Summaries
Summary

Chapter 1 & 2. Context and objective of the research

In the Netherlands, animal welfare in animal production has acquired a permanent place on the political, scientific and private agenda. However, despite a common agreement on the need for welfare improvement, the issue is still frequently a topic of debate without much progress. Within science and society, different perspectives exist on how to treat animals.

In general, animal welfare problems in animal production can be labelled as wicked, complex or unstructured. These types of problems are difficult to solve because they have a multitude of causes and involve an entanglement of social and wider contextual elements (e.g. consumption behaviour, market forces, governmental regulations) along with technical elements (e.g. available knowledge about animals). They are hard to separate from a wider circle of related problems, and the solutions provided frequently result in unintended consequences for other actors in animal production, such as the environment or consumers.

Scientific insights and technological innovations are important contributors to the improvement of animal welfare. However, they are often contested or insufficient for solving animal welfare problems in which many variables are entangled and the context is of major influence. To stimulate the creation of shared solutions for animal welfare improvement, a transdisciplinary research approach is required, in which mutual learning among stakeholders within science and society is facilitated. Multi-stakeholder learning approaches are an important strategy for this form of research. These processes aim to develop congruency among perspectives through a process of mutual learning which involves reflecting on one’s own and the total diversity of perspectives at stake. Research is needed on how to organize and facilitate multi-stakeholder processes effectively, so they constructively support mutual learning and contribute to a sustainable innovation process.

This thesis presents the results of a multi-stakeholder learning process incorporated within the four-year transdisciplinary research program Seeking Sociable Swine. This program, funded by the Netherlands Organisation for Scientific Research (NWO) and the Ministry of Economic Affairs is directed at animal welfare in pig production.

The research described in this thesis serves a dual aim. The first aim is to generate scientific knowledge on stakeholder learning processes and facilitating strategies. By studying the
dynamics of mutual learning between stakeholder groups within science and society, insight is gained into the barriers and catalysts of this process. In addition, by describing the transdisciplinary research program, an example is set of inter- and transdisciplinary research, which can be of help to other researchers. The second aim is to contribute to sustainable development in pig production and animal research. The research not only functioned to provide data, it also functioned as intervention, thereby affecting the perspectives and relationships of participants as well as the animal welfare research program.

Chapter 3. Research Design

The research described in this thesis was guided by the following main question:

How to design multi-stakeholder learning processes, so they will facilitate an interactive innovation process and support mutual learning with respect to animal welfare in pig production?

We chose for an action research approach. This approach is characterised by its dual aim: besides generating scientific knowledge, the research is problem-oriented and functions to contribute to sustainable development. The task of the transdisciplinary researcher was to realise a multi-stakeholder learning process in synchrony with the animal research. Animal welfare in pig production is a context in which there is a tradition of conflict, and therefore it demands a high degree of reflection. The learning interventions as part of the learning process were therefore reflective in nature.

For the strategy of the multi-stakeholder learning process in this research, the Interactive Learning and Action (ILA) approach was used. The ILA approach is typically based on loops of five phases of consultation and deliberation and uses participatory methods like focus groups, in-depth interviews and dialogue sessions. These methods ensure active participation and learning among the researchers and societal stakeholders from the start of the process. At least one ILA-loop was conducted per year, consisting of the following phases:

- Exploratory phase;
- In-depth study of needs and perspectives;
- Integration of different perspectives;
- Agenda setting and planning;
- Implementation.

The stakeholders who participated in this research can be divided into three categories, based on their degree of involvement in the Seeking Sociable Swine program: 1) the researchers; 2) the inner circle stakeholders; and 3) the outer circle stakeholders.

The researchers involved geneticists, animal behaviour researchers and transdisciplinary researchers. The inner circle stakeholders consisted of a panel of four stakeholder representatives, who had committed themselves to the research program (farm branch, animal protection, pig breeding and food industry). The outer circle stakeholders are a broad range of stakeholders who were consulted once by interview or focus group. They were selected according to the topic that was part of the emergent design and varied over the course of the four years.

