, others warn that focusing exclusively on ecological effectiveness is too narrow, and has “major effects on public and academic perceptions of the scheme” (Carey et al., 2003, p. 72). Evaluating effectiveness based on other aspects, such as landscape beauty, history and accessibility, enables a nuanced evaluation (Carey et al., 2005). Rather than emphasising ecological effectiveness as the prime objective, Pagiola et al. (2002), for example, consider the importance of monitoring in order to understand the link between services and environmental effects.

According to a number of authors, design is critical to the functioning of PES in terms of economic effectiveness and efficiency (Pagiola et al., 2002; Engel et al., 2008; Kelsey Jack et al., 2008; Smits et al., 2008; Wunder et al., 2008). Key design aspects include the *mode* of payment for the service provided (e.g. area- or product-based) and the *source* of payment (e.g. a public or private buyer) (Engel et al., 2008). Typically, the beneficiary is the buyer and user of a service, although a government may pay a provider on behalf of the user. Engel et al. (2008) propose that a distinction be made between user-financed and government-financed programmes.

Other expected key aspects of PES design include: making distinctions between supply- and demand-driven (i.e. driven by providers or buyers) and between individual or collective service provision, where the providers may, for example, be residents, small-scale farmers or private-sector investors (Pagiola et al., 2002). Economically successful

PES programmes tend to be demand-driven (Pagiola et al., 2002) and user-financed (Wunder et al., 2008). Longevity of PES schemes may depend on how contracts are included in the design (Smits et al., 2008) and on how monitoring of provisioned services is facilitated (Kelsey Jack et al., 2008). Although functioning and performance of PES schemes may be enhanced by improving their design, Kelsey Jack et al. (2008) warn that “it is unlikely a PES approach will always be able to simultaneously improve livelihoods, increase ecosystem services and reduce costs.” (p. 9469).

Despite all the academic attention to the aim of economic effectiveness and efficiency by means of market dynamics, in practice, prices of environmental services are usually set by an intermediary organisation, and not established within the context of a free market (Vatn, 2010). Vatn (2010) shows that “while in theory PES is seen as a market solution to environmental problems” (p. 1245), in many cases PES fundamentally depend on state engagement and organisation. Although this may be valid for most situations, this aspect is generally not articulated in the PES discourse. Vatn (2010) observes that in most cases, payments are allocated either as compensation or as an incentive to realise public targets, rather than being based on buyers’ appreciation of the provided environmental service. This implies that most of the PES schemes are primarily instruments designed to implement government policies, rather than aspects of autonomous market mechanisms.

Scholars have also reflected critically upon the appropriateness of a governance approach such as PES to contribute to sustainability issues in comparison to alternatives. For example, in a fenland area of East Anglia, in the UK, considerable financial incentives would be required to encourage farmers to participate in AES, while a more drastic intervention such as restoration of wet grasslands “is likely to occur on less productive land and to be associated with changes in land tenure” (Morris et al., 2000, p. 1). Engel et al. (2008) identified misassigned property rights, lack of awareness and what they refer to as capital market imperfections as additional limitations to PES as an appropriate strategy. When threats to an area of highly valued biodiversity are perceived to be serious and urgent, land acquisition, for example, may be proposed as an appropriate change (Wunder, 2006). In some cases, it may be more appropriate to assign property rights to those who manage the natural resources and ecosystems, to offer start-up capital or to raise awareness about impacts of land-use practices (Engel et al., 2008).

Some scholars have been even more critical of a governance approach based on monetary valuation of ecological services or functions. McCauley (2006) observes that ecosystem services may also have undesired impacts, may depend on short-duration market arrangements and may be replaced by technology. When environmental or ecosystem functions are largely unknown or unused, when monetary values are fluctuating drastically or when the costs of biodiversity conservation exceed its economic benefits, economic methods such as PES are considered limited in their capacity to help to conserve, preserve or protect characteristic aspects of the environment or ecosystem (McCauley, 2006).

### 6.2.2 *The payments for environmental services literature and set of evaluation criteria*

#### **Equity**

The focus in the PES literature on poverty alleviation addresses equity issues (Kerr, 2002; Grieg-Gran et al., 2005; Corbera et al., 2007; Kelsey Jack et al., 2008; Satake et al., 2008; Börner et al., 2010; Pagiola et al., 2010; Kinzig et al., 2011). In taking people's livelihoods as the starting point, scholars examine the positive and negative impacts of an intervention on the involved groups. Thus, PES is proposed as a mechanism to increase fair distribution of financial resources (Grieg-Gran et al., 2005; Pagiola et al., 2005; Pagiola et al., 2010). By contrast, Kinzig et al. (2011) argue that poverty alleviation should be addressed directly, not through PES schemes.

There are documented instances of programmes that focus on a single service leading to inequalities, where such programmes may benefit landholders rather than landless people (Kerr, 2002; Satake et al., 2008). Furthermore, unintended distribution-related issues, including "land grabbing, insecure tenure, overlapping claims, and a lack of information on private tenure" have also been observed to occur in PES programmes (Börner et al., 2010, p. 1272).

Aspects of equity are not included as clearly in the discussion of AES and effectiveness and economic efficiency as in the focus on poverty alleviation. The focus on AES takes contribution to biophysical surroundings as its starting point, which leads to less consideration of impacts on people's livelihood. The focus on economic efficiency centres on internal aspects of a PES programme, such as its design.

A notable exception is a study by Pascual et al. (2010). They proposed that inclusion of equity in the design of PES programmes depends more on the bargaining power of the stakeholders than on economic efficiency. Such bargaining power may depend on various factors including power relations among the involved groups, financial resources, practical issues such as available time and travel distance, and the leading group's invitation policy. Pascual et al. (2010) also state that if, in practice, equitable application of PES depends on bargaining power, PES should not be considered as a relatively easy, technical approach to solving environmental externalities, but as manifestations of negotiations, disputed or shared values, and conflicting or similar interests.

#### **Democracy**

The PES literature tends to be rather inattentive with regards to aspects of democracy, such as participation and representation. Some researchers study participation in PES programmes, though rather from the point of view of what influences possible providers to participate in a running scheme, than in terms of participation in the development, decision making and evaluation of a scheme. Two notable studies though analyse aspects of

participation by local groups to improve the design of PES programmes: one examines farmers' participation in an experimental PES programme in Costa Rica (Holguín et al., 2007); the other considers poor people's participation in PES schemes in Vietnam (Petheram and Campbell, 2010). Petheram and Campbell (2010) found that when researchers and participants are actively involved in designing and implementing a PES programme, schemes can be better tailored to potential providers' perspectives and participation can be enhanced.

Advocating a PES scheme entails a trust that the trade mechanism will address the sustainability issue in a certain context. As PES are inherently voluntary, though, uncertainties arise about the degree of willingness to pay and to participate to address the issue. However, this is not addressed in the discussion on economic effectiveness and efficiency. The discussion on AES does identify providers' willingness to participate as an important contributing factor in realising the desired results (Morris and Potter, 1995; Wilson, 1995). Whether farmers participate in AES programmes largely depends on the type of farming they practice (e.g. arable or pastoral) and their financial motivation, although their environmental concerns may also play a role (Wilson and Hart, 2000). Regarding financial motivation, the economic incentive offered by the UK AES programme did not appear to be attractive enough to persuade high-production farmers to participate, which may be due to the relationship between payments under EU Common Agricultural Policy and those under AES (Dobbs and Pretty, 2008). Dutch farmers' willingness to participate in AES may depend largely on their confidence in the government as a reliable buyer, the location of their farms and the high valuation of land-ownership and property rights (Jongeneel et al., 2008). However, other researchers have reported that providers' willingness to participate in the Dutch AES programme was not an issue because applications typically exceed availability in the Netherlands (Smits et al., 2008).

A more explicit scholarly focus on issue-resolution and problem-solving may draw greater scholarly attention to understanding and predicting willingness to pay and to participate, and to understanding whether a voluntary market approach is suitable to address a particular sustainability issue. So far, the aspect of willingness to participate has received greater attention than the aspect of willingness to pay in the discussion on AES. The aspect of willingness to participate is partly addressed in the discussion on poverty alleviation, for example, in terms of poor people having limited access to an initiative intended for their benefit (Kerr, 2002; Pagiola et al., 2010). Researchers observe that access to participation in programmes may be limited when transaction costs are high (Grieg-Gran et al., 2005; Pagiola et al., 2010), and that participation in PES design and implementation may exclude the most vulnerable and financially disadvantaged groups (Corbera et al., 2007).

### **Legitimacy**

Aspects of legitimacy, such as acceptance and accountability, as criteria for intervention in societal and biophysical processes to enhance sustainable development receive little

attention in the PES literature. Exceptions include analysis by Smits et al. (2008) of agri-environmental schemes, which includes the aspect of ‘socio-political support’, which they refer to as social and political acceptance achieved over the long term. A study by Sommerville et al. (2010) analyses fairness and acceptability of PES programmes. They observe that: “the perceived fairness of the distribution of the costs and benefits of the intervention” is “a key determinant of acceptability” of community-based PES (p. 1262). This notion of perceived fairness thus provides a perspective on the criteria of equity and legitimacy.

### **Handling scale issues**

In regard to the handling of scale issues as a criterion for governance for sustainable development, spatial boundaries and temporal constraints are typical features of a PES programme (e.g. Kleijn and Sutherland, 2003; Dobbs and Pretty, 2008; Wunder et al., 2008). The determination of boundaries and time limits is important in attempts to improve a PES scheme’s performance. Discussion on targeting areas of land considered appropriate for conservation objectives refers to spatial scale issues (e.g. Bayliss et al., 2005; Van der Horst, 2007; Melman et al., 2008; Merckx et al., 2009). Institutional scale aspects, in terms of connecting buyers and providers, for example through intermediary organisations, is typically a key issue in the discourse on PES (e.g. Engel et al., 2008; Wunder et al., 2008; Bohlen et al., 2009; Vatn, 2010).

In contrast, linking multiple (i.e. spatial, temporal, institutional and biophysical) and cross-scale aspects is not central to the PES literature. Satake et al. (2008) explicitly frame PES as a cross-spatial scale intervention approach to couple institutional and ecological assets and to handle damage caused by scale mismatches; they identify PES as a mode of intervention that can correct for damage caused by activities at a local scale, such as clearing land and burning fossil fuel and by phenomena that become manifest at a larger scale, such as global warming and biodiversity loss. Kinzig et al. (2011) also include cross-scale issues, and argue, for example, that how cross-country payments relate to payments within a country should receive greater attention in studying PES.

### **Handling uncertainty issues**

Some studies address experimentation and learning applied to improve a PES programme, in this way addressing the criterion of handling uncertainty issues. Holguín et al. (2007), for example, examine farmers’ participation, possibly in conjunction with technical assistance, in a large-scale experimental programme for ‘silvopastoral systems’, i.e. combining forestry and grazing of domesticated animals in a mutually beneficial way, in cattle farms in Costa Rica. They conclude that PES in combination with training and technical assistance is effective in this setting. Petheram and Campbell (2010) observe that in order to increase poor people’s participation in PES schemes, potential providers’ perspectives and context should be thoroughly researched, qualitative research and participatory tools should be used

to design the scheme and a mutual learning process should be facilitated among the involved groups. Using newly gained insights and monitoring to improve ecological effectiveness is an important process element in the literature focus on AES (Kleijn et al., 2001; Kleijn and Sutherland, 2003; Swagemakers et al., 2009; Sutherland et al., 2012).

### 6.3 PES in Practice

Following the conceptual discussion, this section examines empirical research on eight PES cases in the Dutch fen landscape. It analyses practical experiences of orientation towards steering and sustainable development. It also identifies how the PES cases studied address the five criteria on governance for sustainable development. The eight cases are introduced in the paragraphs below; further background information, characteristics and data sources are provided in Appendix C.

The Netherlands' national AES programme, *Subsidieregeling Agrarisch Natuurbeheer* (Subsidy Regulation for Agri-environmental Management - SAN) is the largest of the eight cases investigated. The SAN programme is aimed at landscape and biodiversity conservation, and, at the time of writing, sees the participation of some 5,738 dairy farmers located in the fen landscape. In 2007, SAN was restructured from a nationally-coordinated programme into a regional (i.e. provincial) programme. It should be noted that in June 2013 the Dutch government discussed plans including a proposal to cancel or drastically reform this programme, on the grounds that some aspects of its goals are unclear (Ministry of Economic Affairs, 2013).

The Nederland-Gruttoland (NLGL) programme also operates at national scale, and is mostly aimed at fen-meadow biodiversity. Initially, in 2003, this case was mainly financed through private buyers, but switched in 2006 to public buyers. It includes a group approach for participating farmers, and seeks measures that would successfully contribute to the preservation of a wading bird, the Black-tailed Godwit.

The Waterland (WL) programme operates at regional scale (in the province of Noord-Holland), and is aimed at biodiversity and landscape conservation, as well as water regulation. It is coordinated by an intermediary organisation (an agri-environmental association) and includes farmers as providers and municipalities and the water board as buyers.

The Eem & Vallei (EV) programme operates at regional scale (in the Arkenheer-Eemland area, which has 'national landscape' policy status), and is aimed at biodiversity and landscape conservation. It is coordinated by an intermediary organisation in the form of a public-private landscape fund established in order to implement the programme. The providers are farmers; the buyers include a mix of local and national companies, and local and national public bodies.

The Midden-Delfland (MD) programme operates at regional scale and is situated near urban areas. It was initiated by municipalities, and aims at biodiversity and landscape conservation. The buyers are three municipalities (Midden-Delfland, Delft and Den Haag) and several local companies. The leader is an NGO created to coordinate and implement the programme, with representatives of the three municipalities sitting on its board. Implementation is assisted by the local agri-environmental association. The providers are mostly farmers, with some local residents also participating.

The Alblasserwaard (AW) programme operates at regional scale in the Alblasserwaard-Vijfheerenlanden area (in the province of Zuid-Holland). A public landscape fund was established to implement this programme, which aims at biodiversity conservation and landscape conservation. The buyers are the water board and the implementation bureau for rural areas; the providers are farmers and residents. The leaders in this case are the buyers and the landscape fund itself.

The Biesland (BL) programme operates at local scale, near the city of Delft. It aims at biodiversity, landscape and soil conservation and water regulation. The provider is a single, large, biodiversity-oriented farm. The buyers include local, regional and national public bodies. An intermediary fund is involved to transfer money from the buyers to the provider. There is no officially designated leader in this case; the provider is the *de facto* leader. The financial arrangement developed for this case was approved by the European Commission for ten-year implementation.

The Naobers van Zudert (NZ) programme also operates at local scale, in the northern part of the Dutch fen landscape, and aims at biodiversity and landscape conservation and water regulation. To implement and coordinate this case, a public-private landscape fund was established by local residents and reed cultivators. The providers are local households. Initially (2005-2007), the buyers were a mix, including a national company, a private fund, local residents, a biodiversity conservation NGO, and national and regional public bodies. This later changed to a group composed mainly of the regional public buyer and various ad-hoc buyers of products resulting from the area's environmental services.

**Table 6.1: General information on the payments for environmental services (PES) cases studied.** \*Since start of payments. \*\*Earlier structures of the AES programme date back to the mid-1980s.

	<b>Main aim</b>	<b>Main actors involved</b>	<b>Duration*</b>	<b>Contract periods</b>	<b>Size of project area</b>
<b>Subsidie geling Agrarisch Natuurbe- heer (SAN)</b>	To enhance landscape and biodiversity conservation and water regulation	<ul style="list-style-type: none"> <li>- National government (ministry) (as buyer and initiator)</li> <li>- Province (as intermediary organisation)</li> <li>- Agri-environmental associations (as intermediary organisation)</li> <li>- Farmers (as providers)</li> </ul>	Current programme structure since 2000**	5-7 year contracts; planning how to continue under discussion	≈ 64,306 ha
<b>Nederland- Gruttoland (NLGL)</b>	To enhance biodiversity conservation (especially wading birds) and water regulation	<ul style="list-style-type: none"> <li>- A lottery and national government (ministry) (as buyers)</li> <li>- Three NGOs, an agri-environmental NGO, a nature conservation NGO and a landscape conservation NGO (initiators)</li> <li>- Coordinating organisation (intermediary)</li> <li>- Farmers (providers)</li> </ul>	<ul style="list-style-type: none"> <li>- 1<sup>st</sup> phase 2003-2005</li> <li>- 2<sup>nd</sup> phase 2006 and beyond</li> </ul>	1 year contracts, planned to be continued	≈ 751 ha
<b>Waterland (WL)</b>	To enhance biodiversity conservation, landscape conservation and water regulation	<ul style="list-style-type: none"> <li>- Municipalities and water board (as buyers)</li> <li>- Agri-environmental association (as initiator and intermediary)</li> <li>- Farmers (as providers)</li> </ul>	Since 1997	Ad hoc contracts, planned to be continued	≈ 13 ha
<b>Eem &amp; Vallei (EV)</b>	To enhance biodiversity and landscape conservation	<ul style="list-style-type: none"> <li>- Buyers are a mixture of local and national companies (45%), municipalities, the province, national government (45%) and private individuals (10%)</li> <li>- A local public-private landscape fund (as intermediary)</li> <li>- About ten dairy farmers (providers)</li> </ul>	Since 2003	Ad hoc	Scattered plots in area of ≈ 8500 ha.
<b>Midden- Delfland (MD)</b>	To enhance biodiversity and landscape conservation	<ul style="list-style-type: none"> <li>- Three municipalities and some local companies (as buyers);</li> <li>- A local fund (intermediary);</li> <li>- Agri-environmental association (intermediary)</li> <li>- Farmers and some residents (providers)</li> </ul>	Since 2006/2007 until 2012+	6-year contracts, planned to be continued	≈ 1 500 ha
<b>Alblasser- waard (AW)</b>	To biodiversity conservation and landscape conservation	<ul style="list-style-type: none"> <li>- Water board and the Public Bureau of Rural Affairs (buyers)</li> <li>- A local public landscape fund (intermediary)</li> <li>- Farmers and residents (providers)</li> </ul>	Since 2005	Ad hoc contracts, planned to be continued	≈ 5 ha

<b>Biesland (BL)</b>	To enhance biodiversity, landscape and soil conservation, and water regulation	<ul style="list-style-type: none"> <li>- National government (ministry), the province, the water board and four nearby municipalities (buyers)</li> <li>- A local fund (as intermediary)</li> <li>- One farmer (as provider)</li> <li>- A semi-academic research organisation (contributed in developing the concept and is involved in monitoring and evaluation)</li> </ul>	Since 2008 until 2028/2038+	20-30 year contract	≈ 95 ha
<b>Naobers van Zudert (NZ)</b>	To enhance biodiversity and landscape conservation, and water regulation	<ul style="list-style-type: none"> <li>- A mix of buyers in 1st phase (a national company, a private fund, local residents, a nature conservation NGO, a ministry, and the province)</li> <li>- In the 2nd phase, buyers included: the province, and other various ad-hoc buyers of products resulting from the environmental services in the area</li> <li>- A local public-private landscape fund (intermediary)</li> </ul>	<ul style="list-style-type: none"> <li>- 1<sup>st</sup> phase 2005-2007</li> <li>- 2<sup>nd</sup> phase 2008+</li> </ul>	Ad hoc contracts, planned to be continued	≈ 5 ha

Following the introduction of the SAN AES programme in 2000, the seven other PES programmes described above were introduced or continued as complementary PES measures to address aspects that SAN did not. An important feature of the relationship between the SAN programme and the seven other cases is that application of the SAN national policy imposes formal conditions on how the other programmes operate.

The seven additional programmes were launched for various purposes (see Appendix C for further details). Firstly, SAN was considered to be insufficiently effective in protecting meadow-bird populations (NLGL). Secondly, SAN did not provide payments for specific landscape and water management practices (WL, EV, MD, AW, NZ). Thirdly, SAN did not enable drastic, integral transition to high-level agri-environmental practices (BL). SAN influences four of the cases studied (NLGL, MD, BL, NZ) more than the three other cases (WL, EV, AW).

Available information on the cases studied shows that the majority of funding for PES is supplied by public buyers, i.e. the former Ministry of Agriculture, Nature and Food Quality whose responsibilities at the time of writing were divided among two other ministries, provincial authorities and several municipalities. These are larger in number and level of financing than the private buyers, i.e. local and national companies and private individuals (see Appendix C). The largest environmental service providers are dairy farmers, although cattle farmers and residents also acted as providers. SAN has a relatively large budget and number of providers. No payment flows directly from buyer to provider; all payments in these eight cases flow through an intermediary fund or association. Although the cases differ widely in terms of their participants, it is evident that public

bodies are principal buyers with relatively large budgets, and dairy farmers are principal providers. The scope and budgets of the cases also differ.

### *6.3.1 Experiences with sustainability in payments for environmental services*

In general, the PES cases studied have a practical orientation towards ‘the cause of the problem’. Their stated aims do not explicitly formulate such causes in terms of insufficient incorporation of negative environmental externalities and lack of contribution to livelihood. However, again in general, the cases highlight the beneficial context of biodiversity and environmental conservation goals combined with possibilities for income support for local providers. All the PES cases analysed emphasise conservation of species-rich fen meadows as part of their intended contribution to aspects of the Dutch fen landscape that are under pressure. Although these PES cases are based on financial reward, they made only a minimal contribution to economic viability of the land-use.

The eight PES cases differ substantially in their management practices, the number of aspects-under-pressure that they address and the spatial and temporal scales at which they operate (for an overview, see Appendix C). For example: water table rise is addressed by three programmes (i.e. SAN, NLGL, BL); and peat-soil conservation is addressed by only one (BL). BL makes the broadest range of contributions to sustainability aspects (i.e. water table rise; water-quality improvement; conservation of peat soil, species-rich fen meadows, species-rich fens and cultural historic landscape elements and enhanced recreation options), and at a relatively large spatial scale geared to the long term.

The aspect addressed most frequently and at the largest temporal and spatial scales is species-rich fen meadow conservation. SAN, the AES scheme, contributes on a large spatial scale to such conservation, where external factors also influence bird populations, but some reports show mixed results (Kleijn and Sutherland, 2003; Kleijn et al., 2004; De Koeijer, 2007; Verhulst et al., 2007; Smits et al., 2008; Swagemakers et al., 2009). Practices aimed at conservation of cultural historic landscape elements and enhanced recreation options are also applied, though on smaller spatial and temporal scales. Regulation of greenhouse gases and enhanced flood risk management are not addressed by these programmes.

The PES cases studied mostly contribute to the aspects-under-pressure of the fen landscape by reducing or mitigating some of the negative impacts of the current land-use practices. None of the studied PES schemes intervene at the level of entirely changing land-use practices, although BL does include some major changes.

The basis for payments differs: some cases include product-based payments (i.e. WL, EV, AW, NZ); others include area-based payments (i.e. SAN, NLGL, MD, BL). Seven of the cases (i.e. SAN, NLGL, WL, EV, MD, AW, NZ) compensate the providers for their

additional management costs, labour costs or 'lost' profits, rather than paying a financial reward for the environmental services provided.

Although SAN has the largest budget and covers the largest area, it does not pay the largest sum per hectare. The BL case has the largest average sum available per hectare per year, and is also the only programme that plans to ensure its economic viability through environmental service provision, i.e. by integrally and drastically changing the farming practices from commercial dairy farming to multifunctional land-use practices, which include some extensive grassland farming but in combination with biodiversity conservation.

The seven other programmes provide no more than a third of the amount provided in the BL case (which has developed an innovative, temporarily permitted way to construct its payments). These seven programmes partially or fully pay the costs of environmental service provision, though not sufficiently to enable profitability for the provider. Although one of the cases studied (NLGL) negotiates the PES contracts annually, its participating providers expressed a need for longer-term contracts. Conversely, SAN, which also operates on the national level, offers only long-term contracts, prompting its intermediaries and providers to demand greater flexibility. Appendix C provides an overview of contributions made by the PES cases studied to economic viability of land-use.

There is a noticeable tendency in the PES cases studied towards small local and regional transactions, mostly between private individuals and private groups as providers and public bodies as buyers. The findings show that these cases determine their level of payment either by roughly estimating the effort necessary for provision, or by calculating a substantial portion of the costs of management practices. The cases appear to make only a marginal contribution to economic viability of land-use in the Dutch fen landscape.

### *6.3.2 Experiences with steering in payments for environmental services*

It is important to account for the relatively small contributions generally made by the PES cases examined. A possible factor is that the actors involved reported that they had encountered several obstacles and constraints to steering. These are summarised and categorised in Appendix C.

Firstly, some of the reported obstacles relate to laws and formal rules, which may limit a programme in its development and implementation of practices for provision of environmental services (c.f. Groeneveld and Smits, 2006; Buizer, 2008). The EU, for example, rejected a request for payment of a 'basic landscape bonus' (MD) and a request to apply the concept of the BL case at other locations (cf. Buizer 2008). In both cases, public buyers wanted to pay for environmental services provided by farmers. EU and national administrative regulations on the transparency of public financing for private, individual providers and on governmental aid in market competition prevented such payment. In the

case of BL, the regional public buyers and the EU even explicitly imposed the condition that the provider may receive additional payments only from private buyers. Another external obstacle concerned the difficulty of obtaining private funding when a programme intended to expand spatially. External assessments also identify obstacles relating to formal rules within the SAN initiative, which create an administrative burden and lack of flexibility (Groeneveld and Smits, 2006).

Secondly, two types of obstacles are identified that strongly influence whether PES programmes can be combined, a practice known as “stacking” (i.e. participating in more than one programme to deliver certain environmental services in sequence and/or in certain proportions). The first obstacle concerns regulation on financing. Some providers in the cases analysed have attempted to stack public and public/private financing programmes. Respondents emphasise that EU regulations impose limits on the stacking of publicly financed or co-financed programmes that seek additional public funding (BL, MD). Therefore, once such a PES programme becomes operational, the options for additional public buyers to finance it are limited. As *privately* funded services are not subject to these regulations, they can be stacked with publicly financed or co-financed programmes. This complicating factor – i.e. regulation in public financing – can be compared with Dobbs’ and Pretty’s finding (2008) that public payments from different sources may be mutually exclusive.

The second obstacle concerns the biophysical impossibility of stacking certain services, such as two or more services that require different water management regimes on the same land at the same time. An obvious example of this is the mutual exclusion of species-rich wet-fen conservation and species-rich fen meadow conservation at a single location: a simultaneously high and low water table level is impossible. This type of biophysical limitation to stacking of PES has not been reported as such in the literature.

