Social Feedback

GOVERNANCE

WELL-BEING

Landuse and activities

Ecosystem services

Community Supported Landscape Regeneration

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Community Supported Landscape Regeneration

Building capacity for local empowerment in complex
social- ecological systems

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Preface

'Without self-understanding we cannot hope for enduring solutions to environmental problems, which are fundamentally human problems. And human problems, whether they be economic, political or social, hinge on the psychological pole of motivation, on the values and attitudes that direct energies to goals'

(Tuan 1974, p. 7)

This observation by Tuan in 1974 captures the fascination behind this thesis project. During our studies we became more and more aware of the importance of the human being in the landscape and the role individuals or groups take within their direct environment. Our conviction is that it is in fact not possible to see the human world as separate from natural ecosystems. Still, we observe an increasing alienation between the human and natural system; in the way we have become more and more independent of our direct surroundings and in the way we, mostly without realizing, support behavior that is damaging the live-support system of this planet.

In order to solve this issue, which is fundamentally an issue of awareness and empowerment, we must look inward: what is it we truly get out of ecosystems for our survival and happiness? What is it we are willing and able to give back? What is the effect of the way we structure our society on the relationship we are able to have with the natural environment? We are thankful to have had the opportunity to freely explore these types of question in this thesis. In doing so, we came to believe that the development of social structures and processes in the landscape is one of the largest design challenges of our time. This project allowed us not only to form our own understanding of this challenge; it also allowed us to reflect on our position within the academic debate and the landscape architectural field.

We are grateful for the comments and support of our supervisors. Specific thanks for the 'Landscape Machine' meetings organized by Paul Roncken, and the weekly feedback sessions with fellow students. We would also like to specifically thank Anko Grootveld, who did not only provide a 'no-nonsense' perspective on our work, but also encouraged us in our personal explorations regarding the thesis topic.

Summary

The context of this research is the lack of social support for large-scale regeneration efforts of landscapes that are trapped in a vicious cycle of unsustainable land-use. It addresses the gap in understanding of human processes in complex social-ecological systems through a multidisciplinary literature review, three case studies of regeneration projects and an analysis of the existing socio-spatial situation of the Vechtplassen region in the Netherlands. In the research a methodological Social Feedback Model is introduced that enables analysis of complex landscape systems accommodating the elements of scale and time. The phenomenon of 'social feedback' between landscape appreciation and consequent attitudes and behavior towards the landscape proved particularly helpful in understanding social mechanisms that either disable or support landscape change and large-scale regeneration efforts. These mechanisms deal with alienation, in which a lack of ability to affect a landscape, to appreciate its services and/or experience awareness of systematic problems can lead to frustration, a lack of care or resistance to change.

Based on the understanding gained through the application of the Social Feedback Model we are able to introduce several conditions that counter alienation. These may be used to accommodate social change, necessary in order to enable critical support for landscape regeneration. The conditions are based on input (governance and land-use), output (use and accessibility of ecosystem services) and social feedback level (knowledge and awareness). Specific implications of these conditions are the need for new social contracts for responsibility-sharing between governments and local parties, the creation of local capacity through communal networking and agreements, and allowances for (new) direct relationships between local people and the natural environment.

Through a spatial strategy on different scale levels we show the possibility to deliberately incorporate the conditions in order to plan and design for landscape regeneration that is supported by local communities. The strategy is applied to the peat landscape of the Vechtplassen in order to further explore social organizational processes and specific roles of government, experts and local people in socially supported regeneration processes. This results in the final suggestion towards the landscape architectural discipline to increase its focus on facilitation of social processes, exchange and accessibility of knowledge and the shaping of new ways to be directly connected with the natural system. In this way the landscape architectural field can start using knowledge generated through sociological and political lenses in order to account for the relationship local (groups of) people are able to have with 'their' landscape.This can greatly affect the willingness of people to support regeneration and the commitment of people to maintain a regenerated landscape.

Key-words: social support, landscape regeneration, social feedback, social-ecological systems, governance of natural resources, local empowerment, ecosystem services.

Table of contents

Introduction

Significance and challenges of landscape regeneration

The evidence synthesized by the Millennium Ecosystem Assessment (MA) carried out by the United Nations in 2005 underlines that ecosystem services, being the contributions of ecosystems to human wellbeing (MA, 2005), can only be sustained in the long term if the integrity and completeness of ecosystems are maintained or restored. The MA found that 60 per cent of a group of 24 ecosystem services are currently being degraded (Leemans 2009). Current problems identified in the MA – including growing costs in the form of degradation of ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty and security for some groups of people – are serious. The MA shows that these problems could grow much more serious in the coming decades (MA, 2005).

In his talk for Tedx Wageningen on 30 May 2012, John Liu demonstrates the possibility to regenerate degraded landscapes through large-scale interventions that put back into place natural (eco-)systems. These systems accumulate biodiversity, biomass and organic matter, and thereby form the basis for sustainable land-use and survival of human societies (Liu, 2012). The significance of this type of regenerated landscapes is clear: these systems are based on the cyclical nature of the natural world instead of the linear world of our economic system. They take care of themselves and do not 'run out'. Thus, there is a need for regeneration of degenerated/degenerating landscapes.

The relationship of people to their own natural surrounding is currently often characterized by alienation. Current perspectives and worldviews mentally disconnect human progress and economic growth from the biosphere (Arrow et al. 1995, O'Brien 2009). The life-supporting physical environment, if not simply ignored, has become external to society with people and nature treated as two separate entities(Folke et al. 2011). 'The observed estrangement of people from their land and traditional way of life leads to overexploitation and degradation of ecosystems, which in turn leads to poverty and loss of cultural identity.' (MA 2005, p. 460). If the alienation of people to their environments is leading to degenerative behavior, this means that countering alienation has the urgency to become a top priority in landscape design for regeneration.

Understanding of the particular context and human values involved in local use and management of ecosystem services is a recognized gap in the Millennium Ecosystem Assessment: 'Our knowledge of the linkages between ecological processes and social processes, and their tangible and intangible benefits (such as spiritual and religious values), and of the influence on sustainable natural resource management at the landscape level

needs to be strengthened (MA 2005, P.257). According to the MA the importance of cultural services and values is currently not well enough recognized in landscape planning and management. These fields could benefit from a better understanding of the way in which societies use and manage ecosystems and then relate that to cultural, spiritual, and religious belief systems (MA 2005).

Our suggestion in this thesis is, therefore, that the local human reality surrounding landscape change deserves more attention, as well as the local maintenance of the landscape after planning and implementation. This statement opens a door to not only design for the physical environment, but to carefully consider the 'social design' elements of a plan: what allowances does it offer for interaction with the natural ecosystem? In what ways can people directly benefit from the natural ecosystem so that they can appreciate their relationship with the environment? How can people understand their role in the natural system and how can this role take shape so that it enhances rather than deteriorates the environment?

Regeneration and landscape architecture

Within our field of study landscapes are increasingly being understood as complex systems made up of multiple interrelated layers. There is an increasing number of spatial plans that offer solutions for problems on a landscape-scale, looking at the landscape as an integrated, dynamic system rather than as a separated combination of functional units (Koh 2008, Bélanger 2009). From this perspective, there is an interest in regeneration of ecosystems on a large
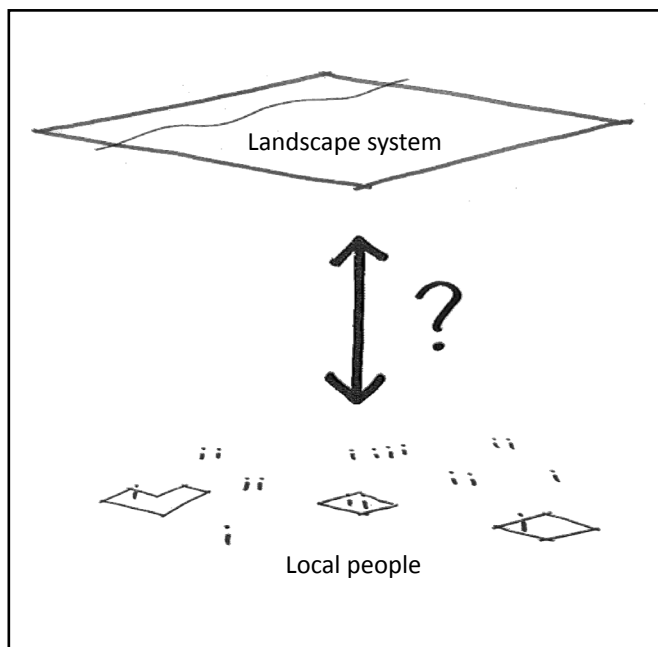

Figure 0.1. Gap between local people's everyday experience and awareness of (problems on) the landscape level

scale, such as the 'room for the river' plan (Ruimte voor de rivier, 2007-2015) in which river dynamics are restored in order to allow the river to regain its natural ability to absorb high-peak discharge. What we observe in the Dutch context is that large scale landscape intervention is not easy to accomplish and plans are often not, or not fully, realized. Especially in the Dutch, highly populated and democratic context in which land is largely privately owned, it is challenging to work with large-scale, integral spatial concepts. An important 'fail factor' in the step towards implementation of plans is the lack of interaction with local people and use of local knowledge (Elerie and Spek 2011, EO Wijers stichting 2009). A lack of social support often leads to local resistance, complicating the process of regeneration.

Participation of local people in spatial plans may offer part of the solution. Although there is much attention and interest in the principle of participation in landscape protection, management and planning, participatory approaches to landscape are still in their infancy in most parts of Europe. Moreover, 'although both scientists and practitioners widely agree about the need for participation, little is known about how participation influences the way in which citizens can become involved' (Turnhout et al. 2010, p. 2). Participation easily becomes seen as the democratic ability of local people to have a say during the process of plan-forming. What we are after is this project, however, is a type of participation that focuses on the actual empowerment of local people in their daily environments, creating enduring social support for landscape regeneration.

An important societal development these years is an increase in bottom-up initiatives; self-mobilization of local people that take initiative in the landscape. Although this is an example of local empowerment and a way for people to establish direct relationships with their surroundings, the risk of a bottom-up approach is that the overview of the larger system gets lost and that local projects start biting each other or biting the overall health of the natural system. What we start to see here is a paradox between the scale of the physical landscape system and the local scale on which local people experience and value the landscape. Within landscape regeneration, these two levels have to be integrated, as the degeneration takes place on a landscape system-scale, but needs to be socially supported on the local scale. In figure 0.1 this paradox is visualized: on the landscape system level, responsibility is needed to make sure the system works, on the level of the local reality, social mechanisms take place that can enable or disable change.

The general proposition following from this is that there is a need to bring these two layers closer together so that social mechanisms are aligned with higher-scale regeneration efforts. This proposition is visualized in fig. 0.2. What we

have seen during our studies at the Wageningen University and during our internships in the landscape architectural field, and what is demonstrated in the analysis we did during this research, is that social mechanisms such as the formation of attachments, habits and traditions in the landscape are not adequately understood and accounted for within design and planning. This results in a lack of prospects for local people involved, and resistance to change. The attachment to and the active role people can play in their own environments needs to be better understood and 'designed' in order to be able to come to socially supported landscape change and sustainable maintenance.

This may change the role(s) landscape architects have within landscape transition processes. It means that human involvement in and care for the own landscape may become central concerns in design-language and design strategies. We therefore argue that it is necessary to start explicitly accounting for the effect design has on the relationship between people and natural ecosystems, so that we can enlarge our understanding of the effect of design on people's day-to day attitudes towards the environment. We hope that this will eventually lead to the ability of designers, aided by new design language, to design *socio-*ecological systems that explicitly offer a balanced place for human beings in which the natural system enforces human existence and vice versa.
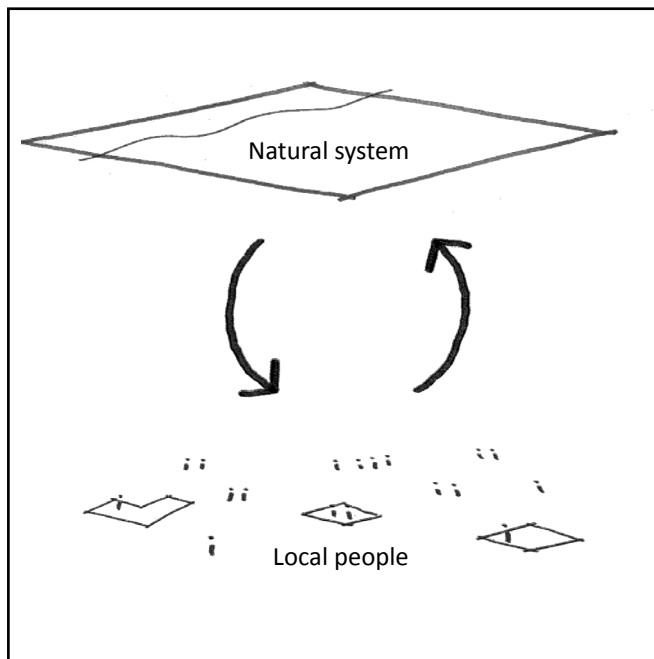

Figure 0.2. Proposition: need to link awareness of the natural system with local experience and initiative

Knowledge gap

Integrative understanding of social mechanisms in the landscape that enable or disable landscape regeneration.

Objective

In order to increase awareness of the social component of landscape change within landscape architectural theory and practice, we need understanding that is based on the integration of insights from multiple disciplines. In other words, we aim to investigate the social aspects of landscape regeneration and management in order to work toward regeneration of problematic cultural landscapes. This investigation will lead us to reconsider the role of landscape architecture in the context of regeneration and social support.

Research Questions

What is needed in order to work towards socially supported landscape regeneration?

- What conditions need to be met in order to accomodate social mechanisms during landscape regeneration?

- What kind of social organization is necessary on different scale levels in order to reach socially supported landscape regeneration?

- How can landscape architects design for socially supported landscape regeneration?

Sub-questions for these main research questions will be introduced in the respective chapters.

Structure of the report

In figure 0.6 the overall structure of the report is visualized showing the three chapters, the tentative outcomes and the methods used in each chapter. The three main questions are answered in the three chapters, moving from a theoretical investigation of social mechanisms to an investigation of the societal context of regeneration, to an investigation through application in design. Sub-questions will be formulated in the beginning of each chapter to guide the investigation. The proposition forms the starting point of our research: we are interested in finding ways to bridge the gap between the physical landscape system on the one hand and the social layer with its social mechanisms on the other hand.

Before we start with the first chapter, we introduce a methodological lens for our research: the Social Feedback Model. This model combines literature from landscape architecture with knowledge from social sciences, ecology and thermodynamics. It serves as a tool to analyze socio-physical systems. This Social Feedback Model serves as a methodological lens for all three parts of the research.

Regeneration in the Netherlands: Vechtplassen case

A large part of this project deals with the peat landscape between Amsterdam and Utrecht. The Vechtplassen area is an exemplary case to study in the context of regeneration and social support for three reasons and will serve as a case to 'test' the finding of our research.

First, direct landscape problems make regeneration efforts in the relatively near future necessary: peat oxidation and soil subsidence, (saline) seepage and unsuitability for dominant land-use (dairy farming) lead to vicious cycles and a slowly degrading landscape. In the section below (fig 0.5), the main physical processes are visualized. The approximate location of the section is indicated on the aerial photograph. Secondly, the high population density, the democratic context and private landownership make explicit consideration of the role of local people in the regeneration of the landscape necessary. Finally, there is a large interest in spatial planning for the area, and lack of social support has shown to be an obstacle for realization of plans (EO Wijers stichting, 2009, Stuurgroep Groene Hart, 2011).

In fig. 0.4 the socio-physical system of the Vechtplassen is visualized in a simple illustration. The curve is a conceptualization of the development of the socio-physical system in time, either going upwards in a virtuous cycle, or going downwards in a vicious cycle. The yellow box shows the current situation of the Vechtplassen region: the system is going downwards in a vicious cycle of unsustainable land-use and ongoing physical processes, but is not in an urgent state of degeneration yet. However, if nothing changes, the system will continue its way downwards and degrade further (a). If a change takes place now, it may become possible to change direction towards a healthy, virtuous landscape system (b).

Fig. 0.3. Aerial photograph of The Netherlands. Indicated are the location of the Vechtplassen and the section below (ESA, 2005)

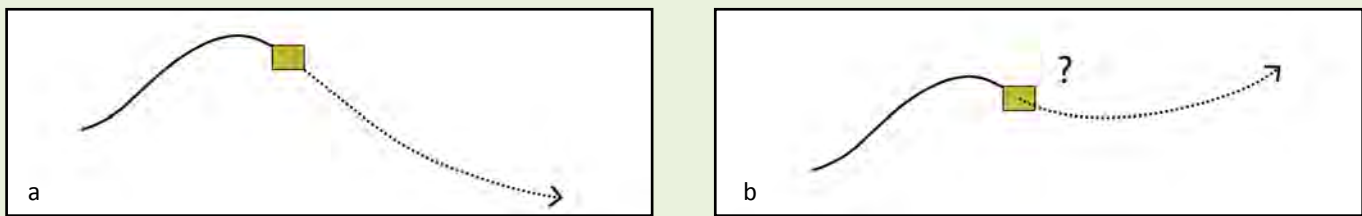*Figure 0.4. Conceptualization of the socio-physical landscape (a) in its projected further degeneration and (b) potential regeneration*
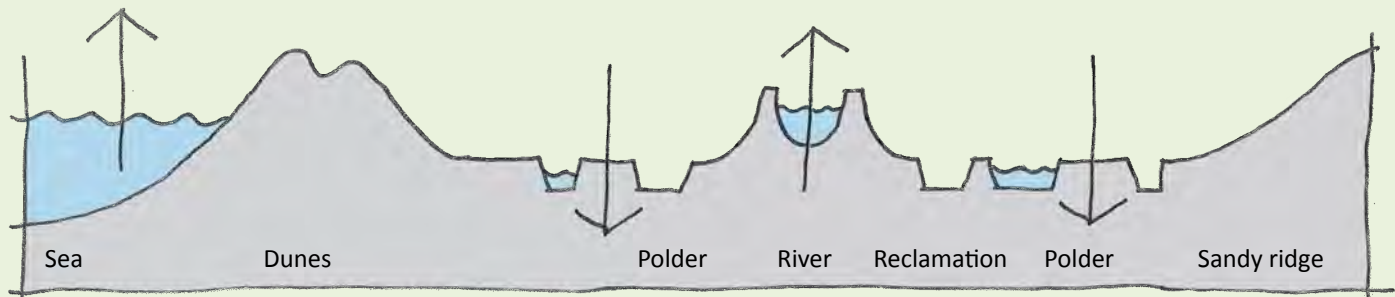

Sea Dunes Polder River Reclamation Polder Sandy ridge

Figure 0.5. The delta landscape of the Netherlands: increasing pressure of water due to waterlevel rise of sea and rivers versus an ongoing subsidation of peat soils

11

Chapter 1: Theoretical investigation of social mechanisms in the landscape. Using the Social Feedback Model, we go through the human input and output elements of socio-physical landscapes and the feedback between these two that represents the willingness of people to care for their own landscape. The review is set in the context of landscape regeneration, so the factors and conditions are seen in light of processes of change in the landscape. The main outcome of this chapter is a list of conditions that we find to be necessary ingredients of socially supported landscape regeneration.

Methods: Theoretical knowledge is gathered through a broad **literature review** combining landscape knowledge and ecology with social sciences concerning environmental psychology, sociology and politics. Further investigation is done through the analysis of three examples of landscape regeneration put into practice. These **reference cases** illustrate the outcomes of the literature review and reveal social and physical processes within landscape regeneration. We selected the cases to be quite distinct from one another in order to get a range of scales and different strategies that have been taken in the context of landscape regeneration.

Chapter 2: Case study of the societal context of regeneration in the Netherlands using the case of the Vechtplassen region. This chapter shows the current state of affairs in the region, as well as in current plans for the area. We reflect specifically on the social organizational aspects of the case and the role of different actors within spatial reality and spatial plans. In combination with the conditions from chapter 1 these findings allow us to come up with a strategy for socially supported landscape regeneration.

Methods: The general method used in this chapter is a case study of the Vechtplassen region in The Netherlands. Within this case study, we use landscape analysis methods such as map analysis and site visits, we conduct interviews with key informants and we have a plan analysis in which three spatial plans are analyzed. The Social Feedback Model serves as a tool to analyze the processes, factors and conditions within the Vechtplassen-system, using the knowledge gathered in this chapter.

Chapter 3: This chapter forms, on an academic level, mainly a test case for the former parts of the research. Is it possible to translate the propositions we gathered into applicable, concrete and spatial form? What new insights does this
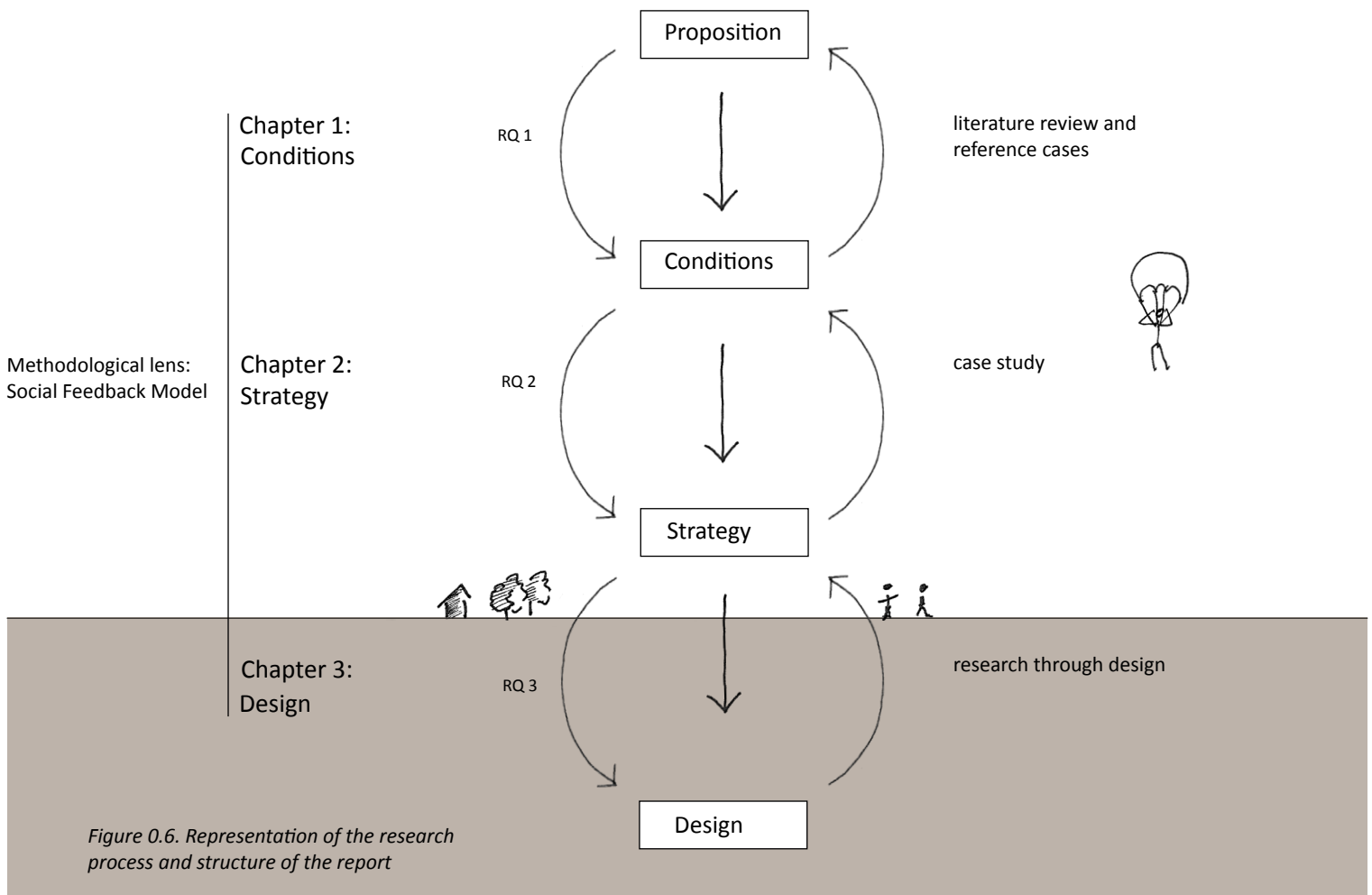

Figure 0.6. Representation of the research process and structure of the report

'translation' exercise offer? We develop the strategy from chapter two into concrete steps for the Vechtplassen, by describing the processes and possible spatial outcomes. By exploring the possibilities for regeneration of the Vechtplassen we can reflect on the previous chapters and come with concrete recommendations to the field of landscape architecture. The role of the landscape architect within landscape regeneration processes will receive specific attention in this chapter.

Methods: The method used here is research through design. Research through design is a method for the production of new knowledge that has not been well established yet. As described in Deming and Swaffield's book on landscape architectural research (2012), this method has to proof itself yet as an academic method.

Besides the (modest) academic contribution, the design for the Vechtplassen aims to be a challenging design project in which we can apply our skills and creativity as designers.

After the three chapters, we will answer the overall research question and relate the findings back to our initial research objective. We will also offer a discussion on the value of our findings for the academic and professional world, as well as on the limitations and need for further research that becomes evident in our study.

Analytical Lens: Social Feedback Model

Theoretical Background: landscape models

In order to do this type of encompassing investigation we need a clear methodological framework through which to carry out research. We built this framework for research based on three main sources: landscape models from ecosystem services theory (MA 2005, TEEB 2010), the landscape architectural concept of the landscape machine (Roncken et al. 2011) and the concept of Confined, Open, Ontic Systems (COOS) coming from thermodynamics (Tiezzi 2011). These sources offer a conceptualization of the relationship between society and the environment which formed the starting point for research into the social layer of the landscape. These models have their departure point predominantly in the physical realm, dealing with physical flows and landscape dynamics. In this research we cast these models in the light of social processes in the landscape, so that we can construct a model that incorporates an investigative lens into the social reality involved in landscape processes.

We selected the three theories for practical reasons: a combination of the three allows us to zoom in on the specific processes we are interested in, while allowing us to keep track of important contextual influences. The framework provided here thus does not claim to be a positive model of reality, but rather a tool in understanding the issues at stake in the specific context of this research.

Landscape models in ecosystem services literature

When considering the landscape as a productive phenomenon for human use, the concept of ecosystem services is very useful. Ecosystem Services are defined as 'the direct and indirect contributions of ecosystems to human wellbeing' by the Millennium Ecosystem Assessment (MA 2005). The term was coined by ecologists and economists to try to enable to put a more socially comprehensible value on natural capital.

The figures on the next page show the connection between ecosystems, the related wellbeing and the feedback loop leading back to the ecosystem. In the first model (fig. 0.7), it is shown how ecosystems lead to certain services, which leads to benefits and (economical) value for humans: human wellbeing. This human well-being leads to institutions and human judgments through governance and decision making, influencing the ecosystem through direct and indirect drivers.

Daily et al. describe and visualize, in a clear and concise way, the process of ecosystem extraction and how the use of these services leads through values, institutions and decisions back to the ecosystem (fig 0.8). They also describe the ingredients that are associated with each step (biophysical models, economic and cultural models, information, incentives and actions and scenarios).

The models from ecosystem service literature are important for us because they form a basis of understanding the relationship between the natural environment and the social aspects of natural resource use. Although they do not yet offer an inclusive explanation of the human processes that take place between resource extraction and human input in the landscape, they do offer a starting point from which to start research.

Confined, open, ontic systems: COOS

COOS is a combination of key concepts from evolutionary thermodynamics, described by Tiezzi (2011). The first principle is the confinement of the system, the presence of a boundary defining the local landscape. The second is openness, relating to the interactions with 'the outside'. The confined landscape is fed by external inputs and its outputs don't necessarily stay within its boundaries: the boundary is open. The third key concept is onticness, focusing on the origins of the place: its identity, its history and its memories. This allows for an understanding of time and resistances that may have become built into a give system through time.

Tiezzi presents COOS as 'a thermodynamic model for understanding evolutionary dynamics that create new structures and enable complexity to emerge, increasing the information in a great variety of systems, more commonly known as living systems capable of self-organization' (Tiezzi 2011 p.
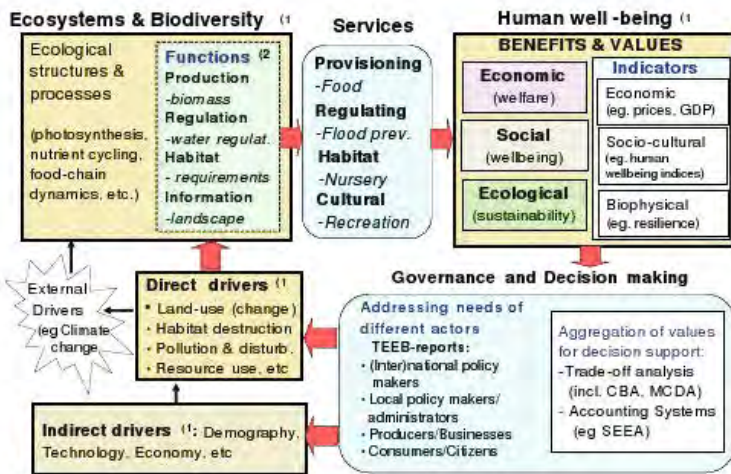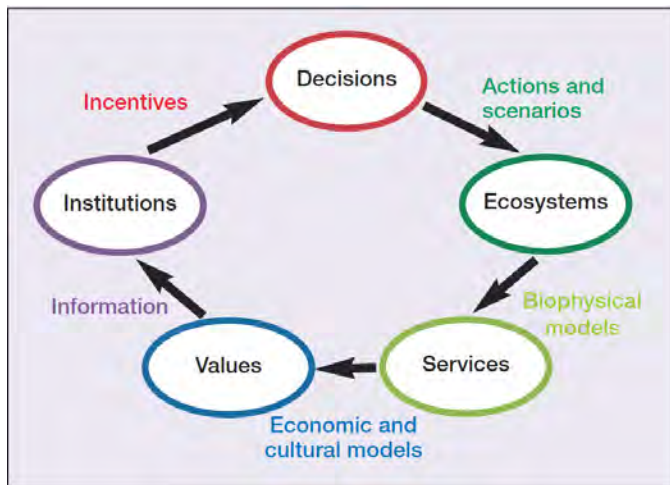
Figure 0.7. Model of ecosytem and society (TEEB 2010)

Figure 0.8. Model of ecosytem and society (Daily et al. 2009)

2901). This also brings in a concern with self-sufficiency and sustainability of local systems and the levels of openness this requires towards external influences.

This concept is important to us, because it adds contextual elements that affect the working of a local system, which have not been thoroughly represented in other literature we have encountered. *Scale* is an important element, repre-senting the interplay between local and external influences on a system which may define its particular functioning. *Onticness* is another, representing things that lay in the past that may still affect the place thus adding the element of time and development.

Landscape machine

The concept of the landscape machine, developed within the chair group of Landscape Architecture at Wageningen university, asserts that living landscapes can be consciously created to perform certain tasks desirable for humanity

(Roncken et al. 2011). In the landscape machine, natural (landscape) processes take the role of technology to perform specific tasks. The landscape machine concept is based on the productive property of ecosystems. The landscape can be seen as a machine, with a certain material input and output. The machine exists of landscape features and is driven by landscape processes, producing a multitude of products, e.g. food, clean air and natural biotopes. Thus, the 'machine' is evolving and changing.

So far specific productive tasks for the landscape have been categorized in four types: waste treatment (of soil, water or artificial materials), production, renewable energy and system repair. The system repair type is 'an intervention in a landscape to re-adjust an unbalanced aspect' and 'catch up with natural balances' (Stremke et al. unpublished, p. 5). In their effort to establish the landscape machine as a valid scientific as well as design concept, landscapes have been analyzed from a thermodynamic perspective to understand uses and flows of energy in complex landscape systems. This connects the landscape machine to the COOS concept. Both concepts share an interest in finding the optimal level of self-sufficiency of local systems in relation to its porous boundaries and external influence.

The landscape machine concept treats the landscape as an evolving, ever changing entity. It makes it possible to look at the landscape as a continuous process, rather than as a static expression. Within the theory, three phases are named: the initial, growth and yield stage. Besides, the evolutionary nature of natural processes is stressed: this element makes time an important factor, since these processes may take years. The outcome of these processes is not always clear, so a degree of flexibility is necessary to accommodate for uncertainty. The landscape machine theory is important for us because it provides a systematic way of looking at landscape processes through time and its focus on the productive features of large-scale landscapes.

From landscape model to Social Feedback Model

The human aspect of landscape is an identified concern within the three concepts introduced above. There have been efforts to connect the physical landscape system to e.g. cultural ecosystem services, human perception and experience. However, the day-to-day significance of the human role in these kinds of landscapes has not been investigated or conceptualized, and in that regard remains a concept based mainly on physical processes. The following section shows how we suggest to conceptualize the human component of landscape in the context of our study. In order to build the methodology, we combine the three theories into a model that will allow us to look at literature and landscape interventions with a focus on the social aspect of regeneration.

Elements of landscape

From the ecosystem services literature, we derived a simple model showing three main elements of the (social) landscape:

1. the ecosystem itself (Ecosystem & natural processes)

2. human well-being as the output of the ecosystem

3. governance as the human input in the ecosystem

These elements are represented in figure 0.9: the ecosystem as the basis, the well-being as output on the right and governance as in the input on the left. The arrows connecting the boxes represent the main constituents that connect one element with the other: appreciation of ecosystem services, social feedback through societal norms and attitudes, and land-use and activities.

What we introduce here is a simple scheme that allows us to understand that wellbeing is influenced by the physical ecosystem, governance and land-use are influenced by wellbeing, and the physical ecosystem is influenced by governance choices and land-use The scheme thus shows the cyclical character of the several human processes in landscape: the element of time plays a central role. In this way, the scheme can help to identify the cyclical character of certain socio-physical landscapes and social mechanisms, being either vicious or virtuous in the context of regeneration. Looking at the landscape in this way allows us to zoom into the feedback process that occurs between output and input: the extent to which the landscape output results in certain attitudes and behaviors in the landscape. This feedback is informed by societal norms and attitudes. Information and awareness plays a large a role here in the context of society and its formal and informal institutions.

Scale: local and external factors of a landscape system

The open boundary introduced through the COOS concept allows us to address the issue of interaction between different scale-levels of a system, notably the external and internal influences. By establishing a confined but open (physical) boundary on a given socio-physical system, conclusions can be drawn about what comes from and stays internal within the system and what external inputs and influences act on the system. There is always a relationship with the 'outside': the boundary is open. For instance, the ecosystem is influenced by decision making which takes place outside the confinement, and the ecosystem provides ecosystem services for people outside the confinement. This way, the self-sustaining qualities and/or external dependencies of a system can be analyzed.
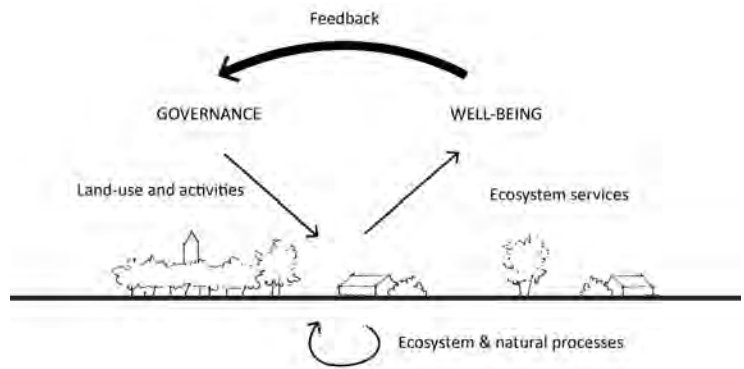

Figure 0.9. Simple landscape model based on Ecosystemservices literature (MA, 2005; TEEB 2011)

The model we are building thus gets enriched with a porous boundary, see fig. 0.10. This confinement doesn't have a fixed scale and systems can be defined at different scale-levels, depending on the interest. The scale depends on the measure of analysis: one ecosystem (for instance a forest), or a combination of ecosystems. The model is thus intended to be scale-neutral, although the implications for use of the model on different scale-levels need to be assessed.

Time: change of a landscape system

The process-focus of the landscape machine concept, combined with the onticness in COOS allows us to consider the factor of time and landscape habits in landscape change. Landscape regeneration involves all steps on the way: not only initiation and intervention, but also maintenance and adaptation to new landscape forms. Understanding this process in time is necessary, for example, in order to understand where resistance to change comes from. We will use three moments in time to analyze change processes: the initial phase, the intervention phase and the regenerated situation.

Using the COOS concept we can explain the occurrence of vicious cycles of land-use. By looking at the onticness of social systems we start to understand the formation of attachments and attitudes to the landscape. These attachments and attitudes inform the social feedback within the system, resulting in a cyclical process that makes change part of the model. This way we are able to track action and reaction as part of stabilizing as well as of change processes using the model.

Social feedback as a focus of research

In figure 0.10 we present the complete Social Feedback Model we will use during our research. This model is focused on understanding the cyclical process of the socially supported, local, landscape. We hope that using the Social Feedback Model for social analysis will provide a tool to start understanding more fully the significance and role of human presence in natural landscapes in full complexity of the cyclical nature and interactions between scale-levels. Physical patterns are accompanied by social patterns, and physical and social realities influence each other. This is what we try to capture in this model.

By looking at the physical confinement as well as at the social confinement of an area, it becomes possible to see their relationships. It also becomes possible to compare their scales, and compare to what extend the social system closely follows the physical system and where they drift apart. In other words, it shows when a society is closely linked with its ecosystem and when it is alienated from the ecosystem. This may have consequences on how people in a given area think about their surroundings, how they interact with it, and to what extent they may be willing to help support it.

Just like the physical system has an internal feedback loop which helps to keep the system 'sustainable', the social system also has a comparable feedback that represents care and responsibility for the system. We hope that the use of the Social Feedback Model will allow us to draw conclusions about the conditions under which a positive feedback arrow occurs and how this can contribute to local support for the landscape and for landscape change. The feedback arrow is a characteristic of a socially supported (local) landscape. The strengthening of this feedback may decrease alienation and increase social support for landscape change and realization of plans. The feedback arrow is affected by several landscape factors and can thus be influenced by landscape architects. Therefore, this social feedback is a key subject of investigation in this project. We hope that investigation into factors that influence the feedback and conditions under which the feedback occurs will provide clues to design for socially supported landscape regeneration.
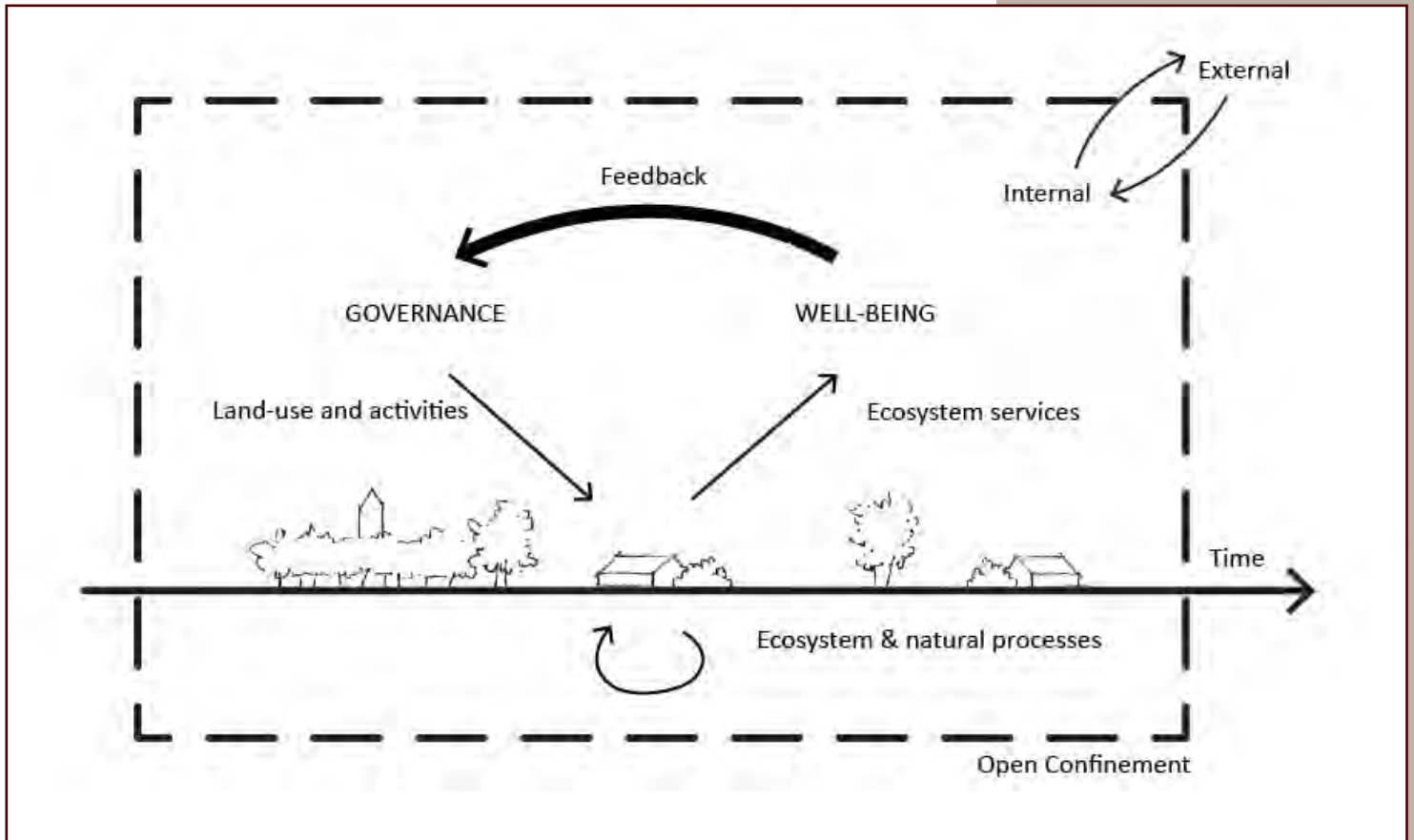
*Figure 0.10. The Social Feedback Model: an analytical lens to investigate
a local landscape, including an open boundary and the factor of time*

Chapter 1: Conditions
for community supported landscape regeneration

In the introduction we presented social feedback as a key element when dealing with social mechanisms and aiming for socially supported landscape regeneration. In this chapter, this feedback is investigated further, placing it in the complex and dynamic context of socio-ecological systems. We are especially interested in the kinds of social mechanisms that enable or disable a positive social feedback needed for landscape change towards regeneration. When social feedback is in place, this enables cyclical social processes in the landscape: social mechanisms. These social mechanisms in the landscape may disable regeneration, and may thus need to change along with physical landscape change.

In order to find conditions and factors involved in the social feedback of the landscape, we use literature and three example cases in which landscape regeneration has taken place. In the literature we can find current knowledge on social processes in the landscape related to the social feedback model. In the cases, we look for increased understanding of the factors we saw in literature, for extra factors that are faced in practice and for increased understanding of the process of landscape change. Using the cases, the meaning of the theoretical knowledge becomes more directly visible.

Research question: what conditions need to be met for social mechanisms to be changed/enhanced during landscape regeneration?

- What is the role of social mechanisms in landscape regeneration processes?

- What factors constitute social feedback in the landscape?

- What conditions need to be met for social feedback to be changed/enhanced?

Literature Review

People inhabit the earth having the power to change their life circumstances and the course their lives take. People make choices which lead to certain behavior in the landscape. As people move and interact with the landscape, whether conscious or unconscious, they give shape to and alter the environment. The other way around, interaction with the natural environment shapes cultural identity, value-systems and economic well-being (MA 2005). Thus, people shape the environment and the environment shapes people. The field of environmental psychology, for instance, views the individual both as embedded in the environment and as actively defining and giving shape to it (Williams and Patterson 1996).

In this literature review, we are looking for conditions under which social feedback can occur between what people take out of the landscape and what they decide to put back in, and for factors that affect this social feedback. We looked at approximately 50 articles related to (1) Output and appreciation of the landscape, (2) The feedback mechanism itself, and (3) Input and governance of the landscape. The literature review is intended as an inventory of current knowledge on the topic of change and management of socio-ecological systems. Therefore it is a broad, horizontal review rather than an in-depth vertical one. This allows us to cross-link knowledge from different fields in order to draw connections between concepts and to provide a rich picture of factors involved in the social feedback model. Knowledge from an ecological (natural science), economic, a psychological and political science perspective has proved to be necessary in order to provide full understanding of social mechanisms that enable or disable social support for regeneration.
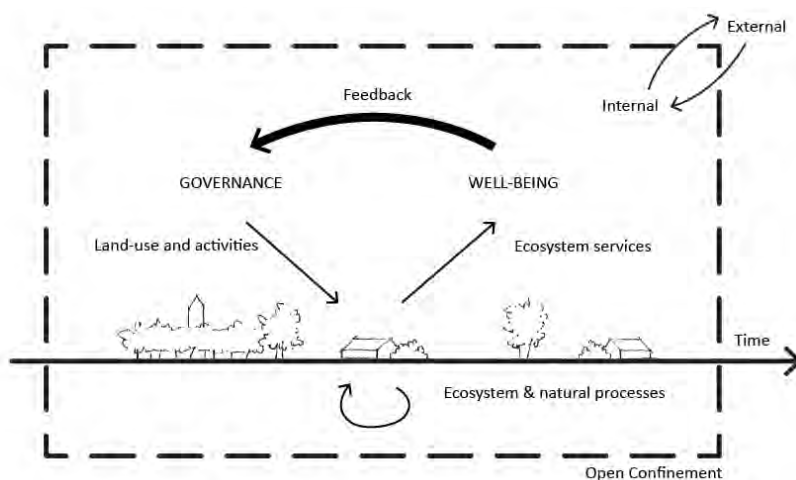

Figure 1.1. Literature will be analyzed using the Social Feedback Model

The review is organized following the Social Feedback Model. We will respectively discuss factors and conditions for the output of the system (ecosystem services and the related wellbeing), the social feedback, and the input of the system (see fig.1.1). The factors we found are printed in **bold**. A full list of factors can be found in appendix A. Conditions for social feedback that follow from the literature are presented at the end of each of the three sections and will be brought together in the conclusion of the chapter.

Output of the Social Feedback Model

The 'output' process that leads to use and appreciation of the environment and to its resulting wellbeing is the harvesting of ecosystem services. This can be physical harvesting of products, but when we speak of cultural ecosystem appreciation, we speak of appreciation through perception. This is an active process: the services gained from the ecosystem are part of this process, but are not treated as a product in themselves. What we are interested in is the resulting wellbeing obtained after the services are used and valued by people. In this section, we will first discuss the ecosystem services themselves and their effect on wellbeing. Then we will discuss factors that affect the ability to harvest or perceive the services. Finally, we discuss psychological factors that decide in what way the services are valued.

Ecosystem services and wellbeing

In the Millennium Ecosystem Assessment four main ecosystem services are distinguished. Figure 1.2 shows these services and their relation to constituents of wellbeing. Provisioning services are products obtained from ecosystems, including genetic resources, food and fiber and fresh water. Regulating services are the benefits obtained from the regulation of ecosystem processes, including, for example, the regulation of climate, water, and some human diseases. Cultural ecosystem services are nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including knowledge systems, social relations, and aesthetic values. Supporting services, finally, are ecosystem services that are necessary for the maintenance of all other ecosystem services. Examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat (MA 2005).

The health of ecosystems and its ability to provide a broad range of ecosystem services forms the basis of human wellbeing and appreciation of the natural environment which, in turn, forms an important input into people's willingness to invest in and care for that environment (MA 2005, Leemans 2009, de Groot et al. 2010, TEEB 2010). Ecosystem health is a condition for a continuous ability to extract and
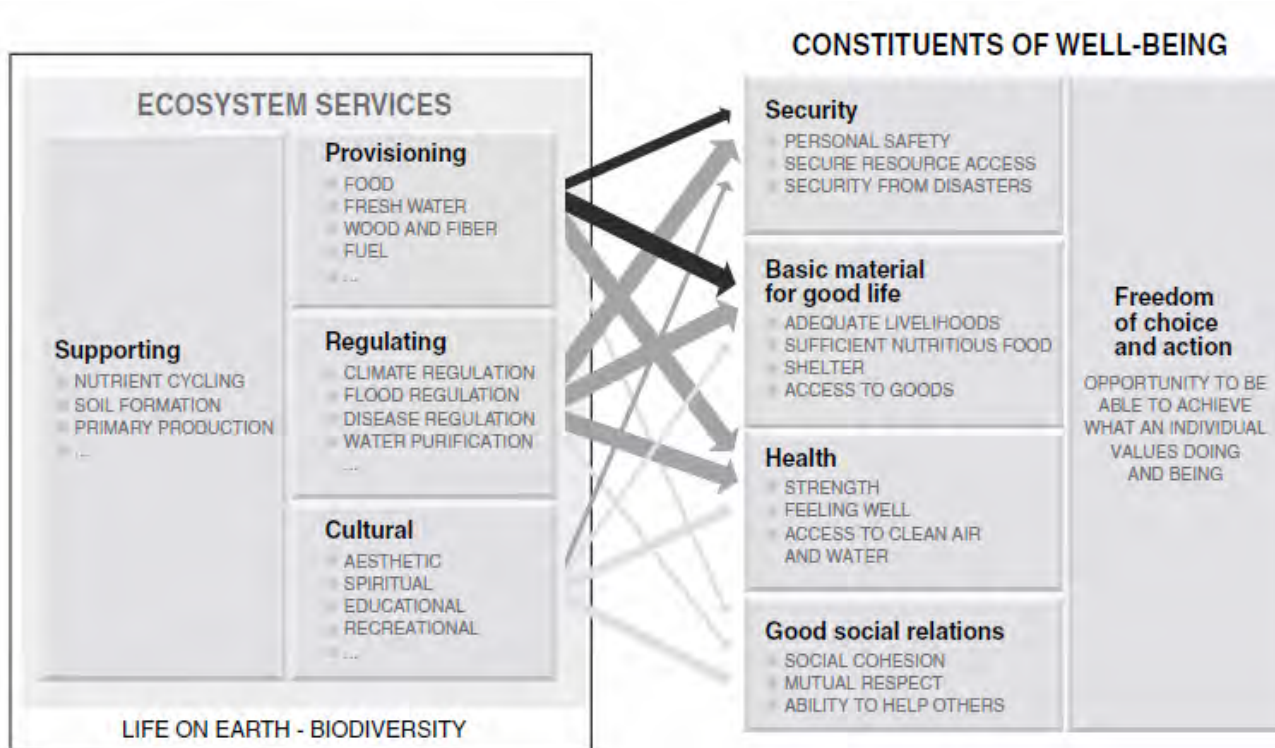
Figure 1.2. Ecosystem services and their related constituents of well-being (MA, 2005)

use ecosystem services. The **material productivity** of an area is a recogized determinant for valuation of landscapes (Tuan 1974, Nassauer 1995, MA 2005, Gobster et al. 2007). Productivity and economic value provide direct incentives to use the land in a certain way, as they ensure a certain **livelihood**. Cultural ecosystem services can also provide livelihoods or ensure a sustainable livelihood based on provisioning services (MA, 2005). **Land-use** and **land-use processes (**McHarg 1988, Nassauer 1995, Braat and de Groot 2012) as well as **diversity** and **interconnectedness** of ecosystem services (MA 2005, Swallow et al. 2009, TEEB 2010, Braat and de Groot 2012) affect the affordances a landscape allows for human appreciation and livelihoods.

Knowledge and **understanding** of the value of these services forms an important incentive for improved management practices of natural ecosystems. Knowledge/cognitive processes (Thwaites 2001, Gobster et al. 2007) and local/traditional knowledge (MA 2005) embedded in the landscape play an important role in the ability to understand and appreciate the services of the environment. Learning by observing and interacting enhances environmental knowledge and might change people's responses to the landscape (Joan Iverson Nassauer 1995). Knowledge about ecosystem and landscape services and values should be clearly communicated, and made easily accessible to policy makers, (other) stakeholders, and the general public (de Groot et al. 2010). Scientific knowledge should inform stakeholders in their decision-making regarding what should be pro-

tected, sustained and/or developed (Bohnet et al. 2011).

This is the basis of the argument used by ecological scientists for their collaboration with economists to quantify and monetize ecosystem services. Certain services, especially those that are not market driven, are however hard to track, and the costs associated with the depletion of these (non-market) services are rarely tracked in national accounts (Leemans 2009). De Groot et al. see ecosystem services mainly as an instrument to analyze the implications of land use and management change. They state the importance of not only directly observable landscape features, but also of cultural features and social embedding. In this way, ecosystem services have the potential to enhance comprehension of the complexity of values in the landscape. Especially the quantitative valuation and monetization of cultural ecosystem services may help to build awareness of the real value of ecosystems for human wellbeing (de Groot et al. 2010).

This economic approach to ecosystem services raises a number of questions. Firstly, the importance of provisoning services, as opposed to other services, is likely to be overstated because it is the only one that is easily quantified and expressed in monetary terms (MA 2005). This may result in management decisions favoring purely productive landscapes over natural or cultural landscapes. Secondly, as pointed out by Lele et all. the social-science side of the ecosystem services concept was developed by a majority of

economists. As a result, the emphasis is on global, universally valid valuation rather than on diverse local realities. Lele et al. argue that because the value of ecosystem services cannot be separated from its socio-technical context, a 'much more place-based approach is called for, [rather] than a focus on 'global' assessments' (Lele et al. In press, p. 25).

Part of this place-based approach could be the understanding and use of the myriad ways other than quantification and monetization through which ecosystem services can be experienced and valued within the local landscape and on a daily basis. These services cannot be valued from outside the local landscape and the value of these services are clear only to those people directly involved in the local landscape. So the **scale at which wellbeing is measured** in relation to the local landscape (internal or external) is an important factor in appreciation of the full range of ecosystem services available.

Physical ability to use and appreciate ecosystem services

'It is crucial to consider the scales of ecosystem services when valuation of services is applied to support the formulation or implementation of ecosystem management plans. Formulation or implementation of management plans on the basis of stakeholders' interest at one institutional scale is bound to lead to sub-optimal ecosystem management from the perspective of stakeholders at other scales' (Hein et al. 2006, pg 225). The benefit of ecosystem services cannot simply be aggregated (Lele et al. In press). This is interesting in the context of the social feedback in landscapes because it introduces the factors of **accessibility** and **distribution** of ecosystem services.

It is only possible to use and enjoy ecosystem services when you have access to them. From a political ecology perspective, we can start to understand *where ecosystem services go* and *who derives wellbeing* from them. In political ecology this is always linked to power (differences) and the reinforcement of inequalities. These factors will help us understand who will ultimately have a stake in the local landscape: is it local people that are using the services, or is the harvest flowing out of and away from the local system? What does this mean for the attitude of local people in decision-making? These are important considerations in trying to fathom under which conditions a social feedback between the local ecosystem, wellbeing and governance input will occur.

When considering a confinement in the landscape, not all services harvested within this confinement are used by local people. Part of the products, as resources for human beings, will be exported. This means that not the people within this confined landscape, the locals, will directly benefit, but external parties will. However, when for instance selling products, the locals can benefit from this export, visualized

by the arrow on the right outer part of the Social Feedback Model. Through this process, products can indirectly influence human wellbeing, through e.g. livelihood. Lele et al. point out that awareness of environmental degradation by policy makers is not the only problem, but that powerful economic interests from resource appropriators often define the state of affairs (Lele et al. In press). Even though the ecosystem services are harvested, this doesn't necessarily mean that local wellbeing is increased. Understanding of flows and distribution of ecosystem services, and the extend of exposure and ability to enjoy ecosystem services could be very instrumental in this regard.

This leads us to factors related to human involvement. Nahlik et al. point out that 'ecosystem processes and functions produce ecosystem services, while people, groups, or firms actualize ecosystem services by utilizing them in consumptive and non-consumptive ways'(Nahlik et al. 2012, p. 29). Community involvement is a foundational concept that is 'often poorly addressed in ecosystem frameworks' (Nahlik et al. 2012, p 27). The level and manner of human involvement in the harvesting of ecosystem services is an important aspect in understanding wellbeing derived from ecosystems.

In literature we found three factors that play a role in the ability of people to be and feel involved in local ecosystems. First is the **level and mode of interaction** with the landscape such as watching, moving through and interacting with (Seamon 1980, Nassauer 1995, Pretty 2004, Gobster et al. 2007). **Ownership type** and **ability to control** plays a role in the level of attachment and responsibility a person feels (Seamon 1980, Nassauer 1995, Elmendorf 2003, Lewicka 2011).

Finally, the level of **direct dependence** on the ecosystem versus dependence on external 'import' also defines the level of care a person is likely to show for the ecosystem (Kyle et al. 2005, Lewicka 2011, Melman and van der Heide 2011, Lele et al. In press). These factors define the relationship a person is having with the ecosystem. They indicate that not only the products of ecosystem services (provisioning as well as cultural) are meaningful, but also the way in which this harvesting is done and the role a person is able to have in the process.

