Joining the development of innovative pig farms

Collaborative approaches in the development of innovative pig farms.

Evelien de Olde

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Abstract

Increasingly, collaborative approaches for the implementation of innovative pig farms are considered as a way to reduce obstacles for the development of sustainable livestock systems. This research analysed the implementation of two collaboratively developed, innovative pig farms to find out whether a collaborative approach improved the implementation of these farms in practice. Obstacles for the implementation of the farms are related to policies and regulations (e.g. ammonia emissions and zoning plans) as well as to societal concerns and financing. The results indicate that a collaborative approach improves the possibilities for innovative pig farmers to deal with these challenges; the collaboration resulted in new insights, relationships between organisations and knowledgeable solutions. Also a higher willingness from local authorities and financers to support the project was noticed. On the other hand a collaborative approach also presents process-associated challenges related to trust, understanding and commitment of those involved.

The next step is to translate these pioneering efforts to the followers in the pig sector to make the transition towards a more social, environmental and economic sound farming system. Communication among actors, sharing knowledge and allowing institutional changes are key aspects to upscale these innovations to others in the sector.

Keywords: collaborative, pig husbandry, spatial planning, transition

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Summary

Modernization of agricultural production after the Second World War resulted in an increase of production and yields. Innovations were developed through a linear model of knowledge creation and transfer of technology. In the past decade concerns were raised about the impact of production on animal welfare, public health and the environment. Innovative livestock farms that address these concerns are facing challenges during the implementation. A collaborative approach is considered as a solution to overcome problems in the implementation of innovative pig farms.

In this thesis the development of two innovative pig farms in the Netherlands is studied in order to analyze whether a collaborative approach improves the implementation of innovative pig farms. This resulted in the following research question:

- Are collaborative approaches improving the implementation of innovative pig farms in practice?

To answer this question the challenges and obstacles in general, and more specifically, regulations and policies involved, were discussed. Furthermore, the characteristics and impact of collaborative approaches were studied. Interviews with involved stakeholders and experts in combination with a documentation study formed the methodology of this thesis.

The results indicate that policies and regulations, societal concerns regarding pig farming and finding financial support can form a challenge for the implementation of innovative pig farms. The collaborative approach in both cases enabled to address a wide variety of challenges, develop smarter solutions and build relationships. Furthermore, an increased commitment and willingness among authorities and financers to support the concept was noticed.

On the other hand, the collaborative approach resulted in a high investment of time and money. Additionally, collaborative aspects such as commitment and a shared understanding of the problem require attention during the process in order to develop trust among stakeholders. Therefore involving a facilitator can be helpful.

To conclude, collaborative approaches can improve the implementation of innovative pig farms in practice. Especially since the implementation of innovative pig farms requires a higher investment of time, persistence and financial risks. The advantages of a collaborative approach can support the innovative farmers in dealing with these challenges. However, the disadvantages of a collaborative approach and the additional attention for managing the collaborative process need to be well considered.

Samenvatting

Modernisering van de landbouw na de Tweede Wereldoorlog resulteerde in een toename van agrarische productie en opbrengsten. Innovaties werden ontwikkeld door een lineair model van kennisontwikkeling en toepassing van technologie. Echter, in het afgelopen decennium is de zorg over de impact van de productie op dierenwelzijn, publieke gezondheid en milieu toegenomen. Innovatieve veehouderijbedrijven die inspelen op deze zorgen hebben te maken met barrières tijdens de implementatie. Een collaboratieve aanpak wordt gezien als een oplossing voor deze problemen.

In deze scriptie wordt de ontwikkeling van twee innovatieve varkensbedrijven in Nederland bestudeerd om te analyseren of een collaboratieve aanpak de implementatie van innovatieve varkensbedrijven verbeterd. Dit resulteert in de volgende onderzoeksvraag:

- Verbetert een collaboratieve aanpak de implementatie van innovatieve varkensbedrijven in de praktijk?

Om deze vraag te beantwoorden worden de uitdagingen en obstakels in het algemeen, en beleid en regelgeving in het bijzonder, bediscussieerd. Daarnaast zijn de karakteristieken en de impact van een collaboratieve aanpak bestudeerd. Interviews met betrokken actoren en experts in combinatie met documentenstudie vormden de methodologie van dit onderzoek.

De resultaten tonen aan dat beleid en regelgeving, maatschappelijk zorgen omtrent varkenshouderij en het vinden van financiële steun een uitdaging kan vormen bij de implementatie van een innovatief varkensbedrijf. Bij de ontwikkeling van beide bedrijven zorgde een collaboratieve aanpak voor de mogelijkheid om een grote diversiteit aan uitdagingen aan te pakken, slimmere oplossingen te bedenken en netwerken te ontwikkelen. Daarnaast werd een toename aan betrokkenheid en bereidheid tot steun van overheden en financiers opgemerkt.

Aan de andere kant, resulteerde de collaboratieve aanpak in een hogere investering in tijd en geld. Tevens vragen collaboratieve aspecten zoals betrokkenheid en gedeeld begrip van het probleem om aandacht tijdens het proces ten behoeve van het vertrouwen tussen de betrokken actoren. Daarvoor kan het aantrekken van een procesbegeleider nuttig zijn.

Concluderend: een collaboratieve aanpak kan de implementatie van innovatieve varkensbedrijven verbeteren. Met name omdat de implementatie van innovatieve varkensbedrijven resulteert in een hogere investering in tijd, doorzettingsvermogen en financiële risico's. De voordelen van een collaboratieve aanpak kunnen innovatieve boeren ondersteunen in deze uitdagingen. Desondanks moeten de nadelen van een collaboratieve aanpak en de extra aandacht voor het managen van een collaboratief proces weloverwogen worden.

Preface

I would like to take the opportunity to explain to you the background of this thesis. In 2008 I was studying Applied Animal Science at Van Hall Larenstein and worked at the Province of Overijssel as an internship. During this internship I carried out a research on how municipalities were dealing with applications for the construction of large farms. Visiting over twenty municipalities brought a lot of new knowledge on a topic I wasn't familiar with: spatial planning.

After finishing this internship I decided to look at the possibilities to learn more about spatial planning and animal husbandry at Wageningen University. Multiple meetings with the study advisors resulted in a study program to combine both masters. This minor thesis is the bridge between the two; it combines animal production systems and spatial planning.

As a board member of the farmers foundation (Stichting Boerengroep), we regularly visit farms. During one of the excursions a farmer expressed his frustrations on the difficulties when trying to implement a new farm. A bit later, the Secretary of State published his vision on livestock production and mentioned that the implementation of innovative sustainable farms should not be unnecessarily hindered. Furthermore, different reports on livestock production underlined the importance of collaborative approaches. These messages made me curious; was a collaborative approach working and what are obstacles that innovative farmers are facing when trying to implement a new farm?

It appeared to be a very interesting but rather new topic. The complexity of the problem is high due to the high number of policies, laws and stakes involved. It took some time before I had an overview of all these issues, and I probably still missed some. The willingness of the interviewees to explain their role and share their experiences was very helpful. I would like to thank all the interviewees for taking time to answer my questions and sometimes even sending additional information. Special thanks to the two farmers for sharing their story and giving me insight in the developments and challenges of their farms. Finally, I would like to thank my supervisors Karen Eilers and Gerrit-Jan Carsjens for their patience and support during the process.

1. Upcoming collaborative developed pig farms

Chapter one provides an introduction in the challenges of the pig sector and upcoming collaborative approaches in the development of animal husbandry systems. After the introduction the problem statement and research objective are described, followed by the research framework, research questions and methodology.

1.1 From linear to interactive knowledge creation

After the Second World War, major agricultural reforms were made to ensure domestic production and affordable food prizes. Modernization of agricultural production was promoted through research, information and education (Bieleman, 2000). A linear model of knowledge creation and transfer of technology was used to develop innovations in agriculture. Knowledge was developed by researchers and spread through governmental financed extension services among farmers (figure 1a). This linear transfer of technology was very successful in increasing production and yields. However, it also led to concerns related to animal welfare, public health, loss of biodiversity and environmental pollution (Wiskerke, 2009). These concerns as well as the outbreak of different animal diseases in the past decade has resulted in doubt about the legitimacy and long-term viability of especially large scale pig production in society (de Greef et al., 2011; Bos, 2008; Le Gal et al., 2011). In increasing extend, the government, societal organisations and the sector itself, became aware that the side effects of the current production system could not be solved by adapting technology and knowledge only (Bos & Grin, 2008).

Different initiatives (like a citizen initiative) to share concerns about the sustainability and scale of animal husbandry were the reason to organise societal debates (Bos et al., 2009). The organized debates discussed the future of intensive livestock production in the Netherlands and underlined the need for change; improving aspects like animal welfare and environmental impact of especially the pig and poultry sector (Alders, 2011). The need for such innovations requires space for pioneers to develop their ideas (Alders, 2011). As a response to the societal debates on the future of livestock farming in the Netherlands, the Secretary of State of agriculture published his vision on the topic. In this vision he states the implementation of innovative stables should not, unnecessarily, be hindered. Furthermore, collaboration within the food chain and society should result in new markets and diversified supply (Bleker, 2011).

Historically, a linear paradigm was followed in which the researcher designed and transferred innovations towards the advisor and the advisor spread the innovation amongst farmers. The farmer implemented the innovation (figure 1a; Le Gal et al., 2011). As an alternative to the linear transfer of knowledge a new model of knowledge creation based on co-creation with stakeholders has been developed. A network of institutions, firms and individuals interact to design, assist, encourage, and implement innovations. In this new paradigm the farmer, researcher and advisor are more on an equal level and carrying out similar tasks but at different scales. The one-way arrows are replaced by two-way meaning that the transfer of information and knowledge goes both sides and a feedback mechanism is present (figure 1b) (Le Gal et al., 2011; Rajalahti et al., 2008).

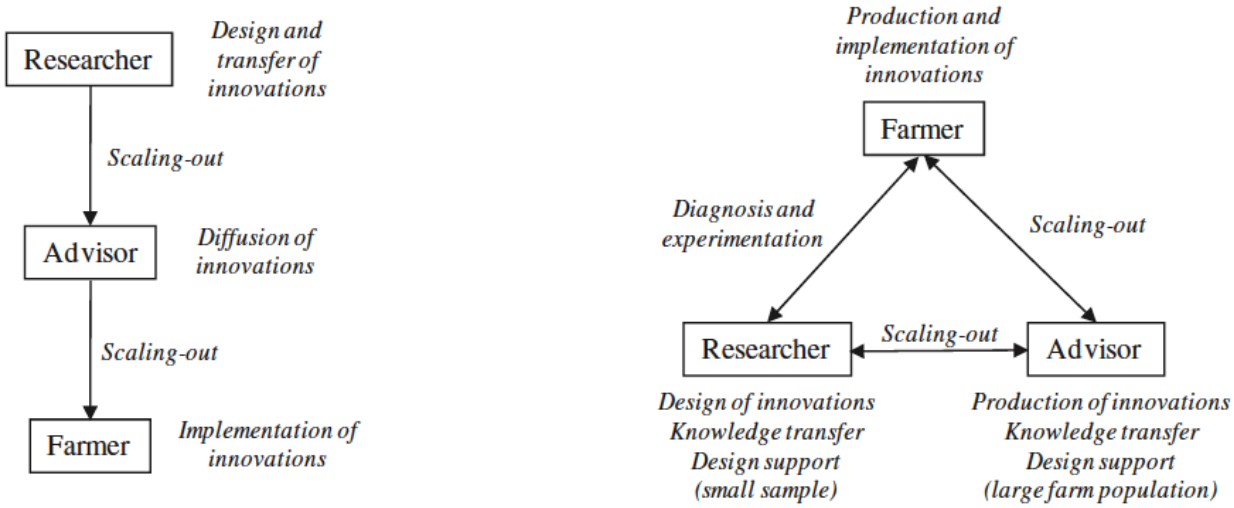

Figure 1a and 1b. Innovation process paradigms (Le Gal et al., 2011, p. 715)

Collaborative approach

The interactive and participative paradigm presented by Le Gal et al., (2011) is also referred to as a collaborative approach. Several examples of collaboratively developed livestock production concepts have been described in literature (de Greef et al., 2011; Bos, 2008; Aarnink et al., 2004). Also the commission van Doorn[1] suggests a more collaborative approach in which government, politics, society and business are involved to come to innovative stables where the position of the animal is the central issue and the stable is embedded in the environment (Van Doorn, 2011). Collaborative and participatory approaches have become a prominent feature in decision-making and planning processes (Turnhout et al., 2010). Advantages of a collaborative approach include the potential to result in more creative solutions, more public support for a plan, improved quality of decisions, enhance learning processes and improved legitimacy (Healey, 2006; Turnhout et al., 2010). On the other hand a collaborative approach is considered to be, among other things, more time consuming and is sensitive to issues as trust building and the development of commitment and shared understanding (Ansell & Gash, 2007).

Dutch policy

The former minister of Agriculture, Nature and Food Quality has defined several targets to come to a sustainable livestock sector by 2023 (Verburg, 2008). The ministry made a change from legislative interventions to a more collaborative approach where solutions from stakeholder and market initiatives are expected (de Greef et al., 2011). Collaboratively, with many different partners (including agricultural, environmental and animal welfare organisations), the ministry works on reaching a sustainable livestock sector by 2023. The aim of this collaborative approach is to work together with different parties to reduce obstacles for the development of a sustainable livestock system (LNV, 2010).

Different targets have been formulated including the target to have 5% integral sustainable housing systems in 2011 and 100% by 2023 (Verburg, 2008). The target formulated by the ministry requires a transition in the sector (van de Wielen, 2010; LNV, 2010). An integral sustainable housing system is defined as a system that is:

- Economically attractive; e.g. lowering financial risks and required investments
- Environmentally attractive; e.g. lowering emissions, use of energy and water
- Socially attractive; e.g. taking into account public health, animal welfare and health (van de Wielen, 2010).

The implementation of integral sustainable housing systems through innovative farms is facing several challenges. Although collaborative approaches are encouraged, they are often considered to be more time-consuming (Healey, 2006). Also innovations often have higher costs, while the performance can be lower and improvements need to be made (van de Poel, 2000). The implementation of innovative livestock farms is facing challenges related to regulations and local policies (van de Wielen, 2010; Bos, 2010; den Hartog et al., 2004). Environmental impact of new farms is not known beforehand, for that reason the implementation often faces difficulties in obtaining the necessary permits and fulfilling planning and environmental regulations. In order to make a change, pioneers are needed and should be given space to develop their ideas (Alders, 2011).

1.2 Problem definition

The pig sector is facing multiple challenges (including animal welfare and environmental impact) and the legitimacy and long-term viability of especially large-scale pig production is topic of fierce debate. Innovative pig farms are facing challenges during the implementation as a result of social barriers. A collaborative approach is considered as a solution to overcome problems in the implementation of innovative pig farms.

[1] commission that focussed on improving the sustainability of the livestock sector in the province of Noord Brabant.

1.3 Research objective

In this thesis the development of innovative pig farms in the Netherlands is studied in order to analyze whether a collaborative approach improves the implementation of innovative pig farms in practice. This information can help farmers and policy makers to tackle challenges and enhance the implementation of innovative pig farms in the future.

1.4 Research framework

Figure 2 shows the research framework. On the right, the research objective is given. The theoretical perspective will be formed on the basis of theory from participation theory, collaborative planning as well as transition theory. Participation theory will present elements that are important for a participatory process. These elements can be used to analyse the participatory process in order to identify crucial aspects to analyse the successfulness of participation. Collaborative planning theory is used to define different key elements that influence the outcomes of a collaborative approach in planning. Transition theory combines the innovation (pig farms) with the collaborative approach (network of actors and interactions). Transition theory can therefore help to analyse the cases as examples of collaborative innovation networks. The objects of study are collaboratively designed, innovative pig farms. Data will be collected from documentation, archive records as well as through interviews with involved stakeholders and experts. Finally, the object and theoretical perspective form the basis for reaching the research objective.

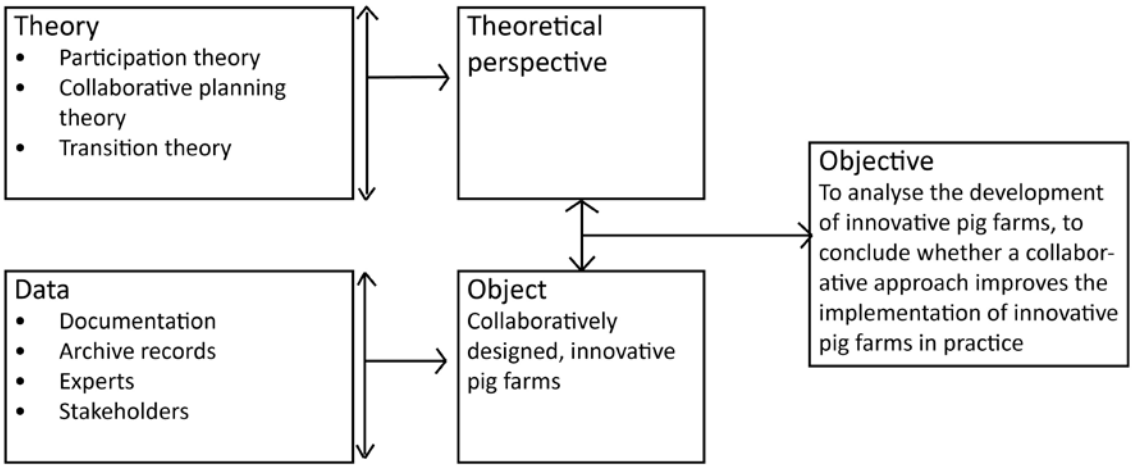

Figure 2. Research framework

1.5 Research questions

To determine whether a collaborative approach improves the implementation of innovative pig farms in practice the following research question will be addressed in this thesis:

- Are collaborative approaches improving the implementation of innovative pig farms in practice?