In addition, several limitations to potential improvement of the contribution to economic viability of land-use in the PES cases studied were observed. Economic viability requires that payments should at least cover costs, which is all that public financing usually covers. EU regulations, for example, restrict public PES above costs.

Private payments largely depend on the private financier’s valuation and *are* permitted to exceed the cost-covering threshold – enabling a provider, in principle, to profit from the payment. However, the findings show that the potential to mobilize large-scale private buyers is limited. In three cases, documentation showed the difficulty of obtaining minor funding from private individuals (MD, WL, EV). There had been, for example, several unsuccessful attempts to secure small contributions from residents of a nearby city or inhabitants of a certain region who were expected to have a commitment to that city or region.

The cases studied show that in the Dutch fen landscape buyers’ participation is a larger obstacle to the continuation and expansion of PES programmes than providers’ participation. This confirms earlier findings that government and consumer demand for

environmental services is more limiting to the development of PES than farmers' supply (Van der Ploeg, 2001; Pagiola et al., 2002). One way to increase the involvement of public buyers could be for a national public authority for environmental management to become a buyer of soil-conservation services, or for a national public authority for water and public works to buy water regulation services (although the payments from public buyers would still not be able to go beyond the cost-recovery level).

All in all, the limitations described above show that PES schemes such as those studied can be expected to be restricted, at least in the near future, in their potential to contribute to economic viability of multifunctional landscapes. A similar finding was made by Van der Ploeg (2001), who observed that, under prevailing conditions, even the maximum possible development of diversified farming, in combination with its maximum possible intensification, seems unable to support local farm incomes (Van der Ploeg, 2001).

Given the ongoing global climate-change debate and the potential of large-scale fen conservation to contribute to reduction of greenhouse gas emissions (Bresser et al., 2005), payments for peat-soil conservation services to prevent soil subsidence and payments for sequestration of carbon could be seen as promising options. For diversifying PES programmes in a fen landscape, water-regulation services could hold potential since they are key to sustainable development of such landscapes. Greater provision of services to raise water table levels and increase peat-soil conservation may enhance the contribution of the PES cases to sustainable development of the Dutch fen landscape. How the PES programmes might include such provision is worth investigation.

However, serious complications arise. At least two points should be considered regarding the virtually non-existent market for peat-soil services: firstly, climate-change policy is an important pre-condition for realising peat-soil conservation services aimed at mitigating greenhouse gas emissions; secondly, such services will require small-scale, highly customised management practices and corresponding payments because peat-soil properties vary substantially by location (Joosten and Clarke, 2002).

Water-regulation services related to raising water table levels are difficult to provide selectively in the context of the Dutch fen landscape, where public bodies (i.e. water boards) are legally obligated to become involved in collective decision making on water table management (Toonen et al., 2006). Consequently, further efforts to raise water table levels need to address a transition from individual providers and receivers of payments to collective coordination through the water board. If the gap between individual providers and collective decision making is not bridged, further provision of this service will be limited. In addition, as peat-soil conservation largely depends on water regulation (Best et al., 1993; Hoeksema, 2007), the transition from individual to collective provision is also important for soil services aimed at carbon sequestration and prevention of soil subsidence.

### 6.3.3 *Payments for environmental services experiences with the set of evaluation criteria*

#### **Equity**

Despite the scholarly focus on poverty alleviation in PES in relation to fair distribution as an aspect of equity, the cases analysed seem not to contribute to a more equal distribution of financial means, particularly between providers who made specific environmental efforts and beneficiaries of those efforts. Although the PES programmes in the Dutch fen landscape may have intended to improve the economic situation of the landscape's providers (i.e. mostly dairy farmers), the analysis above shows that the actual contribution of the eight cases to economic viability of land-use appears to be marginal (see Table C.3 in Appendix C). While fairer distribution may at least have been considered in the cases analysed, the equity aspect of striving for unbiased decision making is not explicitly addressed by the leading actors.

#### **Democracy**

In comparison to aspects of equity and legitimacy, the PES cases address aspects relating to democracy more clearly. This is seen in their processes of participation. With the exception of the national government programme, led by a national governmental body, the programmes include citizen participation (i.e. farmers in all cases, and local biodiversity conservation groups in several cases) and multiple groups in the decision making, albeit in different ways and to differing extent. The aspect of representative or collective decision making for societal goals is not specifically addressed.

#### **Legitimacy**

Aspects of legitimacy appear not to have been explicitly addressed by the leading and coordinating actors, although several issues relating to accountability and acceptability are encountered. These include: a legal conflict between farmers and biodiversity conservationists about a decision on mowing schedules and protection of chicks in fen meadows (NLGL); and objections by participants to high level government decisions - participants objected to the blocking of certain payments due to EU regulations on the stacking of public financing (BL and MD) on the grounds that they are highly unfair and unjust.

#### **Handling scale issues**

Although the PES cases studied have encountered a variety of temporal, spatial and institutional scale issues, they do not develop or consider approaches to handling these issues. Scale issues encountered relate to connecting spatial and temporal scales to financing issues, such as: expansion of a programme's spatial scale causing private

fundraising to become too difficult; lack of a mechanism to create a new fund for spatial upscaling; and a lack of long-term contracts. The findings indicate that there is a trade-off between long-term static schemes and short-term flexible schemes: providers and intermediaries in the case of SAN, which includes 5-7 year contracts, have demanded a mechanism to enable customisation and shortening of contracts, whereas the providers and intermediaries of the one-year-contract case, NLGL, have demanded long-term commitment. One case, BL, illustrates the possibility of a long-term (i.e. 30-year) commitment.

### **Handling uncertainty issues**

The present study shows that the setting of the Dutch fen landscape entails various uncertainties regarding stakeholder status, biophysical contexts and potential for further development. However, most of the cases do not explicitly acknowledge these issues, nor do they focus on how to handle uncertainties and complexities.

However, experimentation and learning as an aspect of handling uncertainty issues, is applied in the policy-making process in one case (NLGL), and has identified, for example, that a group approach may be more effective than an individual approach in enabling learning about the programmes. Actors in two cases (BL, NLGL) observe that the required continuity of knowledge exchange is not guaranteed, which could hinder learning. Most of the PES cases studied (i.e. NLGL, WL, EV, AW, BL, NZ) do identify lessons drawn from the respective programme about the programme itself and about the biophysical environment. Actors in one case (NLGL) report adaptations made explicitly in response to lessons learned. After evaluating its results, the programme has, for example, postponed mowing until later in the spring and spatially enlarged undisturbed breeding space at all locations in the programme in order to improve the breeding success of meadow birds. In doing so, it applies a group approach to conservation of fen meadow bird populations, complementing the ecological effectiveness of SAN, the Dutch AES programme. Positive evaluation of the group approach in NLGL found it to be more successful than an individual approach.

Another lesson learned about the biophysical environment is reported for the WL case, where a successful pilot scheme clustered dredging practices. Regarding the functioning of the programmes themselves, lessons learned include: that motivation and commitment are critical success factors (BL, AW, NZ); that an exceptional legal situation is possible with 'regulated tolerance' of the processing of mown grass (WL); and that raising funds for specific programme aims is more feasible than raising funds for general aims (EV).

Lastly, the existence of multiple cases may offer participants the option of learning from each other, though this did not happen automatically or in a straightforward manner.

## 6.4 Discussion of a Navigational Course Based on Payments

The PES cases analysed include one large, national, publicly financed AES programme focused on species-rich fen meadow conservation and several smaller, publicly or publicly/privately financed PES programmes that are required to relate to the dominant AES programme. Although these PES schemes are economically orientated, they do not involve spontaneous trading. Usually, they are designed and managed with the aid of governments and/or governmental regulation, and are instrumental in achieving a certain environmental goal by financially assisting or compensating the providers of effort to facilitate the related environmental services (cf. Vatn, 2010).

The findings of the present study show that in the empirical context, various configurations are applied in the design of payment programmes. These configurations include payments not only by users, but also by public and private buyers on behalf of beneficiaries. Distinctions between user-financed and government-financed programmes (Engel et al., 2008) and between demand-driven and supply-driven design of programmes (Pagiola et al., 2002) appear to be only partly valid. Findings show that characterising a programme as single-actor driven or jointly driven seems more applicable. It is difficult to make general statements on the success or otherwise of either demand-driven or user-financed programmes because the cases studied comprise various mixed forms of financing and drivers.

Overall, the research shows that the cases examined make a small contribution to the sustainable development of the multifunctional fen landscape. It is evident that several institutional and biophysical obstacles impede their further development in this direction. Impediments include complications due to formal decision making procedures on water management and certain biophysical constraints on water and soil management. Obstacles to stacking and wider-scale application of PES due to dependency on formal (high level) decision making procedures are in line with observations by Groeneveld and Smits (2006), Buizer (2008) and Dobbs and Pretty (2008). The existence of impediments due to biophysical constraints adds a new type of limitation to the applicability of PES to those previously identified.

The present study also found that the PES cases were limited in their contribution to economic viability of land-use in the multifunctional fen landscapes, mainly due to regulations on combining public PES and the small market for privately financed payments. This is in line with observations by Vatn (2010), who indicates that PES in practice are rarely spontaneous market arrangements but typically government-guided arrangements. Moreover, the literature has mainly been oriented towards improving existing PES programmes or introducing new initiatives as effectively as possible; it has not addressed the challenges of creating a market without spontaneous supply and demand.

The PES cases studied in the Dutch fen landscape have to conform to a set of government regulations on financing, market competition, environmental standards, water

management and other policy norms. Thus, the warning given by Börner et al. (2010) regarding the consequences of free-market implementation of unregulated PES, such as land grabbing and insecure tenure, seems not to apply in this multifunctional setting. However, results of the present study show that although government regulation may prevent certain inequalities in distribution of positive and negative impacts, it does not guarantee that equity aspects will be naturally included in the design and decision making of PES schemes.

The observed acceptability issues in the cases studied – involving perceived fairness of the distribution of positive and negative impacts and financial resources – relate to legitimacy and equity (cf. Smits et al. 2008; Sommerville et al., 2010). However, legitimacy is not a key consideration in the PES discourse, and equity is a key consideration only in the discussion on poverty alleviation. The cases studied show that issues related to public acceptance and the ability of public decision makers to explain and justify their decisions, and issues relating to perceived fairness of distribution may influence the functioning of PES programmes. Analysis shows that aspects of equity and legitimacy may further explain why, in a landscape such as the multifunctional Dutch fenlands, where PES may seem promising, they have not yet produced strong results. Further insight into how aspects of representation and participation are included in the design and implementation of PES programmes may lead to a greater understanding of how decision makers deal with representation of affected groups when making normative choices (cf. Petheram and Campbell, 2010; Vatn, 2010).

Despite certain findings that indicate a capacity of PES to handle mismatches of scale to sustainability challenges (Satake et al., 2008), the cases studied encountered several scale issues that impede their function and possible further application. The present study showed that it is complicated to reformulate agreements when initiators intend to increase the spatial scale of a programme, and that it is difficult to extend agreements between current buyers and providers to long-term payments and provisions. A possible reason for these issues arising is that a remote benefit seems less attractive to private funders. More research could be helpful in determining how to build in processes that anticipate and deal with possible changes in temporal or spatial scale.

Finally, although it may be beneficial for the groups involved to strive for improvement of PES programmes, the present study shows that PES as a pathway to sustainable development in such a setting seems limited (cf. Vatn, 2010). Persistent complications relate to factors such as formal procedures for policy-making on water management, biophysical constraints on water and soil management, financial restrictions on public-funded programmes and apparently low latent demand among possible buyers. These amount overall to weak contexts for a voluntary market-like exchange based on payments for environmentally beneficial practices.

### 7.1 Comparison of the Three Selected Navigational Paths

How to navigate towards the destination of sustainable development? How to do so when conditions on the different flight decks of Planet Earth are unsettled and the goal periodically shifts, reinterpreted from diverse perspectives? The three modes of governance examined in the present study are the route maps to sustainable development most prominently debated in the academic cabins on Spaceship Earth. As we face the challenge of ensuring Earth's systems move onto or stay on a sustainable track, the paths presented by adaptive management, transition management and payments for environmental services (PES) make up those most drawn and redrawn in the comprehensive and growing body of literature on governance for sustainable development. The initial impulse behind the present study was twofold: firstly, a desire to understand whether and how the three selected modes of governance differ in their orientation towards sustainable development and towards steering; secondly, curiosity about how they address established criteria for governance for sustainable development. In other words, are we exploring divergent or parallel navigational courses through Earth's systems, and are they likely to take us to the desired destination?

The first section of this concluding chapter offers a comparative reflection on the conceptual orientation of the three selected modes of governance towards steering and sustainable development and on how they address the criteria on governance for sustainable development. The second section reflects comparatively on the same elements of the selected empirical cases. Following a brief critical reflection on the applied research methodology, the thesis concludes by addressing the overall interest behind this study about whether the selected modes of governance actually help to build pathways for sustainable development.

#### 7.1.1 *Conceptual orientations towards sustainability and steering*

The difference in emphasis of the three modes of governance in their orientation towards sustainable development is shown in Table 7.1 (below). Adaptive management and transition management both envisage prevention of system collapse. However, the different notions on which they are based – the former on enabling resilience and thus perseverance

of the existing system, and the latter on radical transformation of the system – illustrate the wide-ranging, even contradictory, interpretation of what sustainable development entails. They also reflect the inherent ambiguity of the concept of sustainable development (cf. Lafferty, 2004; Dryzek, 2005; Kates et al., 2005; Meadowcroft, 2007).

Both adaptive management and transition management originated in the idea that the ‘sustainability problem’ is caused by inadequate handling of important elements in a system that leads to crisis or collapse of that system. However, adaptive management emphasises inadequate handling of uncertainties and complexities as driving the sustainability challenge, whereas transition management stresses inadequate or improper use of technology and resources. In PES, the ‘sustainability problem’ is seen as resulting from insufficient accounting for environmental externalities. Although such insufficient accounting for may include a lack of penalty for harms done (negative externalities), PES focuses on rewarding efforts to ensure provision of environmental services (positive externalities). Change is sought by addressing the absence of or insufficient organisation of market arrangements for ecosystem services.

**Table 7.1: Summary of the comparison of three modes of governance according to their orientation towards sustainable development.**

Orientation towards sustainable development	Mode of governance for sustainable development		
	<i>Adaptive management</i>	<i>Transition management</i>	<i>Payments for environmental services</i>
<i>Main notion of what causes the ‘sustainability problem’</i>	<ul style="list-style-type: none"> <li>• Inadequately handling of uncertainties and complexities and adaption to changing circumstances; which may make a social-ecological system susceptible to collapse.</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate or improper use of technology and resources, and insufficient adaptation of the ‘structure of a system’; which may lead to crisis of the system.</li> </ul>	<ul style="list-style-type: none"> <li>• Exclusion of environmental externalities involving lack of reward of efforts by local resource managers; which may lead to depletion of biodiversity and natural resources and an increase in poverty.</li> </ul>
<i>Substantive orientation towards the goal of sustainable development</i>	<ul style="list-style-type: none"> <li>• Enhancing capacity to reduce vulnerability.</li> <li>• Enhancing adaptive capacity.</li> <li>• Enhancing resilience.</li> </ul>	<ul style="list-style-type: none"> <li>• Creating new conditions to prevent crisis in a system.</li> <li>• Enabling the system ‘to shift to another state’.</li> <li>• Operationalising sustainable development as an ‘open-ended’ process.</li> </ul>	<ul style="list-style-type: none"> <li>• Enhancing livelihoods by increasing income of providers.</li> <li>• Reducing negative environmental externalities by increasing preservation of ecosystem services.</li> </ul>

Unlike adaptive management, PES do not emphasise enhancing a capacity, nor do they emphasise altering the system to arrive at a new 'state' as in transition management. Rather, the PES approach stresses a beneficial trade in terms of enhancing positive impacts on people (i.e. their livelihoods) in return for reducing negative impacts on biodiversity and ecological systems (i.e. negative environmental externalities). In adaptive management, the orientation towards sustainable development includes enhanced capacities to cope with change and to deal with uncertainties and complexities, and facilitating enhanced resilience and reduced vulnerability. The emphasis of transition management on the prevention of collapse explicitly entails an 'open-ended process' for the operationalisation of sustainable development.

An important finding of this study is that, overall, the respective literature on adaptive management, transition management and PES contains little reflection on the goal orientation of each mode: discussion is lacking on what sustainable development entails and how sustainability challenges are diagnosed. For example, the respective literature sees barely any discussion of the appropriateness of resilience as a goal in adaptive management or the extent to which transitions contribute to poverty alleviation and a more equitable distribution of resources. Critical reflection on the goal itself of a mode in question is seen only in the debate on PES in the form of argument that PES are inherently unsuitable to address poverty alleviation (Kinzig et al., 2011) and in doubt whether ecological effectiveness should be addressed through PES (Kleijn and Sutherland, 2003; Kleijn et al., 2004; Kleijn et al., 2006; Verhulst et al, 2007)

The present study shows that the differing conceptualisation of sustainable development and diagnosis of the main cause of the problem is closely connected with the different orientations towards steering. Adaptive management centres on types of process, transition management on envisioned change, and PES on elements of design and organisation. The processes of adaptive management are geared to learning-by-doing towards the goal of dealing with uncertainties and complexities; transition management emphasises continuous fundamental change through dispersal of guided innovation; and PES emphasises contracts or programmes to financially reward specific management practices.

To summarise, in recent academic discussion on adaptive management, transition management and PES, the dominant notions of how to move towards sustainable development are based respectively on gaining greater knowledge in combination with cooperation, enhancing innovation and steering by public bodies, and organising financial arrangements. Table 7.2 provides an overview.

**Table 7.2: Summary of the comparison of three selected modes of governance according to their orientation towards steering.**

Orientation towards steering	Mode of governance for sustainable development		
	<i>Adaptive management</i>	<i>Transition management</i>	<i>Payments for environmental services</i>
<i>Key conceptual assumption about how to induce change</i>	<ul style="list-style-type: none"> <li>• It is promising to deal with uncertainties, complexities and adaption to changing circumstances by equipping the system with learning-through-experimentation and platforms for cooperation.</li> <li>• Aim for incremental enhancement of resilience of a social-ecological system, usually in a certain region or resource area.</li> <li>• The size or scope of the change process from a current situation towards a sustainable situation varies from case to case.</li> </ul>	<ul style="list-style-type: none"> <li>• It is promising to prevent environmental crisis by managing or accelerating drastic societal processes.</li> <li>• A fundamental change of state of the system is necessary, through what is referred to as gradual radical change, eventually at large scale.</li> <li>• It is necessary to stimulate a paradigm shift.</li> </ul>	<ul style="list-style-type: none"> <li>• It is promising to include externalities and to pay local resource managers by attributing monetary value to the provision or management of ecosystem assets.</li> <li>• It is necessary to introduce a market arrangement/economic value-based initiative.</li> </ul>
<i>Key process elements for the design and organisation of an intervention</i>	<ul style="list-style-type: none"> <li>• Learning-by-doing.</li> <li>• Cooperation and knowledge exchange between scientists, policy-makers, practitioners.</li> <li>• Management-by-experiment (i.e. short- and long-term facilities to enable monitoring, evaluation, negotiation, learning and adaptation; large- and small-scale experiments).</li> </ul>	<ul style="list-style-type: none"> <li>• Stepwise learning towards fundamental change (i.e. monitoring and evaluation of content and process in interim rounds).</li> <li>• Envisioning with long-term goals and development of pathways.</li> <li>• Experimentation in niches (i.e. stimulation of transition experiments in niches).</li> <li>• Stimulating and steering changes in the regimes.</li> <li>• Government plays a central role in guiding the process.</li> </ul>	<ul style="list-style-type: none"> <li>• Economic transactions.</li> <li>• Making landscape management and nature conservation economically viable.</li> <li>• Identification of buyer, provider, service and payment.</li> <li>• Agreement on programme or contract.</li> <li>• Guarantee of provision of environmental service as well as guarantee of payment for it, including monitoring.</li> </ul>

Adaptive management focuses on management of ecosystems or natural resources, whereas transition management focuses on management of technologies and production processes. Their notions of a social-ecological and socio-technological system are similar in that they both link a societal construct (i.e. society) to a non-human centred construct (i.e. technology and ecosystems), and consider this coupling as a system (cf. Van der Brugge and Van Raak, 2007; Foxon et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011). A significant difference here is that ecosystems have their own processes and dynamics, whereas technology is designed and implemented by humans (cf. Smith and Stirling, 2010;

Voss and Bornemann, 2011). In contrast, the concept of PES does not articulate the notion of a system in terms of coupled human and non-human centred dimensions.

In the literature on adaptive management, the unit of analysis is typically a governance initiative in a social-ecological system, whereas in the transition management literature it is typically a governance initiative in a socio-technological system. A notable difference here is the explicit consideration of the spatial dimension in the former context and its relative absence in the latter (Foxon et al., 2008; Smith et al., 2010). While the transition management concept focuses on functional levels as niches, regimes and landscape, the relevant literature is unclear about the linkage of such levels to biophysical or geographical dimensions. For example, it has not yet addressed issues such as which biophysical and geographical scale levels should apply for initiatives and socio-technological systems, and which geographical and biophysical locations should apply for niches and regimes.

Although learning and experimentation are key process elements in both the adaptive management and the transition management discourse (cf. Smith and Stirling, 2010; Voss and Bornemann, 2011), their functions differ (Van der Brugge and Van Raak, 2007; Foxon et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011). Learning and experimentation in adaptive management serves to equip actors involved in a social-ecological system with insights on dealing with changing and unexpected circumstances (Van der Brugge and Van Raak, 2007; Foxon et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011). In contrast, transition management promotes learning and experimentation in order to develop and realise new methods, technologies and innovations that are appropriate to a certain pathway or scenario (Foxon et al., 2008; Smith and Stirling, 2010; Voss and Bornemann, 2011).

Certain elements or dimensions of the selected modes are considered aspects of conventional governance in the governance literature. These include learning in adaptive management (e.g. Huitema et al., 2009), a central steering role for elites and public bodies in transition management (e.g. Smith and Stirling, 2011) and market mechanisms in PES (e.g. Vatn, 2010). The three modes also include the conventional steering notion that key actors are expected to be involved (i.e. scientists, practitioners and policymakers; governments and frontrunners; public and/or private buyers and suppliers), although not explicitly in terms of a configuration of state, market and civil society actors. Each mode articulates a type of steering arrangement (i.e. learning and cooperation, government-coordinated innovation through frontrunner groups, facilitation of exchange of finance and environmental services), but not according to a classification of hierarchical, network or bottom-up governance. Thus, the conventional elements or dimensions that are typically used to organise modes of governance appear to be somewhat reorganised in the three modes studied.

Some scholars have borrowed elements from the body of thought on transition management and applied them to adaptive management, and vice versa (Folke et al., 2002;

Smith et al., 2005; Olsson et al., 2006; Geels and Kemp, 2007; Van der Brugge and Van Raak, 2007; Olsson et al., 2008; Foxon et al., 2009; Smith and Stirling, 2010; Voss and Bornemann, 2011). For example, Smith et al. (2005), use the notion of ‘adaptive capacity’ to develop their concept of regime transition, and refer to Folke et al. (2002). Olsson et al. (2008, p. 9489) borrow from the concept of transition management in formulating their observations on adaptive governance in terms of ‘navigating the transition to ecosystem-based management’, and refer to transition management authors Geels and Kemp (2007). However, differences between the two discourses are clear and basic, where resilience could potentially even be an impediment to transformation (cf. Smith and Stirling, 2010; Voss and Bornemann, 2011).

The present study shows that elements from one mode might inform another in terms of handling difficulties encountered in practice. Transition management, for example, might benefit from lessons drawn from adaptive management about learning-through-experimentation in settings where the biophysical and geographical dimensions play a substantial role. A study of the orientation towards sustainability in a specific context may identify more than one cause of the sustainability problem; in such a setting, a mixture of approaches could theoretically be advised in order to address all the challenges. Due to the complexity of sustainable development at least one study suggests that “a broad base of different (and partially overlapping) theories is probably needed to deal with the multiple challenges that present themselves at any point in time – especially because these challenges (and available theories) will also change over time.” (Dewulf et al., 2009, p. 48). However, the present study also reveals that conceptual speculation about possible integration of elements is not likely to improve the capacity to govern towards sustainable development when uninformed by experiences in practice. Rather than combining theoretical approaches, the present study suggests greater value in learning from the empirical practices related to different approaches, the goal orientation behind them, why they do or do not contribute in practice to sustainable development and the actual barriers to the goal.

### *7.1.2 Following the ‘beacons’ along theoretical paths*

Table 7.3 summarises how the respective literature on each mode of governance addresses the set of criteria, or ‘beacons’, on governance for sustainable development. A criterion is viewed as a central consideration when it is explicitly addressed, not a central consideration when it is not addressed at all and as addressed in a few studies when it is included by at least two studies. When a criterion is only partly addressed or addressed only in a specific sub-debate, this is indicated as such and further explained in the text below.

**Table 7.3: Overview of how the literature on each of the three selected modes addresses the criteria for governance for sustainable development.**

Criterion	Mode of governance for sustainable development		
	<i>Adaptive management</i>	<i>Transition management</i>	<i>Payments for environmental services</i>
<i>Equity</i>	Addressed in a few studies.	Not a central consideration.	Central consideration in poverty alleviation.
<i>Democracy</i>	Participation of multiple groups is increasingly emphasised.	Central consideration.	Addressed in a few studies.
<i>Legitimacy</i>	Not a central consideration.	Not considered by proponents; articulated by critics.	Not a central consideration.
<i>Handling scale issues</i>	Central consideration.	Time scales and functional scales are central considerations; spatial scales are addressed in a few studies.	Addressed in a few studies.
<i>Handling uncertainty issues</i>	Central consideration.	The aspect of learning and experimentation (referring to limited knowledge) is a central consideration.	Using new insights and monitoring (of limited knowledge) is central in agri-environmental schemes.

In terms of sustainable development as defined more than 25 years ago by the WCED (1987), equity is considered an inherent and pivotal component. It is notable, then, that none of the respective debates on the selected modes of governance explicitly discusses how learning-through-experimentation and cooperation, innovation and transformation and stimulation of market mechanisms help to enhance equity. With the exception that poverty alleviation is addressed in the PES debate on poverty alleviation (Kerr, 2002; Grieg-Gran et al., 2005; Corbera et al., 2007; Kelsey Jack et al., 2008; Satake et al., 2008; Börner et al., 2010; Pagiola et al., 2010; Kinzig et al., 2011), but it is not a central consideration in the sub-debates on agri-environmental schemes and poverty alleviation.