A typical loop started with inventorying whom to involve (ILA Phase 1), followed by consulting the researchers, inner- and outer-circle stakeholders through the use of focus groups and/or in-depth interviews (ILA Phase 2). This data was then used as input for one or more dialogue sessions, in which the researchers deliberated together with the standard panel of the inner-circle stakeholders on future research directions (ILA phase 3). The aim of the sessions was to induce reflection by making similarities and differences explicit, and subsequently explore options for a shared vision.

**Chapter 4. Setting the stage of the Seeking Sociable Swine Program**

In 2009 the four year Dutch research program *Seeking Sociable Swine* started, which was directed to animal welfare in pig production. Studied was how social behaviour of pigs can be improved in coherence with societal acceptance. The researchers were in particular interested in the potential of a new breeding strategy in improving social pig behaviour. Whereas breeding to date has generally focused on the performance of the individual animal, this new breeding method includes the genetic effects that an individual has on the growth performance of its group mates. Potentially, these social genetic effects are associated with social interactions. Undesired aggression of pigs might be replaced by positive social interactions: a balanced improvement of welfare and production might be achieved.
Exploration through in-depth interviews and focus groups showed that, among others, non-researchers appeared to be concerned that economic motives are the main drivers behind this breeding strategy, instead of the expressed motives of improving animal welfare. In addition, the approach to include social interactions in breeding was perceived as an end-of-pipe solution and an implicit acceptance of the intensive pig husbandry. These results indicated potentially irresolvable value conflicts between the stakeholders and researchers involved.

**Chapter 5. Transdisciplinary team research**

Chapter 5 describes the learning process of the involved researchers, the challenges they faced and the influence of the multi-stakeholder learning process.

In a period of three years, three different phases were identified in the researchers’ learning process, based on the general attitude in the research team towards transdisciplinarity. In the first phase, the researchers preferred monodisciplinary activities above transdisciplinary ones (‘unintegrated’). In the second phase, transdisciplinary activities were initiated, but resulted in a degree of confusion (‘confusion’). The last phase was characterized by successful transdisciplinary activities, through which its added value was recognized and internal motivation was raised (‘internalization’).

In order to function successfully as a transdisciplinary team, three interdependent barriers needed to be resolved. Two were related to interdisciplinary collaboration, and one to transdisciplinary research specifically. The first barrier was to be able to relate two different research fields, i.e., social sciences and animal sciences, with different approaches, framings and types of knowledge. The second barrier was to find possible shared activities and to determine the roles of the different researchers. The third barrier was to acknowledge the relevance of experiential knowledge and to incorporate this into the research design of the animal science projects.

These barriers resulted primarily from a lack of experience with such collaborations among most researchers, and the animal researchers’ unfamiliarity with social sciences. This engendered confusion about what was expected from them in the context of transdisciplinary team research and how to shape the collaboration. Consequently, a considerable amount of time was needed to establish shared thoughts on collaboration and a shared understanding of the objectives of the research program.
Chapter 6. Knowledge exchange

Chapter 6 describes the process of mutual learning between animal researchers and pig farmers in two different settings, a symposium and one-to-one dialogues. The central topic was tail biting, an urgent animal welfare issue in pig production. Although both groups agreed that more interaction was important, the process of joint learning appeared to be rather potentially dangerous for the farmer-researcher relationship. During the symposium, farmers were only moderately open for scientific knowledge and the issue of tail biting had the tendency to run into a deadlock. The dialogues were conducted as follow-up to understand the encountered barriers, i.e. the origin of the different perspectives and to stimulate mutual learning.

One barrier was the relatively low degree of usability of the scientific insights. They were frequently not concrete enough, too uncertain or did not relate to the real-world context of the farmers. Another barrier was that both groups appeared to react and argue from their praxis. This is here understand as the way of handling and understanding the environment, or the usual practices coherent with professionalism. The praxis appeared to function as an a priori filter, influencing what is actually observed in their environment and inducing blind spots. Consequently, the farmers and researchers had their own observations, resulting in different convictions and beliefs and thereby strengthen and even validates one's own framing.