To answer the main question several sub-questions need to be answered to gain more insight in the implementation of pig farms as well as the characteristics and opportunities of collaborative approaches in general:

- What are the challenges and obstacles for the implementation of innovative pig farms in the Netherlands?
  - What are the regulations and policies involved when implementing an innovative pig farm?
  - How are these regulations and policies influencing the development of innovative pig farms?
  - How did the involved stakeholders deal with this?
  - Did other aspects, such as financial and public support, influence the implementation?

- How is a collaborative approach influencing the challenges and obstacles for the implementation of the farm?
  - What defines and influences the collaborative process (the involved stakeholders, method and resources)?
  - What are the reasons for adopting a collaborative approach?
  - What are the results and consequences for the implementation when applying a collaborative approach?

1.6 Research methodology

Research design
The research started with a literature review in order to build a theoretical framework. Scientific publications (covering participation, collaborative planning and transition theory) form the basis of this framework. The framework was used for the development of the interviews and analysis of the results.

Case studies have been used to obtain insight in whether a collaborative approach is improving the implementation of innovative pig farms in the Dutch planning system. Case study research provided the opportunity to examine, in-depth, cases within their 'real-life' context (Yin, 2004). To improve the validity of the research multiple cases and multiple sources were studied.

Data collection
By collecting case study data the main idea is to 'triangulate' or in other words, establish similar lines of evidence to make findings as robust as possible (Yin, 2004). Three different sources of data distinguished by Yin (2003) were used in this research: documentation, archive records and interviews. Documentation includes policy documents, scientific publications, reports, regulations and guidelines. This provides a formal framework to which informal reality can be tested (Yin, 2003). Archive records include recorded data such as the number of permits provided or results of environmental tests. This provides a longitudinal impression on the present situation (Yin, 2003). The interviews that were carried out are semi-structured; several questions were prepared in advance and the interviews have been recorded. For each case different stakeholders have been interviewed including the involved farmer, policy makers from the municipality and province and, if present, other involved business partners.

Selection of case studies
Flyvbjerg (2006) defines six different strategies for the selection of cases. These strategies can be divided into two categories, random selection and information-oriented selection. Random selection requires a large sample size that is not possible due to time limit. For that reason, information oriented selection was applied in this study. Flyvbjerg states that in this strategy '*the cases are selected on the basis of expectations about their information content*' (Flybjerg, 2006, p 230). Within information oriented selection four different typologies can be defined: extreme/deviant cases, maximum variation cases, critical cases and paradigmatic cases (Flyvbjerg, 2006). In this thesis the challenges and obstacles that pioneers in the pig sector are facing are studied. These cases can be defined as extreme or deviant cases: '*to obtain information on unusual cases, which can be especially problematic or especially good in a more closely defined sense*' (Flybjerg, 2006, p 230). Through experts consultation different possible case studies were listed. In order to be selected the cases needed to be:

1. developed through consulting different stakeholder groups
2. a pioneer in the pig sector (implementing a new concept)

Description of case studies
Vechtdal Familiestal
The design of the Vechtdal Familiestal is based on the concept of the 'Family Pen System' developed by Stolba & Woodgush (1984). The design is the result of the involvement of different stakeholders including livestock researchers, the animal welfare organisation, platform organic agriculture, pig farmers, feed industry and the province. The goal of the project was to design innovative organic pig farms that fulfil high standards in animal welfare, animal health, environment, management, labour and economy (Aarnink et al., 2004). The project resulted in three designs of which one, called the Vechtdal Familiestal, was implemented in 2008.

(Lupine Pig) Dartelstal
The design of the new pig production system Dartelstal is inspired on the Comfort Class principles. These principles are the results of cooperation between scientific organisations, the national farmers' organisation and the animal welfare organisation. Two important aspects in the design are the ten requirements of a pig and the implementation of locally produced lupine as feed for the pigs. The farmer is currently applying for the necessary permits to start with the implementation of the farm.

1.7 Structure of the report

In the next chapter the theoretical framework will be explained; this will form the framework to analyse the case studies. In chapter 3, the context and the cases will be introduced and analysed. Interviews with involved stakeholders and experts as well as documentation are used to analyse the cases. A discussion on the method, results and theory can be found in chapter 4, followed by the conclusions and recommendations.

2. The concepts: participation, collaboration & transition

In this chapter the theoretical framework is created. Different theories were studied to create a framework to analyse the cases (figure 3). First of all participation theory will be discussed to get insight in important aspects that influence the level and success of a participative or collaborative approach. Secondly, collaborative planning theory is studied. Increasingly, governments are adopting more interactive and collaborative planning approaches. Collaborative planning theory defines different key elements that influence the outcomes of such an approach. These elements can be used to analyse the implementation process of the cases studied in this research. Finally, transition theory is presented. Transition theory studies innovations and includes the network of actors and their interactions. Transition theory therefore combines the innovation (pig farms) with the collaborative approach (network of actors and interactions). Transition theory can therefore help to analyse the cases as examples of collaborative innovation networks (see also Hermans, 2011).

Together these theories form a framework of criteria that can be used to analyse the case studies. The overview of aspects with the interview questions can be found in appendix 1.

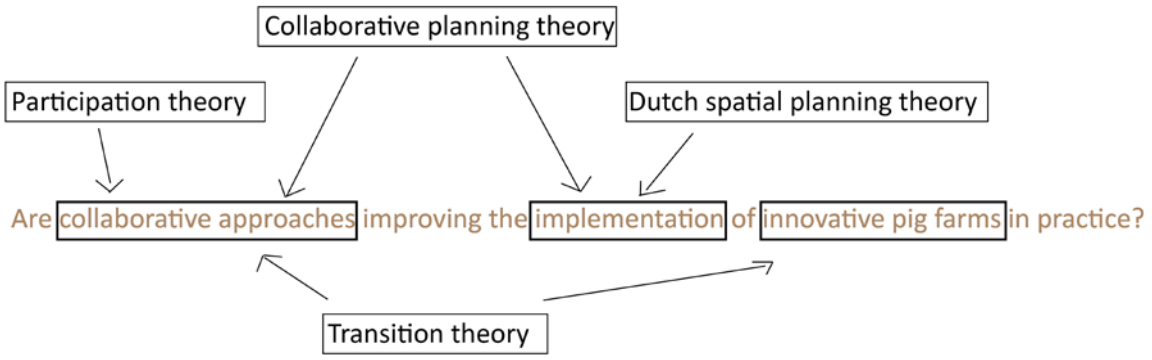

Figure 3. Theory in relation to the research question.

2.1 Participation theory

Increasingly, attempts to involve the public in planning and decision-making processes are made (May, 2007). Participation can be stimulated for ideological or political reasons (to develop democracy by empowering citizens, to create trust) or as an educational method (informing citizens making them understand technically difficult situations) (Irvin & Stansbury, 2004; May, 2007) Public involvement is expected to lead to better policy outcomes, greater public support and therefore smoother implementation (Illsley, 2003). The impact of participation depends on the level of participation. Different levels of participation have been described in the ladder of citizen participation of Arnstein (1969). The different levels are related to the distribution of power that participants obtain to influence a decision. Eight different rungs of citizen participation are defined that indicate the space for citizens to participate in decision-making and the power to influence the final decision (figure 4). The bottom rungs describe non-participatory methods including manipulation and therapy. The second part consists of levels of 'tokenism' that allow participants to have hear and have a voice but the right to de-

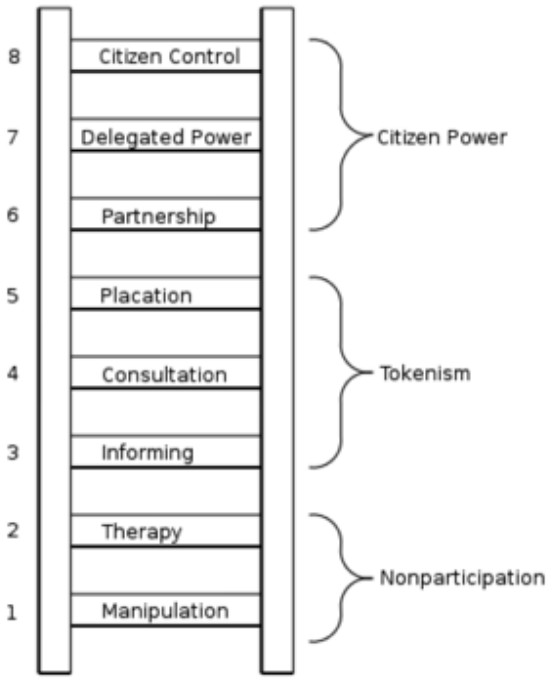

Figure 4. The Ladder of Citizen Participation (Arnstein, 1969, p. 217).

cide is still owned by the power holders. In the top three levels an increasing degree of collaborative decision-making can be determined (Arnstein, 1969).

Burgess and Chilvers (2006) developed a framework (figure 5) to evaluate stakeholder's participation processes. The participation process is defined by the inputs, outputs and outcomes within a certain context. The participation process takes place within a context such as the demographic characteristics, economic structure and cultural environment (Eshuis & Stuiver, 2005; Enserink et al., 2007). The context also influences the decision situation (purpose, objectives and inputs). The stakeholders (who), the method (how) and the resources (time, money and expertise) define the engagement process (Rowe & Frewer, 2000; Burgess & Chilvers, 2006). The outputs are aspects of assessment, decisions or actions (e.g. plans, policies, instruments, indicators and recommendations). The outcomes are defined as material changes, social/institutional capital and learning, behaviour change.

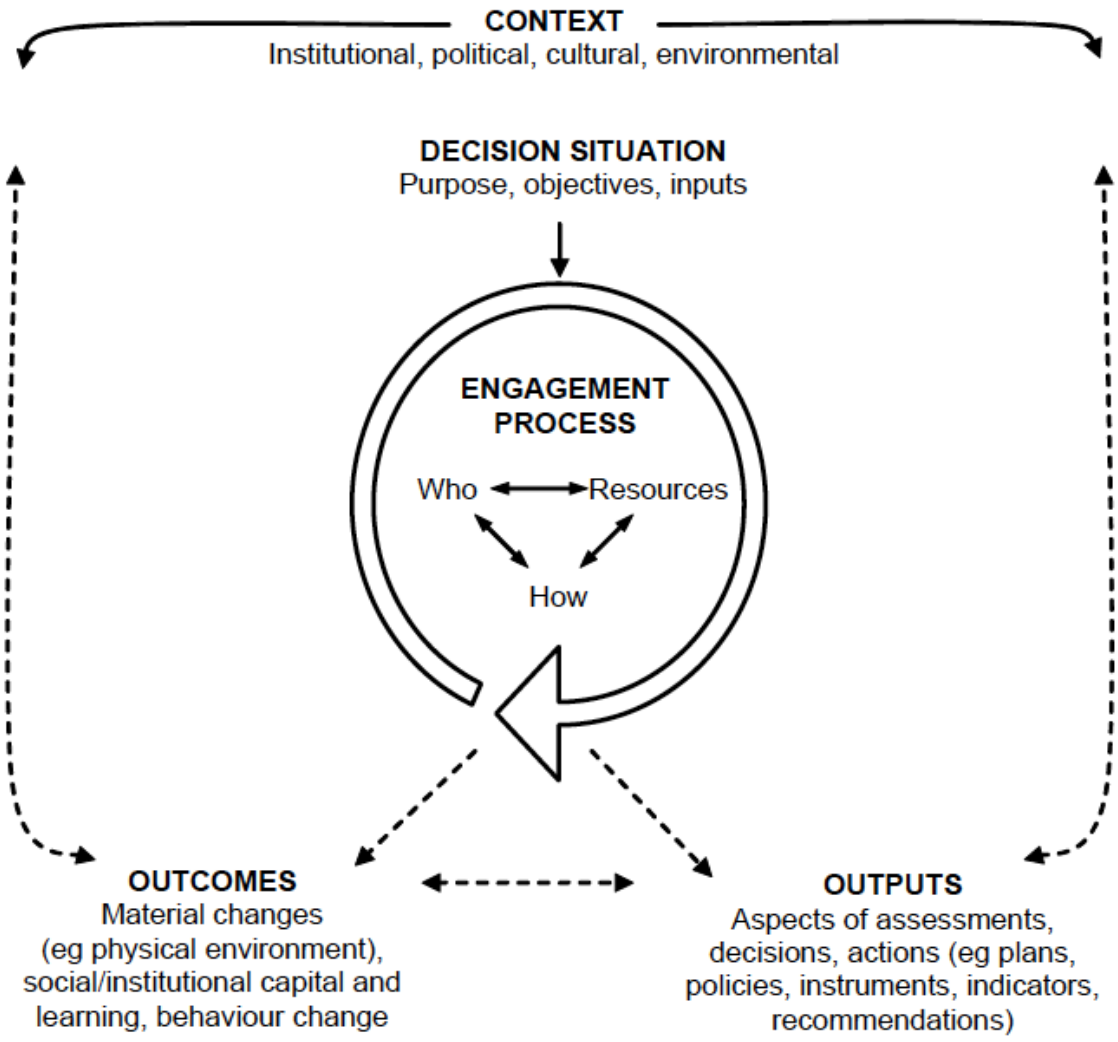

Figure 5. Model of participatory monitoring processes (Burgess & Chilvers, 2006, p. 716).

Conclusion and relevance to the research

Different aspects presented in participation theory are relevant for this research. Studying the economic, spatial and social context of the pig sector can provide information on external influences on the engagement process. Furthermore, the interaction between the stakeholders, method and resources determine the outcomes and outputs. By formulating interview questions concerning these aspects, insight in the reasons for using a participative method as well as the factors influencing the participation process, can be obtained.

2.2 Collaborative planning theory

Since 1970s, there have been critiques and debates over the rational and top-down approach in planning (Allmendinger, 2009). As a response, collaborative or participatory planning has been developed over the past two decades (Ansell & Gash, 2007). A change from a central-government model to a network society with participation in policy-making was made (Castells, 2004). Collaborative planning is a more communicative approach to planning compared to the knowledge driven rational approach in the seventies. Collaborative planning aims to introduce other (non-instrumental rationality) ways of thinking and knowing. Agreement is achieved through free and open discussion (Allmendinger, 2009). Collaborative planning is initiated upon the question:

'*How can we 'make sense' of what is happening and plan for the future within a dynamic and increasingly complex society? When there is wholesale distrust of the political process, a fragmentation into single-issue political process, how can we come to agree on matters of concern?* (Allmendinger, 2009, p. 197)'

Governments have responded to this change by adopting a more interactive steering model instead of a set of policy instruments. In this interactive steering model participation by stakeholders takes place, this development is known as the development from government to governance (van Dijk et al., 2011). Different stakeholders are involved in the development of policies, therefore policies are the result of negotiations and consensus and almost never long-term policies for radical innovations (Loorbach, 2007).

A shift from a centralized nation-state towards a more market and decentralized system has been made. The decentralization resulted in more diffuse policy-making structures and processes as the power of the central government to make and implement policies has decreased (Hooge & Marks, 2001).

Elements of collaborative planning

Collaborative planning as described by Healey (2006) has the potential to lead to more legitimate, inclusive, coordinated, knowledgeable and creative solutions instead of solely technological or ideological. On the other hand collaborative approaches are also more time consuming resulting in higher costs. Ansell & Gash (2007) reviewed 137 cases of collaborative governance to identify critical variables for successful collaboration. Based on the cases they developed a model for collaborative governance (figure 6). The figure indicates that starting conditions can form an incentive or constraint for participation. Different levels of power, resources or knowledge can influence trust, respect and understanding among the involved participants (Warner, 2006; Ansell & Gash, 2007). For example, differences in (technical) knowledge between the different stakeholders can form a constraint for reaching a shared understanding. Furthermore, a prehistory of either cooperation or conflict can positively or negatively influence the commitment and trust during the engagement process (Ansell & Gash, 2007).

Basic ground rules (e.g. transparency and inclusiveness) are set in the institutional design. Facilitative leadership can help to safeguard the process and empower the weaker actors. Similar to the model of Burgess and Chilvers (2006), Ansell & Gash (2007) define the collaborative process itself as a cycle as the process is nonlinear and iterative (figure 6). Ansell & Gash (2007) define five key elements in the collaborative process:

1. Commitment to process; the commitment to process is related to the motivation to participate in the process. Expected mutual gains by interacting in the process are often the motivation. Also mutual recognition of interdependence and shared ownership of the process is important for the commitment.
2. Shared understanding; shared understanding requires a clear and shared problem definition that results in something that can be achieved collaboratively (mission).
3. Intermediate outcomes; intermediate outcomes such as strategic plans or joint fact finding might represent a small achievement on itself but can play a key role in successful collaboration as it can strengthen the trust and commitment to the process.
4. Face-to-face dialogue; face-to-face dialogue is considered as a necessity for collaboration as it can increase mutual trust and respect and can help to find mutual gains.
5. Trust building; a common starting point for collaboration is a lack of trust. Therefore trust building is one of the essential aspects of a collaborative process.