As an aspect of democracy, although participation of multiple stakeholder groups is increasingly discussed in the adaptive management literature (Lee, 1993; McLain and Lee, 1996; Jiggins and Röling, 2000; Olsson et al., 2004a; Olsson et al., 2004b), how to deal with participation of vulnerable groups in decision making is articulated in only a few studies (Smith and Stirling, 2010; Voss and Bornemann, 2011).

Along with the aspects of equity, legitimacy receives the least consideration in the literature on the three modes. Legitimacy is not addressed by transition management proponents, but it is identified as important by several critics of this mode (Shove and

Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010).

Time scales and “functional” scales are central considerations in the transition management literature (Rotmans et al, 2001; Kemp et al., 2007; Grin et al., 2010), while spatial scale is observed in a few studies as a point to be addressed (Foxon et al., 2009; Smith et al., 2010).

The handling of uncertainty issues is not a central consideration in the transition management literature; however the aspect of learning and experimentation is a topic of discussion. Proponents argue that learning and experimentation has the potential to stimulate change (Rotmans et al., 2001; Kemp et al., 2007; Kemp and Martens, 2007; Rotmans and Loorbach, 2009; Grin et al., 2010), but critics counter that transition management is too vague regarding the normative and political aspects of organising learning and experimentation (Van de Kerkhof and Wieczorek, 2005; Shove and Walker, 2007; Foxon et al., 2009; Meadowcroft, 2009; Voss et al., 2009; Voss and Bornemann, 2011). Using new insights and monitoring is a central consideration in the PES debate on agri-environmental schemes (Kleijn et al., 2001; Kleijn and Sutherland, 2003; Swagemakers et al., 2009; Sutherland et al., 2012). Though it is addressed by only a few studies in the debate on poverty alleviation (Holguin et al., 2007; Petheram and Campbell, 2010), but is absent in the debate on economic efficiency.

### *7.1.3 Beacons point towards better reflecting practice in theory*

In the case of both adaptive management and transition management, the limited consideration given to equity and legitimacy may be related to the limited attention in the respective debates to ‘the political dimension’ (Smith and Stirling, 2010; Voss and Bornemann, 2011). According to Smith and Stirling (2010) and Voss and Bornemann (2011), political aspects including conflict, asymmetric power relations and the relationship of the intended intervention processes to wider political contexts are neglected in both adaptive management and in transition management; the limited attention to the political dimension is seen as related to a focus on problem-solving and the fact that adaptive management and transition management are not embedded in a wider political and policy-making context. Voss and Bornemann (2011) argue that the limited attention to the political dimension in both these modes is due to their reliance on an idealistic concept of experimentation, learning and cooperation.

More explicit attention to the political dimension – as advocated by Smith and Stirling (2010) and Voss and Bornemann (2011) – could be helpful in understanding issues of conflicting interests, such as those encountered in the setting studied (i.e. the Dutch fen landscape). It could also help in bringing recognition that not all actors are interested in joining an initiative. The proponents of the three modes studied tend to base discussion on

the notion that actors are willing to cooperate, whereas the empirical cases show in all three modes that this is far from evident. In adaptive management, for example, proponents typically assume that policy-makers, scientists and practitioners are interested in cooperating. Transition management proponents typically assume that there are actors willing to develop innovative practices in niches, to participate in a transition-arena and to develop scenarios and pathways. Proponents of PES typically assume that there are actors willing to negotiate in their role as buyer or provider. However, the cases studied show that it is certainly not evident that practitioners such as farmers and biodiversity conservationists are necessarily willing to cooperate in adaptive management, that municipalities are necessarily willing to cooperate in transition management, and that there are necessarily sufficient buyers and providers available to make PES effective.

Some transition management proponents have responded to the criticism that the concept of power has been insufficiently addressed in the relevant literature (Avelino and Rotmans, 2009; Avelino and Rotmans, 2011; Grin et al., 2011). However, as noted in the chapter on transition management, these responses focus on conceptual categorisations of types of power that have still to be studied in empirical situations where actors may have conflicting interests, and where democratic and legitimate decision making processes may point in different directions than those envisaged by a transition-agent.

The present study further shows that the application of PES mostly concerns government regulated, incentive-based arrangements. Despite the experience in practice, as Vatn (2010) observes, most scholars present and promote PES as a market-based solution to environmental problems. The partial attention to aspects of equity and legitimacy in the PES discourse may be related to its reliance on the key proposition that power inequalities and political issues can be resolved by improving the contexts for financial transactions (cf. Pascual et al., 2010), and that PES are sufficiently robust to deal with market imperfections (McCauley, 2006).

In the setting studied, the political dimension frequently involved a role for government. Some authors emphasise that government is only one of multiple actors involved in addressing societal challenges and that non-state actors are becoming increasingly relevant in doing so (Rhodes, 1996; Merrien, 1998; Van Kersbergen and Van Waarden, 2004). The present study indicates that, indeed, state as well as non-state actors are involved in dealing with the sustainability challenges in the setting studied. Moreover, this study shows that government plays an explicit role that entails initiation, coordination, decision making and implementation by governmental bodies at several local and regional levels (including municipalities, water boards and provinces). Thus the role of government is not minimal, marginal or decreasing; on the contrary, in the setting studied, the government plays a pivotal role (in line with Arnouts et al., 2012).

#### *7.1.4 A call for more attention for sustainable development in comparative frameworks*

The present study shows that, generally, discussion tends to focus on improving the mode of governance in question rather than examining it as one among multiple possible pathways towards sustainable development. Studies that analyse a mode in relation to another are rare (such as Dryzek, 2005; Voss et al., 2007). Discussion typically bases analysis on the assumption that the mode in question is the appropriate avenue to address a sustainability challenge and that it needs only further improvement. The present study shows that assumptions about what is essential to a sustainability challenge have direct consequences for notions about how to induce change (in line with Dryzek, 2005). Finding that complexity and uncertainty are driving a sustainability challenge, for example, has led to identification of lack of knowledge and of cooperation as key issues; this in turn has led to the consideration of learning and cooperation as key process elements. Focusing on one mode exclusively, then, may impede fresh diagnosis of what is causing a sustainability challenge and therefore what measures may be essential to assist in moving towards sustainable development.

Frameworks for the study of multiple avenues to sustainable development have been presented by Van Zeijl-Rozema et al. (2008), Hysing (2009), Arnouts et al. (2012), Driessen et al. (2012) and Lange et al. (2013). However, these frameworks are relatively new and have not yet been extensively tested and applied in empirical studies on governance for sustainable development. None included sufficient aspects to make it the basis of the present study.

Firstly, from the findings of the present study, it is reasonable to expect that frameworks for the study of modes of governance as avenues to sustainable development (Van Zeijl-Rozema et al., 2008; Hysing, 2009; Arnouts et al., 2012; Driessen et al., 2012; Lange et al., 2013) may be enhanced by inclusion of criteria on governance for sustainable development, in particular those concerning equity, legitimacy and the handling of scale issues. Secondly, frameworks for comparative study have been specified more in terms of a governance dimension than in terms of a sustainable development dimension.

The frameworks proposed by Van Zeijl-Rozema et al. (2008), Driessen et al. (2012), and Lange et al. (2013) include some attention to analysis of the goal orientation of modes of governance for sustainable development. Lange et al. (2013) propose including provision for analysis of policy problems, policy objectives and policy instruments. They also advocate that in order to contribute to sustainable development, modes of governance should be consistent with the goals of sustainable development, and should induce some form of transformative collective action. However, these frameworks give most attention to identifying which actors are involved, the degree of coerciveness of government and to power and rules and arguably not enough to analysis of the orientation toward the substantive goal of sustainable development (Hysing, 2009; Arnouts et al., 2011; Driessen et al., 2012; Lange et al., 2013).

The number of proposals for research on the governance or steering dimension of modes of governance for sustainable development has not been matched by calls to study the *content* of the goal of sustainable development. Proposals have been made, for example, for a deeper understanding of aspects of evaluation criteria, for example: democracy and public participation (Meadowcroft, 2007; Jordan, 2008; Smith and Stirling, 2010); power aspects and the political dimension of interventions for sustainability (Meadowcroft, 2007; Smith and Stirling, 2010; Voss and Bornemann, 2011); and the relationship to, or embedding in, the wider institutional context (Smith and Stirling, 2010; Vatn, 2010).

Focusing on the governance dimension specifically in relation to the concept of sustainable development – as advocated by Meadowcroft (2007), Jordan, (2008), Smith and Stirling (2010), Adger and Jordan (2009), Voss and Bornemann (2011) – will certainly help in further conceptualisation and theorisation about governance. However, governance elements need to be explicitly connected to the substantive content of the goal of sustainable development in specific institutional and biophysical settings. This kind of understanding is needed to determine why certain governance elements, and therefore certain modes of governance, may or may not be significantly helpful in moving towards sustainable development.

## **7.2 Navigation in practice**

Following the conceptual discussion, this section considers and compares what was actually experienced when attempting to induce change by applying the three selected modes of governance.

In summary, the setting of the Dutch fen landscape is characterised by: multiple actor groups that typically pursue their own interests as evident mainly in their different claims on land-use and water management; the involvement of multiple governmental bodies; several biophysical aspects under pressure, including the landscape substrate (i.e. the peat soil); several socio-economic aspects under pressure, including economic viability of the main land-use (i.e. grassland farming); a shared notion of the necessity of change due to the unsustainability of the current situation; but different ideas of the causes of the sustainability challenges and how to find a more sustainable pathway.

All fifteen Dutch fenland cases examined were oriented towards sustainable development of the landscape, and the three modes of governance studied could be recognised by the type of steering employed. Four cases were analysed for adaptive management in practice, three for transition management and eight for PES. The costs of implementation of the adaptive management cases added up to 39.4 million euros (this accounts for three cases; costs were not available for implementation in one case). The implementation costs of the transition management cases total about 446 million euros, and

amount to about 1.8 million euros per year for the PES cases total. Estimating PES costs over a nine year period allows better comparison with the adaptive and transition management cases since nine years is the average implementation period for such cases; this leads to a total of about 16 million euros. Altogether, the implementation costs for all the cases amount to about 500 million euros. Expenditure at this scale underlines the value of research on the applied approaches.

The study showed that all three studied modes of governance have included measures aimed to contribute to only part of the range of aspects articulated as under pressure in the studied landscape (more or less equivalent to ‘weak sustainability’). None of the three modes included measures aimed at making a substantial or wide-ranging contribution to dealing with these aspects. For example, no substantial interventions were planned in order to reduce soil subsidence, and no integral measure was developed to incorporate land use practices requiring different water tables while reducing the complexity, costs and risks of water management in an area or region.

In the empirical context studied, a number of issues, several relating in particular to conflicts of interest, were encountered that influence problem-solving capacity, but which have not yet been fully reported in the literature on the three selected modes of governance. Table 7.4 summarises the problematic issues and lessons learned that were identified in analysis of the empirical cases.

**Table 7.4: Summary of problematic issues and lessons learned as identified in analysis of practical experience with the studied modes of governance.**

Issues and lessons learned	Selected mode of governance in the Dutch fen landscape		
	<i>Adaptive management in practice</i>	<i>Transition management in practice</i>	<i>Payments for environmental services in practice</i>
<i>Problematic issues with orientation towards steering</i>	<ul style="list-style-type: none"> <li>• Institutional:               <ul style="list-style-type: none"> <li>- complicated regulations;</li> <li>- conflicts of interest between land-users impeding the adaptive process;</li> <li>- expected insufficient staff and funding.</li> </ul> </li> <li>• Technical and biophysical:               <ul style="list-style-type: none"> <li>- limited scope to experiment with current water tables and land use practices.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Institutional:               <ul style="list-style-type: none"> <li>- lack of municipal cooperation and support.</li> <li>- lack of public support;</li> <li>- conflicting interests between stakeholder groups;</li> </ul> </li> <li>• Related to policy implementation:               <ul style="list-style-type: none"> <li>- difficulties in implementing spatial instrumentation.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Institutional:               <ul style="list-style-type: none"> <li>- restriction on stacking and expanding publicly financed programmes;</li> <li>- lack of buyers and providers;</li> <li>- expected lack of knowledge exchange;</li> <li>- (legal) conflicts between land users;</li> <li>- administrative reporting hinders programmes.</li> </ul> </li> <li>• Technical and biophysical:               <ul style="list-style-type: none"> <li>- biophysical impossibility of stacking certain services.</li> </ul> </li> </ul>
<i>Lessons learned about orientation towards steering</i>	<ul style="list-style-type: none"> <li>• Process-related:               <ul style="list-style-type: none"> <li>- professional process guidance and mediation experienced as beneficial;</li> <li>- adaptation of the process to local contexts;</li> <li>- central leadership by government as well as participatory process considered beneficial.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Institutional:               <ul style="list-style-type: none"> <li>- coercive steering by regional governmental body;</li> <li>- changing EU regulations may influence plan making process.</li> </ul> </li> <li>• Relating to financial resources:               <ul style="list-style-type: none"> <li>- high budget required for land acquisition.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Institutional:               <ul style="list-style-type: none"> <li>- legal exceptions possible to allow stacking of publicly financed programmes.</li> </ul> </li> </ul>

The adaptive management cases studied show only limited scope for experimenting with current water tables and land use practices due to disagreements among the actors involved about the desired water-management measures and related procedural and technical complications. A cumulative effect stemmed from three issues: 1) the complicated process of adaptation to formal regulations on water table management; 2) the requirement of each land use practice for a specific water table level; and 3) the conflicting interests of land users over water tables. Combined, these issues made it difficult to experiment with water tables and land use practices.

The empirical findings of the present study, in line with the work of several scholars (e.g. Lee, 1999; Walkerden, 2006; Arnold et al., 2012), indicate the importance of careful process guidance regarding the distribution of impacts and related conflicts, although this is scarcely addressed in the adaptive management literature (Lee, 1999; Arnold et al., 2012). Also, the adaptive management literature offers no tools for adaptation in the context of complicated rule systems.

In the studied PES cases, limited intervention options were encountered due to: regulation of publicly-financed programmes (which prevented stacking of programmes); difficulties in identifying providers, buyers, services and payments; and biophysical impossibilities, such as the need for different water table levels. How to deal with formal regulatory frameworks is not addressed in the literature on adaptive management and PES. The PES literature includes many proposals for designing an effective PES programme, but these assume the required ‘ingredients’ (i.e. providers, buyers, services and payments) are known (e.g. Engel et al., 2008), and are vague on how to identify these if they are not evident (cf. McCauley, 2006; Vatn, 2010).

Exploration of the transition cases showed a lack of municipal cooperation and support and various difficulties with implementation of the spatial instruments. However, articulations of transition management do not address dealing with the relationship with and position of local governmental bodies or policy implementation in terms of spatial instruments.

Lessons learned concern a range of aspects from process-related to institutional. The actors involved in the adaptive management cases, for example, emphasised professional process guidance and mediation as beneficial in dealing with conflicts that impeded the adaptive process. Adapting the process to local contexts in adaptive management cases was identified as a solution. In the transformation cases, the need to budget for property acquisition and to account for coercive steering by the regional public body (i.e. the provincial authority) were identified as lessons learned about dealing with difficulties. In the PES cases, arrangements for temporary legal exceptions to enable stacking of publicly-financed programmes were identified as a way to handle the obstacle of normal regulatory limitations.

Empirical comparison of the elements selected for analysis assessed whether – and if so, how – the criteria for evaluation of governance or ‘beacons’ for sustainable development were explicitly acknowledged by the leading, decision making and/or coordinating actors. In general, based on information provided by the interviewees and project documentation, aspects of equity and legitimacy tended to be neglected in all three modes, while aspects of representation and participation, the handling of scale issues and the handling of uncertainty issues were partly addressed.

It is especially salient that aspects of equity and legitimacy related to several sensitive issues were not addressed by the decision makers. In the adaptive management cases, for example, issues arose when decisions were needed about who would profit from an experiment and who would not and when certain decisions were publicly disputed. This is in line with Lee’s (1999) observations that adaptive management “is difficult to initiate and to sustain” (art. 3, no page number), and that it should be applied only after a collaborative structure and a shared agenda between the involved groups has been established.

In the transformation cases studied, a serious conflict arose about decisions made; in some instances public acceptance of the intended transformations was minimal. These findings add weight to earlier proposals that more attention should be paid to legitimacy in the transition management literature (Shove and Walker, 2007; Hendriks, 2009; Meadowcroft, 2009; Smith and Kern, 2009; Voss et al., 2009; Smith and Stirling, 2010).

Several disputes arose in the PES cases studied, for example, about fair distribution of positive and negative impacts and about non-granted financial means (cf. Smits et al. 2008; Sommerville et al., 2010). These issues related to public acceptance of actors (in this case, public decision makers) and their ability to explain and justify their decisions, and to perceived fairness of distribution. However, legitimacy is not a key consideration in the PES discourse, and equity is a key consideration only in discussion of poverty alleviation.

The cases studied showed that conflicting interests and land-use practices, as well as shared goals and priorities, influence the context of, and possibilities for, an initiative in a landscape such as the Dutch fenlands. Thus, lack of attention to aspects of equity and legitimacy may impede consideration of approaches and solutions based on explicit indication of losses and gains resulting from choices and interventions and their distribution among the groups involved.

Overall, the decision making actors did address aspects of democracy in terms of representation and participation, albeit in different ways and to differing extent. For example, in the adaptive management cases studied, decision making actors (mostly water boards and municipalities) specifically addressed several aspects of participation in plan making and implementation. Nevertheless, experience showed, unsurprisingly, that non-state actor participation in the design and decision making stage does not necessarily prevent issues and struggles. All three studied transformation cases showed that the leading actor considered input from non-governmental groups. However, decision making rested mainly with the regional governmental body (i.e. the provincial authority). In the PES cases, decision makers varied greatly (i.e. from provinces and municipalities to public-private intermediary organisations and private organisations), and participation of farmer and biodiversity conservation groups was usually included in plan making and implementation.

In most of the cases studied, the decision making actors addressed some aspects of the handling of scale issues and uncertainty issues. For example, the adaptive management cases studied included the linking of biophysical and institutional aspects of their targeted area, as well as experimentation and facilitation of monitoring and evaluation to address limited knowledge of that area's 'system'. In the transition management cases, the decision makers included an orientation towards mid- and long-term timeframes, as well as a few small-scale experiments and pilot schemes. However, a number of issues relating to spatial scale were encountered, involving difficulties in implementing the spatial instruments. In the PES cases studied, the decision makers addressed handling scale and uncertainty issues

less explicitly than in the adaptive and transition management cases. However, a mid- and long-term timeframe was included in one of the studied PES cases, and facilitation of experimentation and learning, for example, was explicitly addressed in another PES case.

What may the above findings mean for actors involved in enhancing the sustainable development of a setting like the Dutch fen landscape? The problematic issues encountered in the studied empirical contexts in terms of attention to equity, legitimacy and scale issues are likely to benefit from being explicitly acknowledged and addressed. This would lead to greater insight into options for distribution of losses and gains and into how acceptable decisions could be made about such distribution. It would also help to facilitate negotiation, mediation and dealing with local sensitivities.

Guidance could apply regarding the potential fit between circumstances and a potential mode of governance. The findings show that diagnosis needs to go beyond the present conceptual basis for such a fit. The applicability, for example, of adaptive management as presently articulated may not necessarily be indicated by uncertainties and complexities, a lack of cooperation and a lack of knowledge about the social-ecological systems; the existence of conflicting interests or disagreement about priorities and required decisions could indicate the need for other measures than those presently considered part of adaptive management. Similarly, for example, when the sustainability challenge is seen to be an issue of crisis prevention involving a lack of renewal and innovation, transition management may not prove helpful unless local governmental bodies support the envisaged transformation, and/or the actors involved agree to a new spatial organisation of land-uses. In this way, for example, if present, a highly-valued cultural historic landscape would not be lost in doing so. In terms of PES as seen to apply when the sustainability challenge is found to lie in a lack of economic arrangements, this mode of governance may succeed only when a sufficient number of local providers and public buyers are willing to participate in or to develop a payment scheme and when the need for a substantial alternative economic carrier is not urgent. However, the present study shows that perception by groups involved of needs, priorities and urgencies is likely to be heterogeneous; the chances of a shared understanding of the challenge and an appropriate approach are not expected to be high.

The groups involved in the setting studied, such as farmers, nature conservation organisations, policy-makers and scientists, have articulated their priorities and ideas about the landscape. However, a wider, societal debate on the future of such landscapes and their development towards sustainability has yet to take place. Although visioning and scenario-sketching among a selection of groups involved was found to be addressed in the transition management cases, the facilitation of broad debate is not embedded in any of the three selected modes of governance. Stimulating such a debate may be helpful in developing a comprehensive notion of the future of such a context or in identifying options for further steps. Such a debate might focus on questions such as: 1) what sustainable development

would actually entail in a context such as the landscape studied; 2) whether principles of sustainable development in such a setting or landscape could be identified; and, 3) how the actors involved would deal with conflicting interests and land-use practices. Such debates could clarify objectives, positions and priorities relating to resource conservation and provision of ecosystem services, and assist in identifying steering options (cf. Edelenbos, 2012).

The current absence of a supra-regional societal debate may be due to previous policy strategies of national governmental bodies on dealing with spatial planning and rural affairs. The Dutch policy strategy on these issues, for example, has favoured decentralisation (Roodbol-Mekkes et al., 2012). Alternatively, the absence of such debate may be due to a lack of fundamentally embedded democratic dialogue. Dryzek (2005), for example, argues that this kind of dialogue is needed wherever the market, regulatory frameworks and expert-based and conventional participatory public policy strategies fall short of addressing sustainability challenges. A lack of debate may also stem from what is referred to as ‘invisible power’, i.e. influence exerted behind the scenes to control the public agenda of issues under discussion, possibly including covert suppression of certain voices or issues that would be debated (Lukes, 2005). Speculatively, such ‘invisible power’ may be behind the fact that the role of grassland farming in the Dutch fen landscape is not discussed at depth on a wide scale. It may be worth investigating whether agricultural interest groups in favour of maintaining grassland farming are in a position to exert more power, both visible and ‘invisible’, than groups in favour of land use changes.

Grassland agriculture is the primary economic activity in the landscape studied. Relating the sustainability challenges of this landscape to a scale above the local and the regional and to the transition management approach leads to speculation on how transformation of the relevant sectors rather than particular local geographical areas could be facilitated. In this way, it may be worthwhile for practitioners and policy-makers dealing with sustainability challenges at the national level to approach the agricultural sector in the fen landscape as a whole. The aim and challenge would then be to stimulate the grassland farming sector to innovate itself in a way that makes its pivotal function in the landscape more sustainable in the long term.

### **7.3 Reflections on the Research Approach**

The focus on examining a single mode of governance on sustainable development typically seeks to understand how that mode operates or on identifying elements that may enhance its contribution or problem-solving capacity. The present study demonstrates that part of the added value of a comparative analysis of the selected modes is new insight into their respective premise. The present comparative study further shows that a certain mode, or its

components, may be more or less promising than another mode as a means of dealing with challenges in an empirical context, and may temper the illusion of a ‘holy grail’ (cf. Shove and Walker, 2007; Voss et al., 2007; Dewulf et al., 2009; Meadowcroft, 2009; Smith and Stirling, 2010; Vatn, 2010; Voss and Bornemann, 2011).

Jordan (2008) and Adger and Jordan (2009) observed two distinct types of analytical approach in the discourse – normative and empirical. The normative approach mainly theorises about how to realise sustainable development (Jordan, 2008; Adger and Jordan, 2009); empirical analysis has focused mainly on steering initiatives intended to enhance sustainable development. The present study combines the two approaches, analysing how societal groups have framed and dealt with sustainability issues and also examining characteristics that may enable more sustainable development. The conceptual analysis of the present study made it possible to include several perspectives from proponents and critics, and responds to the request made by Jordan (2008; 2009) to underpin studies on governance for sustainable development by providing a fairly large number of findings (i.e. from fifteen case studies).

Evaluation according to the five criteria or ‘beacons’ facilitated analysis of the selected modes of governance individually and comparatively in terms of their ambition to contribute to sustainable development (cf. frameworks presented by Adger et al. (2003) and by Biermann et al. (2010)). In general, the findings of the present study are in line with the reservation raised by Adger et al. (2003) and Biermann et al. (2010) that a narrow evaluation framework fails to reveal certain weaknesses that thus go unaddressed by a mode of governance for sustainable development. To contribute to movement toward sustainable development through governance modes, the academic discourse needs to give more attention to evaluation criteria and their application. However, this study has shown that, in the literature as well as in practice, it is difficult – and even in some cases not intended – for interventions to follow the light of all the ‘beacons’ included in the present study. Further research, including empirical studies, may elaborate how modes of governance for sustainable development can or should deal with a comprehensive array of evaluation criteria (cf. Jordan, 2008).

#### **7.4 Concluding Remarks and Research Outlook**

The present study demonstrates that, overall, the modes of governance studied aim to make some minor contributions to the sustainability challenges as encountered in the context studied (i.e. multi-actor, multi-level, multi-sector, with multiple uncertainties and complexities), and entail insufficient measures to address them fully. Research to advance understanding of sustainability challenges and of interventions designed to meet them needs to set aside preferences for any single mode of governance in favour of re-diagnosis of the

challenges in a specific or general context and of reassessment of which approach is the best fit.

Study of interventions may benefit from the lens of evaluation criteria. As shown by the present study's findings (on equity and legitimacy issues in the cases of adaptive management and PES, and also on the handling of scale issues in the cases of transition management), such criteria may shed light on aspects that influence the function of a mode of governance that might not be apparent from the perspective articulated in the literature by proponents. However, any set of criteria may be normative and/or unachievable in practice. They may entail contradictory or overlapping choices, and may or may not be considered desirable by proponents of a mode of governance. Thus a case exists for further research on the application of evaluation criteria and on their inclusion in studies on modes of governance for sustainable development.

None of the frameworks for studying modes of governance for sustainable development as proposed by Van Zeijl-Rozema et al. (2008), Hysing (2009), Arnouts et al. (2012), Driessen et al. (2012) and Lange et al. (2013) include explicit attention to diagnosis of the causes and content of empirical sustainability problems. The present study shows that greater attention to the content of a sustainability challenge and the direction toward the intended goal of sustainability may help to clarify two key factors: 1) the extent to which theoretical diagnoses of sustainability challenges represent real-world contexts; and 2) the extent to which such diagnoses reflect the actual issues encountered in empirical cases. Greater insight into what drives a problematic situation may enable scholars to understand why interventions that are intended to lead towards sustainable development are effective or otherwise (cf. Meadowcroft, 2007).