Perception and personal/social valuation of ecosystem services

This is where we turn to the social sciences for more insights into the pschychological processes of involvement in landscapes. The field of environmental psychology is concerned with the **psychological** and **perceptive** aspects involved in the relationship of human beings to their environment. As pointed out by Thwaites, harvesting non-physical products has both a spatial and an experiential dimension, leading to an attachment of people to certain locations,

the ability to orientate themselves and to develop a certain awareness (Thwaites 2001).The process of valuing services is complex. Perceptual processes by which the landscape is 'consumed' involve e.g. cellular/hormonal systems, physiological systems and psycho-physiological processes (Gobster et al. 2007). People constantly process information they get from their environment and 'make sense' of the landscape. This process includes perception, values and culture – connected by bio-semiotic processes (Nassauer 1995).

Perception is described by Tuan as both the response of the senses to external stimuli and purposeful activity in which certain phenomena are clearly registered, while others recede in the shade or are blocked out (Tuan 1974). Factors that influence whether something is marked as 'important' or 'valuable' to a person may include some of the more tangible factors described above (such as direct dependence or ownership) but also less tangible factors such as **socio-cultural systems** (Nassauer 1995, Farina 2006, Gobster et al. 2007), **personal preferences** and **values** (Tuan 1974, Nassauer 1995, Hobson 2003, Gobster et al. 2007) and **aesthetics** (Nassauer 1995, Farina 2006, Gobster et al. 2007, Lewicka 2011). Also social opportunities and the **sense of community** a landscape offers is named as a factor that plays a role in appreciation of landscapes (Matsuoka and Kaplan 2008, Lewicka 2011).

The time element of experience is important for factors associated with perceptions. In regards to ecological processes, Braat and de Groot point out that the 'clock-speeds of ecological services make it difficult to value restoration' (Braat and de Groot 2012, p. 12). Timing-cycles of human activities and ecological processes do not always coincide. Liu et al. describe difficulties in describing human-nature couplings because of time lags between the interaction and appearance of consequences (Liu et al. 2007). All processes in the landscape, such as harvesting or the creation of traditions and identity, have a certain **time trajectory**. Seamon speaks of changeability as a factor in experience of the landscape. It enhances the 'place' concept from a static thing, towards something in which action, human agency and change is taking place. (Seamon 1980). Moroni connects the time element of change processes in the landscape to the social and personal factors described above. He stresses the need for **flexibility** in the landscape, in order to create possibilities for people to value the landscape in their way and in their own pace (Moroni in Alexander et al. 2012).

Conditions

The concept of ecosystem services is foundational to the understanding of the use and valuation of landscapes. However, not only the presence of these services proves important, but also the social and physical distribution of ecosystem benefits, community involvement and personal perceptive and affective factors play an important role. The

scale at which the landscape is used, and the import and export of ecosystem services are important elements to keep track of. There are multiple ways to appreciate landscapes, ranging from an economic, utilitarian appreciation to mental or aesthetic appreciation, leading to different forms and levels of wellbeing.

In light of the landscape change necessary for regeneration of problematic landscapes, ecosystem services and the related wellbeing are very important. After all, the way people use the land and value it needs to change along with the physical landscape regeneration and support for change depends on current and possible future valuation of ecosystem services. In order to make change possible, it is necessary to understand the way ecosystems are used and valued in the initial situation. This can guide the exploration of ways in which people can adapt to the change by, for example, offering prospects for future land-use.

The following are observations we made based on the literature, offering insight into the conditions for social feedback:

- For continuous (sustained) use of ecosystem services, healthy ecosystems are a prerequisite.

- Appreciation of ecosystem services is scale-dependent. Valuation of services that are appreciated through perception (cultural services) need to be appreciated on a local scale within the landscape.

- In order for harvesting of ecosystem services to lead to social feedback in the landscape, a clear link needs to exist between the services and individual and community involvement. In order for ecosystem services to be appreciated, people need to be able to use, access or experience them (depending on the service).

- Local livelihood and direct dependence on the landscape lead to social feedback; people take care of the landscape because they need it.

- Understanding of and knowledge about ecosystem services and their use/value is necessary for people to be able to appreciate and use them to their full extend.

- Flexibility in the landscape and its use is necessary to accommodate perceptive experiences through time, leading to personal attachment and valuation.
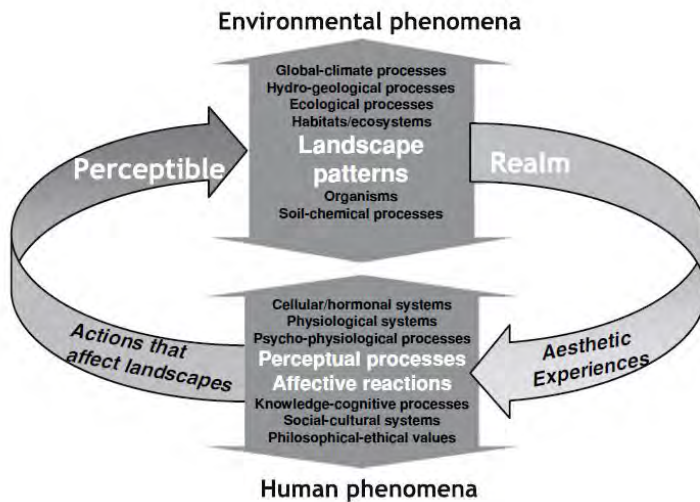
Figure 1.3. Model of human-environmental interaction in the landscape (Gobster et al. 2007)

Feedback in the Social Feedback Model

The model (fig 1.3) of human-environmental interactions in the landscape (Gobster et al. 2007), shows the key principles of how people interact with the landscape. The environment, existing of landscape patterns, is perceived by people within a certain perceptible realm. These experiences then lead to actions that affect the landscape, through perceptual processes and affective reactions. These affective reactions form the social feedback in the landscape, which is what we will focus on in this part of the literature review. According to Gobster, affective reactions are formed by knowledge cognitive processes, social-cultural systems and philosophical-ethical values. Through these processes and systems, reactions to the environment are institutionalized, forming socio-cultural values and norms in the landscape. These values and norms in turn affect management decisions, actions and landscape patterns.

In this section, we will first look at the formation of cultural attitudes towards the environment. We will then look at factors that play a role in changing dominant attitudes.

Cultural attitudes towards the environment

The appreciation of landscapes, described in the previous section, results in attachment to places (Lewicka 2011). **Place attachment** through **place identity** and **meaning** is an important factor of acting and reacting on the landscape (Thwaites 2001, Hague 2005, Farina 2006, Gobster et al. 2007, Dewsbury and Cloke 2009, Scannel and Gifford 2010,

Lewicka 2011). In Moroni's words, 'places are not intrinsically different, but become different in the unpredictable and creative flow of socio-economic relations' (Moroni in Alexander et al. 2012). People are the actors that perceive a place, and attach meaning to it. It is through their experience and their subsequent memories that meaning and identity are formed (Hague 2005).

The way people use, perceive and value the landscape, described in the previous section, is one of the drivers guiding place attachment and an important input guiding subsequent attachment to the landscape and ultimately, behavior. Now we will describe how these factors are translated into attitudes towards the environment, and the influence of not landscape related factors on this process. Social norms and values are only partly based on the local landscape. Institutions can also be based on non-landscape related social or economic values such as religion (MA 2005). In this case, it may be important to understand the impact of these 'external' social influences on the attitude of people towards the local landscape.

How we come from perception of the landscape towards action is influenced by a persons' worldview, which can be seen as a conceptualized experience. This is both personal as social. It is an attitude or believe system, where the word 'system' implies that the attitudes and beliefs are structured (Tuan 1974). As Tuan points out, **attitudes** and **values** direct energy towards goals. Attitudes are primarily a cultural stance, a position one takes vis-a-vis the world. Attitudes are formed by a long succession of perceptions, that is, of experience (Tuan 1974). Many authors emphasize the importance of attitude and values in defining in the environment (Hobson 2003, Elmendorf 2003, MA 2005, Odum and Odum 2006, Daily et al 2009).

Attitudes, norms and values are institutionalised in **institutions**. Institutions are defined as the rules that guide how people within societies live, work, and interact with each other (MA 2005). We distinguish informal and formal institutions. Examples of formal institutions are the constitution, the judiciary laws, the organized market, and property rights. Informal institutions are rules governed by social and behavioral norms of society, family, or community, also referred to as organizations (MA 2005). Institutions influence governance, leading to management of the landscape. As organizing mechanism for human action, institutions are the rules, norms and shared strategies that endure through social organization and interaction (Cook et al. 2012).

Another factor that affects societal attitudes towards the environment is **alienation** of people from the land. Human mankind has the tendency to put man outside of nature, as McHarg (1988) explains: 'the transcendental view of man's relation to nature implicit in Western philosophies is dependent upon the presumption that man does in fact exist outside of nature, that he is not dependent upon it' (p. 19). He

stresses that 'man must learn the prime ecological lesson of interdependence. (...) this is a fundamental precondition for the emergence of man's role as a constructive and creative agent in the evolutionary process.' (McHarg 1988, p. 22). This interdependence is something which is less clear and present in our society, in which nature tends to be 'invisible' (Todd 1991, p. 120).

As Farina (2006) puts it, people in the past were completely dependent on landscape resources. 'The maintenance of landscape configuration was essential and the sense of beauty was coincident with the sense of safety, victory and success.' Now this safety is found somewhere else, which breaks the direct dependence between maintenance and use of the landscape (Farina 2006, p. 27). The life-supporting environment, if not simply ignored, has become external to society with people and nature treated as two separate entities (Folke et al. 2011). 'The observed estrangement of people from their land and traditional way of life leads to overexploitation and degradation of ecosystems, which in turn leads to poverty and loss of cultural identity.' (MA 2005, p. 460). So alienation caused by lack of direct dependence on the system can severely influence the attitudes and behavior towards the environment, and the extent to which social feedback is present.

Change of societal attitudes towards the environment

Since the societal attitude towards nature and towards preservation is one of the key issues ecologists run into in the preservation of natural ecosystems (Hobson 2003, Elmendorf 2003, Daily et al. 2009), understanding of institutions and institutional change may be key to landscape regeneration. Change of institutions (on an organizational or substantial level) leads to change in the way people interact with and influence the landscape. Therefore, institutions might have an important role in changing societal attitudes and installing different governance structures. As Daily describes it: 'without institutional change, communities may well continue to carry on with s behaviors that are widely known to be harmful to society over the long term (e.g. overfishing, high use of fossil fuels)' (Daily et al. 2009 p. 26). Institutions can create awareness and align collective action: 'having the right institutions can create incentives, so that the decisions made by individuals, communities, corporations, and governments promote widely shared values' (Daily et al. 2009). In order to regenerate landscapes, a change needs to happen not only on a landscape level, but also in the larger societal, cultural and economic system (Olsson et al. 2010).

Hobson describes the difficulty of changing existing **habits** and **traditions** that come forth from an institutional landscape characterized by specific cultural attitudes and values (Hobson 2003). Individual and collective cognitive processes have a strong tendency to maintain internal coherence, despite of a potential increasing mismatch with the changing context in which they are embedded. Thus, they **resist change** (Röling 2002, Pahl-Wostl, in press). Lewicka observes that there is evidence for place attachment to result in resistance to change: 'place-related activity may take different forms: it may support environment-protecting changes, or it may entail resistance to changes and protection of status quo. The latter has become known as the NIMBY effect (Not In My Backyard), the construct criticized in more recent literature for its strongly negative connotations (Devine-Wright, 2009).

Olsson et al. describe the problem of 'fit-in': the mismatch between ecosystems and governance systems (Olsson et al. 2010). The authors describe that dynamic feedback loops are formed between societies and ecosystems, in which humans 'both influence and are influenced by ecosystem processes' (p. 265). 'Due to stabilizing feedback mechanisms, shifting into new pathways might be very difficult. This means that attempts and initiatives to move towards place-based ecosystem management might fail because there are mechanisms, such as peoples' opinions and worldviews, incentives, power relations, and institutions, operating at different scales that do not support such shifts' (p. 265).

This links back to the issue of scale discussed in the previous section. Not only changing existing habits appears to be difficult, also the more direct physical change of existing landscapes meets a lot of resistance. Bandura found that participants only supported landscape change when it enhanced a sense of locality in which landscapes revealed connections between people and their environments. When they do not feel empowered to affect change nor have an understanding of alternative visions for landscape change, they might resist landscape change. When these meanings are legitimized, through planning processes and representation in local landscapes, resistance will diminish and a sense of community will be enhanced (Bandura 2006). So **scale, sense of locality** and **degree of control** is an important factor in local processes. Awareness of these factors may help bridge the mis-match in scale between (local) governance structures and ecosystems.

Folke et al. (2011) stress that the institutional solution or structures in themselves are not as important as their capacity to allow for self-organization, coordinated action at multiple levels and learning from changing circumstances. The first factor, self-organization, is related to flexibility and human agency and will be discussed in the next section. Coordinated action and learning are related to community organization, social capital, information and social learning.

Social capital can be seen as the web of social relations and informal network positions of actors providing access to information and political support for actors (Healey 2003). Social capital involves networks together with shared norms, values and understanding that facilitate cooperation within or among groups (Plummer and Armitage 2010).

Rydin and Pennington specify elements that encompass social capital: extend and density of networks, knowledge of relationships within networks, existence of obligations and expectations, local knowledge, trust, norms of behavior and the existence of sanctions to punish free-riding (Rydin and Penington 2000). They also argue that building social capital can be a mechanism for maintaining community involvement over time, and Brown & Ashman point to the role of social capital in fostering future problem-solving, "which will generate more social capital … and so on' (Brown and Ashman 1996, p. 146). Community involvement and social capital are important in dealing with resistance to change, because change of institutions is, by definition, a communal effort and cannot be done on an individual level.

In order to facilitate the formation of social capital, **opportunities for and modes of** interaction can be created. This can be done by changing the nature of arenas for interaction, changing the roles of the involved actors and changing norms and routine practice of interaction (Rydin and Pennington 2000). Social structures influencing behavior are for instance interactions, relations and networks (Cars 2002) and are part of cultural structures. Individuals are embedded in the social structure they are a part of, which guides their chosen behavior, 'not on the basis of discrete, personal decisions, but on the basis of competing demands stemming from the many positions one assumes in society.' (Stets and Biga 2003, p. 422). Also general **social processes** such as building of trust, building of agreements and conflict resolution are important factors (Rydin and Pennington 200, Berkes 2009, Folke et al. 2011).

Social learning is one way of working with the resistance towards change (Hobson 2003, Bandura 2006, Farina 2006, Daily et al. 2009, Berkes 2009). Pahl-Wostl stresses the relevance of social learning regarding institutional change, with the focus on a stronger role for informal institutions (Pahl-Wostl 2006). Learning is described by Plummer and Armitage as the collaborative or mutual development and sharing of knowledge by multiple stakeholders, directly fed into the development of capacity for adaptation by individuals and social collectives (Plummer and Armitage 2010). Thus, learning has the potential to direct towards landscape change. Learning by observing and interacting – enhanced environmental knowledge might change people's responses to the landscape (Joan Iverson Nassauer 1995).

One aspect of social learning is the availability, content and form of **information** people have access to, leading to **awareness** (Rydin and Pennington 2000, MA 2005, Pahl-Wostl 2006, Farina 2006, Berkes 2009, de Groot et al. 2010). Information can be seen as that part of the process of self-organization that is responsible for generating new features in the system's structure, state, or output (Farina 2006). Information can prompt people to adopt sustainable lifestyles, as individuals make connections between forms of knowledge that link their own practice with 'higher', en-

vironmental problems. Information forms the main input to the formation of institutions (Daily et al 2009). Important in this process is that not knowledge itself is guiding, but the connections individuals make between their own practice and the more general environmental impacts. Eventually, common sense and an increased consciousness about their own behavior leads to an understanding on what people are actually doing and how they can change this (Hobson 2003). In fact awareness through knowledge and learning is a keyword within social feedback simply because without awareness of the environment (and its problems) there will be no social feedback.

Conditions

Affective reactions to the environment, combined with cultural and personal elements, lead to attitudes to the environment that affect management decisions and actions in the landscape. Only when the attitude towards the ecosystem is actually based on enjoyed services from that environment, we speak of social feedback in the landscape. However, external cultural factors may play an important role in deciding how much weight the own experienced link to the ecosystem gets in decision-making. Especially information and social learning seem to be important factors in allowing people to gain awareness of what is going on in the environment and change their attitudes. Informal institutions play an important role in facilitating learning and uniting communities in coherent attitudes towards the environment.

When aiming for landscape regeneration, the process of anchoring change in the socio-cultural context takes place in the feedback arrow. So it is important to understand what processes (e.g. social learning) take place, in what kind of social structures (e.g. institutions) and what the initial situation is regarding social mechanisms and resistance. Then it becomes possible to either consciously make use of these processes, or assist their gradual change.

The following are observations we made based on the literature, offering insight into the conditions for social feedback:

- The formation of social feedback and attitudes towards the environment is a cultural affair, not merely one concerning individuals. The existence of social structures and networks (institutions) that facilitate formation of shared norms is thus important.

- Availability of information and awareness is necessary for change in attitudes and/or habits.

- There is a need for a match between the scales of ecosystem management and informal institutions guiding personal and social attitude towards regeneration.
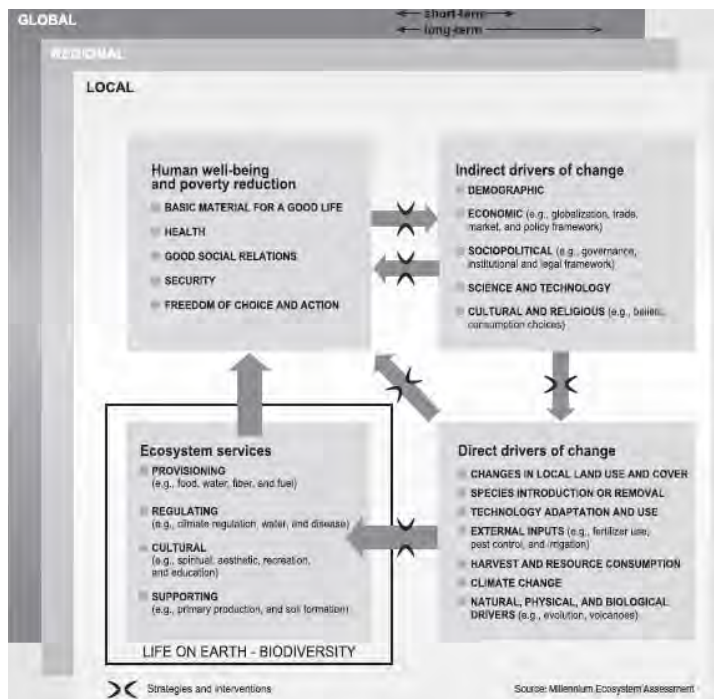
Figure 1.4. Millenium Ecosystem Assessment Conceptual Framework (Braat and de Groot, 2012)

Input of the Social Feedback Model

In cultural landscapes, people shape the environment. Before, we saw different aspects leading people's behavior in the landscape. In short, how people shape the landscape, depends on the use, the perception and the valuation of the landscape on the one hand and cultural and personal preferences, a belief in what ought to be done and market expectation on the other hand (Joan Nassauer 1995). We shape landscapes according to the political system in which we operate, the economic use we see for land, our aesthetic preferences, and our social conventions. In a broad sense, 'as we plant or subdivide or harvest or build, we are the instruments of our culture working within the fundamental ecological framework of the land' (Nassauer 1995 p. 2).

In the previous sections, we have looked at the valuation of the landscape, at attachment to landscape and the cultural context that affects the feedback loop between human wellbeing and governance. In this section we will look at governance itself, which leads to different types of land-use, which in turn affects the ecosystem. Especially understanding of the involvement of different actors involved in local decision-making is important in order to understand the conditions necessary for the social feedback to occur.

In this section, we will first describe factors affecting governance decisions. Then we will consider power-relationships:

who is able to make decisions regarding the ecosystem? Lastly, we will focus on factors concerning local social organization that can enhance the ability of people to express their appreciation of the ecosystem appreciation by taking on positions of care and responsibility in the landscape.

Governance

In some of the landscape models introduced previously, the input of the ecosystem is called 'drivers' – direct drivers like land-use change, habitat destruction, pollution and disturbance and resource use, indirect drivers like demography, technology and economy and external drivers like climate change. The impact human beings have on the physical environment depends on the agency held by man to modify the physical environment. In figure 1.4 **driving forces** are made explicit: human well-being leads to indirect and direct drivers of change – influencing the ecosystem and its services, which in turn influence human well-being again (Braat and de Groot 2012).

Governance is defined as 'the whole of public as well as private interactions taken to solve societal problems and create societal opportunities. It includes the formulation and application of principles guiding those interactions and care for institutions that enable them (Plummer and Armitage 2010). More particularly, the governance of ecosystems is 'the process of regulating human behavior in accordance with shared ecosystem objectives. The term includes both governmental and nongovernmental mechanisms' (TEEB 2010).

Decisions regarding land-use depend on **external economic demand** (Nassauer 1995, MA 2005, Braat and de Groot 2012), the **regulatory environment** (Nassauer 1995, MA 2005) and **Incentives** (Daily et al. 2009, Olsson et al. 2010). However, understanding the structure of decision-making and the actors involved in governance is important in trying to understand if the norms and values described as part of the social feedback are actually translated into action. De Groot et al. describe the challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making: 'management systems differ in the way people extract goods, in the level of production, in the intended and unintended provision of services and in the level and quality of biodiversity. Land use and management influence the system properties, processes and components that are the basis of service provision. A change in land use or management will therefore cause a change in service supply, not only for specific services but for the complete bundle of services provided by that (eco)system' (de Groot et al. 2010, p. 264).

Local organization

Within governance, institutions play an important role. We already saw that institutions can be both formal and in-

formal and need a certain amount of self-organization. As Cars et al put it: whilst formal governance parameters can never be ignored, it is necessary to pay greater attention to the role of informal networks and activity. They argue in favor of challenging existing vertical sectorial networks, and replacing them with new network morphologies with 'horizontal, territorial networks, with tentacles reaching to and linking together all kinds of stakeholders, in attempts to mobilize a collective 'voice' for territory, city and neighborhood' (Cars et al. 2002 p. 212). The **scale and type of governance** in a given area can define to what extend informal networks and activities are possible (Rydin and Pennington 2000, Berkes 2009, Olsson et al. 2010).

Just like in the previous two sections, the question is the scale at which governance is established. The ecosystem services approach to management is focused mainly on global management involving international institutions and scientifically backed methods of ecosystem research and valuation. However, voices are coming up that counter the supposition that ecosystem issues can be solved on a global level. The critique of ecosystem services by Ernstson and Sörlin gives a good example of the arguments for more place-based, local stewardship of ecosystems. Their main argument is that the MA ecosystem services approach, in its attempt to describe and aid preservation of ecosystems on a generalizable, global level could be, in fact, counterproductive. By abstracting the ecosystem services from their local, historically embedded situation, these services become less meaningful to local actors. Local actors become alienated from 'their' natural amenities by the very process of abstraction and quantification that is meant to *increase* the understanding of value of these services (Ernstson and Sörlin 2012). Increased emphasis on **local nature management and responsibilities** is named as an alternative approach to natural resource preservation (Cars et al. 2002, Folke et al. 2005, Berkes 2009, Bodin and Crona 2009, Olsson et al. 2010, Erstson and Sörlin 2012). Increased local, collective organisation is part of this alternative (Olsson et al. 2010).

Through communication and participation, people are able to convert their benefits, their emotion and their perception into action (Luz 2000). The importance of **communication** and **transparency** is stated in relation to social learning. In governance structures this is equally important (Elmendorf 2003, Graedel and Allenby 2010). In order to change people's behavior, Elmendorf comes up with these kinds of solutions: talk to people, use strategic planning, understand the community and their values and allow landowners to value their community (Elmendorf 2003).

Active involvement of people within governance is a useful principle to enhance the possibilities to act for local people and change existing, undesired behavior. '**Participation** is essential for developing citizenship'(Fischer 2002, p. 260), which in turn will influence behavior. Moreover, active participation of stakeholders from the beginning of the planning process will expand the success rate of the process (Bohnet et al. 2011) This is particularly relevant in 'post-normal science' – where facts are uncertain, values are in dispute, stakes are high and decisions urgent. Exercises in local participatory democracy have a role to play in steering the agenda of local politics, re-energizing local communities and re-establishing a base of legitimacy for local political and community systems (Rydin and Pennington 2000).

According to Turnhout et al., who did much research on a participation process in the eastern part of the Netherlands (the Drentse Aa), the largest contribution of participation is the strengthening of public support. Moreover, it will improve the quality of decisions, contribute to local empowerment and promote democratic citizenship and thus leads to effective and efficient implementation processes (Turnhout et al. 2010). Michael and Stenseke see that participation has strengthened the relationship between people and their physical surroundings. They observe that new forms of public participation lead to improved dialogue and communication, respect for the position of others, and new means of social agency (Michael and Stenseke 2011).

There are multiple levels of participation, as described by Pretty (1995):

1. manipulative participation – receiving information; citizens are represented but have no power (power-holders 'educate' citizens about plans)

2. passive manipulation – sharing information, but without listening to response or using it

3. participation by consultation – participants are asked about their views and opinions in an open manner and without restrictions, but the policymakers decide what they will do with the information

4. participation for material incentives – people provide labor, but there is no prolonged involvement

5. functional participation – some shared decision-making, major decisions made by external agents

6. interactive participation – as a right, people have local responsibilities, also in maintenance. Participants are partners in a policy trajectory or project and jointly decide about issues with policymakers

7. self-mobilization – participants initiate, work and decide on projects independently. Policymakers have only a supportive role

Several authors state that only the last half (steps 5,6,7) of the ladder is truly involving and respecting local people (e.g. Pretty 1995, Arnstein 1969, Cornwall 1995). The first half concerns participation in which local people are not truly empowered; they do not gain the power to take decision about their own area. 'Participation' often becomes associated with mere consultation of local people, rarely reaching the level of true power-sharing. Often, skepticism regarding participatory approaches can be seen in government quarters (Michael and Stenseke 2011). As Pretty (1995) explains: government authorities both need and fear participation: they need support, but fear loss of control. So the question is what type or level of participation is needed in the context of landscape regeneration?

The participation ladder suggests that perhaps different types and extents of participation are appropriate in different stages of plan-forming and implementation of spatial change. Careful consideration of the extent of involvement of different **actors** in different phases is necessary in order to balance governmental and expert responsibility with ability of local people to be able to affect their own surroundings. Actors that are able to change institutions can be individuals, groups or (groups of) organizations (Rydin and Pennington 2000). Berkes introduces two main groups of actors: governments and non-local agencies and businesses, and local user-groups and communities. He proposes an arena to combine these two groups, see figure 1.5. Berkes introduces adaptive co-management: rising issues of power-sharing and the role of institutions as mediator (bridging organizations) between different worldviews in order to facilitate knowledge sharing and problem solving (Berkes 2009).

Another group of actors that may be of interest are the experts, with specific knowledge on either content or process. The attitude and role of experts within landscape-change processes is important in defining the extent to which knowledge sharing and local empowerment of expertise can take place. 'As part of this process, it may be necessary to reconceptualize the expert-citizen relationship to one in which the participatory researcher serves as an "interpretive mediator" between theoretical knowledge and competing practical arguments' (Fischer 1993 in Johnson and Campbell 1999). The expert thus has different roles, primarily as a guardian of theoretical understanding, but also in translation of concepts to the world of daily use-value and practical application.

The relationship between decision-makers, experts and local people is key in responsibility-sharing. Each of the three parties has their own characteristics, knowledge and capacities. When relating the decision-making field with local people, it is very important that the role of each of the parties involved is clear. Aarts and Leeuwis found that 'many of the identified problems and dilemmas of interactive policymaking and citizens' participation can be traced back to a lack of

Fig 1.5. Bridging organizations (Berkes 2009)

clarity about the role of government and power in the context of interactive policymaking' (p. 131) Participants might feel that they are not really participating, if their role in the process and the role and responsibility of the government are unclear (Aarts and Leeuwis 2010).

Arnouts et al. (2012) introduce several options for co-governance between governments and communities and how they can contribute to nature preservation. It is important to find a balance between the responsibilities for the landscape between the government and the private actors shaping and using the land, next to a clear task division among different governments (Sijmons 1991). New **social contracts** between government and people could play an important role in the search for balance: 'social contracts play an important role in defining the reciprocal rights, obligations, and responsibilities between states and citizens. Global social–ecological change is creating new challenges and opportunities for both states and citizens, inevitably forcing a rethinking of existing and evolving social contracts in the light of ecosystem changes, more extreme weather events, and the consequences of social– ecological changes in locations' (Folke et al. 2011, p.731).

Social organization

Even though one alone may not be able to affect decision-making, communities may be able to gain a collective voice in the management of their own areas. In this regard, social capital, the formation of networks and interaction spaces, discussed in the previous section, are important factors. Formal and informal **networks** and **cooperation** among local actors play a large role in the empowerment of local communities to take up responsibilities over the landscape (Cars 2002, Olsson et al. 2008, Berkes 2009, Folke et al 2011). Systems are most resilient when internal linkages and interactions among actors are strong. The more complex a system is in terms of interactions, the more likely it is to recover from shocks. However, linkages to other systems
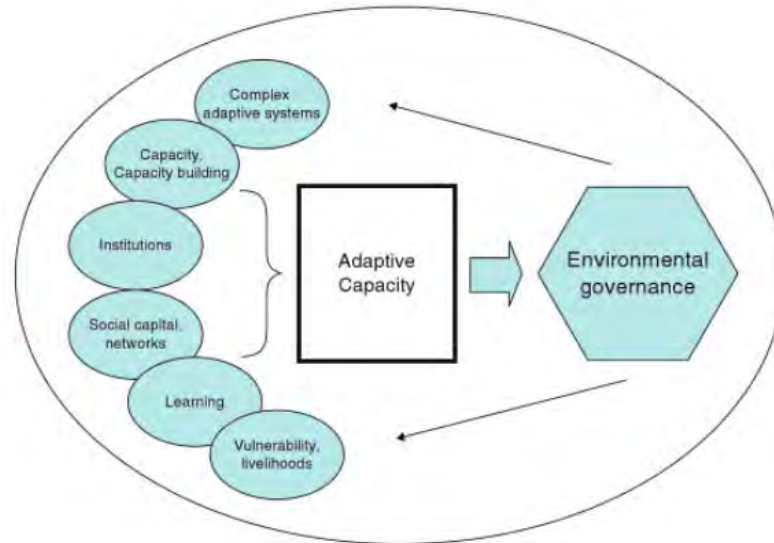
Figure 1.6. Adaptive Capacity and governance (Plummer and Armitage 2010)

should be limited so that external dependence doesn't become too large and so that the local system is relatively self-sufficient (Levinthal and Warglien 1999). Organization emerges from local interacting components. 'These emergent properties complement, and differ from, features that are imposed by external constraints' (Green and Sadedin 2005, p. 119). As part of community cooperation, it is important to build **agreements, vision-building** and set long-term goals (Albrechts 2006, Berkes 2009).

In the scheme of Plummer and Armitage (2010) environmental governance is dissembled into six realms (fig. 1.6). The thing that brings these realms together is **adaptive capacity**. It is about the ability to respond to uncertainty and change. Folke et al. propose an adaptive governance system. When many actors within the landscape are able to react on changes, social learning is increased, thus allowing more efficient feedback. As a consequence, 'regime shifts' in complex dynamical systems, ranging from ecosystems to financial markets and climate, might be better reacted upon if people are given more responsibility and can respond quickly and independently (Folke et al. 2011). The more successful adaptive governance systems, often emergent and self-organizing, connect individuals, networks, organizations, agencies, and institutions at multiple organizational levels with ecosystem dynamics (Folke et al. 2005; Olsson et al. 2008; Berkes 2009; Bodin and Crona 2009). Adaptive governance includes the ability to shift between decentralized and centralized governance modes, and between steering and self-organization. This is reflected in the term 'adaptive co-management' (Berkes 2009).

People are, according to Hobson, self-organizing, pro-active, self-regulating and self-reflecting. The process by which creative individuals construct, evolve, and operate in their lived environments, is called human agency (Williams 1998). Pahl-Wostl (2006) emphasizes the need for a stronger role for informal institutions, referring to self-organization as a

valuable form of informal local organization. **Human agency** and **self-organization** are ways through which human systems adapt to changes. Self-organization plays an important role in providing the complexity and interconnectedness of interactions needed for strong, resilient systems (Levinthal and Warglien 1999).

In order to allow for adaptation to uncertain future circumstances it is necessary that uncertainty and flexibility **are** accepted (Graedel and Allenby 2012). **Flexibility** and **free choice** or autonomy are necessary for the emergent property of self-organization (Levinthal and Warglien 1999, Cars 2002, Folke et al. 2011). Social–ecological systems are dynamic and connected from the local to the global, in complex webs of interactions subject to gradual and abrupt changes. Both natural and social processes guide these webs of interactions. These dynamic and complex social–ecological systems require strategies that build resilience rather than attempting to control for optimal production and short-term gain in environments assumed to be relatively stable (Folke et al. 2011).

In order to enhance adaptive capacity and resilience, knowledge is needed to be able to see opportunities and learn management practices (Cars 2002, Hobson 2003, MA 2005). Berkes (2009) speaks about the importance of knowledge sharing and transfer among parties. Graedal and Allenby (2010) speak about continual learning by governance bodies, so that forms of governance can keep being updated during change processes.

Decision-making expresses itself in land-use patterns, activities, and ecosystem services being produced. As Swallow et al. (2009) state: "trade-offs between ecosystem services arise from management choices made by humans, which can change the type, magnitude and relative mix of services provided by the ecosystem" (p. 508). This concludes the full circle of the social feedback model.

Conditions

Governance guides behavior in ecosystems. The actors involved in the governance of local ecosystem thus define the input to the landscape, and how that landscape will evolve. Who these actors are, and whether they have a direct relationship with the local landscape defined the existence of a social feedback in the landscape. Power-sharing between external governments and often informal, local parties for governance of ecosystems is an important condition. The level and type of local organization defines to what extend local communities are able to take responsibilities in the landscape.

In order to work towards regeneration, change in land-use is necessary and therefore change in governance is needed. How this governance is organized is important for the success of the regeneration, because it defines the extent to which local people can and will feel responsibility towards the regeneration, and the extent to which they are able to adapt to the regeneration in ways that fit with their personal or cultural preferences, so that landscape change gets supported by local initiative and maintenance.

The following are observations we made based on the literature, offering insight into the conditions for social feedback:

- Local parties need to be able to affect decision-making about the landscape in order to complete social feedback.

- Local organization and coordination are necessary in order to carry collective responsibility over the landscape (the scale is too large to do it alone).

- Flexibility in types of activities in the landscape is necessary to allow people to express their creativity, adaptive capacity and their own care about the landscape in their preferred way.

Examples of regeneration processes

After the literature review three cases will be presented where landscape regeneration has taken place. The first case is in China, where ecologist and filmmaker John D. Liu documented an extensive landscape regeneration project which transformed the dried out, unproductive Loess plateau into a flourishing production landscape. The second case is Vattenrike, a wetland area in Sweden with a negative public image as an overgrown, desolate dump-site, which became an example case for wetland protection, attracting local people, school children, tourists and scientists. The last case is Tamera, Portugal, where a strong community executed their vision of a healthy productive ecosystem in a former desiccated landscape. In the textboxes a detailed description of the cases is given, by using the social feedback model. By filling in the output, feedback and input, the theoretical model can be used as an analysis tool for these cases. The factors we found in the literature review come back in these cases and can be explored in a real-life context (printed in **bold**). Factors we find which were not mentioned in literature are printed in *italic*.

By analyzing the three cases, the role of the social feedback is examined in real-life cases of landscape regeneration. For each case, the factors and conditions which influence the social feedback are described and analyzed. While the social feedback model describes a given, dynamic but relatively stable system, the matter we are interested in here is the transition of such a system from one state to another, for example from a vicious to a virtuous cycle. This kind of change disrupts existing landscape processes, resulting in the need to make entirely new descriptions of the system using the social feedback models for the transition phase and for the final situation. This is why we describe the cases using three stages of description within the social feedback model: the initial stage, the intervention and the final stage of regeneration, in which a new equilibrium situation is reached.
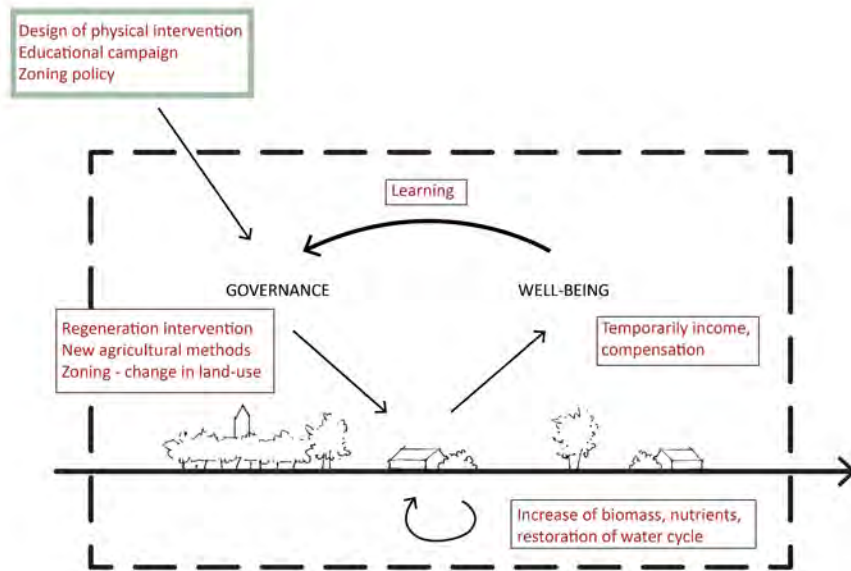

Figure 1.7 Vattenrike wetland, an example of landscape regeneration

The Loess case

Initial situation

Dependence on exter-
nal livelihoods: jobs and
goods

Increased stress on productivity

Eventually: alienation   Traditions and habits

GOVERNANCE   WELL-BEING

Farming on steep slopes,
tree cutting, free ranging
of animals

Social/economical degradation:
poverty, food insecurity, lack of
local livelihoods, flooding

Ecological degradation: decreased
biodiversity, soil erosion, water
runoff, desertification

Design of physical intervention
Educational campaign
Zoning policy

Intervention phase

Learning

GOVERNANCE   WELL-BEING

Regeneration intervention
New agricultural methods
Zoning - change in land-use

Temporarily income,
compensation

Increase of biomass, nutrients,
restoration of water cycle

Zoning policy

Regenerated situation

Renewed attachments to the ecosys-
tem, change in cultural attitudes

GOVERNANCE   WELL-BEING

New agricultural methods
Zoning guides land-use

Ownership of productive land, food se-
curity, appreciation and understanding
of the ecosystem

Accumulation of biomass and
nutrients, water retention

Figure 1.8. The Loess Plateau regeneration process analyzed with the Social Feedback Model

Loess Plateau, China

Ecologist, journalist and filmmaker John D. Liu followed an extensive landscape regeneration project in China for one decade. The ambition of the landscape plan was to regenerate a desiccated landscape and to restore and increase the production capacity of this degenerated landscape. The large Loess plateau once was home to a flourishing civilization, which slowly degraded the rich ecosystem because of ill-suited land-use practices into a barren, sandy and unproductive area. The case of China's Loess plateau is interesting particularly because it shows how a degraded landscape can be regenerated by large-scale, government induced landscape intervention. With the three schemes on the following page, the process of regeneration is visualized. In the green text box on the next pages, a more detailed description of this case is given. The information used to write about the Loess plateau comes from two documentaries, Groen Goud (2012) and the Lessons of the Loess Plateau (2009) and from an article in the journal Kosmos (Quilligan 2011).

Loess Plateau: conditions for social support

When we visualize the case of the regeneration of the Loess plateau in China in our Social Feedback Model it becomes clear that there is a vicious cycle in the initial situation. Then an intervention is started by an external initiative, from the input-side (policy, physical intervention, incentives for local people), which enables the socio-ecological system to change towards a virtuous cycle (see green box in the scheme of the intervention phase). This intervention led to a new state of the system, which also changed the social feedback: the habits and traditions of the local people changed through a widespread educational campaign which raised awareness and understanding of the natural system.

The factors related to knowledge and education appear to be very important in different forms and locations in the model. Firstly there is the external knowledge from a combination of several types of external experts: the government, scientists, managers and the World Bank. This knowledge is used to make a general plan for the area. Then there is the public education campaign used to teach people about their ecosystem and how they can make it productive in the long-term. This campaign takes effect on the output-side (how can I use the new ecosystem?) as well as on the input-side (how can I maintain the new ecosystem?) and, indirectly, on the feedback (how do I relate to the ecosystem?). The availability of knowledge seems to be a condition both in the change towards a regenerated landscape as well as in the final state, where the knowledge offered during the process is embedded on a local level in new habits and tradition, creating a body of knowledge on how to maintain the landscape and to use the ecosystem services.

The fact that the local people were given prospects and were actively involved in the large scale engineering of the land made them aware of the functioning of their ecosystem, the need for change and the benefits regeneration could have for them. Showing their dependence and their ability to change the system to a healthy ecosystem made the regeneration possible. Local people were able to adapt to the changes needed and find back their own place within the system, fitting with their cultural and social preferences. In the final state, a sustainable landscape with a broad range of ecosystem services which can be used and valued on a local scale is in place, creating a virtuous cycle in a balanced landscape.

This regeneration could not have taken place without strong local collaboration. The whole community got involved; everyone has to play its role in the new landscape, and needs to adapt their land-use to the specific needs of the ecosystem. The Loess plateau is enormous, consisting of many villages which are often quite remote. The villages don't have much contact with each other and are strong entities in their own right. Every individual within a village has its own role within the community. This strong local socio-cultural structure is an important condition in both changing the social feedback and in creating an enduring social feedback in the final balanced state. The external parties only became successful in their ambitions when they started to look at villages as a united social entity, instead of at individual inhabitants.

The scale of the several factors and conditions are very important during the process, also visible in the three parts of the model: in the beginning, there is a need for external livelihoods on the output side of the model. During the intervention period, there is a large external 'push' needed to break the vicious cycle. In the final phase, this external influence is limited to the zoning plan. The need for external livelihoods is diminished. In this case, the external push was crucial – there was a large amount of money needed for the regeneration effort, and external knowledge was needed to bring awareness of the local circumstances and of alternatives to the local people.

In the Loess case, people didn't have influence on the plan-making and the organization of the regeneration. On some levels local people were involved in the detailing of the plan and the local implementation plan, but in general the process has been quite external and imposed. This initially led to resistance, which eventually was taken away to a functional extent through the educational processes and by offering prospects for livelihood. However, without a large amount of external finances this plan wouldn't have been successful. In other words, the local people of the Loess plateau wouldn't have taken up the regeneration plan if there wasn't a large external influence. The question is whether a similar approach would work in a more democratic society based on individual property, in which the state does not have the power to enforce such drastic change.

Factors in the Loess regeneration case

Initial situation

The Loess plateau became a dried out, depleted landscape after years of unsustainable land-use by the local population. Existing **habits and traditions,** like cattle grazing on the steep meadows, extensive tree cutting and farming on steep slopes led to a degraded ecosystem. The traditions within this particular culture form an informal institution, which guides the action of the farmers. These habits and conditions led to a loss of vegetation, an increased surface run-off, a decrease of biodiversity and a soil with less nutrients and hardly any ability for rainwater retention: the ecosystem was not in balance but consisted of several negative vicious cycles. The risk of flooding increased. As the degradation of the landscape continued, less food could be produced, causing food insecurity and poverty. Thus, the existing **land-use and land-use processes** didn't lead to (sufficient) wellbeing. As a result, the farmers needed to find other **livelihoods**, not directly linked to the landscape. This enhanced the **alienation** between local people and the landscape, as their mutual dependency decreased. Because this behavior has been taking place for centuries, the situation got worse very slowly and people didn't recognize the link between their own behavior and the degeneration of the landscape.

As the physical and social processes strengthened each other, a **vicious cycle** was created that affected both physical and social wellbeing negatively. Economy and ecology are closely linked and the degradation of the landscape led to ecological destruction as well as to poverty.

Figure 1.9. John Liu on location in the 1990s

Intervention phase

At a certain moment, the government realized that the situation was getting worse and that something should change. The farmers in the area are directly **dependent on the landscape**, increasing the need for regeneration. Moreover, to a minor extend a certain **external economic demand** (products for adjacent cities) increased the relevance for this project. Together with the World Bank and a group of scientists, technicians and managers (external **actors** in a *multidisciplinary team* starting the regeneration as an *external push*), came up with a *physical intervention,* a massive public education campaign and a zoning policy. In one decade, a total amount of 500 million dollars has been invested (*external financial support*) by the World Bank in the transformation of 35.000 km²of land. The group formulated a clear **goal**; to regenerate the landscape in the coming decade. **Communicating** this vision to all farmers and other inhabitants has been guiding the whole process.

The farmers were paid to work on a large physical metamorphosis of the degraded landscape: they created terraces and dams to keep the water from running off. The educational campaign and zoning policy aided the change of behavior by the local farmers through problem recognition (*understanding and awareness of* the problem and their role in the degeneration process). However, also forced land-use change by **regulations and policy** played a role. The zoning policy guided new land-use, slowly leading to new **habits and traditions**. The understanding and awareness made this change in habits and in **attitude and values** strongly anchored in the **socio-cultural system**, as a form of **social learning**. People eventually saw that by using the earth in another way, it got more productive and more safe. This showed the effectiveness and necessity of regeneration. By actively employing the local people in changing the landscape and by educating them on new agricultural methods, people started to embrace new habits **(active involvement and participation)** needed for regeneration.

The government compensated the farmers in case they couldn't farm on their land anymore, and farmers were taught new agricultural methods. **Incentives** for the local people were two folded: first they got paid for the terrace-building work **(temporarily livelihood),** secondly they profited from the new productive landscape they got **ownership** of, leading to new livelihoods in a regenerated landscape. Within this whole strategy, the local people where able to adapt themselves and find new land-uses fitting in the renewed ecosystem (offering a limited degree of **free choice** and **flexibility**).

During the educational campaign it became clear that it was beneficial to target not only individuals, but to take village-

communities as a basis for community involvement because of existing strong internal social ties. Targeting individuals didn't work within the existing social context, because the individual is so strongly tied to the community and thus the whole community had to be targeted in order to work towards change.

The whole process of regeneration took about a decade. This **time** was needed in order to realize the enormous physical change, but also to give people time to adapt to new land-uses and habits: during a period of a decade, money and active involvement of external experts lead to a gradual change of habits. In comparison with the other cases we will describe, ten years is a very fast transition for such a vast stretch of land. The speed of the transition was due to the heavy, affirmative top-down approach taken. With a more democratic process, the regeneration would have likely taken much longer.

Regenerated situation

The project led to a change in behavior of the farmers, **understanding** of the landscape, and to a functional, *healthy* ecosystem with 'healthy' hydrological and nutrient cycles and accumulation of biodiversity and biomass. This ecosystem provides many **ecosystem services**. In this case, the external 'shock' was necessary to change the vicious cycle of land-use the locality was 'stuck' in. In the Loess case, this external push was very literal: a drastic landscape change accompanied by a new zoning policy.

The intervention led to new processes in both the physical and the social realm. After a while, a new, balanced situation was reached. External involvement that was necessary to start the regeneration is no longer needed. Through the education campaign, the zoning plan and the physical changes in the landscape, people can now take care of their own land in a sustainable way. They can have a **livelihood**, as there is enough **material productivity** and the ecosystem services (provisioning, but also cultural and supporting services) are **accessible and distributed** on the plateau. The services are also diverse and highly interconnected; as for instance the terraces made are provisioning food and biomass, and decrease the risk of flooding by keeping the water in the area.

Concerning **alienation**, the situation changed from a lack of connection/understanding between local habits and traditions and ecosystem functioning to an understanding of the ecosystem and human behavior. This happened through a conscious and enduring change of habits (why would I change, how does it affect the landscape?). In general, both the physical and the social part of the landscape were taken into account (community involvement, learning process and landscape change ran parallel).

The Loess case from different perspectives

The Loess case can be seen in the light of different perspectives: the economic and ecological aspects of the project are very important; the external push was dependent on large external parties and finances. Moreover, the economic compensation for the farmers was very important in finding the necessary social support. The role of politics and policy was also large; the external push came from the political realm, enforcing expert knowledge through policy and plan-making. Individual perceptions and psychology has mostly been a side issue. However, without the sociological aspects of this project focused on community involvement, the initial social mechanisms could not have been addressed, and the project would have been likely to run into much more resistance.
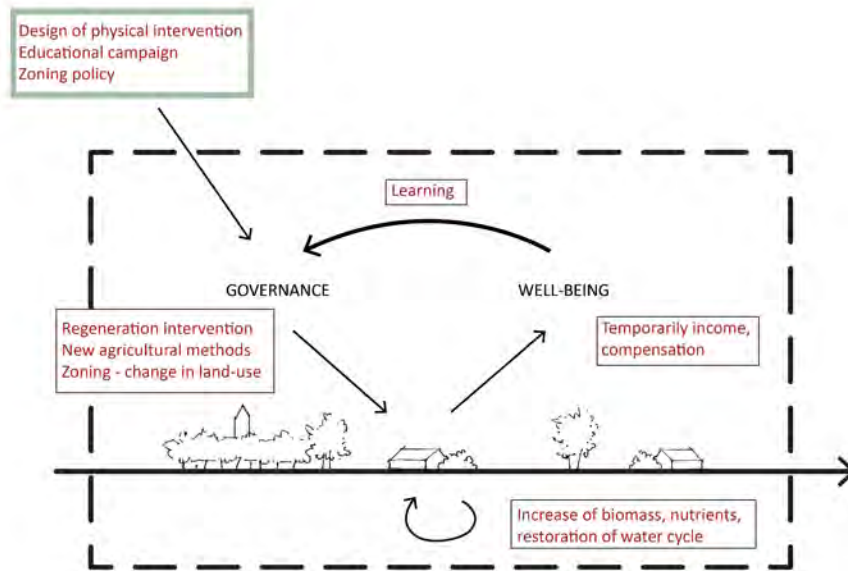

Figures 1.10. and 1.11. The Loess plateau in the initial and the regenerated situation

The Vattenrike case

Initial situation
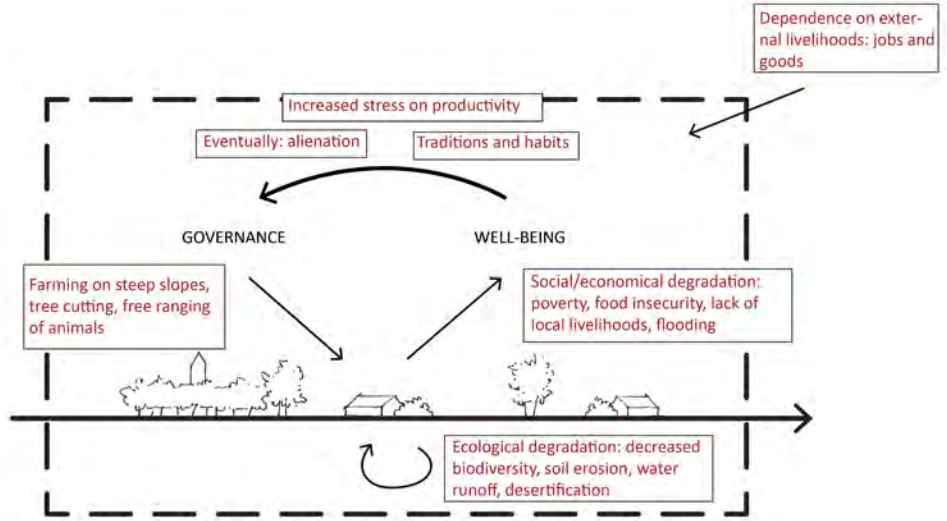
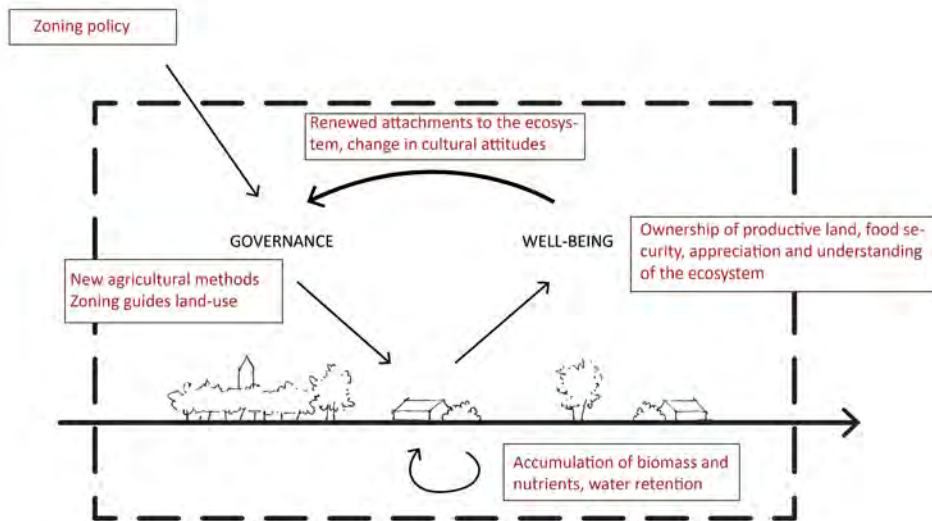Intervention phase

Regenerated situation

Figure 1.12. The Vattenrike regeneration process analyzed with the Social Feedback Model

Vattenrike, Sweden

Kristianstad's Vattenrike Biosphere Reserve is a 35 km stretch of wetlands along the lower reaches of the Helgea river near Kristianstad, Sweden. The Vattenrike wetlands are interesting in light of our research because it shows how local initiatives can lead to regeneration of a landscape. The process of regeneration is shown in three images using our social feedback model. In the green text box on the next pages, again a more detailed description is given. The following information is based on the analyses of the Vattenrike regeneration case by Berkes (2009) and Olsson et al. (2010).

Vattenrike: conditions for social support

When looking at the three phases of the Vattenrike case in the Social Feedback Model (fig. 1.12) it becomes clear that not a large physical intervention started the regeneration, but the creation of the Eco-museum by a key-actor, starting a gradual process of image-building and revaluation of the wetland area which, through the social feedback process, slowly started affecting policy and behavior in the area. The main change thus comes from the output-side on a rather local scale: key actors start influencing the public valuation of the area by providing education and the opening up of the area to public. As people got the opportunity to experience the landscape in several ways (activities, an extensive network of routes, museums etc.), an increased understanding of and renewed attachment to the area made them change their attitude, which was reflected in a change of habits and behavior in relation to the landscape. Ultimately this resulted in political support for the local management of the area. The condition for social feedback that is clearly shown here is the possibility to use and value ecosystem services, creating a direct link with the ecosystem. The initial phase of the Vattenrike case shows that if people are not able to access or enjoy the area (which can also be because of a lack of understanding), there will be no social feedback and no local care for the landscape.

In this case, the role of knowledge appears to be crucial. Researching the landscape and teaching local people and tourists about the area contributed to the revaluation of the area. There was a strong connection between external and internal knowledge and resources. In the beginning of the regeneration, external knowledge was dominant, providing insight into the value and functioning of the natural area. However, the eventual revaluation of the wetlands through the eyes of the local people took place through increased accessibility, interaction with the landscape, and direct learning on-site.

Social organization was an important condition to start the regeneration process; a rather loose but comprehensive and diverse network of actors and institutions made the change gradually encompass the landscape. The social

Figure 1.13. Naturum Vattenriket, a visitor centre

feedback changed towards a strengthened valuation of the landscape and the related sustainable land-uses, and finally finds a balance of positive feedback, fed by the enhanced network. So also in the final state, the network of actors stays an important condition.

The capacity of local people to act and make decisions regarding the landscape and to be part of co-management has been an important factor. Self-organization and flexibility formed strong factors within this case. Individual actors and groups were able to self-organize and carry out projects in the landscape. Through these initial activities, a network started growing that eventually led to regeneration. The conditions related to this, in both the change of social feedback as in sustaining a positive social feedback, are the ability to have a direct link with the ecosystem (enhancing attachment and possibly by providing livelihood) and to have an influence on local policy and governance regarding the area. Through local networking and capacity building, a strong lobby was formed towards local and national governments, thus affecting management decisions. In the Vattenrike case, change of policy and the availability of subsidies gave incentives for local maintenance of the area through for example mowing and grazing practices, leading to the required physical change.

The Vattenrike regeneration was initiated from the inside out by a couple of motivated individuals. The question is whether such a process could be set into motion from the outside as well. As an external expert that is concerned about the health of a landscape system, is it possible to connect this concern with local key actors that are in a position to start a local regeneration effort? The Vattenrike case is, in this regard, directly opposed to the Loess case which was started by a strong external push. However, both cases show that internal and external factors both play a role in regeneration, and a change process can never be fully external or fully internal. There is a balance between internal and external factors that allows a healthy exchange of, for example, necessary information or resources. It seems that this balance moves more towards local self-sufficiency as the regeneration effort progresses and more and more of the knowledge and resources necessary to initiate the process become embedded on a local level.

Factors in the Vattenrike case

Initial situation

The cultural landscape of the flooded meadows of the Vattenrike area has been shaped by millennia of annual floods in combination with livestock grazing and mowing. Degradation of the natural and cultural-historical values of this landscape started with the draining, dredging and building of embankments three centuries ago, aided by a negative public image of the area as 'wasteland' and its use as dumping ground. As an effect, an accumulation of organic matter took place, leading to a slow degeneration of the former cultural landscape with high natural values and the disappearance of key species.