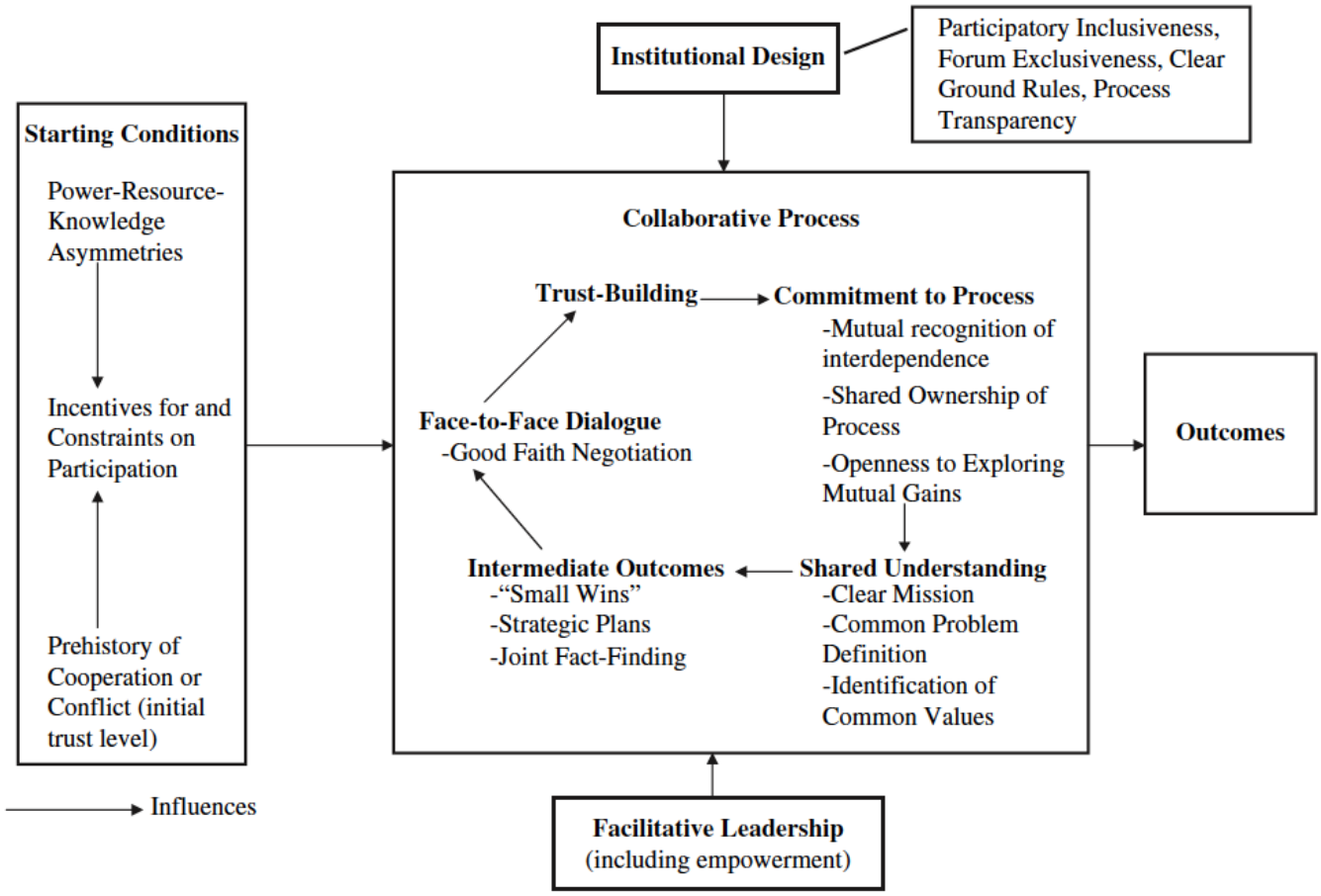

Figure 6. Model of collaborative governance (Ansell & Gash, 2007, p. 550).

Conclusion and relevance to the research

The model of collaborative governance by Ansell & Gash (2007) helps to define different aspects that influence the collaborative process. Through the interviews information can be gathered on how these aspects were managed in the two cases and thereby were influencing the collaborative process and the implementation of the innovative concepts.

2.3 Transition theory

Transitions are defined as fundamental changes in the structure of society, culture and practices (Loorbach and Rotmans, 2006). During a transition existing structures, institutions, culture and practices are broken down and new ones are created. A radical innovation (partial process) can occur almost overnight while other processes may take 1 or 2 generations to materialize (Loorbach, 2007). Transition theory is the field that studies these system innovations or transitions in society. Transition theory considers an innovation not as a single technological device but as an element of a larger entity in which new organizational and social arrangements (e.g. rules, perceptions, procedures and relationships) are developed. Therefore transition theory studies the whole innovation system including the network of actors and their interactions that define the system (Markard & Truffer, 2008). Transition theory underlines the importance of changing from a linear top-down perspective of innovation towards a multidisciplinary approach to create new knowledge and innovations (Hermans, 2011).

Geels (2002) defined three levels of transitions based on their structure (figure 7). At each level the organization of the components and the relationships between actors becomes more complex and the dynamics slows down. The three levels of transitions, so-called multi-level perspective (MLP), is a popular tool to study transformative innovations in society (Hermans, 2011). The levels refer to the socio-technical configurations with different levels of stability (Geels, 2012).

1. Niches

Niche innovations are rather instable; they consist of a small network with broad and unstable rules. The niches are often supported by local projects (Geels & Raven, 2006). The involved actors are prepared to accept a lower performance, higher costs and are willing to work to improve the new technology (Hermans, 2011). These innovations are developed by small-dedicated groups of pioneers (Van de Poel, 2000).

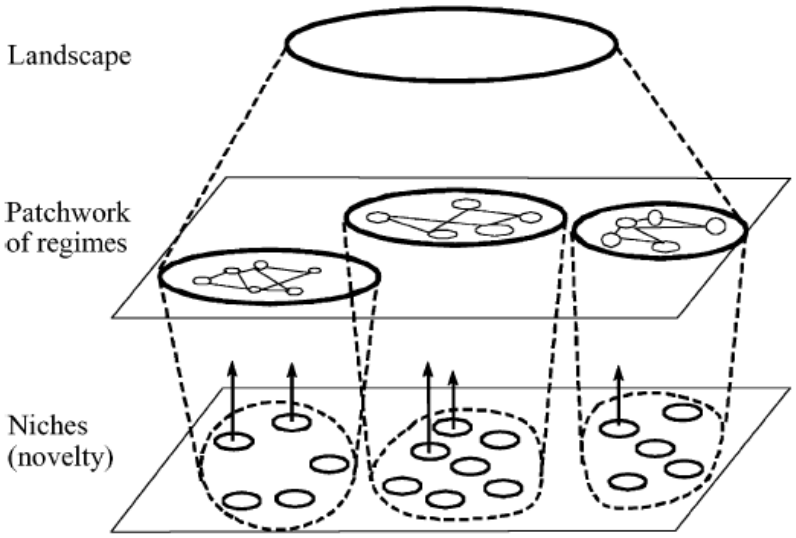

Figure 7. Three levels of transitions (Geels, 2002, p.1261)

2. Regime

The regime is the dominant structure of the societal system and includes physical and immaterial infrastructures resulting from culture, structure and practices. Examples include roads, regulations, routines, actor-networks and relationships (Loorbach, 2007).
These structures provide stability to the societal system and consist of larger networks with clear roles and expectations (Geels, 2012).

3. Landscape

The landscape includes exogenous factors or macro developments that can not be influenced directly by actors from the regime and niches. Examples include the global oil price, neo-liberal ideology but also national factors like cultural values or economic growth can define the landscape. Changes occur very slow and are influenced by cultural patterns, macro-economic trends and demographic developments (Hermans, 2011).

The idea of the multi-level perspective is that transitions come about through interaction of processes at different levels (landscape, regime and niche) (figure 8). Transitions take place when the system and the environment around it are growing apart. The regime is influenced by: pulses (e.g. innovations) from the niche level (bottom-up) and macro influences from the landscape (top-down).

Innovations emerges from niches (e.g. R&D labs or demonstration sites), are used in small market niches where further technical development and specialization can take place. The new innovation starts to stabilize in a dominant design but does not form a threat to the regime. Only when a 'window of opportunity' opens in the regime, new configurations can break through. The landscape can put pressure on the regime and thereby creates possibilities for novelties. Transitions can only occur when dynamics at different levels come together and reinforce each other. The multi-level perspective has been used to describe many different transitions including case studies from shipping, energy supply, pig husbandry and even the breakthrough of Rock 'n' Roll (Geels, 2007; Elzen et al., 2011; Geels, 2002; Verbong & Geels, 2010).

Key aspects of the niche in transition processes

Learning and experimentation between a wide range of stakeholders in a niche requires creativity and consensus. Consensus might not always be desirable as it can exclude contradictory information and potential innovative ideas. The collaboration between stakeholders can bring up issues like competition, negotiation and conflict. A conflict can go two ways, it can enhance the learning process (when stakeholders develop knowledge to strengthen their arguments) or stakeholders can stop listening (Eshuis & Stuiver, 2005). These aspects are also described in the collaboration model of Ansell & Gash (2007). Where the model of Ansell & Gash (2007) mainly focuses on the process and the possible influencing aspects, transition theory also looks to the context of the innovation and the potential to result in a transition.

The niche level is where transitions can be initiated and where connections between different actors and organizations are made. Different case studies have shown how successful innovations started out in a niche before taking over the

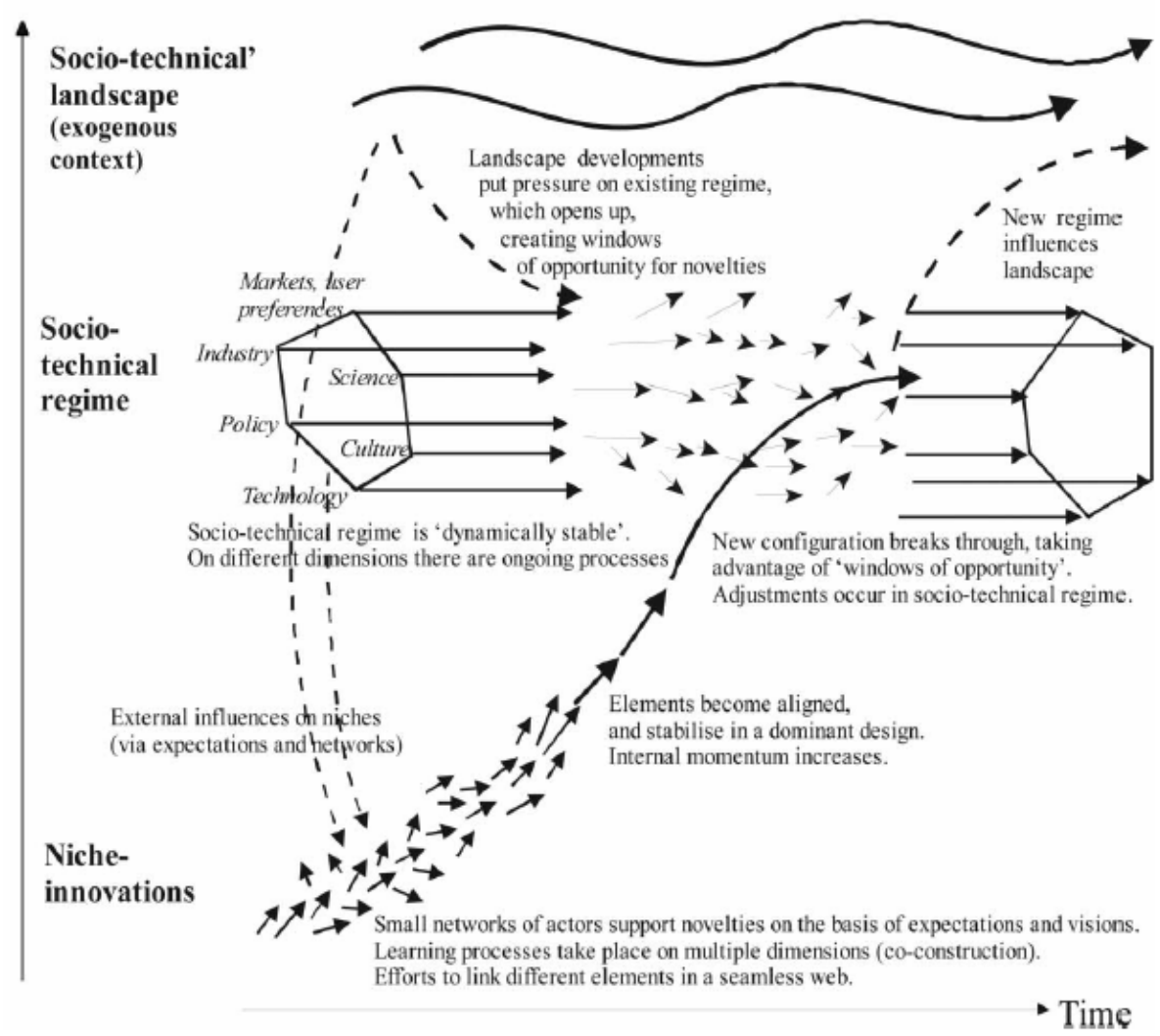

Figure 8. Multi-level perspective on transitions (Schot & Geels, 2008, p. 546).

existing dominant technology (Geels & Schot, 2007). Specific conditions and regulations from the regime can form a barrier and hinder implementations of innovations. For that reason it is crucial to create space to build up alternative regimes in a protected environment (Loorbach, 2007).

Hermans (2011) defines three different functions that take place within a collaborative innovation network: knowledge creation, institutional entrepreneurship and brokerage. These three elements are important for scaling-up local innovations. Knowledge creation is the need to overcome complex societal problems through collaboration and knowledge co-creation with stakeholders (Hermans, 2011). Institutional entrepreneurship refers to a group of actors who want to create new institutions or transform existing ones (Leca et al., 2008). The third function is brokerage that refers to the ability of actors to communicate with different types of organizations in the network. These actors are sometimes referred to as hybrid actors (Elzen et al., 2008).

Conclusion and relevance to the research

Transition theory looks both to the collaborative approach as to the outcome, the innovation. As this study aims to analyse two innovations, the niche level is the most important level to study. Therefore, studying specific conditions and regulations that can form a barrier for the implementation of the innovation is important. Transition theory can help to analyse how the innovation was initiated and its potential to contribute to a transition in the pig sector.

2.4 Theoretical aspects

The different aspects from participation theory, collaborative planning theory and transition theory, relevant to the research questions have been selected. Based upon the earlier presented figure of Burgess & Chilvers (2007), four themes (context, concept[2], process and results) are used to structure the theoretical aspects (see also appendix 1).
The different aspects from the theoretical framework are used to analyse the cases. Furthermore, these aspects are used to formulate interview questions for the different stakeholders and experts involved.

Context
To develop a better understanding of the case studies, the wider context of the pig sector has been studied. This information results in more insight into the decision situation (including purpose, objectives and inputs) and the collaborative process of the cases (Burgess & Chilvers, 2006). In the description of the context the main focus is on two topics: regulations and policies, and societal influences. Specific regulations and conditions were studied as they are considered as a possible barrier for the implementation of innovations such as innovative pig farms (Loorbach, 2007; van de Wielen, 2010; Bos, 2010; den Hartog et al., 2004). Also societal concerns can influence the implementation of innovative pig farms; the expansion and development of pig farms have led to discussions and citizen initiatives (Bos et al., 2009; Alders, 2011).

This context was studied through interviewing experts on the relation between the pig sector and society. The experts include policy makers from the government and the Dutch society for the protection of animals. Scientific literature on reflexive[3] design of innovative farming systems was consulted to gain more insight in the aspects that influenced the developments of innovative concepts. Finally, policy documents, laws and regulations were studied to gain knowledge of policies and regulations involved in the implementation of pig farms.

Altogether, the context will provide information on possible barriers related to regulations and societal influences on the implementation of innovative pig farms. This wider context is similar for both farms and therefore forms a separate introduction paragraph in the next chapter. Additionally, a more location specific context is described for each farm separately.

Concept
Secondly, attention was paid to the innovative farm concept itself. The concept is described on the basis of interviews with the involved stakeholders and available publications concerning the innovative concept. Characteristics of the location and concept indicate possible obstacles for the implementation of the innovative concept. The involved farmers were asked if there is a reason or cause to develop such an innovative concept (e.g. desire to innovate, contribute to knowledge, developing new partnerships or contribute to institutional changes in the sector) (Hermans, 2011; Leca et al., 2008).

Process
On the basis of the earlier presented figure by Burgess & Chilvers (2006) (figure 5) the engagement (or collaborative) process can be divided into three subthemes: stakeholders (who), method (how) and resources. The interaction between the stakeholders, method and resources is influenced by collaborative aspects such as trust, commitment and understanding, as defined by Ansell & Gash (2007). The interaction and aspects are discussed under the subtheme: collaborative process.

Stakeholders
Burgess & Chilvers (2006) indicated that the collaborative process is defined by the interaction of the stakeholders, method and resources. Minutes and project plans as well as the involved farmers provided an overview of stakeholders involved in the cases. To develop insight in the process, those involved in the engagement process such as the farmer, advisors, researchers and policymakers have been interviewed concerning their role and stake in the process. They were also asked to reflect on the influence of the involvement of the different stakeholders on the process. This information provided insight in the network of stakeholders that was created through developing the innovative concept and what the impact of the engagement of certain stakeholders can be.

[2] In the figure of Burgess & Chilvers (2006) the term 'decision situation' is used instead of concept.
[3] Reflexive refers to self confrontation, not to reflection

Method
The selected method such as brainstorms, phone calls or meetings can influence the outcomes of the process (Burgess & Chilvers, 2006). The interviews and minutes indicate what methods were applied to develop and implement the innovative concept. The stakeholders were also asked to reflect on the methods in order to determine whether the selected methods were suitable and how they influenced the process and results.

Resources
The third aspect of the collaborative process includes resources such as budget, expertise and time. Rowe & Frewer (2000) defined resource availability as a key aspect in participation; the availability of resources can strongly influence the process and the outcomes. For example, stakeholders need to invest time to attend meetings; limited availability of time could lower the potential output. Project plans were consulted to gain insight in the available resources. Furthermore, the stakeholders were asked whether they experienced any influence of budget, expertise or time on the process or results.

Collaborative process
To get insight in the challenges and obstacles of a collaborative process, the involved stakeholders were interviewed about the collaborative conditions that influence the collaborative process (as described by Ansell & Gash (2007). First of all, stakeholders were interviewed about starting conditions like differences in power, resources or knowledge among the involved actors and whether a prehistory of conflict or cooperation was present.

Secondly, Ansell & Gash (2007) defined five factors that are crucial within the collaborative process and together form a virtuous cycle. These factors include: commitment to the process, shared understanding of the problem and goals, intermediate outcomes, face-to-face dialogue and trust building. The involved stakeholders were interviewed about how they experienced these factors during the process. For example, they were asked if they experienced a shared understanding of the problem and goals among those involved. Furthermore, several intermediate products and plans were studied to get an overview of intermediate outcomes that could have contributed to the commitment and understanding in the process.