Given the essentially contested nature of the concept of sustainable development and its integration of ecological, economic and societal goals (Kates et al., 2005; Meadowcroft, 2007; Jordan, 2008), the present study shows it would be helpful to diagnose a sustainability challenge by explicitly specifying – rather than immediately integrating – the ecological, economic and social issues at stake. Identifying such, why they are under pressure and why they are considered appropriate to protect is not necessarily far removed from current thinking about sustainable development, it is just rarely done.

The findings of the empirical study show that the conceptualisation and diagnoses of the sustainability challenges and substantive goal orientations as articulated in the literature do not necessarily accurately or fully reflect the actual situations and empirical contexts. The findings question the extent to which a lack of learning-through-experimentation and cooperation, a lack of innovation and transformation, and a lack of payments for provision of environmental services are essential aspects of sustainability challenges.

The analysis of experience in practice reveals that the sustainability challenges as encountered in the context studied are mainly characterised by: a concentration of actors and intensive use of the resources provided by the landscape; conflicting interests of actor

groups and divergent ideas about needs, priorities and urgencies; conflicts in or about the decision making process (mainly concerning distribution of impacts and fairness); the absence of a supra-regional debate; institutional complications (e.g. formal regulations and relations among governmental bodies); and technical and biophysical limitations.

The findings that suggest the value of a broadly representative, supra-regional societal debate are in line with the work of scholars including Dryzek (2005), Meadowcroft (2007), Hendriks et al. (2009) and Buizer and Van Herzele (2012). The empirical experiences invite exploration of ways in which the modes studied could facilitate such broad-based debate not necessarily focused on achieving consensus, but rather on clarifying positions and options. Such debate might help achieve greater insight into how empirical priorities and notions correspond to the conceptual assumptions and diagnoses regarding sustainability challenges as articulated in the literature. Debate of this kind may also help to clarify orientation in specific cases. Proposals could follow on how the literature might better reflect the situations, problems and possibilities that arise in empirical contexts.

The present study shows that application of the set of criteria on governance for sustainable development may be helpful in addressing the sustainability challenges in a setting such as that studied. More explicit inclusion in particular of aspects of equity and legitimacy in studying modes of governance is in line with findings by Adger et al. (2003), Jordan (2008), Jordan (2009) and Biermann et al. (2010).

The empirical evidence indicates that facilitating negotiation, mediation and dealing with local sensitivities may also be helpful in addressing a sustainability challenge. The topic entails a perspective unusual in the governance literature (cf. Kooiman, 2003; Dryzek, 2005; Leeuwis and Aarts, 2011) in its attention to the level of individual actors rather than aggregated institutional scales or the dynamics of public and/or private spheres. The findings of the present study suggest that further exploration of the role of inter-human communication and sensitivities may be worthwhile and even necessary in order to better understand how modes of governance for sustainable development operate in practice (cf. Aarts and Leeuwis, 2002; Leeuwis and Aarts, 2011). Greater consideration of and research into communication and mediation is in line with conclusions drawn by several adaptive management researchers (Lee, 1993; Hatfield-Dodds, 2006; Walkerden, 2006; Armitage et al., 2011).

Returning to the ship metaphor and the widely divergent navigation maps produced in the three main cabins. The present study followed the use of each map in one small part of the ship's onboard systems (i.e. the Dutch fen landscape), which is characterised by a consensual notion that the current balance of system elements is unsustainable due to several biophysical aspects and issues involving transactions among human crew members dependent on the system. The intellectual capacity of humans has generated potential routes that are widely divergent in their consideration of needs, priorities and urgency. The location and onboard resources subject to study are intensively used, multifunctional and

multi-actor, and may exemplify a type of system state arising in other parts of the ship where human crew numbers and their use of onboard resources are likely to increase.

The present study shows that none of the maps has led to more sustainable development to any large degree in one small part of the ship's onboard systems. No single navigational route stands out as preferable. The issues considered central in discussions in the academic cabins apparently do not correspond to the issues shown to be central in practice in the setting studied. Lack of knowledge and cooperation, lack of transformation and innovation and lack of appropriate economic constructions turn out not to be key. Outside the cabins and at the location on the planet where the links between human crew members and ship's stores and resources have been investigated, pivotal significance lies instead with the underlying issues of conflicting interests, institutional complications and technical and biophysical complications.

On the basis of the findings, the present study proposes that greater attention to equity and legitimacy and the handling of scale issues in particular would advance the navigation discussions in the ship's cabins. Such discussions are also likely to benefit from exploration of other issues encountered out on the ship's decks, including underlying issues that fall outside the scope of modes of governance as so far mapped. Current cabin discussions are orientated more towards *how* to navigate than to *where* to navigate, and are more focused on conceptual notions than based on practical experience with sustainable and unsustainable coordinates.

The present study proposes that the discussions would benefit from more detailed plotting of problems, which if mishandled or ignored will lead to long term damage to the decks and stores of Spaceship Earth. If governance for sustainable development is to succeed, scholarly crew members need to plan journeys through the ship's systems that pay greater attention to diagnosis of sustainability challenges and to the goal orientation involved in governing the use of Earth's abundant but systems dependent provision essential for the survival of its human crew.



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# Appendix A      The Studied Adaptive Management Cases

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- 1) Polder Mastenbroek
- 2) Toekomst Amstelland
- 3) Wormer- and Jisperwater
- 4) Zegveld/Oud-Kamerik

## 1) Polder Mastenbroek

The area Mastenbroek is situated in the northern part of the Dutch fen landscape, not in the relatively more attention-receiving western part. This area is acknowledged for its cultural-historic landscape and has a national policy conservation status. Most of the area is in use for grassland agriculture, though quite some parts are also in use for corn cultivation and glasshouse agriculture. Also, there is a nature-conservation area (for wet-fens and fen meadows) situated in this area.

Similar to the situation in Zegveld/Oud-Kamerik, the water-decree had expired and had to be replaced. The previous water-level decree was about 20 years old. The required renewal of this water table decree was mainly the incentive to start an adaptive management initiative in this area. Developing a new water table decree was challenging in this area, as there were conflicting claims on the water table, and different land-uses had to be facilitated. An experimental water management regime was developed by the water board (Waterschap Groot-Salland) in cooperation with a local agricultural group (LTO) and a nature-conservation organisation (Staatsbosbeheer). This experimental management was set-up to be monitored and evaluated, in order to learn how to deal with the challenge in this area. The intention was to learn more about suitable water tables to facilitate the different land-use functions in the area (different nature-conservation uses, different agricultural uses). This case was started in 2001, and coordinated by the water board.

The water board applied for a subsidy to finance the development and implementation of this experimental management. This subsidy was granted (name of funder not available) on the condition that the process would include cooperation of the involved actors groups. And thus, explicit input of local stakeholder knowledge was used in

designing the plan. This participatory process was considered innovative by the actors involved.

A plan was proposed to maintain the land-use functions with new, experimental, temporary water tables; the targeted water table level was relatively high in comparison to that in the surrounding region (and considered experimental by the involved actors). The province had set a minimum water table level of 60 cm below the soil surface, which the water board intended to uphold. The water board was also obliged to maintain water tables for land uses like glasshouse and dairy farming. Practically, important measures included to raise the water table from deep drainage to a water table of a type called II\* (i.e. in summer ~50-80 cm and in winter ~25-40 cm below soil surface) and to facilitate a canoe route.

During the development of the plan, a substantial conflict emerged, according to the nature-conservation organisation and the agricultural group, about the proposed water tables in and around the nature-conservation area. The water board mainly handled this conflict by hiring expert knowledge for an external viewpoint (i.e. a consultancy, Royal Haskoning, a large and well-known consultancy), and by emphasising the temporal character of the experimental water tables. The conflict about the water tables was not explicitly resolved, but decisions were rather postponed until the monitoring results could be evaluated.

A consultancy experienced in agricultural issues (DLV), supported the process of the plan making phase and negotiated with the local farmers. Negotiation with the nature-conservation organisation was done by the water board. Another consultancy (Geodelft) assisted in identifying possible water table regimes and accompanying effects. The temporary water tables and possible effects were set to be monitored regularly, and adjusted if necessary, and not crossing the minimum and maximum water tables. The water board monitored the changes in the water tables, and intended to first evaluate internally, and then include the groups involved in the evaluation.

Parallel to this case, there was another initiative in this area (as part of the Belvedere programme, a national policy programme initiated by the national government) about the cultural-historic landscape. According to the water board and the agricultural group, this parallel initiative about conservation of the cultural-historic landscape contributed to the development of the case studied.

### *Miscellaneous facts*

<i>Costs of implementation</i>	Amount not available
<i>Project area (size)</i>	8350 ha
<i>Duration (start -planned end date)</i>	2001 – not available
<i>Plan making phase</i>	7 years (2001-2008)

### *Interviewed persons*

The project leader, from the involved water board (Groot-Salland), interviewed 15 January 2007, face-to-face.

A representative involved in plan making, from the regional agricultural NGO (G-LTO), interviewed 25 January 2007, face-to-face.

A representative involved in plan making, from the local public nature-conservation organisation (Staatsbosbeheer) interviewed 15 January 2007, face-to-face.

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## **2) Toekomst Amstelland**

The area Amstelland is situated in the western part of the Dutch fen landscape, near an urban area and in the vicinity of the city of Amsterdam. The land uses in this area are mainly dairy farming and fen-meadow conservation. The incentive to start an adaptive initiative in this area was the cumulative challenge of identifying alternatives for agricultural practices struggling to stay economically viable, developing ways to maintain a high-quality landscape, finding ways to address soil subsidence, and developing more options for recreation to fulfil the demands of the nearby urban population. At the start of the project, around 2002, the intention was to develop new landscape management concepts, and to experiment with water tables and new types of land-use practices.

During the plan making process, explicit input in the form of works of art (such as theatre, movies and installations) was used to inspire out-of-the-box thinking about new landscape-management concepts. Four different variants for the area's future were also developed in order to stimulate and invite local stakeholders to propose measures and micro-projects. The coordinating actors explicitly intended to collect the input of a wide range of actors, to be able to develop creative measures as well as feasible and supported by the involved actors. Several meetings were held in a local venue, to which a large number of representatives were invited. For example, representatives of several local residential groups, the province (Noord-Holland), the water board (Amstel, Gooi & Vecht), a landscape conservation group (Landschap Noord-Holland), local and regional agricultural groups (W-LTO, Vereniging Agrarisch Natuurbeheer De Amstel), the national organisation for tourism and transport (ANWB), and several organisations for sports (KNSB, KNHB), attended the last meeting of the series of interactive meetings ('Slotbijeenkomst').

The municipality of Amsterdam was the leading actor in the plan making process. The decision making was done by six municipalities. A small consultancy (under the name of 'de Stad bv') supported and coordinated the plan making process. The documentation and informants revealed that the general public support for this case was positive, and no conflicts concerning this case were reported.

In a period of two years, a large number of possible measures were collected. A selection from these possible measures was made for implementation by the coordinating groups (the municipalities involved and the consultancy), based on feasibility and matching the intended municipal aims. These selected measures were subsequently implemented in the area. Important measures included: to organize a regional committee during the implementation, to implement a property-exchange bank and improve land reallocation, to provide information on extended agriculture, and to facilitate recreation with e.g. information, a ferry schedule and ice-skating and canoe routes.

During the plan making phase, the initial ambition to develop new landscape management concepts was eventually adjusted to more practical terms, and focused on implementing the selected measures.

The case Toekomst Amstelland was included in several larger programs and networks. For example, it was included in the policy programme ‘Belvedere’ (<http://www.belvedere.nu/page.php?section=08&pID=5&mID=3&prID=168>), coordinated by the national-government, and in the EU-funded programme ‘Sustainable & Accessible Urban Landscapes’ (<http://www.saulproject.net/downloads/Newsletters/SAUL%20Newsletter%2010.pdf>).

#### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 1.7 mln
<i>Project area (size)</i>	3500 ha
<i>Duration (start -planned end date)</i>	2002 – 2033
<i>Plan making phase</i>	2 years (2002-2004)

#### *Interviewed persons*

The consultant coordinating the plan making process, from a small consultancy (de Stad bv), 9 November 2006, face-to-face.

The project leader on behalf of the leading and largest municipality (Amsterdam), from the department of spatial planning, 16 November 2006, by phone.

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### **3) Wormer- and Jisperwater**

The area of Wormer- and Jisperveld is situated in the western part of the Dutch fen landscape. The case in this area focused on water management, hence the name Wormer- and Jisperwater. Most of this area is in use for extensive dairy farming. This area has a fine-meshed ditch structure, and farmers typically use boating for transport of cattle and other cargo. The grassland area with extensive farming is also in use for fen-meadow conservation, and is a meadow-bird conservation area of international importance. The area is also used for recreational activities such as boating, fishing, and birding.

A large part of the area was confronted with illegal drainage, estimated at about two thirds of the area. And, there was a high slurry production in the area, deteriorating the water quality, and leading to subsidence of the peat soil. The incentive to start this case was to realise a more sustainable water system, and to realise a reduction of peat decomposition and slurry production by improving the water quality. The intention was to learn about the relationship between fertilization, soil and water management in fen meadow areas.

The project applied experimental management by including small-scale experiments with fertilization, soil and water management in fen-meadow areas. These fertilization, soil and water management regimes were monitored and evaluated to learn about ways to reduce soil decomposition and to enable a more sustainable water system. Various fertilization, soil and water management regimes were developed and implemented in cooperation with local farmers. Next to these experimental soil and water management regimes, important measures included: to implement dredging, to inhibit ingress of 'alien' water, to adjust regulations to reduce the illegal drainage, and to develop and maintain information about the case and scheduled measures for the groups involved.

A nature-conservation NGO (Natuurmonumenten) started the project and passed on the leadership to the water board (Hollands Noorderkwartier) after three years. The leadership of the project was transferred to the water board after three years, because it involved formal public tasks and required public financial means. Eventually, the case was coordinated by a 'project group' which included the nature-conservation NGO, the water board, the municipality (Wormerland), and the province (Noord-Holland); with the water

board in a central position. During the plan making process, a consultant from a large consultancy (Oranjewoud) played a substantial role, and assisted in guiding the process, maintaining contacts and in preparing documents. In monitoring and evaluating the experimental water and soil management, a semi-academic consultancy affiliated at a university (B-ware, at Radboud University Nijmegen) was involved.

During the plan making process, there was a disagreement between the project group and the agricultural interest groups (N-LTO, Agrarische Natuurvereniging Waterland), and though a few farmers participated in the experimental management there was generally no support from the agricultural groups. The support from groups of residents was at first also limited, and there was a disagreement between the water board and the residents concerning the priority of dredging. Later, this disagreement was resolved as soon as dredging near the residents' houses received priority.

#### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 30.6 mln
<i>Project area (size)</i>	2400 ha
<i>Duration (start -planned end date)</i>	2000 – 2015
<i>Plan making phase</i>	6 years (2000-2006)

#### *Interviewed persons*

The project leader, from the water board (Hollandsch Noorderkwartier), 14 June 2006, face-to-face.

The consultant assisting in coordination, from a large consultancy in the field of environment, spatial planning and water (Oranjewoud), 7 July 2006, face-to-face.

The representative involved in plan making, from the nature-conservation NGO (Natuurmonumenten), 28 June 2006, face-to-face.

#### *Documentation*

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Provincie Noord-Holland, Gemeente Wormerland.

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Deelprojecten van het project Wormer- en Jisperwater*. Hoogheemraadschap  
Hollandsch Noorderkwartier, Heerhugowaard.

#### **4) Zegveld/Oud-Kamerik**

This area is located in the western Dutch fen landscape. This area is mostly used for intensive dairy farming, although it also contains a small-scale nature-conservation area of unfertilized grasslands which are protected under European directives. Similar to the situation in Polder Mastenbroek, the water table decree had expired and needed to be replaced. Two previous attempts to renew the water-level decree had failed (the last water-level decree was about 25 years old) mainly due to technical complexities concerning the water management system, conflicting interests on land use practices, and available budgets.

The water board (Stichtse Rijnlanden) started an experimental initiative in this area, to develop a way to renew the expired water-level decree, to enhance social support for an updated water table decree, and to create a more sustainable water system. This case was considered as experimental by the involved as well as non-involved actors, because the plan making approach was new, and openly intended by the initiating actor (the water board) to learn from about plan making in areas with such challenges. The water board also explicitly intended to learn about the water system in this area, and possible measures to improve the water and soil management.

In the plan making phase, the water board used the input of local stakeholder knowledge, as well as the input of computer models in identifying possible water and soil management regimes. A consultancy (Royal Haskoning) assisted in developing and identifying possible water table regimes. University-affiliated organisations (Animal Science Group and LEI at WUR) advised on possible impacts on agricultural practices. During the plan making stage, a consultant (CLM) supported the process and negotiated with farmers and residents.

In general, there was public support for the intended interventions, but a disagreement was reported by the informants. In particular, an agricultural group (LTO-Noord) and the nature-conservation NGO disagreed the adjustment of the water table in and around a buffer zone between agricultural lands and the nature-conservation area.

Important measures of this case included to implement new, to adjust existing, and to formalize water table compartments for agriculture and nature-conservation (from a

static 60 cm below soil surface to a flexible 50 cm below soil surface). Also included were measures to construct ‘nature-friendly’ ditch banks, and to create high water table buffers for buildings. The implemented measures were to be monitored, and subsequently evaluated by the water board.

#### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 7.1 mln
<i>Project area (size)</i>	2700 ha
<i>Duration (start -planned end date)</i>	2003 – 2011/2013
<i>Plan making phase</i>	3 years (2003-2006)

#### *Interviewed persons*

The project leader from the water board (Stichtse Rijnlanden), 26 June 2006, face-to-face.  
 The representative from the nature-conservation NGO (Natuurmonumenten), involved in the plan making, 12 July 2006, face-to-face.  
 The representative from the regional agricultural interest NGO (LTO-Noord), involved in the plan making, 20 July 2006, face-to-face.

#### *Reviewed documentation*

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## Orientation towards Sustainable Development

Table A.1: Contribution to aspects under pressure of the Dutch fen landscape. Legend: NA = not available or no answer; before / : according to key persons (including range in indications); after / : based on project documentation; 0 = minimal contribution; + = small contribution; ++ = medium contribution; +++ = large contribution. The contribution to sustainability aspects was assessed by assigning a value (on a four-point scale) to the contribution to each sustainability aspect, based on the implemented and scheduled measures; by the interviewees (on a scale from 0 to 10, afterwards rescaled to a four-point scale to facilitate comparison) and by using data from the project documentation. These aspects were considered to be more sustainable if a decrease in value was transformed into an increase, or when a positive value was at least maintained or, preferably, enhanced.

	<i>Indicator</i>	<i>Case</i>			
		<i>Polder Mastenbroek</i>	<i>Wormer- &amp; Jisperwater</i>	<i>Toekomst Amstelland</i>	<i>Zegveld/Oud-Kamerik</i>
<i>Biophysical</i>	<i>Water table rise</i>	NA/+	NA/0	NA/0	NA/+
	<i>Water quality improvement</i>	NA/0	NA/+	NA/+	NA/+
	<i>Peat soil conservation</i>	0,+ ,+++	+ / +	++ / 0	+ ,+++
	<i>Species-rich fen meadows</i>	0,+ ,+++	0,+ / +	+ / +	+ ,+++
	<i>Species-rich wet fens</i>	+ ,0 / 0	0 / 0	+ / 0	+ / 0
<i>Socio-economic</i>	<i>Conservation cultural-historic landscape</i>	+ ,+++	++ / ++	++ / +++	+ ,+++
	<i>Enhanced recreation options</i>	0,+ ,+++	++ / +++	++ / +++	++ / +
	<i>Enhanced flood protection</i>	0 / 0	0 / NA	+++ / ++	++ / +
	<i>Economic viability of land-use</i>	+ ,+++	++ / +	++ / ++	+ ,+++

## Orientation towards Steering

Table A.2: Adaptations made, lessons learned and obstacles foreseen. The interviewees were asked to identify and describe the cases' adaptations made to date, lessons learned, and obstacles foreseen. These adaptations made, lessons learned, and obstacles foreseen were categorized according to experiences with "learning-through-experimentation" and "cooperation". Legend: PM = Polder Mastenbroek; WJW = Wormer and Jisperwater; TA = Toekomst Amstelland; ZOK = Zegveld/Oud-Kamerik.

<i>Adaptations made</i>	<ul style="list-style-type: none"> <li>- Time delay because of requests for legal permits (PM, ZOK)</li> <li>- Local permit system adjusted to include more comprehensive permits (WJW)</li> <li>- Extra time needed for impact assessment using modelling (ZOK)</li> <li>- Integration of two separate test areas into one test area (WJW)</li> <li>- Cancelling of flexible water table (WJW)</li> </ul>	<ul style="list-style-type: none"> <li>- Negotiation process for partial areas instead of the entire area (ZOK)</li> <li>- Leadership switched from nature-conservation NGO to water board (WJW)</li> <li>- Switch from central project management by the water board to partial project management by the municipality, water board, province, and a nature-conservation NGO (WJW)</li> <li>- More active involvement than planned beforehand of local government, water board, and national forest agency to ensure proper implementation (TA)</li> <li>- A nature-conservation NGO explored options for consensus building with farmers outside the case and without involvement of the water board (WJW)</li> </ul>
<i>Lessons learned</i>	<ul style="list-style-type: none"> <li>- Earlier and better information about legal permits (PM, ZOK)</li> <li>- Elaborate detail earlier in the process, especially goals of case (ZOK)</li> <li>- National landscape status may be beneficial for agriculture (PM)</li> <li>- More understanding of the relationships between water table, soil subsidence, and decomposition (PM, WJW)</li> <li>- Locally, changes in fertilization have a stronger effect than a flexible water table on peat decomposition rates (WJW)</li> </ul>	<ul style="list-style-type: none"> <li>- A more experienced project team is better equipped for complex problems (ZOK)</li> <li>- External expertise of process and negotiation adds high value (TA, PM, ZOK)</li> <li>- Water board is capable of leading interactive process (PM)</li> <li>- Water board considers more central leadership to be more efficient (WJW)</li> <li>- A highly participatory process is possible and may lead to a feasible project plan (TA)</li> <li>- Earlier and better involvement of local stakeholders (PM)</li> <li>- Closer involvement of the supra-local organisation level of a nature-conservation NGO (PM)</li> <li>- An initiative to set up a landscape fund in cooperation with an agricultural bank based on a change in attitude of farmers (TA)</li> </ul>
<i>Obstacles foreseen</i>	<ul style="list-style-type: none"> <li>- Insufficient financial resources on short (WJW, ZOK) and long-term (TA, WJW, ZOK)</li> <li>- Unclear who should bear the costs (ZOK)</li> <li>- Possibly not enough staff capacity for implementation within the available budget (ZOK)</li> <li>- Unclear priority of European policies "Water Framework Directive" and "Bird and Habitat Directive" (WJW, ZOK)</li> <li>- Fear of local stakeholders of local governmental bodies for financial claims (WJW)</li> <li>- Required permits may not be granted (PM, WJW, ZOK)</li> <li>- Complexity and uncertainty hinder governmental action (WJW)</li> <li>- New administrative boards may not approve adaptations (TA)</li> </ul>	<ul style="list-style-type: none"> <li>- Buffer-zone management between nature-conservation and agricultural area is undecided (PM, ZOK)</li> <li>- Strong agricultural lobby can obstruct implementation (PM, ZOK)</li> <li>- Agricultural cooperation management experiments uncertain (WJW)</li> <li>- Diffuse responsibilities between governmental bodies regarding sustainable water management (WJW, ZOK)</li> <li>- Lack of coordination between land-use function allocation and water management (WJW, ZOK)</li> </ul>

## **Question List Used for Interviews for the Adaptive Management Cases**

### *General*

- Can you specify the role of the organisation you are working for/represent in this project/case? And what is your function in this organization?
- Can you briefly sketch the characteristics of the area of this project? Including size and scope and time line of the project?
- Can you specify the aim of this project?

### *Process and stages*

- Can you briefly characterise the process?
- Who is or are the leading and key decision making actor(s) in this case?
- Who are the other actors involved in decision making in this project? And how are they involved, and could you indicate their motivation to do so?
- Did the decision makers include local groups and practitioners? If so, which and how? If not, why not?
- Were scientists involved in this project? If so, how? Is there a dialogue arranged between the scientists and decision makers and/or other groups involved? (If not, why not?)
- How was the process organised for this project? Are there different stages or phases distinguishable? If so, which? Are there stages of preparation and design, decision making, execution, monitoring and evaluation, and adaptation?
- What is the current stage of the project?
- In which stage were or are scientists involved and in which way? And in which stage local groups and practitioners, and how?
- Have there been changes in the way the actors or your organization has been or are involved? If so, in which way and what was the reason for these changes?
- In which way is achieving consensus addressed in this project? And would you assess it is working or not, and why?
- Have there been or are there attempts to achieve consensus about: the problem definition; the goal of the project; the way the problem should be addressed; and/or the goal achieved?

### *Problem analysis and goal*

- Can you explain how the problem has been or is being analysed in this project?
- In which way have issues such as soil subsidence, water quality, threatened habitats landscape conservation, economic viability of the land use been addressed?
- In which way have administrative and political aspects and the stakeholder setting been analysed?
- In which way does the goal of this project include to deal with the complexity of the problems in this area?

- In which way does the goal of this project include to deal with uncertainties of the issues in this area?
- In which way does the goal of this project include to increase the capacity of this area to deal with complex and uncertain circumstances?
- Were there or are there models or decision support systems used in this project?
- If so, what kind, how, and when and by who were/are they used, and what kind of knowledge or insight did they provide?

### *Learning*

- How will this project be continued? Does monitoring and evaluation take place? If so, what kind, how frequent, and by who?
- Are monitoring and evaluation also scheduled for the long term?
- What is the intention to do with the monitoring and evaluation? Are the management practices designed to be adapted based on monitoring and evaluation?
- How will scientists, local groups and policy makers be involved in the project in future? In which way is a continuous or future dialogue anticipated and facilitated?
- Were results or outcomes from other (previous or parallel) projects used in any way in the design or evaluation of the current project? If so, in which way and from which other projects?