People started to leave the land because of the inability to compete economically in terms of **livelihood.** Traditional grazing and mowing decreased and meadows became overgrown. The decrease of **direct dependence** and **relation with** the landscape left a vacuum of local responsibility, pushing the government into a management role. As these are external parties managing the land, **alienation** took place between the physical land and the people that take care of it. Since 1975, several international, national and county policies and conservation plans have been aimed at preservation of the area, but despite of these efforts, natural values have continued to disappear. A vicious cycles of existing **land-use** ('wasteland') and alienation resulting from a negative **valuation** and **perception** of the area by people led to a degenerated landscape. Since the 1970s bottom-up efforts leaning heavily on public education have aided the reversal of this pattern.

Intervention phase

Since the late 1970s, Sven-Erik Magnussen, the curator of Kristianstads County Museum organized a series of exhibitions exploring the link between nature and culture. This led to the establishment of an on-site outdoor museum to provide information to visitors, and eventually to the creation of Ecomuseum Kristianstads Vattenrike in 1988. The provisioning of information on the natural and cultural-historical values, as well as the coinage of the name 'Vattenrike', which is Swedish for 'water realm', helped to underscore the value of the wetlands, changing the negative public image of the area. This *image-building,* reframing the area, has been very important. The intervention started by the initiative of a single change-agent (an individual key-**actor**) leading to a bottom-up initiative from the inside out: no large-scale external push has been necessary.

An important realization in the process came through understanding of the landscape as a cultural landscape that could not survive solely by 'protecting it from people' in nature protection policies. A specific human presence and agricultural practice was necessary to maintain the preferred natural qualities of the area. This has been an important part of the **socio-cultural system** based on grazing and mowing practices in the past, and had to be brought back in these times.

Scientific investigation and public education worked hand-in-hand in several, largely uncoordinated restoration projects executed by several individuals. Close relationships were built with key external contacts in universities, nature organizations, museums and tourism, with the aim of knowledge building and exchange and creating public **awareness and understanding** of the problem. Support was gathered among local groups as well as on municipal, county and national level through an increasingly strong lobby. The process shows the importance of **network** contacts with external parties within bottom-up initiatives. The Ecomuseum Kristianstads Vattenrike played a key role as a bridging organization providing a platform for knowledge and trust building between key actors in the region (Berkes 2009).

The support and expansion of grazing and mowing practices (reintroducing **traditional land-use and land-use processes**) was the main intervention that lead to physical restoration of the cultural landscape. This **regulatory** intervention placed people and their actions back into the Vatttenrike Ecosystem, thus also strengthening the valuation of the land and the wellbeing of local people. The people working on the land got **incentives** in the form of subsidies (*external financial support*), encouraging the land-uses which maintain the cultural landscape: hay-making, fishing, grazing and mowing and making a certain **livelihood** in the area possible. This placed people back in a position of direct relationship with and dependence on the natural system. Local people working the area are also often involved in educational or recreational programs, broadening their incomes.

The landscape has also been opened up: the wetlands were made accessible and many people were attracted to the landscape: scientists (ecologists, nature management etc.), tourists, school kids and people from the adjacent city. **Interaction** with the landscape, **accessibility** and the possibility to move and explore strengthen the positive valuation and the public image of the wetland. The aesthetic value of the landscape is now to be experienced. The initiatives taken in the area are characterized by **self-organization**: people gather and start small *(pilot) projects.* Based on these projects, people start coming together to form networks and local capacity to carry more and more responsibility.

Regenerated situation

All the individual projects led to an increased awareness and valuation of the landscape, increasing **place attachment**, **local identity** and **sense of locality,** anchored in the

area by **social learning** and institutional change. Informal **institutions**, related to the use of the wetland area in all different forms, help to change attitudes and enhance **social capital**. Initial alienation and negative valuation has turned into a positive attitude towards the landscape.

In Vattenrike, the change is still going on. More and more initiatives are taken, more visitor centers are opening and the ecosystem is getting healthier every year. *Local monitoring* is put in place so that action can be adjusted when necessary. The role of external parties, crucial in providing knowledge, decreased after knowledge is embedded in the local system, but is still part of the extensive network of actors involved with the regeneration of Vattenrike.

When comparing the initial and final situation, the change is relatively small. No grand-scale physical landscape change was implemented. The remarkable thing about Vattenrike is that a large-scale mind shift in the public opinion on this area was reached by the initiative of a few key local actors. This mind shift was eventually instrumental in changing **attitudes** towards and behavior in the area (**habits and traditions**). This shows the potential of taking into account the social aspect of landscape in planning for landscape change. In the final situation, a physical and social confinement is reached where people and environment mutually support each other locally.

Vattenrike wetland has become a *healthy ecosystem*, with a broad **existence of ecosystem services** (mostly cultural, but also provisioning and regulating) which are **varied and interconnected**: the wetlands are ecologically interesting, aesthetically pleasing, productive and educative. The services are **easily accessible** through the network and the several visitor centers and are **valued at different scale levels**, from local people to tourists and scientists from all over the world.

During the process of revaluating and regenerating the landscape, **social cohesion** and **community** feeling is increased: local people are given incentives to use the land for production (fishing, hay-making, grazing) and play a role in maintenance (often voluntary) or are involved in educational activities or catering facilities in the visitor centers. There is a strong relationship between local inhabitants, people from the nearby city, tourists and external experts like scientists, managers and government parties. Social contracts are changed from predominantly governmental management to increased local maintenance.

Lastly, **alienation** has decreased: from a largely inaccessible and unattractive landscape, the Vattenrike wetlands changed into 'a landscape of everyone' – people get attached to the wetlands and use it in different ways.

The Vattenrike case from different perspectives

This case doesn't have a large focus on economic value and profit. The Vattenrike area doesn't have a strong productive aspect, but does contribute to the livelihood of some people through recreational activities. As the landscape regeneration took place from a rather bottom-up departure point, no large money-injections were needed, in contrary to the Loess case. Nevertheless, the subsidies given to local people to restart traditional land-use (grazing and mowing) have been necessary to start the physical change. Important has been the regulatory change to make traditional land-use possible and attractive.

The main strength of the whole process lies in the valuation of the landscape, from both individual perception and experience (psychology) as well as from communal processes and social mechanisms (sociology). By making use of the energy of individuals and groups the valuation and use of the Vattenrike area have changed into a virtuous cycle of social feedback.
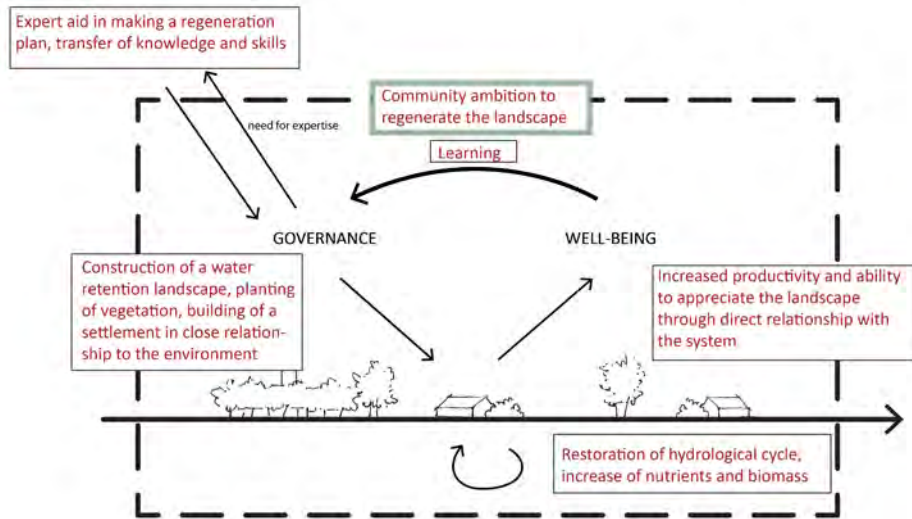

Figures 1.14 and 1.15. The wetlands of Vattenrike (above) and educational activities

The Tamera case

Initial situation
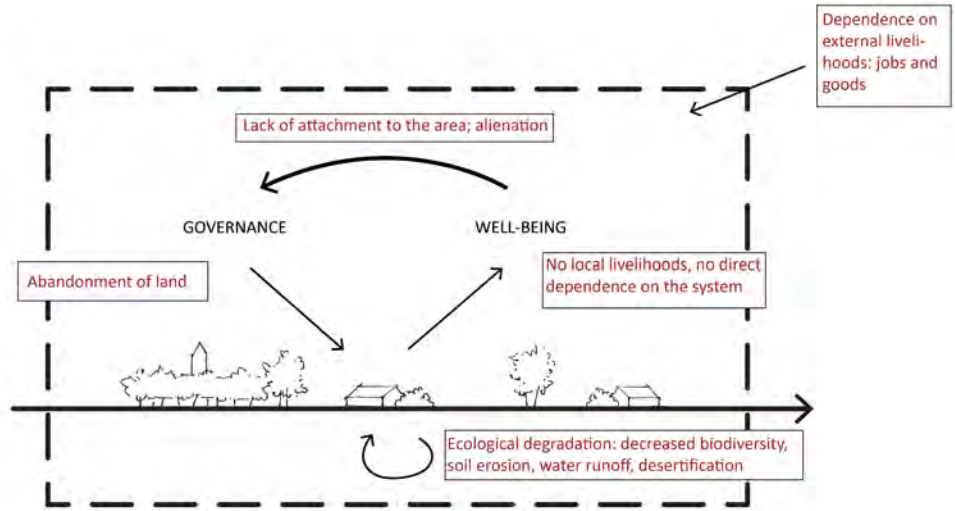
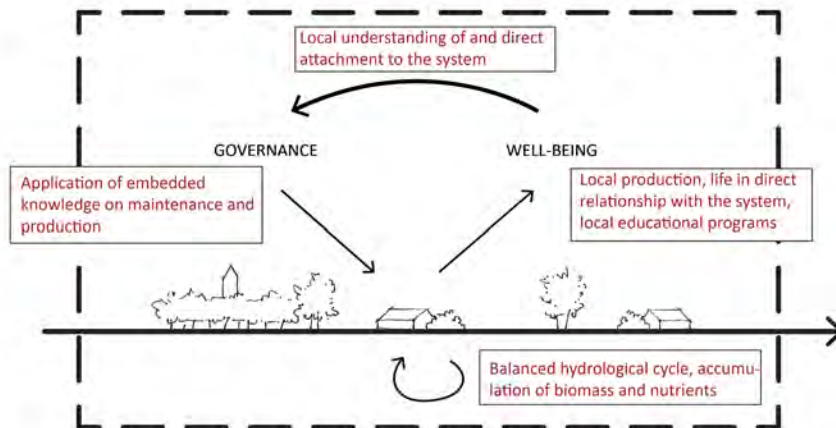### Intervention phase

Regenerated situation

Figure 1.16. The Tamera regeneration process analyzed with the Social Feedback Model

Tamera, Portugal

The Tamera Healing Biotope is an intentional community in the Alentejo region of Southern Portugal. It was founded in 1995 on a 150 hectare area of land with the intention to become a self-sufficient model for co-habitation between humans, animals and nature (Duhm 1993). Tamera is an interesting case for this study since the regeneration of the landscape, which suffered from desertification and erosion, was done by a community directly on-site. With the three schemes on the previous page, the process of regeneration is visualized. In the green text box on the next page a more detailed description is given. The analysis given in this section is based on information from the community's webpage, an evaluation written about the project by the jury of the Buckminster Fuller Challenge (2012) and a 1993 book about the intentions of the project by co-founder Dieter Duhm.

Tamera: conditions for social support

In Tamera, the start of the regeneration came from the inside: the existing community shared a vision to restore the ecosystem and make the land productive and sustainable again. The initial push thus came from the attitude and mind-set of the people directly involved in the landscape. In this sense, the regeneration started from a socio-cultural angle and it came directly from the social feedback itself, in which the 'sustainable' attitude of people didn't fit current landscape and land-use. This led to the attraction of external knowledge and expertise which helped the people to change the landscape. A water retention landscape was built that was meant to restore the natural cycles of the ecosystem. The input of the landscape changed as well as the output, as people learned how to use their lands and maintain the new water retention system. These changes led to a reinforcement of the feedback arrow: people enhanced their understanding and became closely linked with the landscape.

In the Tamera case, social interaction and capital was key for the regeneration. The people involved already formed a strong community and shared a vision on a regenerated landscape. They wanted to work together and to implement and integrate expert knowledge, an aspect which helped the regeneration become successful. The community's internal network and organization of responsibilities has been a strong condition to make the change possible in the first place, and remains an important condition in maintaining and sustainably exploiting the landscape. Tamera is a good example showing that regeneration of natural systems is not something that can be done by one individual alone. Since it concerns drastic changes to an entire system, the whole community needs to organize itself around the changes. In the Loess case, this communal change was brought about by top-down incentives and education. In Vattenrike it slowly formed organically through the succes-

sion of successful projects that showed the value of regeneration. Tamera, unlike the other cases, took community organization as a starting point.

Knowledge played an important role in the intervention phase, where expertise was needed to implement the large physical intervention. Through education and interactive learning the local people learned how to implement and maintain the landscape. To start the landscape regeneration process, availability of knowledge and the possibility to learn was an important condition. In the regenerated phase, the knowledge was embedded within the community, forming a basis for continued maintenance of the new landscape. In the final situation, the initial dependence on external knowledge flipped around into a situation in which the area became a knowledge sharing center reaching out offering knowledge and expertise to the surrounding and communities with similar ambitions. This is interesting because it means that again, like in the other cases, the ba-lance between external and internal factors changed during the process from an initial dependence on external knowledge to a situation of relative self-sustainability in which the community has incorporated the knowledge and resources necessary for the continuation of the new natural system.

The community has a dominant say about the governance of the area. To a large extent Tamera forms its own regulations and defines its own day-to-day functioning. This gave the community the opportunity to implement and maintain the landscape in the way that works for the members. Without this freedom to define the own future, the community could not have made the drastic change in the landscape. As a community with strong internal organization and mutual assistance they were able to take this position necessary for regeneration, nor could it have carried all the responsibilities that came with it. Freedom and flexibility from external decision-makers was thus a very important condition in this project.

Figure 1.17. Community at Tamera

Factors in the Tamera case

Initial situation

The Alentejo region of Portugal has been kept, similarly to the Loess plateau, in a downward spiral of desertification for generations. Deforestation, inappropriate agriculture and interrupted hydrological cycles resulted in falling groundwater levels combined with occasional large floods (Buckminster Fuller Challenge, 2012). As a result of desertification and water scarcity, the area has faced severe difficulties in agricultural production, leading to depopulation. Traditional livelihood and agricultural methods formed a vicious cycle. **Alienation** between people and the landscape resulted from the need for alternative economic sources of income and people moving away.

Tamera is a community which intentionally started living in this degenerated area with regeneration and harmonious inhabitation of the landscape as a goal. This intention, and the fact that the community consisted of likeminded people, forms the **socio-cultural** context. *Recognition and awareness of the problem* was there from the beginning. There was also a strong community with a common vision, sense of **place attachment,** and willingness to work sustainably with the land. This formed a strong initial **institution** guiding regeneration interventions.

Intervention phase

Drastic *physical interventions* were necessary in order to break the vicious cycle and reinstate natural water retention capacity of the land. As part of the foundation of the eco-village, Tamera has implemented a water retention landscape in which water is captured, trees are planted and the hydrological cycle is restored. The water retention landscape was financed by community members and external donations (*external financial support*). An external expert, ecologist Sepp Holzer, was attracted to make the design for the intervention and to teach the community the necessary knowledge and skills for maintenance of the new system.

The physical implementation was done by the community itself, thus actively **participating** in changing their landscape and **learning** how to use and maintain it. The people from the community executed the project with help from external experts. The people exhibit strong **human agency and self-organization.** *Local monitoring* and experimentation helped to understand the system and adjust where necessary.

Unlike the Loess plateau case, change was initiated from a small-scale local initiative with the potential to have an exemplary role for the wider region. Like in the Vattenrike case, the need for **expert knowledge and skills** was

the main reason for involvement of external expertise. **Education** of the local community was a central concern: the external expert was involved not only to make the plan, but also to transfer knowledge so that the community became self-sufficient in knowledge of their own system. **Social learning** anchored the new knowledge and behavior in the socio-cultural context.

Regenerated situation

The design consisted of several retention spaces (lakes) built of earth dams. The water from the lakes soaks the surrounding earth. So far, visible results are the return of vegetation and wildlife, the reappearance of a natural spring, and ability to grow crops on the lakeside terraces (Buckminster Fuller Challenge 2012). In this way, the **material productivity** of the landscape increased drastically, and also other **ecosystem services became existent**, both provisioning, cultural and regulating. These services are **diverse, interconnected** and **accessible** for all local people. People are able to use the ecosystem services for **livelihood.**

The water landscape includes a place for inhabitation in close relationship with the natural system, as a *healthy ecosystem*. It places the community in a position of **direct dependence** on the system, in which people experience directly the influence of their own actions on their surrounding and the need for maintenance and care of the system. The **opportunities for and modes of interaction** with the landscape leads to a strong connection with the landscape. The community **monitors, maintains** and improves its own system. Several programs are in place to share insights and inspire other communities by **education programs.**

Between the initial and the current state, an interesting (social) change that can be observed is that through the process, Tamera has gone from being dependent on the outside for knowledge and skills to a state in which it has absorbed the knowledge and is able to start its own educational programs and serve as an example, a *pilot project*, for others. This indicates that after an area has become both physically and socially confined (COOS), where physical and social mirror each-other closely, it is able to reach out and become meaningful on a larger scale.

In this case, the strongest perspective is that of community and group processes, social mechanisms and social interactions (sociology). The more individual aspect (psychology) also plays a role in the establishments of close personal relationships to the ecosystem. The economic perspective can be seen in the need for a livelihood and prospects for the people from Tamera. This is not so strongly represented in the case. The collaboration between individuals is more apparent than the need for individual livelihoods. Governance turns out to be quite important, as the people from Tamera clearly take their own responsibility and position themselves in the larger societal context.

Comparative remarks

By looking at the three cases above, it becomes possible to compare and contrast different approaches that can be taken in landscape regeneration. The table on the next page gives a short summary of the comparison.

When looking at the output, the feedback and the input, many of the factors and conditions found in literature review can be related to what happened in the cases. We also found some extra factors and conditions not mentioned in literature that seem to have played an important role in the regeneration of these landscapes. The cases allowed us to shed light on deliberate *change* of the state of a landscape

system and the social feedback. This shows that regeneration of a socio-physical system can take very different forms. Because of the cyclical nature of socio-physical landscape processes, regeneration can start at different places in the social feedback model. Regeneration does not necessarily start with a landscape intervention; it can also be started by social change. In all cases, the movement from external push to internal (local) maintenance was taken: this seems to be a factor of success. In the Loess case, the physical intervention and the educational campaign were necessary to start the regeneration. In Vattenrike, the scientific knowledge and interest from tourists and schools has been leading the revaluation, and in Tamera, the water retention landscape could not have been built without external knowledge. A good balance between external input and internal anchoring in the socio-cultural context is necessary for a sustainable regeneration plan.

The accessibility and transmission of knowledge and learning are key success factors for regeneration. The balance between external knowledge and resources necessary for landscape change was shown to shift in each case from a heightened dependence on external sources to an embedment within the local landscape, tending towards self-sufficiency of the local system. Local capacity building that enables this embedment, and that enables the taking of responsibility on a local level, is an important condition. This local capacity includes local organization, but also local use of ecosystem services and local awareness and

Fig 1.18. The water retention landscape of Tamera

monitoring. An aspect playing a key role in increasing local capacity and social feedback is the decrease of alienation between people and the natural environment. When solving this alienation, it becomes possible to reach a state in which economic practices and inhabitation are integrated in the final maintenance of natural resources and people are involved in the maintenance of their own surroundings.

The role of social organization and community between individuals is also an interesting aspect in the cases. In the Tamera case it is obvious that the community made the project a success: a strongly connected group of people took over the control and maintenance of the regenerated landscape. In the Vattenrike case, the community is more loose and diverse, but the fact that many different people, with different social and professional backgrounds are involved with the landscape gives the regeneration the support it needs. In the Loess case, the local cohesion was already strong and people were strongly connected to the landscape and to their neighbors. This made it possible that all people got involved, although some drastic changes in the habits of people were necessary. Individuals could, in all three cases, not do the trick by themselves. It was also clear that an important factor in the regeneration cases was that people had prospects within the process of regeneration and in the changed landscape. Without this, there would be no incentive for local people to support regeneration. In all cases, productivity (of provisioning and/or cultural ecosystem services) was an important factor. It formed a condition for both the change of the social feedback as for (socio-economic) sustainability in the final landscape.

Both the Loess and Tamera cases depended on a radical landscape transformation in order to put back into place natural systems like hydrological cycles that support the growth of vegetation and accumulation of biomass. In this sense, the regeneration took the form of an engineered system repair, much like a landscape machine build for this purpose. In the Vattenrike case, the degeneration was less severe and transition towards a desirable state of the natural system could therefore be less drastic and more gradual. This suggests that the approach taken to regeneration depends on the severity of the degeneration. In the Vattenrike case, the regeneration took the form of transition management rather than of drastic landscape engineering. This allows more flexibility and sensitivity to slow adjustments of social mechanisms that do not force local people to drastically change their livelihood or living environment. This forms an argument for a timely diagnosis of situations in which a landscape is degenerating (through vicious cycles). Timely diagnosis allows for measures to be taken *before* a system is fully degenerated, so that transition from a vicious to a virtuous cycle is less impacting.

Finally, it became clear that the social feedback mechanism played a big role in the regeneration of the three cases. In the Loess case a public education campaign was started that focused on the social feedback and existing attachments to the landscape. Through this campaign and by offering clear incentives and prospect it was possible to make the regeneration effort accepted by the people that were ultimately going to be responsible for the maintenance of the regenerated system. The Vattenrike strategy was target-

	Loess plateau	Vattenrike	Tamera
Regeneration: start, implementation, maintenance	Externally initiated, executed by local farmers, local maintenance	Initiated by key local actor, executed and maintained by local people and external parties	Initiated by community, executed by community with help of external expert, maintenance by community
Knowledge and education	Public education program organized by government to increase understanding of the need and prospects of regeneration, and sustainable land-use practices	On-site knowledge building and sharing through research and education. Knowledge informs policy and behavior, and is at the core of the public 'image- building' effort	Community contacted external expert to supply and transfer knowledge to the community. Eventually, community becomes source of information
Local empowerment and flexibility	People gained back ownership of the land, and ability to adapt to changes in their own way	Strong lobby by the local network provided a voice in regulation and position to take action in the area	Community took complete governance of the natural area, resulting in ability to regenerate.
Community and network	Focus on community rather than on individuals created support by traditional social organization structures	Extensive network of loosely connected individuals led to widely supported landscape change	Strong community based on social cohesion and collaboration realized regeneration

Figure 1.19. Comparison of the three regeneration cases

ing the social feedback directly by doing image-building. By the image and understanding of the area, a social feedback mechanism came into being that connected landscape appreciation with action. Without this continued effort to build social support and social feedback, there would not have been a regeneration. In Tamera, the community embodied a shift in social feedback. By bringing in a strong awareness of the landscape problem, the people of Tamera were able to bring the landscape through their vision and willingness to act to into a regeneration process.

The cases show that the awareness of and explicit focus on social feedback mechanisms during landscape change allow for a strategy that is sensitive to existing attachments, attitudes and traditions in the landscape. This sensitivity has been shown to be the key to critical social support for the regeneration, without which the efforts would almost undoubtedly have failed because of mechanisms such as resistance to change.

Different perspectives taken in landscape regeneration

In the cases we see that the approach to regeneration can vary. In the Loess case, the perspective was more economic than in the other cases. Tamera was a strong example of internal organization and sociological processes. Vattenrike was most focused on politics and image-building. However, in encompassing projects like these we see that all perspectives are necessary. We see that despite the focus on economics, the Loess plateau case also spent considerable attention to sociological processes in the area. Without an integration of perspectives, it is likely that the project would have been less successful because in that case it would have been harder to close the feedback loop with the local people who ultimately maintain the landscape.

Figure 1.20. Construction of terraces during the regeneration of the Loess Plateau

Alienation- neglect
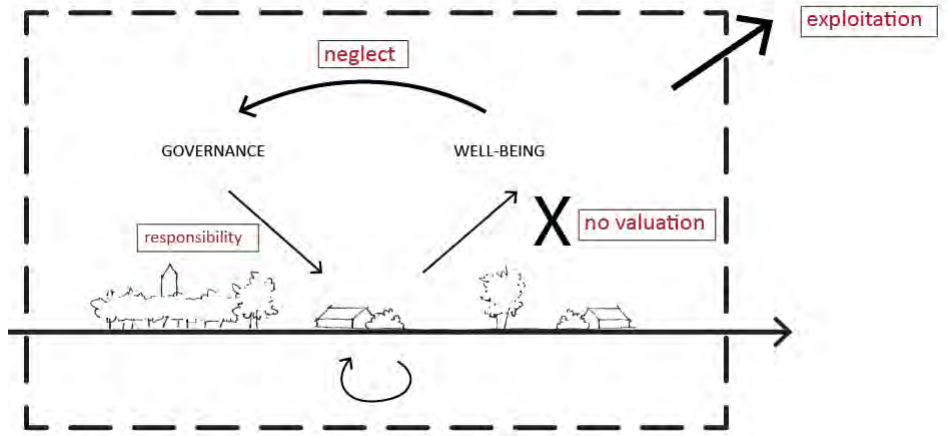
Alienation- frustration
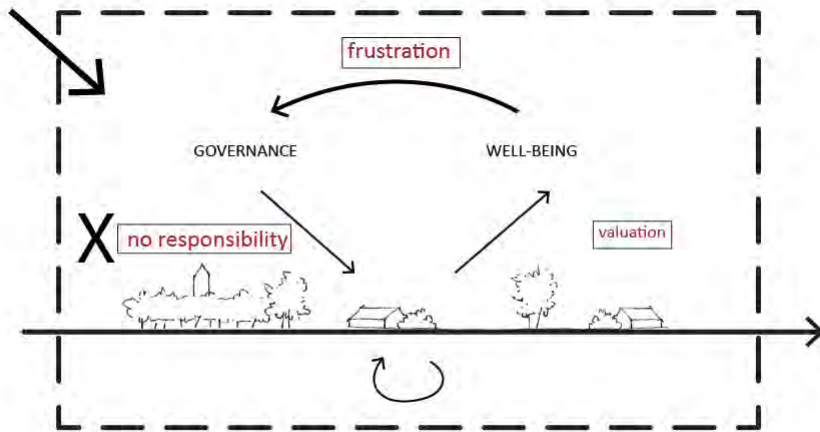
Alienation- resistance to change
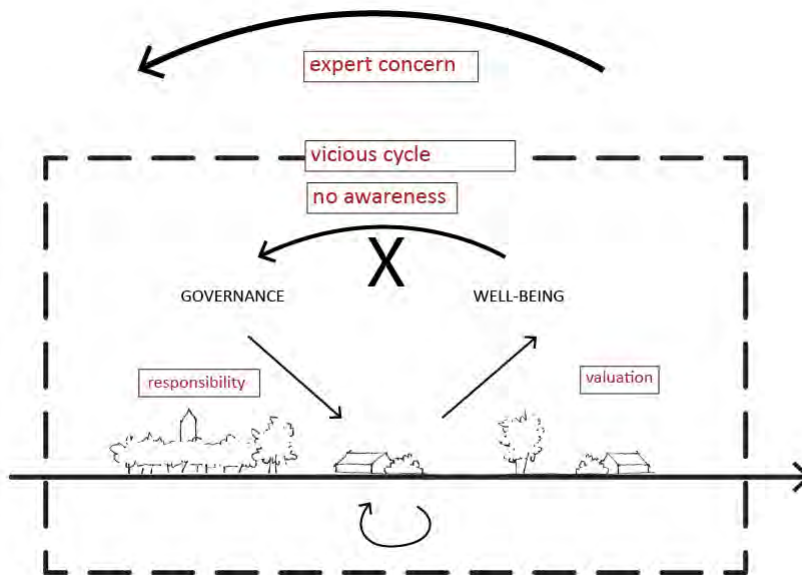
Figure 1.21. Three forms of alienation: when one of the arrows of the Social Feedback Model is missing, alienation occurs

Conclusion Chapter 1

The overall context of this research lies in the need for regeneration of problematic cultural landscapes. The factors and conditions we analyzed in this chapter help to understand the complex processes taking place in the landscape. When understanding these factors and conditions, it becomes possible to use them to work towards landscape regeneration. The focus lies on the social aspects of the landscape, but it is important to stress the fact that most of the factors eventually depend on the presence of a healthy landscape that provides services. Here we start to see that a healthy landscape enforces a strong social feedback, which in turn enforces a healthy landscape, leading to a continuous virtuous cycle. Fig 1.22 shows the characteristics of a socio-physical system with a social feedback that supports this virtuous cycle (and thereby landscape regeneration). These characteristics are formed by the logic of omission: by defining the components that form the building blocks of social feedback, we can argue that if one of the components is weak, also social feedback logically will be weak.

In order to reach a strong social feedback in support of landscape regeneration a healthy socio-ecological system is a sine qua non; a sustainable ecosystem with a broad availability of ecosystem services needs to be in place in order to be appreciated and used. In case of a problematic socio-ecological system (or degeneration issue) there is therefore a need for an initiation of change (a 'push') that can move a system from a vicious to a virtuous cycle. Because of the cyclical, interdependent and dynamic nature of a system, this regeneration can have many forms, external or internal and social or physical.

Alienation and local empowerment

The process of regeneration is characterized by a shift of the entire socio-physical system from a vicious cycle (in which a strong social feedback keeps in place degenerative practices which are ultimately unsustainable), or from a situation of dis-attachment (in which social feedback is weak or not present). Both cases are presented as a form of alienation, because in either case there is a separation between the attitude and behavior of the local people and the actual state of the natural system. In some cases this is because local people are not able to form a social feedback in their own landscapes for lack of power or ability to appreciate landscape services. In other cases this is because of a lack of awareness or experience by local people of the landscape problem. In the three schemes on the adjacent page (fig. 1.21) three forms of alienation are visualized in the Social Feedback Model. The Social Feedback Model clarifies how logically alienation occurs when certain elements are missing within the (local) social level of landscape.

In this chapter we found that social feedback in the landscape is a local phenomenon. When ecosystem services flow away from the local system without affecting local people, there is no incentive for these people to care for the landscape. Similarly, if the people that appreciate the services have no say about the management of the landscape, the appreciation does not get translated into (local) action. In both cases, people are alienated from their own environments and (external or internal) actions might be insensitive to local conditions and local people's wishes and ambitions. A (renewed) focus on local, place-based circumstances is necessary to truly understand and guide processes of attachment, formation of meaning in the landscape and care for the environment inspired by appreciation of the full landscape system.

In other words, in order for social feedback to support the regeneration of a landscape, the social system needs to be closely inter-related with the physical system on a local level (on a larger scale level, the social feedback disappears). This forms the basis of the main argument presented in this thesis: in order for landscape regeneration to be socially supported, a situation needs to be reached in which local people are empowered on three levels: on the input level through the direct power to affect the local environment, on the output level through the direct ability to use and appreciate ecosystem services, and on the feedback level through the accessibility of sufficient knowledge to gain awareness of the state the natural system is in, so that desirable adjustments can be made. Without local empowerment on these three levels a situation of local support for landscape change cannot be reached. This is based on the conclusion that in a situation of alienation of local people to their environment (and thus lack of empowerment), social feedback diminishes or takes the form of resistance to change.
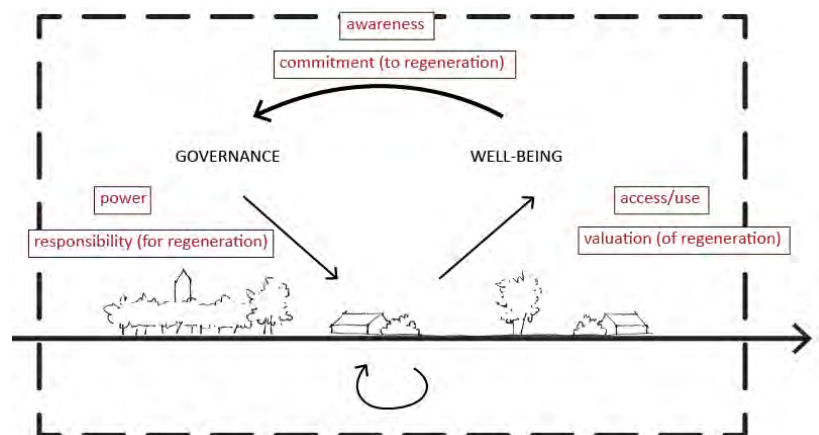

Figure 1.22. Social feedback situation in support of landscape regeneration

Conditions for social feedback in support of landscape regeneration

Below we will describe more specific conditions that underlie empowerment of local people in support of landscape regeneration, as found in the literature review and case studies. These conditions are visualized in the Social Feedback Model in fig. 1.23. on the level of the input, output and feedback of a socio-physical landscape. These conditions form the ingredients of local empowerment when we consider the socio-physical system within its context of time and scale, taking into account the relationship of a given system to external influences, and its trajectory through time.

On the input side, responsibility for the natural system needs to be taken in order to maintain virtuous cycles. In order for a local feedback loop into place, local people need to be empowered to directly affect their surrounding and to step into this role of responsibility. In order for this to happen, external parties need to be willing to share responsibilities through, for example, new social contracts between governments and local groups. An important effect of transferring responsibilities to the local level is that local people are given problem ownership. This brings immediate awareness of existing landscape issues to local users, so that an attitude of 'lazy dependence' on external problem solving, and thereby disregard of the problem itself are no longer possible.

Local capacity needs to be in place in order to be able to take responsibility. As we found, landscape regeneration takes place on a scale that affects large groups of people. A critical majority of the local community needs to support change, and needs to support and carry out the continued maintenance. This requires the presence of strong cultural institutions that inform a pro-active attitude towards the regenerated environment, but also organizational structures and agreements to ensure that certain tasks are carried out and that land-use enforces regeneration. When the local community is entrusted responsibility and there is local capacity to actually take on this responsibility, local communities can start to express their care for the landscape through maintenance and initiative, forming an integral part of the closing of the social feedback loop.

On the output side, local people need to be able to access the landscape and use its ecosystem services. This is a condition that is often infringed upon by ownership of the land by large (external) parties and export of products. This condition implies that there needs to be more flexibility in the ways in which local people are able to interact with their surroundings, and for a more varied and local distribution of services. Flexibility in space and in the time-span of plans allows people to express their own creativity and inventiveness to find a place for themselves and form new attachments to a changed landscape. This

leads to incentives for local people to value the landscape more highly, and offers prospects for people to form direct relationships to the ecosystem through, for example, livelihoods based on natural resources. This forms the basis for local appreciation and valuation of the landscape, leading to attachment and commitment to the health of the system through the feedback loop.

In the feedback arrow itself it is important that there is sufficient access to knowledge about the (state of the) natural system and its potential. The embedment of this knowledge informs local (informal) institutions and cultural attitudes, contributing to awareness and the ability to monitor the landscape on a local level. Without knowledge, local communities cannot evaluate the consequences of the desired land-uses, and they may also not be able to assess the need for regeneration, leading to resistance to regeneration efforts. Knowledge can be embedded in different ways, not only through top-down educational programs, but also through the mobilization and sharing of existing local expertise and through social learning processes in the landscape.

Significance of social feedback

By looking at the factors and conditions for social feedback in light of deliberate landscape change, we start to see the significance of understanding social feedback and social mechanisms in regeneration efforts. Insight in the status and components of the social feedback before regeneration takes place may enable regeneration strategies that are sensitive to the local social situation. This might, for example, lead to a decrease of resistance to change. Resistance to change is a form of attachment to the landscape that can be experienced as frustrating for policy and plan-makers. However, attachment can also result in local people putting maintenance energy into the landscape. When we look at attachment as an asset, we can begin to look at resistance to change in a different light. After all, the resistance reflects commitment to and concern for the local landscape. This commitment and concern somehow gets 'threatened' by external plans. This poses a challenge to policy and plan-makers to work with local people. In the case of regeneration this could mean that a regeneration effort needs to be discussed with and implemented by local people themselves, or it could mean that drastic landscape changes need to offer clear prospects for local people to form rewarding, meaningful and exciting attachments once the change has taken place.
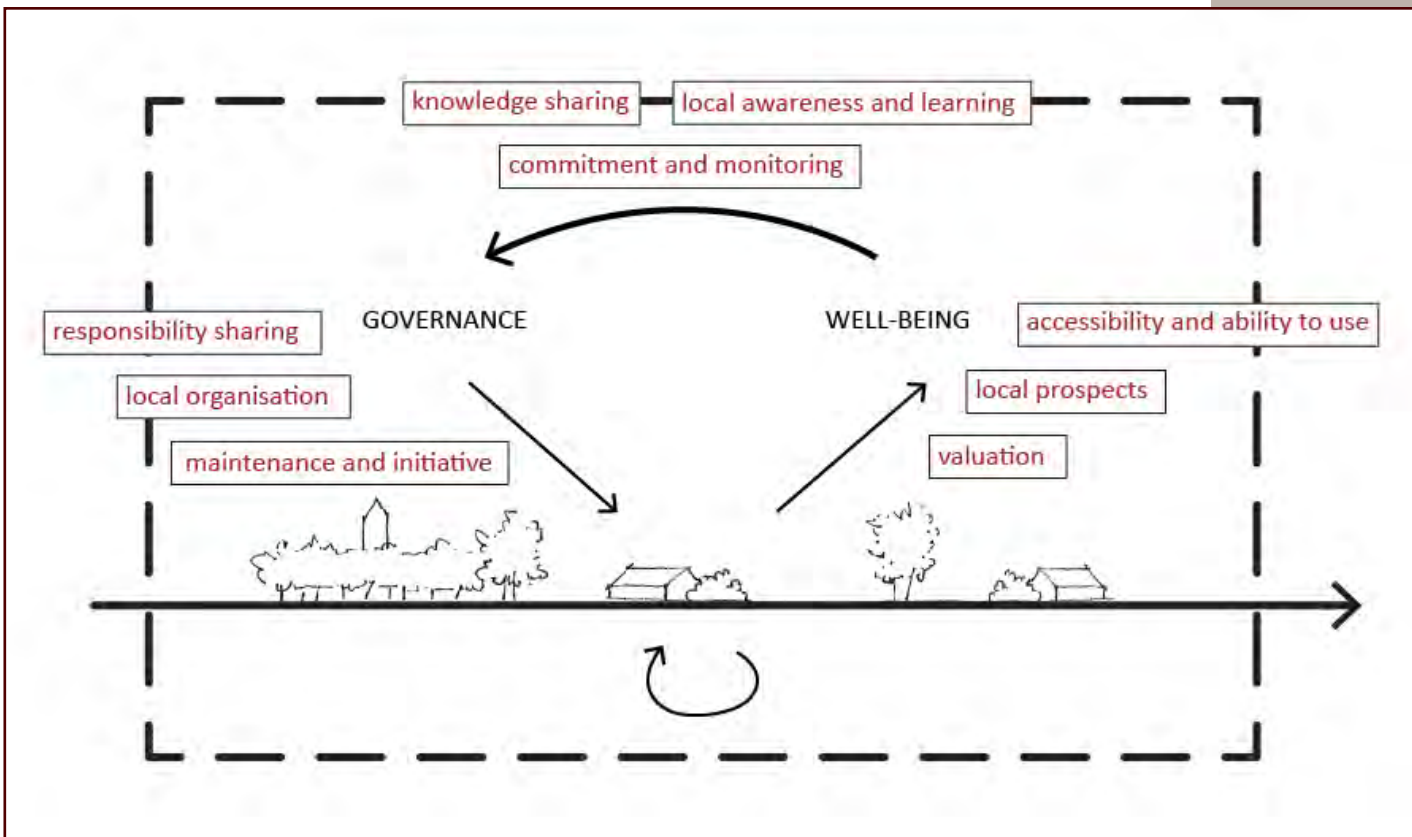
Figure 1.23. Conditions for social feedback in support of landscape regeneration

Integration of disciplines and perspectives

The consideration of the topic through the physical as well as the social science lens proved imperative in exploring the full range of the social feedback. Where the physical science takes a more global perspective looking at the issue 'from the outside', the social sciences offered a much more embedded view on landscape experience and attachment. In fact, we can see different perspectives within the literature, ranging from methodologically individualistic (economics, psychology) to group- and process-oriented (sociology and governance). The perspectives also show a range in focus from external and societal phenomena to internal, personal and behavioral phenomena. Making these perspectives explicit shows how the subject matter can be framed very differently depending on the perspective that is chosen.

In the table below we present four different perspectives, with terms that are associated with the stages of the Social Feedback Model. The components of the Social Feedback Model had to be gathered from a range of disciplines in order to form an integrative view of human processes and human attachment in the physical landscape. For example, we could not have understood the importance of accessibility and empowerment without looking at the topic from a political perspective. Neither could we have understood the importance of prospects without looking at an economic and psychological perspective. This disciplinary overview thus offers an additional (besides the conditions) 'checklist' that could be used in order to ensure that certain aspects are not missed.

This may serve as a suggestion for future research and policy to take an integrative approach and consider, for example, not only the economic or psychological layer (individual view), but also social dynamics and processes as an object of interest. It is a suggestion for separate disciplines to cross the boundaries of their respective fields and to enrich each other in thematic research into landscape transition processes and regeneration. We have found that in order to be able to close the circle from output through feedback to action in the landscape, an integration of insights from multiple disciplines is indispensable.

Evaluation of the use of the Social Feedback Model

In the literature review we saw that the everyday circular reality of landscape reality is continuously changing through landscape processes and virtuous or vicious cycles. The processes and overall tendency of a landscape system at a given period of time can be described using the Social Feedback Model. The model, used in this way, is able to capture a single 'state' of a system, but is not yet describing deliberate landscape *change* in the context of regeneration. What distinguishes daily landscape change and processes from deliberative 'disruptive' interventions is that the former describes a given, dynamic but relatively stable system, whereas the latter describes a landscape system in transition from one state to another, for example from a vicious to a virtuous cycle. This kind of change disrupts existing landscape processes, resulting in the need to make new descriptions of the system using the Social Feedback Models for the transition phase and for the final situation.

By looking at the case studies we were able to see that the need for a push within the existing reality and a (slow) transition to a new, balanced, system needs a focus on social processes in time, in order to aim for shifting attitudes and, consequently, change in the entire socio-ecological system.

A difficulty with the use of the Social Feedback Model is that it is not possible to represent the full complexity of regeneration processes when choosing three periods of time (degraded situation, intervention and new situation). We are aware of the fact that the resulting images are a simplification of reality. A specific challenge we encountered in dealing with three time-phases was the difference between the degenerated phase and the regenerated phase on the one hand and the intervention phase on the other hand. The former situations consist of vicious or virtuous cycles that can be relatively easily captured in one image. The intervention phase, in contrast, is a process of landscape transformation that is more linear. The set of consequences that lead to a new 'steady-state' cycle are hard to capture in one image. Ideally, this phase would consist of a set of images showing the process in time. It will be a challenge to develop the social feedback model in the future into a dynamic and interactive model in which the order of changes can be tracked.

Perspective	Output	Feedback	Input
Economics	Value	Supply/demand	Investment
Psychology	Perception	Attachment/attitude	Individual behavior
Sociology	Discussion/inter-action	Culture/ social cohesion/ learning	Collective behavior/ habits and traditions
Governance/political science	Accessibility/distribution	Institutions/power	Responsibility/agency

Figure 1.24. Different disciplinary perspectives address different issues within the Social Feedback Model

Chapter 2: Strategy
for community supported landscape regeneration

In the previous chapter we found conditions that are of importance to enable socially supported landscape regeneration. In the previous chapter we found that social organization and distributions of responsibilities, landscape services and knowledge forms a crucial element in addressing social mechanisms that disable regeneration. Therefore we will now look at organizational forms and involvement of different actors in the landscape and in spatial plans. This will help us formulate a strategy for regeneration that is in line with the conditions for socially supported landscape regeneration. The extent and form of participation of local people will come back in this chapter.

Research question: what kind of social organization is necessary in order to reach socially supported landscape regeneration?

- How does current social organization relate to current social mechanisms in The Vechtplassen?

- How does the proposed social organization in current regional plans deal with existing social mechanisms?

- What role do different actors play in socially supported landscape regeneration?

We conducted a case study of the Vechtplassen region consisting of three parts. First, we did a (socio-physical) landscape analysis based on the social feedback model, using maps, documents and site visits. Second, we conducted five interviews with 'key informants' listed in the box below. We conducted open-ended interviews in which the response is shaped by the subjects and their interaction with us (Deming and Swaffield 2011). Lastly, we analyzed three recent spatial plans for the area. We selected the plans for the plan analysis on the criteria that they had to span a significant part of the Vechtplassen area, include interventions on the regional as well as on the small-scale level, and that they were detailed enough in the description of the implementation strategy that we would be able to evaluate the plan based on the conditions for social feedback.

Below left: figure 2.1. The location of the Vechtplassen (dark green) located within the Green Heart (light green)

Interviewee	Position
Albert Hooijer	Farmer and member of LTO (agricultural organisation) member of Vecht plassencommissie
Anko Grootveld	Coach and process manager Involved with Nieuwe Hollandse Waterlinie project
Jaap Hofstra	Waternet (waterboard): department of plan making
Maaike Bruggink	Natuurmonumenten: manager of Vechtplassen
Paul Kuiper	Inhabitant Horstermeer and employee at Waternet

Figure 2.2. The Vechtplassen is formed by centuries of peat harvest

Socio-physical landscape analysis Vechtplassen region

Natural system and degeneration issue

The Vechtplassen are situated in the eastern corner of the Green Heart (Groene Hart) on the edge between the higher dry landscapes of the east and the low-lying, wet delta landscapes of the west (see fig 2.1 on the previous page). The area lies between the cities of Amsterdam and Utrecht. If we look at the current landscape, formed by natural and social processes, five main landscape types can be defined. In fig. 2.4 these types are visualized in a map and a section: from west to east, you find the riverbank and peat polders, reclamations, lakes, marshes and swamps and the sandy lateral moraine. First, oligotrophic peat bogs are removed for use in ovens. Second, removal of lower-lying eutrophic peat from below the water surface is started. This process (see fig. 2.3) leaves a landscape of surface water interspersed by narrow ridges used to dry the peat, and broader ridges for housing. The final development was the formation of reclamations by pumping away the surface water.

1000 A.D.

Sand

Eutrophic/mesotrophic peat

Oligotrophic peat (raised bog)

River levee with sandy ridge and clay

Water

Now

1:100.000
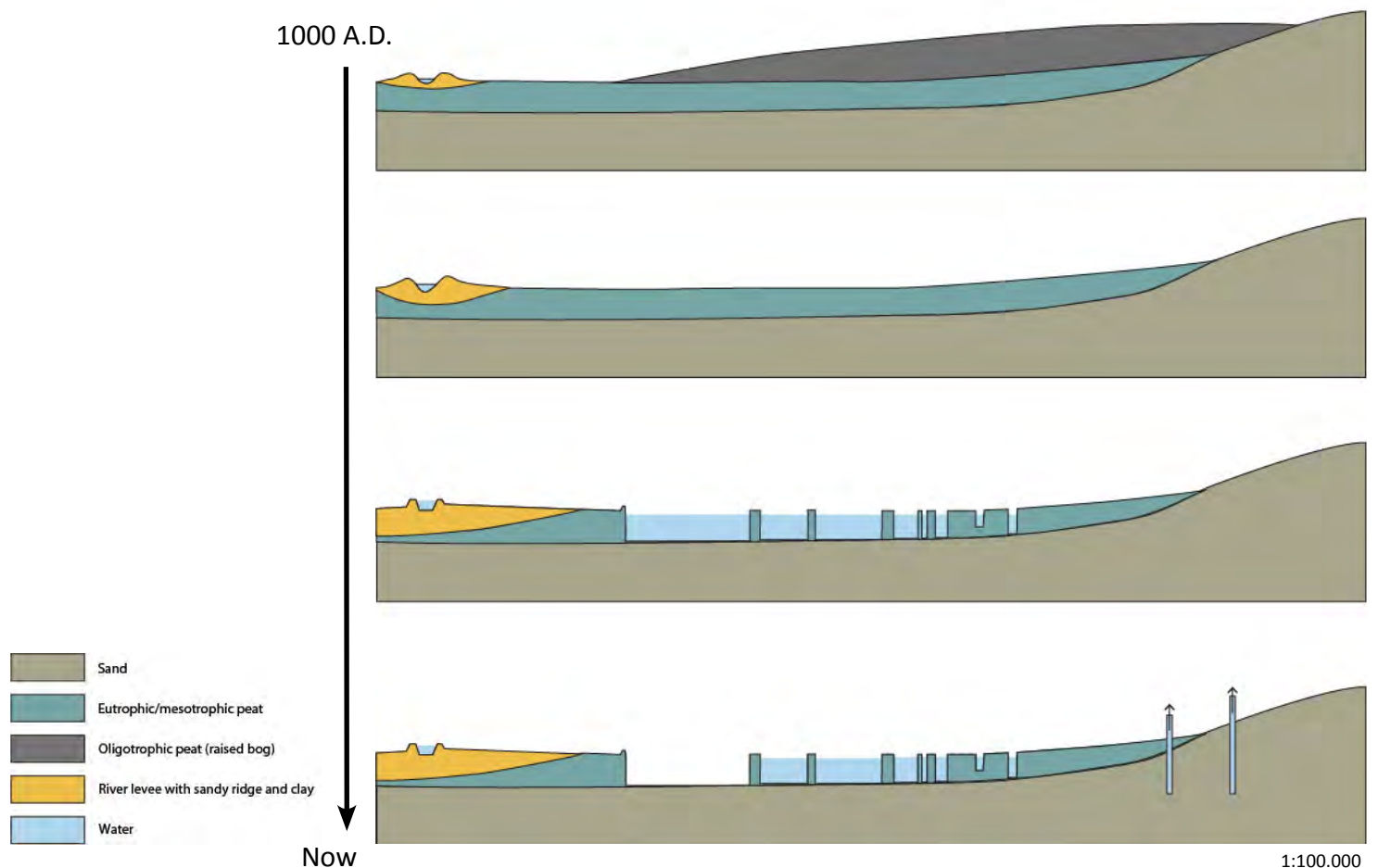
Figure 2.3. Landscape development of the Vechtplassen

The landscape of the Vechtplassen can be seen as a more or less confined entity bounded by the higher sandy moraine to the east, the Vecht river and riverbanks to the west and the Ijsselmeer lake to the north. The water system of the area of the Vechtplassen is characterized by seepage and infiltration. In the section below (fig. 2.5), the water system is visualized. On the high, well permeable sandy soils in the east the rainwater infiltrates. In the lower areas to the west this water comes to the surface as seepage. Seepage always finds its way to the lowest parts in the landscape, in this case the reclamations. The river, which is situated a bit higher in the landscape and has a small sandy river bank, is also an infiltration area.

In order to keep the lands in the lower areas, where much seepage is present, dry enough for agriculture and living, complex networks for water management have been installed. The system includes year-round pumping, which increases the rate of peat oxidation and soil subsidence. When the present land use, mainly dairy farming, is continued unchanged, the subsidence process will continue with approximately 0.4 – 0.8 cm each year (Meulenkamp et al. 2007). In the summer, due to water-flows between higher and lower areas on a small scale, the vulnerable higher areas where peat is still present have problems of drought, speeding up the process of oxidation. In order to counter this, water from outside the system is let in from the Vecht and the IJsselmeer. This water is of a different quality, endangering the valuable low-nutrient biodiversity in the area.

The existing natural system is physically not in balance. The water system is very open, resulting in the need to pump water in and out of the area continuously, depending on the

1:200.000

Riverbank   Peat polder   Reclamation   Surface water   Peat & marsh forest   Peat polders   Forest on ridge
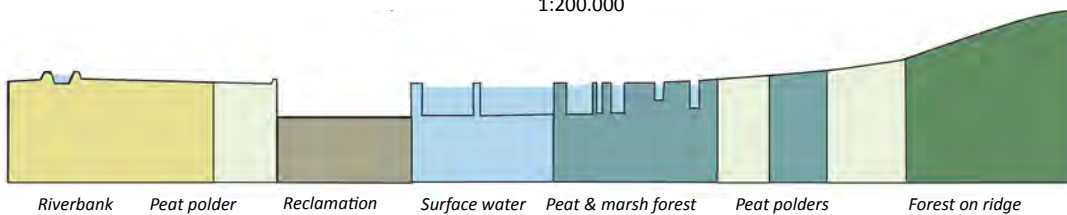
Figure 2.4. Current landscape types in map (above) and cross-section

1:100.000
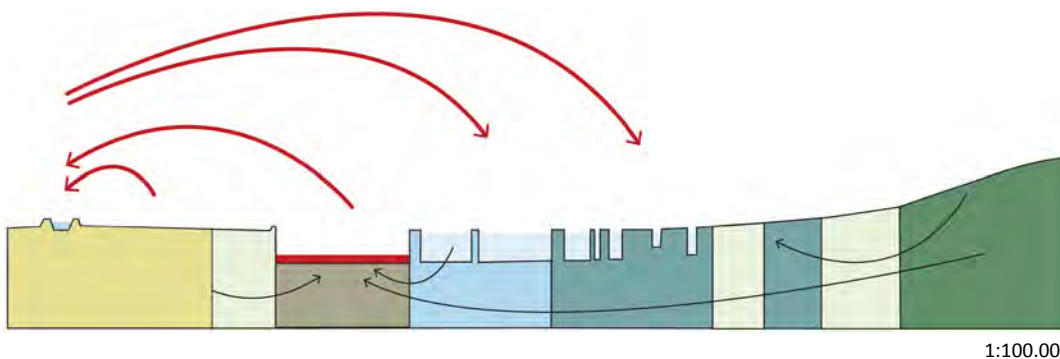
Figure 2.5. The current water system: groundwater and artificial water flows through human activities
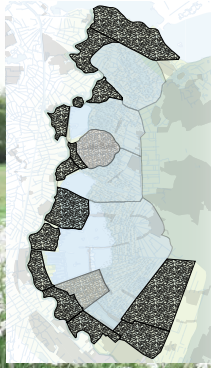
Figure 2.6. Vecht polders
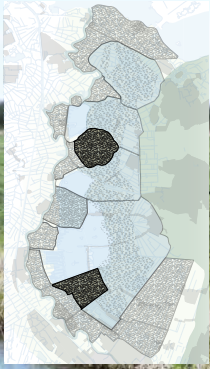
Figure 2.7. Reclamations
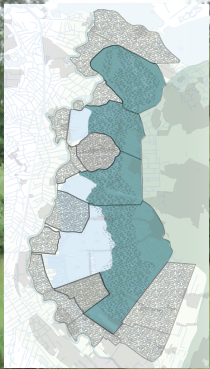
Figure 2.8. Marshes and peat polders
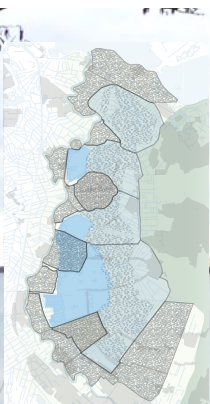
Figure 2.9. Surface water
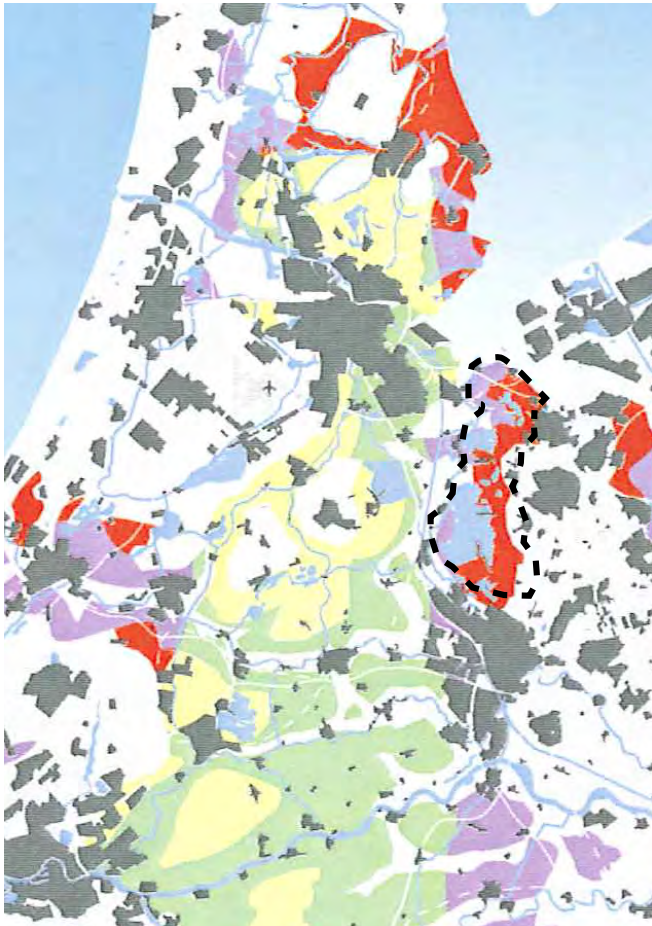
Figure 2.10. Urgency for a regeneration strategy (Vista, 2002)
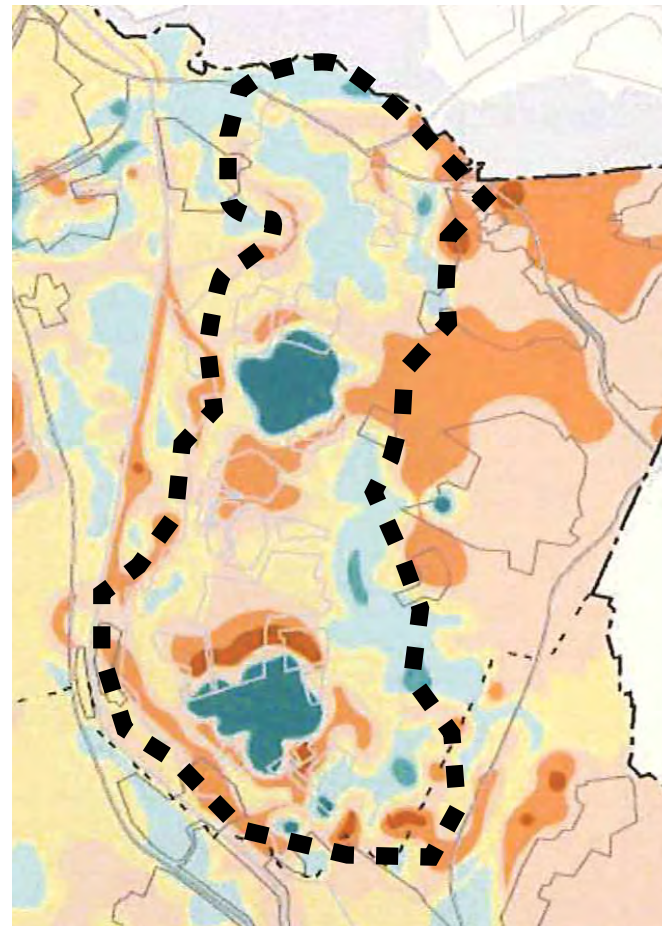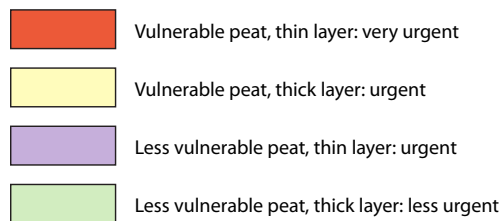
Figure 2.11. Seepage and infiltration (Amstelland, 2003)

	Vulnerable peat, thin layer: very urgent
	Vulnerable peat, thick layer: urgent
	Less vulnerable peat, thin layer: urgent
	Less vulnerable peat, thick layer: less urgent

	Infiltration from 3 mm/day (dark) to 1 mm/day (light)
	Intermediate: +- 0 mm /day
	Seepage from 3 mm/day (dark) to 1 mm/day (light)
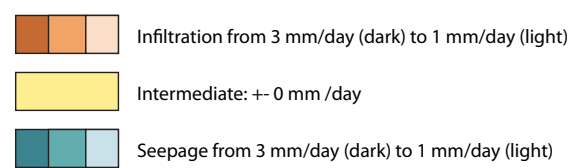
Figure 2.12. Foundations of an old defense bunker reveiling the ongoing soil subsidence in the Vechtplassen

time of year and land-use. Peat is disappearing and compacting, leading to soil subsidence and an increased need to pump, which, in turn, leads to increased peat oxidation.