Thirdly, Ansell & Gash (2007) mention a facilitator and institutional design (ground rules) as aspects that can contribute the collaborative process. Project plans were consulted to determine whether ground rules were present. The stakeholders were asked whether a facilitator was involved.

Finally, to be able to translate these pioneering efforts to a larger scale, the ability of communicating with different stakeholders and organisations is important (Hermans, 2011). Therefore, insight in the communication among stakeholders was gathered through the interviews. The stakeholders were asked how decisions were made and whether room for creativity was offered. Furthermore, the farmers were interviewed about the reason to engage in a collaborative approach.

Results
In this paragraph the impact of the context and collaborative approach on the results is assessed. As Burgess & Chilvers (2007) indicated, the context influences the outcomes and outputs, therefore the involved stakeholders are asked how they perceived and addressed policy or societal influences from the context.

The interviewees were asked to reflect upon the collaborative approach and its results. This information was used to discuss similarities between the experience of the two cases and the advantages and disadvantages of a collaborative approach discussed by Healey (2006). Based upon interviews with the involved stakeholders, an impression of the impact of a collaborative approach on the implementation of innovative pig farms can be indicated.

To analyze the potential contribution of the innovative concepts to a transition in the pig sector, several interview questions were concerning the creation of a network, knowledge development and the willingness to accept a lower performance and higher costs in order to create an innovative concept.

3. The experiences of innovative pig farms

This chapter discusses the implementation of two innovative pig farms: Vechtdal Familiestal & Dartelstal. In the first paragraph the wider context of pig farms is described to get a better understanding of aspects that influence the development of pig farms such as policies, regulations and societal influences. The second and third paragraph discusses the experiences of the implementation of the two farms.

3.1 Context

Figure 9 lists several policies and societal aspects that influence the context of innovative pig farms. The outbreak of Classical Swine Fever (CSF) in 1997 in which more than 700.000 pigs were destroyed had a large impact, both economic and socially (Crauwels et al., 2001). The CSF crisis was one of the reasons to think about the spatial distribution of intensive farms. Therefore, in 2002 the 'Reconstruction law' was introduced. Through this law the spatial structure of agricultural areas would be improved as well as the quality of nature areas, landscape, water and environment (Ministerie van Vrom, 2003).

In 2001 the Ministry of Agriculture, Nature and Food Quality launched a program to develop new animal production systems to deal with the environmental impact as well as animal welfare (de Greef et al., 2011). To reduce the environmental impact of animal husbandry on nature the law on ammonia and animal husbandry was adopted in 2002. Followed in 2007 by the law on odour and animal husbandry.

In 2007 the first direct appeal from society made it to the political agenda. A so-called 'citizen initiative' in April 2007 supported by 106.975 signatures of Dutch citizens requested attention for animal welfare and the environmental impact of intensive animal husbandry (Bos, 2008; Tweede Kamer, 2012).

A year later the Dutch minister of Agriculture, Nature and Food Quality presented her vision on the future of animal husbandry. In this vision the minister sets a target for 100% integral sustainable housing systems by 2023 (see also chapter 1). In 2009, nine large agricultural organisations supported the program to reach this target. Together they work on improving the sustainability of animal husbandry with projects on animal health and welfare, societal support, environmental impact and market. One of the organisations is the Dutch Society for the Protection of Animals; their approach is to stimulate innovation in order to create new markets for more animal friendly products. '*We came up with the 'Beter Leven Kenmerk' to create segments between organic and conventional that enabled a large group of farmers to join and convince large groups of consumers to buy the products* (policymaker of the Dutch Society for the Protection of Animals, 21st of February 2012).'

As a result of societal concerns on the sustainability and scale of animal husbandry the commission Alders was asked to organize societal debates on the future of animal husbandry in 2011. In the same year the province of Noord-Brabant asked the Commission van Doorn to look at options for improving the sustainability of animal husbandry. Both commissions consider a joint approach of government, society and business as a necessity.

The government advisor on landscape launched in 2011 a design competition for 'beautiful and innovative pig farms'. The result was a book in which six farmers developed together with a team a new farm building. The team consisted of an agricultural advisor, a policy maker from the province, an architect and in some cases a landscape architect. The idea of the competition was to encourage good examples of beautiful farms because currently farm buildings are increasingly facing protest because of their looks and size (policymaker of the government advisor on landscape, 21st of February 2012).

The SBIR program (Small Business Innovation Research) launched in 2011 a tender to gather ideas on: 'integral sustainable housing systems in the landscape'. One of the projects that won was the Lupine Pig Dartelstal that will be described later on in this chapter. The SBIR has three phases, the first phase (€ 45000) is meant to do research, the second for developing the ideas further and testing a prototype. In the third phase, the innovation should be translated to practice.

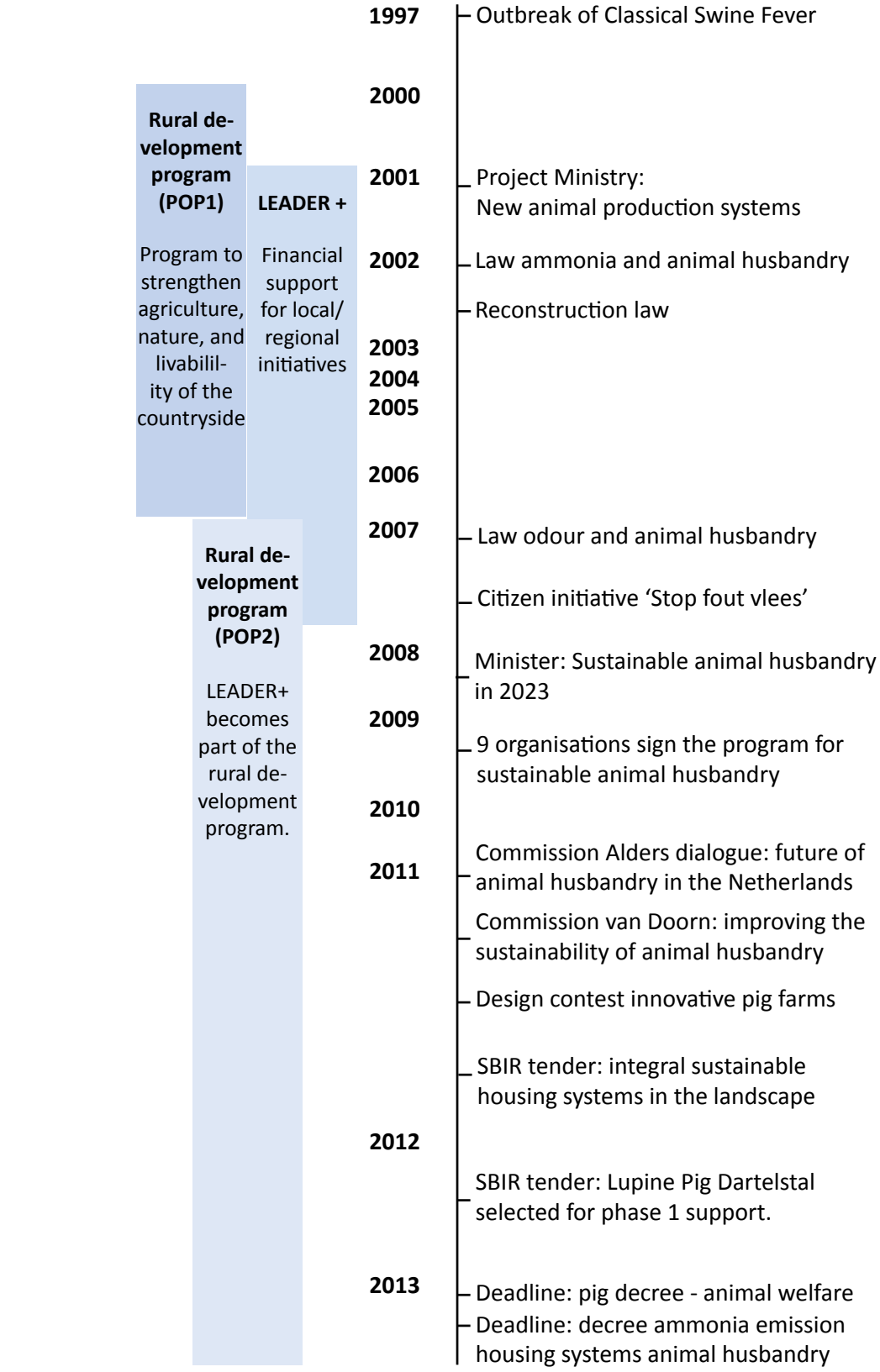

Figure 9. General timeline

In 2013 there are two deadlines for the pig husbandry: one focussed on animal welfare, the other on ammonia emission of the housing systems. Farms need to meet the standards described by these decrees.

Parallel to these aspects, several programs for rural development (POP1 & POP2) were active to strengthen the possibilities and diversity of agriculture and nature. The LEADER+ program that ran from 2001 to 2007 financially supported local and regional oriented initiatives, such as the Vechtdal Familiestal. After 2007, LEADER+ became part of the POP2. Next to the SBIR, these programs also offer opportunities for developing innovative farming systems.

As can be derived from the general timeline, different actions (laws, initiatives, commissions and programs) from different organisations (governmental and societal) have addressed the environmental impact and animal welfare in intensive animal husbandry in the Netherlands. Next to the general timeline, an overview is made of the main legislation and policies that influence the implementation of pig farms.

3.1.1 Policies

The legislation and policies influencing the implementation of pig farms is visualized in figure 10. The policies form an underlying layer (in yellow) as they define the framework of what is possible at that specific location (zoning plan, scale, characteristics). The figure indicates that many different aspects of the farm are addressed through policies and regulations. Strategies of the national government are communicated through the Nota Ruimte towards the province and local government (Ministerie VROM, 2006). This policy is a framework to verify provincial policy and gives an indication of where different land uses and functions can take place. On provincial level a similar construction is present; a province provides a policy frame for municipalities, using spatial plans. The province is involved in projects with a more regional character like defining the boundaries of nature areas of infrastructure. On the local level, municipalities create every ten years zoning plans in which the land use and requirements for land use are defined (e.g. the maximum size of construction area) (Hidding, 2006).

Figure 11 provides an overview of current regulations and policies involved when implementing a pig farm. European directives concerning agriculture are translated into Dutch regulations and implemented in provincial and municipal policies. However, Dutch regulations on e.g. animal welfare are stricter than EU directives indicate resulting in a competitive disadvantage of Dutch farmers compared to their European colleagues (den Hartog et al., 2004).

3.1.2 Regulations

A study by den Hartog et al. (2004) indicated ten challenges related to regulations and laws in the implementation of farms based on the experiences of 1190 farmers. Pig farmers indicated constantly changing regulations and bureaucracy (long procedures) as main obstacles in the development of farms. Especially local zoning plans and receiving permits related to environmental issues were mentioned as obstacles. According to den Hartog et al. (2004) regulations often focus upon means and not on goals. As a result, the impact of the regulations is not always in line with the goals. For example, the law on animal husbandry and ammonia results in investments in air cleaners to lower the emissions; while attention to initiatives from the sector to lower the emissions from the source are not stimulated (researcher, 7th of February 2012). This forms a barrier for innovative technology and production systems (den Hartog et al., 2004).

More recently, the 'Uitvoeringsagenda Duurzame Veehouderij' commissioned an analysis on obstacles in the application and permission of permits. This also indicated that a small group of real innovators are developing concepts that go further and in some cases result in difficulties with legislation. The systems change quicker than legislation, so, there is always a mismatch between rules and innovation. The question is whether you should change the rules and legislation for the small group of innovators, or you should support them individually. In different regions examples can be found where farmer needs to 'earn' room for the farm by investing in animal welfare or environment (policymaker of the ministry of Economy, Agriculture and Innovation, 21st of February 2012).

Regulations influencing pig farms are shown in the upper half of figure 10. The majority of the regulations are related to the environmental impact of the farm. More specifically the impact on water, soil, air and nature is regulated. Furthermore, measures to lower the ammonia emission are addressed. Farmers that want to expand their farm and are located near to nature areas are facing problems to implement their farm due to the sensitivity of the nature area to the environmental impact of a farm (policy maker of the ministry of Economy, Agriculture and Innovation, 21st of February 2012).

The Dutch ammonia policy has two tracks; one is directed on the region, the other on livestock housing systems. The first entails that near ammonia sensitive nature areas specific measures need to be taken (Wet ammoniak en veehouderij (Wav)). The second defines emission requirements for farms (Besluit ammoniakemissie huisvesting veehouderij). This decree states that animal housing systems for which low emission systems are available, need to be realized with this system over time. The decree defines maximum emission values; the housing system can only have a similar or lower emission factor than the maximum defined by the decree (Infomil, 2012). In case of a new developed housing system these emission levels are unknown which can result in uncertainty for both local authorities and entrepreneurs (policy maker of the ministry of Economy, Agriculture and Innovation, 21st of February 2012).

Since October 2010 it is possible to apply for all necessary permits in one time through the so-called 'Omgevingsvergunning' (Wet algemene bepalingen omgevingsrecht (Wabo)). The Wabo includes permits for environmental, constructional, monumental and usage issues. All the different regulations are checked when the necessary documentation is delivered to the municipality.

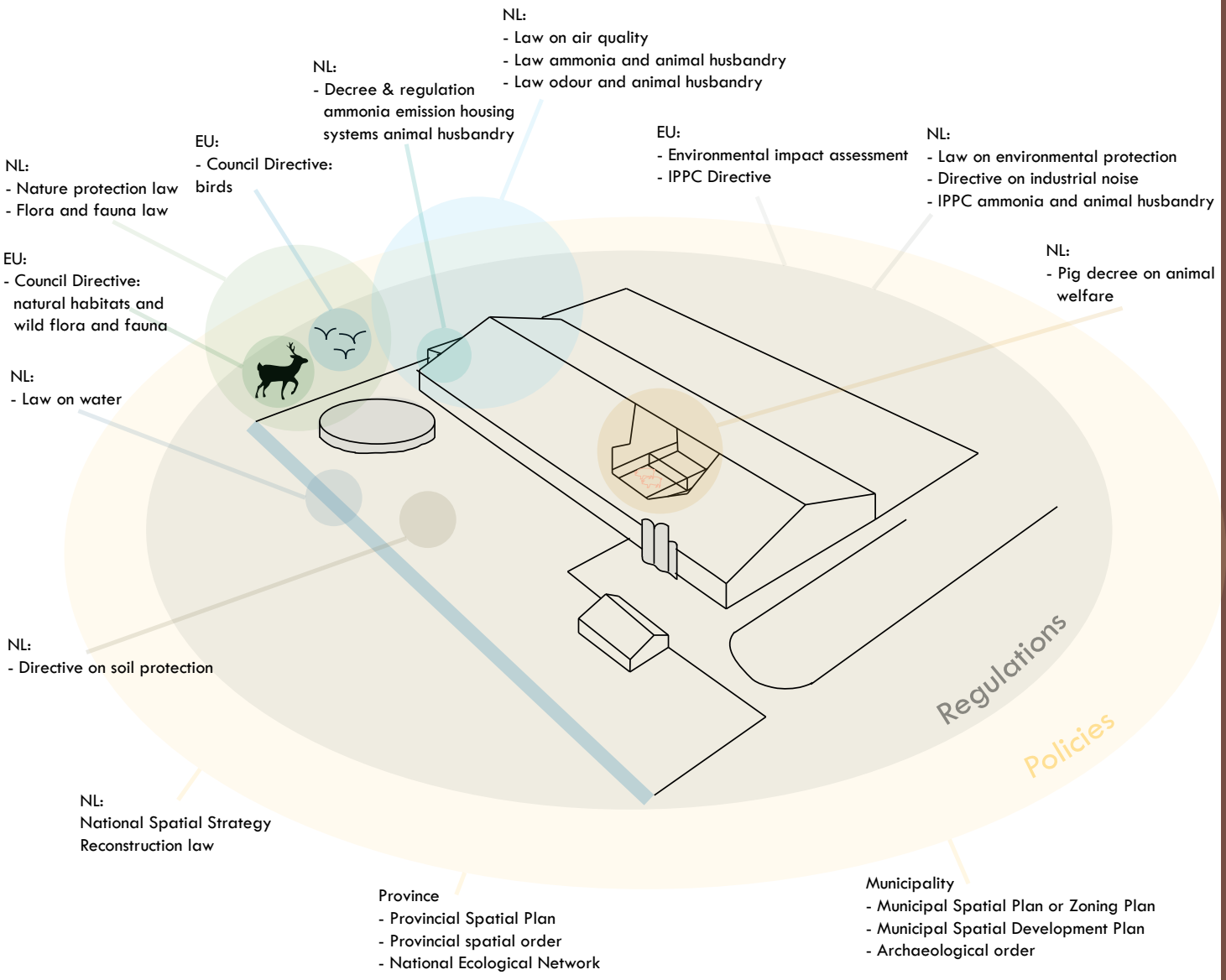

Figure 10. Policies and regulations influencing the implementation of pig farms.

Europe

Environmental impact assessment
Projects need to be assessed on the potential environmental impact.

Integrated Pollution Prevention and Control Directive (IPPC - directive)
Pig farms with more than 2000 meat pigs or 750 sows need to fulfill this directive.

Council Directive on the conservation of natural habitats and wild flora and fauna
In the Netherlands 141 areas are selected for conservation.

Council Directive on the conservation of birds
In the Netherlands 78 areas are selected for conservation of birds. Together with the habitats directive these areas form the Natura 2000 areas.

National

National Spatial Strategy (Nota Ruimte)
The National Spatial Strategy forms the base for spatial developments in the Netherlands.

Reconstruction law (Reconstructie wet)
This law indicates where intensive livestock production is allowed to expand.

Legal provisions spatial law (Wet algemene bepalingen omgevingsrecht (Wabo)
To construct or modify buildings an environment permit is needed. The application is tested based on several laws, only if all regulations are met, the permit is provided.

Pig decree (Varkensbesluit)
The pig decree provides rules to guarantee the welfare of pigs. It includes new housing requirements. The regulations needs to be met in 2013.