### *Adaptability and adaptations*

- Can you elaborate on the management options intended and executed in this project?
- Can you explain in which way the management options are designed to be adaptable, and adjustable to increased insight?
- In which way can the management options be implemented and adapted in the long term?
- In which way are the management options experimental?
- In which way is enhancing variability in this area part of the aim of this project?
- Has the aim changed during the course of the project? If so, how did that change take place?
- How flexible or steady is the aim of this project in the long run?
- Can you elaborate on what kind of adaptations have been so far in the project? Were they adaptations in the management practices, the process (incl timeline), the organisation (incl budget), the actors involved (incl the type of agreement or cooperation between actors), the aims? And in which stage were which adaptations made?
- What was the reason to make that adjustment? And what showed the direction into which the management practices should be improve; were the adaptations based on a monitoring or evaluation result? And who decided on the adjustment?
- Can you elaborate on how the coordination party or team deals with the actual evaluation? How are choices, options or variations dealt with that turn out to be

unsuitable to reach the project's aim? Are practices for example simply adjusted, or may it lead to fundamental re-design of the project?

#### *Bottlenecks*

- Were there any barriers to adaptation in this project, and if so which? Were these barriers different per stage of the project?
- Were there any legal, administrative, political barriers, and if so which? Were there financial barriers, and if so which? Were there practical or technical barriers, and if so which?
- Was there a lack of knowledge or understanding of the problems and issues in the area, and if so in which way?
- Were there any other barriers?

#### *Sustainable development*

- Does this project include (new or specific changes in) management practices, to address the following issues, and if so, what are the practices exactly: water tables; water quality; soil subsidence; nature conservation (such as species-rich fens and fen meadows); economic viability of the land use; cost efficiency (and reduction of complexity) of water management; safety against flooding; conservation of cultural-historic landscape elements; and recreation options?
- What do these management practices mean for current users and inhabitants of the area? And what do these practices mean for future users and inhabitants? Are the intended changes fair towards future users and inhabitants?

## Appendix B      The Studied Transition Management Cases

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- 1) **Gouwe Wiericke**
- 2) **Groenblauwe Slinger**
- 3) **Krimpenerwaard**

### 1) **Gouwe Wiericke**

The area of Gouwe Wiericke was defined as ‘an area’ by policy-makers and beforehand not known as a distinct area. It is a rural area bordering two small towns, and includes dairy farming, glasshouse horticulture and recreational areas as main land uses. Some parts of the historical fen meadow landscape have a policy status of ‘National Landscape’.

To address issues of economic viability of the land use (mainly dairy farming) and to realise a goal for nature conservation (assigned to the province by higher level governments), in 2006, the province (Zuid-Holland) initiated a transformation plan for this area. The initial ambition for Gouwe Wiericke was to realise a transformation in the area similar to the one in the Krimpenerwaard and to focus on development and conservation of qualities and vitality of the rural area. The province realised an agreement in 2010 with five municipalities and two water boards, for the development of this area. Four agricultural interest groups, five nature and landscape conservation groups, and a cultural-historic group were in an advisory position.

The formal aims as articulated by the province covered a range of various land uses and included: to increase climate change resilience through more sustainable water and soil management system, to improve fen nature-conservation; to enhance economic viability of agriculture, to conserve cultural-historic valuable landscapes and to develop economic viable recreation options. Some parts would transform to landscape conservation, fen meadow conservation, wet-fen conservation, and recreation areas, and other parts would remain with dairy farming, glasshouse horticulture and recreation.

Some of the policy priorities changed during the plan making phase. The ambition for a transformation of the area has been greatly tempered and been adjusted to more pragmatic objectives (e.g. the initial goals for wet-fen nature conservation were changed to diversification of fen-meadows with wet-fen patches). After an initial attempt to transform the area as a whole was expected to be unsuccessful, due to lack of social support and too complex implementation challenges, Gouwe Wiericke was split-up in five partial sub-areas

to enable development of smaller-scale solutions. Eventually, Gouwe Wiericke included transformation as well as adaptation areas in its plan. The current implementation stage differs per sub-area, and only a smaller sub-area is scheduled for a transformation. In the adaptation areas, the original spatial structure can remain intact, which may benefit the cultural-historic landscape and fen-meadow nature conservation.

A pilot was conducted for the Western part of Gouwe Wiericke, focusing on land reallocation, as an exercise for the plan making and design process for the whole area. It remains however unclear how the experiences of this pilot were used in the plan making for the entire area, and the plan making process for the entire area was not explicitly monitored or evaluated by the initiators. Furthermore, in a small sub-area, experiments with new types of nature-conservation management are conducted, to learn which types are suitable to be upscaled to other parts in the area. Every two years, the coordinating actors intend to monitor and evaluate the implementation programme for realisation of the envisaged goals, cooperation between the involved decision-making partners, and availability of funds.

#### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 89 mln
<i>Project area</i>	Size unknown (1400 ha. new nature)
<i>Duration (start -planned end date)</i>	2006 – 2014 / 2018 / not yet known
<i>Plan making phase</i>	4 years (2006 – 2010)

#### *Interviewed persons*

The project leader, affiliated at the province (Zuid-Holland), 14 May 2009, face-to-face.

The representative involved in plan making from one of the water boards (De Stichtse Rijnlanden), 4 June 2009, face-to-face.

The representative involved in plan making from one of the water boards (Rijnland), 28 May 2009, face-to-face.

The representative involved in plan making from one of the municipalities (Bodegraven), 3 June 2009, face-to-face.

The representative involved in plan making from one of the municipalities (Reeuwijk), 28 May 2009, face-to-face, continued 4 June 2009 by telephone.

Two representatives involved in plan making from a nature conservation NGO (Natuurmonumenten), 14 July 2009, face-to-face.

The representative involved in plan making from an agricultural interest group (LTO), 3 July 2009, face-to-Face.

The representative involved in plan making, from an agri-environmental association (Lange Ruige Weide), 16 July 2009, face-to-face.

The representative involved in plan making from a landscape interest group (Landschapsbeheer Zuid-Holland), 2 June 2009, face-to-face.

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## **2) Groenblauwe Slinger**

Similar to Gouwe Wiericke, Groenblauwe Slinger was defined as ‘an area’ by policy-makers, and beforehand not known as a distinct area. Groenblauwe Slinger is a small rural strip between urban areas, and the main land uses when the case started were dairy farming and glasshouse horticulture. Whereas Gouwe Wiericke and Krimpenerwaard do have a national policy status to preserve the cultural-historic landscape, Groenblauwe Slinger does not.

Similar to the Gouwe Wiericke and Krimpenerwaard, an initiative oriented at transformation of this area was started by the province (Zuid-Holland). This case was mainly prompted, already in 1994, by a demand from the surrounding urban areas for recreation and ‘green space’, and to lesser extent by a demand for nature conservation and water storage facilities. The main aims of the case, as articulated by the province, included: development and conservation of nature conservation, agricultural landscape and recreation facilities, and improvement of water storage facilities.

Groenblauwe Slinger is divided in five sub areas, of which two are planned as ‘transformation areas’, and three are labelled as ‘adaptation areas’. Dairy farming was the main land use in the areas intended for adaptation, and glasshouse horticulture and some dairy farming in the areas intended for transformation. The parts with mostly dairy farming would adapt to landscape conservation, and the parts with mostly glasshouse horticulture would transform to nature conservation with recreation and water storage facilities. The design for the spatial planning in one of the sub areas (Groenzone-Berkel Pijnacker) is seen by the involved governments as a pilot for transformation and combining recreation, glasshouse horticulture, nature conservation and water storage.

In 2006 (i.e. 7 years after the start), an elaborate evaluation of the content and process of the approach was conducted. A comparable follow-up evaluation has not taken place since then. The project documentation does articulate that the evaluation criteria and indicators for monitoring should be developed ‘together’ (but not when, how or with whom exactly). When individually consulted, participants of this case do report that several lessons were learned.

Some difficult issues were encountered such as high costs, low support from municipalities, and sceptical positions from some agricultural and nature conservation groups during the plan making and early implementation. Most of these issues have been sorted out by guaranteeing the financial coverage of the intended measures, and the case is currently in implementation stage.

### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 253 mln by national government and other parties € 49 mln by province
<i>Project area (size)</i>	Adaptation areas: 20.000 ha. (1600 ha. new nature) Transformation areas: +/- 1190 ha.
<i>Duration (start -planned end date)</i>	1993 / 1994 – 2013 / 2015
<i>Plan making phase</i>	5 / 11 years (1993 / 1994 – 1999 / 2004) (varying per sub area)

### *Interviewed persons*

The project leader on behalf of the province (Zuid-Holland), 14 November 2006, face-to-face.

*(Following interviews conducted by Marjolein Meulensteen, MSc Student Natural Resources Management:)*

The project leader on behalf of the province (Zuid-Holland), 7 May 2009, face-to-face.

The representative involved in plan making, from the water board (Delfland), 4 May 2009, face-to-face, continued 12 May 2009 by telephone.

The representative involved in plan making, from one of the municipalities (Lansingerland), 13 May 2009, face-to-face.

The representative involved in plan making, from a public nature-conservation organisation (Staatsbosbeheer), 11 May 2009, face-to-face.

The representative involved in plan making, from an agricultural interest group (LTO-Glaskracht), 2 June 2009, face-to-face.

The representative involved in plan making, from a local landscape and nature conservation interest group (Natuur-en milieuvereniging Pijnacker), 27 May 2009, by telephone

The representative involved in plan making and implementation, from the public bureau for implementation of rural affairs (DLG), 8 June 2009, face-to-face.

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### **3) Krimpenerwaard**

The area of Krimpenerwaard is historically a distinct rural area, and is bordered by rivers. It is known for its traditional, relatively closed, Christian community. The main land-use in the area is livestock and grassland farming (i.e. cattle and sheep). The cultural-historic landscape in the area has a policy status of 'National Landscape'.

A policy plan from 1999 including land re-allocation for this area (i.e. 'Raamplan') had been largely implemented by the province (Zuid-Holland), but the final part experienced difficulties in the implementation. The stagnated 'Raamplan', together with increasing pressures in the area on the economic viability of agriculture, the maintenance and feasibility of the water system and the realisation of intended nature conservation, prompted the province in 2004 to start a transformation initiative for this area.

This transformation case focused on facilitation of grassland farming in some parts while developing and conserving cultural landscape and nature conservation in other parts. Eventually, the area would transform into: a zone with nature conservation; a zone with viable agriculture combined with fen meadow conservation; and, a zone with production agriculture with a relatively deeper drainage. The aims of this case further included a more sustainable water management system, improvement of recreation facilities, improvement of environmental quality and increase of possibilities for multifunctional land-use.

This case includes a technological experiment (with infiltrating drains in an agricultural field, which can moisten or drain the peat soil depending on the circumstances) to facilitate the grassland farming while attempting to reduce the required draining. This experiment is closely monitored and frequently evaluated. A new concept for farming is being developed in this area; the idea is to develop a farm producing 'agricultural products and nature'. During the plan making phase, an environmental assessment bureau was asked to give a 'second opinion' on the content and the process, though no explicit reports on the further usage of this 'second opinion' could be found. The initiators also scheduled overall monitoring and evaluation of the content and process of the plan making and implementation of the transformation.

This transformation case experienced a phase with enthusiasm and large social support for the transformation, when signing a mutual agreement among the involved actors in 2005. Since 2005, implementation of the transformation has been started. However, after signing the agreement, the implementation slowed down. At the beginning of the

implementation, several groups stopped their cooperation because they did not support the implementation process and measures. The province sought to implement what was feasible, until implementation of the nature conservation measures slowed down again in 2010, due to budget cuts of the national government. In 2013, the province intends to continue implementation of the nature conservation measures with a limited budget.

### *Miscellaneous facts*

<i>Costs of implementation</i>	€ 20 mln is available until 2016, then another € 34,6 is available until 2021
<i>Project area (size)</i>	13.500 ha. (2450 ha. new nature)
<i>Duration (start -planned end date)</i>	1999/2005-2021
<i>Plan making phase</i>	1 / 6 years (depending on what is taken as starting point) (1999/2004-2005)

### *Interviewed persons (conducted together with Marjolein Meulensteen)*

The project leader on behalf of the province (Zuid-Holland), 2 March 2009, face-to-face.

The representative involved in plan making from the water board (Schieland and Krimpenerwaard), 9 March 2009, face-to-face.

The representative involved in plan making from one of the municipalities (Bergambacht), 13 March 2009, face-to-face.

The representative involved in implementation from the public bureau for implementation of rural affairs (DLG), 23 March 2009.

The representative involved in plan making from a landscape and nature-conservation NGO (Zuid-Hollands Landschap), 12 March 2009, face-to-face.

The representative involved in plan making from a regional agricultural interest group (LTO-Noord), 20 March 2009, face-to-face.

The representative involved in plan making from an agri-environmental association (Weidehof), 16 March 2009, face-to-face.

The representative involved in plan making from a local diverse-interest group (DWLK), 31 March 2009, face-to-face.

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## Orientation towards Sustainable Development

Table B.1: Contributions to aspects under pressure of the Dutch fen landscape. The information about scheduled management practices is collected from the documentation. N/A = Not explicitly addressed in the documentation.

Sustainability aspects	Case			
	<i>Krimpenerwaard</i>	<i>Gouwe Wiericke</i>	<i>Groenblauwe Slinger</i>	
<i>Biophysical</i>	<i>Water table rise</i>	Rise of water table in new nature-conservation area.	Rise of water tables in areas with dairy farming.	- Raise the water table until about a quarter of one sub area is open water or puddle-marsh. - Construction of a new water course of 400-500 m width in one sub area.
	<i>Water quality improvement</i>	Location of purification filters in network of nature-conservation areas.	Construction of buffer zones.	N/A
	<i>Peat soil conservation</i>	High water table in winter, lower in summer (though above minimum level to reduce soil subsidence).	Conversion of agriculture to nature conservation on soils with highest sensitivity for subsidence, enabling rewetting.	N/A
	<i>Species-rich fen meadows</i>	Creation of new fen meadow conservation areas that enable conservation of target species.	N/A	Improvement of value of species-rich fen meadow areas.
	<i>Species-rich wet fens</i>	Creation of new wet-fen conservation areas that enable conservation of target species.	Creation of wet-fen nature-conservation area.	Creation of ecological network of wet-fens.
<i>Socio-economic</i>	<i>Conservation cultural-historic landscape</i>	- Protection of: historical cultivation pattern in middle part of the area and locations with high chance at archaeological remains. - Considering cultural-historic characteristics of the area while developing other aspects. - Realise 90 ha of landscape elements.	N/A	- Conservation of cultural-historic elements (e.g. specific woodlands, broad ditch banks, pollard-willows) in one sub area. - Conservation of historical open character of the landscape in one sub area.
	<i>Enhanced recreation options</i>	N/A	- Improvement of accessibility through new infrastructural connections and routes. - Improvement of the quality of existing recreation facilities.	- Improvement of infrastructure and accessibility for recreationists. - Development of three large areas for nature conservation and recreation. - Development of network of large recreation areas.
	<i>Enhanced flood protection</i>	N/A	N/A	Facilitation of water storage options in three sub areas.
<i>Economic viability of land-use</i>	Enable an agricultural structure that can economically develop.	- Facilitation of farming under wetter circumstances. - Economic improvement of farm plots through land exchange.	Improvement of agricultural structure.	

## Orientation towards Steering

### *Gouwe Wiericke*

Table B.2: Results for indicators for ‘aspects as articulated in the literature to be important issues in transition management’ for the case Gouwe Wiericke. Where findings among interviews and among documentation were different, the differences are included.

	<i>Interviews</i>	<i>Documentation</i>
<i>Public support/resistance</i>	<ul style="list-style-type: none"> <li>- Agricultural groups did not support plans.</li> <li>- Agricultural groups are critical, but willing to consider cooperation.</li> <li>- Municipalities may not approve plans, because the councils do not support plans.</li> <li>- No support from societal groups for governmental vision on sustainability problem.</li> <li>- Nature conservation group critical, almost at the point to consider no longer cooperation.</li> <li>- Expected that it will be almost impossible to realise agreements for the sub-areas due to conflicts of interests between the different groups.</li> </ul>	<ul style="list-style-type: none"> <li>- Local residential and agricultural groups are quite critical about the plans and do not support priority for water and soil management, and nature conservation.</li> <li>- One of the municipalities (on behalf of the residents) is critical about the plans.</li> <li>- One of the agricultural groups is opposed to the plans.</li> </ul>
<i>High input from non-state stakeholders in decision-making</i>	<ul style="list-style-type: none"> <li>- Input process differed per sub area: for two sub areas the municipalities claim to be in charge, for the other sub areas decision-making by municipalities, water board and province.</li> <li>- Hardly input from any state or non-state stakeholder (province is most important designer and decision-maker).</li> <li>- Societal groups invited for advisory meetings.</li> <li>- Chamber of commerce was involved sideways.</li> <li>- Future recreationists and the interest group for local enterprises were not included.</li> <li>- Citizens/residents were planned to be included at a later stage.</li> <li>- Unclear how societal groups could participate in plan and decision-making.</li> <li>- No input from societal groups in plan and decision-making included.</li> </ul>	<ul style="list-style-type: none"> <li>- Societal groups made an input-document together; not clear how input-document was used in further plan.</li> <li>- Societal groups are excluded from plan design.</li> </ul>
<i>Type of agreement (representation of public interests)</i>	<ul style="list-style-type: none"> <li>- Semi-formal agreements ('covenants') among province, agricultural groups, environmental and nature-conservation groups (province is in charge).</li> <li>- Details differ per sub-area.</li> </ul>	<ul style="list-style-type: none"> <li>- Semi-formal agreements ('covenants') among province, agricultural groups, environmental and nature-conservation groups (province is in charge).</li> <li>- Details differ per sub-area.</li> <li>- Reported as unclear; first it was a 'societal agenda', and then it became a semi-formal agreement ('covenant').</li> </ul>
<i>Influence of changing national and international policies, and of economic situation</i>	<ul style="list-style-type: none"> <li>- Changing national policy targets for nature conservation and water management influenced plan making.</li> <li>- Changing European regulations for environmental and water management influenced plan making.</li> <li>- Climate change policy was expected to influence the plan in future.</li> <li>- Changing production methods and milk prices in dairy sector influenced position local farmers.</li> <li>- Commercial and speculative trade in land influence willingness to buy and sell land.</li> </ul>	<p>European liberalisation of market for dairy products will influence milk price and opportunities for economic viable farming.</p>

<i>Strong adaptation of approach to local context</i>	<ul style="list-style-type: none"> <li>- No external circumstances influence process.</li> <li>- Approach was adapted to characteristics of area by splitting the plan in sub areas and changing the type of agreement.</li> <li>- Unclear, because plan was being designed by province; and, societal groups were infrequently consulted.</li> <li>- Strong influential position from agricultural groups (at municipality, water board and province) was insufficiently acknowledged from start of process.</li> <li>- Strong influential position of municipalities not acknowledged.</li> <li>- Local power relations were not explicitly present in the process.</li> </ul>	<ul style="list-style-type: none"> <li>- Plan is designed per sub area.</li> <li>- Dependency on support from involved governmental bodies and local societal groups for implementation was acknowledged.</li> </ul>
<i>Use of spatial &amp; spatial planning instruments</i>	<ul style="list-style-type: none"> <li>- (Voluntary) land acquisition; expropriation of land; application of a trade-off scheme (Ruimte-voor-Ruimte); payment scheme for nature conservation by private individuals; though little application expected; application of adjusted existing AES scheme.</li> <li>- An experiment with newly developed payment schemes for nature conservation by private individuals showed that it was not attractive enough to participate.</li> <li>- Exchange of land was expected to be possible to different extends in different sub areas.</li> <li>- Changes in formal policy decisions about water levels and soil management.</li> <li>(- Large financial budget available from national government for acquisition and management of land.)</li> <li>- Options for relocation for glasshouse horticulture included.</li> <li>- Options for relocation for dairy farming not included.</li> <li>- Dairy farming was being planned to be limited to facilitate nature conservation; however old en new locations were not yet discussed.</li> </ul>	<ul style="list-style-type: none"> <li>- Improvement of existing payment schemes.</li> <li>- Land exchange.</li> <li>- Land acquisition.</li> <li>- Expropriation of land.</li> </ul>
<i>Organisation of selection from (in particular spatial) alternatives as a political process</i>	<ul style="list-style-type: none"> <li>- Alternatives for nature conservation are considered.</li> <li>- Only for sub area alternatives were considered.</li> <li>- No alternatives were considered.</li> <li>- Consideration of alternatives is planned.</li> <li>- Alternatives have been considered for some sub areas.</li> <li>- Unclear whether alternatives have been considered.</li> <li>- For first design for nature conservation, no alternatives have been considered. For new design, there been alternatives considered.</li> </ul>	<ul style="list-style-type: none"> <li>- One of the water boards considered spatial alternatives for plan design for one sub area.</li> <li>- The governmental bodies considered spatial alternatives for two sub areas.</li> </ul>
<i>Explicitly acknowledging uncertainties</i>	<p>Not specifically asked and not articulated in open reflection questions.</p>	<p>Uncertainties not explicitly acknowledged.</p>

## Groenblauwe Slinger

Table B.3: Results for indicators for ‘aspects as articulated in the literature to be important issues in transition management’ for the case Groenblauwe Slinger. Where findings among interviews and among documentation were different, the differences are included.

	<i>Interviews</i>	<i>Documentation</i>
<i>Public support/resistance</i>	<ul style="list-style-type: none"> <li>- In beginning, municipalities did not entirely support plan.</li> <li>- Agricultural groups were against plan.</li> <li>- Implementation was stopped for a year, because of financial conflict.</li> <li>- Local nature-conservation NGO has opposed plan.</li> <li>- Long plan making process to come to an agreement (11 yrs in some subareas).</li> <li>- The state bureau for implementation of rural affairs, however, claims that all actors agreed with plan from beginning.</li> </ul>	<ul style="list-style-type: none"> <li>- 24 Critical reactions on municipal (legally binding) spatial zoning scheme for sub-area (Groenzone Berkel-Pijnacker)</li> <li>- Citizens and societal groups formally protested at national governmental body for legal issues ('Raad van State') (sub-area Groenzone Berkel-Pijnacker).</li> </ul>
<i>High input from non-state stakeholders in decision-making</i>	<ul style="list-style-type: none"> <li>- Strong emphasis in plan making and implementation by public actors.</li> <li>- Societal organisations organised in advisory committees.</li> <li>- Decision-making actors are governmental parties.</li> <li>- Societal groups were consulted.</li> </ul>	<ul style="list-style-type: none"> <li>- Governmental and non-governmental actors represented in advisory committee.</li> <li>- Municipal (legally binding) spatial zoning scheme for sub-area (Groenzone Berkel-Pijnacker) was adjusted after formal procedure for critical reactions by citizens and societal groups.</li> <li>- Non-governmental groups were consulted.</li> <li>- Non-governmental groups had some influence through municipal council ('gemeenteraad').</li> </ul>
<i>Type of agreement (representation of public interests)</i>	Decisions are applied in formal (and legally binding) municipal plans.	Semi-formal agreement ('covenant') between province and 2 municipalities.
<i>Influence of changing national and international policies, and of economic situation</i>	<ul style="list-style-type: none"> <li>- Some national policy changes about 'national ecological network' ('EHS').</li> <li>- Availability of funding for land acquisition and payments schemes which depends on national policy decisions and EU policy decisions</li> <li>- Changing prices of soil plots.</li> <li>- Changing EU policies about nature conservation and water management.</li> <li>- Construction of a road influenced soil plot prices.</li> </ul>	<ul style="list-style-type: none"> <li>- Permission required from European Union for special, new payment program.</li> <li>- National governmental legal body ('Raad van State') may not approve with adjustments in municipal (legally binding) spatial planning plans.</li> </ul>

<i>Strong adaptation of approach to local context</i>	<ul style="list-style-type: none"> <li>- Specific local features of the area were not clearly considered in the plan making.</li> <li>- The approach to the whole area did not address the many involved regional and local governmental bodies; while in the sub-areas the dense institutional context was addressed.</li> <li>- The plan makers did not consider the present local land-uses, but only focused on future land-uses.</li> <li>- Not evident whether influential position of glasshouse horticulture farmers was acknowledged.</li> <li>- Not evident whether powerful position of municipalities (control over zoning schemes) was sufficiently acknowledged in advance.</li> <li>- Required approval by province for ground acquisition was insufficiently acknowledged in advance.</li> <li>- Agricultural interest group for glasshouse horticulture had clear (semi-formal) influential position in process.</li> </ul>	<ul style="list-style-type: none"> <li>- Strong adaptation to local context by division in sub-areas and focus on area-based plan making.</li> <li>- Plan makers did not consider specific landscape and biodiversity qualities in certain parts.</li> <li>- Required approval for ground acquisition was insufficiently acknowledged in advance.</li> </ul>
<i>Use of spatial &amp; spatial planning instruments</i>	<ul style="list-style-type: none"> <li>- (Regular) payment schemes only applied for the parts of the area where incremental change is planned.</li> <li>- Expropriation of lands (applied because of time limits).</li> <li>- Few possibilities for land exchange scheme (Ruimte-voor-ruimte).</li> <li>- As government is only purchaser of land in the area, prices drop; though not evident what influence is on opportunities for farming.</li> <li>- Price of land increase; because it's clear that government will buy; influence on opportunities for farming not evident.</li> <li>- Relocation options for glasshouse horticulture included, but these are limited due to high plot prices outside the area and not enough available finance.</li> </ul>	<ul style="list-style-type: none"> <li>- Initially, voluntary land acquisition.</li> <li>- Regular and new, specific, payment schemes.</li> <li>- Expropriation of land (because of time limits).</li> <li>- Prices of plots for glasshouse horticultural are high above the national average for plot prices; which influences opportunities for exchange for farmers.</li> </ul>
<i>Organisation of selection from (in particular spatial) alternatives as a political process</i>	<ul style="list-style-type: none"> <li>- No alternatives considered for the approach.</li> <li>- Several spatial alternatives considered for the design of the plan.</li> <li>- Alternatives were considered in the spatial design of the plan.</li> </ul>	<ul style="list-style-type: none"> <li>- Several spatial alternatives considered for the design of the plan (through MER).</li> </ul>
<i>Explicitly acknowledging uncertainties</i>	<ul style="list-style-type: none"> <li>Not specifically asked and not articulated in open reflection questions.</li> </ul>	<ul style="list-style-type: none"> <li>Intention to develop a strategy to deal with uncertainties and risk about political-administrative issues &amp; legal and financial issues.</li> </ul>

## Krimpenerwaard

Table B.4: Results for indicators for ‘aspects as articulated in the literature to be important issues in transition management’ for the case Krimpenerwaard. Where findings among interviews and among documentation were different, the differences are included.