Chapter 7. Observing differences

Observing differences between stakeholder groups were studied more in depth, as described in chapter 7. Participating stakeholders were pig farmers, animal scientists and urban citizens. They were asked to observe the behaviour of a pig on nine videos and to score for each video 21 given mood terms, such as happy or irritated, i.e. the Qualitative Behaviour Assessment (QBA) approach. The results of the QBA showed that pig farmers observed the behaviour of pigs systematically more positively than the urban citizens and animal researchers. Urban citizens and animal researchers observed the behaviour of pigs in line with each other. Intra-observer analysis indicated that the differences were likely not due to interpretation of the terms. From the additional questionnaire it appeared that the farmers framed pigs primarily as production animals, while the citizens and researchers thought of them as sentient beings. This study underlines that differences in observing might hamper the development of a shared understanding of pigs and their welfare and that there is a need to address differences in observing during multi-stakeholder learning processes.
Chapter 8. Frame reflection

Chapter 8 describes the direct effects of various frame reflection exercises on the framing of pig farmers and urban-citizens regarding animal welfare, pig husbandry and each other. Five homogeneous focus groups were formed, consisting of either urban-citizens or pig farmers. Frame reflection was stimulated by the use of role-play and film fragments showing the perspectives of the other party.

After taken the role of farmers in the role play, the urban citizens were more open for the objectives of the farmers. Nevertheless, they were not able to leave behind their overall negative perceptions concerning the living conditions of pigs in pig husbandry. The farmers maintained their own perspective and defended their practices. They denied the perspective of the urban-citizens by portraying them as ignorant of the ‘factual’ farm practices. They proposed the use of one-way information, but the results indicate that this is likely to fail as a strategy to support or restore public acceptance. The results shows hardly any consensus regarding the relevance of the facts at stake and a very limited amount of shared values. However, the shared love for animals together with the recognition by the urban citizens of the inescapable dilemma for farmers to adopt a use-framing towards animals might provide an opening for further learning strategies.

Chapter 9 & 10. Design principles & Recommendations

Chapter 9 and 10 presents our lessons learned on how to organize the process of mutual learning between animal researchers and societal stakeholders. The previous chapter showed that the intention to learn, does not automatically lead to learning. Four design guidelines are provided in response that facilitate mutual learning on the sensitive or wicked issue of animal welfare in pig production.

- **Planning:** Structural and recurrent embedding of learning interventions, in order to realize change.
  
  Active sessions on a frequent basis are needed to become aware of and reflect on own framing; to open up for other’s knowledge and underlying framing; to synchronize expectations and language; and to search for shared activities needed for realizing win-wins.

- **Learning level:** Organizing mutual learning at the level of the praxis, or first-order notions, in order to realize second-order learning.
  
  Second-order learning might be better or faster realized by a shared reflection on first-order notions. Learning processes may profit from frequent mutual visits to
each other’s professional environment and dialogue sessions at a material level. This helps to make differences explicit and difficult to ignore and escape from.

- **Design:** Designing of eye-opening sessions, in order to facilitate an open mind and stimulate commitment.

  Learning interventions are most successful when different perspectives are used to problematize the issue at stake and to create an eye-opening effect. Hereto, it is needed to show the unusual in what is taken for granted or to show the wide disparity between what is expected and what the real situation turns out to be (a shock). This is most effective when a lively, unescapable setting was created (a direct experience). In addition, it is key to discuss an issue that is manageable and can be translated to direct actions (self-efficacy), if necessary by planning follow-up sessions.

- **Boundary conditions:** A fair share of the responsibilities and integrated solutions is needed to engage participants in dialogue.

In chapter 10 is also reflected on the interdisciplinary collaboration particularly. It was halfway through the program that conducive circumstances were provided to fully embrace transdisciplinary inclusion activities. The most important reason was that it took a process of two years for a fruitful interdisciplinary collaboration to arise.

The major lesson that can be distilled from this research program is that transdisciplinary research demands a different organization and management than mono- or multidisciplinary research. Although it is tempting to start directly with the planning of experiments, it seems a better strategy to start with team building instead, followed by structural and frequent embedding of learning interventions. We list potential learning interventions that can be used to establish a fruitful interdisciplinary collaboration. It seems beneficial when these learning interventions focus in the early phase (first two years) on:

- the development of a (shared) understanding on the research program and how its relate to its wider context;
- the aligning of expectations on the interdisciplinary collaboration.