Nature protection law (Natuurbeschermingswet)
Farms need to prevent to have a significant impact on nature areas. They need to comply with stricter emission and depostion limits.

Flora and fauna law (Flora en Faunawet)
Projects are not allowed to have a negative effect on protected species.

Law on environmental protection (Wet Milieubeheer (Wm))
Provides a framework to check the environmental impact. The authority determines whether an environmental impact assessment (Milieueffectrapportage) is needed.

Law on air quality (Wet Luchtkwaliteit)
Provides limits for particulates and nitrogen dioxide.

Law on water (Waterwet)
To drain off wastewater to the surface water or to extract groundwater, a permit is needed.

National

Dutch Directive on soil protection (Nederlandse richtlijn bodembescherming)
Determines the need for soil protecting measures.

Directive on industrial noise (Handreiking Industrielawaai en Vergunningverlening)
Provides limits to reduce noise hinder.

Law ammonia and animal husbandry (Wet ammoniak en veehouderij)
Projects are not allowed to have negative effects from ammonia emission on vulnerable nature areas.

Decree ammonia emission housing systems animal husbandry (Besluit ammoniak-emissie huisvesting veehouderij)
From 2013, farms need to apply the Best Available Techniques (BAT) to reduce ammonia emissions. Not for organic farms.

Regulation ammonia and animal husbandry (Regeling ammoniak en veehouderij (Rav))
The Rav provides a list of housingsystems per animal category with the emission values.

IPPC environment test ammonia and animal husbandry (Beleidslijn IPPC omgevings-toesting ammoniak en veehouderij)
Provides emission limits for larger farms, based on the best available techniques (BAT).

Law odour and animal husbandry (Wet geurhinder en veehouderij)
Framework for testing odour nuisance.

Province

Provincial Spatial Plan (Provinciaal omgevingsplan)
Describes the landscape, landuses and the possible developments that may take place.

Provincial spatial order (Provinciale omgevingsverordening)
Provides, amongst other things, a framework to test applications for a spatial permit for livestock farms.

National Ecological Network (Ecologische Hoofdstructuur)
The National Ecological Network is a network of nature areas where flora and fauna is protected.

Municipality

Municipal Spatial Plan or Zoning Plan (Bestemmingsplan)
Describes the landscape, landuse and functions. It also provides the regulations for construction and the construction surface.

Municipal Spatial Development Plan (Landschapsontwikkelingsplan)
Gives a vision on landscape development.

Archaeological order (Nota archeologie)
Indicates where valuable cultural historical sites are located.

Additional visions or orders
The municipality can create additional policies or regulations to steer developments.

Figure 11. Overview of regulations and policies concerning pig farming

3.2 Vechtdal familiestal

The following paragraphs will discuss the concept, location specific context, process and results of the collaborative approach in the implementation of the Vechtdal Familiestal. Information was gathered by studying documentation (including project plans and evaluation reports) as well as by interviewing five stakeholders (including the farmer, policy makers and researchers) that were involved in the process.

3.2.1 Concept

The Vechtdal familiestal is the initiative of a farmer in the province of Overijssel. In 2007 the organic pig farm was opened with a closed farming system for 250 sows and 1800 finishing pigs. The farmer is active in many different agricultural organisations. Together with his family and business partners, he runs an organic dairy farm, conventional pig farm and organic pig farm. The farmer distinguished two main drivers for developing the new farm. First, the farmer considers himself as idealistic and adventurous and therefore likes to come up with new ideas. Secondly, he wanted to escape from the conventional pig sector: '*You have no control, the value that you try to give to the product is not returned*' (farmer, 26th of January 2012).

The concept Vechtdal Familiestal is based on a housing system that aims to incorporate the natural behaviour of a pig as much as possible in a family pen system[4]. In every production phase this is taken into consideration together with the elements of economy, labour, environment, hygiene and animal health. The different parts of the farm are connected through which pigs can explore their new housing before they are moved into a new house (figure 12). The pigs are housed together with approximately 6 sows with their piglets (Aarnink et al., 2004). The sows came from SPF farms (Specific Pathogen Free) to ensure a high animal health level. In this way the company aims to create social responsible and high quality pork.

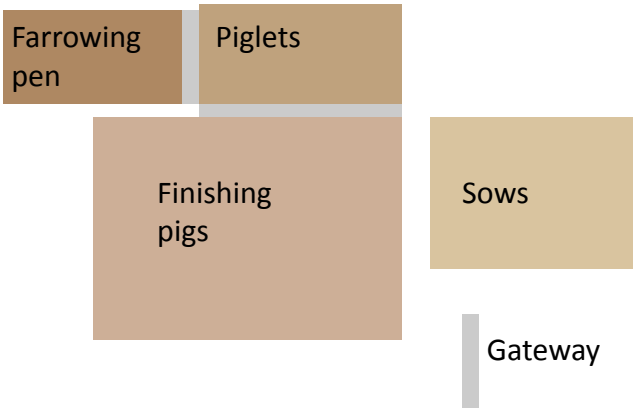

Figure 12. Layout of the Vechtdal Familiestal (adapted from Aarnink et al., 2004).

Figure 13. Farm location

The farmer wanted to provide a solution for the current problems with animal welfare, animal health, antibiotics and social acceptation of the conventional pig sector. The innovative project is made possible by venture capital for which a 'B.V.' (private limited liability company) is established: Vechtdal Familiestal B.V.

3.2.2 Location specific context

The farm is located in Dedemsvaart in the municipality of Hardenberg (figure 13). The family bought in 1997, 5.65 hectares in order to establish a new organic pig farm. In 2000 a first business plan was created but the economic opportunities were limited as a result of the financially bad years 2000-2002 in the pig sector (Unknown, 2006). For that reason the plan was postponed. Meanwhile, the farmer and other stakeholders invested time in developing a new concept and its market opportunities. Different opportunities to share ideas and develop a concept presented themselves between 1999 and 2003. This resulted in the Vechtdal Familiestal. The name, Vechtdal Familiestal refers

[4] Stolba and Woodgush developed a farming system for a combination of sows and meat pigs, the Family Pen System. In this system four sows and their piglets are kept in familygroups (Stolba & Woodgush, 1984).

to the area situated along the river Vecht and connects the farm with the region. The aim is to create a closed cycle with the production of feed in the region.

The farm is not situated near to nature areas; therefore the Nature Protection Law did not influence the development of the farm. The farm did not exceed the standard construction surface of 1.5 hectares and replaced an old farm. There were no obstacles from legislation for the development of the farm. The SKAL recognition for organic farming lowered the requirements of emission reduction. For that reason the implementation of the farm took place rather fluently. An advisor of the farmer created the application for the necessary permits. The spatial planning department of the municipality was not consulted before the application was filed.

3.2.3 Process

Timeline

In the timeline (figure 14) the most relevant projects are mentioned that have a direct link to the development of the Vechtdal Familiestal. Beginning 1999, 22 pig farmers and representatives of several environmental, agricultural and governmental bodies, signed the Wageningen Declaration. Hereby they committed themselves to actions that contribute to ways of socially acceptable pig production. The ministry launched in 2001 a programme to stimulate innovation in animal production. Within the programme, the project 'Family Pen Systems for Organic Pig Farming' took place. A group of researchers from several research institutes started to gather knowledge on Family Pen Systems described by Stolba and Woodgush (1984). To translate this theoretical concept to practice several stakeholders joined the discussions to make it socially, environmentally and economically viable. This project resulted in three different designs (including the Vechtdal Familiestal) for family housing systems that fulfilled high requirements on animal welfare, animal health, environment, management, labour and economy. The team that worked on this consisted of researchers of different disciplines together with stakeholders like technicians, feeding companies, farmers and NGO's.

To translate this idea to practice, a follow-up research was carried out to determine the possibilities for a regional pork chain in the Vechtdal area. This resulted in the Agricultural Chain Knowledge (AKK) project 'Regional arrangements for organic pork' in which different parties came together and developed a way to (re-) connect producers to the Vechtdal region (phase 2). The project started with developing a vision and establishing ways of cooperation in order to sell the Vechtdal meat at local butchers and restaurants. The involved organisations underlined the need to produce and sell the meat in the region and signed the 'Vechtdal Covenant'. The Dianthus Foundation was founded to implement and maintain an environmentally, nature and animal friendly agricultural production system in the Vechtdal and make this accessible for citizens and consumers. The farmer is currently chairman of this foundation. The AKK project resulted in the publication 'Regional opportunities for organic pork' (Donkers, 2003).

In the last phase the implementation was prepared (phase 3). In 2006, the applications for construction permits could be sent and in 2007 the construction started. The farm was implemented with support of a wide variety of stakeholders and a LEADER+[5] contribution. The project received a LEADER+ subsidy due to the facts that it was an innovative farm (organic and with more attention to animal welfare), an active entrepreneur, improved the cooperation in the region (Vechtdal regional products) and strengthened the image by making the farm accessible to others (policy maker of the municipality of Hardenberg, 13th of February 2012).

In 2008 the farm was opened but the products were sold to the German market, at the moment 50% of the meat is sold in the Netherlands (farmer, 26th of January 2012). Regionally, the meat is sold at different butchers and restaurants. Next to pork meat also other products are offered as a regional Vechtdal product. Furthermore, part of the meat is sold through Marqt, a store located in three cities in the Netherlands with special attention for high quality products.

The Vechtdal familiestal received attention in the national media and even in Dutch parliament where the minister was asked whether the Family Pen System would be implemented more often as the farm resulted in stress reduction for the pigs kept in the farm (Verburg, 2008*b*).

[5] LEADER+ was an initiative of the EU structural funds to help rural stakeholders to take the long-term potential of their region into account. LEADER stands for Liaison Entre Actions de Développement de l'Economie Rurale (Netwerk Platteland, 2012).

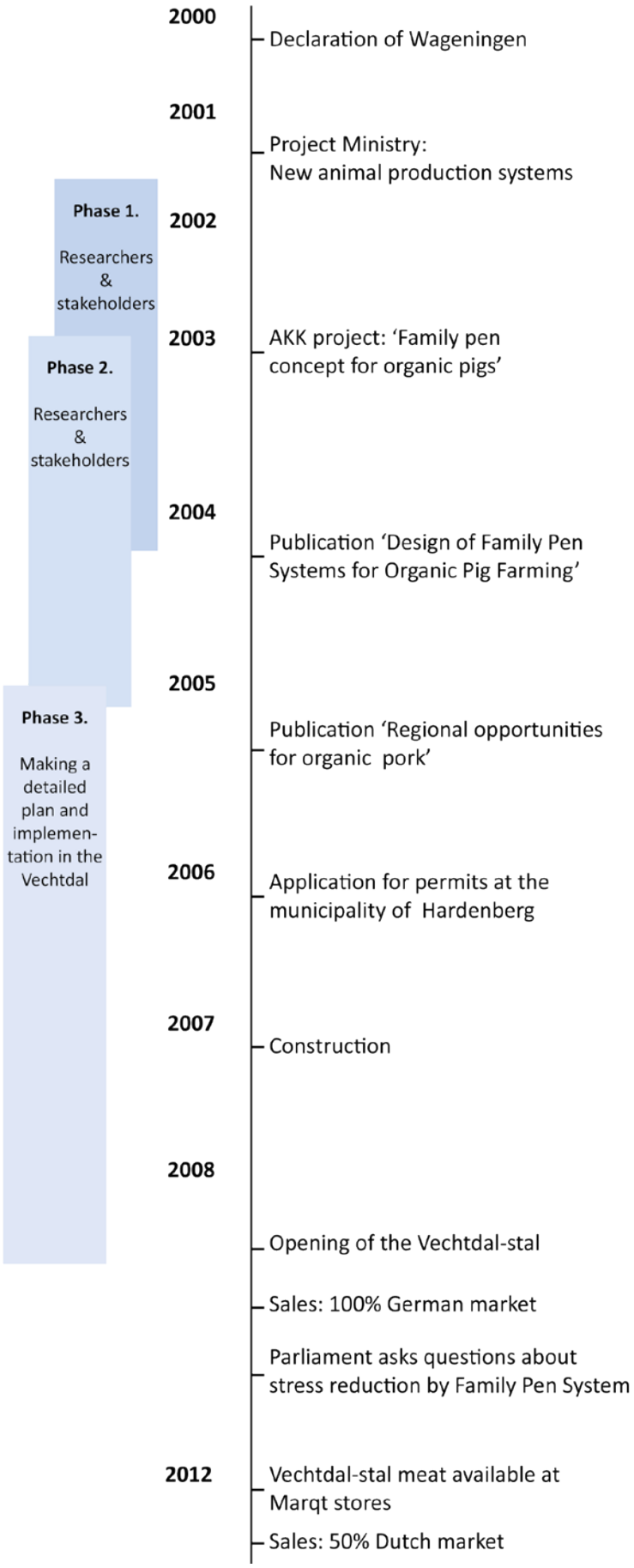

Figure 14. Timeline Vechtdal Familiestal.

Stakeholders

The number of stakeholders involved can be divided into the three phases. Although the ministry initiated the program for new housing systems they were not directly involved in the projects. In the first phase the initiative came from the research side as the ministry gave them the assignment to develop new housing systems. The project leader was working for IMAG (research institute for Agricultural and Environmental Engineering). Different stakeholders were asked to join the discussions including two groups of pig farmers: one from the Vechtdal region in the province of Overijssel, the other from the Mergelland region in the province of Limburg. The involved stakeholders represented a diverse background from retail, animal protection agency, nature organisations to animal feed companies (figure 15, phase I) (Donkers & Aarnink, 2003; Programma Nieuwe Veehouderijsystemen, 2003).

After this first program ended, the farmer in the Vechtdal region continued to work on the concept they had develop. Therefore, the second phase of the project became more oriented on the Vechtdal region (figure 15, phase II). In the second phase another researcher from the IMAG got involved as a project leader. In this phase next to the researchers more regional stakeholders were involved including local farmers, nature- and regional governmental organisations. Both the province and municipality were involved in the project (Donkers, 2003).

The final phase of the project was led by the farmer and aimed to implement the project in practice (figure 15, phase III). Different, mostly local, companies were involved to construct the farm and arrange the necessary inputs (Unknown, 2006). The municipality dealt with the application for the necessary permits, the province or ministry were not involved in this process.

As can be derived from figure 15, a large number of stakeholders were involved in the development of the farm. Interviewees have different opinions about the involved parties. On the one hand, the involvement of the animal protection agency and farmers organisations was a positive signal. Many times these parties were opposites but in this project they became partners. On the other hand, the project required the involvement of persons that could think on a long term and beyond the focus on costs price only, which was difficult for some stakeholders (researcher, 7th of February 2012). As a result, one of the stakeholders left the project.

The group of involved parties was very broad and introduced different ways of looking to pig farming: theoretical, practical, animal focussed, cost price oriented, market chain perspective and environmentally focussed. The different focuses also made it sometimes difficult to communicate. The farmer and one of the involved researchers mentioned a gap between science and practice but also difficulties to integrate different researchers (technology and economy) with each other.

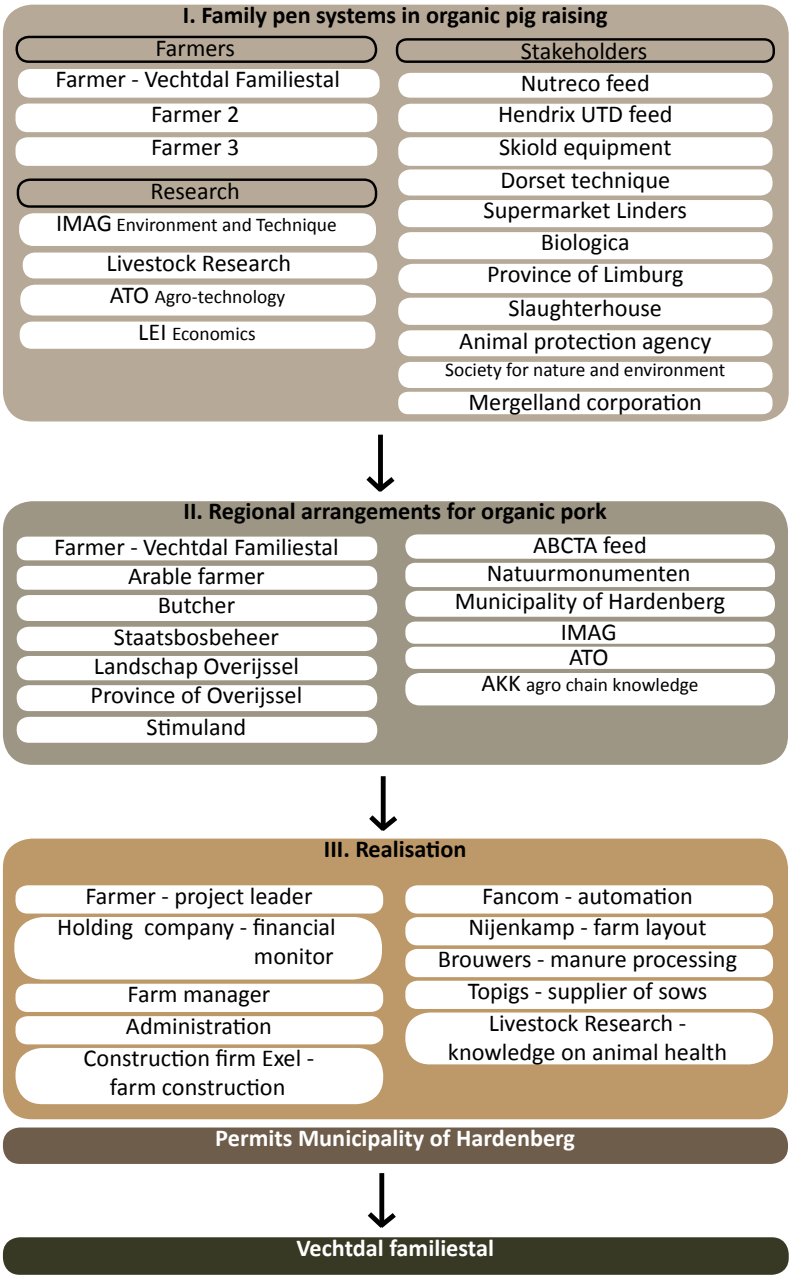

Figure 15. Stakeholders involved in the Vechtdal Familiestal

Method

In the first phase creative sessions and brainstorms on different topics like environment, animal health and animal welfare were used to share ideas on future pig farming (Grin et al., 2004). The interviewees agreed that this method worked well to make everyone share his/her ideas. The researchers presented their ideas for the family pen system and together with the inputs from the brainstorms three different designs were developed.