	<i>Interviews</i>	<i>Documentation</i>
<i>Public support/resistance</i>	<ul style="list-style-type: none"> <li>- A local (Dutch reformed) church and some ad-hoc citizen groups protested.</li> <li>- 2 Agricultural groups postponed their cooperation for a period, because they didn't agree with the acquisition process of soil plots.</li> <li>- A local agricultural group was initially involved in the process, but after the ambition of the province became clearer, it opposed the plans.</li> <li>- All agricultural groups are critical about the plan; as the impact of the plan on agriculture is considered negative.</li> <li>- Some stakeholders did not support soil subsidence as high priority.</li> <li>- No shared support for nature conservation.</li> <li>- No shared support for decision to realise 2450 ha nature conservation.</li> </ul>	<ul style="list-style-type: none"> <li>- No shared social support for goals and approach.</li> <li>- Critical notes from other municipalities at agreed plan.</li> <li>- One municipality and 2 agricultural groups protested against the implementation of the plan and postponed their cooperation.</li> <li>- The provincial public board (Provinciale Staten) protested against the implementation of the plan, because there was no unanimous support anymore among the formally stakeholders.</li> </ul>
<i>High input from non-state stakeholders in decision-making</i>	<ul style="list-style-type: none"> <li>- Decision-makers included a broad range of stakeholders, though the majority were governmental actors.</li> <li>- Leading decision-maker was the province.</li> <li>- A local (Dutch reformed) church and some ad-hoc citizen groups wanted to influence the decision-making but were not included in the process.</li> <li>- A local agricultural group was initially involved in the process, later excluded from the process.</li> </ul>	<ul style="list-style-type: none"> <li>- Decision-makers are 7 formal local and regional governmental bodies, 1 semi-public local tourism group, 3 agricultural groups, 2 nature-conservation groups, 1 local soil management group, and 1 ad-hoc public group concerned with land reallocation.</li> <li>- Main decision-makers are local and regional governmental bodies.</li> <li>- Initially, a broad range of stakeholders was included in the decision-making.</li> <li>- Except for one agricultural group.</li> <li>- However, at the start of the implementation the input from one municipality (on behalf of their citizens) and 2 agricultural groups, was insufficiently considered (according to them).</li> </ul>
<i>Type of agreement (representation of public interests)</i>	<ul style="list-style-type: none"> <li>- Formal among a broad range of stakeholders, though at least one was excluded (an agricultural group).</li> <li>- First it was an agreement with voluntary elements; later, coercive elements were added (expropriation).</li> </ul>	<ul style="list-style-type: none"> <li>Semi-formal agreement ('covenant') among 9 public and 6 private groups.</li> </ul>

<p><i>Influence of changing national and international policies, and of economic situation</i></p>	<ul style="list-style-type: none"> <li>- Discussions in national politics about policy priorities influence acceptance &amp; capacity to justify provincial decisions.</li> <li>- National (legally binding) policies on dung treatment ('mestwetgeving').</li> <li>- EU agricultural policies influence economic situation of farmers.</li> <li>- EU policies influence maximum payments by public bodies, and therefore property acquisition by province.</li> <li>- Market dynamics in land prices have big influence.</li> <li>- Economic perspectives influence incentives of farmers: when positive, farmers are not inclined to sell farms.</li> </ul>	<ul style="list-style-type: none"> <li>- Availability additional national budget.</li> <li>- Developments in property prices and European dairy farming economy influence process.</li> <li>- Liberalisation of European agricultural policies.</li> <li>- Recently, food production has become more profitable, leading to lower incentive to sell farms.</li> </ul>
<p><i>Strong adaptation of approach to local context</i></p>	<ul style="list-style-type: none"> <li>- Doubtful whether approach was customised to traditional, closed community-character in the area.</li> <li>- Approach insufficiently considered closed, traditional community-character to discuss and enable change.</li> <li>- Approach enabled to give municipalities a larger role in the plan making process to be able to adapt to local circumstances (though 1 municipality postponed cooperation due to conflict).</li> <li>- Powerful local agricultural interest groups; not evident whether sufficiently acknowledged in process.</li> <li>- Insufficiently acknowledged that a local agricultural group has large influence in the area, despite not signing the agreement.</li> </ul>	<ul style="list-style-type: none"> <li>- Approach considered mainly water and soil aspects of the area.</li> <li>- Doubtful whether 20-year old history of spatial planning in the area with many difficulties and sensitivities was carefully considered.</li> <li>- Powerful local agricultural interest groups; not evident whether sufficiently acknowledged in process.</li> <li>- Power of individual land owners to obstruct process is insufficiently addressed.</li> <li>- Continuous change in public representatives may not be adequate to deal with local power relations and a risk for the process.</li> </ul>
<p><i>Use of spatial &amp; spatial planning instruments</i></p>	<ul style="list-style-type: none"> <li>- Land acquisition.</li> <li>- Expropriation of land.</li> <li>- Land exchange.</li> <li>- New and existing payment schemes for nature conservation by private individuals.</li> <li>- Options for inclusion of opportunities elsewhere when limiting farming were included, e.g. some farmers moved to another region in the country.</li> <li>- Options for inclusion of opportunities elsewhere when limiting farming were included, but limitedly feasible due to high land prices within the area as well outside the area.</li> </ul>	<ul style="list-style-type: none"> <li>- Land acquisition; land exchange; adjustment of provincial and municipal zoning schemes; expropriation of land; new and existing payment schemes for nature conservation by private individuals.</li> <li>- Awareness among all participants of shift from voluntary land acquisition to obligated property transfers increases successful application of instruments.</li> <li>- Equal opportunities for relocation of farming to elsewhere not explicitly included, though one farmer has moved elsewhere.</li> <li>- Uncertainty about options for exchange or relocation to elsewhere.</li> <li>- Difficulties in voluntary land acquisition and property exchange due to large differences in property prices of agricultural plots in relation to surrounding areas (property prices in target area are relatively low, prices building plots are high and some agricultural plots are even lower than nature conservation)</li> <li>- Increasing property prices hinder options for exchange.</li> <li>- Time gap between moment of sale of old farm to government and moment of buying new farm gives financial problem.</li> </ul>

<i>Organisation of selection from (in particular spatial) alternatives as a political process</i>	Several alternatives were considered (impact on individual companies not included + alternative proposed by agricultural group not considered).	- Several alternatives for nature conservation, agriculture and spatial planning have been considered. - Alternatives were considered, but without clear motivation.
<i>Explicitly acknowledging uncertainties</i>	Not specifically asked and not articulated in open reflection questions.	Explicitly acknowledging uncertainties not addressed.

## Questions List Used for Interviews for the Transition Management Cases

### *General*

- Can you specify the role of the organisation you are working for/represent in this project/case? And what is your function in this organization?
- Can you briefly sketch the characteristics of the area of this project? Including size and scope and time line of the project?
- Can you specify the aim of this project?

### *Design of the plan*

- Who initiated this project?
- When did your organisation get involved in this project?
- What was the problem that prompted this project? How was or is the problem defined?
- Is this problem definition shared by all actors involved?
- What is the aim of the project? Who defend this aim? And in which way to which extent is it a shared aim?
- How was or is the plan being designed?
- Is the plan (being) designed in text or also in maps? And in general terms or translated into specific measures?
- Are/were certain studies or research used to design the plan (e.g. spatial studies, economic assessments, cost-benefit analysis, ecological assessments? And if so, which studies and in which way?
- Are/were alternatives considered in the plan? How are/were these alternatives developed? How is/was the selection made between these alternatives?
- Who has the lead in developing the content of the plan?

- What does this plan mean for the spatial planning in this area? Will/are land use functions relocated?
- Have there been any changes so far in the design of the plan, and if so, which and why? And are these changes considered or positive or negative and by who and why?
- What is the legal status of this plan? And what are the possibilities and limitations of it being so or not?
- Why did the initiator(s) choose for this approach to address the problem and to attempt to realise the goal?
- Have other approaches been considered to address the problem or to realise the goal? And if so, which? Or why not?
- Which documentation lists the measures of the plan and to which goals they contribute?

#### *Instruments*

- Which instruments, such as spatial (planning) instruments, are/will be used to implement the plan?
- Do you assess that as sufficient? And if so why? Or why not and what would be needed?

#### *Stakeholders and process*

- Who are/were the actors involved in the decision making process? And how are/were they involved?
- Are there any other actors that do have a stake in the area, but are not involved in the decision making process? And if so, who are they, and do you know why they are/were not involved?
- What are the coalitions among the actors?
- Have there been any significant changes in the involvement of the actors? And if so, which and why? And changes in their coalitions?
- Has the position or involvement of your own organisation changed, and if so, how and why?
- How would you assess the degree of trust among the actors involved? And has that changed and if so how?
- Have there any conflicts? If so, between who and what were they about? How were the conflicts dealt with?
- What is the current state of support for the projects' plan? What are the positions of the actors involved?

#### *Area and context*

- Do specific characteristics play a role and/or have been/will be taken into account in the decision making process and in the implementation of the projects' plan? If so, in which way?
- For example historical and/or emotional ties in the area, or changes in those ties?

- Have/do specific power relations in the area play(ed) a role? Or changes in those power relations? If so, in which way?
- Are their external circumstances or influences that had/have their effect on the decision making process and/or implementation process for this project? If so, which and how? (E.g. national or EU policy or political developments, economic developments, dynamics in land prices)

### *Reflection*

- What do you consider as the strengths of this approach? And what as the weaknesses? (E.g. relating to legal, political, financial-economic issues? Sufficient capacity in terms of human resources, budget and available policy instruments?)
- Do you support the statement that this approach is suitable to address the problems and issues in this area? If so why?
- If not why? What would be additionally needed to address the problems and issues in this area?
- What would you advise to do different a next time this approach would be applied?
- Could this approach work out in a different way in a different area?
- Under which conditions do you think this approach could be successful to address the problems and issues of the fen landscape?
- Would you like to add anything else?

## **Appendix C      The Studied Payments for Environmental Services Cases**

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- 1) Subsidieregeling Agrarisch Natuurbeheer (SAN)**
- 2) Nederland-Gruttoland (NLGL)**
- 3) Waterland (WL)**
- 4) Eem & Vallei (EV)**
- 5) Midden-Delfland (MD)**
- 6) Alblasserwaard (AW)**
- 7) Biesland (BL)**
- 8) Naobers van Zudert (NZ)**

### **1) Subsidieregeling Agrarische Natuurbeheer (SAN)**

The national AES programme Subsidieregeling Agrarisch Natuurbeheer (SAN) programme operates at national scale, is a publicly financed subsidy scheme and is the largest of the eight analysed PES cases. It is aimed at landscape and biodiversity conservation and water regulation, and many dairy farmers in the fen landscape participate (i.e. about 5738 farmers). SAN has been restructured from a nationally-coordinated programme into a regional (i.e. provincial) programme in 2007. It should be noted that recent plans (i.e. as discussed in June 2013) of the Dutch government about the SAN programme include ideas to cancel or drastically reform the programme, due to unclear contributions to the goals of the programme (<http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2013/06/07/kamerbrief-over-het-nieuwe-stelsel-agrarisch-natuurbeheer.html>). The buyer and leader in this programme was the Ministry of Agriculture, Nature and Food Quality; the tasks of the former Ministry of Agriculture, Nature and Food Quality are currently distributed over other ministries. The handling of the payments has been transferred to the provinces.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ €10.1 million (in 2007)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 64 306 ha (29%) (in ≈ 223 000 ha) (For the western fen area, data was available, but coverage in the northern fen areas is an extrapolation based on the western fen areas, because relevant data were not available.)
<i>Duration (since start of payments)</i>	Current programme structure since 2000 (earlier structures of the AES programme date back to the mid-1980s)
<i>Contract periods</i>	5-7 year contracts, not sure yet how current contracts will be continued

### *Interviewed person*

The representative involved in implementation of this programme, from the umbrella organisation of agri-environmental interest groups, department West of the Netherlands (Natuurlijk Platteland West), April 2008, by email.

### *Reviewed documentation*

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- Swagemakers, P., Wiskerke, H., Van der Ploeg, J.D., 2009, Linking birds, fields and farmers. *Journal of Environmental Management*, vol. 90, iss. suppl. 2, pp. S185-S192.
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## **2) Nederland Gruttoland (NLGL)**

The programme Nederland-Gruttoland (NLGL) also operates at national scale and is a public-private payment scheme. It is mostly aimed at biodiversity conservation and water regulation, in particular the preservation of a wading bird called the Black-tailed Godwit. Providers participating in this case are mostly dairy farmers. The buyers of the environmental services changed; in the first phase (2003-2005) it was a lottery (i.e. Postcodeloterij), in the second phase (since 2006) it was the Ministry of Agriculture, Nature and Food Quality (of which the tasks are currently distributed over other ministries). The programme was started by three NGOs, an agri-environmental NGO (Natuurlijk Platteland Nederland), a nature conservation NGO (Vogelbescherming) and a landscape conservation NGO (Landschapsbeheer Nederland). Together, these NGOs started a new organisation to coordinate and implement this case (which was also called Nederland-Gruttoland). The programme included a group approach of preferably ten farmers nearby or adjacent to each other, and applied some experimental measures to learn about how the godwit population could be enhanced. The initiative was monitored and evaluated, and it learned that a group approach can be more effective than an individual approach, and that early intensive mowing and small space for chicks strongly determine the breeding success.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ € 249 133 (2006/2007)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 751 ha (0,4%) (in ≈ 223 000 ha)
<i>Duration (since start of payments)</i>	1 <sup>st</sup> phase 2003-2005 2 <sup>nd</sup> phase 2006+
<i>Contract periods</i>	1 year contracts, planned to be continued.

### *Interviewed person*

The project leader, from the coordinating organisation which was started to implement this programme (also called Nederland-Gruttoland), 13 March 2008, by phone, continued by email March 2008, by email.

### *Reviewed documentation*

- Gerritsen, G., 2006, Gruttonieuws 2006. Nederland-Gruttoland, Boerenland-Vogelland.
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### **3) Waterland (WL)**

The programme Waterland (WL) operates at regional scale, in the middle of the province Noord-Holland. It is publicly financed and coordinated through an agri-environmental association (Water, Land & Dijken). It is aimed at biodiversity conservation, landscape conservation and water regulation and includes three types of environmental services: the processing of mown grass in manure production (in Dutch: 'humest productie'), dredging and verge management (in Dutch: 'berm- en dijkbeheer'). The processing of mown grass in manure production is provided by 10-13 farmers, dredging by about 40 farmers, and for verge management the number of providing farmers was not available. Buyers of the environmental services in this initiative are municipalities and the water board (Hollands Noorderkwartier). The leaders in this case are the buyers and the coordinating agri-

environmental association. This case included a pilot with clustering of dredging practices, which was evaluated as successful. The case also included a specially created, exceptional legal situation to allow ('regulated tolerance') the processing of mown grass in manure production, which is normally prohibited as it is a type of waste management; for waste management special licenses are required.

#### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ € 41 625 (2006/2007)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 13 ha (0,05%) (in ≈ 26 000 ha) (Size ditch width equals 1m. This programme includes services that are not convertible to hectares, e.g. it includes 820-2000 tonnes/year of processed mown grass.)
<i>Duration (since start of payments)</i>	Since 1997 (i.e. mown grass since 1997, verge management since 1999, dredging since 2006)
<i>Contract periods</i>	Ad hoc contracts, planned to be continued.

#### *Interviewed person (interview conducted together with Wouter-Dirk Huitzing, MSc Student Natural Resources Management)*

The representative involved in coordinating and implementation of this programme, from an agri-environmental interest group (Water, Land & Dijken), 30 January 2008, by telephone.

#### *Reviewed documentation*

Schoenmakers, S., Brak, C., Terwan, P., Buijs, J., Praag, C., Resius, F., Sas, W., Tijssen, W., Visbeen, F., 2005, Jaarverslag 2004. Vereniging Agrarisch Natuurbeheer Waterland, Purmerend.

Terwan, P., Visbeen, F., 2005, Samenwerkingsverband Waterland, Activiteitenverslag 1999-2004. Samenwerkingsverband Waterland, Purmerend.

Water, Land & Dijken, no year, Groen-blauwe diensten. Water, Land & Dijken, Purmerend. Online information on 'Humest', 'Baggeren' and 'Berm- en dijkbeheer' at: <http://www.waterlandendijken.nl/natuur-en-landschapsbeheer/groene-blauwe-diensten/> [consulted 7-6-2013].

#### **4) Eem & Vallei (EV)**

The programme Eem & Vallei (EV) operates at regional scale, and is situated in a region with a policy status of 'National Landscape' ('Arkemheen-Eemland'). It aims at biodiversity and landscape conservation. A public-private landscape fund ('Stichting Landschapsfonds Eem en Vallei') was started by several parties involved in the region

including consultancies, a bank, a landscape interest group and an agri-environmental association, to coordinate and implement this programme. Providers in this case are about ten dairy farmers. Buyers are a mixture of local and national companies (45%), municipalities, the province (Utrecht), national government (45%) and private individuals (10%). The consulted informants emphasised that raising funds for specific aims is more feasible than raising funds for general programme aims.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ € 10 000 (2007)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	Scattered plots (in area of about 8500 ha) (This programme includes services that are not convertible to hectares.)
<i>Duration (since start of payments)</i>	Since 2003
<i>Contract periods</i>	Ad hoc, planned to be continued.

### *Interviewed persons*

The representative involved in plan making and implementation of this programme, from the landscape fund (Landschapsfonds Eem en Vallei), January 2008, by telephone and by email.

The representative involved in implementation of this programme, from a landscape interest group (Landschap Erfgoed Utrecht), July 2008, by email.

### *Reviewed documentation*

Ark & Eemlandschap, no year, Wat doen wij?. Online information at:

[www.arkeneemlandschap.nl](http://www.arkeneemlandschap.nl) [consulted 21-4-2008].

Eem + Vallei Landschapsfonds, 2005, Jaarverslag 2004. Stichting Landschapsfonds Eem en Vallei, Hoogland.

Eem + Vallei Landschapsfonds, 2008, Jaarverslag 2007. Stichting Landschapsfonds Eem en Vallei, Hoogland.

Kloen, H., Terwan, P., Tolkamp, W., Van Well, E., 2007, Bouwstenen voor de financiering van het Nationaal Landschap Arkemheen-Eemland. Opdrachtgever Stichting Vernieuwing Gelderse Vallei. CLM, Utrecht en Paul Terwan Onderzoek & Advies, Utrecht.

Project Innovatiegroepen Ons Eemland, 2007, Een nieuwe band tussen Stad en Land, Tien innovaties voor het nationaal landschap Arkemheen-Eemland. Opdrachtgever Provincie Utrecht, Programma Leren voor Duurzame Ontwikkeling. Project Innovatiegroepen Ons Eemland, Hoogland.

## 5) Midden-Delfland (MD)

The programme Midden-Delfland (MD) operates at regional scale, is situated in the province Zuid-Holland, and a public-private landscape fund. It is initiated by several municipalities (Midden-Delfland, Delft, Den Haag), and aims at biodiversity and landscape conservation. A system was developed by the regional agricultural interest group (LTO-Noord, afdeling Delflands Groen), the local agri-environmental association (Vockestaert), a small consultancy (Paul Terwan Onderzoek en Advies) and a regional agri-environmental association (Natuurlijk Platteland West), on which the payments were based. The buyers are the three involved municipalities (Midden-Delfland, Delft, Den Haag) and some local companies. The leader is an NGO started to coordinate and implement this case (Stichting Groenfonds Midden-Delfland), of which the board is composed by representatives of the three municipalities. Implementation of the programme is assisted by the local agri-environmental association (Vockestaert). Providers are about 80 farmers and about 10 residents.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ € 249 000 (2006)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 1 500 ha (32%) (in 4750 ha)
<i>Duration (since start of payments)</i>	Since 2006/2007 until 2012+
<i>Contract periods</i>	6-year contracts, planned to be continued.

### *Interviewed persons (interviews conducted together Wouter-Dirk Huitzing)*

Consultant involved in plan making of this programme, from a small consultancy (Paul Terwan Onderzoek & Advies), 19 January 2008, face-to-face.

The representative involved in implementation of this programme, from the local agri-environmental association (Vockestaert), 29 November 2007, by telephone.

### *Reviewed documentation*

Groenfonds Midden Delfland, 2003, Uitgangspunten inrichting Groenfonds Midden Delfland 20-11-2003.

Schaafsma, R., Terwan, P., Van Herk, J., 2007, Kansen voor groenblauwe diensten in Midden-Delfland, Plan van Aanpak. Projectgroep FES Proeftuin Groenblauwe diensten Midden-Delfland. Opdrachtgever HHRs Delfland. Waaloord, Woerden, Paul Terwan Onderzoek & Advies, Utrecht.

Terwan, P., Rodenburg, B., 2004, Een puntensysteem voor groene diensten in Midden-

Delfland. Oprachtgever Vereniging voor agrarisch natuur- en landschapsbeheer Vockestaert en WLTO afdeling Delflands Groen. Paul Terwan Onderzoek & Advies, Natuurlijk Platteland West, Schipluiden.

- Ter Woorst I. (red), 2007, Voor een open en groen Midden-Delfland. Initiatief van Groenfonds Midden-Delfland en Agrarische Natuurvereniging Vockestaert. Groenfonds Midden-Delfland, Midden-Delfland.
- Van Rij, E., 2008, Improving institutions for green landscapes in metropolitan areas. PhD thesis. Delft University of Technology, Delft.
- Van Rij, E., Dekkers, J., Koomen, E., 2008a, Analysing the success of open space preservation in the Netherlands: the Midden-Delfland case. Tijdschrift voor Economische en Social Geografie, vol. 99, iss. 1, pp. 115-124.
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## 6) Alblasserwaard (AW)

The programme Alblasserwaard (AW) operates at regional scale, in the area Alblasserwaard-Vijfheerenlanden (in the province Zuid-Holland). A public landscape fund was started to implement this programme (Landschapsplan Alblasserwaard-Vijfheerenlanden), which aims at biodiversity conservation and landscape conservation. Buyers are the water board (Rivierenland) and the implementation bureau for rural areas (DLG). Leaders of this case are the buyers and the landscape fund itself. Providers are farmers and residents. Both consulted project leaders (the former and the successor) emphasised motivation and commitment were critical success factors in realising and continuing this programme.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ 100 000 € (2006/2007) (Mainly the budget for maintenance of historic landscape elements such as pollard trees, other budgets incidental.)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 5 ha (0,5%) + scattered plots in area (in 978 ha) (Size occupied by pollard tree equals 1m <sup>2</sup> /tree. This programme includes services that are not convertible to hectares.)
<i>Duration (since start of payments)</i>	Since 2005 (For cultural-historic landscape elements)
<i>Contract periods</i>	Ad hoc contracts, planned to be continued.

### *Interviewed persons*

The project leader involved in plan making and implementation, from a municipality (Gorinchem), 5 February 2008, face-to-face.

The former project leader involved in plan making and implementation, then affiliated at a local public bureau for rural affairs (Streekkantoor Alblasserwaard-Vijfheerenlanden), 9 July 2007, by email.

### *Reviewed documentation*

Sipkema, J., 2004, Behoud platteland particulier betaald? Onderzoek naar de kansen en randvoorwaarden voor particuliere financiering van groene diensten in de Alblasserwaard-Vijfheerenlanden. Opdrachtgever Landschapsplan Alblasserwaard –Vijfheerenlanden. MSc opleiding Land en Water Management, Hogeschool Larenstein, Velp.

Stichting Uitvoering Landschapsplan Alblasserwaard Vijfheerenlanden, no year, Uitgaven en inkomsten projecten Landschapsplan Alblasserwaard-Vijfheerenlanden, 2000-2004.

Stichting Uitvoering Landschapsplan Alblasserwaard Vijfheerenlanden, no year, Projecten uit het Landschapsplan A-V in +/- 30 woorden.

Stichting Uitvoering Landschapsplan Alblasserwaard Vijfheerenlanden, 2007, Stand van zaken van projecten uit het Landschapsplan Alblasserwaard-Vijfheerenlanden. Bijlage 4, 12-3-2007.

Veerman, S., 2004, Contact met je Groene Hart!, Een voorzet tot een gebiedscontract met begeleidend essay. Streekkantoor Alblasserwaard-Vijfheerenlanden, Groot Ammers.

## **7) Biesland (BL)**

The programme Biesland (BL) operates at local scale, nearby the city of Delft. It aims at biodiversity, landscape and soil conservation, and water regulation. The provider is one farm (Hoeve Biesland); which used to be mainly a dairy farm, and which changed to mainly providing environmental services (it also includes educational activities and production of special high-quality farm products). The buyers are the Ministry of Agriculture, Nature and Food Quality (of which the tasks are currently distributed over other ministries), the province (Zuid-Holland), the water board (Delfland) and four nearby municipalities, who transfer their money to a fund, which pays the farm. There is no articulated leader in this case; though the party involved with the relatively most leading position is the provider. A semi-academic research organisation (Alterra) was involved in the development of the payment concept for this case, and is involved in the monitoring and evaluation of the implementation of this concept. The financial construction developed for this programme received permission from the European Commission to be implemented for

ten years (and then would have to be evaluated again by the European Commission. A researcher who studied this programme emphasised that perseverance, motivation and commitment were critical success factors for this case (Buizer, 2008).

#### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ 116 200 € (2008)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 95 ha (100%) (in ≈ 95 ha)
<i>Duration (since start of payments)</i>	Since 2008 until 2028/2038+
<i>Contract periods</i>	20-30 year contract

#### *Interviewed person*

Researcher involved in plan making and evaluation of programme, from a semi-academic research organisation, started February 2008 by email, continued 17 March 2008 face-to-face.

#### *Reviewed documentation*

- Buizer, I.M., 2008, Worlds Apart, Interactions between Local Initiatives and Established Policy. PhD thesis. WUR, Wageningen.
- Buizer, M., Van Herzele, A., 2012, Combining deliberative governance theory and discourse analysis to understand the deliberative incompleteness of centrally formulated plans. *Forest Policy and Economics*, vol. 16, pp. 93-101.
- Deelstra, T., Boyd, D., Van den Biggelaar, M., 2001, Multifunctional land-use: an opportunity for promoting urban agriculture in Europe. *Urban Agriculture Magazine*, number 4, July 2001.
- Europese Commissie, 2006, Staatssteun/Nederland, Steunnummer N 58/2005, Boeren voor Natuur. C(2006) 3452, 26-VII-2006. Europese Commissie, Brussel.
- Europese Commissie, 2007, Steunmaatregelen van de staten/Nederland, Steunmaatregel N 476/2007, Boeren voor Natuur II, onderdeel schapen, zoogkoeien en gemengde bedrijven. C(2007) 5629, 16-XI-2007. Europese Commissie, Brussel.
- Hoeve Biesland, no year, Boeren voor Natuur, de visie, het inkomen, afspraken. Online information at: [www.hoevebiesland.nl](http://www.hoevebiesland.nl) [consulted 11-2-2008].
- Niemijer, C., 2007, Boeren voor Natuur, een economische vertaling, Een modelmatige benadering van de economische gevolgen van de verandering in bedrijfsvoering. Rapport 52. Animal Sciences Group, WUR, Lelystad.
- Westerink, J., Ottbrug, F., De Vries, C., Plomp, M., Smolders, G., Finke, E., 2006, Verhalen van Biesland, natuurgericht landbouwbedrijf. Boeren voor Natuur.