The result of peat oxidation and soil subsidence is that only parts of the area is still moderately suitable for the main livelihood in the area, dairy farming (Alterra 2007). The numbers of dairy farmers are slowly decreasing (CBS 2009) and farmers are searching for additional income from outside the farm (Hooijer 2013). Climate change and the prospect of higher peak discharges through the rivers increases the pressure on the dikes leading to safety concerns and increased need for costly, technocratic watersystem solutions. Costs to maintain the landscape as it is are rising, while inability to fine-tune the artificial water system on the sensitive, small-scale natural level leads to loss of biodiversity and biomass.

As stated in the introduction, it can be said that the socio-physical system finds itself in a vicious cycle leading to degeneration. The issue does not need immediate intervention and current land-use can probably carry on for several decades. However, the longer is waited, the harder it becomes to move out of the vicious cycle and the more impacting the change in land-use and living conditions will become.

Current social structures and mechanisms

Input of the Vechtplassen landscape

The input of the socio-physical system of the Vechtplassen is formed by the governance of the landscape and the behavior and actions of all stakeholders within the landscape. The responsibility of the area is taken mostly by large parties (nature organizations and government), leaving little room for inhabitants to take responsibilities in their own areas beside the ownership they have over their own land and homes. This results in a large gap between responsibility taken on the regional scale by large parties, and local responsibilities limited to individual pieces of land (see fig. 2.15).

There is also a big difference in scale between the large comprehensive physical system and the various social units within the Vechtplassen area. Figure 2.16 shows the boundaries of the physical system and a rough indication of social entities in the landscape, based on settlement patterns, property of and direct visual relationships with landscape entities, and the existence of citizen groups. The scale of current social structures is mostly related to a village or a landscape entity, as people form an attachment to their direct (social) environment.

There is very little organization amongst local people concerning landscape. Some inhabitants organize themselves:
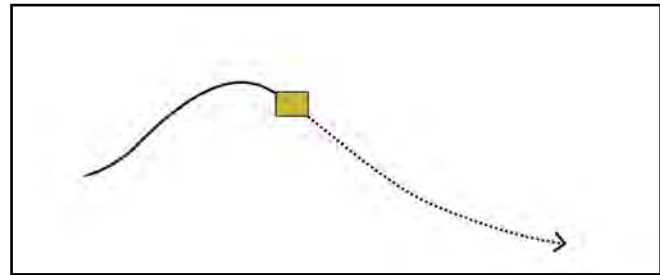
Figure 2.13. Degenerat-ing landscape: vicious cycle
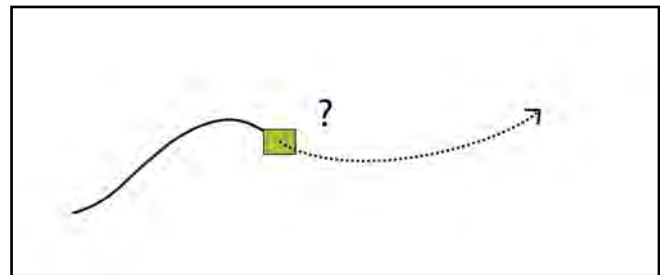
Figure 2.14. For regeneration, intervention is necessary

there is an active group of residents in the Horstermeer-polder, trying to actively engage in the plan making for the reclamation (fig. 2.17). This form of organizing rises from protest against external plans. In the area of Loosdrecht, inhabitants and entrepreneurs organized themselves to strengthen and guide the recreational and nature developments in the area. They want to carry out the nature ambition set by Natuurmonumenten on their own terms. In the rest of the area, however, local people depend on large parties and governments for the decision-making and maintenance of their environment. The large separation between large scale system responsibility and small-scale individual awareness, together with the lack of local organization makes it likely that many local people lack an overview of the interdependence of the larger natural system.
The large water management task is taken up by Waternet (the water board). Waternet continuously keeps solving water issues in a technocratic way by adapting and improving the artificial system of pumps and locks. They do acknowledge the larger degeneration problem, but they do not see it as their task to propose large-scale regenerative interventions, since their role is in service of government and local interests (Hofstra 2013, Grootveld 2013). As Paul Kuiper of Waternet puts it: 'if plans are made with people, instead of within an office by experts not living/working in the area, you might not get the perfect, idealistic plan, but you will get a feasible plan'. They want to keep being 'nice' and have good contact with the local people, giving local solutions more weight than structural solutions which meet more resistance (Kuiper 2013). The continuous 'fixing' of the problem however takes away problem-ownership and awareness from farmers and residents, resulting in a lack of conviction that regeneration is necessary.
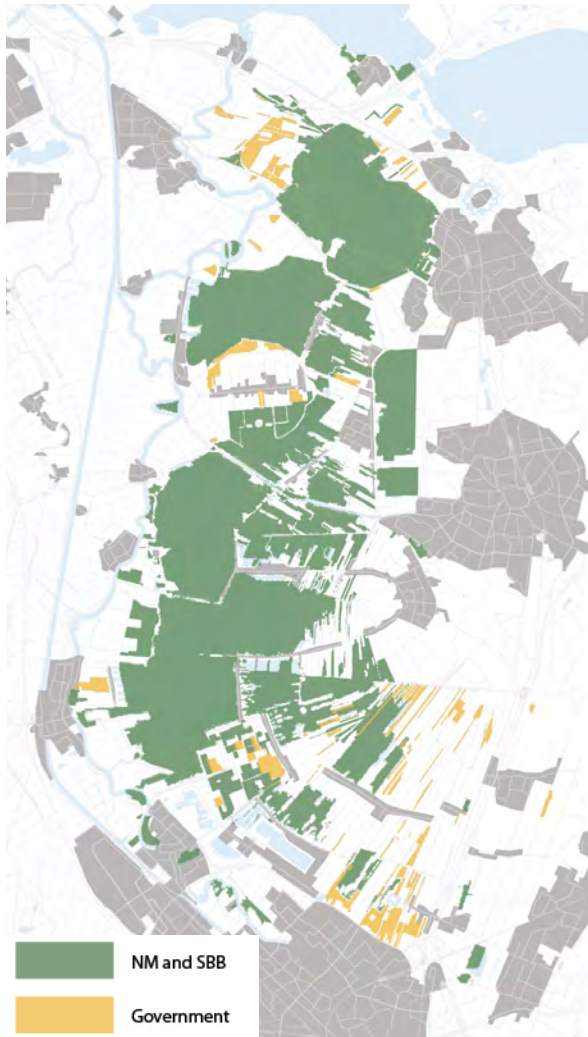
Figure 2.15. Map showing current land-ownership by large nature organisations and government. The land not indicated is mainly privately owned by farmers, entrepreneurs and inhabitants.
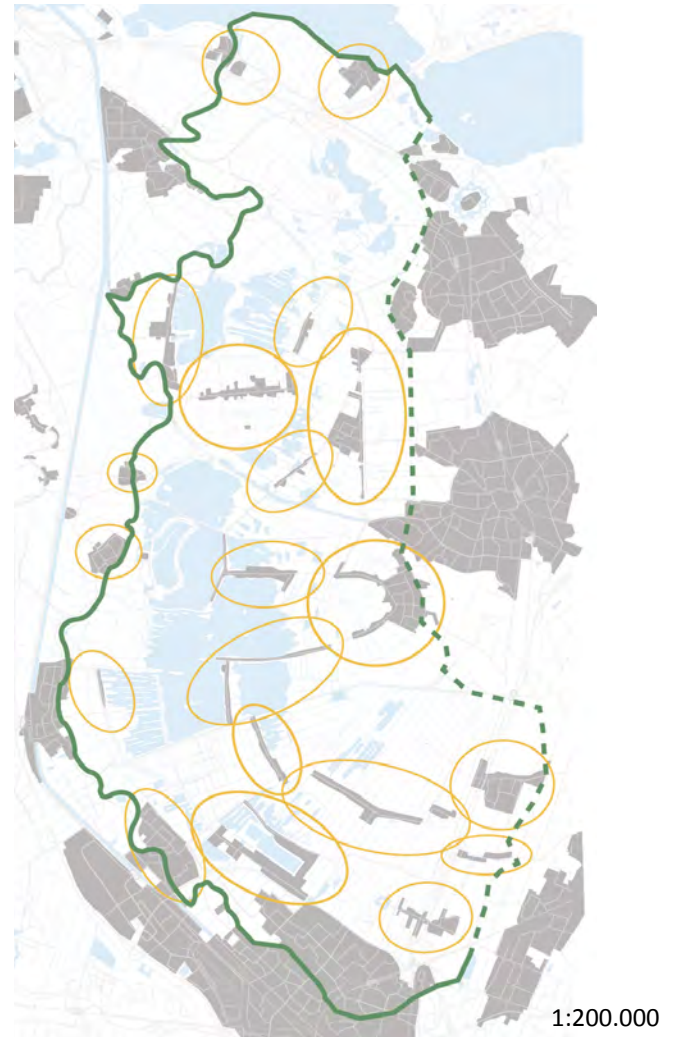
NM and SBB
Government

1:200.000

Fig 2.16. Map showing the physical confinement in green, with an open boundary in the east where the watershed boundary is situated more uphill towards the east. In yellow a rough indication of the several social confinements.

Figure 2.17. Resistance to change: protest in the Horstermeerpolder, one of the reclamations
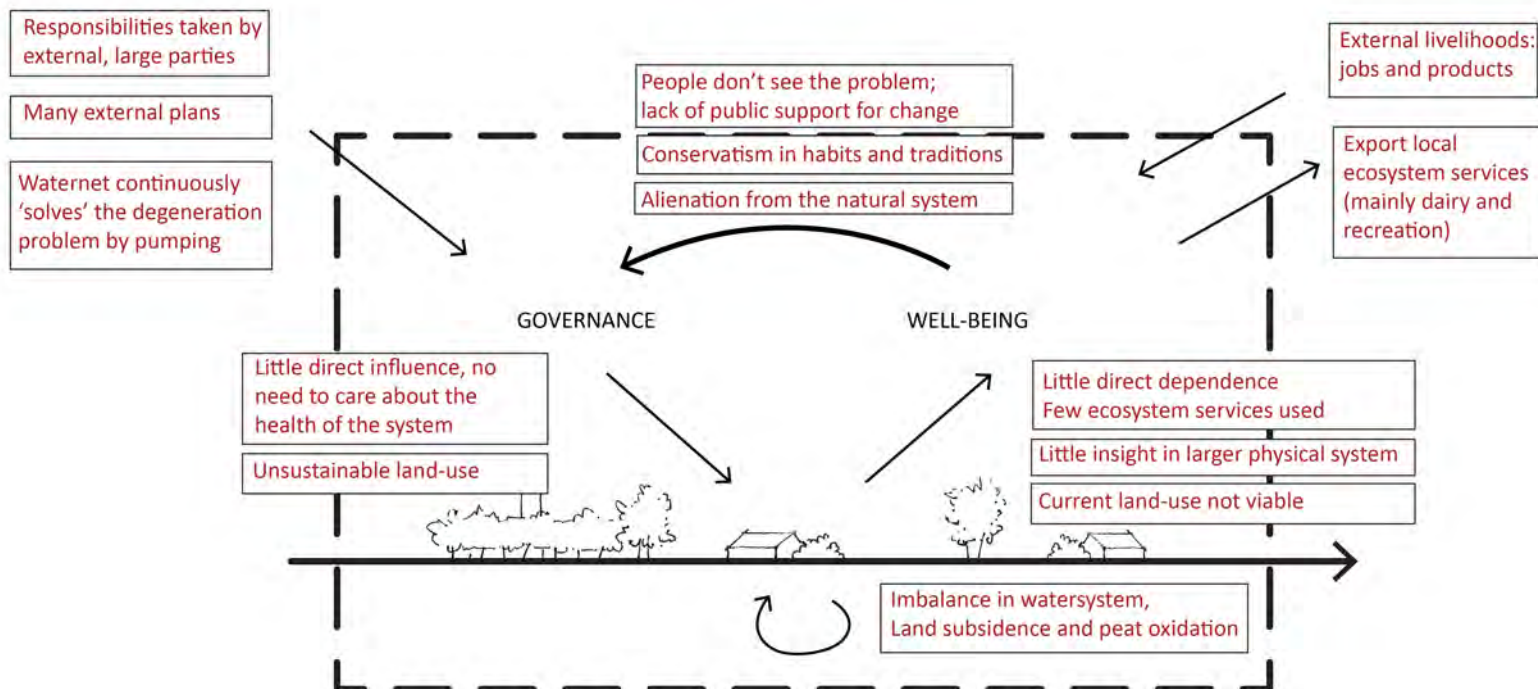
Figure 2.18. The current socio-physical system of the Vechtplassen in the Social Feedback Model

Nature organizations, in our case Natuurmonumenten and Staatsbosbeheer, own much of the land. These parties have their own ambitions for the area and often don't tolerate much activities on their lands. The large influence of these land-owning parties on the landscape makes the landscape dependent on these parties and decrease the direct relationship between local people and the natural landscapes. These parties however are facing financial and political insecurities (e.g. Stuurgroep Groene Hart 2011) and it is unclear whether they can continue in their habitual way. This makes them more open to alternatives in which they actively cooperate with entrepreneurs and inhabitants to share responsibilities more locally and allow more diverse use of the land (Bruggink 2013). Although Natuurmonumenten says they are open for other ways of maintenance, Hooijer (2013) states that 'Natuurmonumenten doesn't want to give any responsibility to the farmers', exemplifying the often tense relation between the nature organization and farmers.

An important input in the system of the Vechtplassen is the existence of many external plans for new developments in the area. People tend to get tired of the many plans made for their area, of which many are not executed (Stuurgroep Groene Hart 2011, Kuiper 2013). This diminishes the trust of local people in plan-makers and governments, enlarging the gap between local people and external, regional expertise and planning.

Output

The main land use in the Vechtplassen is dairy farming. Due to relatively bad conditions for production of dairy and hay (wet, narrow plots) and developments like (international) competition and inflation of the costs this economical backbone of the Green Heart is under pressure. For the farmers, beside stopping their practice, two alternatives are available: up scaling and intensification of their industry, or down scaling and broadening of activities (de Jong and Meulenkamp in Rienks and Gerritsen 2005). Upscaling and intensification asks for even more drainage, leading to compaction of the peat and higher costs (Atelier Rijksbouwmeester 2009). This enhances a vicious cycle in the landscape that ultimately will lead to the inability to continue the land-use. Current livelihoods are thus under pressure and farmers are complementing their income with other jobs (Hooijer 2013). Other land uses are mainly tourism, rural living, and nature reservations. There is a potential for other functions that are currently not being used, e.g. new agricultural products (water-based crops or fish), living on the water or water purification.

The ecosystem services used and valued on a local scale are limited. On page 62 we present a list of ecosystem services based on the Millennium Ecosystem Assessment (MA 2005): the currently used services are green, the others

Polders

Provisioning services
livestock, wet crops (e.g. watercress, rice)
non-human food (fibers, algae, duckweed)
energy crops/biomass
(e.g. miscanthus, reed)
solar energy, thermal energy

Cultural services
Liveability
Landscape experience
Education, information
Tourism and recreation (multifunctional farm)

Regulating services
Regional water storage capacity (temporary)
Water purification
Fresh water control, underwater drainage
Biodiversity flora and fauna

Reclamations

Provisioning services
livestock, wet crops (e.g. watercress, rice)
aquaculture (e.g. fish, duckweed)
non-human food (fibers, algae, duckweed)
drinking water
energy crops/biomass (algae, duckweed)
water height potential
wind energy, solar energy, thermal energy

Cultural services
Liveability and qualitative living
Landscape experience
Education, information
Tourism and recreation

Regulating services
Regional water storage capacity
Water purification, waste treatment
Fresh water control, drainage (adjustable
waterlevel, contextrelated)
biodiversity flora and fauna

Surface water

Provisioning services
aquaculture
energy crops/biomass,
(+ wind energy, solar energy)

Cultural services
liveability and qualitative living
landscape experience
education, information
tourism and recreation

Regulating services
regional water storage capacity
(flexible water level)
water purification, waste treatment
biodiversity flora and fauna

Marshes

Provisioning services
livestock (extensive)
aquaculture (e.g. watercress, duckweed)
non-human food (fibers, algae, duckweed)
wild plants
energy crops/biomass (products from
nature maintenance, algea, reed)
solar energy, thermal energy

Cultural services
liveability, qualitative living
landscape experience
education, information
tourism and recreation

Regulating services
regional water storage capacity
water purification, waste treatment
climate regulation (CO_2 fixation)
biodiversity flora and fauna
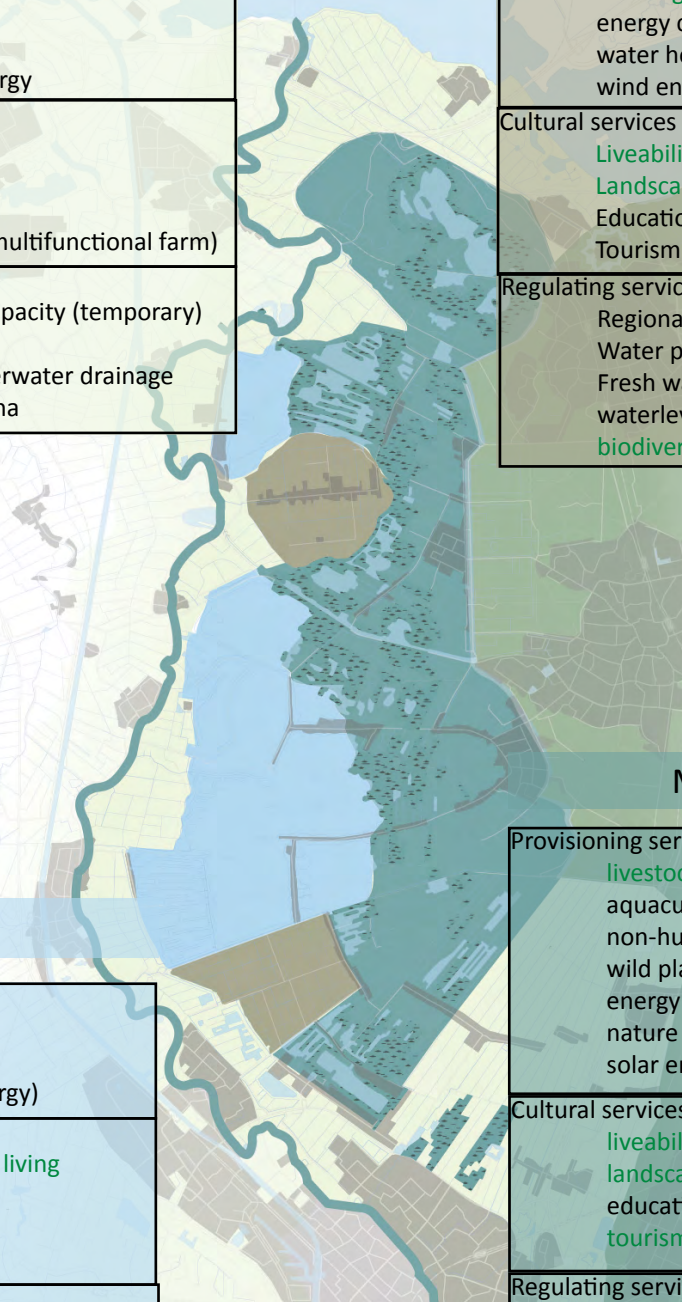
Figure 2.19. Ecosystem services analysis - in green existing services, in black potential services currently not being used

black. The analysis is based on map and document studies and the report of Alterra on Ecosystem services in peat areas of the Netherlands (Smit et al. 2012).

It is revealing to consider the distribution of existing ecosystem services. Most products (mainly dairy) from the region are directly exported and many of the local people gain a livelihood outside the area. In other words, people are not directly dependent on the landscape: if they need services they are easily imported. On the other hand, many services are used and valued by people outside the area; the exported (mainly dairy)products, but by tourism and recreation of external people. These people have a different relationship with and attachment to the area, as they are not part of the local feedback cycle between well-being and governance.

There are few people in the area that have a direct connection with the land in terms of livelihood. Farmers have a direct relationship with the landscape and are dependent on the productivity of the land. Recreational entrepreneurs are dependent on the landscape for its cultural services, but not directly responsible for it. Other inhabitants often have a primarily 'visual' relationship with the environment, walking or cycling through the landscape. However, many natural areas have restricted access, and there is limited possibility to interact with and play a role in the landscape through e.g. harvesting or taking on management tasks.

The limited use of ecosystem services leads to a fairly one-sided land-use and landscape valuation. This goes hand-in- hand with the clear functional division present in the area between (dairy) farmland and 'nature'. There is little land that doesn't belong to either category, and on which it is possible to have a different type of relationship to the land. More diverse functional options, combined with comprehensive use of the existing ecosystem services may give people prospects in livelihood and a more direct connection with their landscape.

Social feedback

Based on the social analysis and stakeholder interviews we got a general overview of some dominant cultural patterns and social aspects that are important in the area. We identified three common social attitudes that may block regeneration efforts, expressed through the social feedback: conservatism, frustration with external decision-making and lack of care. The first is seen mainly in farmers, entrepreneurs and inhabitants, who are currently not aware of, or don't experience, the degeneration problem. They like to keep things as they are because all is going fine for them and they see no reason to change (Hooijer 2013). This attitude results in the continuation of the current vicious cycle of land-use and resistance to change. Farmers in particular have a rather individualistic mentality and tend to respect authority (Grootveld 2013) (Bruggink 2013). They do not tend to oppose top-down decisions unless they become or-

ganized (Grootveld 2013). Local entrepreneurs can also be grouped in this category. They are currently not experiencing the degeneration problem, although they are likely to accept change if it is profitable to them. They actively organize in order to push for expansion of recreational facilities and accessibility of the landscape (Bruggink 2013).

The second common attitude is frustration with external decision-making. This is expressed through local resistance to top-down plans, exemplified by the local action group in the Horstermeerpolder. This type of resistance can be combined with the former pattern of conservatism, but is not necessarily an expression of unwillingness to change. As Paul Kuiper points out for the Horstermeerpolder, what he sees is that people are simply frustrated by their lack of ability to decide the fate of their own areas, and the lack of concern external plan-makers have shown to accommodate local wishes in the plans (Kuiper 2013). Grootveld notes that people are tired of external plans being made for them, and that the level of trust in external plan-makers is diminishing, making it less and less likely that this type of plan making will be successful (Grootveld 2013).

The third attitude, lack of care, is mainly expressed in the upper-class group of people living in the area that earn livelihoods outside, and import their goods. They are often not original inhabitants, but chose to inhabit the area for its natural beauty, spacey homes, direct water access and relative closeness to big cities. They have a very limited direct relationship to the local landscape, and do not express concerns about the future of the area. They tend to stick to themselves and don't tend to be involved in any type of local social organization (Bruggink 2013). This attitude may not necessarily lead to resistance to change, but the alienation that is behind it may lead to indifference towards current problems and lack of interest in and active support for solutions.

Conclusion

The current socio-physical system of the Vechtplassen is not in balance. The system is over its tipping point and is in a vicious cycle of pumping and land subsidence. Unsustainable land-use, together with a diminishing viability of the land-use in terms of livelihoods leads to an unsustainable system on a social level. The physical system is kept in place by the governance of local and external stakeholders that aim to preserve their habits and traditions. Within this system, there is no broad availability of ecosystem services which can be valued and used by local people, due to limited land-uses and large-scale land-ownership by large parties. There is a large separation between large-scale regional (external) responsibility and local individuals. There seems to be a general distrust by local people of large parties, governments and external plan-makers, further aggravating the divide. Behavior of large parties such as Waternet,

The main stakeholders in the area are analyzed using the diagram we introduced before, where the socio-physical system is plotted against time. Now, we place the stakeholders on this line: to what extend do they consider the system to be in 'crisis'? And in what way do they deal with this? The three groups of stakeholders A, B and C are firstly located on the line related to their current attitude towards the existing situation. Then, their behaviour is visualized, showing a certain direction of development in relation to the current situation. Finally, the predicted outcome of this behavior and ambition is shown by extrapolating the line of development of the system.

Problem awareness

Behavior

Effect on the system

A

B

C
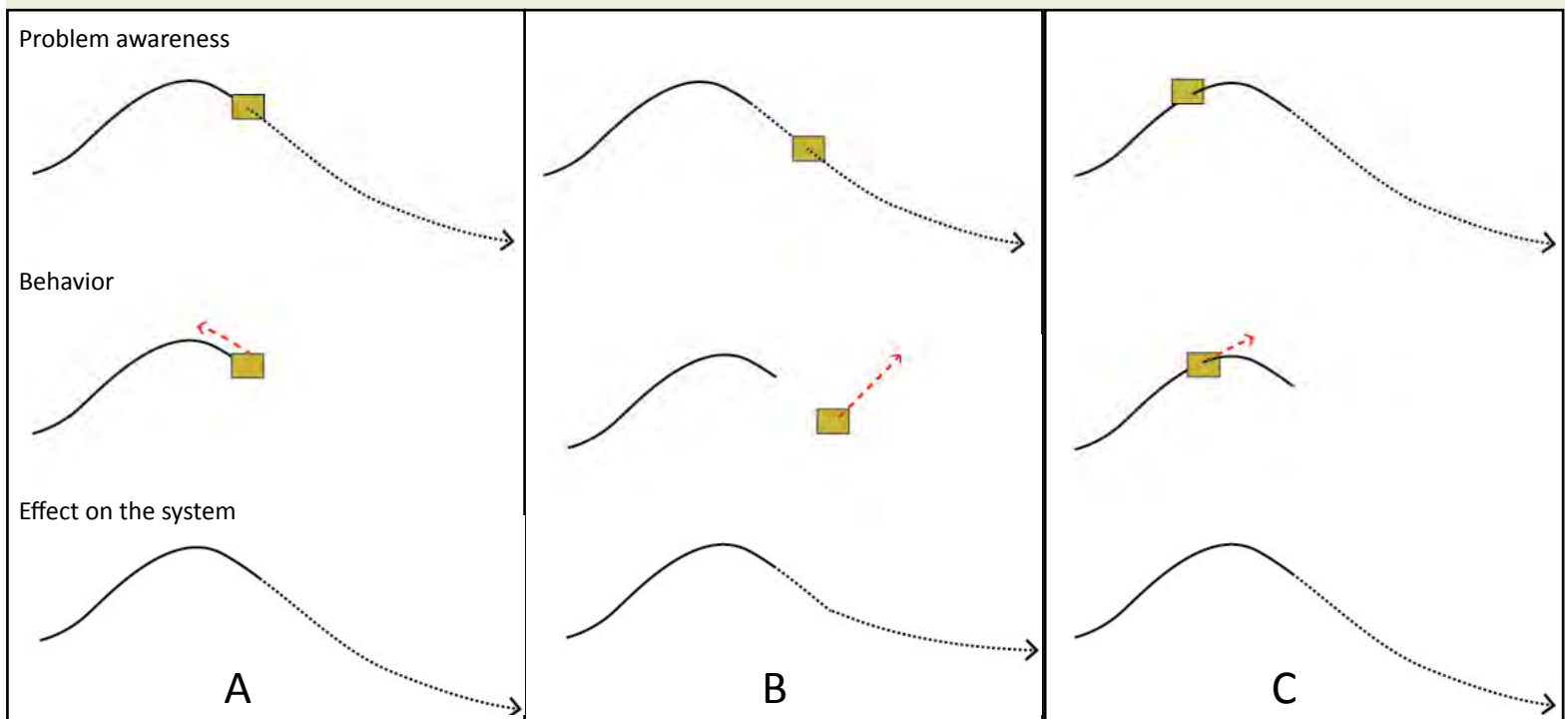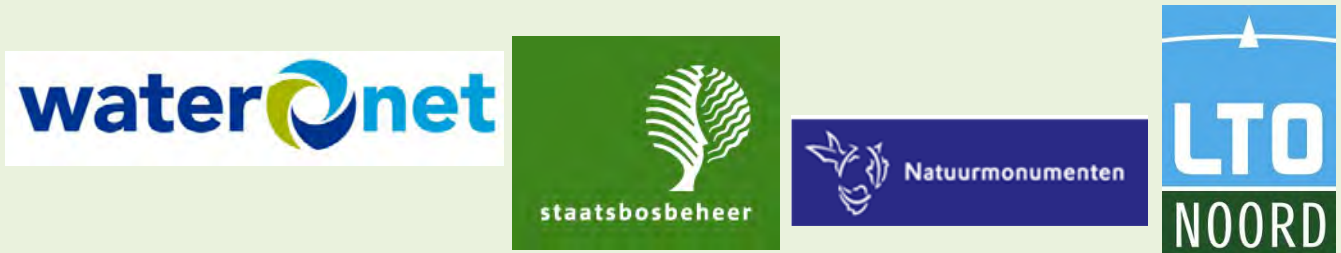
[A] Waternet, farmers and the agricultural organisation LTO Noord are roughly in the same position as the socio-physical system itself. The regeneration problem is considered to be existent, but not urgent. These stakeholders keep using traditional and small-scale interventions to try to optimize the existing system, thus keeping the system artificially close to the tipping point, not allowing it to slip. However, this won't stop the degeneration in the long-term and the behavior of Waternet keeps problem ownership and awareness away from farmers and inhabitants, leading to resistance to change.

[B] Natuurmonumenten and Staatsbosbeheer are situated pretty far down on the line: they see the problem, and face the need to change behavior becasue of the changing governmental and financial situation they are facing. They need to, and want to, change their current practice, but haven't found a way to do so (yet). Some important internal changes in ambition and management can be seen within the organisation. This way the regeneration problem might be slowed down.

[C] Inhabitants and the recreational sector do not see (the urgency of) the regeneration problem, so they can be situated near to the top in our scheme. They find themselves in a slowly changing situation, but without any urgency to change their habits and traditions related to the landscape. However, this won't change the vicious cycle leading to degeneration of the landscape. Moreover, this lack of awareness might lead to resistance to chance.

Natuurmonumenten and Staatsbosbeheer keep landscape problems in place rather than to solving them, further alienating the local people from the problems. This alienation from the problem in turn leads to resistance to change, because the need for change is not experienced. In short, the current organizational structures in the Vechtplassen region keep social mechanisms that disable regeneration in place. Using the conditions we found in the previous chapter, we can conclude that there are quite obvious reasons why there is no social support for change: on the input-side there is little power to express responsibility for the own area. External parties keep the control and there is no local capacity to carry responsibility. This leads to lack of problem-ownership and (perceived) need to change. The output side shows limited direct attachment to the area through ecosystem services. Because of the limited or missing local in-and output arrows, the feedback arrow in the social feedback model is logically also limited. There is a lack of awareness and experience of the degeneration problem, expressed in a lack of commitment to change. Knowledge about the physical system and the possibility to change is available but hard to find, making the threshold for local initiative quite high.

Spatial plans and developments in the Vechtplassen region

In The Netherlands, spatial planning in general is always subject to change. Budget cuts and the shift of responsibilities from national to more local levels have led to a new political situation. The national government is retreating in the fields of spatial planning and spatial quality, landscape building and nature policies (Luiten 2012). This means that provinces and municipalities are responsible for many policy-aspects. As a result of the new Spatial Planning Act (Wet Ruimtelijke Ordening) in 2008 responsibilities for landscape management is increasingly being delegated to municipalities. This leads to an increasing degree of dependence on public support (Michael and Stenseke 2011).

Also the jury of the EO Wijers contest, a contest for spatial quality on 'supra-local' scale sees a shift from government to shared governance, with more focus on organization, processes, interaction and participation. This participative aspect has been incorporated in the Dutch planning practice in several forms, in order to create social support for plans. Since the late 1980s, interactive policymaking and public participation have become dominant discourses in the Netherlands. Both central and local governments make considerable efforts to involve the public in order to guarantee support for their policies and are constantly searching for new methods for effective communication and negotiation (Aarts and Leeuwis 2010).

Eric Luiten names other societal shifts that can be seen: urbanization and urban sprawl, shrinkage in rural areas,

individualization and democratization (Luiten 2012). The latter two are especially informative for our topic. There is a growing interest in local and communal initiatives in the landscape and in taking up local responsibilities. An example of this is the Transition Towns movement, including many initiatives regarding for example local energy production, communal permaculture gardens and spatial quality in living environments.

In chapter 1 we showed the significance of empowerment of local people in their own landscapes. In this section we will reflect on current spatial planning and design practices in the Vechtplassen region and the forms that participation and empowerment take at the moment. This allows us to reflect on the use of the conditions for social support we found in chapter 1. Specific interest is on the role of different actors within (proposed) landscape change processes in different phases and on different scales.

In the previous sections we have seen that there is a large divide between local people and responsibility of the landscape in the Vechtplassen region. We have also seen that the existing organizational structure is keeping this divide in place. This raises the question to what extent participatory approaches are able to breach the gap, what type of participation is necessary on different scales, and what the roles of different actors can be within regeneration processes. By looking at spatial plans for the Vechtplassen area, we can start to answer these questions.

The plan analysis has two goals. First, it enables us to reflect on the extent to and way in which the conditions for social support are currently being used in practice. This can lead to inspiration on ways in which these conditions can be used more consciously and effectively in order to work towards local empowerment and support for regeneration. The second objective of the plan analysis is to investigate organizational forms that accompany implementation strategies. This insight will form an important input for the strategy introduced at the end of this chapter. This investigation links back to the discussion of roles of different actors and participation in chapter 1. Especially by looking at the respective roles of governments, experts and local people the analysis provides insights into the importance of involvement of different actors at different moments within the planning and implementation process.

We analyzed three plans: de Groene Uitweg (2006; Province Noord-Holland, Grontmij), de Nieuwe Hollandse Waterlinie (2004; Stuurgroep Nationaal Project Nieuwe Hollandse Waterlinie) and Klimaatpark Groene Hart (2010; Vista). The plans are analyzed using the Social Feedback Model, by filling in the ambitions of the plan in the input, output and social. The Social Feedback Model is used to understand what is likely to happen in the socio-physical system of the Vechtplassen and what the likely effect of the proposed interventions is on current social mechanisms.
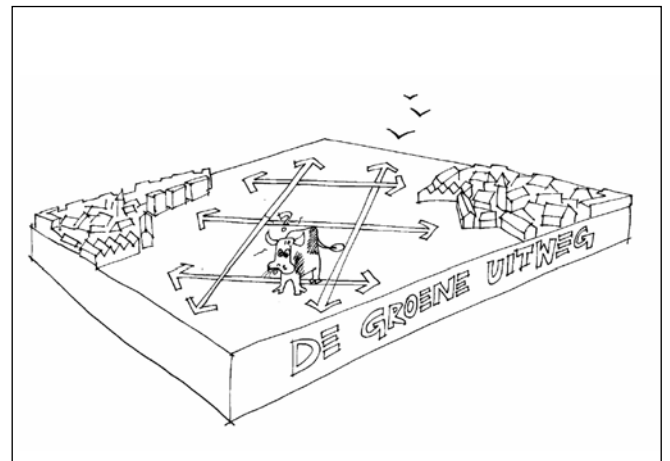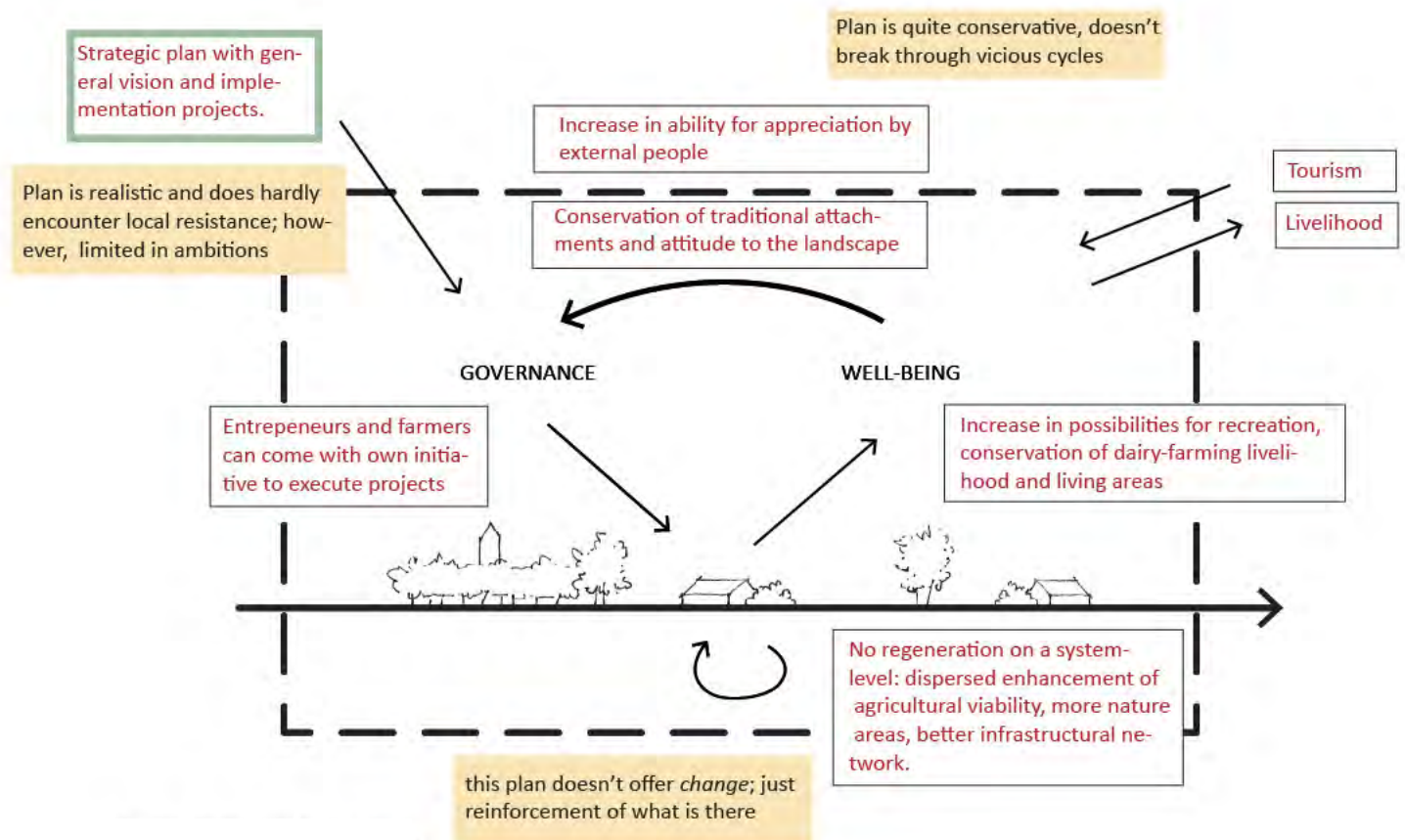
Figure 2.20. Images of Groene Uitweg

Strategic plan with general vision and implementation projects.

Plan is quite conservative, doesn't break through vicious cycles

Increase in ability for appreciation by external people

Tourism

Plan is realistic and does hardly encounter local resistance; however, limited in ambitions

Conservation of traditional attachments and attitude to the landscape

Livelihood

GOVERNANCE

WELL-BEING

Entrepeneurs and farmers can come with own initiative to execute projects

Increase in possibilities for recreation, conservation of dairy-farming livelihood and living areas

No regeneration on a system-level: dispersed enhancement of agricultural viability, more nature areas, better infrastructural network.

this plan doesn't offer *change*; just reinforcement of what is there

Figure 2.21 the Groene Uitweg in the Social Feedback Model: realistic plan, but doesn't address landscape issues

Groene Uitweg

The province of Noord-Holland wants to develop the area between Amsterdam and het Gooi by combining new infrastructure with the development of agrarian and recreational functions, while enhancing spatial quality. The main problems addressed are the fragmentation due to infrastructure, the hard intersection of the area by the Amsterdam Rijnkanaal and the wish to connect existing nature areas. Important are viable agriculture and possibilities for recreation. The plan combines ambitions of large projects (e.g. the Natte As, with a strong nature ambition; and the Nieuwe Hollandse Waterlinie, focused on cultural heritage) with new, general ambitions. There is a focus on support by large stakeholders, instruments and finances.

Using the Social Feedback Model and the conditions we found in chapter 1 we evaluated the effects of the Groene Uitweg plan on existing social mechanisms in the area in light of landscape regeneration (see fig. 2.21). In red, we describe the stated ambitions of the plan. In the orange boxes we describe the likely further effect of these ambitions in the Social Feedback Model. The following information is based on *Uitvoeringsprogramma Groene Uitweg* (Grontmij Nederland BV, 2006)

Conditions for social support

At the input level, not much changes in the way responsibility is delegated to existing institutions and land-users. Although farmers are seen as the managers of the polder landscape, they are supported in a rather conservative way with current practice as starting point. There is no intention to change the organizational structure in the area to increase problem-ownership, awareness and responsibility on the local level. There is hardly any attention for a local level of organization.

At the output level, the main concern of the plan is to maintain current production patterns (mainly dairy). The plan is rather conservative, aiming to maintain the status quo by continued technocratic solutions. There is no integral large-scale regeneration ambition that might change prospects and livelihoods. The unsustainability of the current land-use in the long term is not addressed. There are some new activities named in the plan, mostly focused on recreation and housing. This can broaden the use of ecosystem services, but is limited.

At the feedback level, as a result of lacking problem-ownership and lacking impact of the plan on local livelihoods, problem awareness is likely not to increase. Without this awareness, there is no support for change. The lack of a strong vision makes it difficult to communicate the plan to all stakeholders and promote the area to inhabitants and tourists. Moreover, contact with local people takes place mainly on an individual level, related to smaller projects.

Overview project de Groene Uitweg

Vision: to develop the area as a part of the Green Heart: a Dutch landscape of quietness, openness, wide views, water, polders and monuments. Strengthening nature, recreation, agriculture, landscape and cultural heritage. Three cornerstones are appointed for the landscape: (1) a sustainable open and green (2) diverse in all aspects and (3) recreationally attractive.

Strategy: the plan structure of the Groene Uitweg exists of two layers: a general ambition for the whole area, and smaller projects of implementation. A choice is made for 11 'star projects'; projects that will be executed first: feasible, quick-win projects that carry out an exemplary role and have a strong link with relevant large-scale developments. The projects are set up together with one or more partners, based on the guidelines in the general document.

Status: in progress, with broad support by all partners. Subsidies are given to farmers, small-scale projects are getting executed (e.g. nature development Horstermeer, infrastructural interventions), active monitoring is in place.

Organization: policy-based plan by province of Noord-Holland with partners. The Uitvoeringsprogramma Groene Hart ('Implementation Program Groene Hart') is composed of a 'Taskforce', consisting of several partners related to the project. After agreement on the program in 2006 a program team has been established which coordinates the projects. The projects are executed by the partners.

Time: long –term. Planning: 2003: Manifest Uitweg. 2005 - 2006: writing of the Uitvoeringsprogramma. In 2011, the government has decided to update the Uitvoeringsprogramma Groene Uitweg 2011-2013.

Scale: regional scale, project area lies between Amsterdam and 't Gooi.

Community formation and shared responsibility is only visible with regard to the project for the Horstermeer, but in a counterproductive way: the plan, which didn't take into account local people and their ambitions, strengthened the existing community in opposing the plan.

Involvement of actors

The plan caters directly to existing interests of large parties, which is not surprising considering the fact that the main large stakeholders were partners in the plan-forming. The result of this is that the plan also caters to existing social mechanisms, conserving rather than changing or breaking vicious cycles of land-use. The plan conserves existing organizational structures and, in fact, strengthens the existing role of the stakeholders involved. This enforces current social mechanisms that cause the current lack of
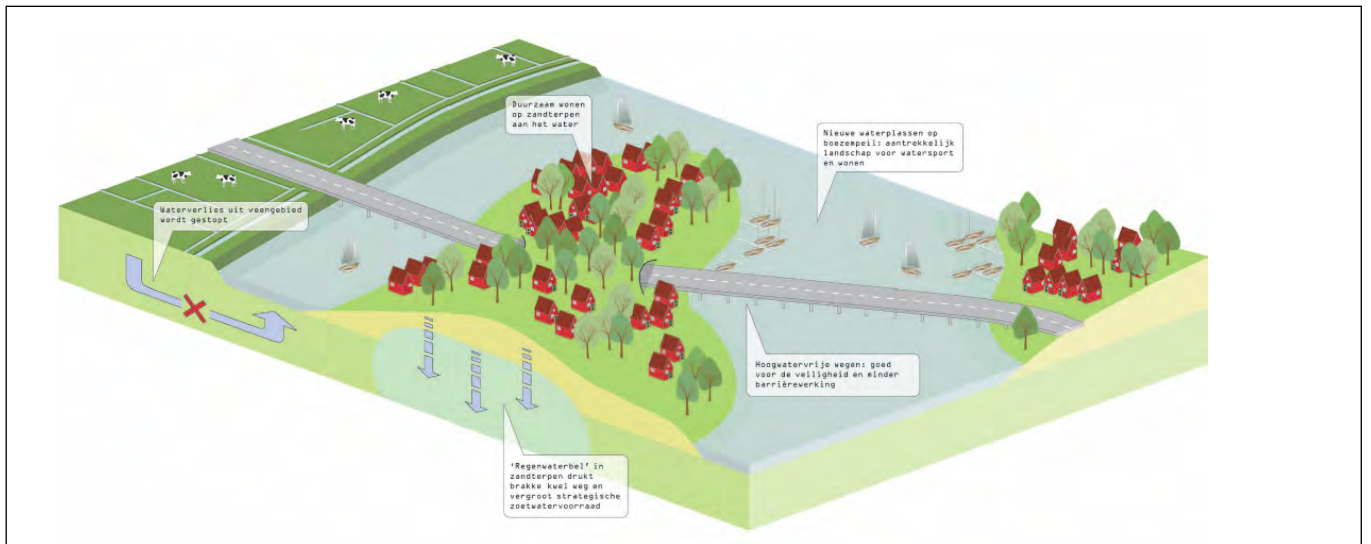
Figure 2.22. Image from the report of Klimaatpark Groene Hart showing a flooded reclamation with new functions
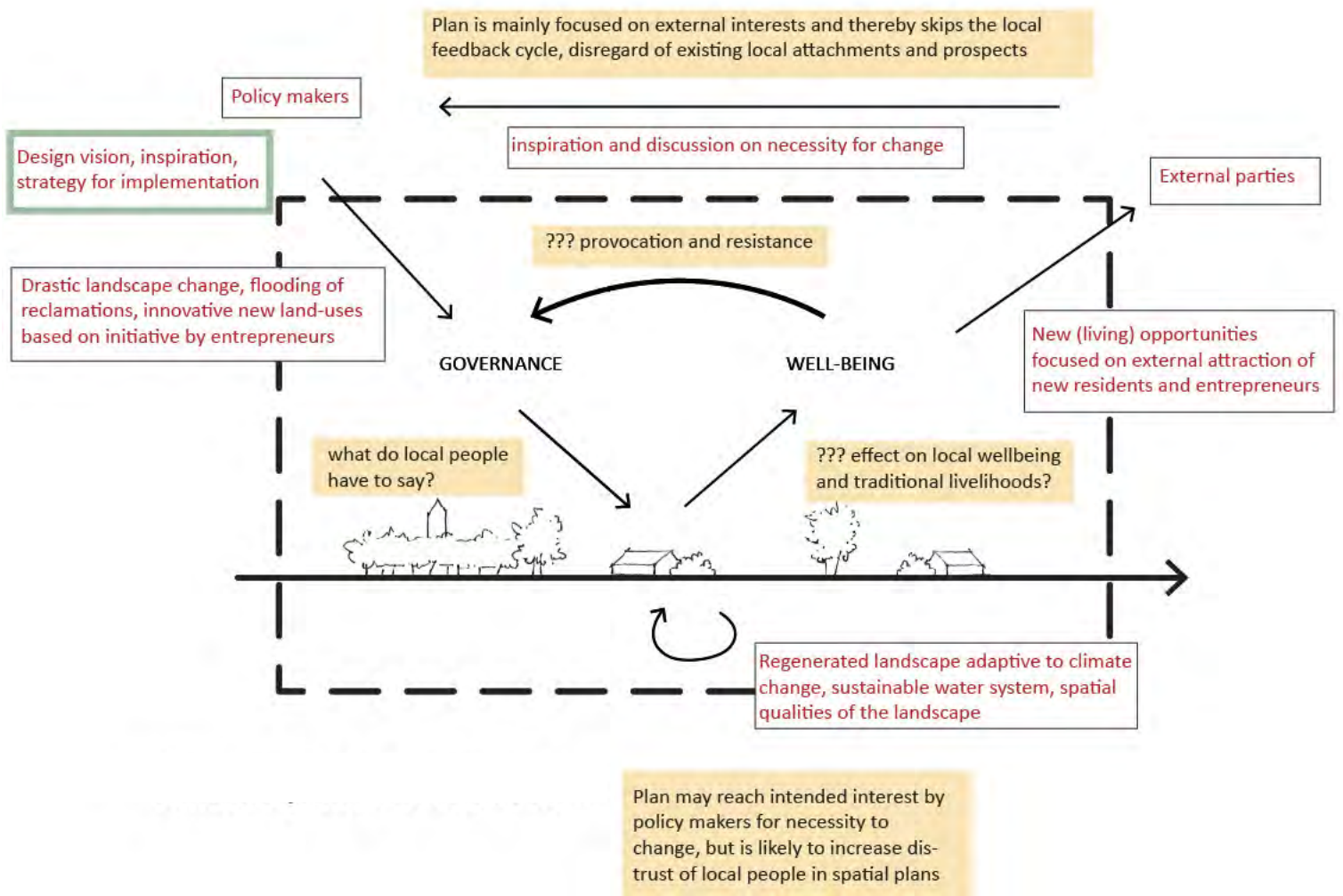

Figure 2.23. Klimaatpark Groene Hart in the Social Feedback Model: rigorous regeneration but lack of support

problem-ownership: the plan actually forms another reason why local farmers and inhabitants will not experience and become aware of the degeneration problem in their daily reality. This enhances alienation from the actual state of the system. It could be argued that by strengthening the roles of large parties, actual empowerment of local people on the lowest scale-level is impeded.

There is mostly indirect communication with the local people: the Taskforce is in contact with partners, these partners again with local people in a specific area. Local people (and tourists) are not involved in the regional-scale plan (which is an abstract, general plan, without spatial interventions), but can have a role in the several projects.

Experts such as landscape architects were involved in the process, but were not at the core of the plan-making. This plan seems to form an example of a case in which active participation of all stakeholders in the earliest stages of the process is counter-beneficial for regeneration, because expert knowledge on the landscape as a system becomes only one voice among others and responsibility for the landscape is easily lost in compromise.

Klimaatpark Groene Hart

Klimaatpark Groene Hart is a combined project by a landscape architectural office and an 'innovation office' in order to find ways to adapt to climate change in the area of the Green Heart. Climate change will lead to water problems as the pressure from the sea and rivers will increase while the land is slowly subsiding as a result of centuries of drainage and peat oxidation. Vista offers a drastic regeneration plan for the Green Heart, including the Vechtplassen region. The following information is based on *Klimaatpark Groene Hart* (InnovatieNetwerk and Vista Landscape and urban design, 2012).

Conditions for social support

According to Vista, there is no social and political support for their plan (Visser, mail conversation, 2013). Visser states that policy for the Green Heart is very conservative and gives little space for experimentation. The plan is intended to increase (political) discussion of the need for regeneration of the project area. The regeneration measures proposed are very impacting on current land-use and living environments, and will almost certainly encounter fierce resistance upon serious consideration by locals. Therefore, the accommodation of social mechanisms is especially relevant for this plan and it is interesting to see what propositions are made in this regard, while considering the fact that the plan was not meant for implementation.

This plan has regeneration as a starting point, as the landscape will have to adapt to climate change (see fig. 2.23). Drastic physical changes have to be made, accompanied by

Overview project Klimaatpark Groene Hart

Vision: the vision of Klimaatpark Groene Hart consists of working on two main tasks: climate adaptation and sustainable water management on the one hand, and improved livability and economic competitiveness on the other hand. Drastic large-scale system interventions will be necessary. The plan argues for an innovative way of working, with climate change as a trigger. For this, the system has to be altered, through: (1) concentration of urban functions in river zones, (2) open peat polders with focus on agriculture, nature maintenance and landscape conservation, (3) large areas with nature and recreation (increased water level) and (4) inundation of reclaimed areas including (new forms of) tourism and living. In this way, the landscape starts having a more 'local' water system: less water needed from rivers, more possibilities for water storage, less pumping, less soil subsidence, less salinization, and less drought.

Strategy: the project consist of a visionary spatial design and a strategy for implementation. The proposed strategy of implementation is based on the IBA-Emscherpark process. It exists of space for experiments, implementation of pilot projects (new coalitions, need for innovators, competitions) and simplification of policy procedures.

Status: inspirational document, not executed. Meant to provoke discussion and to encourage people to think about the current situation in the area.

Organization: Vista, landscape architectural office, and Innovatienetwerk, a thinktank for innovations in agriculture, agribusiness, food and green space worked on this project. After implementation, a strong organizational structure is proposed with its own financial structure.

Time: one document (2010), no follow-up.

Scale: Green Heart

changes in land-use. On an output-level, the plan is searching to use ecosystem (services) broader and more fully. Prospects are given, for instance aquaculture, more natural and recreationally attractive areas, new ways of living (floating houses) and new estates. However, these prospects and this flexibility targets mainly potential new users and inhabitants rather than existing attachments and prospects of current locals. In fact the local population is hardly mentioned at all.