In the second phase meetings were arranged to discuss the ideas of phase one with regional stakeholders. The ideas were translated to a regional approach for the Vechtdal region. The intensive cooperation between research and practice resulted in a more market-oriented way of research and a regional embedding of the plans for the Vechtdal Familiestal.

In the final phase the implementation needed to be arranged. In this phase meetings with the different executing companies were planned to make and construct the final farm design. An advisor of the farmer delivered the application for the necessary permits. The spatial planning department of the municipality was not involved in the process before the application was submitted. The applications were tested on the basis of the existing regulations for pig farms and no difficulties were noticed. Without any objections the permits were provided. There was a high willingness from the municipality to help when the farmer came with a question or suggestion (farmer, 26th of January 2012).

Resources

Time

The development of the concept for the Vechtdal Familiestal took place in three phases (figure 15). For the first two phases a time limit of 1.5 to 2 years was set. The project plan of the second phase also indicates the investments in days for each stakeholder group (Unknown, 2002). For the final phase a time limit was not set as it depended on the application of permits and the proceeding of the construction.

For the researchers involved, the project was finished when the three designs were delivered. As a result of the project based financing the cooperation ends when the project ends. In this case, the researchers were not involved in the last phase of detailing, application for permits and monitoring. One of the involved researchers said about this: '*Because of this you are lacking the complete overview of such a project. We would have liked to see more of the implementation phase as researchers*' (researcher, 7th of February 2012).

Budget

The budget from the ministry was mainly available for the involvement of researchers and experts in phase 1 and 2. The researchers wrote their report for their commissioner, the ministry, and therefore a good connection to the practice was not always present. The other parties were responsible for financing their own time with the idea that they have an interest in the development of these innovations for their own companies.

Before the implementation took place, different investments (in advisors and plan making) were done. For the implementation of the farm in practice, the LEADER+ contributed about 8% of the investment in the farm (farmer, 26th of January 2012).

The entire process, from buying land to construction of the farm took ten years. The pig cycle, the returning six years pattern of high peaks and pits can be recognized in this process (Enting & Verver, 2007). In the first years (2000-2002), limited economic opportunities were available as a result of low financial results. In this period the farmer got involved in the project 'New animal production systems' and took time to develop the idea for the Vechtdal Familiestal. These plans were ready in 2005 when the financials results had improved.

Expertise

Experts from different disciplines could be consulted. The project included already different expertise centres: from the research institutes (Wageningen University related) and from the other parties (e.g. the animal protection agency and animal feeding industry) (Donkers, 2003).

Collaborative process

The collaborative process starts with the starting conditions. Several of the involved stakeholders, especially the involved researchers, were acquainted and shared a prehistory of cooperation. The large group of involved stakeholders presented differences in knowledge: '*The trick was to value everyone's knowledge input and to link it to the project*' (farmer, 26th of January 2012). In the end of the project when the detailing of the design was discussed some stakeholders did not attend the meetings because they had no direct stake in this (e.g. animal protection agency and nature organisations).

Furthermore, the influence of the different stakeholders varied through the phases. In the first phase the researchers played an important role while later on the commercial parties became more important. One interviewee mentioned specifically the influence of the animal protection agency as a strong one. Decisions were made together, while in the last phase, the decisions were made by the farmer, as he was the one putting the ideas into practice.

The interviewees believe a shared understanding of the problem among the involved stakeholders was present; something needed to be done in intensive pig farming. However, it took some time to define the shared problem and goals, in the beginning it was considered to be a divided problem. As mentioned earlier, for some stakeholders it was difficult to have a long-term vision. These differences led to a lowering of trust and commitment in the beginning of the process but improved towards the end (farmer, 26th of January 2012). Over time different reports and publications were published on the proceedings of the project. This contributed to the commitment and understanding.

For each phase of the project a project leader was assigned. This person was also considered as the facilitator, however, looking back, one of the interviewees mentioned that having a process manager or facilitator with a focus on translating science to practice could have helped.

Regarding the institutional design; for phase 2 several ground rules of the process were described in the project plan. All participants signed an agreement that included some guidelines on financing, sharing information and involving new stakeholders (Unknown, 2002). For the other two phases the rules were less explicit.

Finally, the main reason for the farmer to get involved in a collaborative approach was the idea that by connecting different actors, new ideas will develop and you can take more steps ahead (farmer, 26th of January 2012).

3.2.4 Results

The context of the project gave incentive to work on more animal friendly and environmentally sound farm design. This resulted in three different designs for farms, including the 'Vechtdal Familiestal'. The project expanded its scope by including regional development and regional products in its aim (figure 16).

The involved stakeholders mentioned three main advantages of using a collaborative approach to come to a design: understanding each other's discipline, cooperation and innovation. The innovative aspects (open to colleagues, development of region product chain and a new way of keeping pigs) were for the municipality reasons to support the farm through the LEADER+ program (policy maker of the municipality of Hardenberg, 13th of February 2012).

Reflecting on the result of the collaborative process the farmer stated: '*It was a long process [ed. 7 years] in which we got to know each other. One of my conclusions is that connecting practice with science can result in real innovations…*'. '*… Having partners helped to arrange the finance. Although everyone keeps his own identity, being together makes is possible to ensure your liquidity. Alone, it wouldn't have been possible*' (farmer, 26th of January 2012).

The disadvantages of the collaborative approach were considered to be the time and money investments, especially when you organize it in the way this project was organized. The farmer states about this: '*You have a dream you want to realize, that's why you accept a longer process. Therefore, having a long-term vision is crucial. In the beginning you will make costs, you have to learn things and there are no examples to learn from. You have to be open to work together in order to strengthen each other*' (farmer, 26th of January 2012).

Within the project two kinds of results can be defined: outcomes and outputs. Outcomes (changes in environment, behaviour, capital or learning process) include the (design of the) farm itself, the cooperation and appreciation between the different stakeholders (research & practice) and development of animal oriented thinking. The main output (plans, policy and instruments) is the way the design was developed. Animal oriented and collaborative design is increasingly adopted as a way to develop new farming systems; also in the plan of the minister on stimulating integral sustainable farms (Verburg, 2008; policymaker of the Dutch Society for the Protection of Animals, 21st of February 2012).

With respect to transitions, the interviewees considered creating space for new concepts as one of the aims of the project: '*We wanted to discover new paths for the development of pig farming in the coming 20-30 years*' (researcher, 7th of February 2012). On the basis of existing knowledge on farming systems, animal welfare, animal health and environment the new concepts were developed. Therefore, evaluating these projects is crucial to share the experiences and make a translation to others in the sector. Examples are of high importance in order to stimulate others to follow.

Figure 16. Meat from the Vechtdal Familiestal recognizable in Marqt supermarkets

3.3 Dartelstal

The collaborative approach in the implementation of the Dartelstal is discussed in the following paragraphs and covers the concept, location specific context, process and results. Similarly to the other case, information was gathered by studying documentation (including minutes and preliminary project plans) as well as by interviewing eight stakeholders (including the farmer, policy makers, the architect and advisor) that were involved in the process.

3.3.1 Concept

The Dartelstal is the concept for a new farm building in the Northeast of the Netherlands. The farmer runs the farm together with her husband, son, brother and one employee; she is also chairman of the pig-farming sector of the farmers union LTO. Currently the farm consists of an arable farm, a sow farm, two rented sties with finishing pigs and biogas processing. In the future the family wants to create a closed cycle on one location. The feed is partly produced on-farm and fed to the pigs; the manure goes into the biogas installation, the outputs of the biogas are used for the arable farm and for heating the farm buildings.

In order to comply with the 'Decree ammonia emission housing systems animal husbandry' the current farm buildings needed to be adjusted. Next to this adjustment the family wanted to expand the farm and developed a new concept; the idea of the Dartelstal. The name Dartelstal (translated: Frisky stable) refers to the additional animal welfare investments the family wants to do. The pigs will be kept according to the 2 star system of Beter Leven, an initiative from the Dutch Society for the Protection of Animals (Dierenbescherming). This means that the pigs can go outside. Furthermore, the family wants to feed regionally produced lupine instead of supporting the import of soy produced in South America[6]. The change from soy to lupine is initiated and supported by Kiemkracht, the alliance of the Innovation Network (from the Ministry of Economy, Agriculture and Innovation) and the Commodity Board of Arable Farming. The meat will be certified as lupine pork and offered at butchers and supermarkets. A visitor centre will be created to invite citizens and farmers to see and learn from the farm (figure 17). In total the construction area planned is about 6 hectares.

Figure 17. Illustration of the visitor centre in front of the Dartelstal (Rendering by DAAD architects, 2012).

3.3.2 Location specific context

The farm is located in Beerta, municipality of Oldambt, province of Groningen (figure 18). During the process, different location specific regulations and policies changed (figure 19). The municipality is since the 1st of January 2010 the result of the merger of the municipality Reiderland, Scheemda and Oldambt.

[6] Especially soybean meal is an important input for the animal feed industry. Dutch imports of soybean meal originated mainly from Argentina and Brazil (both 48%) in the period 2005 – 2010 (Product Board MVO, 2011).

The Municipal Spatial Plan allows a construction surface of 1.5 hectares and with a possible extension of 0.5 hectares. The new, more urban oriented, municipal council is not in favour of giving room for extension of intensive livestock farms. For that reason, all applications for extension of intensive livestock farms need to receive permission from the council (policy makers municipality of Oldambt, 9th of February 2012). A construction application that exceeds a construction surface of 1.5 hectares is handled together with the province in so-called 'kitchen table meetings'. The 'kitchen table meeting' (in Dutch: keukentafelgesprekken) is a tool of the province of Groningen to discuss plans of entrepreneurs from an early stage on. In these meetings policy makers, civil servants, the farmer and advisors meet to discuss the plans and the limits.

Figure 18. Farm location

Initially, the family would start with taking measures to comply with this legislation starting in June 2011. The policy makers from the municipality explained: '*we could decide to enforce this but that wouldn't make sense, knowing the history of this process. We need to try to be on time with reaching the final deadline of June 2012*' (9th of February 2012). The pressure increases as the process for the spatial procedure will take at least 26 weeks and the deadline to comply, 2013 is near. Furthermore, the council needs to give a 'declaration of no objection', which makes the process longer.

The environmental impact assessment will indicate whether the farm has a significant impact on nature areas in the area. Interviewees expect that because of the large distance to nature areas, this impact won't form an obstacle.

3.3.3 Process

Timeline

Figure 19 shows the process of development of the farm and ideas. In 2005, several farm buildings were adjusted to a higher level of animal welfare with the standards of Comfort Class[7] (see also de Greef et al., 2011). In 2008, new regulations on ammonia emissions were launched and need to be complied with in 2013. In order to comply, the farm buildings need to be adjusted and the family would like to expand the farm. Therefore, in 2009, the family contacted the municipality about their wish to adjust and expand. As a result of having an arable farm and a manure processing installation, the total build area is already large; an expansion of the farm would exceed the limits of the zoning plan of the municipality. For this reason the province became involved and in 2010 a first 'kitchen table meeting' was organized to discuss the possibilities with the family and advisor, the municipality of Oldambt, the province of Groningen and Libau (bureau for landscape quality).

During this first meeting the response was that a new farm building would result in a too large build surface. The province suggested building the new stable (for 7000 pigs) 500 meters from the farm (Hut, 2010). The neighbour of the family did not agree with these plans. He was afraid that the development of the pig farm would reduce the opportunities for him to develop. Therefore the municipality decided the new farm building had to be constructed next to the existing farm. To discuss these ideas a new 'kitchen table meeting' was arranged with the message that the plans had to be for the coming 10 years.

In the second meeting the family presented their long-term plans (figure 20). These plans were divided into two phases. Phase 1 would be an expansion till 3500 finishing pigs and 750 sows; in phase 2 another 3500 finishing pigs were added. However, the result of the meeting was that the province agreed with only phase 1 and not with phase 2. In figure 20, phase 1 is given in red, phase two in yellow and existing buildings are in dark red. The plan also included the construction of three manure digesters.

[7] Comfort Class project: different organisations worked together to develop an economic viable system where the 10 most important welfare requirements of pigs are fulfilled.

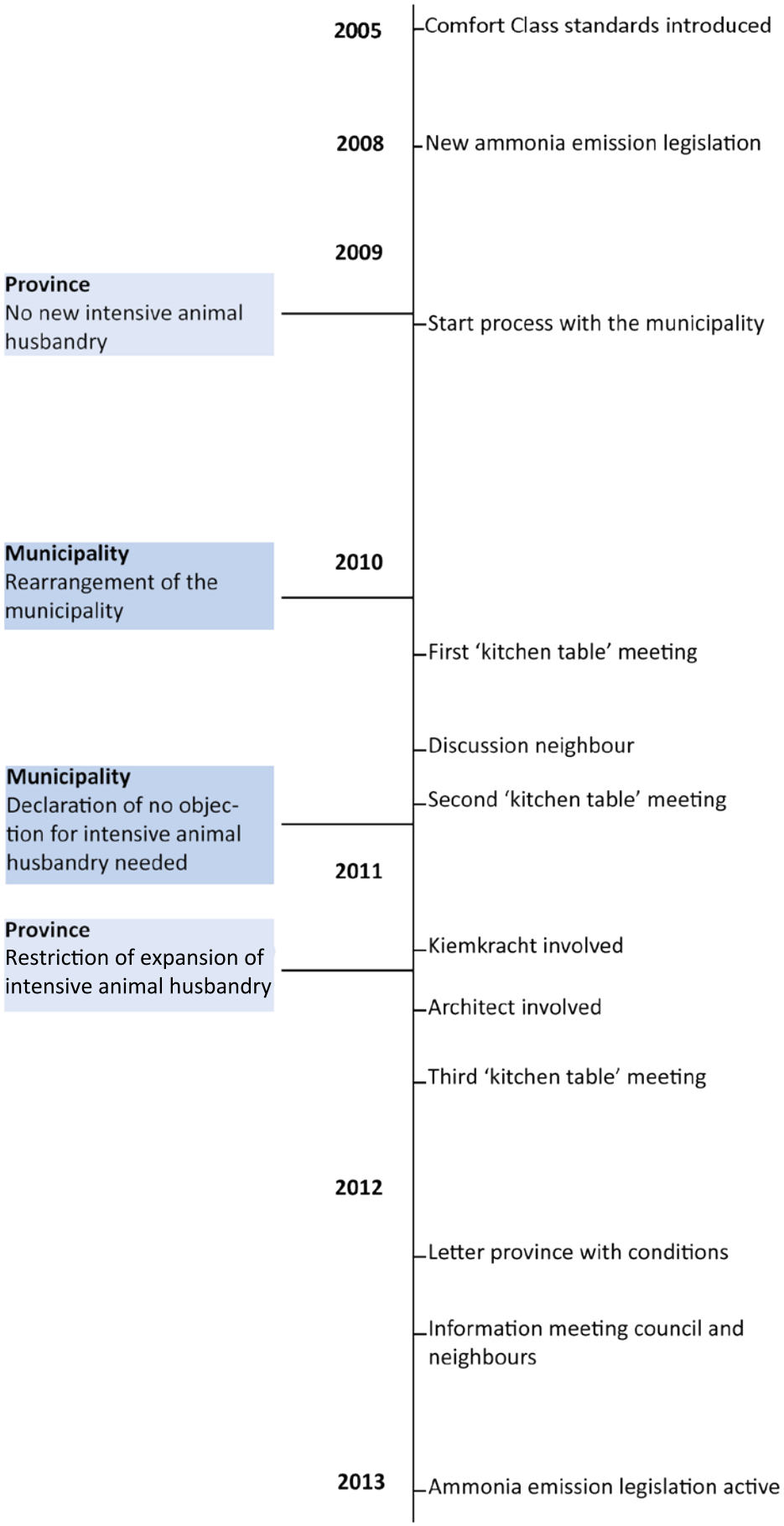

Figure 19. Timeline Dartelstal

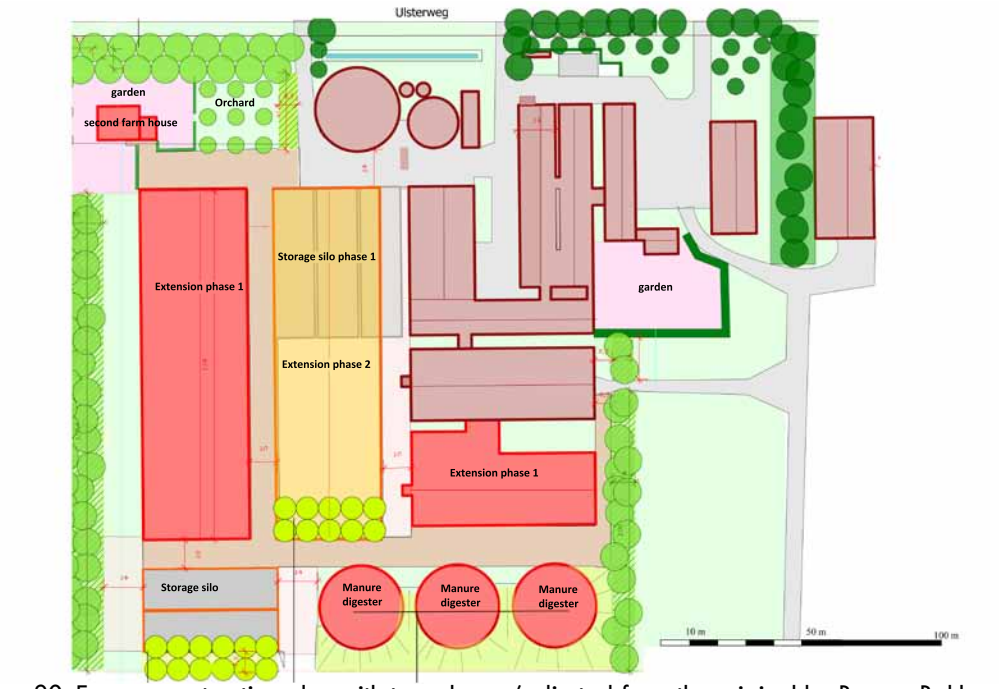

Figure 20. Former construction plan with two phases (adjusted from the original by Bureau Bakker-Weenink, 2011).