## 8) Naobers van Zudert (NZ)

The programme Naobers van Zudert (NZ) operates at local scale, in the northern part of the Dutch fen landscape and aims at biodiversity and landscape conservation, and water regulation. To implement and coordinate this case, a public-private landscape fund was started by local residents and reed cultivators. The providers are 13 households in that are situated in the area. The buyers changed. In the first phase (2005-2007), the buyers included: a national company (KNHM), a private fund (VSB Fonds), local residents, nature-conservation NGO (Natuurmonumenten), the Ministry of Agriculture, Nature and Food Quality (of which the tasks are currently distributed over other ministries), and the province (Overijssel). In the second phase, the buyers still included the province, but other buyers were various ad-hoc buyers of products resulting from the environmental services in the area. In this case, it concerns buyers of reed produced and collected in the area, which is used for various purposes (e.g. roof covering). The consulted person from the programme, emphasised motivation and commitment are critical success factors to realise and continue the programme.

### *Miscellaneous facts*

<i>Costs of implementation (annual budget)</i>	≈ 1200 € (2007)
<i>Project area (surface of area covered by programme / surface of area in which the programme operates)</i>	≈ 5 ha (36%) + scattered plots in area (in ≈ 14 ha) (This programme includes services that are not convertible to hectares.)
<i>Duration (since start of payments)</i>	1 <sup>st</sup> phase 2005-2007 2 <sup>nd</sup> phase 2008+
<i>Contract periods</i>	Ad hoc contracts, planned to be continued

### *Interviewed person*

The representative involved in plan making and implementation of this programme, from an NGO coordinating and implementation this programme (Stichting Naobers van Zudert), started March 2008 by email, continued 12 March 2008 by telephone.

### *Reviewed documentation*

Landschapsbeheer Nederland, no year, Burgers slaan handen ineen in Dwarsgracht. In: Een mooi landschap, daar werken we samen aan. Landschapsbeheer Nederland, De Bilt.

Piek, H., no year, Naobers van Zudert. Presentatie. Stichting Naobers van Zudert, Dwarsgracht.

NederlandMooi, no year, Stichting Naobers van Zudert. Online information at: [www.nederlandmooi.nl](http://www.nederlandmooi.nl) [consulted 12-2-2008].

## Orientation towards Sustainable Development

Table C.2: Contribution to aspects under pressure of the Dutch fen landscape. The information about scheduled management practices is collected from the documentation. N/A = Not explicitly addressed in the documentation.

Progr amme	Main management practices	Addressed biophysical aspects					Addressed socio-economic aspects		
		Water table rise	Water quality improvement	Peat soil conservation	Species- rich fen meadows	Specie s-rich wet fens	Conservatio n cult-hist landscape	Enhanced recreation options	Enhanced flood protection
SAN	Postponed mowing date, raised water table in spring, nest protection, maintenance of pollard trees, reed borders & small ponds.	√	N/A	N/A	√	√	√	N/A	N/A
NLGL	Postponed mowing date, raised water table in spring, nest protection, using extensive & crude dung, refuge area for chicks, extensive grazing by cattle.	√	√	N/A	√	√	N/A	N/A	N/A
WL	Handling mown grass, dredging, verge management.	N/A	√	N/A	√	N/A	N/A	√	N/A
EV	Construction & maintenance of minor landscape elements.	N/A	N/A	N/A	√	N/A	√	√	N/A
MD	Specific mowing regime, preservation of old grassland, maintenance of pollard trees, small woodlands & natural ditch banks.	N/A	N/A	N/A	√	N/A	√	√	N/A
AW	Construction and maintenance of landscape elements (e.g. pollard trees)	N/A	N/A	N/A	√	N/A	√	N/A	N/A
BL	Year-round raised water table, implementation of various landscape amenity elements, no additional fertilizers & forage.	√	√	√	√	√	√	√	N/A
NZ	Dredging, maintaining reed borders, specific mowing.	N/A	√	N/A	√	√	N/A	√	N/A

Table C.1: Spatial and temporal scope. Classifying the spatial and temporal scope means the BL programme has a medium spatial scope (95 ha) and a long temporal scope (20-30 year contracts). The other cases were likewise assessed. Programmes are sorted on the number of sustainability aspects they address. Classification of spatial scope (indication of surface area in use for services): small (<15 ha), medium (15-1500 ha) and large (>1501 ha). Classification of temporal scope (time span of guaranteed contracts): short (< 3 years), medium (3-10 years), long (> 11 years). <sup>a</sup>The temporal scope of SAN would be categorised as long, when the previous programme structures would also be included.

<i>Programme</i>	<i>SAN</i>	<i>NLGL</i>	<i>WL</i>	<i>EV</i>	<i>MD</i>	<i>AW</i>	<i>BL</i>	<i>NZ</i>
<i>Spatial scope</i>	Large	Medium	Small	Small	Medium	Small	Medium	Small
<i>Temporal scope</i>	Medium <sup>a</sup>	Medium	Medium	Medium	Medium	Small	Long	Small

Table C.3: Contribution to economic viability of land-use. <sup>a</sup>Wherever possible, payments have been converted into euro per hectare (rounded to whole euros). The programmes are sorted on payment/ha. <sup>b</sup>NA = not available. <sup>c</sup>The NZ, WL, EV and AW programmes also support services that are not convertible payment per hectare. <sup>d</sup>Estimated for SAN coverage in fen areas, based on extrapolation of SAN in western fen areas.

<i>Programme</i>	<i>€/ha<sup>a</sup></i>	<i>Other payments for services</i>	<i>Perceived contribution to income</i>
<i>BL (2008)</i>	≈ 1223 (annually)	NA <sup>b</sup>	NA
<i>NLGL (2006/2007)</i>	≈ 332 (annually)	NA	NA
<i>NZ<sup>c</sup> (2007)</i>	≈ 240 (annually)	NA	NA
<i>MD (2006)</i>	≈ 166 (annually)	NA	Substantial contribution to costs or complete coverage
<i>SAN<sup>d</sup> (2007)</i>	≈ 157 (annually)	NA	Substantial contribution to costs or complete coverage
<i>WL<sup>c</sup> (2006/2007)</i>	≈ 1 (per occasion)	€ 28.50 per tonne of mown grass	Substantial contribution to costs or complete coverage
<i>EV<sup>c</sup> (2004)</i>	NA (paid at start)	Contributions per landscape element	Substantial contribution to costs or complete coverage
<i>AW<sup>c</sup> (2006/2007)</i>	NA (per occasion)	e.g. € 1.86 per pollard tree + 50% of construction landscape elements	Substantial contribution to costs or complete coverage

## Orientation towards Steering

Table C.4: Interrelations between SAN and other PES programmes and incentives to start.

Programme	SAN bird protection considered ecologically ineffective	Incentive to start programme in addition to SAN			SAN in area	Relation to SAN
		No payments available for:				
		Drastic change in farming practices	Start-up of specific landscape management practices	Maintenance of specific landscape management practices	Maintenance of specific water management practices	
NLGL	√					√ Usually in addition to SAN.
WL				√	√	√ Management practices do not overlap.
EV			√			√ SAN finances maintenance, practices overlap.
MD				√		√ Providers are obliged to adjust fen meadow management practices to SAN.
AW			√	√		√ Practices do not overlap.
BL		√				√ Provider is obliged not to overlap with SAN.
NZ				√	√	√ Providers use SAN and are obliged to meet SAN conditions.

Table C.5: Obstacles to improved functioning. <sup>a</sup>Restrictions are due to regulation on processing of mown grass.  
<sup>b</sup>Application of an experimental concept allowed at only 5 farms in the Netherlands.

<i>Obstacles</i>		
<i>Internal</i>	<i>Administration</i>	<ul style="list-style-type: none"> <li>- Long-term contracts are not available (NLGL)</li> <li>- New fund construction for spatial upscaling is not yet available (EV)</li> </ul>
	<i>Social support</i>	<ul style="list-style-type: none"> <li>- Required continuity of (scientific) knowledge exchange is not guaranteed (BL, NLGL)</li> <li>- Few proposals / lack of input from farmers (EV)</li> </ul>
<i>External</i>	<i>Finance</i>	<ul style="list-style-type: none"> <li>- Private fundraising becomes too difficult when the spatial scale of an programme increases (EV)</li> <li>- Insufficient structural financing (NZ, NLGL)</li> <li>- Required details of programme aims, as demanded by public buyers, are not yet available (EV)</li> </ul>
	<i>Legal regulations</i>	<ul style="list-style-type: none"> <li>- Desired 'basic landscape bonus' has not been approved by EU (MD)</li> <li>- Legal conflict between mowing schedules and protection of chicks in fen meadows (NLGL)</li> <li>- Legislation prevents expansion of the programme (WL<sup>a</sup>, BL<sup>b</sup>)</li> </ul>
	<i>Administration</i>	<ul style="list-style-type: none"> <li>- Required administrative reporting represents a heavy burden (WL, SAN)</li> <li>- Limited possibilities for custom-made agreements and flexibility (SAN)</li> <li>- Lack of policy priority for preservation of the 'village landscape' hampers continuation of the programme (NZ)</li> </ul>
	<i>Social support</i>	<ul style="list-style-type: none"> <li>- Limited options for applying the concept 'Farmers for Nature' leads to disappointment (BL<sup>b</sup>)</li> <li>- Providers' willingness to participate decreases due to premature implementation (SAN)</li> </ul>

## Question List Used for Interviews for the PES Cases

### *General*

- Could you sketch the general characteristics of the initiative? Such as name? Key words? Phase per 1/1/2008? Stage of the initiative? (e.g. preparation, decision making, implementation, stagnated)
- Surface and spatial scale (ha)? surface in ha, local, regional, national scale, location
- Amount and type of payment? How much /month /year? Occasional/structural, short/long term
- Payment for what exactly? Input/output payment? Per hectare/product/species? Other units?
- Time span (months, years)? time in years, term: short (< 1 y), medium (1-5 y), long (>5 y)

### *Type of PES*

- Could you indicate the type of service? Water management, nature conservation, landscape conservation/facilitating amenity (incl. tourism, on-farm sales and health and social care), soil preservation, carbon sequestration, ...
- Do the provided services address water table management? If so, in which way?
- Similarly, do the provided services addressing water quantity management, soil subsidence, species-rich wet-fens and fen meadows, cost efficiency of water management, conservation of cultural-historic landscape, safety against flooding, recreation options? And if so, in which way?
- Are the provided services a profitable by-product or an independent specific practice?
- What is the amount of hectares for which payment is received? Or, per which type of unit is the payment made?
- What is the current income per provider from delivering the services (or a likely estimate)?
- What is the flexibility or rigidity of the measures and the organization (e.g. task division)?

### *Actors*

- Who are the provider of the services and what are their motivations? (usually same as recipient, receiver of payment) E.g. dairy farmers, other farmers, residents, governmental bodies, NGOs, other? Motivation in terms of e.g. financial reasons, peer pressure, ideological, public task.
- Who are the beneficiaries (receiver of service) and what are their motivations? E.g. holiday-makers, local residents, urban residents?
- Who are the buyers of the service and what are their motivations? Usually same as beneficiaries, but could also be otherwise.

- Who is/are the leader(s)/decision maker(s) and what is/are their motivations? E.g. NGO, governmental body, etc.
- Are there any specific financial demands from the key players? And if so, in which way?
- Are there agri-environmental associations involved, and if so how?
- Are there any other stakeholders involved and what their motivations? (E.g. intermediary organizations)

*Context and reflection*

- Can the PES scheme you are involved be combined ('stacked') with other PES schemes? And if so, which other schemes? And if not, why not?
- Can you characterize the influence this initiative on others? And the influence of others on this one?
- Are there any other possible services, providers and/or buyers that are not yet active(ly involved)?
- To which extent do you assess the current initiative has reached its full potential?
- Has anything been adapted in the scheme? If so, what, why and when?
- Can you elaborate on any striking experiences from the key actors involved?
- Are there any specific demands from key actors? If so which?
- Are there any current striking issues?
- Are there any striking options or bottlenecks for the functioning of this scheme?



# Summary

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## *Introduction*

This dissertation began with a desire to better understand the conceptual and empirical contexts for governance for sustainable development. How does current research define and explain governance for sustainable development? In line with established research, the present study takes up sustainable development as conceptualised and implemented using modes of governance which differ in character and in orientation towards steering and the goal of sustainable development. Like sustainable development, the concept of governance is under debate. Here, the 1987 WCED Brundtland Report definition is taken as a starting point: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (1987, p. 1 of Chapter 2). Governance is understood as the act or manner of steering societal developments by public and/or private actors towards collective goals. A mode of governance for sustainable development is defined here as a type of steering arrangement with a certain institutional configuration (including public and/or private actors and different types of institutional relations) that is intended to influence societal changes towards sustainable development.

The research focuses on three such modes of governance: adaptive management, transition management and payments for environmental services (PES). These have been selected due to their prominence in the discourse on governance for sustainable development. Adaptive management refers to efforts to enable a social-ecological system to maintain itself over long periods through learning-by-doing and cooperation, and efforts to enhance the adaptive capacity of a system to respond to changing circumstances. Transition management is based on innovation, experimentation and learning, with an orientation towards a long-term vision; it aims to fundamentally alter the structure of a socio-technological system in order to prevent environmental crisis. PES describes efforts to make environmental conservation economically viable by accounting for and preventing negative environmental externalities and by contributing to sustainable livelihoods.

Research for this dissertation has found no academic studies that have comparatively examined the selected modes of governance for sustainable development based on empirical analysis. Such analysis can help to understand how the selected modes work in practice and whether they assist in a real-world context in moving towards sustainable development. This study achieves this by examining practical experience with

interventions in accordance with the three selected modes of governance as applied in the Dutch fen landscape.

#### *Research aim*

The present study aims to gain greater insight into the key challenges arising in steering towards sustainable development. It achieves this aim by:

- Analysing three different modes of governance – adaptive management, transition management and PES – according to their steering mechanisms and orientation towards sustainable development;
- Evaluating the three modes according to a set of criteria for governance for sustainable development;
- Analysing practical experiences with the selected modes in the Dutch fen landscape.

#### *Research approach*

The present study first analysed the orientation of each mode towards sustainable development and steering of adaptive management, transition management and PES according to the way they are articulated in the literature. The representation in the literature of each mode is also assessed according to the criteria on governance for sustainable development. Second, study turned to empirical cases recognised as applied examples of the modes. Analysis parallel to the conceptual study focused on four adaptive management, three transition management and eight PES cases. Empirical data were gathered through review of project documentation and consultation with actors involved in the cases.

#### *Criteria for governance for sustainable development*

Governance intending to enhance sustainable development inherently entails intervention in both societal and biophysical processes, and leads to partly unknown outcomes that hold various implications for affected groups. For this reason, many studies on governance for sustainable development articulate criteria concerning such implications as concepts for public and private actors involved in interventions to take into account. These criteria are considered as ‘beacons’ that may help to guide governance for sustainable development as defined in the WCED 1987 Report.

The criteria used in the present study include equity, democracy, legitimacy, handling of scale issues and handling of uncertainty issues. In short, equity refers here to the allocation of positive and negative impacts in space and time and the application of a procedure of environmental decision-making which are both regarded as fair. Democracy is considered to be the representation of a plurality of groups involved and the participation of societal groups in decision-making for public goals. Legitimacy in this context refers to decision-makers taking responsibility for and explaining and justifying decisions (i.e. accountability) and to public acceptability of decisions made according to those affected

and/or to those charged with assessing acceptability. The handling of scale issues is understood as acknowledging and addressing the various scale dimensions of a sustainability issue, i.e. spatial, temporal and institutional scales and biophysical and institutional boundaries. This criterion also includes the adaptability of an institutional context to changing scale issues. The handling of uncertainty issues refers to the explicit acknowledgement of uncertainties (to address variability) and to the use of learning and new insights (to address lack of knowledge).

### *The Dutch fen landscape*

The Dutch fen landscape reveals itself as an exceptional subject for a study of practical experiences with the three selected modes of governance for sustainable development. Why? The context in this landscape is an example of a multi-actor, multi-level, multi-sector challenge with a biophysical and socio-economic situation characterised by complexities and uncertainties. It is a location where the three modes of governance are recognisable in empirical cases, which enables a comparative study of the three modes in the same context. The Dutch fen landscape features a high population density, intensive economic usage, high pressure on spatial usage and natural resources, involvement of many governmental bodies and conflicting claims from actor groups involved. The context and challenge as presented by this setting may also serve as a forerunner example for other locations worldwide, where similar intensification of use of rural areas is expected, typically as a result of population and economic growth.

Multiple actors in the setting of the Dutch fen landscape share the belief that the current situation is unsustainable, but characterisation of the sustainability problem and consideration of urgencies and priorities for further steps diverge. Discussion in the context of the landscape mainly converges on disagreements on water management. A salient issue concerns different ideas about the urgency of the need to preserve the peat soil. Peat soil is the substrate of the landscape, requiring sufficient freshwater infiltration in order to persist, and is depleted by land-use practices which require water table drainage. Debate on the future of this landscape has so far occurred at a noticeable level only among scientists and regional policymakers involved. A broader societal debate among the larger public and national government has been absent.

### *Adaptive management*

In adaptive management, ideas about causes of the 'sustainability problem' centre on a lack of knowledge and cooperation. Sustainable development is envisaged as enhancing the adaptive capacity of the social-ecological system. Learning-by-experimentation and cooperation among actors involved (typically policymakers, practitioners, scientists, and local stakeholders groups) is seen as key to steering towards sustainable development.

The adaptive management cases studied show that land-use practices requiring a specific water table level, and featuring a lack of renewal of the water table decrees,

conflicting stakeholder interests, conflicting spatial claims and a complex institutional structure limit the range of experimentation. Actors involved in the cases studied emphasise that professional mediation and process guidance and enhanced knowledge about negotiation approaches would be helpful in clarifying conflicts. The present research proposes that a change from common to adaptive practices may require a concurrence of advantageous circumstances, such as elimination of resentment over past issues, consensus on the need for and direction of an experimental strategy and the biophysical and technical possibility of implementation of desired experimental practices.

Due to a limited range of possibilities for experimentation, the contribution of adaptive management to sustainable development may be limited in contexts such as the Dutch fen landscape. The cases studied show that a narrow scope of experimentation – mainly due to institutional complexity and conflicting interests – contributes to the sustainability challenge more than a lack of knowledge about the social-ecological system. Thus, greater clarification on how to deal with institutional complexity and with conflicting interests may be more useful for moving toward sustainable development than the principal steering mechanism employed in adaptive management, i.e. enhanced, detailed knowledge about the functioning of the social-ecological system.

### *Transition management*

In transition management, the cause of the ‘sustainability problem’ is considered to be a lack of capacity to handle an environmental crisis and to innovate. Sustainable development is envisaged as continuous transformation to another ‘state of the system’. Key to steering towards sustainable development is the stimulation of innovation and transformation, typically with a pivotal role for government and a selection of innovation-oriented stakeholders.

The transformations studied show a heavy dependence on spatial instruments, with a preference for land acquisition and expropriation, and relatively limited attention to learning and experimentation. However, some pilots and small-scale innovative practices are included, which could serve as examples and perhaps be applied at other locations. In the areas of the cases studied, it is practically impossible to experiment with spatial organisation of the landscape, and serious complications with all of the scheduled spatial instruments are present or expected. Measures to handle the spatial scale dimension of transformations are thus found to be essential to transition management in settings such as the Dutch fen landscape. Further research on this topic may prove helpful. Even though democratic representation and participation have been emphasised by several authors as important in transition management, and despite calls for these aspects to be better addressed in the conceptualisation of this mode of governance, the empirical cases studied show that neither aspect is explicitly addressed by the leading actor. Present findings also show that if key actors in an area (such as local governments) do not support envisaged transitions, they will be nearly impossible to realise. Thus, the cases studied confirm the

conclusion of several scholars in the transition management literature that legitimacy and its relationship to the institutional context should be included in the study and implementation of transformations.

The cases studied include no straightforward substantial contributions to the sustainable development of these landscapes. The experiences analysed also suggest that transition management cases in contexts with multiple, sometimes incompatible sustainability issues need to pay careful attention to the development of sustainability goals, the reasons for them and their order of priority and especially to ways to deal with the likely irreversible consequences of drastic intervention when the sustainability priorities change over time. All in all, the promise of management through transformations as a mode of governance for sustainable development in settings such as the Dutch fen landscape appears to be limited.

#### *Payments for environmental services*

In PES, the cause of the 'sustainability problem' is seen as a lack of suitable economic instruments. Sustainable development is envisaged as the operation of market arrangements that reduce or eliminate negative environmental externalities and improve livelihoods. Key to steering towards sustainable development is the establishment of contracts or programmes to transfer payments from buyers to providers, typically with a role for intermediary organisations.

The PES cases studied comprise one large national, publicly financed programme (i.e. an agri-environmental scheme) that focuses on species-rich fen meadow conservation and seven smaller, publicly or publicly-privately financed programmes that were all tied to the dominant programme. Although these PES schemes are market oriented, they do not involve spontaneous trading. They are mainly designed and executed with help from governments and/or governmental regulation, and can be viewed as instrumental in achieving certain environmental goals through financial assistance or compensation for providers. Although the PES cases have made some minor contributions to sustainable development of the landscape studied, it has become clear that several institutional and biophysical obstacles have impeded their further application. These persistent complications relate to formal procedures for policy-making on water management, biophysical constraints relating to water and soil management, financial restrictions on publicly-funded programmes and apparently low latent demand among possible buyers.

It may be beneficial for groups involved in such a setting to pursue and strive for improvement of PES programmes. However, the present research has shown that PES as a pathway to move towards sustainable development in contexts like that of the Dutch fen landscape seems limited due to persistent complications. The sustainability challenges arising appear unlikely to be addressed by an approach based on market-like exchange involving payments for environmentally beneficial practices.

### *Findings on governance for sustainable development in the Dutch fen landscape*

Overall, the present research observed that the selected modes provide some limited contributions to the sustainability challenge as encountered in the setting studied. No single mode was found to be more suitable to meet the challenge than the other two. The present study shows that issues identified in the literature as central – i.e. lack of knowledge and cooperation, lack of transformation and innovation, and lack of appropriate economic instruments – are not the central issues in the empirical contexts studied. Investigation of the practical experiences suggests that the sustainability challenge in the setting studied is mainly characterised by a high number of actors, intensive use of the resources provided by the landscape, conflicting interests of actor groups, diverse ideas about urgencies and priorities, and conflicts in or about the decision-making process, mainly about distribution of impacts and decisions perceived as unfair.

What would further assist, then, in addressing the sustainability challenge in the context of the Dutch fen landscape? First, present findings suggest that a broad, public debate at the supra-regional level among a representation of a large number of actors involved about the future of the setting may assist not necessarily on achieving consensus, but in clarifying options, positions and priorities of involved groups. Attention to such a debate is not incorporated in practice or theory in the three modes of governance studied.

Second, assessment of use of the criteria on governance for sustainable development shows that insights into options to achieve fair and acceptable distribution of losses and gains and fair and acceptable decision making procedures may assist in addressing the sustainability challenge. This suggests the potential value of research into how conceptualisation of adaptive management, transition management and payments for environmental services could better reflect how such aspects are and could be addressed in practice.

Third, the collected observations indicate that facilitation of negotiation, mediation and measures to deal with local sensitivities may assist in addressing a sustainability challenge. Attention to the level of individual action does not refer to aggregated institutional scales or dynamics of public and/or private spheres; it is a level not usually studied in the governance literature. However, findings indicate that further exploration of the role of inter-human communication and sensitivities may be worthwhile in order to better understand how modes of governance for sustainable development work in practice. Suggestion of the need for greater consideration for and research into communication and mediation is in line with conclusions reached by several adaptive management researchers.

### *Findings for the academic discussion*

Finally, what would assist in further understanding a sustainability challenge and interventions intended to move towards sustainable development? Proponents of the modes studied may be inclined to focus their research on improving the performance of their preferred mode. Moreover, proponents of the modes studied may not be inclined to re-

diagnose the sustainability challenge in a specific context. Nevertheless, a set of criteria to evaluate governance for sustainable development may be helpful in applying a broader research perspective that goes beyond the focus of one mode of governance. Present findings show that using such criteria may shed some light on issues that influence the functioning of a mode by addressing, for example, observed equity and legitimacy issues and handling of scale issues. However, a set of criteria on governance for sustainable development may be normative, impossible to achieve, entail contradictory or overlapping choices, and in some cases not desired by the proponents of a mode. Further research is needed on the applicability of such criteria within studies on modes of governance for sustainable development.

Proposed frameworks for the study of modes of governance for sustainable development may also assist in going beyond the perspective of a single mode. However, these frameworks pay most attention to identifying which actors are involved, the degree of coerciveness of government, and the influence of power and rules. The diagnosis of the ‘sustainability problem’ receives barely any attention. The present study shows that assumptions about what is essential to the content of a sustainability challenge have direct consequences on ideas about how to induce change. Conversely, ideas about inducing change have direct consequences for the diagnosis of a sustainability challenge. Focusing on the governance dimension may be insufficient to understand fully the actual challenges in empirical contexts. Greater attention to the content of a sustainability challenge and to the intended goal may help to clarify how diagnosis of a challenge might represent actual issues encountered in an empirical context and the extent to which conceptual diagnosis in the literature insufficiently reflects real-world contexts. In this way, enhanced understanding of what drives a problematic situation may help to understand why interventions intended to move towards sustainable development do or do not work.

Sustainable development is generally positioned as an integrative concept comprising practices and goals relating to ecology, economy and society. Findings of the present study suggest it would help to diagnose a sustainability challenge by explicitly specifying – instead of immediately integrating – ecological, economic, and social issues at stake. Identification would include why the issues are under pressure and why their protection is considered relevant and desirable. Explicit specification of the ecological, economic, and social stakes would ensure a view of significant factors integral to the sustainability problem and of their configuration within the relevant context.