At the input level, local empowerment or capacity building seems to be of no concern. Existing social mechanisms in the local landscape are not addressed. Large propositions are made about landscape changes on a system-scale, but there is no social strategy that can guide the local population through the change. The landscape problem

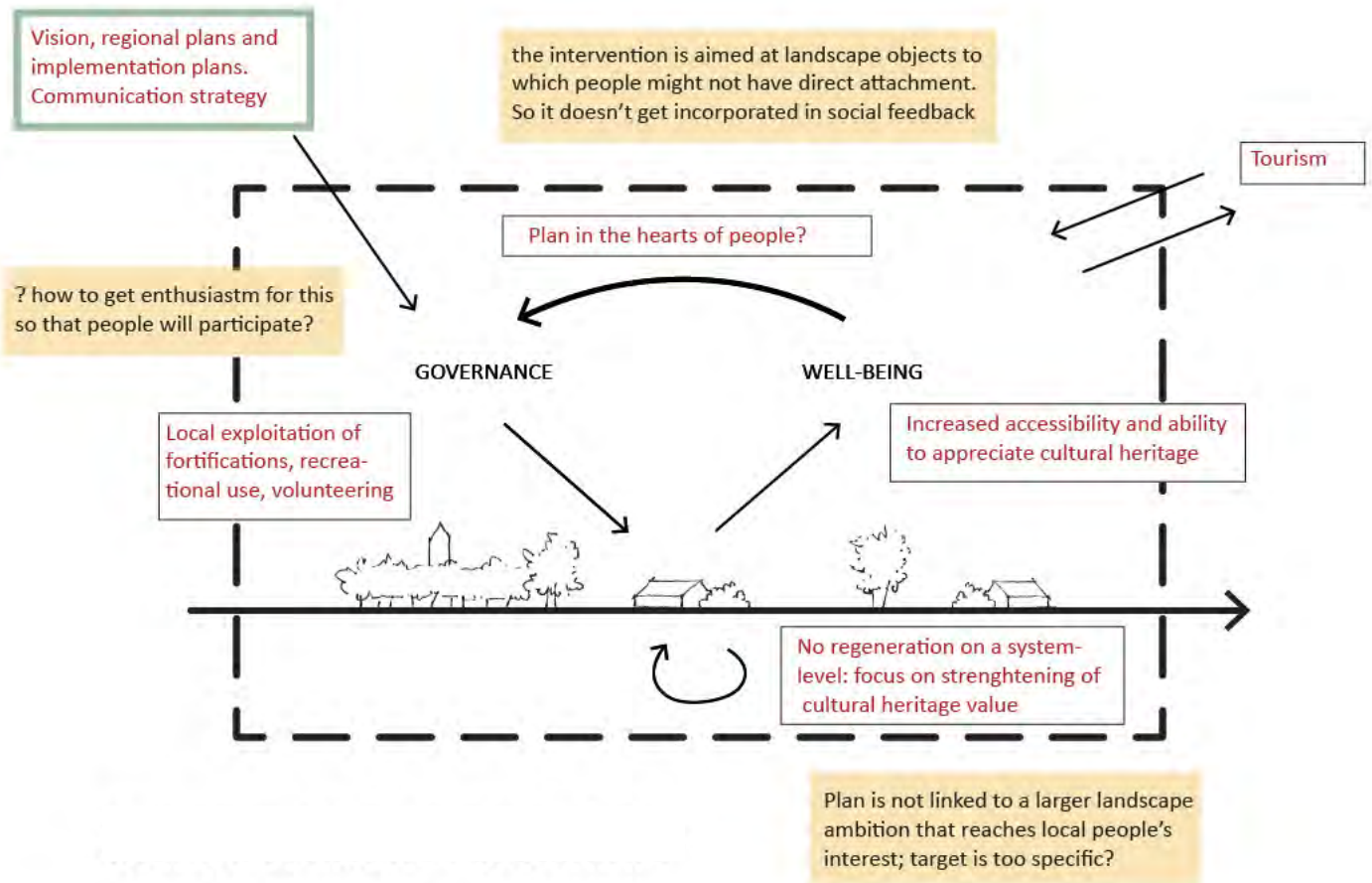Figure 2.24. Image and logo of the Nieuwe Hollandse Waterlinie

Fig 2.25. Nieuwe Hollandse Waterlinie in the Social Feedback Model: without direct relevance to local people, there is a lack of social support for the plan

is identified mainly on a physical level, and the solution is also given on a physical level, without reference to the local social change in attitude towards the landscape that needs to take place in order to enable change in land-use. There is no strategy to build local organization and carry direct, local responsibilities. There is no mention of internal capacity building or specific prospects of local people to regain livelihoods in the area. Existing social cohesion is not taken into account and even intruded upon by the suggestion to flood whole reclamations in order to build housing for external target groups. However, the proposed strategy in the end of the report, with space for experiments, implementation of pilot projects and new coalitions, might encompass some of the previous elements. This strategy is, however, not embedded in the overall project and not linked to the physical interventions proposed.

On a feedback level, awareness building is attempted on a governmental level but not in the landscape itself, among local people. The plan forms a strong provocation for policy-makers to take the degeneration issues in the Vechtplassen seriously. Although the provocation of a discussion on the issue of degeneration seems to be worthwhile, it can be questioned whether the scale and level at which this was done is optimal. The potential side-effect of making this kind of plans about an area externally on a governmental level is that it further aggravates the distrust of local people in plan-making. It may be worth looking at the possibility to do similar provocation on an embedded level, involving local people directly into a discussion about the sustainability of their area rather than keeping them out of the debate.

Involvement of actors

This plan offers an example of expert-knowledge that does not sufficiently connect to local reality and embedded experience of local (social) circumstances. It is a very external plan. The role of the expert, in this case mainly landscape architects, is limited to the design of the physical system and creation of provocative images to spur public debate. This plan does offer a strong stance on the necessity of regeneration in the area. However, there might be a subsequent role for the external experts to take these visionary plans a step further, more than leaving them as inspirational documents meant for discussion and awareness on a rather external scale. Taking the plans a step further would also mean a much more expanded strategy for the involvement of local people, and a more defined role for governments in the process.

Nieuwe Hollandse Waterlinie

This project focuses on one main ecosystem service: cultural heritage. The Nieuwe Hollandse Waterlinie ('New Dutch Water Defense-line') is a defense system from the 15th century, existing of fortifications and large inundation areas, intended to stop the enemy from entering the western part of the country. The following information is based

Overview project Nieuwe Hollandse Waterlinie

Vision: The main goal of this project is to present the Nieuwe Hollandse Waterlinie as a recognizable spatial entity, sustainably maintained by adding contemporary functions and local entrepreneurship. The Nieuwe Hollandse Waterlinie (NHW) intends to form a coherent story for the area with a strong internal identity. Next to physical restoration of the defense line and the spatial goals for the surroundings, two other goals are formulated: to bring the line in the 'heads and hearts' of the people, and to create sustainable exploitation.

Strategy: 'Panorama Krayenhoff' presents a vision on a regional scale which is not a concrete design proposal but a spatial ambition. On a scale level lower, project envelopes are formulated, seven in total, which have their own landscape development plan and organization. Responsibility for each envelop is given to the Provinces. On this level, a more detailed vision is made for the specific area addressed in the envelope. From the overall vision and the development plan in the 'envelope', implementation plans on a small-scale level are derived for individual projects, each having their own (design) process and aim (e.g. restoration, nature development, housing development, entrepreneurship), with the guidelines from the overall vision.

Status: on-going. Several projects have been executed, focus is now shifting from restoration efforts to image building and national valuation of the area.

Organization: three main organizational levels: overall vision & development plan (Linie partners, DLG) , seven envelopes (Province and partners) and local plans (several local partners). A quality team, comprised of independent experts from different spatial disciplines, involved with projects in an early stage. Several meetings through the organizational levels.

Time: diverse implementation plans (e.g. 2011-2015).

Scale: the NHW has a linear character, extending from Muiden, at the Ijsselmeer, all the way south to the Biesbosch (85 km).

on *Panorama Krayenhoff* and *Linie in Bedrijf* (Projectbureau Nationaal Project Nieuwe Hollandse Waterlinie, 2004, 2012)

Conditions for social support

Although this plan is not focused on system-scale regeneration of the landscape (it is mentioned as a potential added layer of the plan), the spatial plan does offer valuable insights into certain aspects of social support and empowerment (see fig. 2.25).

On the output side, the plan attempts to include the wider landscape into its scope by describing three main spatial

entities: (1) the main line of defense with historical artifacts, (2) the area directly west from this line: where densification (visual and functions) takes place, and (3) east from this line the 'fields of fire', which are quiet and open. However, the approach is mainly visual and experiential and lacks real-life consequences to people. Therefore its relevance for local people stays limited. An interesting conclusion we can draw from this could be that in order for a plan to be supported, it needs to 'touch' local people personally, rather than to occur at the edges of people's consciousness.

Social mechanisms are addressed recently through efforts to increase involvement by local people. The conclusion of a preliminary investigation is that attachments by local people to the historical defense-line are limited. The defense line has always been a national project, not really 'in the mind' of local people (Grootveld, 2013). This logically comes with alienation and a lack of care by local people for the historical artifacts. Social mechanisms on a landscape scale are not included, and the vicious cycle of land-use is not addressed.

On the input-side, considerable effort is put in mobilizing local empowerment for the daily running of the several projects in and around the historical objects. Incentives are put in place for entrepreneurial initiative, to give prospects

and responsibility to local exploitation of the defense line. However, the organization seems to have difficulties to truly take a step back and see its own role decline (Grootveld 2013). Another reason that it is difficult to attract entrepreneurs can be that many of the fortifications are far from cities and villages and are quite difficult to reach. The image of the defense line as a coherent story might not be strong enough as an interesting line for exploitation.

Local capacity building is not mentioned as a possible strategy to enlarge the ability of local people to take up responsibilities. It is, however, mentioned that the historical artifacts could function as focal points in the landscape with a symbolic meaning for the surrounding community. These focal points could function as interaction spaces for local people. The interaction between different people at a fort or other artifact can lead to a stronger communal feeling, for instance between (local) entrepreneurs and volunteers. When the project is growing, a social network of people involved with the line might be formed.

The fact that the plan is not landscape-based but rather focused on 'niche' objects in the landscape makes it interesting mainly to parties directly involved, and parties with a clear interest in the cultural history of the objects. Other (local) people hardly have a connection with the artifacts,

	Groene Uitweg	Klimaatpark	NHW
Existing social mechanisms	Not addressed, kept in place	Not addressed	Addressed only in regard to cultural heritage
Local empowerment	Enlarged alienation from the degeneration problem; focus on enforcement of existing reality	Local people are mentioned as entrepreneurs, building the landscape; no strategy for local empowerment	Focus on local entrepreneurship to carry out the vision, including strategic steps; lack of actual 'letting go' from vision-level
Conditions	Local capacity building - strengthening of existing large stakeholder-structures, not that of local actors. Prospects - preservation of existing livelihoods Awareness - not addressed	Local capacity building - not addressed Prospects - mainly new living environment for new inhabitants Awareness - not addressed to local people, addressed on higher scale level (other experts, general discussion)	Local capacity building - not (literally) addressed Prospects - entrepreneurial incentives Awareness – education and learning on cultural heritage
Actors involvement	Governmental and local stakeholders support the plan; limited expert involvement	External experts - focus on reaching decision-making, disregard of local people and prospects	'Niche' involvement of experts and governments interested in cultural heritage. Lack of local interest
Regeneration	Degeneration problems are mentioned, but no comprehensive regeneration is proposed	Drastic regeneration proposed that is likely to meet public resistance	Not specifically addressed

Figure 2.26. Comparison of the three plans

and they are not easily attracted to actively support the plan. There is a defined lack of ability to let the plan land in the 'heads and hearts' of the local people (Grootveld 2013). This means that the plan is encountering difficulties to create a feedback of local care and attachment, despite the extensive effort to raise awareness through education.

Image building and education is very important in this project. The general website is easy to find, clear and very useful. An example of the extend of communication about the project is the 'ontwerpatlas', a design atlas. The aim is to map basic information of the location, the construction, operation and transformation of this unique Dutch landscape, as a basis of understanding the significance and the potential of it. Other examples are a large variety of activities such as excursions, cultural events and conferences for knowledge sharing.

Involvement of actors

Experts and landscape architects have been involved in all stages of the project, carrying out a variety of roles such as vision-building, communication with local stakeholders, creation of educational materials and the monitoring of developments as part of the quality team. In this project it is visible how experts can take a wide variety of roles, not only limited to the subject of expertise itself, but including facilitation and educational tasks. However, the role of the landscape expert as an actor responsible for the health of large-scale ecosystems gets a bit lost in this project, in favor of more creative interests concerning small-scale cultural objects.

The main plan was made by a combination of large parties in the area and governments. It can be argued that in this case, participation of the local community in an earlier phase of the plan-forming may have helped to map local interest and increase local awareness of the defense line. This way, the effort to rehabilitate the defense line and take it in use could have become a local responsibility from the beginning, rather than to be an external interest that needs to be 'sold' to the locals after most of the work has been done.

Conclusion of landscape analysis and plans

What we have seen in the plan analysis is that plans seem to be either rather ambitious and innovative but less placed in reality, or more realistic but lacking ambition for change. All plans show some concern with empowerment, mentioning the importance of social support and appropriation of the plan by people in the local social reality. However, there are no concrete *strategies* mentioned of how this is going to happen. Especially a concern with existing social mechanisms is lacking: these mechanisms are insufficiently analyzed, and subsequently

hardly addressed in the plans. Also a concern with capacity building on the local scale is missing. This lack of concern with local capacity building mirrors the existing lack of local capacity in the Vechtplassen region. The contrast between large institutions and individuals is big, and there is little in-between level of organization that is able to embed the responsibilities and expertise that is present in the large institutions on a more local level.

As Anko Grootveld notices, in the Vechtplassen area large parties tend to have a hard time letting go of their own role and allowing plans to land in the social reality of an area. Many organizations find themselves in a split between seeing the necessity to 'let go' but not being able to because this would undermine their own existence (Grootveld 2013). This means that participation remains a procedure that is associated with the planning process, rather than to denote actual freedoms of local people to act in and affect the landscape itself.

We found that commitment to regeneration means that all actors involved need to be willing to let go: governments and large formal institutions need to give up control, experts need to allow flexibility in implementation, and local people need to be willing to change current social mechanisms and build new attachments to a changing landscape. Respect and understanding of each other's position and experience is crucial in this regard, so that system expertise, governance and local experience get the place they need to get within the regeneration effort. An important concern in this is the actual *ability* of these different actors to take the role they need to take. It is not possible to steer towards local empowerment of a final regeneration effort without the creation of sufficient social capacity to carry such a responsibility. Local responsibility structures and agreements, but also ability to form local livelihoods and embedment of expertise are part of this (as pointed out in chapter 1).

The plan-analysis shows that involvement of different actors at different moments in the planning and implementation process contributes to different results. What we see in the plans is that either the regeneration fails because of lack of involvement of local actors and subsequent resistance, or the regeneration ambition disappears from the plan because of compromise between stakeholder interests (the voice of the expert responsible for the landscape system becomes lost). Navigating regeneration without getting lost in either of these two options poses a challenging balancing act between the voice of system-experts and local people. A deliberate strategy for the roles of actors in the process may prove to be key in being able to reach landscape regeneration while also accommodating local social mechanisms. This involves different forms of 'participation' at different phases and at different scale-levels of planning.

Strategy for community supported landscape regeneration

Because the scale and structures of human systems often are poorly matched to those of ecosystems, participatory landscape planning may help link institutions with land-scapes (Cleveland et al. 1996, p. 24)

This quote summarizes the issue at stake in the Vechtplas-sen: there is a large discrepancy between the human sys-tem and the ecosystem. The regeneration of a landscape is a complex issue with many scale-levels and physical as well as social elements. Current organizational structures contribute to a lack of experience and awareness of the physical degeneration problem that is going on, while at-tachment to current land-uses keeps vicious cycles of land-use in place. Governmental parties are involved in landscape plans that encompass different scales and differ-ent stakeholders. Empowerment processes, leading to local problem-ownership and maintenance by local people may diminish the gap between system-scale awareness and lo-cal reality. However, there is also a need for embedment of decisions in a governance-structure to guide developments and ensure the continued health of the natural system. A pure bottom-up approach is likely not enough to maintain the type of overview and integration that is necessary on the larger scale-level.

In this regard it becomes revealing to link Pretty's (1995) participation ladder to different types of participation pro-cesses and decision-making processes (see chapter 1, p.28), needed during a regeneration process. Certain decisions regarding the functioning of the system as a whole may benefit from extensive consultation of local people, where-as decisions on how the regeneration will be performed and in what way people adapt to it may be concerns that need more elaborate local involvement or even need to be left to self-mobilization. In the following section, we propose a strategy that links top-down and bottom-up concerns, the landscape system with local people and expert concerns with local experience and initiative. The strategy shows the type of decisions that need to be made on different scale-levels, connected to diverse levels of involvement of large (governmental) institutions, experts and local people.

The main proposition made is to create a sub-level between the individual and regional scale in which external and local energy and expertise can be combined in support of landscape regeneration (see fig. 2.27). The aim is to create and maintain a situation in which the regenerated landscape and the local people are closely related, so that local initiative and behavior supports landscape regeneration, and landscape regeneration gives opportunities for local initiative. This process of mutual reinforcement needs to be strongly embedded in a decision-making context, giving sufficient space for experts, government and local people.
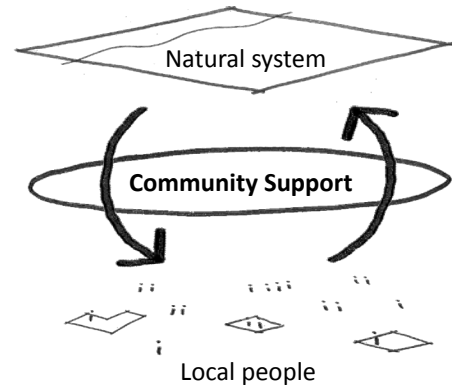
Figure 2.27. Creation of a local level of social organisation that can carry responsibilities in the landscape

Another important basis for the strategy are the conditions from chapter one. In fig 2.29, the strategy is presented with its three levels, with on each level the corresponding conditions from the Social Feedback Model. For each level the use and value of these conditions will be described, together with the different forms of participation and the related roles of different actor groups. The strategy introduced here is based on observations made in the Vechtplassen area, but is not case-specific and can serve as an approach to design for socially supported regeneration in general.

Level 1: Setting regeneration in motion

As we described in the research, an initial push is needed in order to shift a system from a vicious cycle or a situation of alienation. This push does not need to be a direct physical intervention. In fact, we found that especially in a densely populated, democratic context like the Netherlands it is advisable not to start with a drastic physical change but rather to target the socio-cultural reality in a less determin-istic way.

We believe it is possible to create the conditions under which (physical) regeneration efforts can come more from the 'inside', initiated by stakeholders that are a direct part of the local socio-physical reality. In order for a push tar-geting local agency to have an effect, people need to have ownership of the degeneration problem. This means that factors that currently alienate the people from the problem need to be eliminated. For example, external/governmental parties may need to stop solving the problem for the peo-ple, so that the problem actually starts to be experienced. It may also mean that large-scale knowledge exchange and learning need to be facilitated, creating awareness and consciousness of the landscape processes. The next thing that is crucial here is that external control of how the rege-neration will 'look like' in terms of function and materiality is limited. As long as the minimum necessities are met for
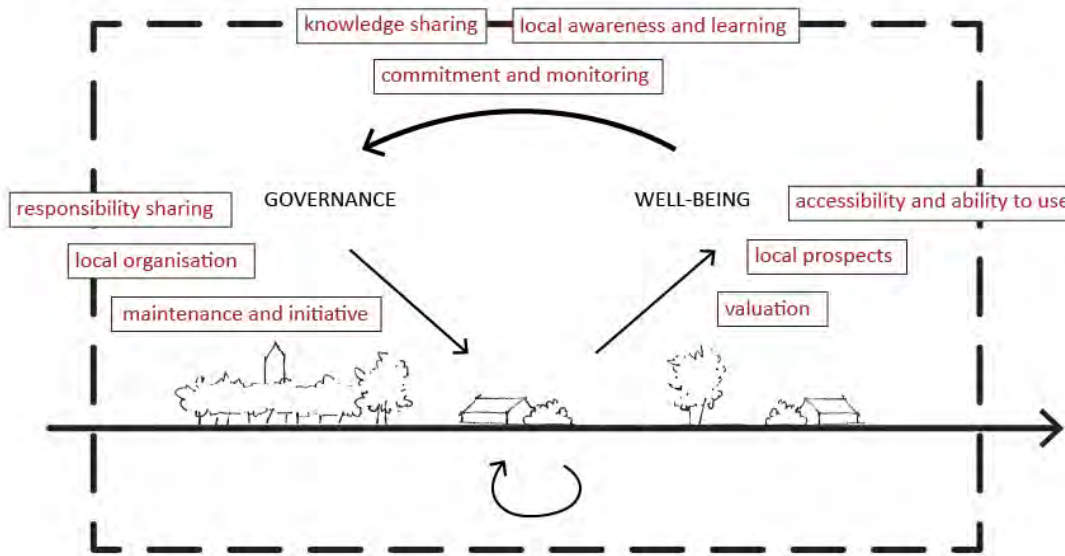
Figure 2.28. The conditions for community supported landscape regeneration in the Social Feedback Model

Level 1: Responsibility for the natural system

Responsibility sharing
Accessibility and ability to use services
knowledge sharing

Level 2: Local Capacity

Local organization
Local prospects
Local awareness and learning

Level 3: Direct connection to the landscape

Maintenance and initiative
Valuation
Commitment and monitoring
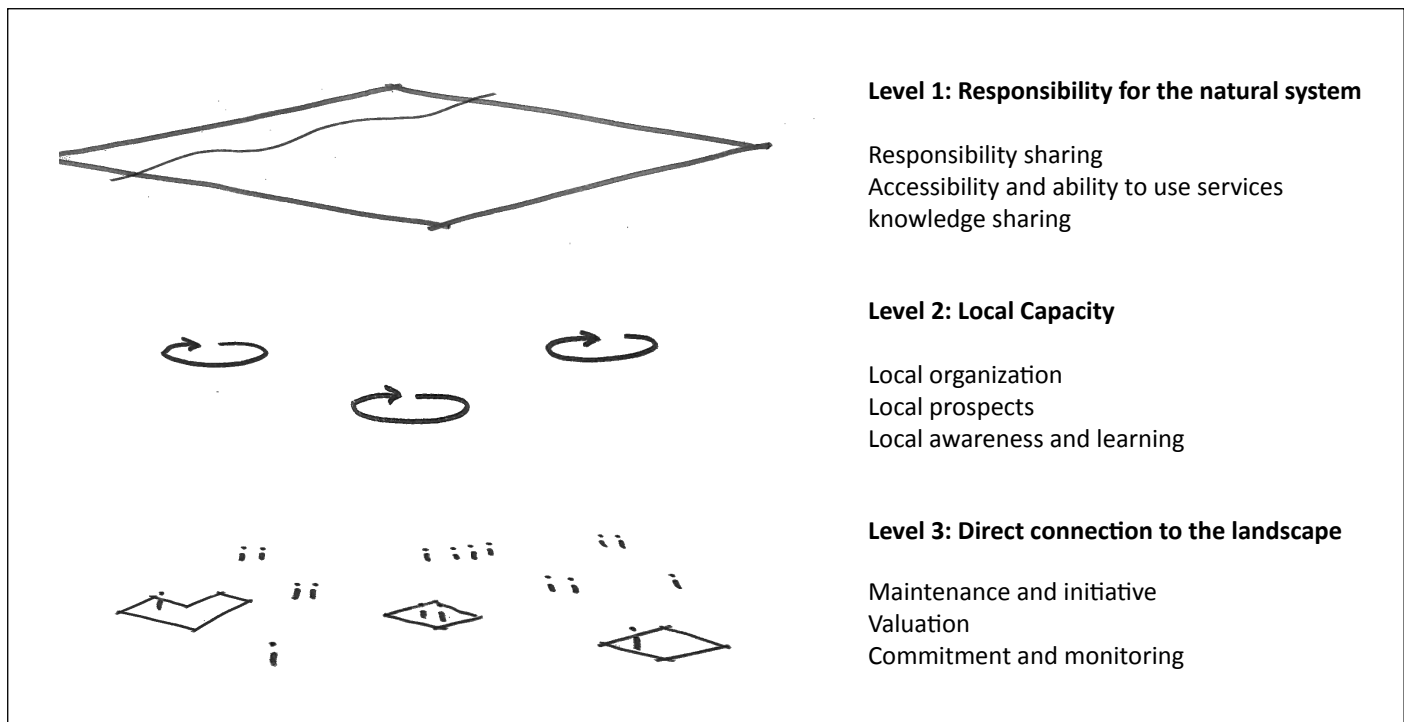
Figure 2.29. Conditions for community supported landscape regeneration applied to three scale-levels of organization in the landscape. Each group of conditions consist of an 'input, output and feedback'- aspect.

regeneration of the ecosystem, people need to be able to adapt flexibly in order to attach to the landscape in their own way. This forms prospects for local people to form new attachments and livelihoods in the area and paves the way for empowerment of local people in the use as well as the governance and maintenance of ecosystems. Working with boundary conditions and/or a strategic framework with several possible interventions (e.g. a 'toolbox') might work on this level.

Based on the above, we propose that on the scale-level of the entire socio-physical system an investigation is started that shows the logic of the landscape, and shows how the landscape would look like if degeneration issues were to be solved. Together with a social investigation and analysis where local knowledge is included, a strategy can be laid out with certain boundary conditions and a clear, but not detailed, vision for the future. This serves as a common direction of development, rather than as a direct and literal implementation plan. Prospects for adapted land-uses and new livelihoods might be part of the outcome, but there has to be enough flexibility to all parties involved to adapt to changes in their own way.

A deadline for the boundary conditions, by which time the problem ownerships is given to the people (external parties stop 'fixing' the problem), will make clear to people that change *will* happen and that there is no point to continue creating short-term, non-systematic fixes. On this level, communicating the consequences of the regeneration on existing land and land-use is important.

The team working on this level needs to consist of core members that are experts on natural systems to ensure that not stakeholder's personal interests but responsibility for the natural system is central. It is however necessary to embed local experience and expertise in the process, as well as to reach broad consensus about the validity and significance by key stakeholders. Transparent communication of the process is important, as well as consultation of the local population and the incorporation of people's questions and comments. At this stage there is not necessarily a very pro-active form of participation. This can be compared to Pretty's (1995) level of 'functional participation', where local people and local knowledge are part of the process but the final regeneration aim is set by system-experts.

Level 2: Landing regeneration in community structures

When a clear regeneration aim is laid out on the first level that gives ownership of the degeneration problem to the local people and leaves enough flexibility for empowerment, the next step is to go into the landscape and facilitate shifts in current social mechanisms and organization. This is an interactive step that relies on a strong collaboration with local parties, and an attitude of service to local interests and ambitions by the experts and decision-makers. The partici-

pation-level applied here is one of co-creation, in which all parties equally participate and are able to take initiative. This is comparable to 'interactive participation' (Pretty, 1995). However, the underlying aim is to facilitate eventual self-mobilization of local people.

Some conditions need to be met to make sure the social feedback in a virtuous socio-physical system is present: the local community needs to be able to use and value the ecosystem services in order to create a direct relationship with and attachment to the environment, and the local community needs to be empowered to carry responsibility and influence the governance of their own areas, in order to create a direct relationship with and attachment to the environment. A flexible regeneration plan that allows empowerment can be accompanied by specific programs that encourage actual empowerment by local people.

Based on our research we think that efforts should specifically target the condition of local capacity building to enlarge the ability of the local community to deal with the problem-ownership and flexibility they 'receive' in the regeneration strategy. This capacity focuses on actual local responsibility structures and agreements, but also on ability to use and valuate local ecosystem services locally, and on knowledge embedment necessary to monitor and adapt the local system when necessary. Figure 2.31 gives an idea of factors that can be taken into account on this level. These factors form an inspiration for new roles and new ways of working for experts that get involved with regeneration efforts on this level.

Level 3: Local initiative and adaptation

The last level of the strategy concerns the actual engagement of regeneration through local adaptation and projects. This is a level beyond the direct control of experts and decision-makers on the higher levels and needs to stem from local ambition and initiatives. At this level, decision-makers but also experts need to take a step back and truly hand over control. This means that these parties accept that 'things can go wrong', or that they do not develop in the way that may have been envisioned. If the two previous levels have been successful, all the conditions are present for things to work out: there is awareness and problem-ownership, there is local capacity to take responsibility and there is an overall and integral regeneration ambition known and supported by all stakeholders. On this level, there needs to be trust in the actual willingness of people to self-mobilize.

The eventual aim here is that all conditions are met and that people are empowered to use and value their own areas, to carry responsibility and that they are able to monitor and adjust the system. This leads to a full cycle in the social feedback model, forming a virtuous cycle of land-use that supports regeneration. The type of participation that is applied here is self-mobilization, which is about the actual

Objective:

Landscape regeneration

Community support

Local use and maintenance

Strategy:

Level 1: Setting regeneration in motion
Expertise on the natural system (local and external)
guides decision-making. Decisions made on this
level only concern the health of the system and offer
flexibility and local problem-ownership

Level 2: Landing regeneration in community structures
Local people, experts and governments working together
to build local capacity through community building,
responsibility structures and agreements.

Level 3: Local initiative and adaptation
Local people take their own initiative in adapting to
a regenerated landscape. Involvement of experts or
governments is by commission and is in service of
local wishes and local connection to the landscape

Level	Governments	Expert	Local people
1: Landscape regeneration	Institutionalization of the regeneration strategy, monitoring of regeneration process and communication between local groups	Overview and continued evaluation of the landscape system, formulation of landscape logic and regeneration aim	Consultation: input of local experience
2: Community support	Support of local groups: institutionalization of decisions	**Several roles: providing connection between actors and levels**	Co-creation: involvement and shared responsibility
3: Local use maintenance	Letting go: providing flexibility and problem ownership	In service of local initiative	Self-mobilisation: local initiative and responsibility

*Figure 2.30. Strategy for community supported landscape regeneration showing three scale-levels of organization in
the landscape, and a table of associated roled of actors*

Conditions (level 2)	Factors to work with
Local organization: responsibility structures and agreements	Facilitation of *social processes*, communal *agreements and vision-building*, structuring of *interaction possibilities* in communities, the 'design 'of *responsibilities* and *new social contracts* between government and people
Local prospects: new prospects for livelihoods and attachments	*Accessibility and use of ecosystem services, prospects and inspiration*, direct *dependence on* the landscape, registration of successful initiatives
Local awareness and learning: knowledge embedment, monitoring	facilitation of *knowledge exchange* and *learning, training of local people*, readability and understanding of landscape function and relationships

Figure 2.31. Building local capacity: factors to work with on level 2 of the strategy

ability of people to affect and care for their own environments in daily reality. Note that this doesn't need to mean that an area becomes completely autarkic: the three levels of the strategy interrelate, and on this third level the aim is that empowerment is reached so that local people are enabled to actively support regeneration and create new meaningful attachments in the landscape. This empowerment is formed *within* local organizational structures and in collaboration with governmental parties.

Conclusion Chapter 2

The strategy relies on strong involvement of local people, especially in the implementation and maintenance of regeneration efforts. Rather than heavy focus on participation of local people in the planning process, we suggest that people need to gain empowerment in the actual landscape, and that, as a consequence, the (formal, external) planning process itself needs to become more minimal and focused on the securing of 'healthy' landscape systems that are able to support sustainable human inhabitation and land-use.

For decision-making parties this means that rather than to allow local people a voice in the planning process after which firm control of the outcome is retaken, local people need to be allowed a direct voice in the everyday management of their areas. This means a release of control by governmental parties, so that local people are able to creatively adapt to changes, form new attachments and livelihoods and build up relationships of responsibility with the landscape in which landscape problems are directly felt and fixed on a local level.

For experts this means stepping into a role of responsibility to the landscape on a regional scale, but on the smaller-scale levels it means to step into a role of advice and service to local capacity building and local initiatives. This is a role in which the landscape designer, for example, cannot design

solutions from behind the desk but has to actively engage in local reality to construct context-fit solutions in an interactive way. Especially on the level of local capacity building we see exciting new roles for experts. The level of community organization within landscape development and regeneration is a largely unexplored territory, and we think that in starting to build local structures that can carry landscape responsibilities expertise on the natural system will prove paramount. This opens up many possibilities for experts to apply their knowledge in combination with new skills of, for example, facilitation of community processes and education.

For local people, finally, it means to step into a role of responsibility for the direct surroundings and to get used once more to a situation in which problems are not automatically fixed by external parties or governments. It means accepting a position of interdependence and collaboration with neighbors in the landscape in order to make joint decisions that can eventually benefit all. It also means a great deal of flexibility in adapting to new living and livelihoods in the area, letting go of the idea that landscapes are stable, and embracing the idea that they are actively shaping new attachments and new meaning on a daily basis during a dynamic regeneration process that is guided by their own ambition and creativity.

Figure 2.32 Aerial photograph of the Vechtplassen

Chapter 3: Design
for community supported landscape regeneration

In this chapter the findings of the first two chapters will be evaluated and developed through a design for our case area, the Vechtplassen. Research through design will be used to explore ways to design with the factors and conditions we found, in order to reach our aim to design for socially supported landscape regeneration. The information from the case study, gathered through interviews, landscape analysis and plan analysis, is used to understand the current situation and find a direction for regeneration.

In this way we will also explore the field of landscape architecture in the light of regeneration and social support. The design strategy for the Vechtplassen is developed and described in content and process with specific attention to the role of the landscape architect. We conclude this part of the report with a reflection of the design exercise. To explore the remaining questions and illustrate possible developments in more detail we conclude by presenting two 'dream' scenarios, showing potential developments in the area.

Research question: how can landscape architects design for socially supported landscape regeneration?

- What are the implications of the design strategy for the role of the landscape architect during regeneration processes?

- What type of design products and strategies can lead to socially supported landscape regeneration?

- What insights follow from concrete application of the social feedback model that can be used to enrich theory?

Landscape architectural design perspectives

It is relevant to position the debate of landscape regeneration and social support within the landscape architectural field. Within the spatial field, landscape architects are uniquely positioned to fill the gap between overview of natural systems and local agency. Landscape architects are also in a position in which they have an overview of knowledge from various other disciplines. They can combine interests from various actors and layers of the landscape in order to build integrated visions.

As designers, we have traditionally tackled the relationship between man and his environment by looking at phenomenological processes and experiences in the landscape. This is exemplified by a focus on form and experience in design products and representation, but also by the theoretical investigations into subjects such as beauty and sublime experience of the landscape. Larger-scale plans, e.g. regional plans, have brought a focus on ecology and land-use, resulting in more systematic interventions that incorporate a spatial planner's perspective, political and economic incentives.

Deming and Swaffield describe the current knowledge gap in the landscape-architectural discipline, based on research priorities of CELA (Council of Educators in Landscape Architecture), the ASLA advocacy agenda (American Society of Landscape Architects) and LAF landscape futures initiative (Landscape Architecture Foundation). They identify four priority areas for new knowledge: design and planning sustainable landscape systems, understanding social and cultural values and processes in the landscape, healthy and livable communities and urban regeneration (Deming and Swaffield 2012, p. 28). In our experience so far, based on the research we did, the first three topics are intricately inter-related. Especially the second and third topics, but arguably all, require understanding of not only physical reality and phenomenological experience, but of sociology and politics as well.

Also from outside the world of landscape architecture, authors are starting to call upon designers to accept sociological and political concerns as key challenges in their work. According to Levinthal and Warglien (1999), structuring of interdependencies and organizational adaptation are key landscape design tasks. They argue that effective self-organization requires good design, thus posing design as a discipline that can guide the empowerment of local people to take responsibility in their own landscapes. Another example are Windhager et al., advocating the importance of creating 'communities that ensure the maintenance and enhancement of ecosystem services through development processes' (Windhager et al. 2010) (p. 115). This underlines the importance of 'social design', design for social processes and organization.

In order to find the tools and language that are fit for the challenge of large-scale system design within a socio-physical landscape system, it may be very instructive to give more attention to the fields of sociology and political science. These disciplines offer understanding of the man-environment relationship in light of social processes and power relationships that enable or disable landscape change. Learning from these disciplines may provide us with ways in which we can design for and facilitate the gradual change not only of physical systems, but also of the accompanying social system, thus being able to take a position of responsibility for healthy landscapes in their full socio-physical reality. In this way, we can specifically start to provide the conditions related to empowerment that we found necessary for socially supported landscape change and for maintenance of regenerated landscapes. Formation of communities and social networks in the landscape, as well as the awareness of the effect of a design on the empowerment of people in the landscape could be explored within design theory and in design language in order to be addressed more deliberately. Also the element of social learning, as a sociological concept, could lead to (renewed) attention to change processes in existing communities aided by the availability and exchange of knowledge.

Top-down and bottom-up approaches

As landscape architects we are in a position to take responsibility for landscapes on a system scale and ensure the 'health' of hydrological and ecological processes and cycles on which we depend. The landscape approach to design (Koh 2008), the recently formulated infrastructural approach to landscape (Bélanger 2009) as well as the landscape machine concept (Roncken et al. 2011) propose to look at the landscape on a system-scale, designing processes and cycles rather than separated functional landscape entities. By keeping a view of the landscape in this way, the landscape architect encounters system-scale problems that need to be addressed in order to counter vicious cycles that will result in ultimate inability to continue the use of the system.

Now the question is how the landscape architect can address these large-scale issues in the landscape. As we described in the strategy in the previous chapter, these issues require a system-level approach. This approach needs to be supported by local people. The puzzle here is that the landscape architect forms an 'external' party. As described in the strategy, external influence needs to be limited in order to give space for (adaptation of) social feedback. This means that, as an external party within processes of change, we have to find a balance between providing the initial push and letting go of control in order to empower local initiative. This is reflected in propositions for more strategic design within the field of landscape architecture.

The issue of top-down versus bottom-up strategies is currently debated in the field, exemplified by e.a. the E.O. Wijers stichting (EOWijers stichting 2009) and the recent publication 'the necessity of design' (Hendriks, 2013), which compiles changes in design strategies by offices around the Netherlands. A returning question is to what extend we can use blue-print design on a regional scale, and if we can't, how we can 'design without designs'. There are more and more examples of strategic designs with flexibility and uncertainty integrated. Okra for instance, a Dutch landscape architectural office, often makes strategic plans. They state that a flexible network with small interventions that are not fixed are often better than a filled-in blue print plan. Giving a strong vision for the future should then be enough to convince the client and the investors, after which a step-by-step transformation can take place (Knuijt, 2013).

The role of the landscape architect

The considerations above imply an increased shift from plan-making in offices outside the target area, to active *facilitation* of social processes and plan-making within the landscape, making use of social capacity and local empowerment. This is an embedded position in which the landscape architect is working to connect the interests of the physical landscape with the interests of the local people, allowing regeneration plans to land within local social structures, and enabling local projects to enhance large scale developments. The role of the landscape architect thus can be considered as holistic, where 'connecting' becomes key: connecting the responsibility for a healthy ecosystem with the strength and social capital of social reality.

Participation processes need to be used more thoroughly on different scale levels and in different forms, as we described in the previous chapter. Especially participation of local people in the landscape itself, not only in the planning process deserves attention. The landscape architect can have an important role in designing and executing these processes. Wals and Noorduyn (2009) write about the process of participations. They see the landscape architect as an expert within the process, being able to visualize ambitions and to bring everything together in a conceptual landscape framework. The landscape architect thus acquires several distinct roles; one to do with responsibilities of the large-scale system, one to do with facilitation of local capa-city-building processes, and one concerned with more 'traditional' design on a lower-scale level. A broad range of potential products that landscape architects are able to make in support of these roles can be identified. The basis for this design exploration is the strategy presented at the end of the previous chapter.

Design for community supported regeneration of the Vechtplassen landscape

In this chapter the three-level strategy introduced in chapter two will be developed into a more concrete design strategy to regenerate the Vechtplassen area. In figure 3.1 the three different levels of the strategy are shown, together with the related 'products'. We see distinct roles for the landscape architect on these three different scale levels. What is contained in these roles and which processes and products are part of them will be explored throughout this chapter.
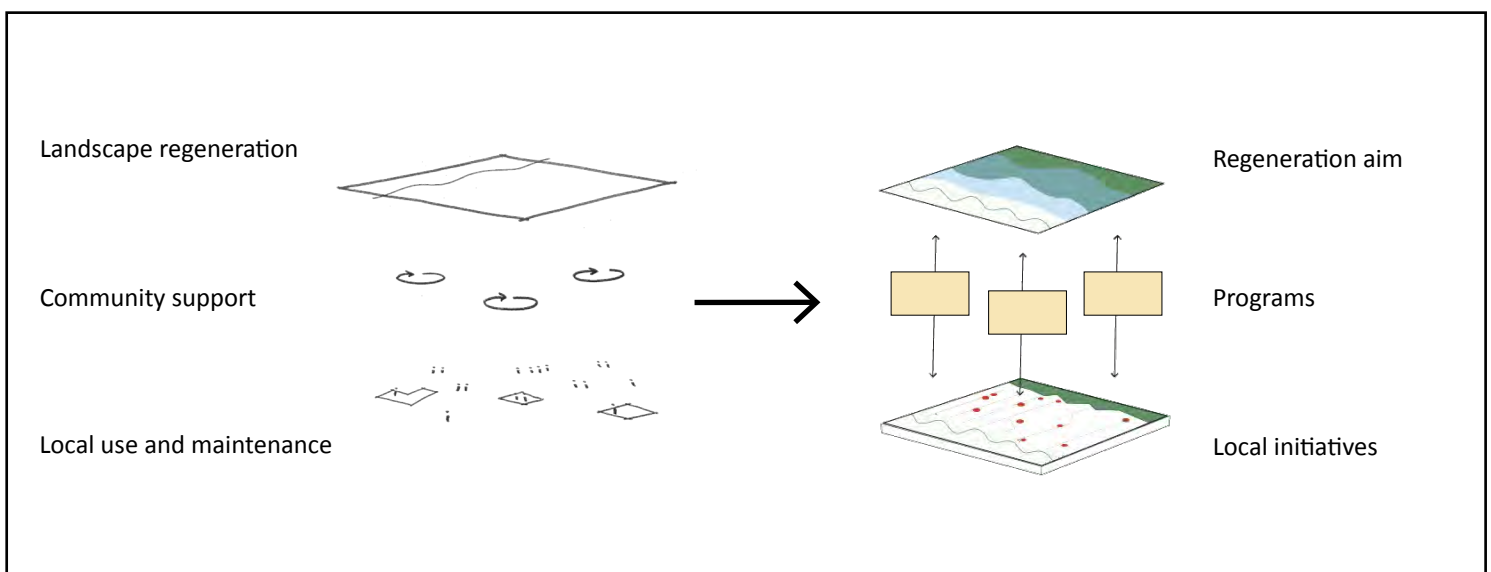
Figure 3.1. From strategy to proposed design products

Figure 3.2. First level of the strategy: regeneration aim

Riverbank   Peat polder   Reclamation   Surface water   Peat & marsh forest   Peat polders   Forest on ridge
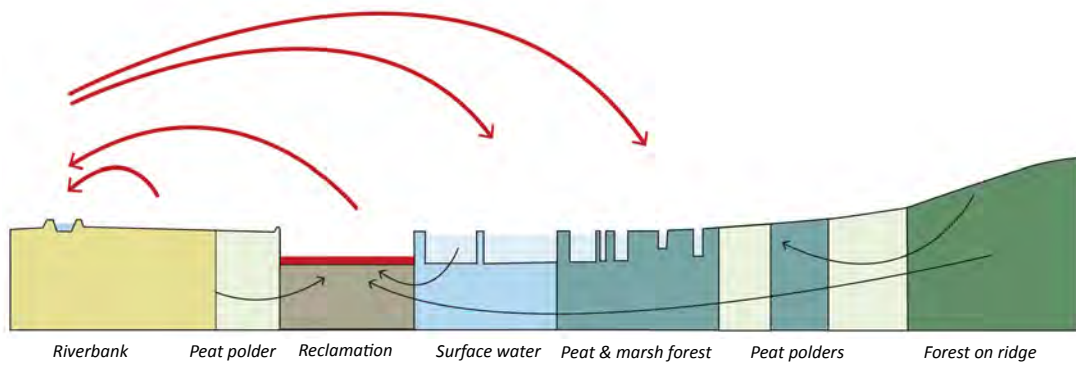
Figure 3.3. Current situation of the Vechtplassen: much seepage and infiltration through the soil (black arrows) and unnatural water-flows through pumping and inlet of external water (red arrows)

1:100.000
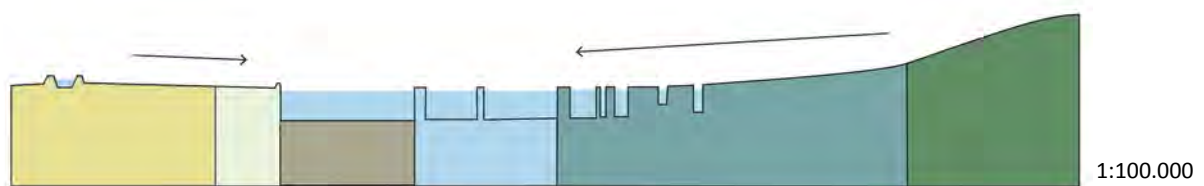
Figure 3.4 Regenerated landscape: a natural water system of runoff from higher to lower areas. Only very occasional external waterflows necessary, natural drainage and sufficient water buffer for seasonal changes.

Level 1: Regeneration Aim

On the highest scale-level we are looking for a strategic plan which ensures regeneration of the Vechtplassen. This plan is made with expert knowledge on landscape systems, regional hydrology and ecology, but also includes local experience and local knowledge through consultation. A program office will be set up, consisting of experts and representatives of local people and institutions involved with decision-making (see figure 3.2).

The first step is the analysis of the system and understanding of the current degeneration of the Vechtplassen, carried out by experts. The main problem is the imbalanced water system due to current land-use, which causes oxidation of peat and soil subsidence in a vicious cycle of pumping and soil subsidence (figure 3.3). This 'landscape logic' results into a regeneration aim for the area, showing the landscape types necessary to reach a regenerated landscape that is locally balanced and not degenerative (see figure 3.4, 3.5 and 3.6). Interventions are kept as minimal as possible, and the types of land-use and what activities that will form the eventual landscape is left completely open at this level.

The regeneration entails rising water tables in practically the whole area. The rise of water level will stop the oxidation of peat (oxidation stops at drainage of less than 10 cm), will decrease infiltration and seepage and can create more water storage in the soil, which can serve as a stock for dryer periods (BoschSlabbers 2012).

Also the flexibility of water levels will be increased in large parts of the area. This aids the seasonal balance of water, decreasing the need to pump and to add external water in dry periods (STOWA 2012). The largest change needs to take place in the deep reclamations, now drawing a large part of the seepage in. These reclamations are depicted as part of the surface water in the regeneration aim, because the logic of a natural landscape dictates it. However, this doesn't mean that human functions such as living need to disappear from these area. Solutions will be found on the next levels of the strategy to deal with these kinds of drastic changes in landscape.

The regeneration aim is the starting point for a participative process in which the social reality is addressed through participatory processes. Issues that are explored are potential social mechanisms of alienation and resistance to change. This exploration can only be done together with local people to reveal what attitudes are currently dominant among central stakeholders in the area, and what human factors are keeping the degeneration problem in place. Representatives from the area will be part of the program office and a broader communication campaign can be set up to reach as many people as possible. From this participatory process a strategic plan is established that gives a boundary framework of the minimal interventions necessary to stop degeneration.

Role of the landscape architect at level 1: system expert

- In service of regeneration: system knowledge and expertise
- Design of a strategy that combines system knowledge and local input
- monitoring, evaluation and advise
- Communication, exchange of knowledge

On this level of the design strategy the landscape architect has a responsibility towards the landscape system, making sure the landscape processes are sustainable in time. Based on his expertise, the landscape architect can express his advice on the interventions that are necessary for regeneration and thus represent the voice of the natural system. Inclusion of local knowledge and sensitivity to local responsibilities is necessary in order to create a socially supported strategy. By monitoring and evaluating local developments, he can (objectively) show consequences of plans and thus relate action to the regeneration aim. Landscape architects on this level can also be seen as agents for a raise in awareness by working on the availability and exchange of knowledge.

The consequences that follow from application of the regeneration aim are shown in the map on page 88. This map shows consequences for current land-use, so that local stakeholders get direct insight in the problem-ownership that they will gain. The map can be used for communication purposes between experts, governmental parties and local people. The regeneration ambition leads to a need for change of functions; current practices have to anticipate and adapt to higher and flexible water levels. How this will be done however is up to the people themselves. On this level no statements are made about functions, land-uses and activities. However, the map is accompanied by a toolbox with possible options of different ways to deal with the changes, see fig 3.8.

As a push to make sure that the regeneration process will set in motion, a deadline is set. In thirty years, the flexible water level in the marshlands has to be in place and all polders and reclamations need to have a strategy for peat preservation and a balanced water situation. This deadline gives direct problem ownership to the local people affected, forcing them to start thinking of ways to anticipate the changes that are coming. The deadline is enforced by the program office (through e.g. the programs explained at the next level).
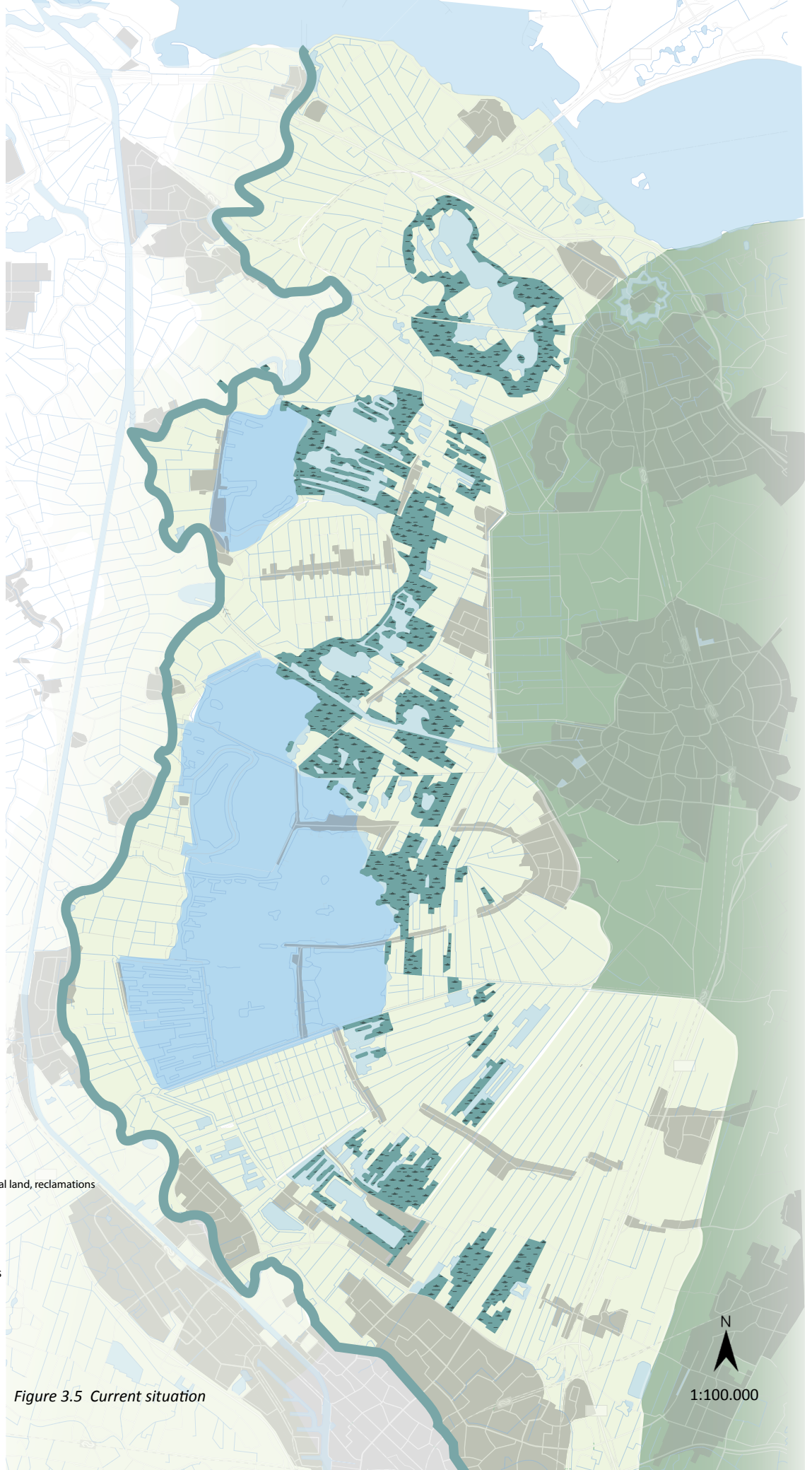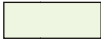
Meadows, agricultural land, reclamations

Surface water

Marshes, wetlands

Vecht

Forest

Figure 3.5 Current situation

1:100.000

Figure 3.6 Regeneration aim

	Meadows, agricultural land, reclamations
	Surface water
	Marshes, wetlands
	Vecht
	Forest

Water-level rise

Drastic water-level rise

Partial and temporal flooding
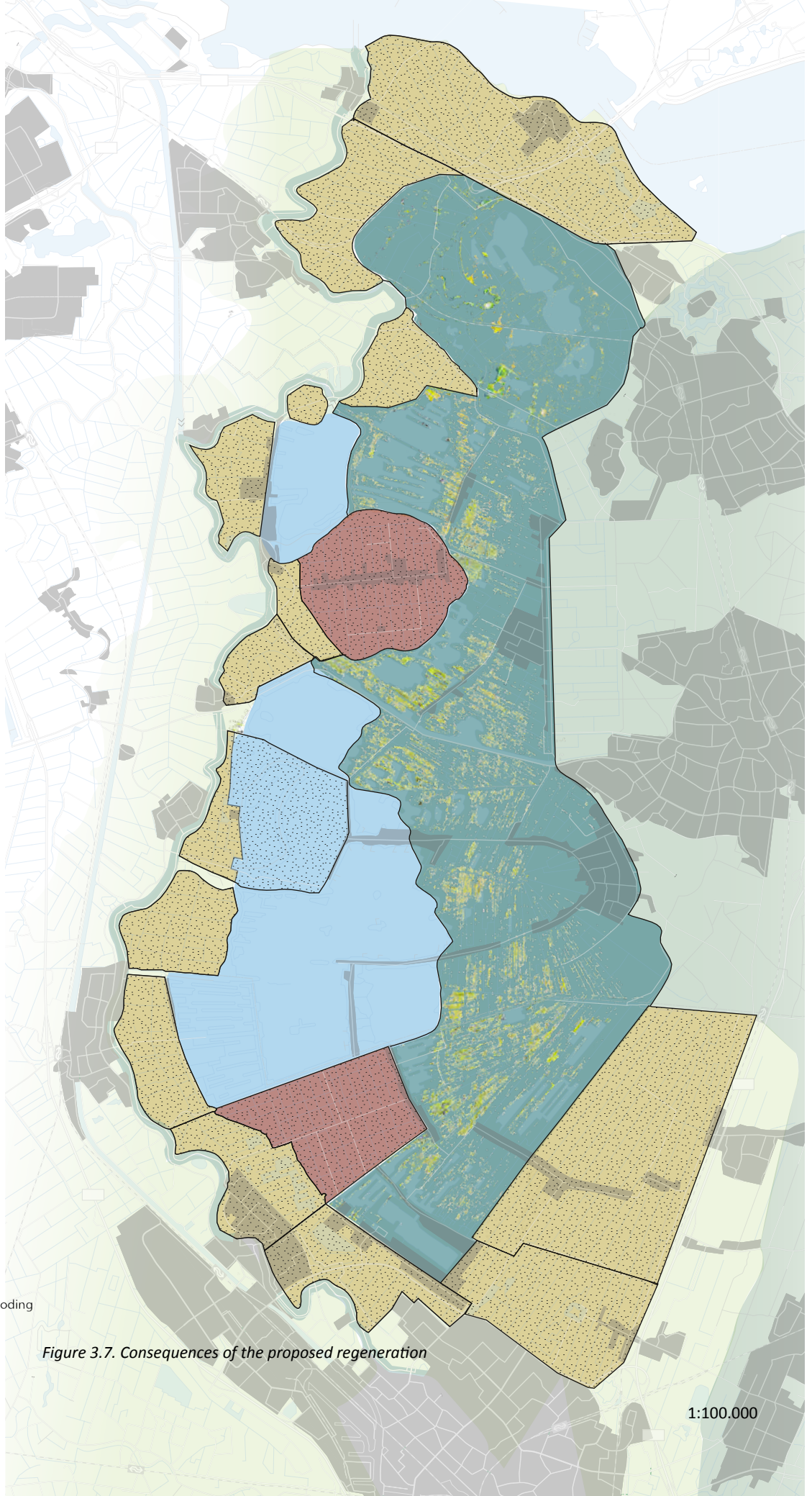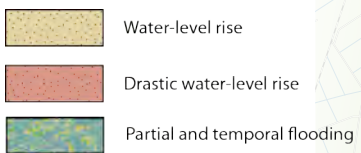
Figure 3.7. Consequences of the proposed regeneration

1:100.000

Purification of (external/internal) water

Closed water balance

Dynamic water level

Flexible water level

Flexible water level

Increase natural infiltration

Rise water level

Rise water level Rise water level

Rise water level

1

2

Under water drains

Stop drinking water extraction

Stop drinking water extraction

Encourage increase of vegetation

Robust nature areas

Enlarge water units

Enlarge water units

Natural drainage

Natural drainage

Stop peat oxidation

Stop peat oxidation

10 cm

10 cm

Figure 3.8. Toolbox of possible ways to deal with the consequences of the regeneration plan on a local scale

Reflection on feasibility level 1

The successfulness of this part of the strategy depends on the attitudes of stakeholders. Experts and decision-makers need to be able to let go of strict ideas of how regeneration may look like on a small scale level. However, especially experts need to strongly voice the needs of natural systems, so that regeneration aim doesn't get lost in compromise. Local people need to accept the general need for regeneration, and adopt a pro-active attitude. The strategic plan needs to be broadly supported, which may be challenging because it is one of the first products produced, before current social mechanisms have been addressed. Our hope is that the explicit minimal character and open-ended form of the regeneration aim makes it clear that this is not a final design and that the final implementation leaves lots of room for people to adapt in their own ways. We also hope that people will accept the problem-ownership that is proposed, taking it as a cue to become aware of the fact that there is, indeed, a problem and that it is time to get together and think of possible solutions. Finally, the social processes need time. It is not necessary that everyone agrees immediately.