The family was disappointed with this result and decided to reconsider their possibilities. Meanwhile, a debate had started within the province about the development of intensive livestock farms. No new intensive livestock farms could be constructed and from 2011 also possibilities for expansion of existing farms were restricted. In case the province was already in the conversation with a farmer, a transition regulation was active, to continue the process.

After the implementation of the Comfort Class, the family maintained interest in new concepts to implement on the farm. In a meeting with the director of Kiemkracht (innovation platform for arable farming) ideas on producing lupine as feed for pigs in the Netherlands were shared. Kiemkracht is active on developing new ideas for arable farming. The current production on arable farms is directed on potatoes, sugar beets and wheat. Protein crops are, because of international trade agreements, limited produced. As pig feed it is currently too expensive. The aim is to create a new market niche where a higher price can be paid for the feed and the meat (Kiemkracht, 17th of February 2012).

The family decided to adopt this idea and created a new concept, the Lupine Pig Dartelstal, for the farm with a distinctive farm building, outdoor run and litter for animal welfare (figure 21). Hereby the plan changed completely and a meeting with the provincial executive of agriculture was arranged to discuss the concept of lupine pig in combination with the Dartelstal. The provincial executive was enthusiastic but permission of the provincial executive on spatial planning was needed. Therefore, a new 'kitchen table meeting' had to be arranged. In order to create a beautiful plan, an architect was assigned. In the beginning of February 2012 the family received a letter with the final conditions for approval (Provincie Groningen, 2012).

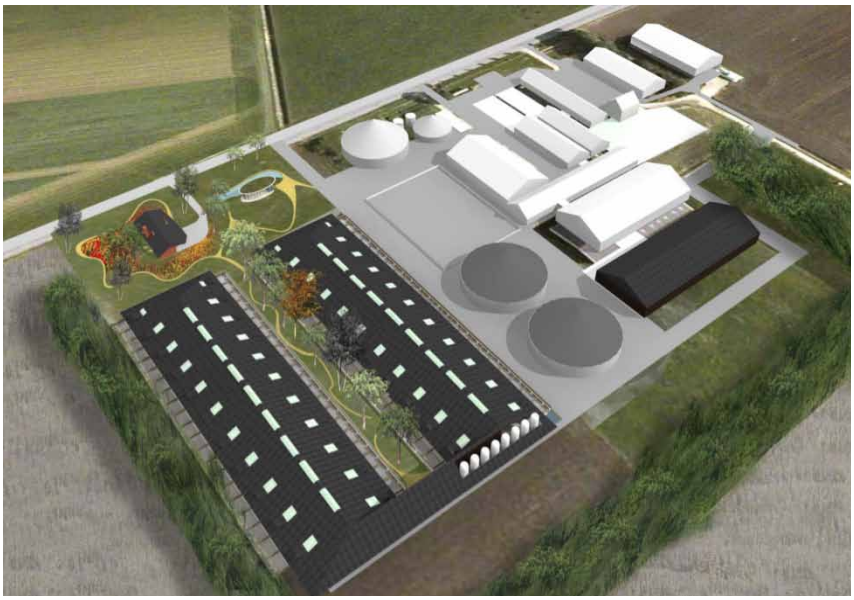
Figure 21. Illustration of the Dartelstal (Rendering by DAAD architects, 2012).

On the 23rd of February 2012 the family, Kiemkracht and a Top chef, organized a meeting to inform the local community and council members about the new plans for the farm. The family hereby wanted to indicate that this idea is different from other ideas to expand a farm. To illustrate this, the architect created several renderings of the future farm (figure 17 & figure 21). Up till the publication date of this report it is unknown whether the municipality will allow the implementation of the farm. Uncertainty increased as the alderman responsible for spatial affairs was replaced in April 2012 (farmer, 19th of July 2012).

Stakeholders

The family is the initiator of the concept Dartelstal. An advisor on Spatial Planning and Environment from Rombou[8] supports the family. As mentioned before, during the process, the farmer met the Director of Kiemkracht and the idea for Lupine Pig was combined to the Dartelstal (figure 22). The concept of Lupine Pig is supported by the family, Kiemkracht, a top chef, the Commodity Board of Arable Farming and Slaughterhouse Gosschalk. Furthermore, an architect was involved for making a good farm design.

The municipality of Oldambt and province of Groningen are involved to assess the agricultural and spatial possibilities and limits. The ministry is not involved in the process or application. However, the concept of the Lupine Pig Dartelstal won 45000 euro to spend on research on the feasibility of the concept, from the Small Business Innovation and Research (SBIR) programme (Rijksoverheid, 2012).

All interviewees were positive about the involvement of Kiemkracht and the architect. The involvement of Kiemkracht that led to the concept of Lupine Pig Dartelstal, resulted in a higher added value of the project.

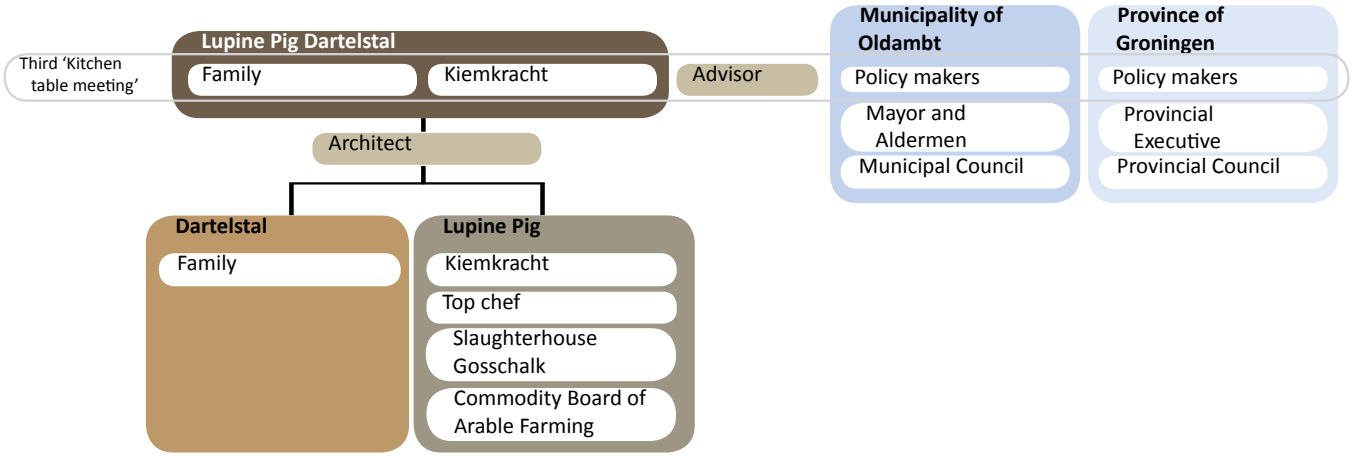

Figure 22. Stakeholders involved in the Dartelstal

Method

As the application for the farm exceeds the 1.5 hectares, the 'kitchen table meetings' was used as a method to discuss the possibilities and limits. These possibilities and limits are based on the spatial plans and regulations as described earlier in figure 11. The municipality organises such a process in discussion with the province. The municipality provides information about the plan, maps, reports and what the obstacles with local policies are. The first 'kitchen table meeting' always takes place on the farm itself, for the involved stakeholders to get an impression of the location (Provincie Groningen, 2006).

During a 'kitchen table meeting' the municipal and provincial policy makers, and the farmer with advisor discuss the plans. The farmer: '*During a 'kitchen table meeting' you try to look for the possibilities for implementation, at the end it also influenced the ideas I had*' (31st of January 2012).

In preparation of the third 'kitchen table meeting' the architect was asked to create a design for the (Lupine Pig) Dartelstal in order to have a better discussion with the province. Next to the 'kitchen table meetings' consultations often

[8]Agricultural consultancy for spatial planning, architecture and environmental aspects of farms.

took place through telephone and email.

Resources

Time

In 2009, the municipality was asked to start the process for implementation. As the permission for planning the first 'kitchen table meeting' took time, also due to the reorganization of the municipality, the time pressure, to comply with the ammonia regulation, increased. The aim was to start with the construction around June 2011, however over time the plans changed and new 'kitchen table meetings' had to be arranged. In figure 19 you can see the process over time; the deadline is approaching. Interviewees do not expect that time influenced the final decision for the concept.

Budget

Up till now, there was no fixed budget set for the project. However, investments in involving an advisor on spatial planning and an architect were made. Furthermore, the SBIR program enables research on the feasibility of the concept. Up till the publication date of this report, it is uncertain whether the new plans will be financed.

Expertise

The involvement of different experts in the process accompanied the availability of expertise. For example an advisor on spatial planning and environment was involved to support the family with receiving the permit for construction. The ideas were also discussed with Livestock Research of Wageningen University and Research Centre.

Collaborative process

Starting conditions; there was no history of conflict or cooperation between the different stakeholders that had a direct influence on the process. Furthermore, a difference in knowledge, if there was any, was not perceived as a problem. However, differences in power and resources were noticed. Although, the authorities try to think along with the ideas of the entrepreneur, in the end the regulations and authorities define the spatial limits.

The province uses the (Omgevingsverordening) criteria to determine the possibilities for the plan. A quote of such a criteria:

- … '*The plan for an expansion of an agricultural construction parcel larger than 1 hectare needs to take in consideration:*
  - *Respect the historical developed landscape structure*
  - *Keep distance of other spatial elements*
  - *Sufficiency of infrastructure*
  - *Balance of the positioning, scale and design of buildings …*' (Provinciale Omgevingsverordening, 2009, p. 20).

These criteria can be interpreted differently and can result in differences in opinion. Difference in taste and opinion on the balance of the positioning, scale and design of buildings is understandable. In a 'kitchen table meeting' these criteria are discussed and the possibilities explored. The advisor: '*It's like horse trading, it is giving and taking*' (15th of February 2012). There is room for negotiation up till a certain limit: '*The power was in hands of the province, that's how I experienced it*' (farmer, 31st of January 2012).

The stakeholders involved have different tasks and resources in this process, where the farmer can tell the story of the farm and the concept, supported by advisors, the municipality and province need to assess the plan and have a responsibility to other citizens. Because of these differences in tasks and resources it is difficult to indicate the commitment to the project. Also, as indicated earlier, the parties involved are complex, those sitting at the table with the 'kitchen table meetings', are not the ones making the final decisions (figure 22). In this case, three 'kitchen table meetings' were organized as a result of changing ideas from both the municipality and province as well as from the entrepreneur. The changing ideas resulted in a longer process because after every meeting the decision makers (such as the provincial executives) had to be consulted on the proceedings of the meeting.

Overall the impression of the interviewees is that a shared understanding of the problem was present. The complexity of the organization of the process doesn't allow insight whether all involved persons understood the problem.

During the process notes and drawings have been made to visualize and explain the plans. The number and location of the silo's and the landscape plan were topics of debate. The differences in opinion about the location of the silo's became more prominent when the architect was involved. This lowered the trust and made the process troublesome, while the involvement of the architect was meant as a way to make it easier (farmer, 31st of January 2012).

Still, the farmer experienced a good level of trust (7 on a scale of 10) among those involved. This was confirmed by other stakeholders. Later on in the process the trust lowered a bit as communication within the province became less transparent for the family and the family came with additional wishes towards the province. Therefore, involving a facilitator would have been a good idea (farmer, 31st of January 2012).

The family engaged in a collaborative process because Lupine Pig was an interesting concept to add to the plans of the Dartelstal. As a result a more collaborative approach, with more people involved in the development of the farm, was adopted. The collaborative planning process, the 'kitchen table meetings', was an obligatory step for getting permission for the construction.

3.3.4 Results

During the process, the context, provincial policy on livestock production, changed and also insight of the parties involved changed. This influenced both the process and the outcomes. Next to the spatial limits the farmer also has to deal with the bank and the market; these are influenced by external factors and can add pressure to the process.

The family adopted a concept with extra attention for animal welfare and the regional production of lupine. This choice resulted in a higher willingness of the authorities involved to support the project (policy maker of the province of Groningen, 8th of February 2012). However, not just the concept but also the spatial criteria were important (Provincie Groningen, 2012). The province expressed the hope that agreement can be reached as the parties have come so close to each other (policy maker of the province of Groningen, 8th of February 2012).

The collaborative planning approach, the 'kitchen table meeting', was perceived positively by the involved stakeholders. The policy makers of the municipality consider the 'kitchen table meetings' as a good method to reach agreement of future developments of a farm: '*Having different partners around the table, results in more concrete plans, a better discussion and a quicker process. Together you work towards a conclusion*' (9th of February 2012). The architect agrees: '*Together you can develop smarter solutions*' (9th of February 2012).

The negotiations during the process took more time beca use of the changes in insight from both the authorities and the entrepreneur. The farmer indicated that although she believed a collaborative process is preferred, the lack of time limits in the 'kitchen table meeting' process is a disadvantage.

As the project is not yet finished, the final outcomes and outputs are not described.

4. The evaluation of collaborative approaches in developing pig farms

In this chapter the discussion of the findings in relation to the theory will take place for each (sub-)research questions of this study. Additionally, a discussion of the used methodology is given, followed by the conclusion and recommendations.

4.1 What are the challenges and obstacles for the implementation of innovative pig farms in the Netherlands?

4.1.1 What are the regulations and policies involved when implementing an innovative pig farm?

Loorbach (2007) indicated that specific conditions and regulations from the regime could form a barrier and hinder the implementation of innovations, in this case innovative pig farms. Studying regulations and policies involved resulted in an extensive overview of aspects that are addressed when implementing an innovative pig farm. The impact of these regulations and policies is discussed in the next paragraph.

Regulations that influence pig farms strongly focus on the effects of the farm on the environment. Especially ammonia emission and the impact on air quality, nature (flora and fauna), soil and water is regulated through different laws and directives. While regulations mostly concentrate on the external influence of the farm, other legislation also addresses the interior and exterior of the farm.

The possibilities for constructing a pig farm are influenced by policies from different governmental levels (municipality, province and national government). On the municipal level, the zoning plan defines the land use and requirements for each area (including the maximum height and surface of the construction area). The provincial and national governments are responsible for defining plans on a more regional scale like for nature areas and infrastructure.

4.1.2 How are these regulations and policies influencing the development of innovative pig farms?

The influence of regulations and policies on the implementation of innovative pig farms varies depending on the local characteristics (e.g. proximity to nature areas or housing) as well as on policies (e.g. zoning plan or construction surface). Yet, similar to the findings of den Hartog et al., (2004) and Loorbach (2007) this research indicated that regulations and policies could form a barrier for the implementation of innovative pig farms.

A mismatch between regulations and innovation results from the intention to keep all entrepreneurs at least on a minimum level through laws and regulations: '*Hereby, laws and regulations are oriented on agricultural production systems of yesterday*' (den Hartog et al., 2004, page 28). As a result innovative and pro-active entrepreneurship is not stimulated but de-motivated.

Furthermore, several interviewees indicated that regulations on ammonia emissions, odour and particles require investments of farmers in technological solutions to lower the environmental impact. Regulations often focus upon means and not on goals, even though the goal should be leading (den Hartog et al., 2004). Initiatives that focus upon a certain goal but through the application of different means are hereby not stimulated. Increasingly, instead of solving problems through the application of technology and strict regulative policies, a transition towards a more collaborative approach with facilitative governance is favoured (Bos & Grin, 2008; Voss et al., 2006; Verburg, 2008).

4.1.3 How did the involved stakeholders deal with this?

The research of den Hartog et al., (2004) indicated that concerning policies and regulations especially local zoning plans and receiving permits related to environmental issues present an obstacle for the implementation of pig farms. These findings are similar to the obstacles in the implementation of the Dartelstal; to comply with the ammonia regulations the farm had to be reconstructed and the additional expansion exceeded the construction surface assigned in the zoning plan.

The involved stakeholders initiated a so-called 'kitchen table meeting' process through which different stakeholders are collaboratively discussing the spatial impact and possibilities. Due to several reasons and the absense of a time limit in the 'kitchen table meetings' the process took a relatively long time. Furthermore, during the process provincial policies on animal husbandry changed. As the 'kitchen table meetings' process was already initiated, the Dartelstal became part of a transition regulation. These obstacles (time consuming procedures and constantly changing rules) are mentioned also the most important hinder aspects for pig farmers when developing their farm (den Hartog et al., 2004).

The implementation of the Vechtdal Familiestal does not confirm the obstacles found by den Hartog et al., (2004); the new farm stayed within the assigned construction surface and was in line with the land use definition and requirements of the zoning plan. The Vechtdal Familiestal was planned on a new location and replaced an old farm. Therefore, it was easier to make a plan that would fit within the zoning plan compared to expanding on another location. Furthermore, obtaining the necessary permits was different as the organic certification lowered the requirements on emission reduction.

4.1.4 Did other aspects, such as financial and public support, influence the implementation?

Next to the earlier mentioned policy related conditions and regulations, also societal aspects influenced the context and implementation of the cases. Societal concerns about the sustainability of animal husbandry were noticed not just on a national level but also on a provincial and municipal level. In the province of Groningen this resulted in restrictions for the expansion and construction of intensive animal husbandry. On the municipal level the council needs to approve plans for intensive animal husbandry. Hereby, as a result of societal concerns, the process of the Dartelstal took longer.

Whereas this study mainly focuses upon societal and policy related obstacles, also financial aspects influence the implementation of the cases. The financing of the Dartelstal is not completely certain at the time this report was published. The Dartelstal received financial support (to research the feasibility) but than from the national SBIR program.

Public support did not influence the implementation of the Vechtdal Familiestal, as debates on this topic did not take place in the municipality of Hardenberg, at that time. Financial support did influence the implementation of the Vechtdal Familiestal. Whereas in 2000, limited economic opportunities were present to build a new farm, five years later, when the concept of Vechtdal Familiestal was finished through a collaborative design process, the financial results in pig farming had improved and financial support was found to build the farm. Furthermore, the municipality supported the realization of the farm through the LEADER + program.

As mentioned earlier, Loorbach (2007) indicated that specific conditions and regulations from the regime (including market, society, science, technology and policy) could hinder innovation. The findings confirm that policies and regulations, public support and finding financial support can form an obstacle for the implementation of innovative pig farms.

4.2 How is a collaborative approach influencing the challenges and obstacles for the implementation of the farm?

In chapter 2 the models of Burgess & Chilvers (2006) and Ansell & Gash (2007) were explained to get insight in aspects that influence the collaborative process. In the following paragraphs the challenges and obstacles of a collaborative approach in the implementation of innovative pig farms is discussed.

4.2.1 What defines and influences the collaborative process (the involved stakeholders, method and resources)?

The context is the first aspect that influences the decisions made, the collaborative process and the outcomes (Burgess & Chilvers, 2006). The influence of the context on decisions made can be recognized in both cases. For the farmer of the Vechtdal Familiestal, engaging in the program of the ministry of new animal production sys-

tems formed an important step in the development of a new concept. This program got a more regional follow-up and was translated into the Vechtdal Familiestal concept. For the Dartelstal, new ammonia regulations required adjustment of the existing farm. In addition the farmer wanted to expand the conventional farm. As these possibilities appeared limited (also due to societal support), a search for new concepts with new possibilities was initiated and resulted in the concept Lupine Pig Dartelstal.

The collaborative process is shaped by the interaction between stakeholders, method and resources. In this interaction several collaborative aspects can influence this interaction such as trust and commitment to the process (see chapter 2).

The diversity and large number of stakeholders involved characterizes the Vechtdal Familiestal case. Regarding resources; the involvement of several researchers provided access to different kinds of expertise. Furthermore, for the first two phases plans with a defined time limit and budget were made. The methods used during the process were considered helpful to gather new ideas and make decisions. The challenge of the Vechtdal Familiestal case was the large number of involved stakeholders; it presented different levels of knowledge and different ideas. This resulted in difficulties to reach agreement on a shared problem and goal and hereby lowered the commitment and trust among stakeholders. Once a shared understanding and commitment was reached, trust increased also. This confirms that collaboration depends on a virtuous cycle between communication, trust, commitment, understanding and outcomes (Imperial, 2005). As Ansell & Gash (2007) point out, trust and interdependence are partly endogenous: shaped in positive or negative ways by the collaborative process itself.

In the development of the Dartelstal the collaborative planning process (the 'kitchen table meetings'), was prescribed by the province and municipality. This already provides an outline of the process with a general impression of the stakeholders involved and the method. Ansell & Gash (2007) indicated that starting conditions such as differences in power, knowledge and resources could influence the collaborative process. In this case, differences in power and resources (time) were present, as the involved authorities needed to approve the plans and the farmer was asking for permission to start (re-) constructing to comply with the ammonia regulation.
The policymakers involved in the 'kitchen table meetings' were not the decision makers, therefore the results of the meetings need to be transferred to the decision makers, this resulted in a not-transparent process for others involved in the meetings. Similar to the Vechtdal Familiestal, the virtuous cycle of collaboration can be recognized: limited face-to-face dialogues and changing ideas affected the trust among stakeholders. However, as the involved stakeholders invested considerable time in the process, commitment to the process was present.

The collaborative process is next to these aspects also influenced by the presence or absence of a facilitator (Ansell & Gash, 2007). In both cases a facilitator that monitors only the process was absent but considered helpful.

4.2.2 What are the reasons for adopting a collaborative approach?

Collaborative planning theory indicated that a collaborative approach could result in more legitimate, inclusive, coordinated, knowledgeable and creative solutions (Healey, 2006). This is similar to the reasons for adopting a collaborative approach given by the stakeholders involved in the case studies. For the Vechtdal Familiestal case, an inclusive approach that would lead to creative solutions with support from different organisations was aimed for.

For the Dartelstal this is a bit different, as the 'kitchen table meetings' process is the collaborative planning approach of the province of Groningen. Yet, interviewees indicate that having different stakeholders at the table helps to make the plans more concrete, to have a good discussion and together find smarter solutions.

4.2.3 What are the results and consequences for the implementation when applying a collaborative approach?

In line with Healey (2006) and Imperial (2005), the collaborative approach in both cases enabled to address a wide variety of challenges, develop smarter solutions and build relationships. More specifically, the collaborative approach resulted for the Dartelstal in an increased commitment and willingness among stakeholders to support the concept. In the Vechtdal Familiestal project, the approach helped to ensure the stability and support for the project and made it possible to arrange the finance of the project.

On the other hand, similar to Healey (2006), the collaborative approach resulted in a high investment of time and money. Yet, as Van de Poel (2000) concluded, pioneers are, up to a certain level, willing to accept higher investments in order to contribute to a transition. Additionally, as both cases confirmed, collaborative aspects such as commitment and a shared understanding of the problem and mission, require attention during the process in order to develop trust among stakeholders (Ansell & Gash, 2007). Therefore, as was concluded by several interviewees, involving a facilitator can be considered helpful.

Den Hartog et al., (2004) indicated that innovative farmers are dealing with greater economic risks, are tested on their persistence and a high time investment is needed. These conclusions can be recognized from studying the implementation of the Vechtdal Familiestal and Dartelstal. From the cases can be concluded that the involvement of several stakeholders through a collaborative approach can support the farmers in dealing with these challenges.

In both cases the collaborative approach resulted in the development of an innovative pig husbandry concept. The two new concepts for pig husbandry address economic, environmental and social challenges the pig sector is currently facing. Still, both projects are examples of the micro level, the niche, defined by the cooperation of a group of pioneers. In order to make a transition, these pioneering efforts need to be translated to the peloton. Therefore, the initiators of both concepts want to show new possibilities to both colleagues and consumers. Also the financial support that both concepts received, aimed to translate the new concepts to a wider public. Therefore it is the responsibility of both farmers as well as financers to enable others in the sector to follow the pioneering efforts by sharing knowledge, communication and allowing institutional changes (Hermans, 2011).

4.3 Discussing the methodology

This research was carried out through the analysis of two cases. A theoretical framework was developed based on literature from participation, collaborative planning and transition theory. The theoretical framework provided aspects for the interviews and analysis.

Different stakeholders involved in each case were interviewed and the results compared. Triangulation took place by interviewing different stakeholders but also by looking at the available documentation and archive records. Policy documents, meeting reports, regulations, guidelines and scientific publications were consulted. This provided a longitudinal impression of the situation in both cases. Also, different experts were consulted to gain more insight in the context of the cases.

However, results presented in the thesis are an interpretation of the researcher and therefore it is important to be aware of the bias. The background of the researcher (gender, culture, history, socio-economic origin) shapes the interpretation of the results (Creswell, 2009). The researcher grew up in an area where currently a lot of societal concerns are being raised towards large-scale farming. Furthermore, the researcher is educated in (applied) animal science and spatial planning. Therefore, being aware of possible influences of this background on the response of interviewees and the interpretation of the results is important.

In addition, only a limited number of cases have been discussed therefore it is important to be careful when generalizing. Also, the cases were different in their collaborative approach; the Dartelstal had a primarily collaborative planning process, whereas the Vechtdal Familiestal had a collaborative design process. However, Flybjerg (2006, p 228) stated: '*One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods.*' Therefore, recommendations for follow-up research are given in paragraph 4.5.

Overall, the cases studied resulted in valuable concrete and context dependent knowledge. The combination of a model from participation theory and collaboration theory appeared to be very helpful to get a better understanding of both the context as well as the internal influences on the outcomes of a collaborative process.

4.4 Conclusions

Are collaborative approaches improving the implementation of innovative pig farms in practice?
Yes, collaborative approaches can improve the implementation of innovative pig farms in practice. The involvement of different stakeholders in the development of a concept resulted in new insights and more knowledgeable solutions. Collaboration enables stakeholders to get to know each other and develop understanding and support. Additionally, it can result in a higher willingness from local authorities and financers to support the project. These advantages can support the innovative farmers in dealing with the financial, social and policy related challenges they are facing.

However, a collaborative approach also requires managing the collaborative process itself. To ensure everyone is rowing in the same direction, having a shared understanding of the problem and the mission is crucial. Also a shared commitment and a transparent process are important to establish trust among those involved (see also Ansell & Gash, 2007). Involving a facilitator to guard the process can therefore be helpful.

Finally, the pioneering efforts of the described entrepreneurs resulted in a higher investment of time and money. With the current pressure on the pig sector, this investment is not possible for the average pig farm. Nevertheless, to deal with the social, economic and environmental pressure on the sector, translating these pioneering efforts to the wider sector is needed. Sharing knowledge, communication among stakeholder groups and allowing institutional changes are key terms in this transition process.

4.5 Recommendations

On the basis of the findings of this research several recommendations can be provided for researchers and policy makers involved in collaborative approaches or more specifically in the implementation of innovative pig farms.

4.5.1 Further research

Not many authors have discussed the field of study this thesis has touched upon. The complexity of the societal, economic and environmental aspects of pig husbandry and the extensive number of rules and regulations that influences the sector presents many elements of potential further research. Studying a collaborative process over time could provide more insight in the role of each stakeholder and the impact of the method and resources.

Transition theory as a relatively new theory provides opportunities to study the impact of pioneers and actor networks on the transition of animal husbandry. Specifically, attention to translating initiatives in the niche towards others in the sector is needed. Also, as this study focuses mostly upon policy and societal influences, a more detailed study on the regime (including market, technology and science) could provide a more extensive overview of aspects that have influenced the development of pig farms over time and could indicate what the impact of certain changes was on pig farming.

4.5.2 Policy

In this research the implementation of two innovative pig farms has been analyzed. Based on the experiences of the involved municipalities and province, the following recommendations to policy makers can be given.

Collaborative planning
The collaborative approach as adopted by the province of Groningen, the so-called 'kitchen table meetings' can be seen as a useful tool to apply collaborative planning. As pig husbandry is challenged by environmental and spatial regulations, early involvement of the local and/or regional planning department can help to establish and discuss possibilities. Often, going to the authorities is seen as the last step while in that phase it is more difficult to re-direct the project in order to comply. It is important to distinguish some ground rules before starting a collaborative planning process, for example on time, communication and reaching agreements.

Pay attention to the process

A collaborative approach can improve the implementation of innovative pig farms. However, as also many others have indicated, different aspects related to the collaborative process are important to pay attention to. Involving a facilitator and developing guidelines (e.g. invested time and presence) can help to clarify the process and requirements.

Monitor and evaluate projects

Although some stakeholders might play a more important role in the development of the concept, their involvement in the next phases is of crucial importance to prevent mismatches between theory and practice. Monitoring and evaluating the project can help to capture the social learning process that takes place within a collaborative process. It can help to develop a better understanding of the process and outcomes, and provides suggestions on what can be improved.

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Appendix

Appendix 1 - theoretical framework

Context	Participation	A participation process is influences by the context (demographic situation, economic structure and cultural environment) in which it is taking place	Wat was de aanleiding (context) waardoor dit idee op deze manier is ontwikkelt?
	Transition	Specific conditions and regulations from the regime can form a barrier and hinder implementations of innovations.	Wat is de belangrijkste wet en regelgeving die directe invloed heeft op de ontwikkeling van varkensbedrijven?
			Hebben bepaalde wetten en regels de ontwikkeling van de stal beperkt?
			Zo ja, welke wetten en regels?

Concept	Transition	Institutional entrepreneurship refers to a group of actors who want to create new institutions or transform existing ones	Wat houdt het concept in?
			Hoe is het idee voor deze stal tot standgekomen?

Process	Participation	Participation can be stimulated for different reasons including educational or political reasons	Om welke reden heeft u gekozen voor een participatieve aanpak?
	Collaborative planning	Starting conditions; differences in power, resources or knowledge as well as a prehistory of conflict or cooperation can influence the collaboration process	Was er sprake van verschil in invloed?
			Was er sprake van verschil in middelen?
			Was er sprake van verschil in kennis?
			Zo ja, op welke manier heeft dit het proces beinvloedt?
			Was er een geschiedenis tussen de betrokken actoren?
			Zo ja, op welke manier heeft dit het proces
		Collaborative process; the collaborative process is a cycle and consists of five elements	
		a. Commitment to process is strongly related to the motivation and the potential mutual gains	Was er sprake van de toewijding aan het project gelijk voor de verschillende actoren?
		b. Shared understanding requires a clear problem definition and mission	Was er sprake van een gedeeld begrip van het probleem?
			Was er sprake van een gedeeld begrip van de doelstellingen?
		c. Intermediate outcomes such as strategic plans can help to strengthen the commitment to the process	Zijn er tussentijdse producten (zoals bijvoorbeeld tussentijdse rapporten, plannen) gepresenteerd die de toewijding versterkten?
		d. Face-to-face dialogue helps to increase mutual trust and respect	Was er sprake van mondeling overleg? (niet alleen telefonisch of per internet)
		e. Trust building is a precondition for a good collaborative process	Kunt u op een schaal van 1 tot 10 aangeven hoeveel vertrouwen er tussen de betrokken actoren was? (1 is geen vertrouwen, 10 veel)
		Facilitative leadership; a facilitator can help to safeguard the process and empower the weaker actors	Was er een facilitator om het proces te ondersteunen?

		Institutional design; a set of ground rules often define who's included and the transparency of the process	Waren er vooraf afspraken gemaakt over het proces? Zoals bijvoorbeeld over de betrokken partners en communicatie?
	Transition	Creativity and consensus are needed to learn and experiment in a niche	Was er ruimte voor creativiteit in de conceptvorming?
			Op welke manier kwamen de betrokkenen tot overeenstemming? (stemmen of lag de beslissing bij de ondernemer?)
		Brokerage refers to the ability of actors to communicate with different types of organizations in the network	Konden de verschillende actoren goed met elkaar communiceren?
			Wat was hiervoor de reden?
Stakeholders	Participation	Innovations are developed by small-dedicated groups of pioneers	Kunt u aangeven wat uw rol was bij de ontwikkeling van de Dartelstal/Vechtdal familiestal? (adviseur, bedenker, financierder?)
		The engagement process is influences by the stakeholders (who), the method (how) and the resources (time, money, expertise).	Welke actoren waren betrokken bij het proces?
			Op welke manier hebben de actoren invloed gehad op het proces?
		The engagement process influences the outcomes and outputs	Op welke manier hebben de actoren invloed gehad op de resultaten?
	Transition	The niche level is where transitions can be initiated and where connections between different actors and organizations are made	Tussen welke actoren en organisaties zijn verbindingen (samenwerking, uitwisseling van kennis en informatie) gelegd?
		The region is increasingly the responsibility of the provinces and municipalities together	Was de provincie betrokken bij het proces?
			Was de provincie betrokken bij de aanvraag?
			Was het ministerie betrokken bij het proces?
			Was het ministerie betrokken bij de aanvraag?

Method	Participation	The engagement process is influences by the stakeholders (who), the method (how) and the resources (time, money, expertise).	Welke methode werd er gebruikt om het proces te organiseren? (zoals bijeenkomsten, brainstorms, ontwerpsessies...)
			Op welke manier heeft de methode invloed gehad op het proces?
			Op welke manier heeft de methode invloed gehad op de resultaten?

Resources	Participation	The engagement process is influences by the stakeholders (who), the method (how) and the resources (time, money, expertise).	Wat was het budget voor het proces?
			Hoeveel tijd was er beschikbaar voor het proces?
			Waren experts en expertise beschikbaar om te raadplegen?
			Op welke manier heeft de beschikbare tijd invloed gehad op het proces?
			Op welke manier heeft het budget invloed gehad op het proces?

			Op welke manier heeft de beschikbaarheid van experts en expertise invloed gehad op het proces?
			Op welke manier heeft de beschikbare tijd invloed gehad op de resultaten?
			Op welke manier heeft het budget invloed gehad op de resultaten?
			Op welke manier heeft de beschikbaarheid van experts en expertise invloed gehad op de resultaten?

Results	Participation	The context influences the outcomes (changes in physical environment, capital, learning and behaviour) and outputs (plans, policies, instruments	Op welke manier heeft deze context invloed gehad op de resultaten van het proces?
			Op welke manier zijn jullie hiermee omgegaan? (met de obstakels in de context
	Collaborative planning	Collaborative planning has the potential to lead to more legitimate, inclusive, coordinated, knowledgeable and creative solutions	Wat heeft de collaboratieve aanpak toegevoegd aan het proces?
		Collaborative planning is more time consuming and has therefore higher costs	Wat zijn de nadelen van een collaboratieve aanpak?
			Heeft de collaboratieve aanpak meer tijd gekost?
			Heeft de collaboratieve aanpak meer geld gekost?
		Outcomes and outputs	Wat zijn de resultaten geweest van het gehele proces?
			1. Outcomes (veranderingen in de omgeving, kapitaal, leerproces of gedrag)
			2. Outputs (plannen, beleid, instrumentarium)
	Transition	Knowledge creation is the need to overcome complex societal problems through collaboration and knowledge co-creation with stakeholders	Is er nieuwe kennis ontwikkelt om te komen tot dit concept?
			Zo ja, wat voor kennis?
		To create new knowledge and innovations a multidisciplinary approach is necessary	Is een collaboratieve aanpak een vereiste om te komen tot innovaties als deze case?
		Institutional entrepreneurship refers to a group of actors who want to create new institutions or transform existing ones	Was het uw doel om ruimte te scheppen voor nieuwe concepten?
		In niches the involved actors are prepared to accept a lower performance, higher costs and are willing to work to improve the new technology	In het ontwikkelen van een nieuw concept komen bepaalde risico's. Wat waren de risico's voor u?