# Samenvatting

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## *Introductie*

Dit onderzoek komt voort uit de wens om governance voor duurzame ontwikkeling beter te begrijpen; zowel conceptueel alsook in de empirie. Wat betekent governance voor duurzame ontwikkeling in de context van het huidige onderzoek? Dit onderzoek volgt het idee dat governance voor duurzame ontwikkeling kan worden bestudeerd en uitgevoerd volgens diverse vormen van governance, die verschillen in hun oriëntatie op zowel sturing als duurzame ontwikkeling. Zowel het concept van duurzame ontwikkeling als dat van governance zijn onderwerp van wetenschappelijk discussie. Het WCED rapport (1987) dat hier als uitgangspunt wordt genomen definieert duurzame ontwikkeling als: “ontwikkeling die aan de behoeften van het heden voldoet, zonder afbreuk te doen aan het vermogen van toekomstige generaties om in hun eigen behoeften te voorzien” (1987, p. 1, eigen vertaling). Onder governance wordt hier verstaan: de handeling of de wijze van sturen van maatschappelijke ontwikkelingen door publieke en/of private actoren in de richting van collectieve doelen. Een vorm van governance voor duurzame ontwikkeling wordt hier gedefinieerd als: een type sturingsarrangement volgens een bepaalde institutionele configuratie (waaronder publieke en/of private actoren en verschillende typen institutionele relaties) dat zich richt op het beïnvloeden van maatschappelijk verandering richting duurzame ontwikkeling.

In dit onderzoek is gekozen voor het bestuderen van drie vormen van governance voor duurzame ontwikkeling, vanwege het feit dat juist deze drie vormen centraal staan in de maatschappelijke en academische discussie over ‘governance voor duurzame ontwikkeling’. Het onderzoek richt zich op: adaptief management, transitie management en betalingen voor milieudiensten. Adaptief management verwijst naar instandhouding van een sociaal-ecologisch systeem over een langere periode door ‘leren-door-experimenteren’, samenwerking, en het verbeteren van het vermogen van een systeem zich aan te passen aan veranderende omstandigheden. Transitie management verwijst naar het fundamenteel veranderen van de structuur van een zogeheten ‘sociaal-technologisch systeem’, is gericht op langetermijnvisies, is bedoeld om een ecologische crisis te voorkomen, en is gebaseerd op leren, experimenteren en innoveren. Betalen voor milieudiensten verwijst naar het economisch levensvatbaar maken van natuur- en landschapsbehoud, het voorkomen van negatieve milieu-externaliteiten, en het bijdragen aan duurzame middelen van bestaan.

Voor zover bekend zijn er tot dusver geen studies in de academische literatuur die een vergelijkende analyse maken, op basis van empirisch onderzoek, van deze drie

verschillende vormen van governance voor duurzame ontwikkeling. Deze studie doet dit, door een vergelijkende analyse te maken van deze drie vormen van governance, op basis van ervaringen in een empirisch context, en geeft daarmee inzicht in hoe deze vormen van governance kunnen bijdragen aan het realiseren van duurzame ontwikkeling. Het empirische veld waarin deze praktijkervaringen worden bestudeerd is het Nederlandse laagveenweidelandschap.

### *Onderzoeksdoel*

Dit proefschrift komt voort de vraag om meer inzicht te krijgen in het uitdagende proces van sturing voor duurzame ontwikkeling door:

- Het analyseren van drie verschillende vormen van governance – adaptief management, transitie management, betalingen voor milieudiensten – volgens de manier waarop ze georiënteerd zijn op duurzame ontwikkeling en sturing;
- Het analyseren van de manier waarop criteria voor governance voor duurzame ontwikkeling opgesteld en gehanteerd worden in deze drie vormen van governance; en
- Het analyseren van praktijkervaringen met deze vormen van governance in het Nederlandse laagveenweidelandschap.

### *Onderzoeksbenadering*

In deze studie zijn adaptief management, transitie management, en betalingen voor milieudiensten eerst geanalyseerd op basis van hun oriëntatie op duurzame ontwikkeling en op sturing, zoals aangegeven in de literatuur over deze vormen van governance, en vervolgens op basis van de criteria voor governance voor duurzame ontwikkeling. Verschillende empirische initiatieven, die gezien worden als voorbeelden van deze vormen van governance, worden hier geanalyseerd: vier initiatieven voor adaptief management, drie voor transitie management en acht voor betalingen-voor-milieudiensten. Om de empirische gegevens te verzamelen, zijn actoren geraadpleegd die bij de initiatieven betrokken zijn en is per initiatief projectdocumentatie geanalyseerd.

### *Criteria*

Sturen richting duurzame ontwikkeling betekent interveniëren in maatschappelijke en biofysische processen. Dit heeft voor de betrokken publieke en private actoren verschillende gevolgen, en leidt tot deels onbekende uitkomsten. Om deze redenen wordt in veel studies gewezen op criteria waar beleid ten aanzien van duurzame ontwikkeling rekening mee zou moeten houden. Deze criteria worden daarbij niet als noodzakelijke voorwaarden gezien, maar eerder als ‘bakens’ die bij de realisering van duurzame ontwikkeling een belangrijke richtinggevende rol kunnen spelen.

De criteria die worden gebruikt in de huidige studie zijn: rechtvaardigheid, democratie, legitimiteit, het omgaan met schaalproblemen en het omgaan met onzekerheden. Kort gezegd verwijst rechtvaardigheid hier naar een verdeling van positieve

en negatieve effecten, in zowel ruimte als tijd, en naar, als rechtvaardig ervaren, besluitvormingsprocedures voor milieuvraagstukken. Democratie verwijst hier naar representativiteit van de betrokken actoren en participatie van maatschappelijke groepen in de besluitvorming met betrekking tot publieke doelen. Legitimiteit verwijst in dit verband naar het nemen van verantwoordelijkheid en het kunnen uitleggen en verantwoorden van beslissingen door de verantwoordelijke besluitvormers. Het verwijst tevens naar instemming met die besluiten en naar geaccepteerde autoriteit. Omgaan met schaalproblemen wordt gezien als het onderkennen en hanteren van verschillende schaaldimensies van een duurzaamheidsvraagstuk: ruimte, tijd en institutionele schalen, en biofysische en institutionele schalen. Ook relevant hier is het vermogen om met veranderende schalen om te gaan. Het omgaan met onzekerheden verwijst naar het expliciet erkennen van onzekerheden (om variabiliteit te kunnen duiden), en naar het gebruik van leren en nieuwe inzichten (om om te kunnen gaan met gebrek aan kennis).

#### *Het Nederlandse laagveenweidelandschap*

Het Nederlandse laagveenweidelandschap blijkt een geschikte context om de ervaringen met de drie prominente vormen van governance voor duurzame ontwikkeling te bestuderen. Waarom? De situatie in het Nederlandse laagveenweidelandschap blijkt een voorbeeld van een multi-actor, multi-level, multi-sector uitdaging. Het Nederlandse laagveenweidelandschap heeft een hoge bevolkingsdichtheid, een intensief economisch landgebruik, een hoge druk op de natuurlijke hulpbronnen, conflicterende claims van actorgroepen, en een veelheid aan betrokken overheidsorganen. Het is een plek waar de drie bestudeerde vormen van governance herkend kunnen worden in de empirische initiatieven, wat een vergelijkende analyse mogelijk maakt. De specifieke context en uitdaging in dit landschap kunnen ook dienen als een 'proeftuin' voor andere locaties, wereldwijd, waar dergelijke intensivering van de landelijke en natuurlijke gebieden verwacht wordt (bijvoorbeeld door bevolkingsgroei en economische groei).

De duurzaamheidsuitdaging in deze context wordt gekenmerkt door het algemeen aanvaarde inzicht dat de huidige situatie onhoudbaar is, maar de gesignaleerde urgenties en prioriteiten lopen uiteen. De discussie hier richt zich vooral op onenigheid over waterbeheer. Een belangrijk punt betreft de verschillen in opvatting over de urgentie de veengrond te behouden. Deze veengrond, de ondergrond van dit landschap, is voor haar behoud afhankelijk van voldoende vochtigheid, en zal uiteindelijk verdwijnen wanneer de huidige praktijk van het verlagen van het waterpeil voortgezet wordt. Het debat over de toekomst van het veenlandschap is momenteel vooral te vinden in kringen van wetenschappers en beleidsmakers, terwijl er geen sprake is van een breder maatschappelijk debat.

### *Adaptief management*

In het adaptief management debat worden gebrek aan kennis en samenwerking als essentiële problemen gezien in de aanpak van het duurzaamheidsvraagstuk. Duurzame ontwikkeling wordt gezien als het vergroten van de capaciteit tot adaptatie van een sociaal-ecologisch systeem. Kernonderdelen in het sturen van duurzame ontwikkeling, gezien vanuit adaptief management, zijn leren-door-experimenteren en samenwerking van betrokken partijen, zoals beleidsmakers, beheerders, wetenschappers en lokale belanghebbenden.

In de onderzochte adaptief management initiatieven blijkt dat experimenten beperkt worden door omstandigheden als landgebruik dat specifieke grondwaterstanden vereist, gebrek aan vernieuwing van peilbesluiten, tegenstrijdige belangen van belanghebbenden, conflicterende ruimtelijke claims, en een complexe institutionele structuur. Betrokken actoren in de onderzochte praktijken benadrukken dat professionele bemiddeling en procesbegeleiding, en verbeterde kennis over onderhandelingen, nuttig kunnen zijn om met tegenstrijdige belangen van belanghebbenden en conflicterende ruimtelijke claims om te gaan. Het onderzoek toont aan dat een overgang van de gangbare naar nieuwe adaptieve praktijken kan afhangen van gunstige factoren, zoals het goed benaderen van gevoelige kwesties uit het verleden, een consensus over de richting van een experimentele strategie, en een biofysische en technische mogelijkheid om de gewenste experimentele praktijken te implementeren.

De bijdrage van adaptive management aan beleid voor duurzame ontwikkeling lijkt voor het Nederlandse laagveenweidelandschap beperkt, vanwege de beperkte mogelijkheid tot experimenteren. Experimenteren lijkt vooral een geschikte strategie wanneer gebrek aan kennis over het sociaal-ecologisch systeem bepalend is voor een duurzaamheidsvraagstuk. In het geval van het Nederlandse laagveenweidelandschap blijkt echter dat tegenstrijdige belangen en een smalle bandbreedte om te experimenteren een groter obstakel betekenen dan een gebrek aan kennis over het systeem. De verwachting is dat meer inzicht over hoe om te gaan met de gesignaleerde institutionele complexiteit en met tegenstrijdige belangen meer bij kan dragen aan een betere sturing richting duurzame ontwikkeling; en dit verdient wellicht meer prioriteit dan een betere, gedetailleerdere kennis over de werking van het sociaal-ecologisch systeem.

### *Transitiemanagement*

Aan transitiemanagement ligt de gedachte ten grondslag dat het huidige systeem niet toereikend is om het duurzaamheidsvraagstuk aan te kunnen, dat er onvoldoende capaciteit is om een milieucrisis te voorkomen, en om voldoende innovaties en vernieuwing te creëren. Duurzame ontwikkeling wordt gezien als een voortdurend transformeren naar een andere 'staat van het systeem'. Kernonderdeel in het sturen naar duurzame ontwikkeling is het stimuleren van innovatie en transformatie; gewoonlijk door overheden, en een selectie van 'innovatieve betrokkenen'.

De in dit onderzoek onderzochte transformaties laten een grote nadruk op ruimtelijke instrumenten zien - vooral aankoop en onteigening van grond - en een relatief geringe aandacht voor leren en experimenteren. Wel waren er enkele pilots en kleinschalige innovatieve praktijken, die een lokale voorbeeldfunctie zouden kunnen hebben of die misschien toegepast kunnen worden op andere locaties. In de voor dit onderzoek bestudeerde gebieden is het praktisch onmogelijk om te experimenteren met de ruimtelijke organisatie van het landschap, en ook zijn er verschillende problemen aanwezig of te verwachten bij de toepassing van de geplande ruimtelijke instrumenten. Dit laat zien dat de ruimtelijke dimensie van transformaties essentieel is voor transitie management in een context zoals het Nederlandse laagveenweidelandschap. Hoewel benadrukt wordt dat democratische vertegenwoordiging en participatie meer aandacht zouden moeten krijgen in transitie management, tonen de onderzochte projecten dat vertegenwoordiging en participatie niet vanzelfsprekend aan bod komen in de besluitvorming. Het onderzoek laat ook zien dat wanneer sleutel actoren in een gebied (zoals lokale overheden) de beoogde transitie niet steunen, deze heel moeilijk te realiseren zijn. De bestudeerde interventies bevestigen eerdere observaties van verschillende wetenschappers, die stellen dat zowel legitimiteit als de relatie tot de bredere institutionele context in acht genomen dienen te worden bij het bestuderen en uitvoeren van transitie management.

In de onderzochte projecten werd geen duidelijke bijdrage aan de duurzame ontwikkeling van het landschap gevonden. Tevens kwam naar voren dat bij transitie management zorgvuldige aandacht besteed dient te worden aan de ontwikkeling van een set van duurzaamheidsdoelstellingen. Dat wil zeggen, zorgvuldige aandacht voor welke doelen voorrang krijgen om welke redenen, en vooral hoe om te gaan met drastische interventies die mogelijk onomkeerbare gevolgen hebben, wanneer de prioriteiten voor duurzaamheid veranderen. Al met al lijken de mogelijkheden van transitie management beperkt waar het gaat om een succesvolle sturingsstrategie te bieden voor het navigeren naar duurzame ontwikkeling in een context als die van het Nederlandse laagveenweidelandschap.

### *Betalingen voor milieudiensten*

De initiatieven met betalen voor milieudiensten – in Nederland ook wel groene en blauwe diensten genoemd – zijn gebaseerd op het idee dat het ontbreken van geschikte economische impulsen een essentieel obstakel vormt binnen het duurzaamheidsvraagstuk. Duurzame ontwikkeling wordt vervolgens gestimuleerd door het verbeteren van marktregelingen en het voorkomen van negatieve effecten op het milieu. Een belangrijk stimuleringsmiddel wordt gevormd door contracten of programma's die betalingen mogelijk te maken aan de leveranciers van milieudiensten, waarbij in veel gevallen intermediaire organisaties een belangrijke rol spelen.

De hier bestudeerde betalingsprogramma's bestaan uit een groot, nationaal gefinancierd programma (SAN) dat zich onder meer richt op het behoud van soortenrijke

veenweidegebieden, en uit een aantal kleinere, publiek of publiek-privaat gefinancierde programma's, die allemaal rekening moeten houden met het dominante SAN-programma. Hoewel al deze regelingen een economische oriëntatie hebben, kunnen ze niet worden beschouwd als volledig zuivere markttransacties. Ze worden ontworpen en uitgevoerd met de hulp van overheden en/of overheidsregelgeving en kunnen worden gezien als een instrument om bepaalde milieudoelen te bereiken door het financieel ondersteunen of compenseren van leveranciers. Hoewel de programma's tot op zekere hoogte wel bijdragen aan de duurzame ontwikkeling van het bestudeerde gebied, werd duidelijk dat een aantal institutionele en biofysische barrières hun verdergaande toepassing tegenhouden. Deze structurele complicaties hebben betrekking op zaken als ambtelijke procedures ten aanzien van het beleid van waterbeheer, biofysische beperkingen met betrekking tot water- en bodembeheer, financiële beperkingen op (het stapelen van) publiek gefinancierde programma's, en geringe belangstelling onder mogelijke afnemers die de milieuvriendelijke maatregelen moeten betalen.

Hoewel het op zich nuttig zou kunnen zijn om door te gaan met deze programma's, of met het verbeteren ervan, toont het huidige onderzoek aan dat deze benadering in de onderzochte context belemmerd wordt door structurele complicaties. Deze structurele complicaties leiden tot de conclusie dat de duurzaamheidsproblematiek in deze context zich niet leent voor een benadering gebaseerd op een markt-gebaseerde uitwisseling van betalingen en duurzaamheidsgerichte maatregelen.

#### *Bevindingen voor het Nederlandse laagveenweidelandschap*

Algemeen kan gesteld worden dat de onderzochte vormen van governance weliswaar een zekere bijdrage leveren aan de duurzame ontwikkeling van het laagveenweidelandschap, maar dat ze onvoldoende mogelijkheden bieden voor de duurzaamheidsuitdaging als geheel. Dat betekent ook, dat het huidige onderzoek niet één vorm van governance uitlicht als meer geschikt dan de anderen voor die duurzaamheidsuitdaging. Uit dit onderzoek blijkt dat de vraagstukken die centraal staan in de literatuur over vormen van governance – namelijk gebrek aan kennis en samenwerking, het ontbreken van transformatie en innovatie, het ontbreken van een passend economisch model voor de gewenste wisselwerking – kennelijk niet overeenkomen met centrale kwesties in de onderzochte projecten. De praktijkervaringen leren dat de duurzaamheidsuitdaging in het veenweidelandschap voornamelijk gekenmerkt wordt door een groot aantal gebruikers, intensief landgebruik, tegenstrijdige belangen van de betrokken actoren, uiteenlopende ideeën over urgenties en prioriteiten, en conflicten in het besluitvormingsproces.

Wat zou de bestaande inspanning voor duurzaamheid in het Nederlandse laagveenweidelandschap verder kunnen helpen? Ten eerste laten de bevindingen zien dat het faciliteren van een breder debat, boven het regionale niveau, met een grote vertegenwoordiging van de betrokken groepen, over de toekomst van het landschap zou kunnen bijdragen aan het verhelderen van opties, posities en prioriteiten van de betrokken

groepen. Deze aandacht voor een breder publiek debat (niet per se gericht op het bereiken van consensus, maar eerder op verduidelijking van standpunten en opties) ontbreekt in de drie onderzochte vormen van governance.

Ten tweede blijkt uit de evaluatie op basis van criteria voor governance voor duurzame ontwikkeling dat inzicht in de mogelijkheid winsten en verliezen op een eerlijke en aanvaardbare manier te verdelen, en hoe aanvaardbare, breed gedragen, beslissingen genomen kunnen worden, kan helpen bij de inspanning voor een duurzame ontwikkeling van dit landschap. Dit betekent ook dat het interessant kan zijn om verder onderzoek te doen naar opvattingen over adaptief management, transitie management, en het betalen voor milieudiensten, en naar hoe zulke opvattingen duidelijker en explicieter kunnen weergegeven hoe met deze aspecten wordt omgegaan in de praktijk.

Ten derde wijzen de huidige bevindingen erop dat het faciliteren van onderhandelingsprocessen, bemiddeling ('mediation') en het omgaan met lokale gevoeligheden, kan helpen bij de inspanning voor een duurzame ontwikkeling van dit landschap. De schaal van het menselijk individu is een andere schaal dan die welke meestal gebruikt wordt in de governance literatuur, en heeft geen betrekking op de institutionele schaal of op de dynamiek van publieke en/of private sectoren. Toch geven de bevindingen aan dat aandacht voor intermenselijke communicatie gunstig kan zijn voor het welslagen van een interventie, en lijkt het eveneens profijtelijk om het omgaan met gevoeligheden verder te verkennen, waar het gaat om beter te begrijpen hoe verschillende vormen van governance voor duurzame ontwikkeling in de praktijk werken.

#### *Bevindingen voor de academische discussie*

Tot slot: wat leert dit onderzoek ons bij het verder begrijpen van deze duurzaamheidsuitdaging en het beter begrijpen van interventies die zich richten op duurzame ontwikkeling? Voorstanders van een van de drie bestudeerde vormen van governance kunnen geneigd zijn om hun onderzoek vooral te richten op de governance vorm van hun voorkeur, en zich richten op de verbetering ervan. Bovendien kunnen zij weinig animo hebben om opnieuw een diagnose op te stellen van een duurzaamheidsuitdaging in eenzelfde context. Evalueren volgens een set van criteria voor governance voor duurzame ontwikkeling, zou nuttig kunnen zijn om breder te kijken dan het perspectief van alleen één vorm van governance. De bevindingen tonen aan dat het gebruik van een dergelijke set van criteria licht kan werpen op kwesties, die niet vanzelfsprekend onderzocht worden door de voorstanders van één specifieke vorm van governance; bijvoorbeeld de waargenomen rechtvaardigheids- en legitimiteitskwesties, en het omgaan met schaalkwesties. Tegelijkertijd kan zo'n set van criteria voor governance voor duurzame ontwikkeling normatief zijn, onbereikbare einddoelen stellen, tegengestelde opties in zich dragen, en, in sommige gevallen, nadrukkelijk niet bedoeld zijn om na te streven door voorstanders van een bepaalde vorm van governance. Dit betekent dat meer

onderzoek nodig is over het toepassen van zo'n set van criteria voor governance voor duurzame ontwikkeling.

Om een vorm van governance in een ruimere context te plaatsen, kunnen voorgestelde kaders voor het bestuderen van governance voor duurzame ontwikkeling helpen. De meeste aandacht in deze voorgestelde kaders voor het bestuderen van governance voor duurzame ontwikkeling gaat uit naar aspecten als het identificeren van de actoren die betrokken zijn, en de mate van sturing door overheid, inclusief hoe macht en regels invloed hebben. Er is nauwelijks aandacht voor een diagnose van de *inhoud* van een duurzaamheidsvraagstuk. Het huidige onderzoek toont aan dat aannames over wat essentieel is voor de inhoud van een duurzaamheidsvraagstuk directe gevolgen heeft voor de ideeën over hoe veranderingen geïnitieerd kunnen worden. En omgekeerd, ideeën over hoe veranderingen te initiëren zijn, hebben directe gevolgen voor de manier waarop de diagnose van een duurzaamheidsvraagstuk gesteld wordt. Een focus op vooral de governance dimensie zal – zo komt uit dit onderzoek naar voren – uiteindelijk onvoldoende zijn om dieper inzicht te krijgen in de uitdagingen van de alledaagse praktijk in een werkelijke context. Meer aandacht voor de *inhoud* van een duurzaamheidsvraagstuk en voor de *inhoud* van duurzame ontwikkeling kan helpen om te begrijpen in hoeverre conceptuele diagnoses in de literatuur over duurzaamheidsvraagstukken zich ook daadwerkelijk voordoen in de praktijk. Een beter begrip van de oorzaken van een problematische situatie kan helpen om te begrijpen waarom interventies voor duurzame ontwikkeling werken of niet.

Duurzame ontwikkeling wordt over het algemeen naar voren gebracht als een geïntegreerd concept met een doelstelling voor ecologie, economie en maatschappij. Mogelijk zou het ook kunnen helpen, bij het opstellen van een diagnose van een duurzaamheidsuitdaging, om ecologische, economische en sociale vraagstukken elk afzonderlijk en expliciet te specificeren in plaats van direct te integreren. We dienen dan te identificeren wat die ecologische, economische en sociale belangen zijn, waarom ze onder druk staan en op welke wijze, en waarom het relevant is ze om te beschermen. Expliciet specificeren van ecologische, economische en sociale belangen hoeft niet heel ver te staan van onze gebruikelijke manier van denken over duurzame ontwikkeling, en het maakt het mogelijk om een frisse blik te houden op de problemdiagnose van een complexe situatie.

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## Curriculum Vitae

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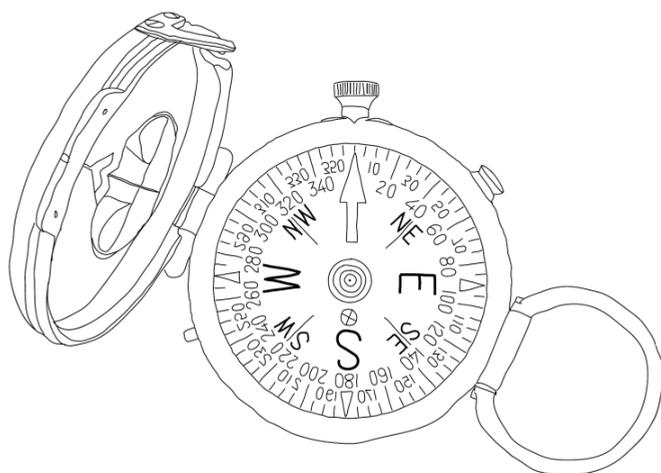
Roos M. den Uyl was born 28 November 1980 in Amsterdam (the Netherlands) and spent her childhood and formative years in the Dutch capital. She started studying Science & Innovation Management at Utrecht University in 1999, and switched to Environmental Sciences in her 2<sup>nd</sup> year of study. During her studies she travelled to Costa Rica to attend a summer school there, did an internship in Cotonou, Benin (West Africa) where she joined an

intercultural, interdisciplinary and interactive project which resulted in an advisory report to ameliorate the quality of life in a slum neighbourhood, and worked as a teaching and research assistant. She finished her studies with an internship at the Netherlands Environmental Assessment Agency, and wrote a thesis about an assessment of a regional land-use transformation plan to enhance sustainable agriculture.

After graduating, she worked for the project 'What about the peat areas?' commissioned by a consortium of multiple governmental bodies and interest groups, funded by BSIK/Leven met Water, at Utrecht University, and conducted empirical research in the Dutch fen landscape. After this project, she spent 3 months in the USA (Burlington, Vermont) and worked on a comparative article on initiatives for sustainable development of fen landscapes in Germany, the Netherlands and the UK (co-authored with Martin Wassen, and published in *European Planning Studies*). She used the empirical data from the research project 'What about the peat areas?' to write a dissertation about governance for sustainable development, supervised by Peter Driessen and Dave Huitema, resulting in the present document.

In Spring 2013, Roos participated in the 'OECD-NL Policy Dialogue on Water Governance', by providing an assessment of water quality in the Netherlands, and an assessment of costs and financial flows of water management in the Netherlands. She started working as a postdoc at the Centre for Rural Policy Research at the University of Exeter (England) in Autumn 2013, in the EU FP7 funded BASE project on climate change adaptation strategies (supervised by Duncan Russel). Her main tasks for the BASE project include studying 2 cases on climate change adaptation in Devon (one at the South Devon Coast and one on ecosystem services in National Park upland moors); studying national climate change adaptation plan making processes in the UK and the Netherlands; and studying climate change adaptation plan making processes at the EU level in relation to national and local adaptation plans. She can be contacted at: [r.m.den-uyt@exeter.ac.uk](mailto:r.m.den-uyt@exeter.ac.uk)





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