Level 2: Programs

On the level of local capacity building we propose three programs that intend to bridge the gap between the scale of natural systems and that of local people: a program of responsibility-sharing by large parties, a platform for knowledge exchange and a program for local vision-building. Many other programs can be formulated and these programs could have many forms. The three programs illustrated below serve as an illustration of what type of work can be done on this level. The programs are all participative processes in which local people carry direct responsibility and decision-making power. They can be initiated by any actor, so the programs also verge into the realm of self-mobilization. Programs can also be started by governments or external experts, in which case they take on a facilitative role.

Role of the landscape architect at level 2: social facilitator

- Facilitation of participative vision-building
- Spatial strategies for programs
- Exchange of knowledge, info graphics
- Registration of developments and monitoring
- Advise on system functioning and responsible land-uses

Landscape architects on this level are facilitators and connectors. The aim is to link existing reality with the regeneration vision through the programs that we propose. Within the first program, the landscape architect can explain large parties how they might combine their ambition with regeneration ambition and serve as a mediator between these parties and other stakeholders. In the second program, the landscape architect can objectively map initiatives and show consequences of local action. Knowledge exchange and creating awareness are key here. In the third program, design-knowledge and skills can be used through spatial concepts and programs, visualization and design visions that include maintenance roles and responsibility structures.

Program 1 – Responsibility Sharing

In this program the existing large parties in the area play a main role. Here we focus on nature organizations Natuurmonumenten and Staatsbosbeheer, Waternet and the Nieuwe Hollandse Waterlinie. The aim of the program is to connect the organizational structure and ambition of large parties/institutions with local people and local initiative. The idea behind this program is that large parties can put their land, expertise and resources in service of local communities in order for them to experience and experiment with new forms of responsibility-taking and initiatives that use a broad range of ecosystem services and are in line with the regeneration plan.

Figure 3.9. Second level of the strategy: programs

A new role for Natuurmonumenten

Current situation

Existing parties have their own agenda; ambitions are not aligned with common goal of regeneration

Contrast between large nature organisations and individual landownership (fig. 3.10)

Action

Use existing land under nature ambition to allow communities to take responsibility

Goal

Create a new zone in which local community can take responsibility for nature.

Existing nature: NM and SBB

acquired not realised

not acquired

Minimal human use

Extensive human use

Intensive human use

Towns

1:200.000

Figure 3.10. Land for nature: ambitions and realization
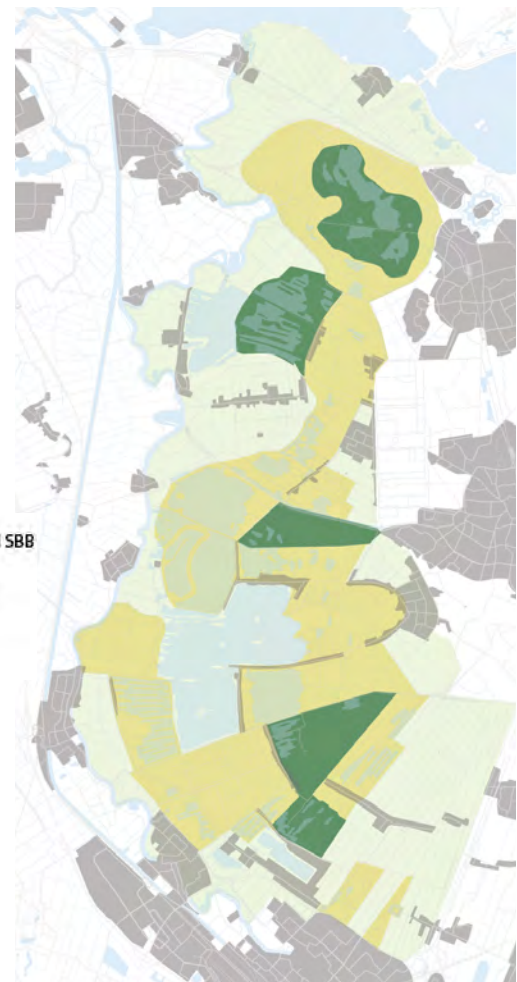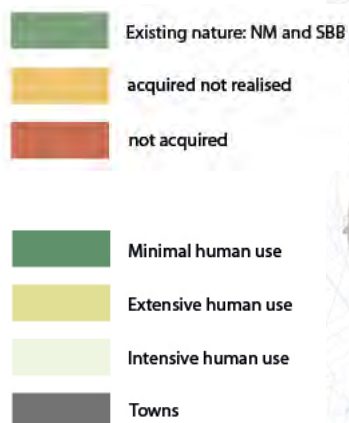
Figure 3.11 New experimental nature maintenance zone

1:200.000

HOLLANDSE WATERLINIE®
LAAT JE VERRASSEN

Current situation

Current infrastructure doesn't support community interaction and is physically incomplete

Action

The NHW network is transitioning to new functions. Why not use this for facilitation of community interaction?

Goal

Network of meeting places that support community and vision building, readable and accessible landscape
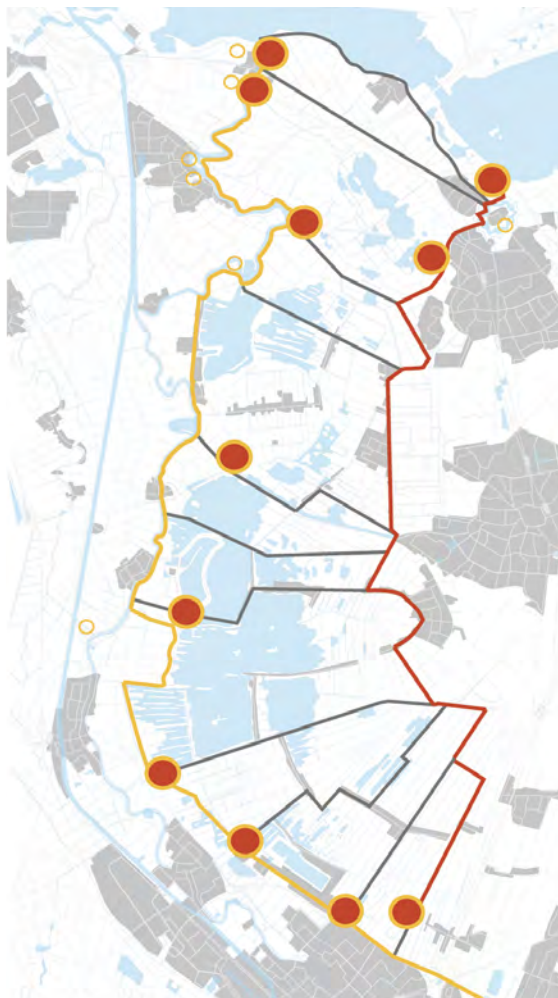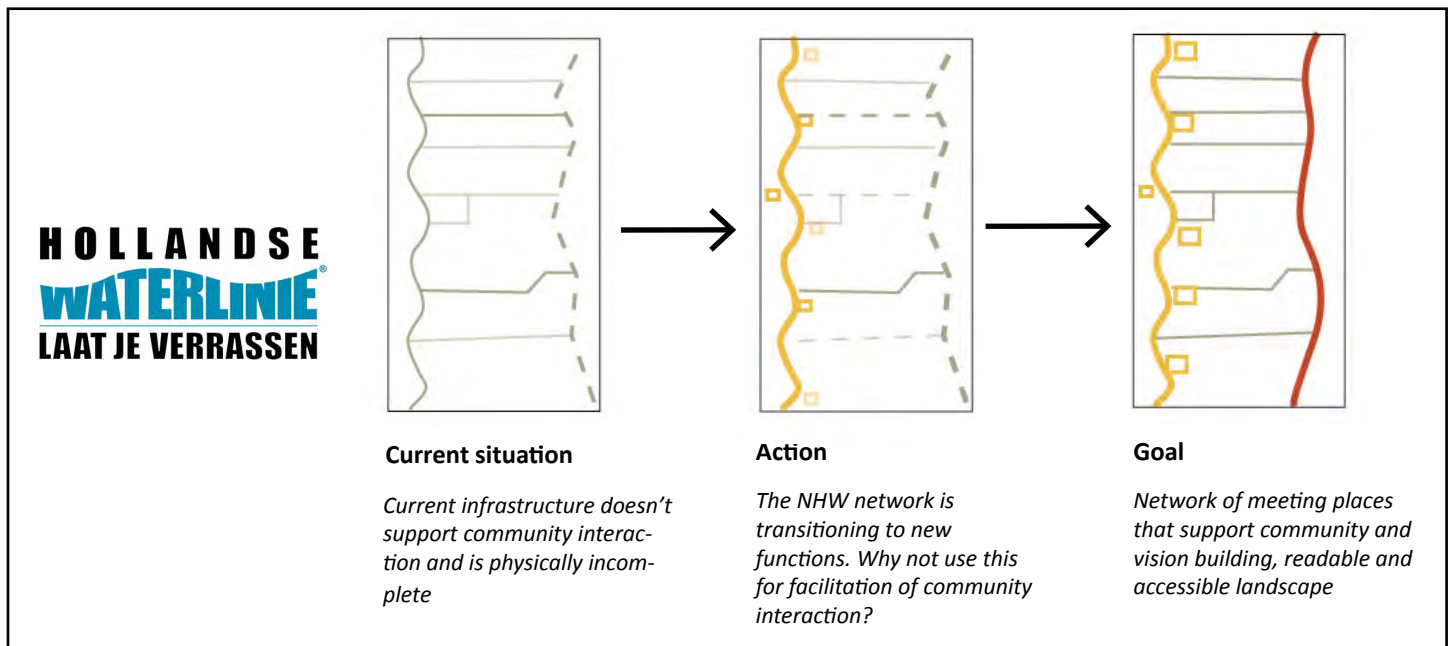
![route]	Route along main line of defense
![route]	Route along east border of indundation area
![route]	Routes along access lines
![node]	Nodes outside the plan area, part of the NHW
![node]	Nodes: fortifications of the NHW within the plan area

(new) functions of nodes:

- facilitation of interaction for (local) people
- documentation and display of developments in the area
- access to the landscape: entrance, transferia
- making the history of the NHW visible
- several (combinations) of other functions: catering, recreation, living, museum

1:200.000

Figure 3.12. Network with nodes

A new role for Natuurmonumenten

Natuurmonumenten (see previous page) currently owns a large part of the land (and water) in the Vechtplassen. Their ambition is to protect vulnerable nature (e.g. the characteristic water landscape left by former peat harvest) and to increase the area of protected natural landscapes. Landownership by Natuurmonumenten creates a landscape in which there is a large contrast between individual plots of land and wide-stretched natural areas in which Natuurmonumenten has sole responsibility. What we propose in light of the responsibility-sharing program is the introduction of a third 'zone' in which responsibility is shared with local actors (communities, farmers, entrepreneurs). In this way existing core natural areas with minimal human, use to protect vulnerable nature, can be connected with each other by more accessible nature areas with flexible use and new prospects for a wide variety of stakeholders. This will encourage local (groups of) people to experiment with new land-uses that take advantage of the changing natural conditions while also taking responsibility for the maintenance of the ecosystem.

This program suggests that Natuurmonumenten changes its role from a 'nature owner' to a nature 'facilitator'. In this new function, Natuurmonumenten can stay involved in order to share their knowledge and materials, to support in case of lacking capacity by local parties, and to monitor results. In short, Natuurmonumenten becomes a 'tutor' to several local groups and initiatives try to learn the trade of nature maintenance.

Nieuwe Hollandse Waterlinie offers interaction spaces

The ambition of the Nieuwe Hollandse Waterlinie (historical defense line) is to strengthen cultural heritage and to create a landscape contrast between the fortifications, the defended area behind and the areas in front intended for inundation to protect against enemies (see plan analysis chapter 2). What we propose in light of this program is to strengthen and broaden the network of historical artifacts to make the physical system of the landscape readable. The fortifications and other focal points that are identified can be opened up to local communities as interaction spaces in which people can come together for formal and informal meetings, to exchange knowledge and increase social cohesion.

The fortifications are owned by different parties, e.g. Natuurmonumenten, private entrepreneurs and the project team of the Nieuwe Hollandse Waterlinie. We suggest that these parties designate these spaces as meeting spaces in which local communities can come together. In this way, the local community takes 'ownership' (possibly even literally) of these focal points in the landscape, and they can become important spaces for social capacity building. This matches with the ambitions formulated by the project team of the Nieuwe Hollandse Waterlinie.

Waternet in service of local regeneration interventions

Waternet is an important party related to the water system in the area. When Waternet embraces the overall regeneration ambition set up by the program office, they can start to fulfill a role in which they support local initiatives related to the water system by sharing expertise and taking on necessary engineering. In this role, they have a responsibility towards the regeneration effort, evaluating the proposed interventions and advising alternatives that are more beneficial to the overall regeneration aim. Moreover, as they are organized on a regional scale, they are in the position to work towards more structural changes, for instance related to the proposed change in flexible water level, an intervention that in scale transcends direct local responsibility.

Program 2 - Platform for exchange

The second program (see next page) is an interactive, digital platform for knowledge exchange accessible for all stakeholders. There is currently a lot of information scattered over the internet, which is difficult to find and time-consuming to collect. A common platform on which information is gathered on a local scale may greatly lower the threshold for local parties to organize themselves and start initiatives. The platform will serve also as a medium for communication and exchange between experts, decision-makers and local parties.

The platform is highly interactive – all stakeholders can add new knowledge and can use information from the platform. In fig. 3.13 four examples are given. Map A is the map showing consequences of the regeneration, communicating the problem ownership. Related to this the landscape system can be explained to increase understanding and awareness. Example B shows the process of mapping initiatives. By mapping initiatives, people can see what others do in the landscape, see what works well, and potentially get connected. Through an approach of positive deviance more and more 'positive' local initiatives will be inspired, slowly forming a critical mass of people that get connected in support of regeneration. Map B also gives the opportunity for the program office to follow what is going on and evaluate the effects of local initiative in light of the regeneration aim. Example C shows the process of social mapping of individuals and their ambitions and skills. Mapping the social reality on a local scale may lead to an increased network and social cohesion. Map D shows an example of prospect mapping: for each landscape type the platform offers information on the available ecosystem services, thus creating a (growing) body of knowledge on how the landscape and its services can be valued and used.

Program 2: Platform for exchange

Current situation

Information exists but is scattered and not readily accessible

Action

Creation of a space where information can be collected, organized and made accessible

Goal

Interactive platform for exchange
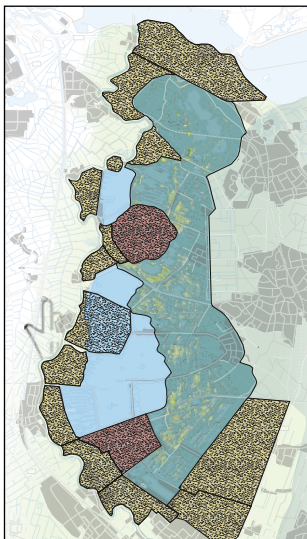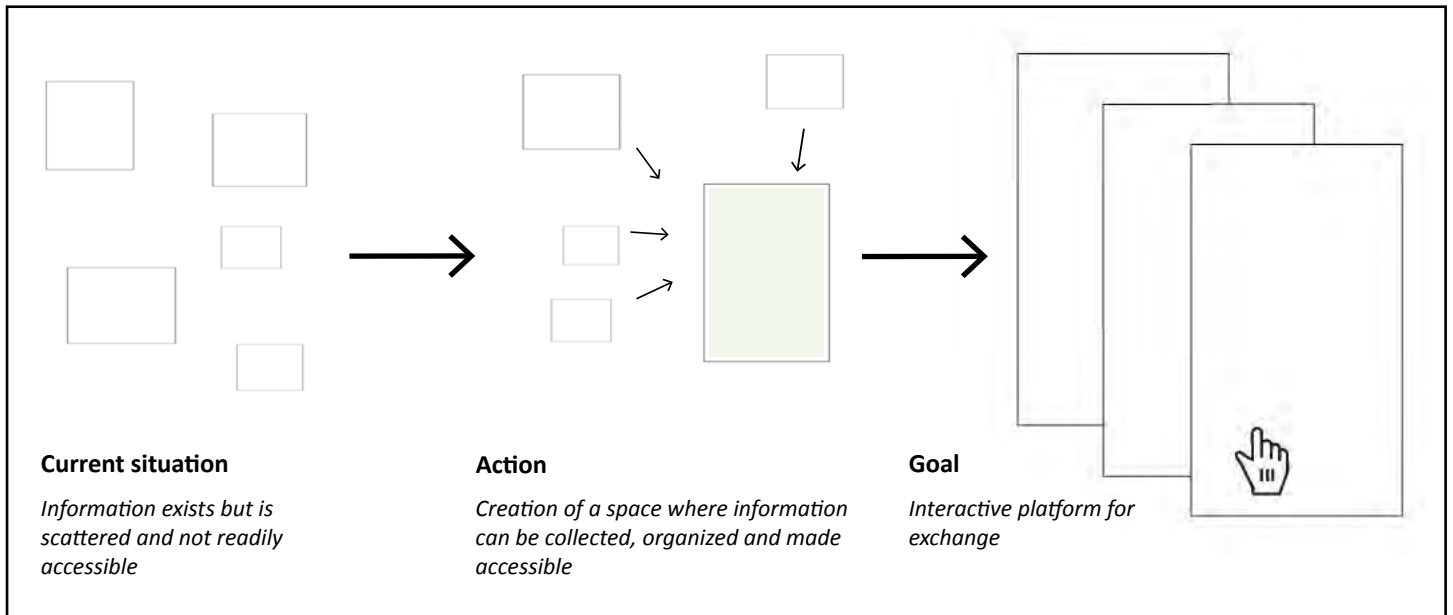
Fig 3.13. Map A: Consequences of regeneration
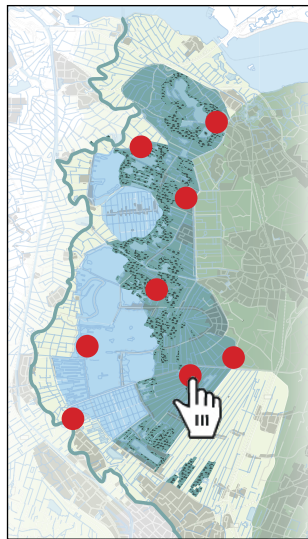
Map B. Mapping initatives & positive deviance
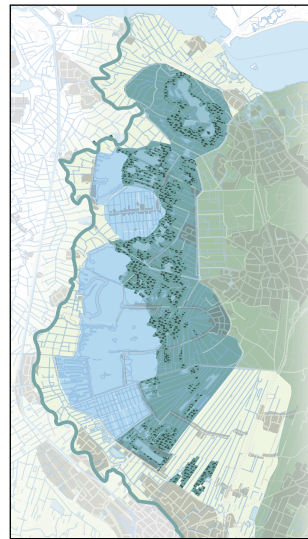
Map C. Networking: mapping of individuals, skills and ambitions
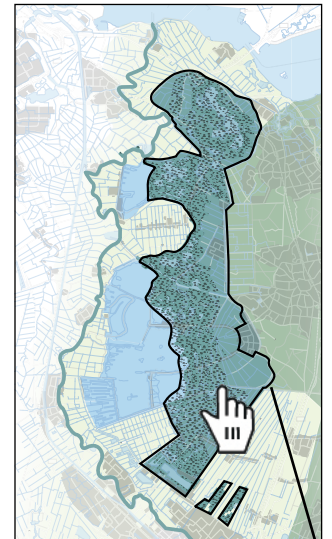
Map D. Mapping ecosystem services per landscape type

Part of Map D: inspiration and knowledge on different ecosystem services

Provisioning services in Marshland

livestock (extensive)
aquaculture (extensive,e.g. watercress, duckweed)
non-human food (fibers, algae, duckweed)
wild plants
energy crops/biomass

Edible plants: watercress, cranberry and blueberry (sources: infofrankrijk.nl; houtwal.be; blauwebessenbudel.nl)

Energy from biomass: reed and other natural materials from nature maintenance. (source: basdekker.eu)

Extensive nature farming. (source: facebook.nl/natuurmonumenten)

Program 3: Local vision-building

Current situation

Social cohesion doesn't match the scale of the natural system

Action

Tie interdependent landscape types together in coherent units

Facilitate cooperation between social groups within these units

Goal

In-between layer of social organization able to take on responsibility for the integrated landscape types

Figure 3.14. possible connections between existing social organization

A: growing awareness of regeneration

B. growing social network through platform
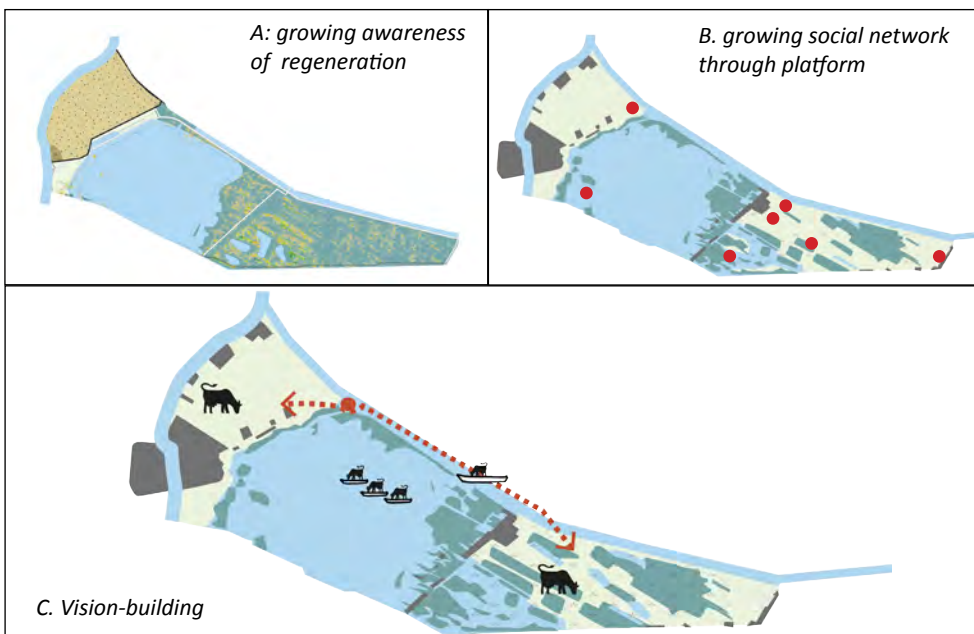
C. Vision-building

Program 3: Local vision-building

The vision-building program is illustrated on the previous page and further explored on the pages to follow. The program relates most strongly to the creation of an in-between layer of social organization that is able to carry local responsibilities. Because the regeneration plan is strategic and doesn't appoint functions, there is a large gap in needing to decide what will happen exactly on a local level. This raises the need for local groups of people to get together and make their own agreements on how to deal with changes. This happens either spontaneously because of the perceived need to do it, aided by the recording of initiatives through the platform, or it can be pro-actively facilitated by external actors.

Existing social entities are concentrated in one or two landscape types. This makes it difficult to reach awareness on the larger system. It would be desirable to connect the different landscape types in the awareness and span of

responsibility of local communities. Therefore we propose that two or three (not more) existing social units work together in the vision-building for the future of their areas. The suggestion to collaborate with other groups in different landscape types, in order to create new synergies based on landscape logics, can be deliberately brought in by facilitators at the moment local groups start coming together. In fig. 3.14 we show how existing communities in the Vechtplassen might start working together.

The process starts with local initiatives in a certain area. All these activities can be mapped. Especially those who anticipate changes in the landscape in a successful way, e.g. adapting to rising water levels by introducing innovative land-uses are interesting. On the platform all initiatives are collected and exchange of knowledge and experience can take place. Positive deviance is a slow process which can only be partly guided through for instance objective

Figure 3.15. Visualization of a local vision: two times a year cows need to be transported from their winter to their summer lands. A festival is organized that includes local people and visitors in the activity, making it a trademark for the area.

mapping and evaluation of initiatives in the light of the re-generation and by showing the consequences and level of success of initiatives.

Aided by the platform and the communication of the regional regeneration plan awareness grows by more inhabitants of the area. It becomes clear what consequences they will have to deal with in the coming years. They start coming together and social capital grows. At a certain moment, there is enough social capital to start building a vision, setting rough boundaries in the landscape that encompass at least two landscape types. How this process will take place is depending on the developments in reality; the maps are thus only an indication of what is possible. By the vision-building program the whole area of the Vechtplassen may become filled in by spatial visions (Figure 3.16).

Reflection on feasibility of level 2

The three programs are depending on each other, on the functioning of the regeneration plan and on actual initiative shown by local people. Each program has its own draw-backs and uncertainties. The programs are dependent on the functioning of the other programs and the attitude of all stakeholders involved. This makes the uncertainty and unpredictability of the functioning of the programs in level two very low. Especially the local vision building program depends highly on the willingness of local people to step into complex social processes in order to build local visions. This kind of cooperation places people in a more 'dependent' position, which may not be a desirable idea for many. Also parties such as Natuurmonumenten has to step out of its 'comfort zone' in order to give away responsibility for natural areas to relatively inexperienced people. We hope to address this by offering clear incentives and new roles for local people as well as for large parties.

Exploration of vision areas
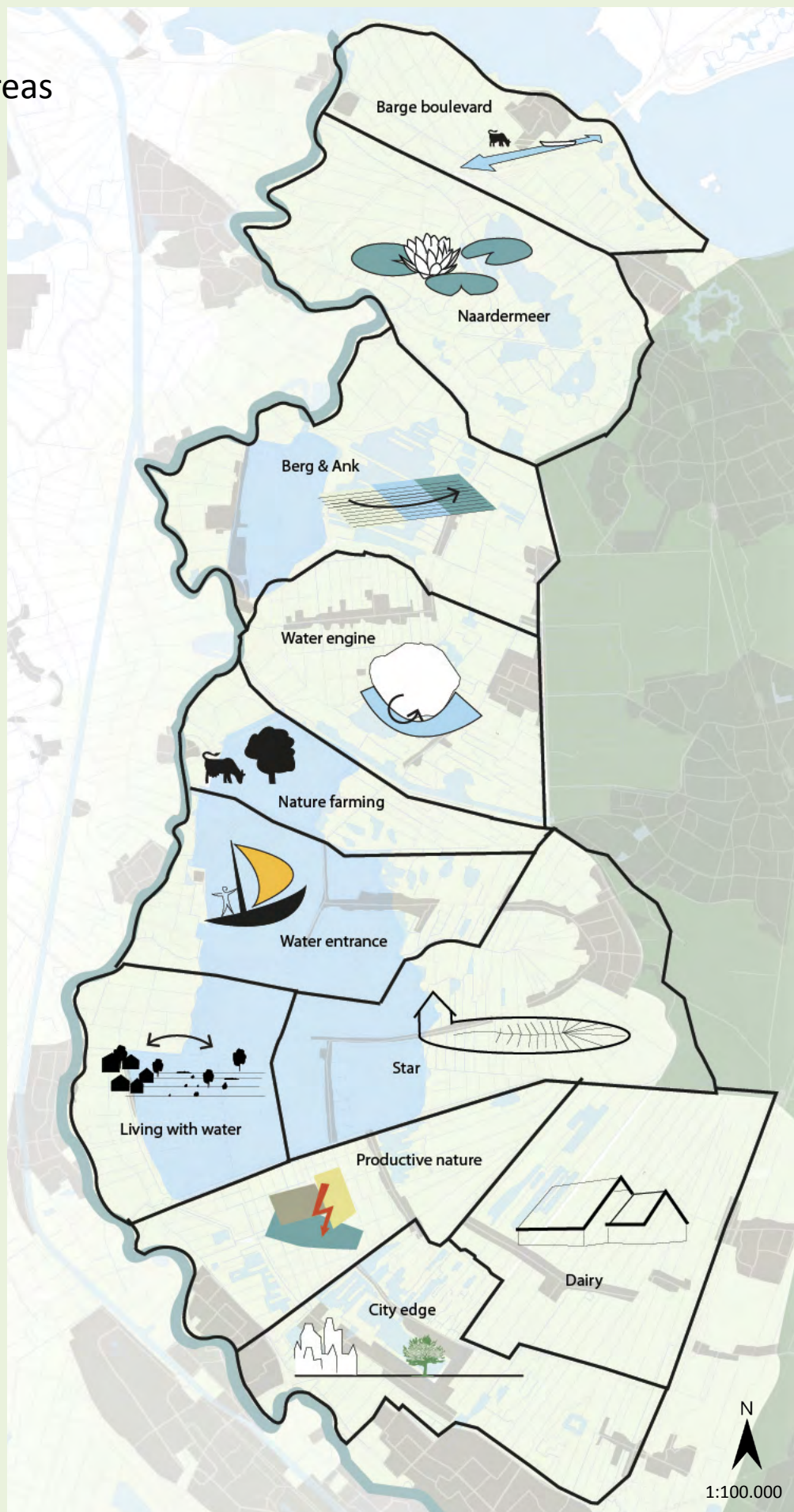
Figure 3.16. In the following pages all vision-building areas are shown, in an exploration of potential local visions in line with landscape regeneration of the Vechtplassen region. This helps us evaluate whether the strategy is practically applicable and whether it carries enough potential for local communities to gain viable prospects after landscape regeneration

The geographical borders of the vision-building areas are only indications, as these areas will be formed through a gradual and complex social process.

Two areas, Loosdrecht ('Water Entrance') and the Horstermeerpolder ('Water engine'), are not shown here but will be developed in more detail later in this chapter.
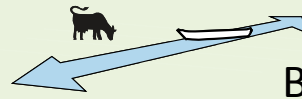
Barge canal

Current situation
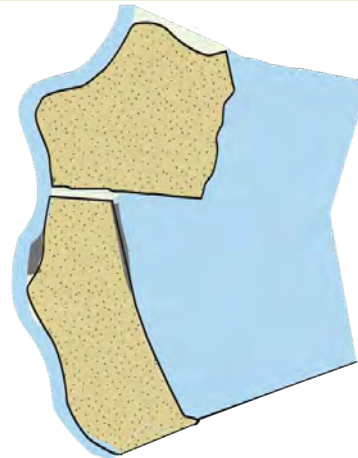
1: 70.000

Legend:
- Polders
- Reclamations
- Surface water
- Marshes and meadows
- Water-level rise
- Drastic water-level rise
- Partial and temporal flooding

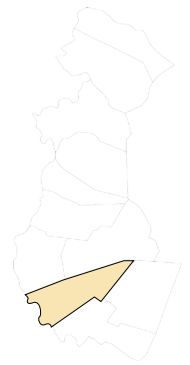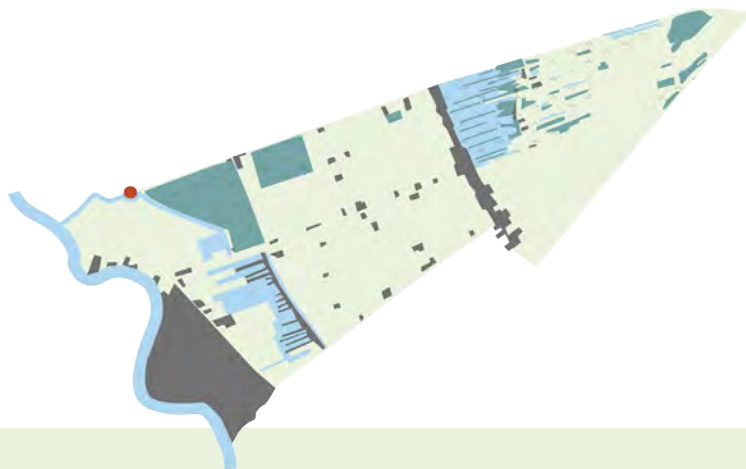1: 70.000

Regeneration consequences

Muiden gains access to local products from the landscape

Barge canal for people and products

Restoration of barge canal between two historic towns. Farmers offer services for visitors along the way and can ship their products to town

Naarden gains access to local products from the landscape

1: 50.000

Local vision

Naardermeer
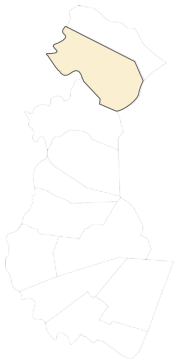
1: 70.000

Current situation

Legend:

- Polders
- Reclamations
- Surface water
- Marshes and meadows

- Water-level rise
- Drastic water-level rise
- Partial and temporal flooding

1: 70.000

Regeneration consequences

Intensive production

Natural production: nutrient rich

Productive nature: nutrient poor

Natural reserve
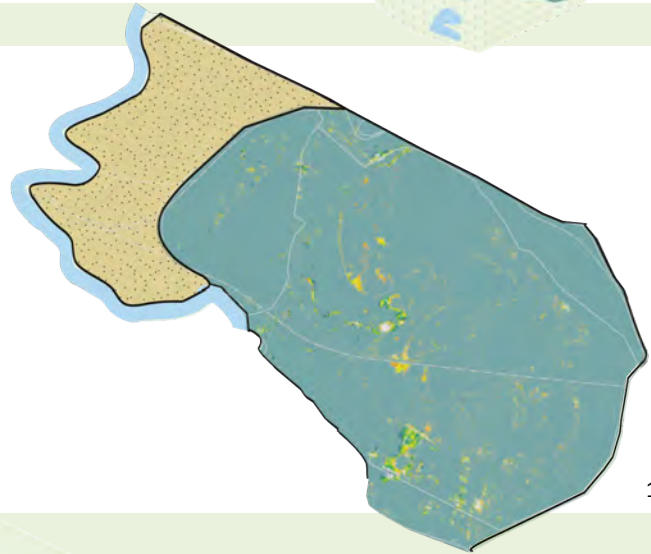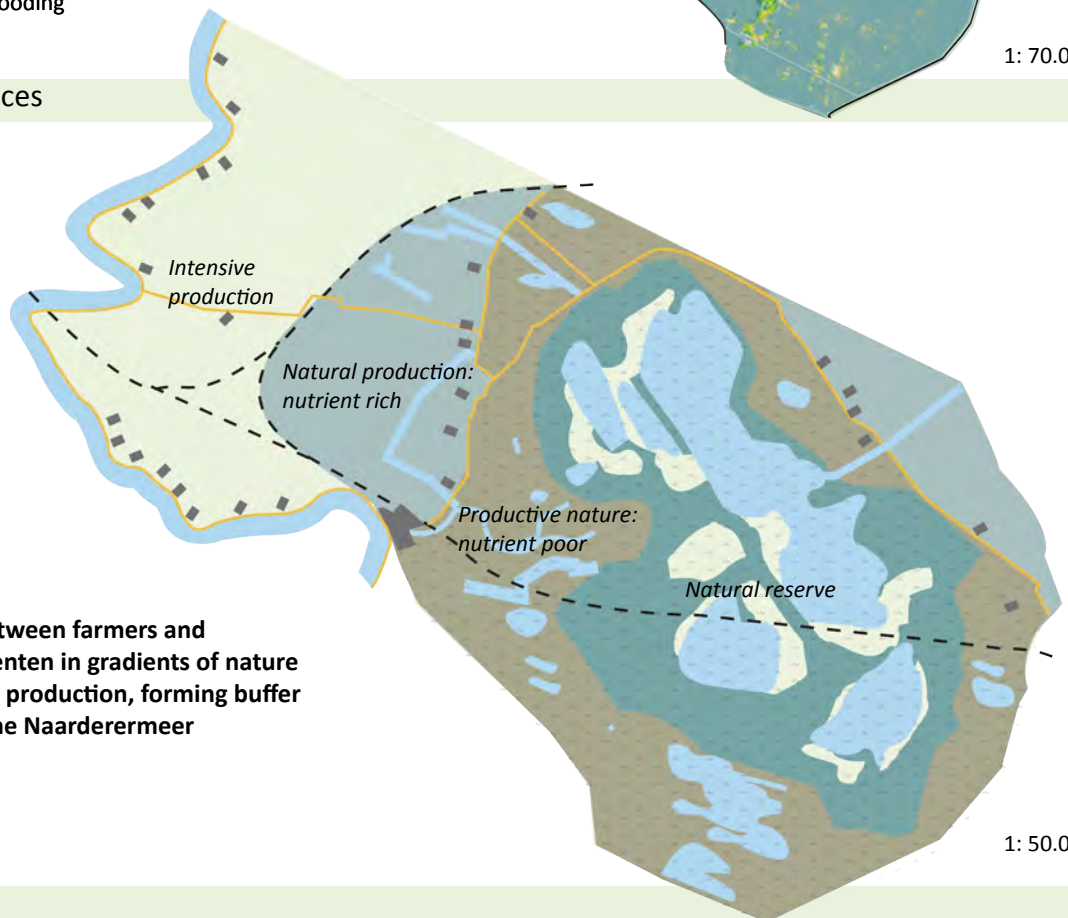
Cooperation between farmers and Natuurmonumenten in gradients of nature and agricultural production, forming buffer zones around the Naarderermeer

1: 50.000

Local vision
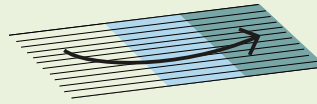
Berg & Ank
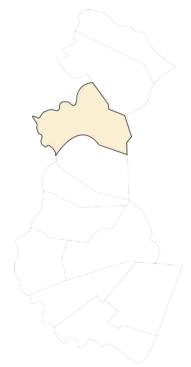
1: 70.000

Current situation

1: 70.000

Regeneration consequences

Exemplary Vechtplassenlandscape: education and learning on landscape formation and services

Routes for biking, walking and canoing, and transferia
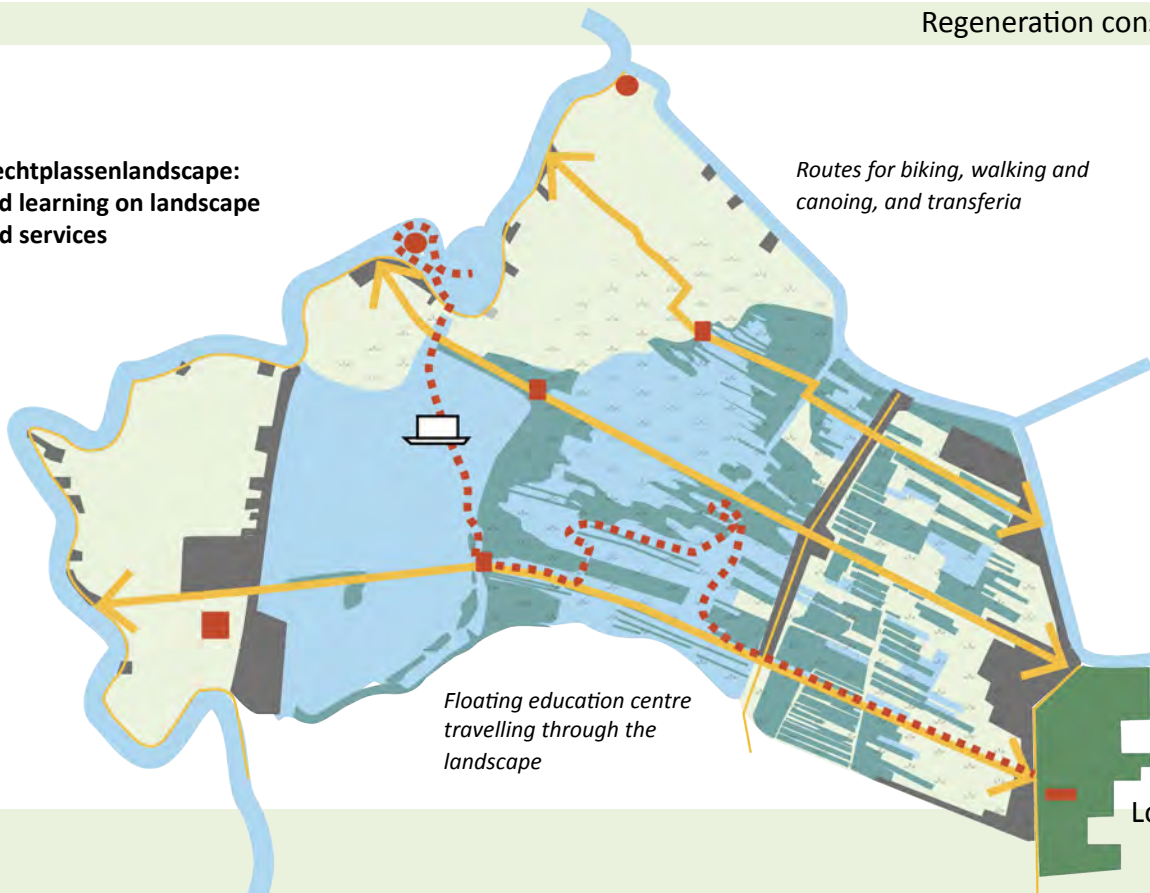
Floating education centre travelling through the landscape

1: 50.000

Local vision

Nature farming
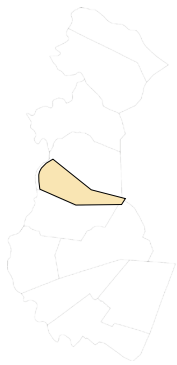
1: 70.000

Current situation

Polders	
Reclamations	
Surface water	
Marshes and meadows	
Water-level rise	
Drastic water-level rise	
Partial and temporal flooding	
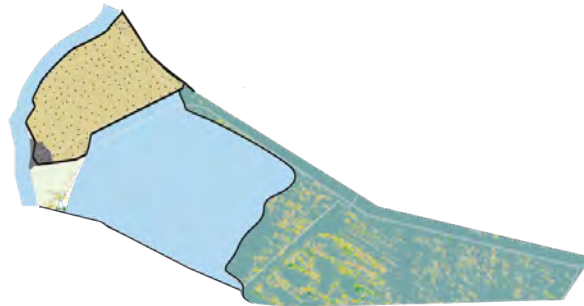
1: 70.000

Regeneration consequences

In this area the concept of Nature Farming is applied: extensive cattle grazing in natural areas

Summer: dairy cattle
Winter: young cattle, meat cattle
(dairy cattle in stables)

Summer: young cattle, meat cattle, hay
Winter: too wet for cattle
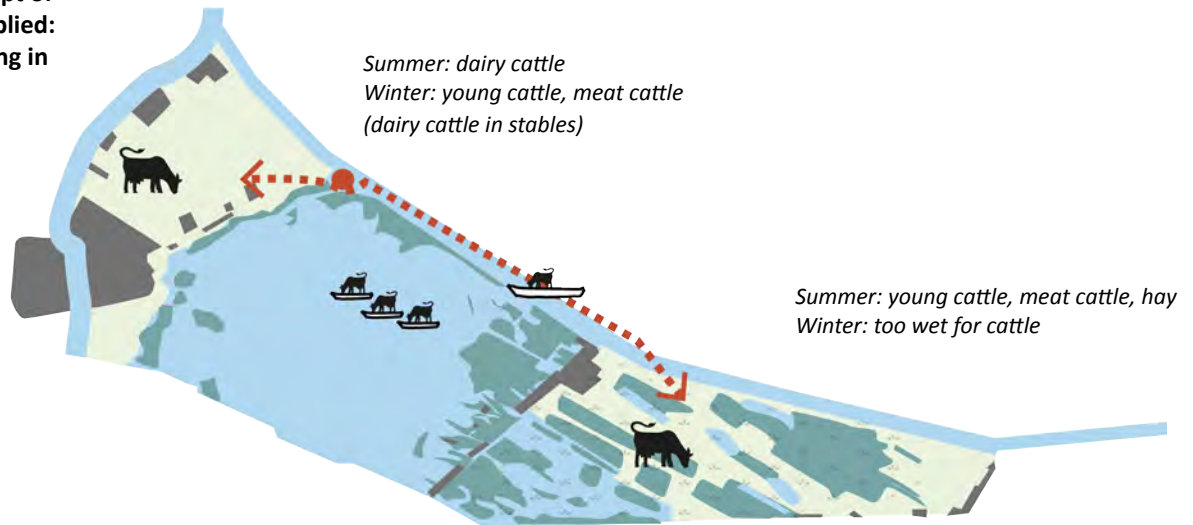
1: 50.000

Local vision
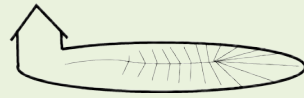
Star of Loosdrecht

1: 70.000
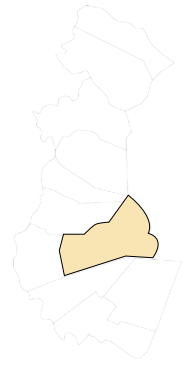
Current situation

1: 70.000

Regeneration consequences

Location to test the potential of the online matchmaker function between land and initiatives
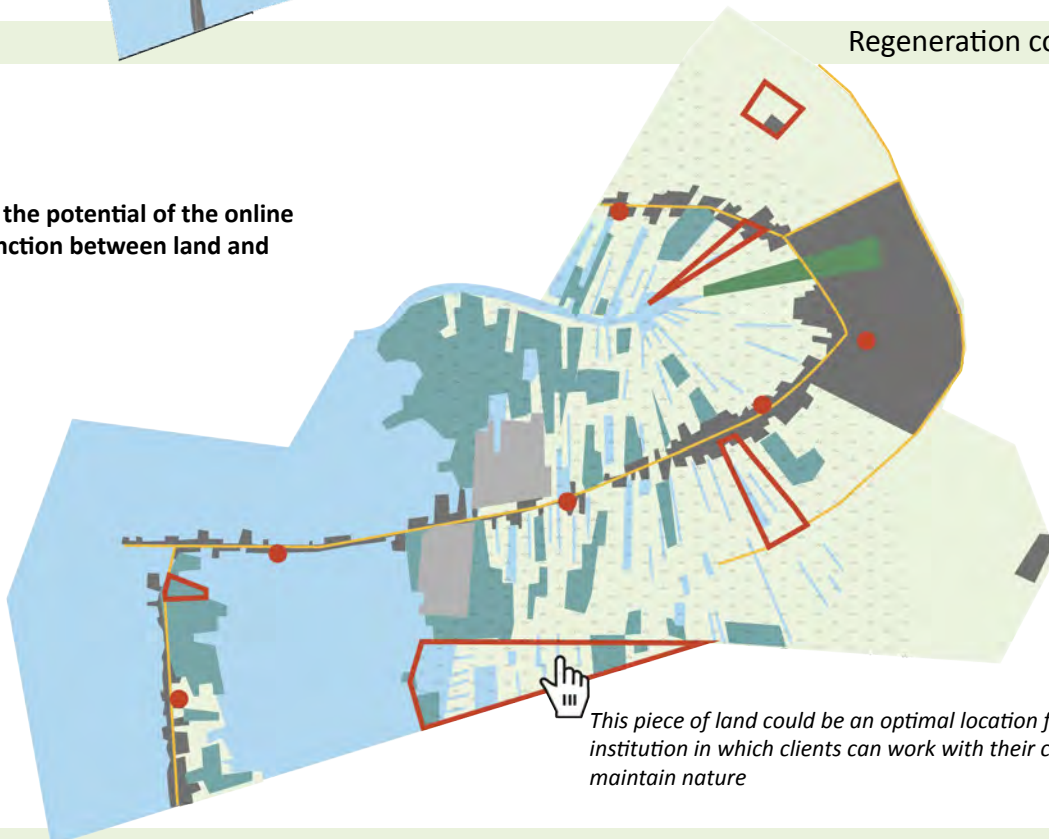
This piece of land could be an optimal location for a day-care institution in which clients can work with their caretakers to maintain nature

1: 50.000

Local vision

Water communities
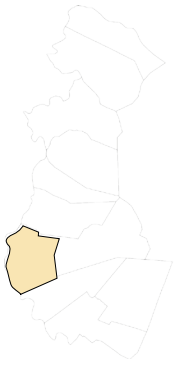
Current situation

Legend:
- Polders
- Reclamations
- Surface water
- Marshes and meadows

- Water-level rise
- Drastic water-level rise
- Partial and temporal flooding

1: 70.000

Regeneration consequences

1: 70.000

New eco-settlements directly dependent on
their wet surroundings take up ownership
and maintenance of the landscape

1: 50.000

Local vision

1: 70.000

Current situation
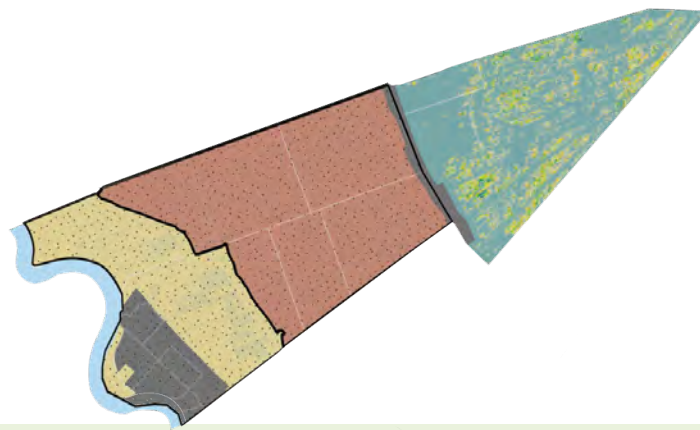
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Regeneration consequences

Nature development is the basis for a productive landscape: the inhabitants form cooperatives on energy and water
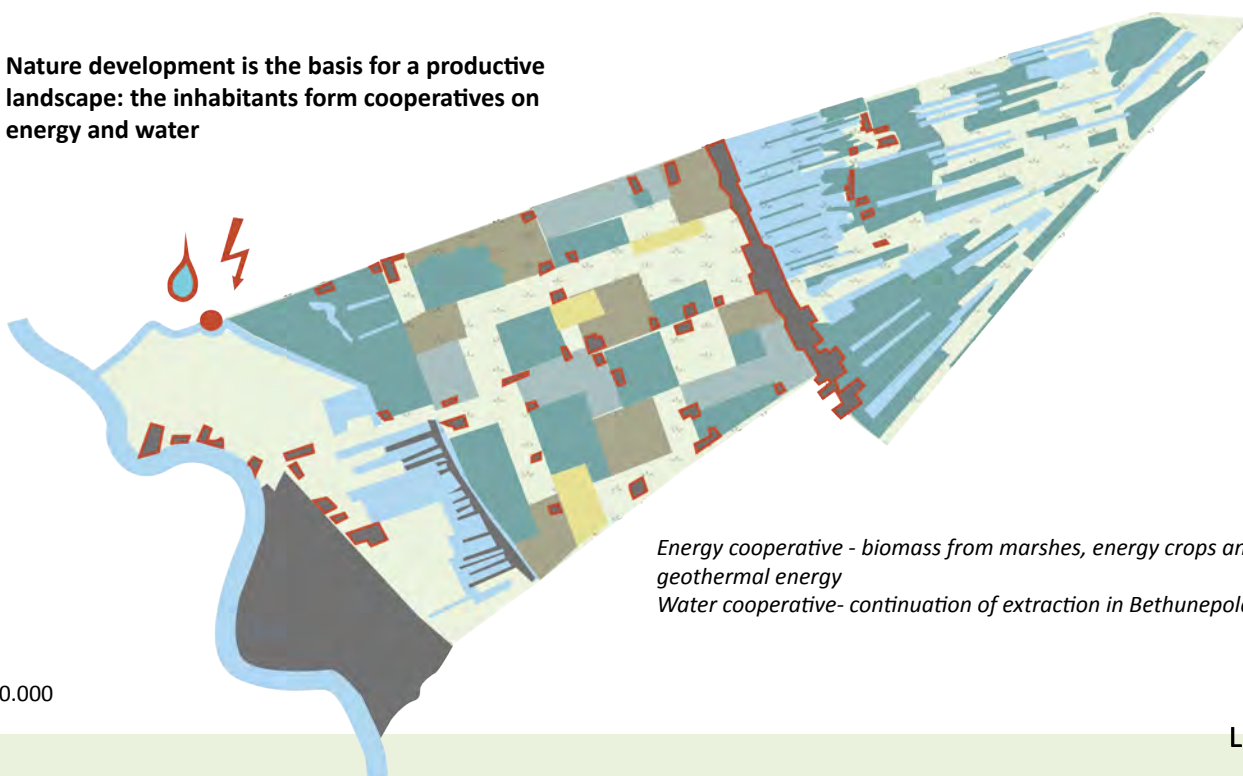
Energy cooperative - biomass from marshes, energy crops and geothermal energy
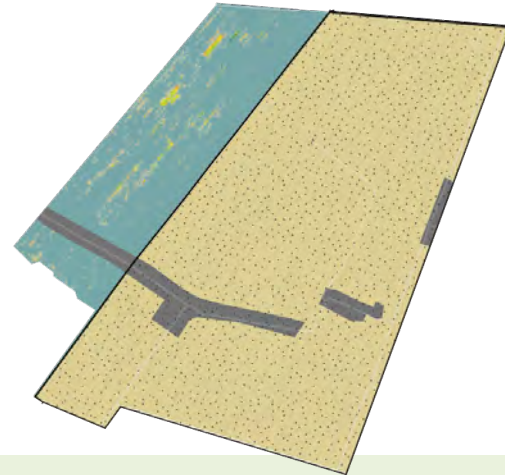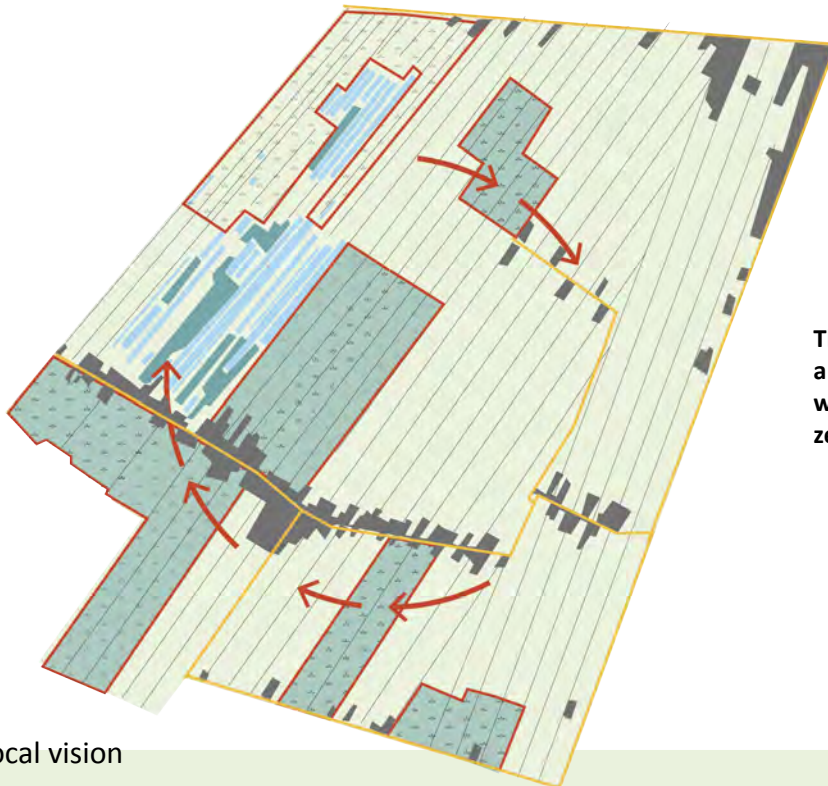*Water cooperative- continuation of extraction in Bethunepolder*

1: 50.000

Local vision

Wetland exchange
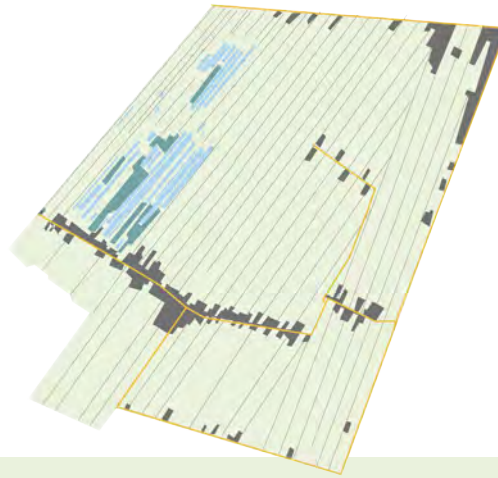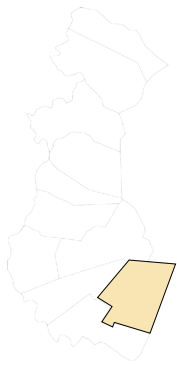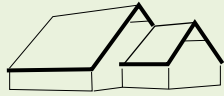
1: 70.000

Current situation

▦	Polders
▦	Reclamations
▦	Surface water
▦	Marshes and meadows
▦	Water-level rise
▦	Drastic water-level rise
▦	Partial and temporal flooding

1: 70.000

Regeneration consequences

The wetland exchange system (Alterra) is a system that combines dairy farming with wetland production, resulting in a net. zero soil subsidence
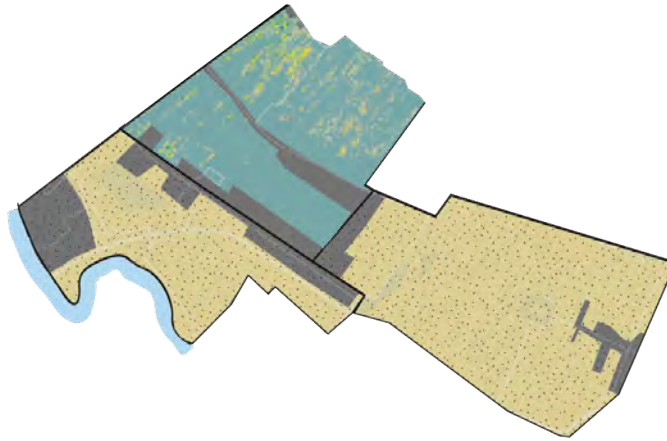
1: 50.000

Local vision
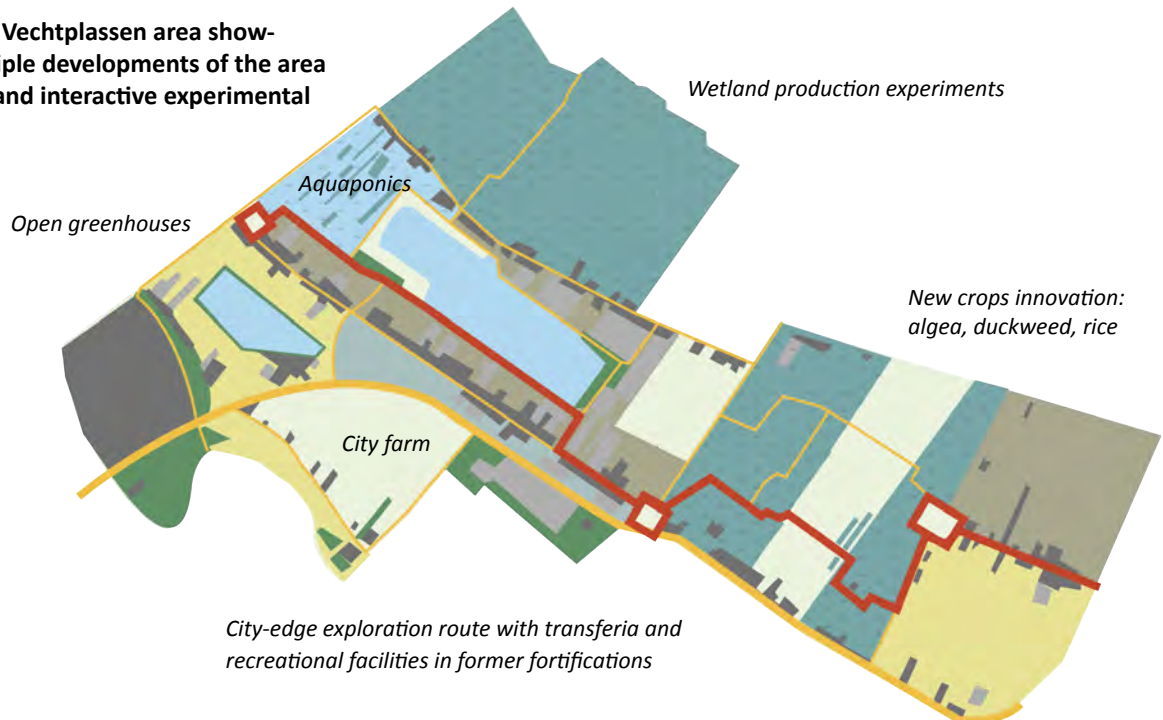
Landscape Park

1: 70.000

Current situation

1: 70.000

Regeneration consequences

Entrance to the Vechtplassen area showcasing the multiple developments of the area in recreational and interactive experimental facilities

Wetland production experiments

Aquaponics

Open greenhouses

New crops innovation: algea, duckweed, rice

City farm

City-edge exploration route with transferia and recreational facilities in former fortifications

1: 50.000

Local vision

Level 3: Local initiative

On this level all external parties need to let go. The programs introduced on the second serve as mediums to guide and steer local initiatives, but on the level of local reality it is up to the people themselves. What is needed here is local responsibility, local valuation, both existing and new, innovative land-uses and local monitoring.

On this level the conditions of socially supported regeneration can be translated into spatial form through a new design language, that creates allowances for direct relationships between people and their environment, that can design for communal responsibilities in the landscape, and can reveal ecosystem functioning in order to aid learning. These local direct connection to the landscape need to be enable on the input, output and feedback level of the social feedback model. This way abilities can be created for people to take on tasks in the landscape, to have direct access to and appreciation of ecosystem services, and to gain awareness of the functioning of the natural system.

There is a large scope for landscape architects on this level to find innovative new ways to use factors like *direct dependence, ownership types, accessibility and visibility of ecosystem services* in order to create places that do not alienate, but rather form possibilities for (renewed) attachments of people to their landscape. So on this level, the landscape architects translates wishes of people into landscape plans, while taking into account the factors related to the creation of a socially supported regeneration.

The examples in the box below are meant to form an impression of the various possible concepts derived from our research and design exploration. In order to develop these examples into a 'design language' much more encompassing research is necessary.

Some of the examples below are directed at interventions people can apply individually. Others are interventions for which new forms of social organisation among individuals or communities is necessary. In the latter case, design also becomes accompanied by 'social design', e.g. mutual agreements, roles and responsibilities in the landscape.

Reflection on feasibility of level 3

This level is dependent on the actual development of local initiatives and on the success of the programs and the regeneration strategy in general. Is there enough local capital? Are people willing to take initiative? The level of successful empowerment that is actually achieved at this level depends also on the ability of powerful parties to let go.

PRODUCTION

- Agricultural nature maintenance and 'nature farming'
- Added functions on the farm: care, education, catering
- Backyard cultivation systems: aquaponics/hydroponics
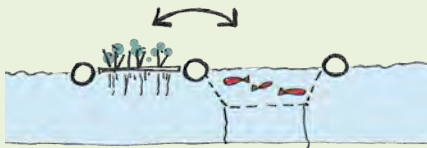
- Community supported agriculture, e.g. ties with the city
- Landscape Machines: productive landscape systems such as fish/duckweed combination
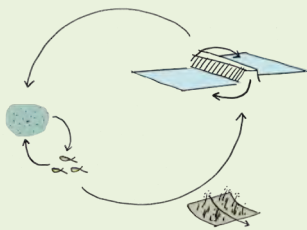
- New cultivation: water-based crops
- Water purification
- Innovation and experiment

LIVING

- Self-sufficient buildings in direct dependence with natural services
- Paths and backyards on the (flexible) water level
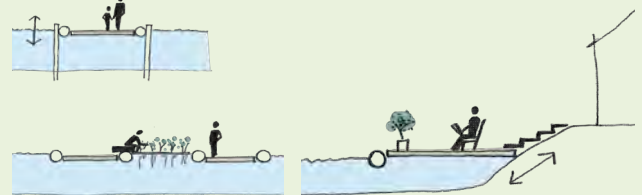
- Communal property: new commons
- Estates and farms as base for new living concepts
- Floating housing/ pole-houses
- New co-habitation concepts: Eco communities that take responsibility of the surrounding

- Use of local material

Role of the landscape architect level 3: landscape designer

Design in service of...

... direct connections to the environment
... healthy ecosystems
... embedment of knowledge
... spatial quality and experience

Potential involvement of landscape architects on this level is by commission: local (groups of) people are the commissioners and the landscape architect works to accommodate their wishes. On this level, the landscape architect is engaged with form and materiality, aesthetics and experience. This is the level in which the 'traditional' qualities of design can be expressed. Subjective and personal wishes come together in plans that are aiming to create functional and aesthetically pleasing places, in line with the landscape vision and the wishes of the commissioner.
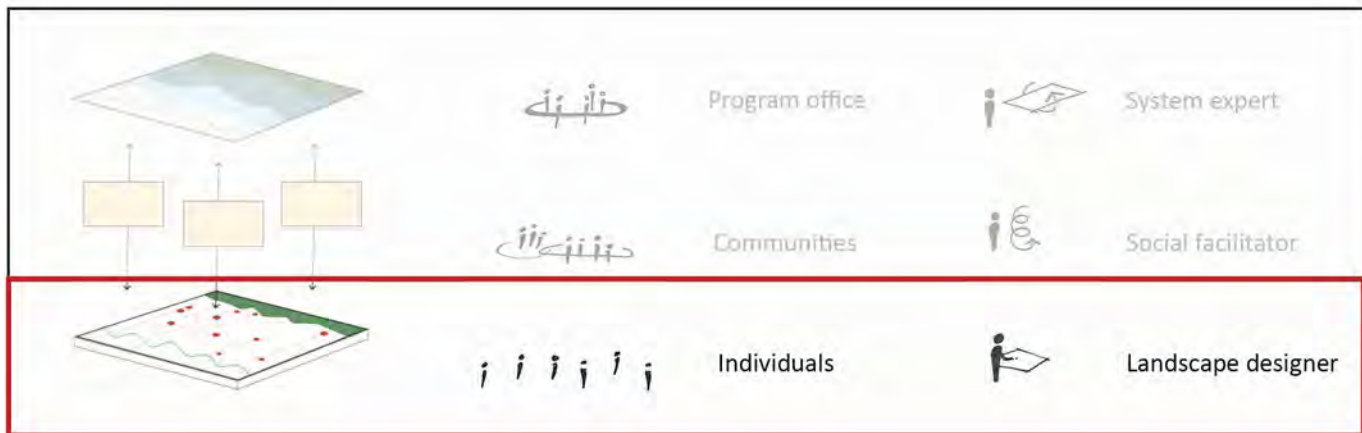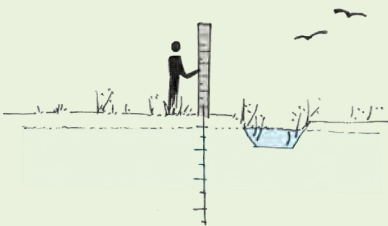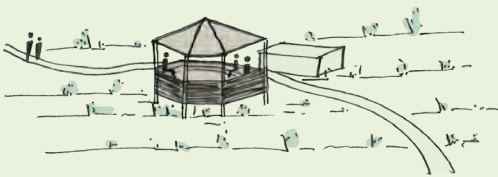

Figure 3.17. Third level of the strategy: local initiatives

LANDSCAPE EXPERIENCE

- Accessibility: network of paths and nodes
- Local monitoring

- Nature classroom
- Community 'getaways' in nature for meeting, staying and storage of equipment

- Readability: landscape identity and logic:
- Showcase developments: small-scale interactive setups
- Temporary events, season-related activities

Two examples from actuality:

1 *In Lemmer, dairy farmer Johan Adema will be the first farmer developing a duckweed production pond. The project started with the aim to deal with a surplus of manure at the farm. Duckweed thrives well on manure and is very high on protein, making it a very suitable substitute for livestock feed, now made of imported soy.* Zuid-Friesland, 12 juni 2013 jaargang 84 nr 24

2 *In 2013 an innovative project takes place in the municipality of Smallingerland, in the North of the Netherlands. A new neighborhood of 45 houses will be developed, where the future residents are the ones developing not only their own (energy-neutral) houses, but also 90 ha of natural landscape. The future residents will together, in a form of 'Collectief Particulier Opdrachtgeverschap' develop, own and maintain a natural landscape, where they can also live according to their own wishes. The inhabitants and the municipality share responsibilities and experts help during the process.*
Innovation network, Stroming, Urbannerdam, municipality Smallingerland. (depeindermieden.nl)
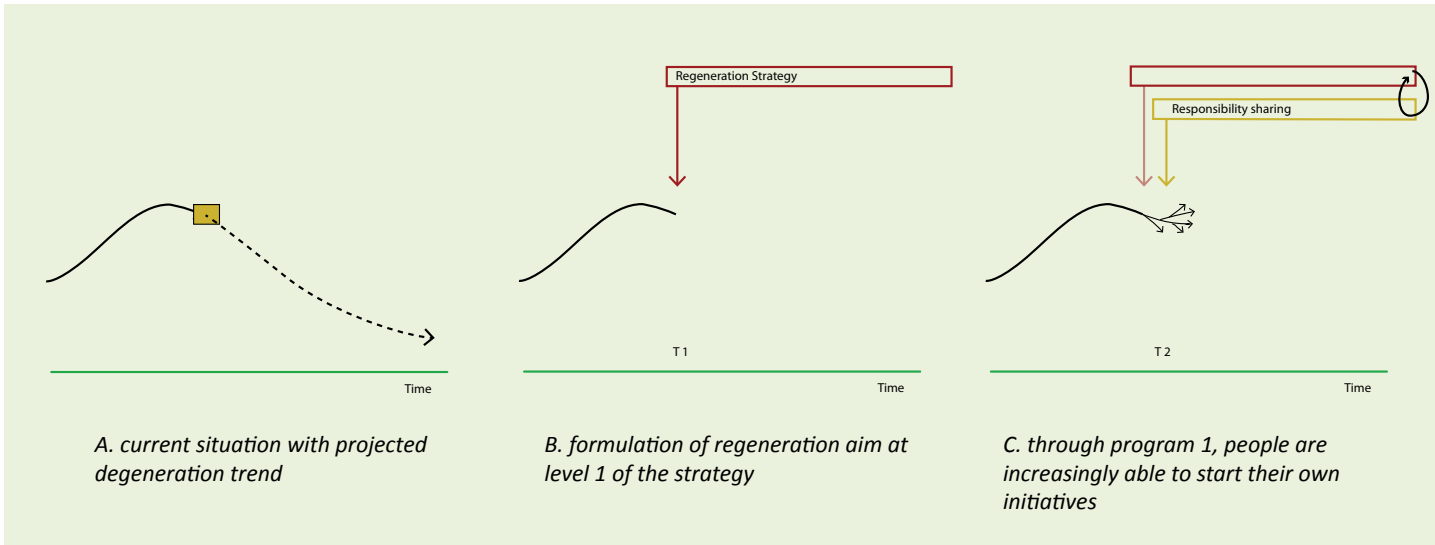
A. current situation with projected degeneration trend

B. formulation of regeneration aim at level 1 of the strategy

C. through program 1, people are increasingly able to start their own initiatives

Figure 3.18. Process of regeneration in time showing the interaction between various elements of the strategy and their effect on the system

Evaluation

Below we will shortly evaluate the design strategy we presented above. Does it work? Are the conditions we found in chapter 1 met? What seems successful, and for what do we still need further investigation?

In figure 3.18 the time-process of the regeneration strategy is visualized using a scheme in which the socio-physical system is plotted against time. In the timeline all elements of the strategy are shown. The regeneration starts with the formation of the program office, the development of a regeneration strategy and the communication of this strategy. Then the three programs are set in place, developing through time. The programs guide local initiatives through local vision-building, slowly uplifting the whole system. All elements continually reinforce each other, thus creating a complex but resilient process with many initiatives, possible visions and diverse land-uses. This simple visualization of the process shows the interdependence of the programs we introduced above.

This leads directly to the first concern regarding the design so far. The success of the strategy depends on the coming together of several elements at the right moment in time. Since it is hard to predict the time trajectories of the different programs, especially the moments of vision-building in each area, it is also hard to predict whether and how things will work out in each area. The visions we presented for each area are therefore quite idealistic, and there is a need to explore the likelihood that these kinds of visions will result from the strategy we presented more fully. We will attempt to do this by taking into account more explicitly the different actors and institutions in two vision areas, presented hereafter. However, these more detailed descrip-

tions remain on the level of an 'educated guess'. This is why we call them 'dreams', so that it may be clear that they are not actual expectations of how the strategy will play out in real life.

The vision areas show that there are many different approaches that can be taken in order to work with the regeneration plan and the three programs. This shows that there is flexibility in the form the regeneration is going to take for local areas and local people. Flexibility allows for solutions that are adapted to local wishes, and are therefore more likely to be socially supported. The vision areas show that there are many directions of development possible in the area that are in-line with the regeneration aim, some focused on agriculture, others on the recreational sector or living. Through the examples of the vision-areas it seems clear that there are multiple ways to work with the regeneration that are promising and that give prospects for viable land-uses. Therefore, even though it is not possible to predict the outcome of the strategy in reality, the variety of options indicates that it is plausible that local communities will find a way suited for them to deal with the regeneration challenge. The variety of options thus directly increases the likelihood that regeneration will become socially supported.

Two tricky points in the strategy are community organization and the combination of different landscape types. Several of the visions presented above are dependent on the willingness of people to work together and to set a common development direction. In some visions communal collaboration is crucial, in others it is less important. This shows that there is an option for a community to choose

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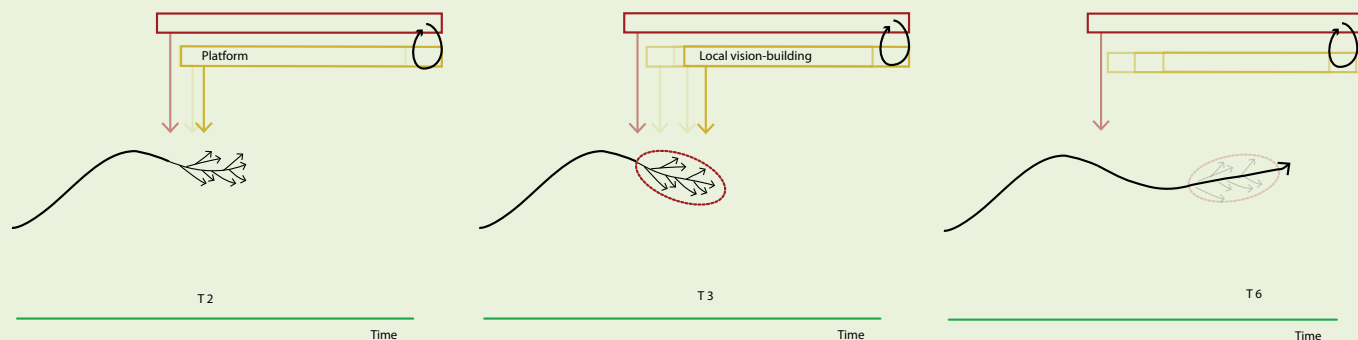
D. through program 2, more initiatives are inspired and people get connected

E. through program 3, local capacity is used to form a collective regeneration direction

F. through local agreements and initiative, local regeneration becomes reality

a 'lighter' option regarding cooperation and community building. However, especially in cases where it is crucial that the community acts in awareness of different interdependent landscape types, community organization is fundamental. The visions we presented show that there can be clear incentives for communities to work together, for the benefit of all members. Examples are production of crops or energy in for instance a cooperation, or the shared responsibility for nature areas which can then be used for several purposes or developed. As a community group it is possible to explore potential of the area that cannot be 'harvested' alone. However, this prospect is by no means a clear indication that people are actually willing to work together. This depends on the individuals concerned, but also on the support and facilitation through the three programs.

The attitude of the large parties is very important. Although it is difficult to predict future developments, we found that the three parties we investigated, Natuurmonumenten, the Nieuwe Hollandse Waterlinie and Waternet are themselves already in transition and can, if they want, relate their own ambitions to an overall regeneration ambition. In the 'dreams' below we will attempt to clarify further how this may work.

Another important aspect is the need to form co-governance and new social contracts: experts, decision-makers and large parties have to share their responsibility with local people. The willingness for this has to be set on the landscape system scale; all parties need to understand a the need for reorganization and restructuring of their organization. The attitude of all stakeholders is decisive for the success. The strategy we propose might lead to a complex,

resilient network of stakeholders and individuals. The attitude of decision-makers might be challenging, as the context of spatial planning is complex and difficult to change. Especially the role of the local municipality needs to be clarified and substantiated.

On the lowest scale-level of the strategy, the main condition is to create a direct connection between local people and their own environment. We described the need for a new design language related to the conditions of social feedback and we presented a toolbox with ideas on how to translate the factors and conditions into design. How the conditions can get embedded in local reality and guide local design needs however more exploration. Not all local initiatives on the lowest level of the strategy need to encompass a direct design challenge, but there is a need to rethink local plans and local designs to work towards a true embedment of knowledge and awareness, direct local responsibility and empowerment, and new, attractive prospects.

We have seen that the strategy as we propose it has the potential to indeed lead to the conditions for social feedback. There are however some remaining questions and many uncertainties. First, we need to fully understand the whole process in its physical, social and procedural complexity – the elaborated strategy only shows specific elements but not the complete story in all its layers. Secondly, the social organization needs more exploration; how can the process from local initiatives to a broadly supported local vision take place? What are, in this process, the specific roles of experts, local people and the large parties? And thirdly, how to design on the local scale for direct connectedness?
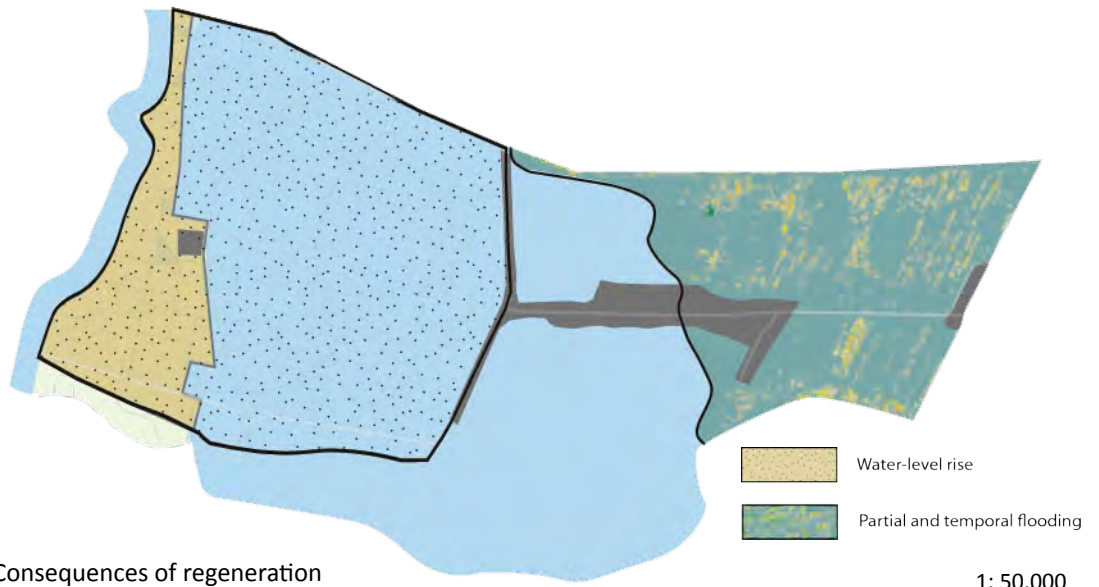
Water purification

The Vecht

Fort Spion

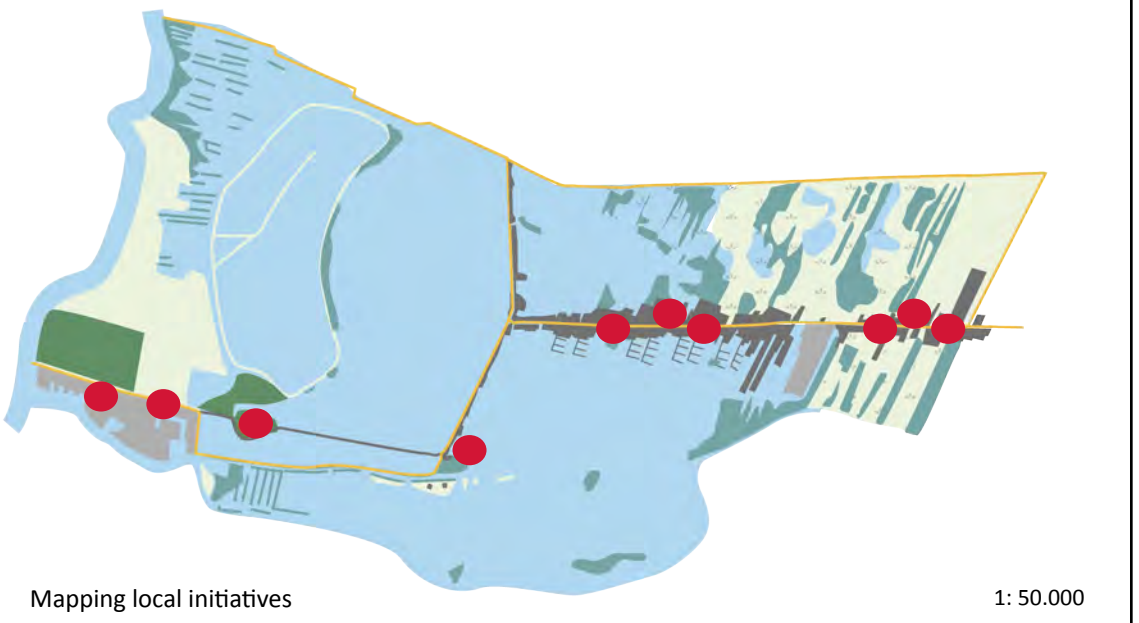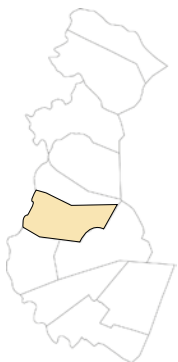Oud-Loosdrecht

Current situation

1: 50.000

Consequences of regeneration

Water-level rise

Partial and temporal flooding

1: 50.000

Loosdrecht area

Mapping local initiatives

1: 50.000

Two Dreams

In this section we will further investigate the strategy by telling two stories: for two local vision-building areas we will present a 'dream'. The possible developments are described, starting from the first regeneration aim developed by the program office, through the programs and the layer with local initiatives towards a 'local' regenerating landscape. A continuous iteration through the levels of the strategy will take place in time. Note that these dreams are only possible developments; in reality, all developments are guided by the actors in the area and formed through extensive and various forms of participative processes. We based the spatial developments on the analysis from chapter two. The two dreams are explained through steps in time.

Loosdrecht, towards collective nature maintenance

Loosdrecht is located in the center of the Vechtplassen and consist of a cultural peat landscape with a lot of surface water and linear built-up areas. In Oud-Loosdrecht water sports is an important activity for both residents and tourists. Many entrepreneurs are related to this viable economy. In the western part of the vision-area, at the entrance to the Vecht river, there is a large zone reserved for holiday houses and the storage of boats. Fortification 'Spion' is an element of the Nieuwe Hollandse Waterlinie and has some small recreational facilities.

Step 1

The regeneration strategy made for the whole area shows that this area has to deal with two main consequences. In the polder on the west side the water level has to rise, making sure the existing peat in the soil is stabilized. This leads to difficulties for the present dairy farming, but tools like under-water drainage can help optimize the land-use. The strategy, based on expert knowledge and local knowledge, culture and social structures, proposes a customized strategy, where the farmers and, optionally, other inhabitants can come to a consensus on the water level rise. Waternet should have a guiding and monitoring role here, to make sure the regeneration goals are met.

In the marshlands and meadows on the east side, the water level has to become flexible; the highest water level will be higher than at present conditions, and the lowest will be similar as now to slightly lower. This leads to temporal flooding of land, including lands close to the village of Oud-Loosdrecht. This might lead to loss of land and land that is seasonally unsuitable for e.g. recreation, small-scale production or other land-uses. As these marshes are part of the regional structure of marshlands reaching all the way from north to south, this has to be decided on a higher level. When exactly the water level will change depends on

Step 2 and 3: more and more initiatives take place, are mapped on the online platform, and actors start to come together

the collaboration between the project office, Natuurmonumenten, Waternet and local people. This could be a slow transformation, starting with a certain flexible water level which can be monitored and altered in time.

Step 2

Several initiatives take place in the area, anticipating the pending changes in the landscape. The two visualizations (figures 3.19 and 3.20) show two examples of positive local initiatives that could take place in this area. These initiatives take place on the 3rd level of the strategy, where the local people are empowered to come up with their own initiative, optionally helped/advised by experts.

At this step, the program office services as a monitoring and evaluating medium, using the platform (program 2) to get informed and to give input on system knowledge and on the regeneration strategy. The initiatives that are taking place are mapped, and slowly more and more connections and interaction between local parties are established. In this way, the program forms a crucial program in this area, providing opportunity for local people to get connected

Step 3

Parallel to the developments in step 2, also the program on sharing responsibilities starts to take shape. The role of Natuurmonumenten is very important. In this area, Natuurmonumenten owns a lot of land. In line with program 1 for responsibility sharing they offer the opportunity to local parties to experiment with taking responsibilities in the landscape. This process encourages entrepreneurs and inhabitants to come up with initiatives in line with new natural conditions which are also economically interesting, as they can use the attractive nature areas in new ways (see figures 19 and 20 for two examples of local initiatives). After a while it becomes clear that guiding agreements between individual initiatives are necessary and a communal vision for the maintenance of Loosdrecht's natural areas is desirable.

The role of the Nieuwe Hollandse Waterlinie is also interesting here, as one of the example initiatives we introduce is directly related to a fortification of the historical defense

Figure 3.19. Example of an initiative that takes place in step 2: the redevelopment of Fort Spion as a community center for the area. An entrepreneur decides to open up the fortification and offer several facilities: an information point for visitors, a meeting place, a small café and place to camp and dock boats.

Figure 3.20. Example of an initiative that takes place in step 2: 'houses of nowhere' (inspired by the concept of 'huisje van niks', WTS architecten). An entrepreneur rents out small floating, autarkic houses. People can 'sail' with them through the landscape surrounding the village, and stay overnight at a quiet place. This initiative reinforces the direct relationship people have with the water and the natural landscape, as they are really ín the landscape. The entrepreneur uses the cultural services of the landscape fully and is aware of his dependence on the sustained quality of the ecosystem. Therefore he is willing to contribute to the landscape fund that is set up in the area and take part in maintenance activities.

line (figure 3.20). In order to accomplish a successful inter-action space for the community in fortification 'Spion', the project team of the Nieuwe Hollandse Waterlinie needs to be open for the initiative.

Step 4

The previous steps lead to a growing interest for a shared vision; both Natuurmonumenten and the Nieuwe Hollandse Waterlinie as well as local entrepreneurs and inhabitants are interested in overall agreements to guide future deve-lopments and make some structural changes in the area. Thus, a gathering is organized to find common agreements on how the nature areas are going to be maintained and how the structural water level change in the eastern part has to be implemented.

The vision encompasses several aspects, visualized in fig-ures 3.22, 3.23 and 3.24. Through communication with the program office it is made sure that the vision is in line with the overall regeneration vision. In order to embed the vi-sion in the local decision-making structure, the municipality helps to institutionalize local agreements. It is decided that a local landscape 'steward' is trained who is familiar with the landscape and can mediate between the municipality and the local vision-building group. A fund is established for communal maintenance of natural resources. Local entre-preneurs contribute to this fund annually so that financial means are gathered to pay for the maintenance of the area. Natuurmonumenten is asked to carry out the maintenance

Steps 4 and 5: People decide to make a communal vision which can inform and strengthen (new) initiatives

task, together with local volunteers. Collaboration with Natuurmonumenten continues until a local actor (or group) decides to take up the task.

Step 5

When the vision is established, more developments can take place that are inspired by and in-line with the structu-ral vision. From now on, the vision will form a guidance for new developments, steering the area in a common direc-tion. This combines the economic activities in the area with nature ambitions and the overall ambition for regeneration. The local initiatives are continuously mapped through the platform for exchange and the municipality is making sure the ambitions within the vision are implemented. The grad-ual development of strong attachments and commitment to the natural areas form a strong social feedback that ensures the sustainable maintenance of the landscape. In Figure 3.21 the resulting situation of Loosdrecht's socio-physical system is visualized in the Social Feedback Model.
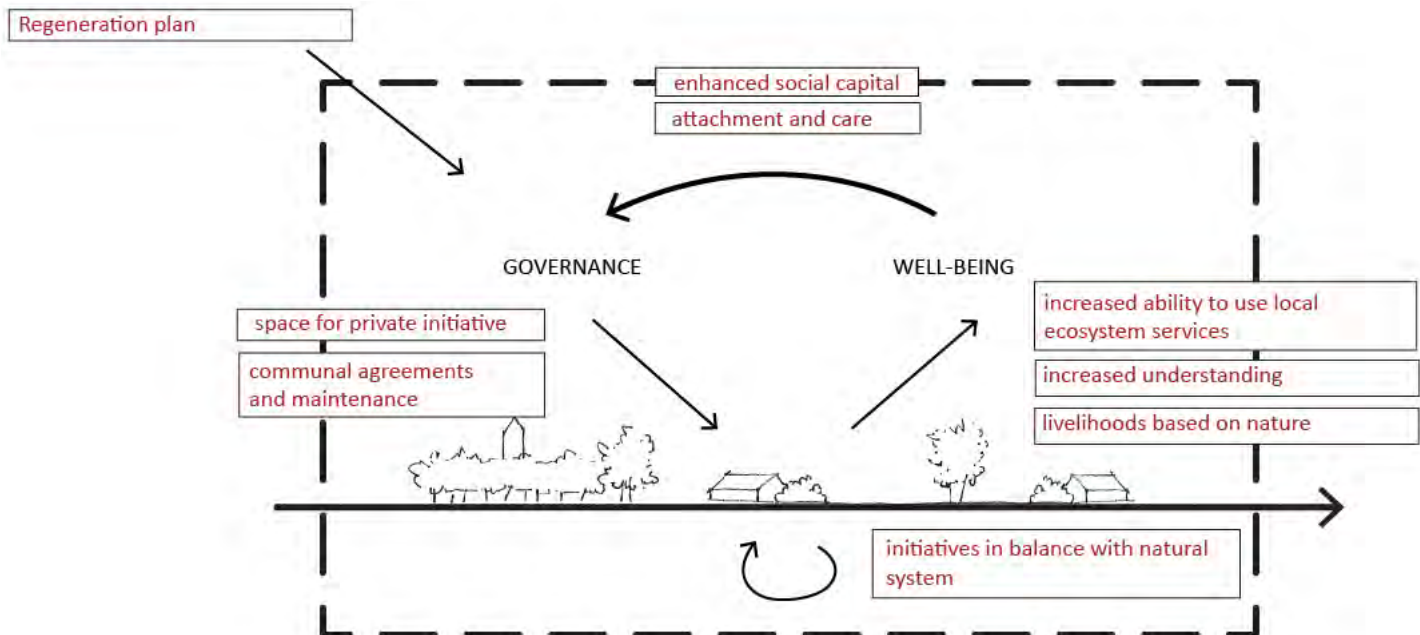
Figure 3.21. Overview: the effects of the dream for Loosdrecht shown in the Social Feedback Model
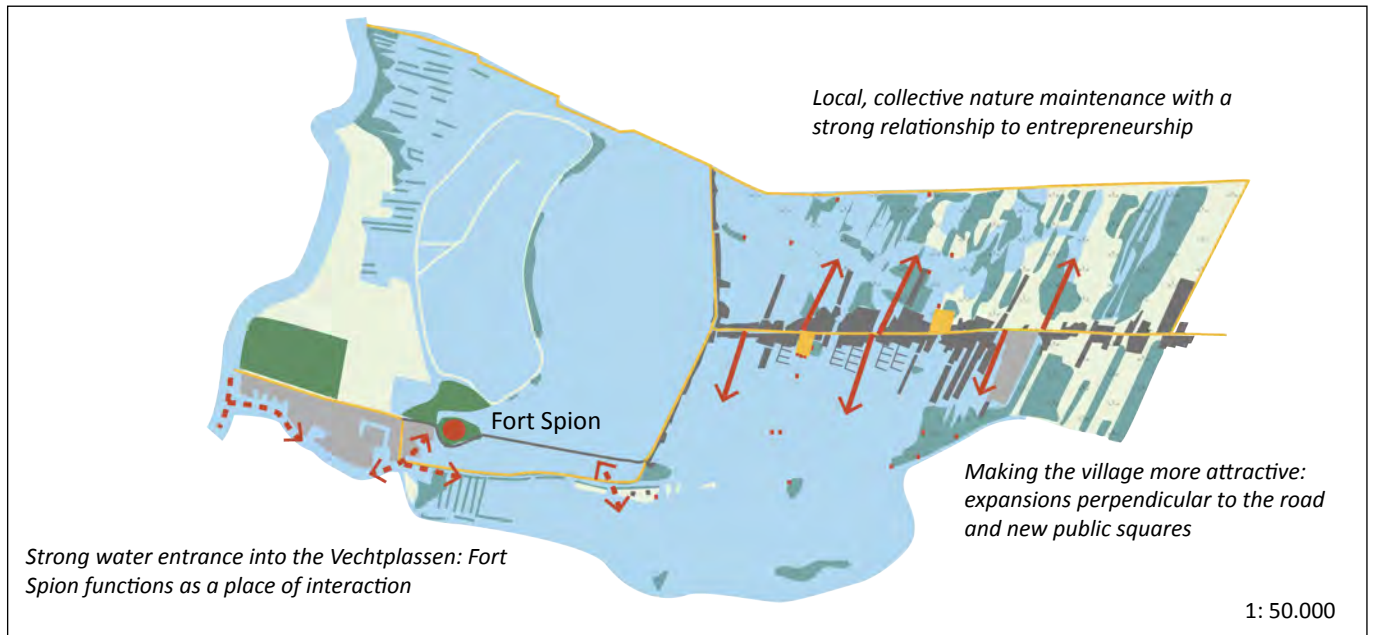
Figure 3.22. The final vision for Loosdrecht. The main aim is to organize collective nature maintenance. Entrepreneurial initiatives guide the change towards an attractive and qualitative recreation area.

Within the map:

Local, collective nature maintenance with a strong relationship to entrepreneurship

Fort Spion

Making the village more attractive: expansions perpendicular to the road and new public squares

Strong water entrance into the Vechtplassen: Fort Spion functions as a place of interaction

1: 50.000

Figure 3.24 Visualization of collective nature maintenance and landscape education carried out by entrepreneurs, inhabitants and tourists, facilitated by Natuurmonumenten. Entrepreneurs are encouraged to include the opportunities offered by the natural areas on the north side of the town in their enterprises. Activities can be allowed with respect to the vulnerable peat landscape. Maintenance activities may be interesting also in regard to educational trips.
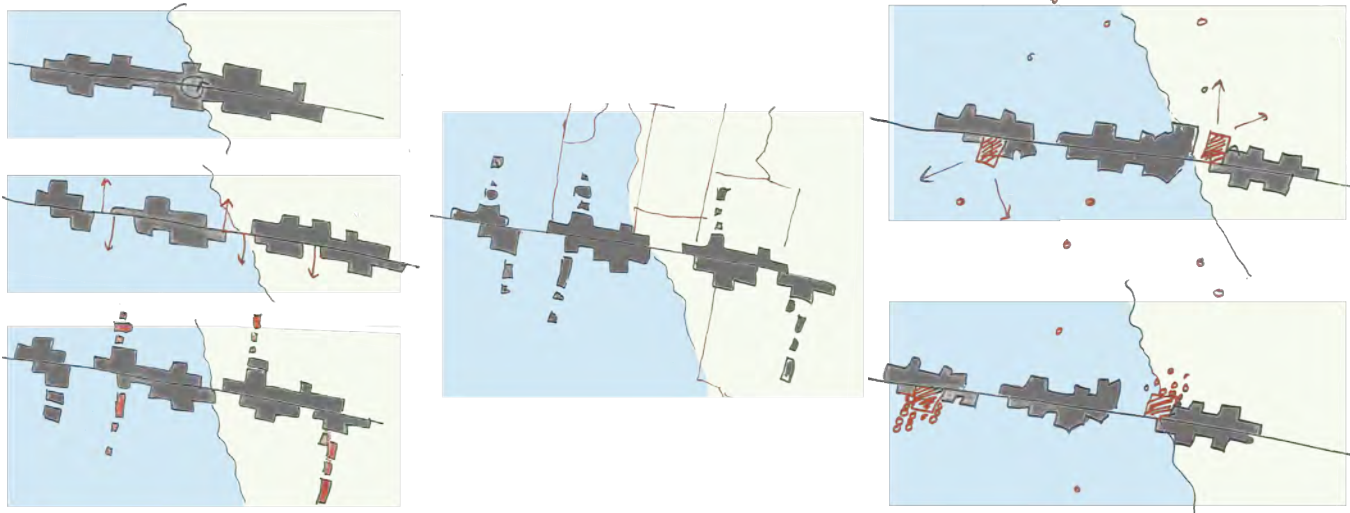
116

Figure 3.23 The vision includes the transformation from a closed, internally focused village towards village that is opened up toward the waterscape with lines of sight to the landscape and new developments perpendicular to the road (left). The landscape itself will be accessible by a network of paths. These changes can, to a large extend, be realized by entrepreneurial initiative.
The new structure lends itself well for the creation of one or two new public squares strongly related to the water. The 'houses of nowhere' can be linked to the squares, travelling around during summer (lower right) and coming 'home' in winter time (upper right). In winter, the presence of the houses forms enclosure and shelter for continued activities through the year.

Design of a public square opening Loosdrecht towards the surface water to the south. The square reaches outwards to the water through three seperate spaces, creating three places with a unique character.
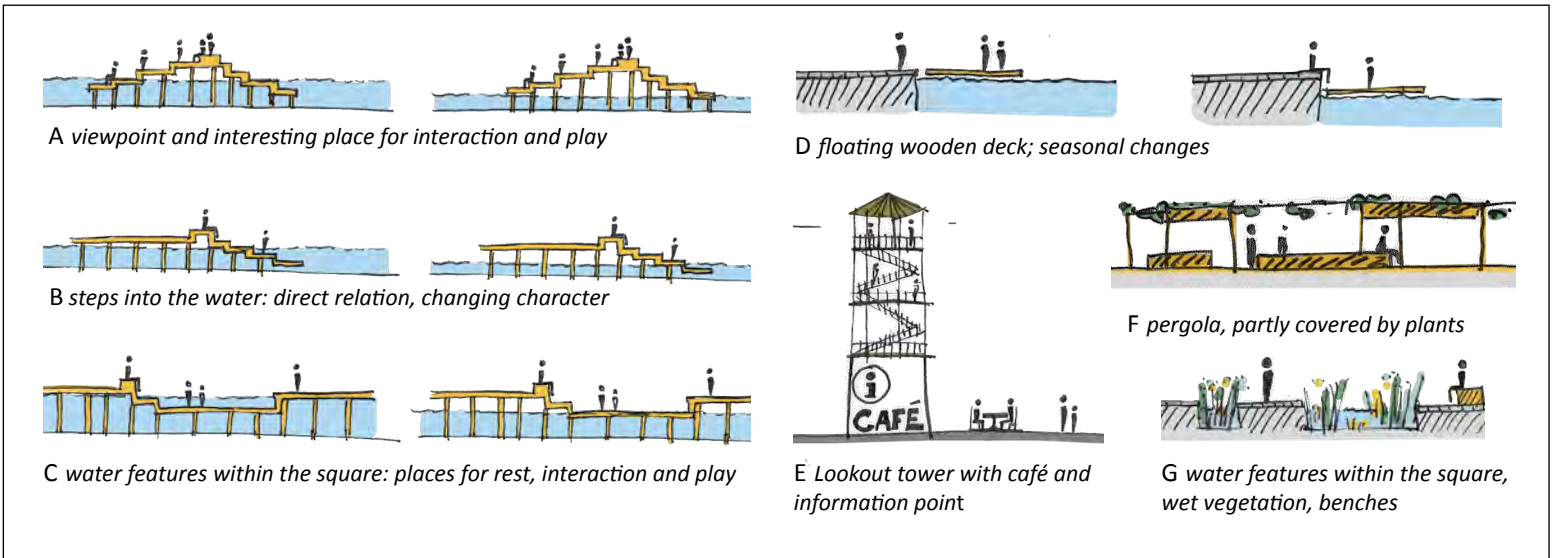
Parking place

Grass area

Tiles

'Houses of nowhere'

Wooden deck

F

C

B

N

1:500

A

Situation with 'houses of nowhere' home in winter (left) and away in summer (above).

A *viewpoint and interesting place for interaction and play*

B *steps into the water: direct relation, changing character*

C *water features within the square: places for rest, interaction and play*

D *floating wooden deck; seasonal changes*

E *Lookout tower with café and information point*

F *pergola, partly covered by plants*

G *water features within the square, wet vegetation, benches*

Some principles related to the design of the two squares. Sections A - C and F relate to the square on the left page, sections D, E and G to the square on the right page

Design of a public square opening Loosdrecht towards the wetland areas to the north. The square reaches into nature, relating (in form) to the cultural peat landscape and providing access to walking paths.
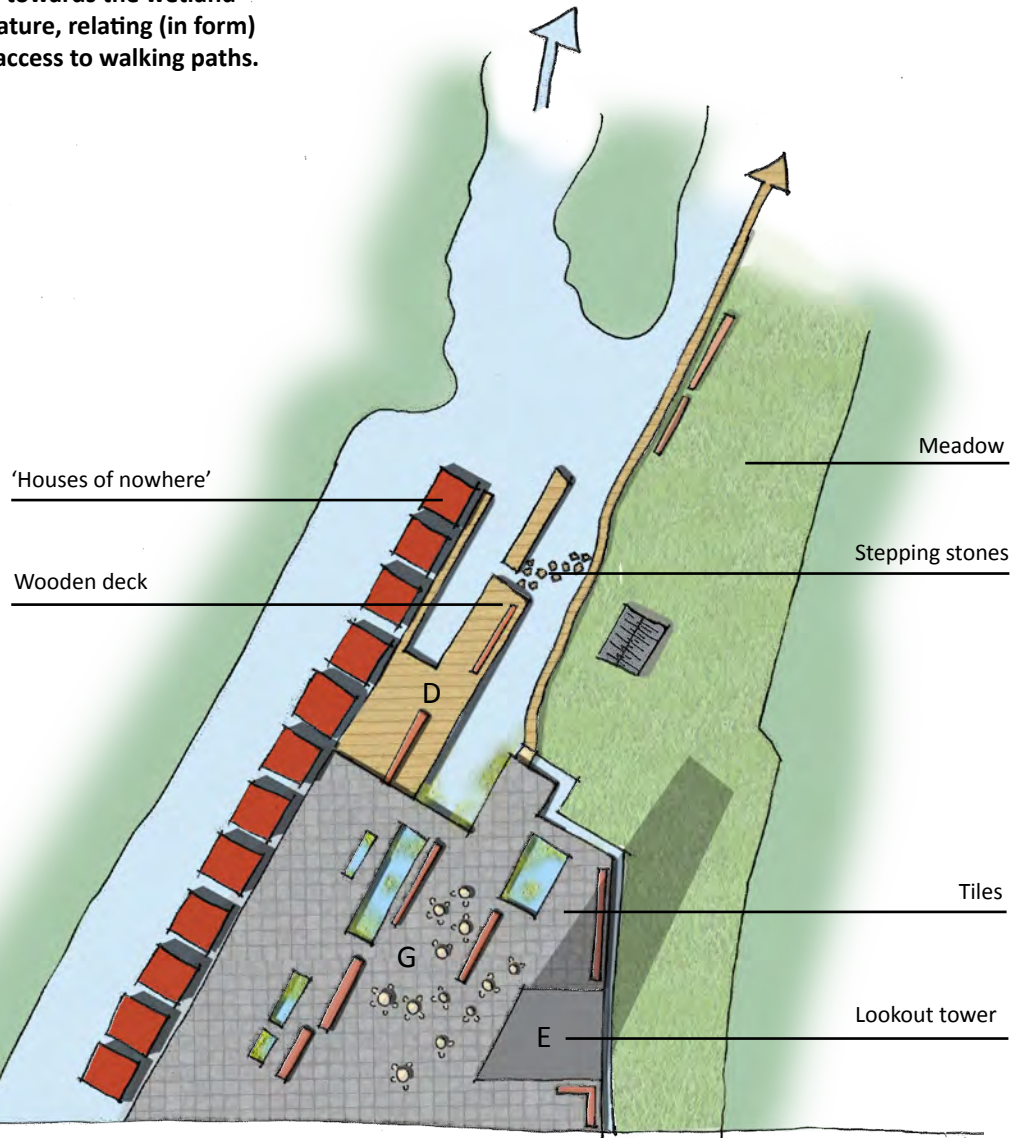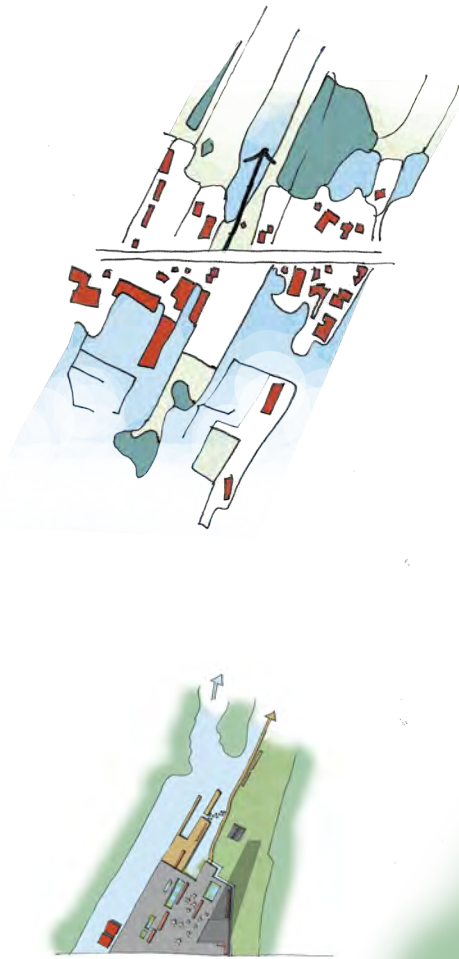
Situation with 'houses of nowhere' home in winter (right) and away in summer (above).

'Houses of nowhere'

Wooden deck

Meadow

Stepping stones

Tiles

Lookout tower
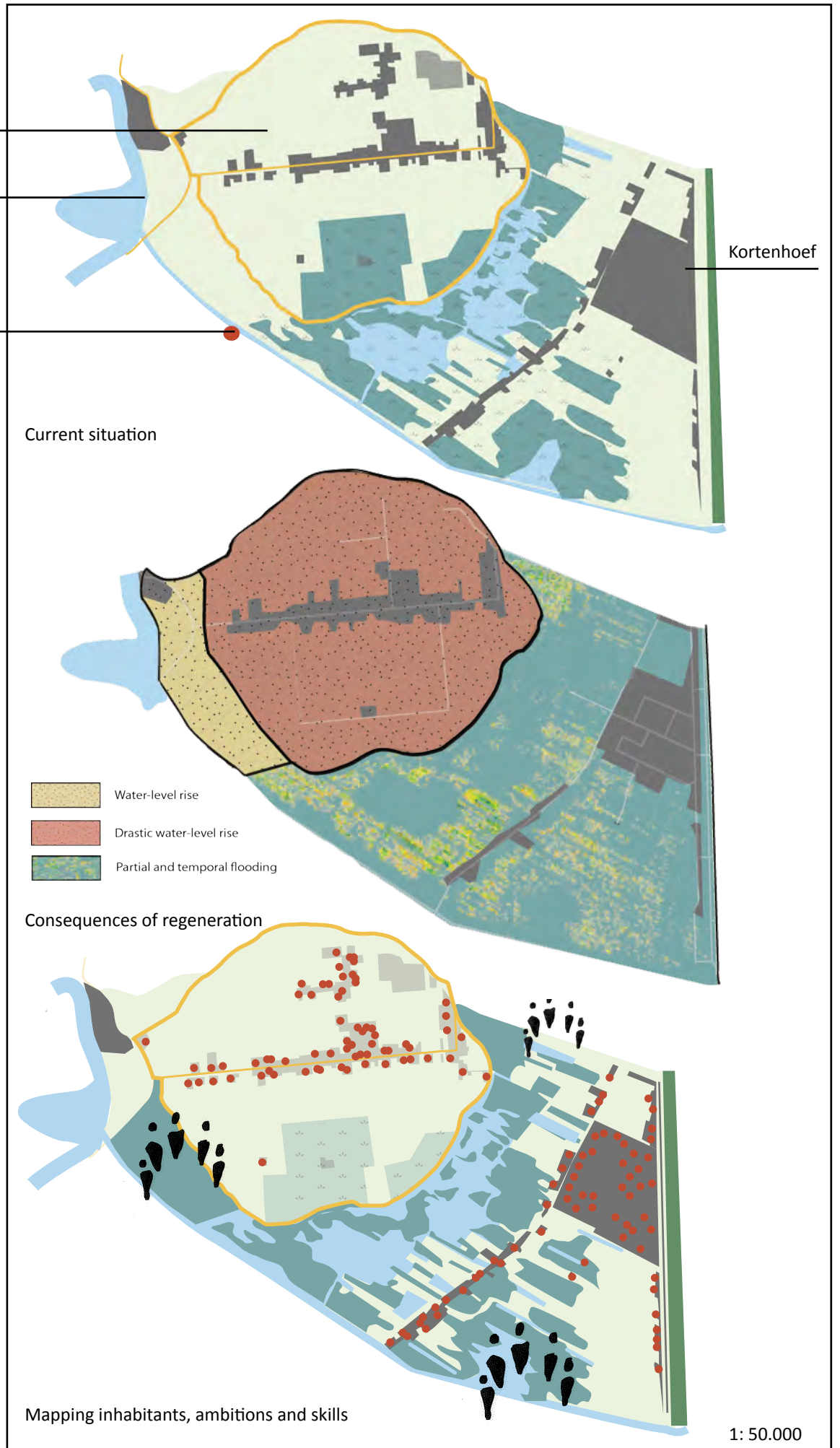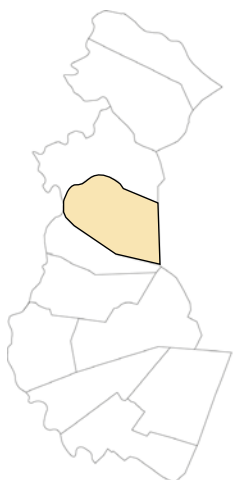
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119

Horstermeerpolder

The Vecht

Fort Kijkuit

Kortenhoef

Current situation

Water-level rise

Drastic water-level rise

Partial and temporal flooding

Consequences of regeneration

Horstermeer area

Mapping inhabitants, ambitions and skills

1: 50.000

Horstermeerpolder, a cooperative landscape machine

The Horstermeerpolder is one of the deep reclamations in the Vechtplassen positioned three meters deeper than its surroundings. The polder counts circa thousand inhabitants, of which four are farmers with dairy cattle. From the many orchid farms in its productive history, only one is left. In the nature area east of the Horstermeerpolder the village Kortenhoef is situated. This village is developed along a long road, related to the gradual harvest of peat. Now, the largest part of this village is a concentrated built-up area at the forest border, where it meets another linear village called 's Graveland. The village is oriented towards the area with estates to the east.

The Horstermeer used to be a lake and was successfully drained in 1882 in order to do horticulture and dairy farming. Since the beginning of this century, plans are made to inundate the reclamation in order to stop the large seepage flows that cause droughts in the vulnerable adjacent natural areas. However, the inhabitants of the polder find themselves ignored in the plan making and resist implementation of plans that are made. They fear the water level rise, as the amount of mosquitoes might increase and the foundation of houses might be affected. They denounce plans that don't include local and flexible land-use, e.g. wet nature areas that are not accessible (Kuiper 2013).

Step 1

The regeneration strategy made for the Vechtplassen region shows that the Horstermeerpolder faces drastic changes. These changes are necessary in order to bring the regional water flows in a more natural balance; at present, its low ground surface leads to large seepage flows. Currently the drying up of vulnerable adjacent areas is solved by letting in external water which has an inferior quality, creating ecological degradation. Moreover, the drainage of the Horstermeerpolder is costly. The map with consequences from the overall strategy shows three areas with different consequences. The Horstermeer itself needs to work towards a drastic rise of water level. The polders west of the reclamation face the need for a less drastic water level rise. The natural areas, finally, are connected to the larger area of wet marshlands, where a flexible water level will lead to more wet area with seasonal changes in water-level.

Step 2

In this area, there is an immediate necessity to start building a communal strategy, rather than to opt for a more gradual adaptation to change like in the area of Loosdrecht. The necessary water level rise in the Horstermeerpolder affects everyone and cannot be reached through individual initiative. The plan-making in the last years has created a strong social cohesion (grown from a negative reaction to

plan-making). Because of the existence of an active citizen group in the area it is not difficult to get people together to start thinking about a general vision. Program three can thus start immediately, initiated by the existing citizen group and supported by external actors through the program office.

One of the first steps the local group takes is to attract a landscape architect to help them in the process. After analysis of the local situation, the landscape architect makes the suggestion to work together with the neighboring community to create synergy between higher and lower land so that the reclamation may earn its value in the bigger system as a water 'machine'. So the inhabitants of Kortenhoef are invited to join the vision-building group. This group thus exists of representatives of the two communities (Horstermeerpolder and Kortenhoef) and a landscape architect. The group of representatives come together in fortification 'Kijkuit', which becomes a community centre.

The concept they come up with is the 'water-machine', in which the Horstermeerpolder is inundated in two phases and gets an integral function within the regional water system. The water-machine, which can be seen as a landscape machine, has as main (regional) function to retain water and provide (seasonal) balance not only in water availability, but also in water-quality through purification. In the vision, it is crucial for the local group that the new, wet landscape can also serve for production, that it provides new living environments and that it is accessible for recreation. Natuurmonumenten and Waternet, the two main large parties with a strong say in the Horstermeerpolder, are open for the ideas of the vision-group. They are willing to share responsibilities and think along with the group.

Step 3

Once the general vision is set, the platform (program 2) becomes important. The platform is used to map the community of the Horstermeerpolder: what are the existing ambitions, skills and interests? Through a pro-active and transparent process of vision-building and community mapping, the social support for an attractive and usable water machine grows. The internal network grows stronger. In this step, the developments within the Horstemeerpolder are central, as the largest change is needed there. The opportunities this creates for the adjacent community of Kortenhoef are taken into account as well.

An important conclusion from the social mapping is that there is no-one currently in the area that is willing to run the daily exploitation of a water machine in the Horstermeer. However, most people support the idea and want to be involved. Interest is expressed in developing recreational facilities related to the overall plan. The solution is found in the creation of a cooperative in which everyone who is interested gains a share of the enterprise. An entrepreneur is
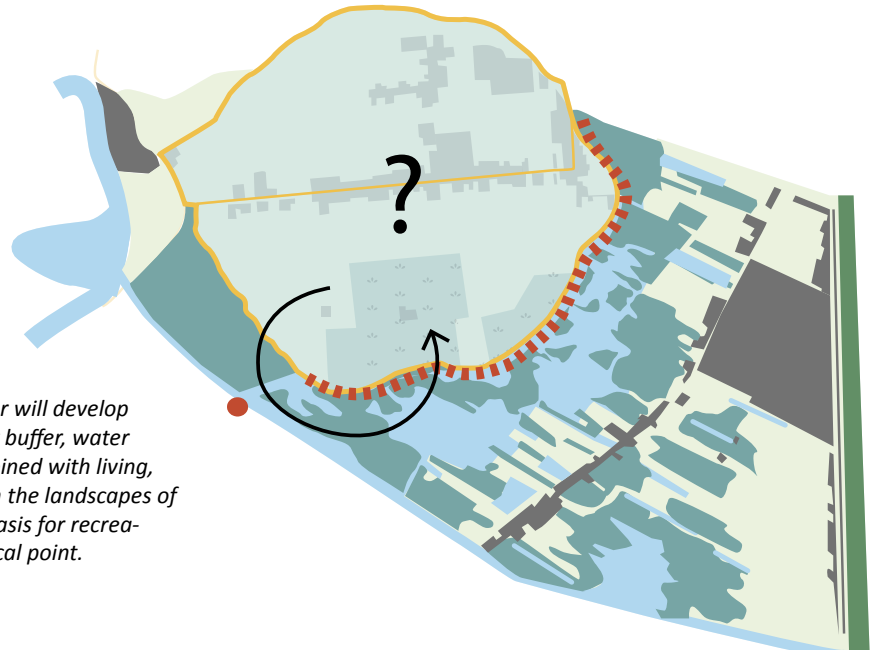
Figure 3.25. Initial vision: The Horstermeerpolder will develop into a water machine (exchange of water, water buffer, water purification), having a productive function combined with living, recreation and natural values. The dike between the landscapes of Kortenhoef and the Horstermeer becomes the basis for recreational functions, with fortification Kijkuit as a focal point.
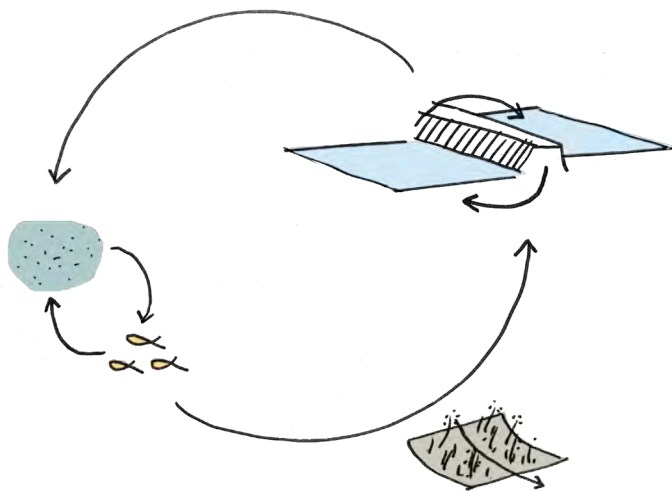

Figure 3.26. The duckweed and fish system provides an economic motor behind the plan. It works as follows: the duckweed is situated along the borders of the reclamation, where the water level is the shallowest, which is profitable for the duckweed production. The duckweed is produced in rectangular spaces separated by 'screens' which are flexible in use. These are needed to prevent the duckweed to be blown to one direction. The rest of the farm consists of water for fish production. The fish is fed by the duckweed, which can directly be let in the water on the edge of the duckweed production area. The fish and the duckweed have a synergetic relation: the duckweed serves as food for the fish, the fish leave nutrients etc. in the water through excretion, which in turn serves as food for the duckweed.

Figure 3.27. Development of the village is started when the dikes have been built to protect existing settlement. From this point on, no new houses are built on the ground surface, but either on the dike, on poles or floating. This is a slow development but can be fastened with certain incentives. In phase 2 the area between the two dikes will be inundated as well, filling the last deep 'hole' in the landscape. The village will thus change into a water world, with floating and dike-houses. In between the dikes people can still have their 'backyard', with e.g. floating terraces or vegetable gardens in the form of aquaponics.
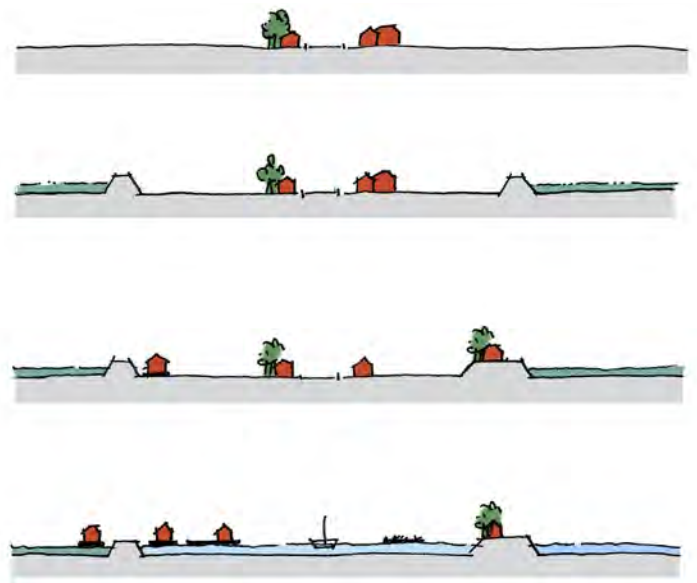
attracted to run the new landscape. This entrepreneur has to be open to include the wishes of the inhabitants for their area and accommodate a variety of functions and activities.

Step 4

The ambition and the vision are clear, a cooperative is formed and an entrepreneur is found who is willing to exploit the water machine in close collaboration with the cooperative. Time for the final vision. The landscape architect (either the same as the process facilitator, or another specialized in comparable plans) works, together with the entrepreneur and the cooperative on a spatial strategy. The idea of combined duckweed and fish production is developed, giving the area (and the cooperative) an economic motor.

The development of the area will take place in steps, with two main stages of development (see figures 3.29 and 3.30). The plan will be implemented in the coming 30 years. This allows for the gradual relocation of housing from the reclamation floor to the new dikes. The plan allows for flexible use and a gradual growth of multiple functions: for instance canoe rentals, educational tours and water machine and the exploitation of holiday homes can be started. Within the integral vision Natuurmonumenten has to give up their ambition to create wet nature but is invited to help integrate other nature ambitions within the water machine. Waternet has an important role in implementing the water

Entrepreneur

Cooperation

Step 3: Formation of a cooperation and attraction of a manager

system. The Nieuwe Hollandse Waterlinie opens up the fortification Kijkuit to provide space for group processes.

The plan thus leads to a fully balanced and productive landscape machine, with a strong embedded role of local people and visitors. The design includes multiple roles in the landscape, with different responsibilities and the opportunity to experience the productive landscape and the several ecosystem services.
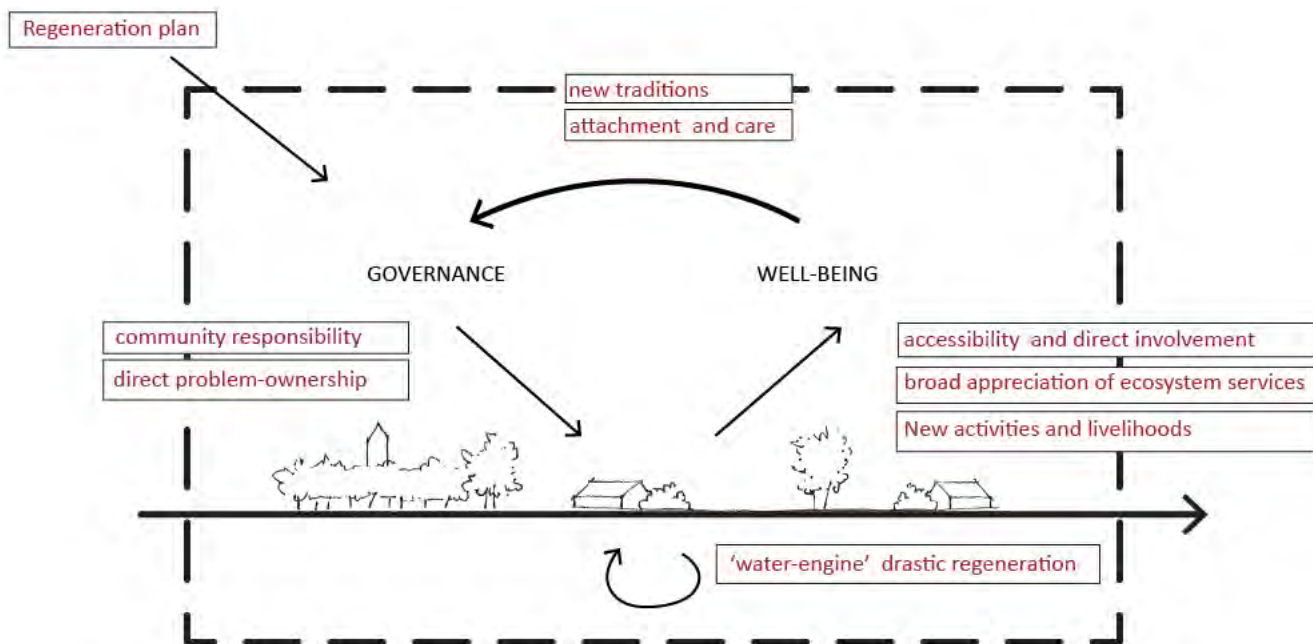

Fig 3.28. Overview: the effects of the dream for the Horstermeer area shown in the Social Feedback Model
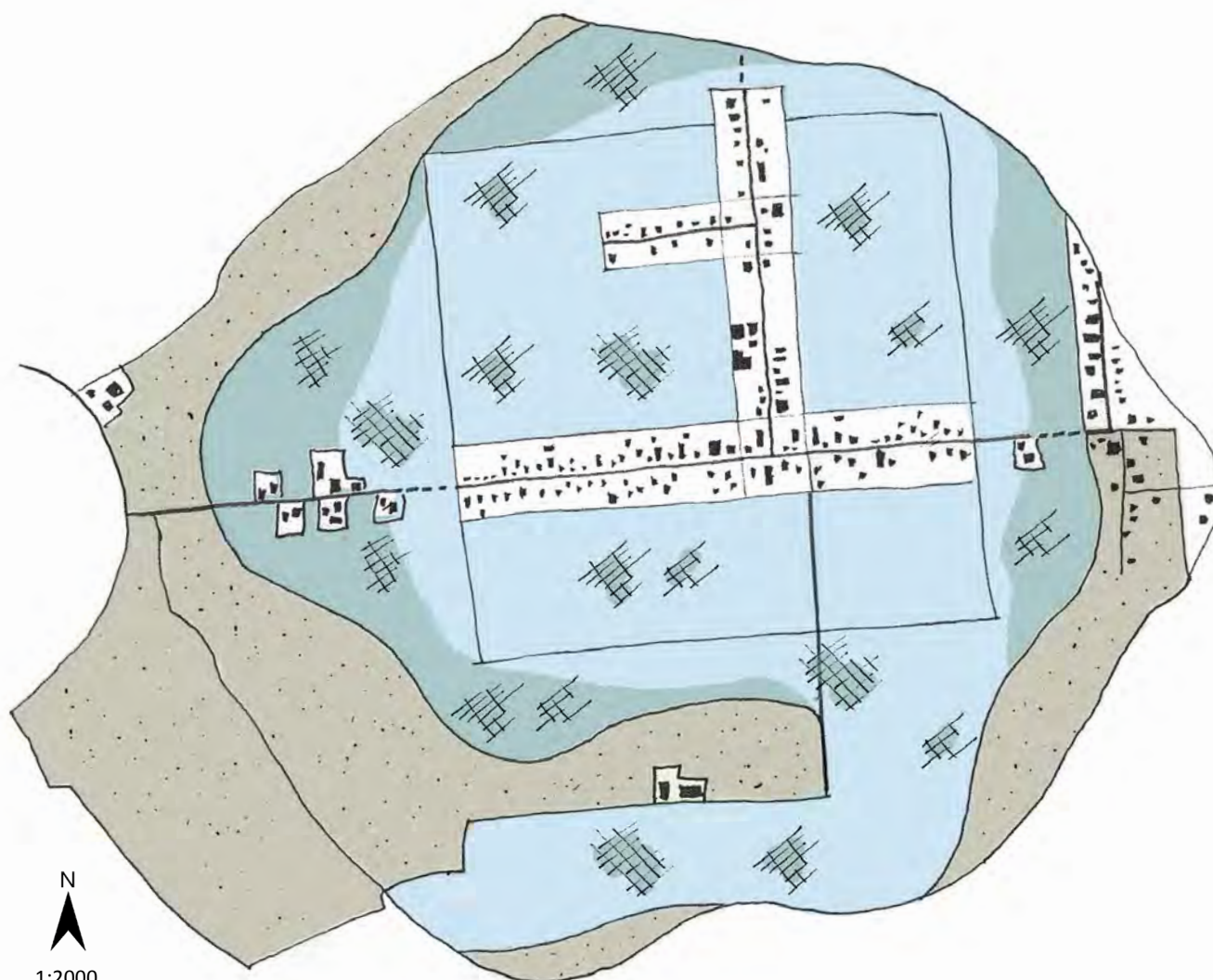
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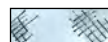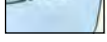
Houses, public space	Duckweed (cultivation)
Duckweed in open water (purification, experiments)	Diverse use, cultivation & private use
Reed (purification & biomass production)	Surface water, recreation
Surface water with fish (cultivation)	Beach

Figure 3.29. In the first stage, taking about 20 years, the main aim is to purify the soil and start experimenting with the production of duck-weed. The water level will be about 50 cm above the surface in the deepest point of the reclamation. On the sides, there will be some lands above this water level. On the dry lands, reed can serve as purification vegetation and a biomass product. In the wet areas, duckweed will be used to clean the soil and can be used as biomass. To protect the existing houses, a dike is being built, on both sides at 100 meter distance from the houses.

124
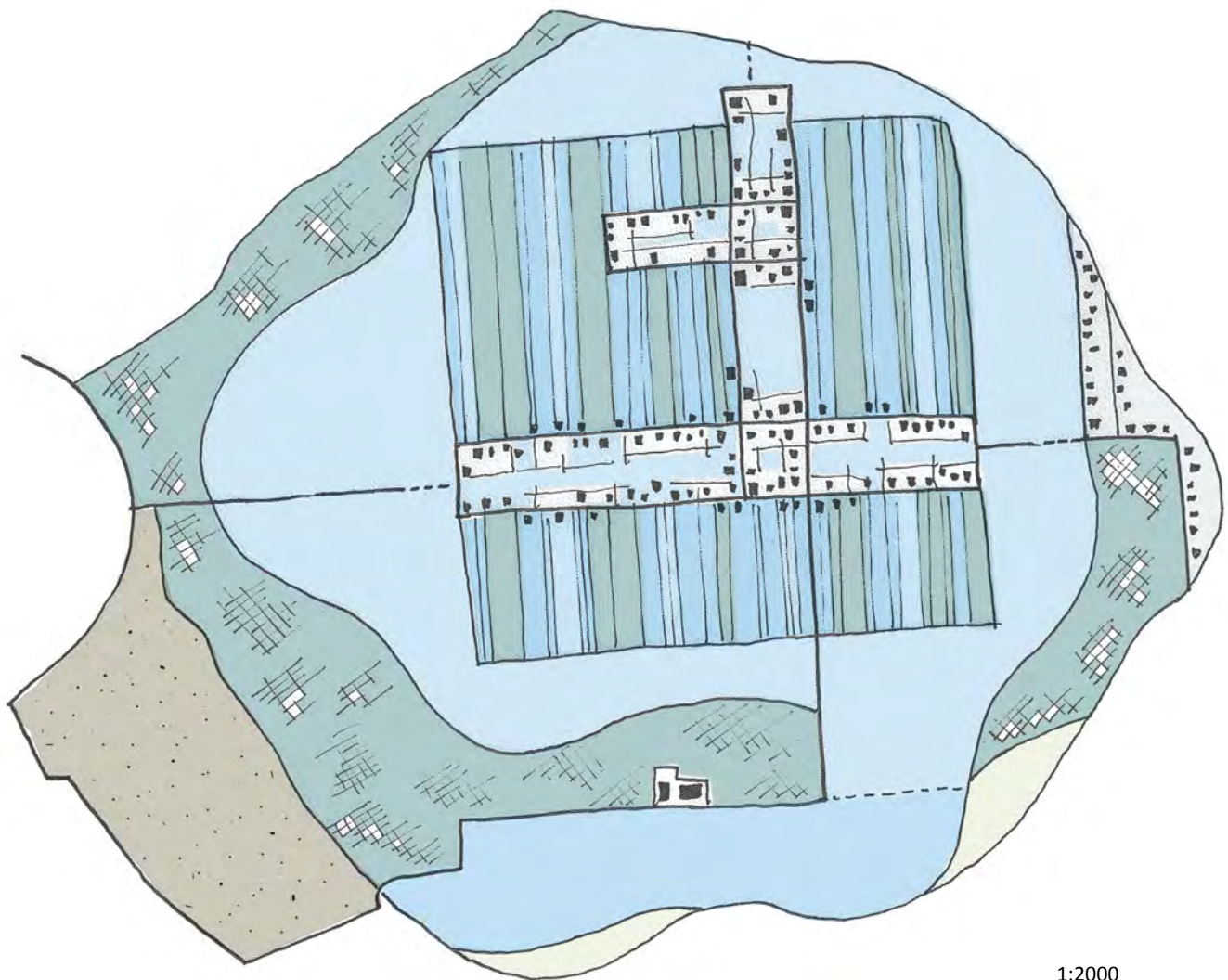
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Figure 3.30. Second stage. When the soil is clean, the water level can be raised and the entrepreneur of the collective can start with his fish and duckweed farm. This second stage involves a higher water level and thus a complete inundation of the reclamation. The water level will be, in the deepest point, circa 2 meters above the ground surface. This implies a water level difference with the adjacent nature areas of about half a meter. This difference makes it possible to circulate water and create a possibility to buffer extreme rainfall or extreme water levels in the Vecht. In the reed area in the south-west, a helophyte system is installed that can purify water before it goes (back) to the nature areas to the south. Also external water can be let through this system in order to compensate in case of draught.

In the outer circle of the design, the duckweed/fish system will be set in place (see next page). In the square surrounding the village single plots of water are available for individual initiatives, experiment and innovation. These plots can be used by local people, rented out in service of the cooperative, or rented to research institutes. The spatial configuration is strongly related to the current polder landscape, using long small plots. In this way local people gain a direct connection with the environment, by having the opportunity to take up a role in the system and contribute as part of the cooperative.

NERA-building
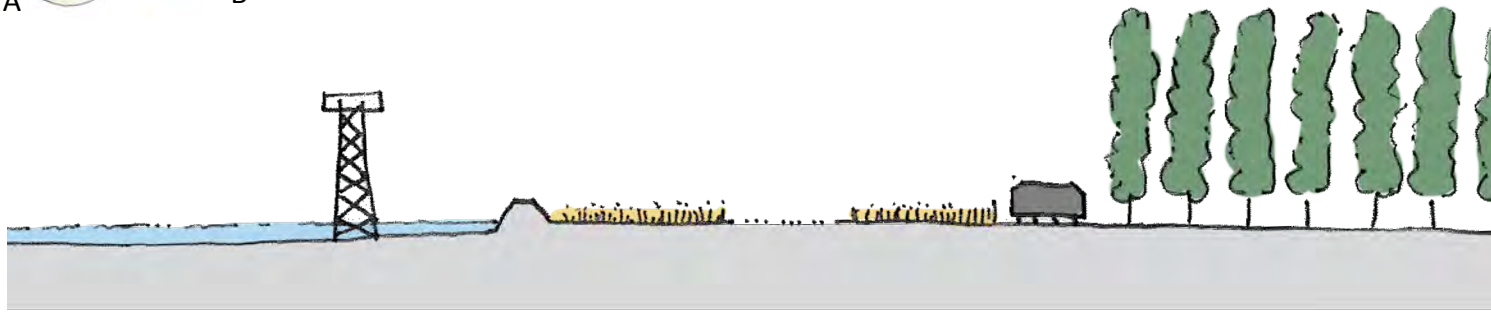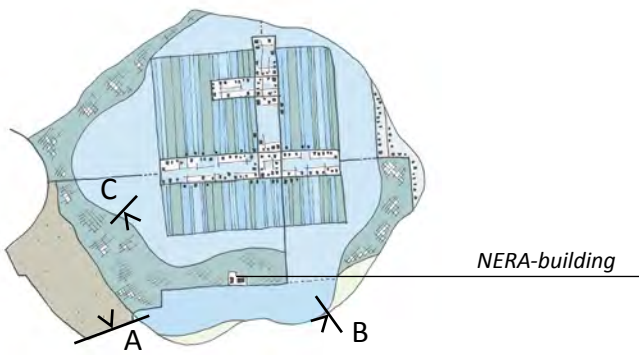
Section A, showing from left to right: the surface water with a look-out tower (existing, renovated), the dike, the polder with reed for water purification and biomass, a bunker, of the historical defence line, a row of poplars (existing, emphasizing this line in the landscape), a canal and on the other side of the water the fortification Kijkuit and a mill. This line can be developed as a walking path, connecting the Horster-meer with the fortification, while crossing the helophyte-landscape.

1:100

Section B. Along the dike several activities can take place. An area for swimming is proposed, by excluding the fish in the southern part of the productive area. The NERA-building in the southern part of the reclamation, once built for radio-communication but now used by several small offices, can serve as an important element with facilities relating to recreational use of both the farm and the swimming area. The dike itself is an interesting line between the reclamation and wetland landscapes. It will be a route for biking and walking. Moreover, holiday houses can be exploited or buildings for scouting or landscape education. It might also be interesting to create a crossing point for canoes. The landscape is readable and accessible from this line and the system of water and production can be experienced.
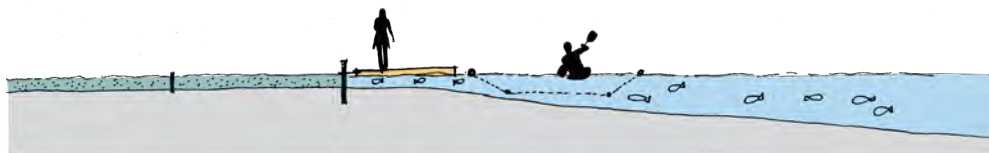
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Section C. Between the duckweed plots and the fish 'lake', a route can be implemented for walking and canoeing. The canoe route exist of a net, thus excluding the fish but still being part of the system. This route can also go across the fish lake or between the duckweed plots. It can encompass places to rest and for instance 'fish your own meal'. These routes and spots lead to an active experience of the production landscape and an interaction with the system (see also figure 3.31).

126
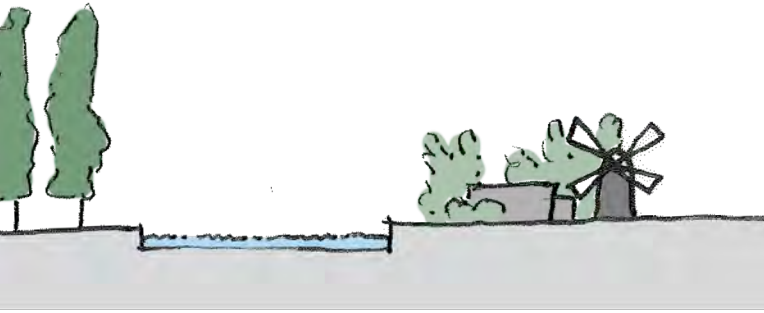
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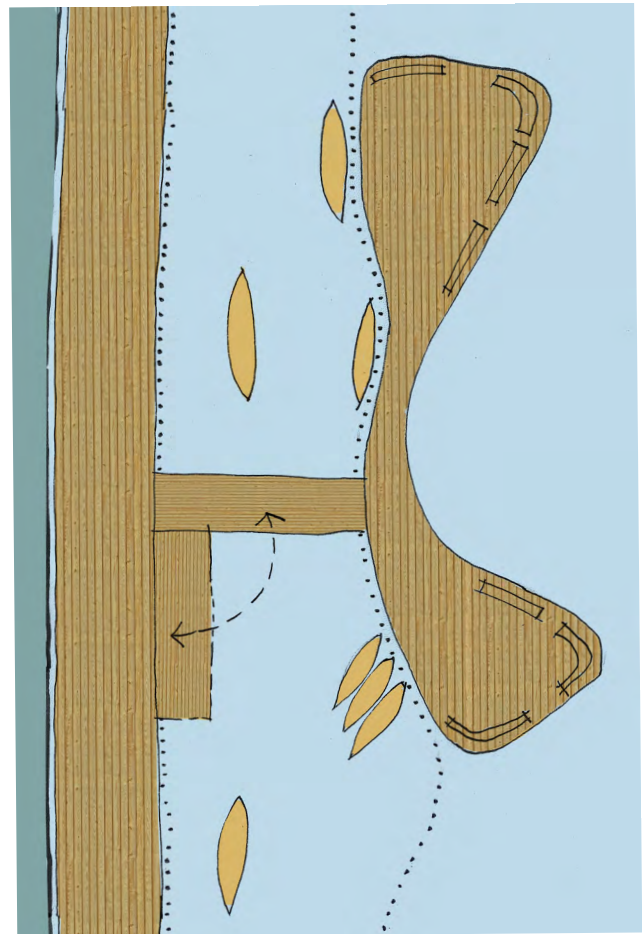
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Figure 3.31. A place to rest, for recreants (by foot or canoe) a special moment in the middle of the production landscape

Conclusion Chapter 3

We can now fully reflect on the strategy and design we proposed. The 'dreams' allowed us to explore more deeply the time and organizational aspects of the design, to see whether and how the strategy will successfully lead to local visions that are able to deal with the regeneration challenge. These dreams are thought-experiments intended to allow us to think through all the steps and to oversee all the actors involved before the areas can come to their final regenerated state. Based on this exercise we estimate that the three programs we suggest for local communities to take up local responsibilities could be sufficient. We did not find unexpected steps or actors that are not accommodated within the strategy (although the role of local municipalities could be clarified more). However, the strategy needs to be tested in reality to be able to draw conclusions about the eventual willingness of local communities to work together. This is dependent on a lot of factors that cannot be predicted.

Power-sharing and letting go of responsibility is a pre-requisite for the feasibility of the strategy. We see a general transition in the Dutch spatial planning context towards more space for local responsibility. If this trend is picked up by decision-makers and experts and embedded in a strategy like we propose, large scale landscape regeneration *with* social support may become possible. If we take a closer look at the design products and design strategies, we have seen that there are many possibilities to work with the conditions for social feedback. The three main conditions, related to power-sharing, building local capacity and design for a direct connection give clues for appropriate participation processes, explicit roles for decision-makers, experts (among which landscape architects) and local people and the related products.

Especially the roles and products associated with social capacity building offers ways to enlarge the scope of the landscape architect. Communication and transfer of system expertise and the registration, monitoring and evaluation of developments may be an area of expertise the landscape architect can expand in. Another would be to increase focus on the facilitation of processes and group dynamics. The design strategy, in content and process, shows that landscape architects can have many different roles and produce different products in support of landscape regeneration. In fact, the broadness and integrative nature of landscape architecture may be a key strength, since regeneration processes require experts that are able to oversee the whole process from large scale system responsibility to small-scale interventions. Especially the role of 'connector', positioned between different actors and different scale-levels is very interesting and might be a key in generating a strategy for regeneration.

Another element is the challenge in finding new ways to

visualize and shape the (direct) relationships people are able to have to their environments. This needs a sensitivity in design that might need years of experimentation and practice to develop, until it becomes intuitive to think about the allowances a design creates for local people. Also for the landscape architect letting go is necessary; local designs need to be primarily in service of local people, combined with a responsibility for the larger landscape system, instead of primarily being focused on form and material.

Altogether, these elements may deserve more attention in the early stages of training of the landscape architect in landscape architectural schools. As in fact these roles, all strongly related to the role of 'connector', might eventually bridge the gap between the landscape system and the local people. The variety of roles argue for a portfolio of the landscape architect that includes skills that cover the whole range. This argues for the landscape architect to be the ultimate generalist, creating connections between knowledge of different disciplines, and connecting abstract visions with reality. However, within this broad range of working, we can also see how individual landscape architects may decide to specialize in one specific task or role.

With regard to theory, the main challenge seems to be to make a strong translation from theory to practice. Generally we see that knowledge about this step is lacking: what is needed in order to implement ideas? What does it look like in a specific locational context? We found that it is important to give more attention to contextual elements within the formation of theory: what are the implications of the fact that certain elements cannot be universalized? Does it mean that theory loses its practicality in these cases, or does it argue for a different kind of theory that explicitly accommodates flexibility?

Understanding of the step from theory to practice might also specifically be aided by an enlarged understanding of actors and institutions in the spatial field. What effect do different actors and institutions have on the ability to implement theory/design? What is needed in order to be able to land the theory in the existing social reality? These are theoretical questions that do not directly target the subject-matter of regeneration per see, they are rather supporting questions that increase the likelihood that regeneration theory can become relevant for society. In this project we have attempted to answer some of these questions, but our suggestion is nevertheless that more effort needs to go towards these supporting questions in order to start implementing regenerative concepts. Within this effort, the risk is large that great theory and ideas are left as an 'academic exercise', with their practical value left unexplored.

While working on a design strategy for the Vechtplassen, we became more and more aware of the importance of two

other elements: scale and time. Social and physical characteristics of the landscape are strongly related to a certain scale. Notable is the difference we found between the scale of physical and the scale of social systems. The fact that these systems are not connected to the same scale seems to define the alienation problem we found. Within literature we found limited reference to this scale-issue which we found to be crucial in understanding the lack of support for regeneration. The element of scale in general and the effect of looking at an area at different scale-levels merits further investigation.

Time is also very important. For example, while designing the 'dreams' in process and content, the continuous exchange of and mutual dependency of the three programs became clear. Without a fine-tuning between these programs, the intended effect would not be reached. The inspiration this offers towards theory is that an understanding of time-trajectories would be beneficial. Especially understanding of the time path of social processes in relation to the time path of physical processes would be instructive. The mismatch of trajectories in time may have a similarly alienating effect as the mismatch between the scales of human versus natural systems.
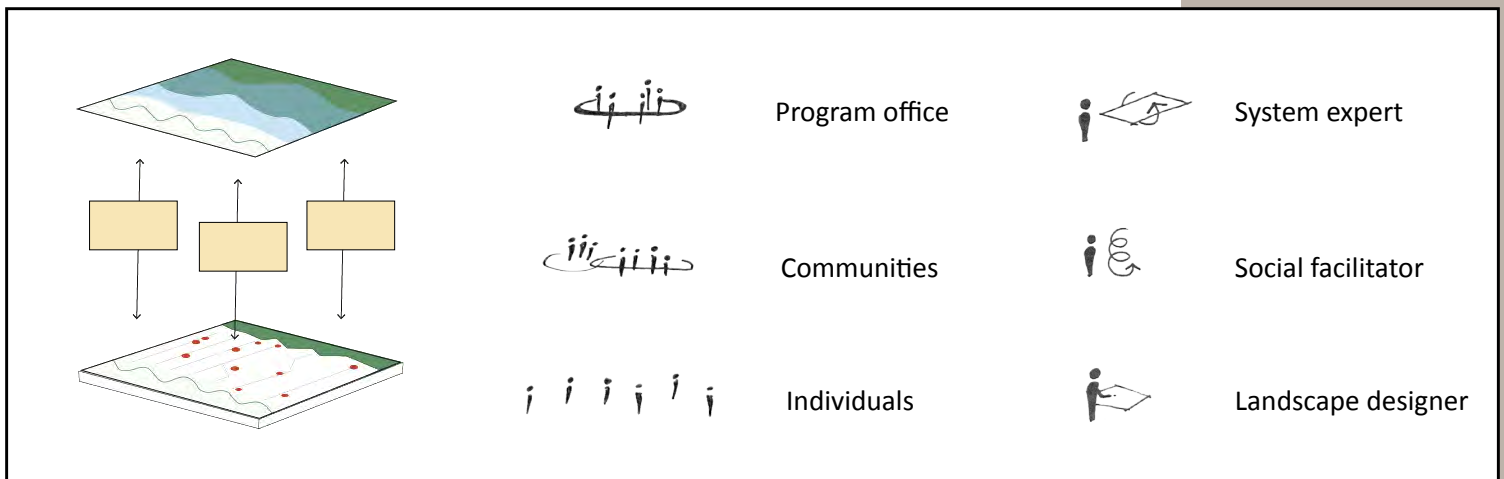

Figure 3.32. Design strategy for the Vechtplassen showing organizational forms and the role of the landscape architect on three levels

Conclusion

The main question of this project was: what is needed in order to create *socially supported* landscape regeneration? This question was induced by the context of increased global need for regeneration of degraded natural systems, and the difficulty of doing so in the current social environment. Spurred by the paradox that is visible in spatial reality between responsibility of physical systems and the involvement and interests of local people, we set ourselves the aim to increase the integrative understanding of social mechanisms in the landscape that enable or disable landscape regeneration. By looking at literature and reference cases, we were able to see that social mechanisms can enable or disable landscape regeneration. This made the need to work with social mechanisms in landscape regeneration evident. In order to change social mechanisms in support of regeneration, we found that empowerment of the local connection with the landscape is crucial. The connection between local people and their surrounding enables new social mechanisms based on local appreciation of ecosystem services, heightened awareness of the need to change, and local responsibility. The upper figure on the next page shows an overview of the conditions we found that need to be met by different actors at the different scale-levels involved in regeneration.

By looking at the societal context through landscape analysis, stakeholder analysis, interviews and a plan analysis we were able to explore more deeply certain elements that play an important role in spatial reality. Especially the role and effect of different actors and institutions in the Vechtplassen region was revealing: we found that a careful balance of involvement of governmental, expert and local parties is necessary in order to work towards regeneration. This balance can differ depending on the scale-level and the time in the process. Based on this investigation, combined with the conditions we found in chapter 1, we were able to propose a strategy for socially supported regeneration (see middle figure on the next page). With the proposition as a starting point, showing two levels that have to be connected, the basis for the strategy is the introduction of an 'in-between' layer. From here, we described all three levels using the conditions and the appropriate role of the three main groups of actors: decision-makers, experts and local people.

Finally, through the application of the strategy within a design for the Vechtplassen region, we were able to evaluate the applicability of the conditions and the strategy through concrete spatial concepts and design. We found that the three-level approach made it possible to deliberately use the conditions and translate them into both products and roles. We found that very different forms of design, from strategic and conceptual to concrete and detailed interventions are necessary to bridge the gap between system

expertise and local experience and use of the landscape. Based on this evaluation we believe that taking into account the conditions for socially supported regeneration can greatly increase the awareness of social mechanisms within regeneration processes, thus aiding the ability to actually trigger regeneration of a degenerated landscape and form a basis for a sustained, healthy landscape as the final result.

We think that our strategy has the potential to be widely applied in planning and implementation processes. This way of working has several implications for the role and products of the landscape architect. Especially tasks associated with communication of knowledge, facilitation of group processes and design for direct connection with the landscape seem to be avenues of development in this regard. Although there is a need to further define and explore the design language for socially supported regeneration, we can conclude that landscape planning and design can deliberately form spatial and organisational strategies for socially supported landscape regeneration and that landscape architects can have several roles within these strategies.

Discussion

The value of our findings can be presented as threefold, concerning the different potential audiences with potential interest in the project. For landscape theory and modelling of complex adaptive systems the social feedback model offers a way to conceptualize the role of social mechanisms within physical systems. This could lead to an integrative inclusion of social mechanisms into complex models. However, we also see the strength in maintaining the Social Feedback Model in its relative simplicity, to show the relationship between physical and social aspects in landscape. In this case, it is the relationship between the two that is interesting, and not the respective complexity of the physical and social realms in themselves. In this regard it would be valuable to conduct a more in-depth exploration of all the possible interrelationships between the realms with a team of physical as well as social scientists.

The Social Feedback Model offers a way to increase understanding of the role of social mechanisms within landscape change, especially underlining the importance of taking into account and deliberately accommodating these social mechanisms in the formation of spatial strategies and policies. For landscape architects and spatial practitioners there is a direct appeal to include awareness of social mechanisms in their practice in order to be able to guide landscape regeneration processes. The consequences of this for spatial practice are suggested in this project, but need to prove themselves in reality through further creative steps and experimentation.
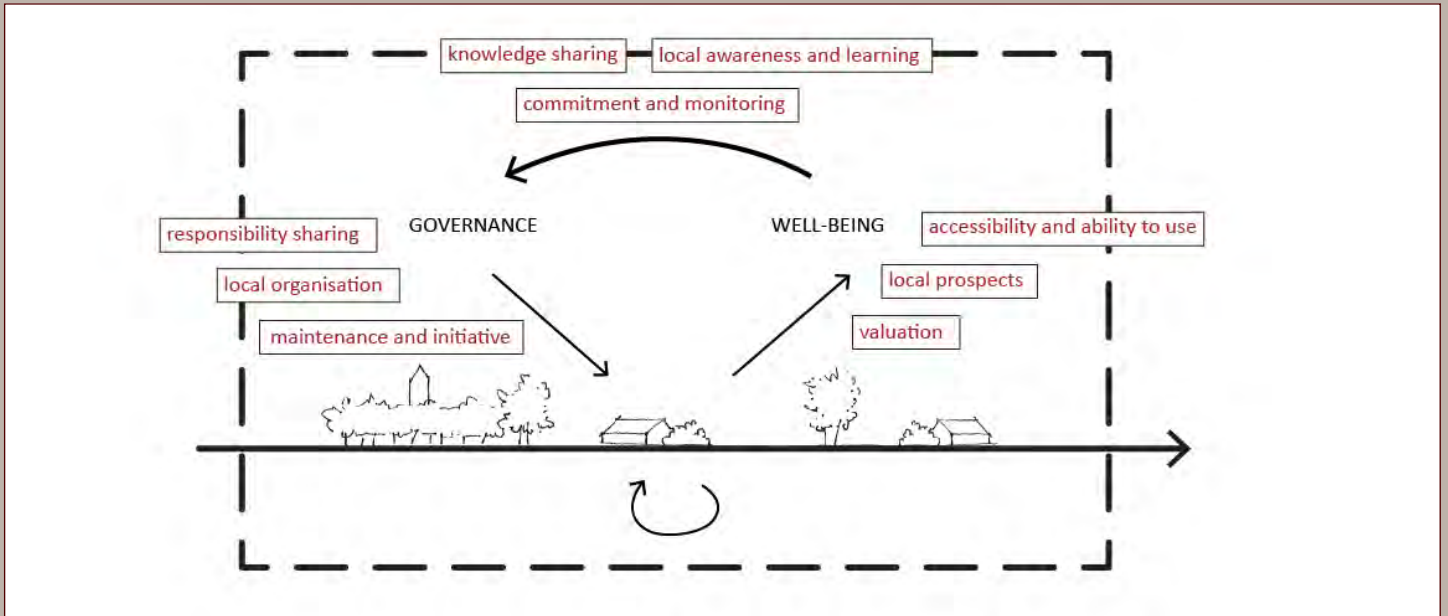
Conditions *for community supported landscape architecture*

Level 1: Setting regeneration in motion
Expertise on the natural system (local and external) guides decision-making. Decisions made on this level only concern the health of the system and offer flexibility and local problem-ownership

Level 2: Landing regeneration in community structures
Local people, experts and governments working together to build local capacity through community building, responsibility structures and agreements.

Level 3: Local initiative and adaptation
Local people take their own initiative in adapting to a regenerated landscape. Involvement of experts or governments is by commission and is in service of local wishes and local connection to the landscape

Strategy *for community supported landscape architecture*

Program office   System expert

Communities   Social facilitator

Individuals   Landscape designer

Design *for community supported landscape architecture*

For the social sciences concerned with regeneration and natural resource management, this thesis forms a reminder of the importance of scale dependency and local social factors. Understanding of scale and local versus external influences on a system may aid in rethinking the attitude towards local communities involved in nature protection and maintenance. This could eventually lead to the ability of local communities to step into a role of responsibility for their own natural systems. Especially the conditions for socially supported landscape regeneration formulated in this project may form a valuable input for the social science disciplines concerned. In this regard, it would be valuable to fine-tune and evaluate the conditions further in light of existing articles and knowledge. Because of the extreme multidisciplinary character of our project, we were only able to review a limited amount of existing knowledge within different disciplines. An extended thematic search in several disciplines, using extended keywords will surely bring about a more refined list of conditions that is more robustly placed within the academic debate.

Finally, we want to reflect on the use of the Social Feedback Model for analysis. Our experience is that it was very useful to use the tool to look at complex systems. By filling out the model for different stages of change processes the process became apparent in a structured way. By following action and consequences within the scheme, it became possible to make complex landscape processes more understandable, especially when it comes to the relationship between physical and social aspects of change. However, it must be noted that modelling reality always results in a simplification. It is important to be aware of the exclusions a model may create. In our process, we passed through several steps in which we made the model more and more complex. Eventually we have decided to present a version that is more general, and does not try to be absolute. Many concepts can find their way within the model, without having to be explicitly named. This was our solution to get around the issue of exclusion. This does not mean however, that our model is encompassing, or that it is the only way to model reality. We see it as a tool that allows us to shine light on a very specific topic, used in a specific context. Before using it in another context, it needs to be evaluated if the model applies.

The several 'designs' we made on different scales, to give an idea of the practical implication of our findings (the strategy, the visions and the detailed designs within the dreams), are based on both the investigation on social mechanisms as on social and physical analysis of the Vechtplassen. This latter analysis is, however, not as complete as we would have liked. Due to the time limitation,of this thesis, we decided to focus on the social mechanisms and not so much on an encompassing analysis of the landscape itself. However, we tried to grasp the social and physical reality of the

Vechtplassen as much as possible. This landscape proved to be a very suitable case, as both the regeneration issue as the current social organisation gave much reason for a strong, socially oriented regeneration strategy.

Suggestions for further research

- Extended research on social mechanisms, extra keywords and disciplines

- Extended research on scale of social organisation vs. natural systems

- Extended research on role of actors and institutions within regeneration processes

- Embedment in landscape architectural and planning theories; it would be very informative to do an in-depth research on existing landscape architectural and spatial planning theory in order to substantiate the ideas above and to embed them in existing theoretical knowledge.

We found that the main concern now is the embedment of the formulated insights into practice. In our design-process, we ran into multiple practical questions regarding the translation of abstract theory into concrete spatial reality. Our project shows multiple possibilities, but there is a large scope for creativity and innovation in this regard. The full application of the theory in this thesis requires a thorough process of formulation of new design language based on the conditions for socially supported regeneration.

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Appendix A: List of factors

From output: factors that affect wellbeing		Loess	Vattenrike	Tamera
Existence of ecosystem services	(MA 2005)(Leemans 2009)(de Groot et al. 2010) (TEEB 2010)(Melman and van der Heide 2011)			
Land-use and land-use processes	(Nassauer 1995)(McHarg 1988)(Braat and de Groot 2012)			
Diversity and interconnectedness of ecosystem services	(MA 2005)(Swallow et al. 2009) TEEB 2010) (Braat and de Groot 2012)			
Knowledge and understanding of the value of ecosystemservices	(Nassauer 1995) (Thwaites 2001)(MA 2005) (Gobster et al. 2007) (Leemans 2009)(de Groot et al. 2010)			
Material productivity	(Tuan 1974) (Nassauer 1995)(MA 2005)(Gobster et al. 2007)(TEEB 2010)			
Livelihood	(MA, 2005)			
Scale at which ecosystem services are appreciated	(Lele et al. In press)			
Accessibility and distribution of ecosystem services	(Hein et al. 2006)(Lele et al. In press)			
Level of interaction	(Seamon 1980)(Nassauer 1995)(Pretty 2004) (Gobster et al. 2007)			
Ownership type and ability to control	(Seamon 1980)(Nassauer 1995)(MA 2005)(Elmendorf 2003)			
Level of dependence on the ecosystem	(Kyle et al. 2005)(Melman and van der Heide 2011)(Lewicka 2011)(Lele et al. In press)			
Psychology and perception	(Tuan 1974) (Nassauer 1995)(Gobster et al. 2007)			
Socio-cultural systems	(Nassauer 1995)(Farina 2006)(Gobster et al. 2007)			
Personal preferences and values	(Tuan 1974)(Nassauer 1995)(Hobson 2003)(Stets and Biga 2003)(Gobster et al. 2007)			
Aesthetics	(Nassauer 1995)(Farina 2006)(Gobster et al. 2007) (Lewicka 2011)			
Sense of community	(Matsuoka and Kaplan 2008)(Lewicka 2011)			
Time trajectories	(Liu et al. 2007)(Braat and de Groot 2011)			
Flexibility	(Seamon 1980)(Moroni in Alexander et al. 2012)			

Factors directly affecting feedback		Loess	Vattenrike	Tamera
Place attachment, identity, meaning	(Thwaites 2001)(Farina 2006)(Gobster et al. 2007)(Dewsbury and Cloke 2009)(Scannell and Gifford 2010) (Lewicka 2011)			
Attitudes and values	(Tuan 1974)(Nassauer 1995)(Hobson 2003)(Elmendorf 2003)(MA 2005)(Odum and Odum 2006)(Daily et al. 2009)			
Institutions	(Nassauer 1995)(Rydin and Pennington 2000)(Hobson 2003)(MA 2005)(Pahl-Wostl 2006)(Olsson et al. 2010)(Cook et al. 2012)			
Habits and traditions	(Hobson 2003)			
Resistance to change	(Röling 2002)(Devine-Wright, 2009)(Olsson et al. 2010)(Folke et al. 2011)(Lewicka 2011)(Pahl-Wostl, in press)			
Alienation	(McHarg 1988)(Todd 1991)(MA 2005)(Farina 2006)(Folke et al. 2011)			
Scale, sense of locality	(Bandura 2006) (Scannel and Gifford 2010)			
Social capital	(Brown and Ashman 1996)(Rydin and Pennington 2000)(Cars 2002)(Pahl-Wostl 2006)(Plummer and Armitage 2010)(Folke et al. 2011)			
Opportunities for and modes of interaction	(Rydin and Pennington 2000)(Cars 2002)			
Social processes	(Berkes 2009)(Rydin and Pennington 2000)(Folke et al. 2011)			
Social learning	(Joan Iverson Nassauer 1995)(Rydin and Pennington 2000)(Pahl-Wostl 2006)(Bandura 2006)(Berkes 2009)(Plummer and Armitage 2010)(Folke et al. 2011)			
Information and awareness	(MA 2005)(Rydin and Pennington 2000)(Hobson 2003)(Pahl-Wostl 2006)(Farina, 2006)(Daily et al. 2009)(Berkes 2009)(Plummer and Armitage 2010)(de Groot et al. 2010)			

From input: factors affecting governance (and thus feedback)		Loess	Vattenrike	Tamera
External driving forces (e.g. climate change, demography)	(Nassauer 1995) (Braat and de Groot 2012)			
External economic demand	(Joan Nassauer 1995)(MA 2005)(Braat and de Groot 2012)			
Regulatory environment	(Joan Nassauer 1995) (MA 2005)			
Scale and type of governance, changing organisational structures	(Rydin and Pennington 2000)(Berkes 2009) (Olsson et al. 2010)			
Local nature management and responsibilities	(Cars et al. 2002)(Folke et al. 2005)(Olsson et al. 2008)(Berkes 2009)(BodinandCrona 2009)(Olsson et al. 2010)(Ernstson and Sörlin 2012)			
Communication and transparency	(Luz 2000)(Elmendorf 2003)(Graedel and Allenby 2010)			
Participation	(Arnstein 1969)(Cornwal 1995)(Rydin and Pennington 2000)(Fischer 2002)(Elmendorf 2003)(Albrechts 2006)(Turnhout et al. 2010)(Michael and Stenseke 2011)(Bohnet et al. 2011)			
Actors	(Johnson and Campbel 1999)(Rydin and Pennington 2000)(Berkes 2009)(Aarts and Leeuwis 2010)			
New social contracts	(Sijmons 1991)(Berkes 2009)(Folke et al. 2011)(Arnouts et al. 2012)			
Networking and cooperation	(Pretty 1995)(Levinthal and Warglien 1999)(Rydin and Pennington 2000)(Cars 2002)(Green and Sadedin 2005)(Berkes 2009)(Folke et al. 2011)			
Agreements and vision-building	(Rydin and pennington 2000)(Albrechts 2006)(Berkes 2009)			
Adaptive Capacity , adaptive management/ co-management	(Berkes 2009)(Plummer and Armitage 2010)(Folke et al. 2011)			
Human agency and self-organisation	(Williams 1998)(Levinthal and Warglien 1999)(Pahl-Wostl 2006)(Folke et al. 2011)			
Flexibility and free choice	(Levinthal and Warglien 1999)(Cars 2002)(Graedel and Allenby 2010)(Folke et al. 2011)			
Knowledge and learning	(MA 2005)(Cars 2002)(Hobson 2003)(Berkes 2009)(Graedal and Allenby 2010)			
Incentives	(Daily et al. 2009)(Olsson et al. 2010)			

Extra factors from cases		Loess	Vattenrike	Tamera
Ecosystem health (biodiversity, biomass, fertile soil, nutrients, water retention etc.)		■	■	■
Safety (from flooding, draught, poverty, food insecurity)		■		
External push (necessary to break vicious cycles)		■		
External financial support (e.g. compensation land-use change)		■	■	■
Physical regeneration plan		■		■
Understanding and awareness of the problem		■	■	■
Multidisciplinary team (diff. expertise and internal/external sources)		■		
Pilot projects			■	■
Local monitoring			■	■
Image-building			■	

Appendix B: Glossary

Adaptive capacity: the ability of a social-ecological system (or the components of that system) to be robust to disturbance and capable of responding to change (Plummer and Armitage 2010)

Attitude: primarily a cultural stance, a position one takes vis-a-vis the world. Formed of a long succession of perceptions, that is, of experience. (Tuan 1974)

Capacity building: the ability of individuals or organizations to perform efficiently, effectively and on an on-going basis a set of externally defined goals (functionalist perspective). (Plummer and Armitage 2010)

Co-management: the sharing of power and responsibility between the government and local resource users.

Complex system thinking: offers a way of examine, describing, interpreting, and cognitively structuring not only ecological systems but also increasingly linked social-ecological systems as well. Highlights the dynamic non-linear relations among couples social and ecological phenomenon that result in discontinuities, surprises, system flips, and the potential for multi-equilibrium estates. (Plummer and Armitage 2010)

Direct driver: A driver that unequivocally influences ecosystem processes and can therefore be identified and measured to differing degrees of accuracy. (MA, 2005a)
Indirect driver: A driver that operates by altering the level or rate of change of one or more direct drivers. (MA, 2005a)

Direct use value (of ecosystems): The benefits derived from the services provided by an ecosystem that are used directly by an economic agent. These include consumptive uses (e.g., harvesting goods) and no consumptive uses (e.g., enjoyment of scenic beauty). Agents are often physically present in an ecosystem to receive direct use value. (MA, 2005a) **Indirect use value:** The benefits derived from the goods and services provided by an ecosystem that are used indirectly by an economic agent. For example, an agent at some distance from an ecosystem may derive benefits from drinking water that has been purified as it passed through the ecosystem. (MA, 2005a)

Disturbed (degenerated) ecosystems: Ecosystems that have been altered as a result of anthropogenic activities or natural disasters.

Ecological value: Non-monetary assessment of ecosystem integrity, health, or resilience, all of which are important indicators to determine critical thresholds and minimum requirements for ecosystem service provision.

Ecosystem: A dynamic complex of plant, animal, and microorganism communities and their non-living environment interacting as a functional unit. (MA, 2005a) The individuals, species and populations in a spatially defined area, the interactions among them, and those between the organisms and the abiotic environment (Likens, 1992 in (Hein et al. 2006)).

Ecosystem function: a subset of the interactions between ecosystem structure and processes that underpin the capacity of an ecosystem to provide goods and services. The capacity of ecosystems to provide goods and services that satisfy human needs, directly and indirectly'' (De Groot, 1992 in (de Groot et al. 2010)

Ecosystem services: The direct and indirect contributions of ecosystems to human wellbeing. The concept ''ecosystem goods and services'' is synonymous with ecosystem services.

Cultural ecosystem services: The nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values. (MA, 2005a)

Provisioning services: The products obtained from ecosystems, including, for example, genetic resources, food and fiber, and fresh water. (MA, 2005a)

Supporting services: Ecosystem services that are necessary for the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat. (MA, 2005a)

Regulating services: The benefits obtained from the regulation of ecosystem processes, including, for example, the regulation of climate, water, and some human diseases. (MA, 2005a)

Governance: the whole of public as well as private interactions taken to solve societal problems and create societal opportunities. It includes the formulation and application of principles guiding those interactions and care

for institutions that enable them. (Plummer and Armitage 2010)

Governance (of ecosystems): The process of regulating human behavior in accordance with shared ecosystem objectives. The term includes both governmental and nongovernmental mechanisms. **Management (of ecosystems):** An approach to maintaining or restoring the composition, structure, function, and delivery of services of natural and modified ecosystems for the goal of achieving sustainability. It is based on an adaptive, collaboratively developed vision of desired future conditions that integrates ecological, socioeconomic, and institutional perspectives, applied within a geographic framework, and defined primarily by natural ecological boundaries. (MA, 2005a)

Human well-being: A context-and situation-dependent state, comprising basic material for a good life, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience. (MA, 2005a)

Institutions: The rules that guide how people within societies live, work, and interact with each other. Formal institutions are written or codified rules. Examples of formal institutions would be the constitution, the judiciary laws, the organized market, and property rights. Informal institutions are rules governed by social and behavioral norms of the society, family, or community. Also referred to as organizations. (MA, 2005a) As organizing mechanism for human action, institutions are the rules, norms and shared strategies that endure through social organization and interaction. (Crawford and Ostrom 1995, in (Cook et al. 2012)

Learning: the collaborative or mutual development and sharing of knowledge by multiple stakeholders, feeds directly into the development of capacity for adaptation by individuals and social collectives. (Plummer and Armitage 2010)

Natural capital: An economic metaphor for the limited stocks of physical and biological resources found on earth. (MA, 2005b)

Perception: both the response of the senses to external stimuli and purposeful activity in which certain phenomena are clearly registered, while others recede in the shade or are blocked out. (Tuan 1974)

Resilience: The ability of an ecosystem to recover from disturbance without human intervention. The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks. (Folke et al. 2011)

Stakeholder: any group or individual who can affect or is affected by the ecosystem's services. The value of ecosystem services depends upon the views and needs of stakeholders (Vermeulen and Koziell, 2002 in (Hein et al. 2006)

Social capital: involves networks together with shared norms, values and understanding that facilitate cooperation within or among groups. (Oecd, 2001 p 41 in (Plummer and Armitage 2010))

Socio-ecological system: An ecosystem, the management of this ecosystem by actors and organizations, and the rules, social norms, and conventions underlying this management. (MA, 2005a)

Sustainability: A characteristic or state whereby the needs of the present and local population can be met without compromising the ability of future generations or populations in other locations to meet their needs. (MA, 2005a)

Sustainable flow (of ecosystem services): The availability of ecosystem services to yield a continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. (MA, 2005a)

Worldview: conceptualized experience. Partly personal, largely social. It is an attitude or believe systems: the word system implies that the attitudes and beliefs are structured. (Tuan 1974)

Landscape: an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors; ...evolves through time, acted upon by both natural forces and human beings; ... the landscape's natural and cultural components form a whole and should not be taken seperately; ...the view of all groups should be included. (European Landscape Convention) http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm