A dissertation submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfilment of the Degree of Doctor of Philosophy

"What is the right thing to do?"

Perspectives on the "moral imperative" and the "ultimate goal" of farm animal welfare in Hungary

Mariann MOLNÁR

January, 2018.
Budapest

Notes on copyright and the ownership of intellectual property rights:

(1) Copyright in text of this dissertation rests with the Author. Copies (by any process) either in full, or of extracts, may be made only in accordance with instructions given by the Author and lodged in the Central European University Library. Details may be obtained from the Librarian. This page must form part of any such copies made. Further copies (by any process) of copies made in accordance with such instructions may not be made without the permission (in writing) of the Author.

(2) The ownership of any intellectual property rights which may be described in this dissertation is vested in the Central European University, subject to any prior agreement to the contrary, and may not be made available for use by third parties without the written permission of the University, which will prescribe the terms and conditions of any such agreement.

(3) For bibliographic and reference purposes this dissertation should be referred to as:

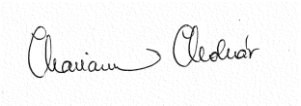
Molnár, MM. 2018. "*What is the right thing to do?*" *Perspectives on the "moral imperative" and the "ultimate goal" of farm animal welfare in Hungary.* Doctoral dissertation, Department of Environmental Sciences and Policy, Central European University, Budapest.

Further information on the conditions under which disclosures and exploitation may take place is available from the Head of the Department of Environmental Sciences and Policy, Central European University.

Author's declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Furthermore, this dissertation contains no materials previously written and/or published by another person, except where appropriate acknowledgment is made in the form of bibliographical reference, etc.



Mariann MOLNÁR

THE CENTRAL EUROPEAN UNIVERSITY

ABSTRACT OF DISSERTATION submitted by:
Mariann MOLNÁR for the degree of Doctor of Philosophy and entitled: "What is the right thing to do?" Perspectives on the "moral imperative" and the "ultimate goal" of farm animal welfare in Hungary

Month and Year of submission: January, 2018.

Animal welfare conditions in conventional livestock farming systems have seen major reforms over the last decades, yet studies indicate that many problems are still apparent. Due to the "conflicting" interests of humanity and farm animals however, current problem-solving efforts aim to slowly transition conventional livestock farming to more welfare-friendly systems. But studies also suggest important inconsistencies in the societal evaluation of welfare and consumer behaviours, and farmers are often blamed for using production methods that many oppose. These problems initiated theoretical disputes over "what the right thing to do" for livestock should be. The purpose of this study was to evaluate the impacts of a fragmented livestock welfare reform effort. Using the Anderson (2011) model on how truly powerless groups such as children and animals gain societal protection, it has assessed important discrepancies between animal welfare reform principles and livestock farming practices. In particular, it aimed to identify the emerging features of a united "moral imperative" and "ultimate goal" for livestock welfare, and comprehend opportunities and threats that influence the livestock welfare reform effort. A Grounded Theory approach enabled the researcher to pursue a pluralist scientific perspective in which the socially constructed nature of "reality" was integrated with an understanding of the "lived realities" of animals. A qualitative research strategy provided data from in-depth semi-structured interviews with "experts", "conventional farmers" and "alternative farmers" and observational data from conventional and alternative pig farms in Hungary. These data sets were comparatively assessed and captured many aspects of the livestock welfare problem which was "grounded" in empirical data. Results suggest that the majority of conventional and alternative farmers have a shared understanding of "ideal" livestock welfare conditions, which only alternative farmers are able to pursue. While "ideal" conditions are believed to provide good lives for animals, farmers thought that the "realistic" scenario was probable, in which only economically advantageous aspects of welfare are ensured. Farmers believe that conventional livestock farming is unable to transition to a system that ensures all aspects of welfare, not because farmers prioritise economic benefits over livestock welfare, but rather because they are constrained by major external pressures and conventional technologies. Data suggests that a successful livestock welfare reform will depend on extending current problem-solving approaches to incorporate "external" as well as "internal" aspects of agriculture that determine farming methods and livestock welfare conditions. Emerging features of the "moral imperative" and "ultimate goal" for farm animal welfare prioritize traditional "care principles" and aim to ensure good lives for animals in small-scale, low-intensity, near-natural farming systems. It did not call for non-interference rights for livestock, but rather enhanced and mutually beneficial human-human and human-animal interactions. The study suggests that this aim could only be achieved in situations where societal consensus and cooperation are ensured. To pursue a successful livestock welfare reform effort the contribution of conventional and alternative farmers is also essential.

Keywords: animal welfare, pig farming, conventional and alternative agriculture, pragmatic ethics, advocacy, reform, powerless groups, norms, practices, Grounded Theory, Hungary

---

Acknowledgements

I would first of all like to thank my Supervisor Prof. Alexios Antypas for his deep interest in my topic, clear determination to help me though the many ups and downs I have experienced in the past years, and the incredible patience by which he supervised my work. His unfailing determination and thoughtful advise helped me come this far. I am very grateful to my Internal Committee Member Prof. László Pintér, who's determination and positive attitude has been a great influence on my work. I am incredibly thankful to my External Committee Member Prof. David Fraser (University of British Columbia, UBC), whose work has always been an inspiration to me, for taking my project on from such a large distance and for flooding me with encouragement, expert advice and prompt feedback. I could not have completed my work without his support, and so I believe to have been truly blessed with such an amazing PhD Committee.

Next, I would like to thank my interview participants, all those experts, conventional and alternative farmers whom I have had the pleasure to work with. The interviews and farm observations were a true delight to do, because the participants generously took time to talk, provided ample information, and showed an incredible amount of trust in me, which was so rewarding. I shall never forget my rich experiences, including the heart-to-heart conversation with conventional farmer "George", who shared his tears and fatherly advice, which I will always cherish. It was amazing to know them and my experiences have inspired me to continue working in the field of animal welfare with an aim to ensure good lives for animals by empowering farmers to respond to their deep ethical convictions in their daily interactions with livestock.

My thanks extend to the Central European University (CEU) for creating such a superb working environment, which I have always enjoyed, and to the Department of Environmental Sciences and Policy for accepting me to the PhD Program, even though my topic was outside of the immediate scope of interest. Thank you to Prof. Zoltán Illés for his initial supervision. I am very grateful to Prof. Guntra Aistara, Prof. Tamara Steger and Prof. Alan Watt for all the interesting courses they held, and for all the feedback I have received from them. In addition, I would also like to thank Prof. Evelyne Hübscher (School of Public Policy) and Prof. Simon Rippon (Department of Philosophy) for allowing me to visit their courses. It was an eye-opening experience to take part on the sessions provided by Prof. Sally Schwager, Prof. Helga Dorner and the late Prof. Joanna Renc-Roe, who taught me about teaching and reflected on my learning process. Grateful thanks to Györgyi Puruczky, PhD Program Administrator, who has been a superb colleague and a true friend over these years.

My fellow PhD students have given me inspiration, professional and private support. Here I need to highlight the important contribution of Sergi Moles-Gruesco, who has been a great study companion and exceptionally good friend. He has helped me to learn, to grow and to reflect. I will always be thankful for his honesty, empathy and good sense of humour. For the many laughs and deep conversations I am truly grateful to all of my fellow students, but especially to Ágnes Kelemen, Andrea Gagyi-Pálffy, Anna Ruban, Ariadne Collins, Csaba Tóth, Márta Vetier, Milos Milicevic, Noémi Gonda, Rika Elisa, Souran Chatterjee, Vadim Vinichenko and Vivek Anand Voora. I am very thankful to Ági and Csaba for being there when I faced sudden challenges. I am also very grateful to my friends at the Animal Welfare Program (University of British Columbia), for being such amazing people and for working so hard for animals. I would especially like to thank Katie Elisabeth Koralesky and Anne-Marieke Smid for their friendship and many forms of support.

It is very important for me to highlight the invaluable contribution of my former Tutor Dr. Frank Nowell (University of Reading) to this dissertation, who has initially taught me what I know about academic writing and who has generously volunteered to read my drafts and provide feedback on the manuscripts of this piece. We have been friends for 22 years, and I am grateful to know that I can always count on him. Additional thanks to my dear friend David Bowles (Royal Society for the Prevention of Cruelty to Animals) for being the best boss ever. The years I have had the pleasure to work with him gave me invaluable work experience in animal advocacy. With his help and guidance I managed to experience many aspects of the animal welfare reform effort, giving me a head start in the present research project.

I hereby acknowledge the loving support of my friends outside the realm of academia, and am especially thankful to Attila Kovács, Enikő Varga, Erika Dömötör, Judit Vincze, Katalin Herbák-Doll and Viktória Jankó. Thanks to Györgyi Anikó Bucsás for the incredible flamenco lessons that refreshed my body and mind. A big thank you for the invaluable help of Dr. Éva Prágai, and the generous support of András Lovas, Dr. Dóra Bernhardt, Prof. Miklós Kázmér, Dr. Tamás Czövek, the HCS and all those at Gazdagrét who anonymously helped me. To Bill, Dorcas and Andrew Reimer I shall always be grateful for their hospitality and for treating me as a member of their wonderful family. Every moment I spent with them was a healing, rejuvenating experience. I could not have done any of the work without the love and support of my husband Dr. István Szigeti, to whom I am truly grateful. He has taken over many burdens from me, so that I may pursue my academic interests. I am also very grateful to our son Dániel Szigeti, for being, who he is, the most wonderful, loving and kind son ever. At his young age, he was able to understand the importance of my studies. His pride in me and my work helped me soldier on, even when I felt that I should be at home instead. They both have been an amazing inspiration, and I truly hope that in some way they will feel that the completion of this journey was our joint effort.

Finally, I must acknowledge the financial support I have received in the past years allowing me to work full time. Without these funds this project would have been impossible to realize. Thank you Central European University for 36 months of stipend, doctoral research support grant, conference travel grant, and PhD write-up grant. Grateful thanks UBC Animal Welfare Program for the additional funding that supported my trip to Canada and for filling a gap of funding, which enabled me to continue working without delay.

I hope to maintain these fruitful relationships in the years to come. I look forward to the adventures that await us all.

In loving memory of my grandparents

Omi & Opi

Table of contents

List of Tables

List of Figures

List of photographic evidence

"The history of child labour reform illustrates that it is possible to achieve protection for powerless groups, even when such protection is detrimental to society's economic self-interest. Because the impetus for reform is moral, the development of a new ethic is crucial. This will not happen overnight, but the combined efforts of many moral entrepreneurs, who disseminate the stories that resonate in the societal conscience, can eventually make a difference. In addition, the progress of reform depends on a number of other elements, including the development of an array of symbolic resources, such as the language and intellectual argument to counter the free-market ideology of industrialized agriculture, and structural resources, including the collaborative efforts of animal welfare organizations….

One important question is whether moral concerns alone can bring about meaningful reform, when powerful economic forces clearly favour the status quo. Even in cases like child labour and slavery, subjects more central to the average citizen's moral compass than animal welfare, reformers relied not only on moral suasion, but also developed economic arguments to counteract the *laissez-faire* arguments of factory owners and slaveholders. However, history also shows that reform can be motivated largely by altruistic, moral concerns. Moreover, once a new ethic is firmly established – toward child labour or slavery, e.g. – it can be at least as powerful as legal reform in changing behaviour. Without this ethical shift, in fact, mere legislative reform will probably be ineffective.

The complex forces necessary to effect change seem to be swirling around us, and the success of reform efforts depends on whether they can be marshalled correctly. William Shakespeare…noted long ago: 'There is tide in the affairs of men, / Which taken at the flood, leads on to fortune.'[1] We seem to be on the brick of such rising tide in the area of animal welfare reform."

Anderson 2011. (p. 61-62)

[1] William Shakespeare, Julius Caesar, Act 4, Scene 3, lines: 218-19 (cited by Anderson 2011).

Chapter 1. Introduction

The aim of this study is to find a cohesive and feasible moral imperative and ultimate goal for farm animal welfare. Unlike earlier work in pragmatic animal welfare ethics, here the focus is directed on seeking areas of consensus among animal producers and exploring how a consensus-based approach to animal welfare may be advanced.

Using the case study of conventional and alternative pig farming in Hungary, interview and observational data were obtained via a qualitative research strategy. To frame the study the present chapter aims to explore the importance of the Anderson (2011) model on how powerless groups gain societal protection; examine current opportunities and challenges affecting the animal welfare reform effort; and consider ways in which reform efforts may further progress, to "deliver" animals from harmful human-animal interactions and arrangements.

In addition, this introductory chapter also aims to explain the significance of and my interest in problematic human-animal interactions; describe the specific context of the animal welfare reform; give a brief outline of the research objectives; and finally present an outline of the dissertation.

1.1. Background

Significant indicators of welfare problems for non-human animals (hereafter, animals) include (Broom 1986, 1988a,b, 1991; Webster 1994a, 2005): stereotypic behaviour (Appleby & Lawrence 1987; Broom 1983; Dawkins 2006; McBride & Long 2001), self-mutilations (Reinhardt & Rossell 2001), learned-helplessness (Chourbaji *et al*. 2005; Overmier 2005),

"distress" and suffering (Broom & Johnson 1993; Moberg & Mench 2000), lameness (Galindo & Broom 2002; KilBride *et al.* 2009; Winckler & Willen 2001), cannibalism (Appleby 1993; Baxter 1994; Savory 1995), increased rates of mortality (Clubb & Manson 2003; Mellor & Stafford 2004), pathologies (Broom 2006; Moberg & Mench 2000), decreased fertility and fitness (Broom & Johnson 1993), and aggression (Blaney & Walls 2004; O'Connell & Beattie 1999). Indeed, these physical, physiological and mental conditions are apparent where wild, captive wild and domestic species of animals are subjected to human-animal interactions (Webster 1994a, 2005) especially in captivity or confinement.

There is an ever-growing concern for human-induced environmental and animal welfare problems (Kendall *et al.* 2006; Miele *et al.* 2005; Miele *et al.* 2011). Fraser & MacRae (2011) claim that the number of animals affected by human activities runs into the tens of billions per year, acting through the use of animals but also the indirect effects of technology and changes to the environment. Indeed, they emphasize that "the unintended effects of human activities must be viewed as affecting animal welfare to an enormous extent…In the English-speaking world, ethical concern over animals during the 1700s and 1800s was focused largely on preventing acts of cruelty as part of a broader programme of moral improvement (Fraser 2008a). In the 1900s, the focus expanded to include institutionalised forms of animal use, especially in food production and science. In the 2000s, when an unprecedented human population will lead to unprecedented levels of construction, land use, transportation, manufacturing, travel and other activities that harm animals, ethical concern over animals must expand again to include the unintended and indirect harms which may well be or become among the most significant types of harm caused to other species" (p. 587). The quote clearly illustrates that the scale and magnitude of human-induced harm to animals is overwhelming (Bekoff 2006, 2014; Food and Agriculture Organization of the United Nations 2006; Renton

2013; World Wildlife Fund *et al.* 2014). Yet, while the majority of people would agree that harming nature and animals is inherently "wrong" (Wicks 2011), the above articulated concerns are far from being universal; calls for sustainability and compassion do not immediately and inevitably transform human-nature and human-animal interactions (Anderson 2011; McGlone 2001).

My interest in problematic human-animal interactions has been sustained since my youth and by the time of starting the present research project I had come to the conclusion that the cause of environmentalism and animal welfare was lost. Striving to find the basis for ethical convictions transforming day-to-day interactions in a coherent and consistent way was hard, if not impossible and my own convictions were strengthened by personal experiences and the findings of published research papers, political statements, advocacy campaigns shedding an ever-growing amount of light on the difficulties of "the welfare problem" the known clash of interest between human well-being, environmental protection and animal welfare.

This problem was addressed in great detail by Anderson (2011), who looked at how "truly powerless" groups such as children and animals gain societal protection (see also Miele *et al.* 2005). By using the history of child labour reform, Anderson (2011) created an explanatory model of how reform efforts were possible and protection ensured, and claimed that the process followed a "a remarkably consistent path" (p. 7). By applying the new social movement theory, Anderson (2011, see also Elzen *et al.* 2011) identified a number of key components on which successful reform rests that are worth considering for any party concerned with the welfare of animals. In particular, two of the major components in a progression from an ethically "unjust" to a "just" arrangement were especially noteworthy: first of all, the model indicates that any reform effort requires a firm understanding of why the

group in question should be "protected". This necessitates the development of a "moral imperative" that aligns reform efforts. Second, it was essential to define the purpose of reform; hence the "ultimate goal" of efforts needed to be clearly and consistently identified and articulated. While the model found a number of key components on which reform efforts rest, it became possible to identify certain shortcomings of the animal welfare movement in comparison to the successful European child labour reform movement.

Since animal welfare problems in conventional agricultural practices were first revealed (Harrison 1964), animal advocacy and legislation has achieved a great deal of change (Blockhuis *et al.* 2010; Miele *et al.* 2005). Welfare problems have been widely documented and exposed, scientific methods have been developed and refined (Broom 1986, 1988a, b, 1991; Fraser 1999; Miele *et al.* 2005; Webster 1994a, 2005a), and animal advocacy has been established to educate the public and guide the work of lawmakers. Nonetheless, while both the abolitionist call to end slavery and the protectionist approach to child labour reform had clear moral imperatives and ultimate goals, approaches to ensure the welfare of animals were found to be highly fragmented (Anderson 2011). While a "welfarist" approach is the "prevailing model of animal advocacy" (Ibrahim 2006 p. 178), it has been heavily critiqued by scholars who claim that it is an inconsistent ethical framework (Brennan & Lo 2008). This has led to the development of competing categorical hegemonic discourses (Stibbe 2005) and ethical frameworks (Fraser 1999) and has induced an ever-deepening divide between the welfarist perspective and its counter discourses and approaches (Anderson 2011) solely based on moral disagreement. Many argue that welfarism – an ethical compromise between the extremes of granting no direct moral standing to animals and granting moral standing equivalent to humans – has been and still is the most successful approach to preparing the way for change (Garner 2006). Others highlight that animal welfare is not a "compromise"

between abolition and the status quo, but rather as a distinct set of goals based on its own philosophical framework (Fraser 1993, 1999; Fraser *et al.* 1997).

Despite the recognition of the importance of both the causes and the manifestations of animal welfare problems, it appeared that these two issues, namely the ethical imperative and ultimate goal of animal welfare were neglected. There was a limited uptake of how these disagreements damaged the cause of animal welfare and little enquiry on how these issues of crucial importance could be resolved. Yet, Anderson (2011) finds that major divisions in societal goals significantly "weaken the overall reform effort" (p. 44) and delay the development of a "critical mass" who are able to deliver meaningful change. It is therefore vital to clarify the moral imperative and ultimate goal of efforts and to find unifying areas of interest, and it seemed that my findings generated over the course of this study could be of some value.

Therefore this study proposes to understand the perspectives of experts and farmers on the moral imperatives and ultimate goals of farm animal welfare via a case study on conventional and alternative pig farming in Hungary. The aim of the present case study is to provide clarity on the pragmatic ethical challenges of pig farming, addressing important characteristics of the specific context in which the welfare of animals "ought to" be an issue of consideration. Hence, external pressures on livestock farming, on-farm decision-making and the ethic of livestock welfare are examined in detail via a qualitative research strategy, outlining in particular how farmers navigate through real-life challenges and ethical considerations. In addition, detailed observations of conventional and alternative pig farms provide information on how the values of farmers manifest in their daily interactions with livestock and how much has animal advocacy been able to achieve to ensure good lives for animals. The objective of

the study is to identify significant, context-specific constraints of the current livestock welfare reform effort identify how further progress could be ensured.

1.2. Research objectives

As outlined, my intention at the outset of this research was to gain an in-depth understanding and gather empirical evidence on the possible moral imperatives and ultimate goals of farm animal welfare within the context of conventional and alternative pig farming in Hungary, firstly, by identifying the present context and unveiling major external pressures affecting farming as seen by experts and farmers; secondly, by understanding the norms of conventional and alternative farmers on animal welfare, their internal convictions on ethical duties towards animals; thirdly, by discovering how farmers perceived ideal and realistic human-animal interactions; and fourthly by investigating farmers' ability to respond in practice to their convictions.

Based on the above outlined aims, the following research questions were formulated:

Main research questions	How do experts and farmers conceptualize the moral imperative and the ultimate goal of farm animal welfare? What kind of constraints and opportunities can be identified? How can these affect farm animal welfare reform efforts? How could further progress be ensured?

Sub-questions	How do experts and farmers perceive external pressures on livestock farming? How do these influence their farming operations? How do farmers conceptualize their ethical duties towards livestock? How do the views of conventional and alternative farmers align to or conflict with each other? How do farmers comprehend the ideal and realistic future of farming and livestock welfare? How do these views affect the current decisions of farmers? What kind of farming technologies and animal welfare standards are there on current conventional and alternative pig farming operations? To what extent do these indicate the ability of farmers to respond in practice to their ethical convictions?

In order to answer the research questions, the present research project aimed to refrain from using a pre-constructed theoretical framework. Data gathering was based on a qualitative, exploratory research strategy for which a Grounded Theory (GT) approach was most fit. Data sources included empirical data from interviews with experts and farmers via a snowball sampling strategy, and observational material, objective and reflective notes taken after interviews and farm visits. The research process – research methodology and methods – are described in Chapter 3.

1.3. Thesis outline

The present chapter provided a problem statement, and background information on which the study is based, indicated research aims and provided basic information on the research design.

The next chapters have been organized as follows. Chapter 2 positions and contextualizes the present study in the relevant literature. Chapter 3 provides information on research methodologies and methods. Chapter 4 presents an account of major external pressures on farming by experts, conventional and alternative farmers, describing their possible influences

and the vulnerability of farmers and livestock enterprises. Chapter 5 reviews the norms of conventional and alternative farmers regarding livestock production, and discusses in particular their personal convictions on ethical duties towards livestock. Chapter 6 discusses the understanding of conventional and alternative farmers with regard to ideal and realistic livestock farming methods, and illustrates how farmers navigate between external pressures and internal norms when making decisions. Chapter 7 debates the ability of farmers to respond in practice to their ethical convictions and discovers how they address animal welfare issues. Based on findings of the case study, Chapter 8 analyses implications on the moral imperative and ultimate goal for farm animal welfare, evaluating in particular opportunities and limitations of the welfare movement and concluding possible ways to make substantial progress in the welfare reform and eliminate as many animal welfare harms as possible.

Chapter 2. Literature review

The present review chapter aims to give a broad, interdisciplinary understanding of scientific literature on the research topic at hand, especially to introduce the problem of contemporary farming systems and animal welfare problems, societal dilemmas and problem-solving approaches, theoretical considerations and finally the theoretical approach applied during the project.

Previous research in the field has been able to highlight the importance of animal welfare. By presenting the problems of intensified agricultural systems and their often detrimental effects on farm animal welfare conditions, it has created a basis for societal action. But, findings also highlight that the views and interests of humanity greatly diverge and are even in conflict with one-another. Theoretical and ethical dilemmas seem to lie in the heart of the problem; nonetheless, it has also been suggested that progress in the animal welfare reform effort may only be ensured if there is a consistent societal approach to the problem, which depends on a clear understanding of the moral imperative and the ultimate goal for change.

The literature review will therefore attempt to critically assess what is already known in the field, ground the research problem and aim to highlight the potential contribution of the project to scientific enquiry. The chapter will be concluded with a short discussion of findings.

2.1. Farming systems and welfare problems

2.1.1. Farming methods

Technological changes in farming have brought about animal welfare benefits (e.g. pre-slaughter stunning methods) as well as harms. Indeed, technology has been found to have the potential to cause significant harm to large numbers of animals (Anderson 2011; Fraser 2005, 2014; Rollin 2008), which is best documented for modern conventional agricultural, fishing and aquaculture practices. Rollin (2002) argues that technology has "allowed us to put animals into environments that didn't impair their productivity but harmed their well-being" (p. 913).

The roots of conventional agriculture arise from the Middle Ages, when there was a marked shift from a system of local subsistence production and consumption to the production of food in rural areas and their transport to cities for use, consumption or further sale (Anderson 2011; Perfecto *et al.* 2009). This, Perfecto *et al.* (2009) claim as the rise of a self-reinforcing model of capitalist agriculture in which "increasing numbers of people worked in manufacture, trade and transportation of goods, while at the same time cropland, forests and marshland were converted into sheep pasture. Consequently, demand grew to produce more food on less land with less labour. Those who could grow more food were rewarded with increased income" (p. 38). By the 18th century it became evident that this race for optimization was closely linked to the rise of "scientific agriculture" (Rollins 2008) the "systematic approach to the problem of feeding more people with less available cropland and fewer farmers and farm workers…Inventors, entrepreneurs, scientists and farmers began applying new scientific and technological advances to the problems of maintaining or enhancing soil fertility, making tools more durable and efficient, providing better drainage and irrigation, selecting and breeding crops and animals that would yield more, and improving transportation and motive

power" (Perfecto *et al.* 2009 p. 38-39). This profound transition toward industrialized agriculture was suggested to further develop with colonization, the re-invented system of plantations, the newly invented steam engine and railroads (Perfecto *et al.* 2009). By the mid-20th century further increased road transportation and new technological inventions, such as automated farm equipment and the refrigeration of products (Fraser 2008b), transformed the agricultural sector, and intensive systems (hereafter called "conventional" systems) became the dominant form of agriculture (Frank 1978).

Changes in the intensity of farming methods and agricultural inputs brought a number of significant societal, environmental and animal welfare problems. Anderson (2011) argues that the agricultural revolution and intensified production facilitated large-scale detachment from the natural environment and animals, and while workers also lost their ability for subsistence agriculture, they were transformed into consumers of the very products they manufactured in factories (Anderson 2011). In addition, environmental problems emerged due to rapidly declining soil fertility, the introduction of chemical fertilizers, a drive for pursuing ever-increasing yields, an increase of pest species, and the introduction of chemical pesticides, and finally a significant decrease in biodiversity (Perfecto *et al.* 2009). The livestock sector was also greatly affected. Fraser (2008) finds that an exponential rise in the production of meat (Table 1) and large-scale structural changes, have led to farm consolidation, the indoor housing of livestock, and optimized production methods. In an effort to remain economically viable, farmers had to increase farm efficiency[2], decrease production inputs and costs to maximize outputs (Galanopoulos *et al.* 2006), hence animals were provided limited space

[2] Farm efficiency is defined as "the optimal utilization of inputs to produce output in such a manner that maximizes economic returns" (Galanopoulos *et al.* 2006)

allowances, herd and flock sizes were increased, human labour was decreased, and the provision of "amenities" (e.g. bedding) was limited (Fraser 2008b).

Source of meat	1961	1971	1981	1991	2001
World production (1,000 t/year)					
Poultry meat	8,911	15,657	27,386	42,939	71,414
Pig meat	24,702	39,345	52,903	71,784	92,071
Bovine meat	28,737	39,386	47,581	56,278	59,149
Mutton/goat meat	6,026	6,934	7,585	9,811	11,449
World exports (1,000 t/year)					
Poultry meat	303	594	1,900	2,923	9,359
Pig meat	1,092	2,025	2,788	4,618	7,752
Bovine meat	1,658	2,886	4,692	6,940	7,431
Mutton/goat meat	487	715	940	848	874
Percentage exported					
Poultry meat	3.4	3.8	6.9	6.8	13.1
Pig meat	4.4	5.1	5.3	6.4	8.4
Bovine meat	5.8	7.3	9.9	12.3	12.6
Mutton/goat meat	8.1	10.3	12.4	8.6	7.6

Table 1**.** FAO statistics on world production and exports of main meat producing sectors
The table shows a significant increase in poultry (eightfold), pig (fourfold), cattle, sheep and goat (double) production worldwide between 1961 and 2001 (Fraser 2008b p. 174).

The above outlined issues have caused significant conservation and animal welfare concerns, but some claim that the environment and animals are resources, readily available for exploitation and capable of recovery from human stressors. Indeed, Rollin (2008) finds that conventional agriculture is often presented to be progressive and/or being adopted out of need. While the literature suggests that these assumptions are widely common in certain public forums, and can even be found in scientific discourses on the environment (Dryzek 2013), food availability (Godfray *et al.* 2010), molecular genetics and other agricultural sciences (Dekkers & Hospital 2002), critics of such optimistic discourses present evidence to suggest otherwise. By outlining the consequences of uncontrolled and unlimited exploitation of the natural environment (Miller 1996), of wild and domestic species of animals (Rauw *et al.* 1998), they argue for a need to revise or indeed radically reform agricultural methods.

To be able to address these issues in their complexity, the current problem needs to be clearly identified. The Standard Critique of conventional agriculture outlined by Fraser (2008) summarizes the mainstream discourse, as follows: the "intensification of animal production as a process whereby corporations have replaced family farms and substituted industrial methods for traditional farming methods; it claims that profit motivation has replaced the traditional animal care values that were present in family farming; and it claims that all of this has had terrible consequences for animal welfare" (p. 179). Fraser (2008) however also identifies the need to assess the foundational premises of the Standard Critique to identify additional elements of the problem. In an Alternative Hypothesis Fraser (2008) acknowledges the interplay of a "variety of contributing factors" (p. 181) and outlines societal, economic, policy, technological and cultural changes, highlighting that "these developments would have allowed slaughter and processing industries to become concentrated in fewer and fewer companies, because a single plant could source animals and sell products over a very large geographic area. With a vast number of producers selling to a small number of large processors, we might expect that market competition would lead to very low levels of profit for the farmer until some further development (such as cooperative marketing or consolidation of production in fewer hands) reduced the pressure of competition. I will argue…that pressures created by periods of low profit played a key role in the intensification of animal production and had important effects on animal welfare" (p. 181, Table 2).

Year	Eggs: Net returns in US$0.01/dozen[a]	Chicken: Net returns in US$0.01/kg[a]	Pigs: Profit from farrow-to-finish operations in US$1/head[b]
1967		−1.1	
1968		4.0	
1969		6.4	
Decade		3.1	
1970		−1.1	
1971		−0.7	
1972	−2.8	−0.2	
1973	6.2	5.7	
1974	−0.4	−4.4	1.46
1975	1.0	12.8	34.53
1976	10.0	2.0	23.89
1977	3.8	0.9	16.70
1978	1.7	9.7	36.33
1979	3.1	−2.4	13.85
Decade	2.8	2.2	21.13
1980	−3.5	−3.3	−4.13
1981	0.4	−11.9	−5.03
1982	3.8	−6.2	28.96
1983	3.3	−3.7	−0.65
1984	8.9	10.3	−2.24
1985	1.2	13.4	−0.20
1986	7.0	27.9	23.36
1987	0.2	4.4	34.29
1988	−5.0	12.3	0.55
1989	15.2	15.8	−3.88
Decade	3.2	5.9	7.10
1990	16.7	12.1	29.92
1991	12.8	6.6	21.99
1992	1.7	7.3	3.83
1993	8.6	14.1	12.71
1994	3.5	12.8	−8.28
1995	8.8	16.6	0.87
1996	13.1	11.9	9.99
1997	11.6	12.8	13.61
1998	13.1	31.5	−27.98
1999	5.9	26.0	−17.29
Decade	9.6	15.1	3.94
2000	9.0	20.2	11.89
2001	6.7	25.7	13.67
2002	4.4	17.2	−16.21
2003			−6.34
2004			22.55
Decade	6.7	21.0	5.11

[a]USDA (2004) (Table 050, Eggs: net returns, and Table 091, Young chicken: net returns (converted from cents per pound).

[b]Data from John D. Lawrence, Iowa State University.

Table 2. Data on the profitability of USA chicken and pig industries
The table shows that years of loss and modest profit are important driving forces for farm consolidation, here the chicken and pig industries, resulting in the expansion of farms and the intensification of production methods (Fraser 2008b).

Therefore in addition to structural changes on livestock farms, the consolidation of the meat, slaughter and processing industries has inflicted major external pressures on farmers and livestock farming operations. The consequences have been suggested to reinforce the need to apply intensified livestock production methods, which have greatly affected animal welfare conditions (Figure 1).

2.1.2. Pig welfare problems

A number of animal welfare issues have been identified in pig production, which range from issues of basic health and functioning, challenges on the affective states of animals, and problems related to restricted abilities for using natural adaptations (Fraser 2008a). As the literature on the topic is vast, the present section gives a basic overview of scientific findings on pig welfare problems, emphasising in particular that the welfare of livestock in different systems depends on a number of crucial factors (Arey & Brooke 2006; Grandin 2015) including the quality of stockmanship (Biovin *et al.* 2003; Fraser 2014), the environment (Broom 1991; Duncan 2005), disease control measures (Broom 1991), livestock genetics (Grandin & Deesing 2013), and the level of coherence between the above factors and the adaptability of pigs (Baxter 1989; Webster 1994a).

Pigs are highly adaptable animals. Describing them as "ecological generalists" Baxter (1989) finds that "the pig copes remarkably well with an environment that bears little resemblance to the environment in which it evolved" (p. 2439), nonetheless, in certain environments, their abilities to cope can be severely constrained or overcome. An "integrative model" on animal welfare (Fraser *et al.* 1997) highlights this, showing that all animals are equipped with coping mechanisms, but depending on the environment, the "surroundings" of the animal some may remain relevant, while others will become non-relevant. In the case of livestock in confined systems, Fraser *et al.* (1997) find that the adaptations of animals often correspond imperfectly to the challenges faced under direct human care (Figure 3).

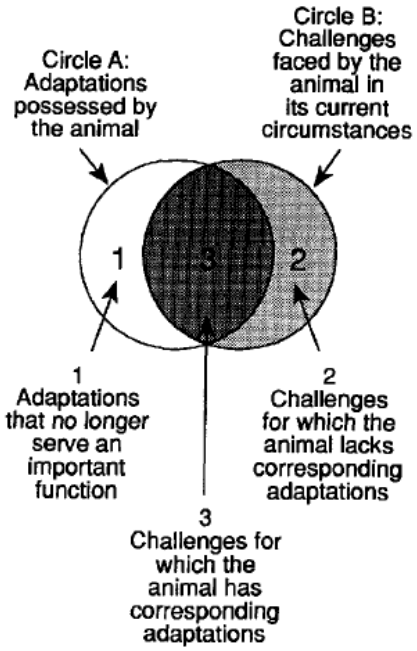


Figure 1. The integrative model of adaptive mechanisms
The scientific conceptualization of animal welfare illustrates relevant and non-relevant adaptive mechanisms of farm animals (Fraser *et al.* 1997).

An imperfect correspondence between adaptations and environmental challenges may lead to the occurrence of the following animal welfare problems (Fraser *et al.* 1997):

1. Adaptations without function: in cases where there is no effect on the welfare of the animal (e.g. camouflaging stripes of zebra in zoo) adaptations without function will be of no concern, however if coping is prevented by means of ignoring an important physical or mental motivation and/or need, then the issue is of animal welfare concern. For example a calf fed from a bucket may have strong desire to suckle. The animal will not be malnourished, but will experience "immaterial suffering" (Fraser *et al.* 1997). In short "in such cases, animals may experience negative subjective feelings, or fail to experience positive ones, without necessarily showing any impairment of biological functioning" (Fraser *et al.* 1997 p. 201);

2. Lacking adaptations: in these cases the animal will possess no natural coping mechanism for the challenges it faces. For example, animals (generally speaking) evolved in unpolluted environments; therefore they show little or no avoidance behaviours to some contaminants, even if they can severely affect their health and welfare (e.g. fish to certain contaminants like phenol or selenium, pigs to ammonia). In short "in such cases, animals may undergo impaired biological functioning without necessarily showing evidence of effects on subjective feelings" (Fraser *et al.* 1997 p. 201);
3. Adaptations with function: in these cases animals face challenges for which it has adaptations, hence feelings and functioning will be corresponding to one-another (e.g. fluctuating temperatures trigger thermoregulatory adaptations, and affective experiences motivating behavioural adjustments). Problems can arise when the challenges exceed natural coping mechanisms, or when the animal is prevented to sufficiently respond to them.

The above outlined model "provides a way of conceptualizing the range of quality-of-life concerns that animal welfare needs to address" (Fraser *et al.* 1997 p. 11). While the industry often presents livestock as animals that are well adapted to farming environments and technologies (Mignon-Grasteau *et al.* 2005; Prince 1999; Rauw *et al.* 1998; Roots 2007), the findings of animal welfare science presents an overwhelming amount of evidence to suggest otherwise (Rollin 2008).

First issues of basic health and functioning are an important element of animal welfare (Grandin 2010b; Temple *et al.* 2012). An industrial web-page (The Pig Site n.d.) lists 140 different pig diseases, which are classified by the Scientific Veterinary Committee (1997) into

the following three categories: a) notifiable diseases, those which frequently arise from a clearly distinguishable pathogen, mostly a severe viral infection that is highly contagious and requires special regulations and procedures (e.g. Foot and Mouth Disease, Swine Fever, Aujeszky's Disease), b) other viral diseases, less severe but easily transmissible (e.g. Transmissible Gastro-Enteritis, Swine Influenza, Porcine Respiratory and Reproductive Syndrome), and finally, c) enzooic diseases, which become apparent due to herd management problems (e.g. Enzooic Pneumonia, Post-weaning Diarrhoea, sow Metritis-Mastitis-Agalactia). Other forms of health problems are related to injuries such as shoulder sores of breeding sows, and various parasitic conditions (The Pig Site n.d.).

Depending on the severity of the disease, injury or parasitism, various animal welfare problems may occur, yet in the case of animals produced for human consumption, the emphasis is on preventative measures (Scientific Veterinary Committee 1997). These include the establishment of high health herds, appropriate environmental conditions, and good hygiene and management practices to avoid health problems, minimize economic losses and ensure biosecurity (The Scottish Government 2012; Scientific Veterinary Committee 1997). In addition, preventative measures also include an emphasis on low herd stress levels and other sources of immune system deficiencies (Scientific Veterinary Committee 1997).

Although in the case of livestock health, human and animal welfare interests are broadly aligned, critics still emphasize that the health of pigs in conventional systems is often compromised. Prunier *et al.* (2010) find that high-performing pig strains have a decreased ability to cope with environmental challenges, and are therefore more vulnerable to behavioural (stress sensitivity, abnormal behaviours), physical (leg weakness, claw health, gait abnormalities), physiological (deficiencies) and immunological (disease susceptibility)

problems. Others also highlight that the scale and high stocking densities of conventional farming systems predispose the occurrence of significant health problems (especially respiratory diseases, Humane Society International 2014), and thus reinforce the need to establish closed systems and the routine medical treatment, including the use of antibiotics (Compassion in World Farming 2011). On the other hand health related problems in alternative, organic farming systems were predominantly caused by management related issues leading to parasitism (Hovi *et al.* 2003), lameness, sunburn and injuries (Edwards 2011; Hovi *et al.* 2003; von Borell & Sørensen 2004). Finally, a comparative study on health indicators between five different farming systems found that pigs in conventional systems were more prone to develop severe wounds, injuries from tail biting and lameness than pigs housed in alternative systems (Temple *et al.* 2012). Nonetheless, the study also emphasized that there was a high variability between findings on different farms, indicating that "classifying farms by production systems may be less informative than individual management considerations" (Temple *et al.* 2012, p. 269).

Second, issues related to affective states including pain and distress or thermal and physical comfort have also been widely studied (Fraser 2008a). In addition to health-related concerns, most studies of pain or fear focus on management practices including handling and invasive procedures (Ison *et al.* 2016). Thus much of the scientific literature is focussed more on human induced pain, less on natural sources (Ison *et al.* 2016). Grandin (2010b) found that farm animals were subject to the following four sources of pain: a) suffering caused by abuse or neglect, b) routine painful procedures, c) fear and distress during handling (and transport) and d) overloading an animals' biology and its capacity for coping.

Problems of abuse or neglect are predominantly understood through social science research (Arluke *et al.* 1999), law enforcement studies and undercover investigations (e.g. http://www.animalequality.net/pigfarmsexposed). In terms of routinely practised procedures, the following activities have been identified to cause the most pain to livestock: castration, tail docking, teeth clipping or grinding, artificial insemination, vasectomy and electro-ejaculation, early weaning, nose ringing, ear notching, ear tagging and other forms of physical damage and injuries (Arey & Brooke 2006; The Scottish Government 2012; Royal Society for the Prevention of Cruelty to Animals 2014; Scientific Veterinary Committee 1997). To date much of the scientific and advocacy literature finds that invasive practices are carried out in conventional systems predominantly without anaesthetics or analgesics (Arey & Brooke 2006; Eurogroup for Animals 2010; Grandin 2010a; Scientific Veterinary Committee 1997). While alternative systems also apply some invasive practices (Hovi *et al.* 2003), due to the scale of the problem, the issue is more prominent in conventional farming systems. Fear and distress induced by handling is another important area of study, as poor handling is able to induce additional problems, such as decreased productivity, fertility, decreased immune function or elevated stress responses (Grandin 1989; Hemsworth *et al.* 1987a,b; Hemsworth 2014).

In comparison to diseases, pain is an issue where there seems to be less of an overlap between the interests of humans and animals and therefore is an issue of moral relevance, hence science is required to provide evidence for and the need to address painful and fear-causing procedures (Grandin 2010a) even if it is against human interest. As pain is a subjective, "multidimensional" experience, various types of pain assessment techniques are applied to study the behaviour, vocalization and physiology of pigs (Ison *et al.* 2016), but even so findings are often heavily disputed by the industry. In the case of routinely practised painful procedures such as the surgical castration of male piglets the debate is still ongoing

(Eurogroup for Animals 2010; Grandin 2010a) whether to abandon castration altogether, replace it with alternative techniques or allow castration on the condition that pain is properly managed and mitigated (Ison *et al.* 2016).

In the case of positive affective states such as thermal and physical comfort, the physical environment in which the animals are kept and the management of these spaces are of most concern. Tuyttens (2005) highlights that pigs spend the majority of their time (80%) lying down, hence climatic conditions, cleanliness of the environment and the quality of substrate on which they lie are of great importance to their welfare. The difficulty to ensure thermal and physical comfort - and other positive affective states - is in part due to the relative nature of needs and preferences. For example different production phases were found to require different thermal environments and ventilation needs; while sucking piglets require 25-28°C, group housed pregnant sows only need 15-20°C (Royal Society for the Prevention of Cruelty to Animals 2014). And while these indicators are straightforward, other studies found that depending on indoor climatic conditions, the preferences of pigs for flooring and bedding material could also easily change (Fraser 1985; Morrison *et al.* 2007; Royal Society for the Prevention of Cruelty to Animals 2014). Therefore the level of thermal and physical comfort of livestock is determined by many attributes of accommodation, including general building design, floors, amenities, ventilation and temperatures (Royal Society for the Prevention of Cruelty to Animals 2014; Scientific Veterinary Committee 1997). The evaluation of comfort has been found to depend on the assessment of pig behavioural indicators (Royal Society for the Prevention of Cruelty to Animals 2014).

Third, in terms of freedom to use natural adaptations, the environment and its effects on the behaviour and physiology of livestock is studied (Fraser *et al.* 1997; Webster 1994a, 2005).

Pigs are naturally inquisitive animals and their wild counterparts have been identified to spend 75% of active time with various exploratory behaviours (e.g. rooting, grazing) (Kittawornrat & Zimmerman 2010) and live in small, relatively stable social groups (Scientific Veterinary Committee 1997). However, while the behaviours of domestic pigs resemble the natural behaviours of wild boars (Gustaffson *et al.* 1999; Špinka 2006, 2009), the environments they live in are markedly different. In conventional pig farms, housing is generally restrictive and barren (Arey & Brooke 2006; Royal Society for the Prevention of Cruelty to Animals 2014; Scientific Veterinary Committee 1997), and pigs are unable to freely use their natural adaptations or coping mechanisms (Broom 1986). Many of the welfare problems identified in conventional systems are due to limited space allowances, individual housing (e.g. boar housing) and restriction (e.g. gestation and farrowing crates) devices, the absence of environmental enrichment and frequent group mixing (Arey & Brooke 2006; Royal Society for the Prevention of Cruelty to Animals 2014; Scientific Veterinary Committee 1997; Webster 1994a).

The most prominent welfare problems arise due to the physical and behavioural deprivation of pigs in conventional systems. In an effort to minimize production losses, ease management and handling procedures (Webster 1994a), conventional housing systems restrict natural forms of movement, rest and play behaviours, exploratory and foraging behaviours, farrowing behaviours and other forms of social interaction (Scientific Veterinary Committee 1997). Depending on the phase of production such restrictions are able to induce negative welfare states such as stress, and extend to conditions of severe and chronic frustration (Webster 1994a) indicated by a range of abnormal behaviours (e.g. feeding, sexual behaviour, dog-sitting, depressive states), increased aggression (e.g. tail, flank, ear or vulva bighting), self-mutilation (e.g. excessive grooming) and stereotypes (e.g. crib bighting) (Arey & Brooke

2006; Humane Society International 2014; Lawrence & Terlouw 1993; Marchant-Forde & Marchant-Forde 2005; Royal Society for the Prevention of Cruelty to Animals 2014; Scientific Veterinary Committee 1997). These predominantly animal based indicators are useful to identify certain, specific environmental problems also (Blockhuis *et al.* 2010; Rushen & de Passillé 1992), however some may be difficult to resolve. Webster (1994a) finds that "the need for animals (especially farm animals) for space…presents probably the most clear-cut example of the conflict of interest between economic forces and our moral obligation to provide a reasonable standard of living for the animals in our charge" (p. 78). Hence, the physical and behavioural deprivation of pigs in conventional husbandry systems is of great animal welfare concern (Dawkins 2006).

Environmental, genetic and management-related pressures inflicted on pigs and the ability of animals to adequately respond to challenges are important issues to consider. Baxter (1989) highlights that "the coping process may impose a biological cost to the pig…where such a cost can be identified, it remains for that cost to be justified or reduced by altering the environmental pressures on the animal" (p. 2439).

2.2. Societal dilemmas

2.2.1. Social science research on lay and farmers perspectives

Some scholars suggest that livestock welfare problem could be solved by renewing an "ancient contract" (Dawkins & Bonney 2008; Morris 1990; Rollin 2008), an unwritten law of ethical conduct that would necessitate the application of welfare friendly farming methods. Indeed, Te Velde *et al.* (2002) insists that "since values and norms differ widely…the question is whose values and norms should form the basis of the domestic contract" (p. 203). Social science research provides invaluable information on conflicting norms and values, and also

deals with ambivalence in human perceptions on animals or farm animal welfare (Lund *et al.* 2006; Miele & Bock 2007).

Scientific inquiry in the field ranges from the assessment of concepts and interests regarding the treatment of animals in various contexts (most prominently farm animals, see Spooner 2013; Te Velde *et al.* 2002), meanings associated with animal welfare (Lassen *et al.* 2006; Vanhonacker *et al*. 2008), different (mostly food) labelling schemes (Kehlbacher *et al.* 2012), and also include studies into the attitudes of selected interest groups such as consumers (Chilton *et al.* 2005; Miele & Evans 2010; Schröder & McEachern 2004), farmers (Bock & van Huik 2007), and/or society in general (Boogard *et al.* 2006; María 2006). These studies aim to explain reasons for the observable multitude of human perspectives on animals and animal welfare. For the purposes of this study the attitudes of selected interest groups, namely lay and farmers' perspectives were studied.

Scientific findings indicate that human understanding of animals depends on many factors including direct (e.g. childhood) experiences (Kendall *et al.* 2006), social processes (Blumer 1986), and economic or social status (Kendall *et al.* 2006). Case study evidence suggests that in the US for example concern for animals was not the luxury of the "more affluent individuals", but of subordinate groups especially "women, people experiencing economic hardship, those with less education, younger and middle aged people, and blacks" (Kendall *et al.* 2006 p. 399) who showed empathy towards animals in distress. Among European citizens, however, Harper & Henson (2001) and Miele (n.d.) found that the majority of people expressed concern over the welfare of farm animals. Indeed the latter point is also strengthened by data from the European Commission's regular Eurobarometer's on animal welfare (Eurogroup for Animals 2016; European Commission 2016), which finds that 94% of

EU citizens think that the welfare of farm animals is an issue of significance while 98% believe that the European Union should legislatively obligate people to take care of animals (Figure 4).

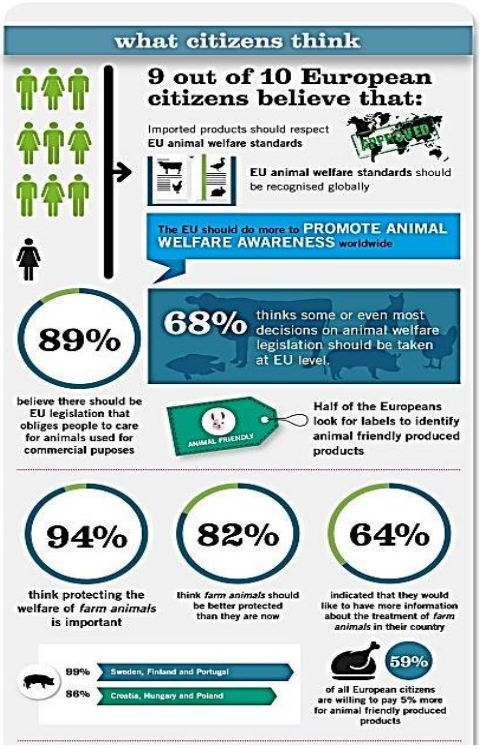


Figure 2. Eurobarometer data extract on animal welfare concerns
Data extract from the Eurobarometer survey shows that EU citizens are greatly concerned for farm animal welfare (Eurogroup for Animals 2016)

Various studies of consumers and the non-producing general public (Spooner 2013; Spooner *et al.* 2014b; Harper & Henson 2001; Miele n.d.; Miele *et al.* 2011; Schröder & McEachern 2004; Te Velde *et al.* 2002; Vanhonacker *et al.* 2007, 2008) found that these people expressed genuine interest in animal welfare issues. While unanimously objecting the welfare outcomes of conventional agricultural practices, they were also highly critical of profit-oriented animal industries and consumers taking advantage of cheap food without considering animal welfare problems (Spooner 2013; Spooner *et al.* 2014b). The study group also expressed predominantly negative views on current livestock conditions, recognizing that they were "far

from optimal" (Te Velde *et al.* 2002 p. 203). When questioned on ideal welfare conditions, participants prioritised the possibility for "natural" living conditions, positive affective states and humane death (see also Miele *et al.* 2011; Rollin 2008), while animal health and biological functioning were expressed as secondary issues.

In terms of agricultural methods, consumers and the non-producing public widely believed that "organic, free range, and extensive/outdoor systems of production, as well as small-scale farming" (Miele n.d. p. 9; Miele *et al.* 2011) were universally declared as the most animal-friendly production systems. However, studies also found that participants were unable to consistently outline the animal welfare implications of organic production and admitted that they possessed only limited knowledge of current production methods (Harper & Henson 2001). Nonetheless, consumers in particular "equated good animal welfare standards with good food standards*"* (Harper & Henson 2001) and believed that quality assurance schemes (e.g. labels, brands) offered products that were animal welfare friendly even if no welfare claim was made. The importance of labelling schemes depended on their availability, and were best recognized in the UK, Sweden, the Netherlands, and least recognized in Norway and Hungary (Miele n.d.).

Finally, while the majority of the non-producing public "were under the impression that positive changes have been achieved through recent European and national legislation as well as positive initiatives by retailers and other meat supply actors" (Miele n.d. p. 9) they were sceptical of legislators, central administration bodies and the industry as genuine sources of information. Consumer action was also found to be closely associated with "trust in experts, food suppliers and regulatory institutions" (Miele n.d.). Even though EU citizens acknowledged that when purchasing animal-based foods they did not consider animal welfare

issues, they still articulated the need for more information on the realities of livestock production. They clearly believed that more information and a better understanding of the issue would facilitate more ethical purchasing behaviours (Harper & Henson 2001).

Producers (Spooner 2013; Spooner *et al.* 2014a; Te Velde *et al.* 2002; Vanhonacker *et al.* 2007, 2008) on the other hand expressed positive views of conventional systems and farmers did not find any reason for major concern over the welfare of livestock. They claimed that there was "nothing wrong with animal welfare in livestock breeding" (Te Velde *et al.* 2002 p. 203), and livestock were provided with good conditions. This meant that the overall health and functioning of livestock were seen to successfully ensure welfare via the provision of "dry, thermally regulated, indoor environments, where animals received abundant feed, careful monitoring and where disease outbreaks could be minimized…low stress handling and agreeable working conditions which were believed to promote good animal care" (Spooner *et al.* 2014a p. 569).

The majority of producers were also found to clearly oppose animal neglect, and were often defensive or generally uncomfortable "with expressed and unexpressed accusation of mistreating animals" (Te Velde *et al.* 2002 p. 203). They did acknowledge that pain was caused to animals in some procedures (e.g. tooth clipping, tail docking, castration), but they emphasised that these were necessary for economic reasons, management related issues or to prevent serious animal welfare problems (e.g. injury, infection). They also claimed that procedures were "sufficiently short-term to be relatively unimportant" (Spooner *et al.* 2014a p. 569). Finally, producers believed that they themselves were "knowledgeable and rational actors*",* while the general public was identified "as emotional and uninformed" (Vanhonacker *et al.* 2007 p. 85) and were responsible for demanding cheap food (Serpell 1999).

The above outlined findings give a good indication of conceptual discrepancies between the understandings of producers and the non-producing general public on the nature and extent of the animal welfare problem (Lassen *et al.* 2006). The most crucial disagreement was identified on how the needs of animals were framed, especially in relation to "the ability to engage in natural behaviour…aspects related to pain, stress, and the availability of space" (Vanhonacker *et al.* 2008 p. 126). While the non-producing public aimed to ensure the best possible outcome for livestock producers seemed to act in total ignorance of livestock welfare problems. This, Spooner *et al.* (2014a) suggests, may be due to the use of different animal welfare definitions, emphasizing the inability of producers to adequately identify animal welfare problems. In addition to differences in in the perceptions of farmers and consumers, similarities have also been identified. The most significant overlap discovered was that both groups objected poor animal welfare conditions (Spooner 2013; Spooner *et al.* 2014b, Te Velde *et al.* 2002). Indeed, none of the participants seemed to claim responsibility for livestock welfare conditions and farmers believed that by ensuring welfare provisions, by providing good management and care, the welfare of livestock could be ensured.

2.2.2. Societal inconsistencies

"In simple terms, when it comes to animals, society says one thing but does another" (Ibrahim 2006), is an issue that puzzles scholars and advocates alike. Individual attitudes and social perceptions of nature and animals are deeply embedded, therefore common-sense understandings also significantly diverge, and are manifested in "discrepancies between perceptions and behaviour" (Te Velde *et al.* 2002).

Figure 3. Eurobarometer data extract on inconsistent consumer behaviours
Data extract from the Eurobarometer survey shows that EU citizens increasingly consume animal products imported into the EU (Eurogroup for Animals 2016)

While expressing significant concern over the welfare of animals, consumers continue to purchase animal-derived products from production systems to which they object (Figure 5). Imports in livestock and animal derivatives from non-EU States have substantially increased over the last decade (Eurogroup for Animals 2016; European Commission 2016). These countries possess little or no animal welfare legislation, clearly indicating the lack of coherent consumer purchasing behaviours. While food labelling has been suggested to ensure greater consistency, Miele and Evans (2010) show that transparency may not ensure the necessary change; they claim that labelling cannot guarantee that consumers will be competent, will feel responsible enough to act, and will demand accountability. Indeed Miele and Evans (2010) claim that "this new governance might create new anxieties, and a sense of erosion of previous certainties, such as the responsibility of the state for improving the quality of all farm

animals…it creates a new 'product': the ethically non-competent consumer, who is left inactive by labels" (p.186, emphasis removed).

Evidence suggests that other forces, such as the "lack of information about production methods, lack of availability of products, lack of belief in the ability of individual consumers to make a difference to animal welfare standards, disassociating the product from the animal of origin, and the increased cost of "animal-friendly" products" (Harper & Henson 2001 p. 5; see also Evans & Miele 2012) can also discourage active engagement and ethical shopping behaviours, and some scholars believe that societal inconsistencies originate from a powerful self-protecting mechanism known as "cultural denial" (Wicks 2011). Wicks (2011) finds that "denial operates to protect people from unpleasant feelings…of helplessness and guilt as well as the emotion of fear of 'being a bad person'…Denial then becomes a way to hold unpleasant information at a distance and so acts as a form of emotional management" (p. 189). Denial (also called functional ignorance or cognitive dissonance) has been identified to operate in many segments of society (Miele & Bock 2007; Wicks 2011), which has been suggested to facilitate detachment, shifting responsibilities, concealment, and misrepresentation of animal welfare related problems (Te Velde *et al.* 2002). Because "the unethical becomes unpalatable" (Evans & Miele 2012 p. 312) there are many challenges in being aware and reflecting on where animal based food comes from.

Literature available on societal inconsistencies relevant for animal welfare seems to agree on the operation and consequences of denial; however, what is not so clearly articulated is the issue of societal consent. Some scholars suggest that the rate and extent of animal welfare problems are only possible with ideological oppression, maintained by the "implicit consent of the population*"* (Stibbe 2001 p. 145, see also Mansson & McCarthy 1994; Serpell 1999).

Wicks (2011) finds that "the most endemic and numerically significant forms of animal suffering are also those which are supported by large and powerful economic interests" (p. 195) and emphasises that these actors "have every reason to co-operate in the maintenance of a public denial concerning the reality of factory farming" (p. 195). On the other hand, some scholars question the intentionality of these acts, and suggest that many forms of harm inflicted on animals may actually be unintended (Klikenborg 2014b, Fraser 2012). While this issue seems unresolved, the dominant way to present the livestock welfare problem was to assume a significant level of societal consent.

The consequences of inconsistent values and behaviours are highly relevant (Sayer 2011) in the animal welfare context. Blumer (1986) finds that society is unable to function without shared meanings and understandings of the value and place of "things", and when there is change in understanding, "there is always some connection and continuity with what went on before" (p. 20). Therefore, while denial is believed to be "the normal state of affairs" (Wicks 2011), some have suggested that in order to address the issue of societal inconsistencies and ensure livestock welfare the "ancient contract" (Dawkins & Bonney 2008; Morris 1990; Rollin 2008), an unwritten law of ethical conduct should be adopted. The literature suggests that this is possible only if denial is "punctured" (Wicks 2011). Anderson (2011) finds that exposure of the lived realities of the oppressed, compelling counter-discourses, the support of prominent figures, and cohesive advocacy efforts are all necessary (Elzen *et al.* 2011). However, to achieve this aim, evidence of problems and consequential social action is needed. Wicks (2011) claims that "cultural channels should visibly be in place: to validate the sense that something can be done, inform you what this something is and enable you to do it" (p. 196).

2.2.3. Problem-solving approaches

Gruen (2011) claims that "the challenge for us, as ethical agents who are responsive to values, is to try to identify what values are being threatened in their particular contexts, to try to make their claims on us understandable, and to act accordingly". In other words, threats caused by a certain ethical challenge need to be identified, reasons why they apply to society clearly articulated, and solutions presented in a way to allow consistent behaviour. Current, well-meaning problem-solving approaches target all of the above outlined issues however the literature indicates that political and legislative actions fail to sufficiently address emerging problems.

In an effort to protect animals, the Council of Europe identifies animal welfare as an issue of "common cultural heritage of its Member States" (Caporale *et al.* 2005). By adopting five animal welfare conventions, the Council has aimed to ensure sound human-animal interactions in international transport, farming, slaughter, experimental and other scientific purposes, and pets (Caporale *et al.* 2005). While acknowledging the moral obligation "to ensure, within reasonable limits, that the animal's health and welfare in each case is not unnecessarily put at risk" (Caporale *et al.* 2005), the level of protection that is to be delivered seems open to interpretation (Croney & Millman 2007; Miele *et al.* 2005). These political principles have also been adopted in Community legislation. While the 1957 Treaty of Rome identifies animals as goods (Caporale *et al.* 2005), the Treaty of Amsterdam (1997) recognizes animals as sentient beings (Miele *et al.* 2005), which has also led to the development of the so-called Protocol on Animal Welfare. The Protocol is known to provide the legislative basis for animal welfare provisions "in key areas of European law and policy making" (Camm & Bowles 2000 p. 197). In practice this aim is ensured by the Convention ETS 87 for the Protection of Animals Kept for Farming Purposes, which forms the basis of EU minimum

legislative standards for different species or groups of animals, including calves, pigs, laying hens and dairy cattle (Council Directive 98/58/EC) and also defines standardized technological and management-related measures (e.g. during transport, killing, slaughter). However, Miele *et al.* (2005) find that "the panoply of codes, directives, guidance notes and legislative tools now in existence…imply that farmers and others involved in the livestock trade will become subject to stricter and stricter modes of regulation" (p. 84).

The most important feature of the EU legislative framework relevant for the present study is that it aims to protect animals by defining a number of baseline or minimum welfare standards, thereby prescribing conditions or actions that at least "ought to" be ensured. Any legally responsible actor going below the minimum standards will commit an offence, while actors are free to go above standards on their own merit. High on the legislative agenda are issues of food safety and quality and the protection of farmers (Blockhuis *et al.* 2010; McLeod-Killmurray 2012), while low on the agenda are issues facilitating a decrease in the demand for animal products, the subsidized oversupply of food (Elinder 2005), food loss and waste (FAO 2016). Nonetheless, the outlined political and legislative approach has often been framed to deliver major animal welfare improvements (Vapnek & Chapman 2010). McLeod-Killmurray (2012) states that "the European Union has been leading the way in recognising the animal welfare consequences of industrial animal farming, and taking legal measures to counteract the harms of this mode of food production" (p. 76) and claims that EU legislation represents a "counter-commoditization strategy" (p. 77), suitable for "legally prioritizing animal welfare protection" (p. 81). Although McLeod-Killmurray (2012) argues for the need to adopt a centralized legislative strategy in the US, other scholars articulate important concerns with the current legislative approach.

Rose (2010) finds that "in the development and implementation of policies, governments look for a course of action that represents and protects the interests of the community as a whole, taking into account competing interests and seeking a middle ground that best meets the needs of all stakeholders. Thus, a lack of consensus as to the value and claims of other animals presents particular difficulties in the formation of effective public policies" (p. 71). These competing interests have been suggested to induce significant challenges to the animal welfare reform effort. Critics argue that the current legislative framework only focuses on "the irrational property owner" (p. 187) who inflicts harms without any human benefit (Ibrahim 2006) and emphasises the role of consumers and/or retailers, who are able to sufficiently overcome welfare problems by making the "right" choices (Dryzek 2013; Miele *et al.* 2005).

Studies however find that the EU legislative framework is heavily influenced by World Trade Organisation (WTO) rules of conduct (McLeold-Killmurray 2012), which necessitate the application of neo-liberal free trade principles and agreements. This has been found to have two major effects: in the present context, it has been able to have substantial influence on international trade and consumer choice. In the case of EU trade, Hobbs *et al.* (2002) finds that the EU is under obligation to allow the import and marketing of "like" products, without a duty to distinctly label them according to production standards. Trade practices have been found to negatively influence the competitiveness of EU farmers, who face the need to fulfil higher EU production standards, and at the same time prevent informed consumer choice. In addition, studies of bilateral and multilateral market interaction have shown "a tendency to lower moral values, relative to individually stated preferences" (Falk & Szech 2013a p. 710): with an increase in the complexity of the market, a significant decrease in the value of life was observed (Falk & Szech 2013b). Indeed, studies have found that "morality has only a limited

potential for alleviating negative market externalities" (p.710), thus damage or harm caused to a third parties could not be sufficiently addressed via the market.

Second, scholars found that in the animal welfare context legislation alone cannot effectively deliver a shift in status quo. Once again two important issues need to be considered: Anderson (2011) finds that legislation without consistent societal values and actions cannot ensure the proper treatment of animals, and Fraser (2014) finds that legislation focussed only on the animals' environment cannot deliver welfare. In this case, Fraser (2014) finds that "policy response to intensive animal production also paralleled the model set during the industrial revolution" (p. 156), raising attention to the following significant difference: "when factory workers spend only part of their days in factories, regulating features of the factory environment and hours of work is a plausible way to deal with the welfare challenges that factories create. In contrast, when intensively raised animals spend their entire lives under human control, good animal welfare relies not only on the physical environment and time in confinement, but (also and more importantly) on the attentiveness, skill and knowledge of animal producers and staff" (p. 159). Indeed, the above quote illustrates the need to reflect that in addition to the question of longevity, both the physical environment and the level of care they receive will affect welfare conditions they are subject to. Scholars, such as Seabrook (1984), Hemsworth *et al.* (1987a,b), Gonyou *et al.* (1986) and Jones (1993) have carried studies to identify the importance of care and found a correlation between positive human-animal interactions, animal health and production rates. Livestock treated in a humane manner exhibited higher production yields, higher fertility and growth rates, higher offspring survival and increased meat quality. Other studies also found that the same outcomes could not be delivered by automated technologies replacing human care (Rushen 1986). Fraser (2014) also finds that the welfare of animals can significantly diverge between farms even if

similar technologies and space allowances are adopted. Therefore, standardized legislation addressing physical, technological and only some management related issues has not been able to sufficiently deal with the farm animal welfare problem (Blockhuis *et al.* 2010; Ibrahim 2006).

2.3. Research ontology

The study of human-animal interactions and their animal welfare consequences have been traditionally informed by different scientific approaches: the positivist natural sciences, rationalist philosophical enquiries and the subjectivist science of sociology and anthropology. However, it has been noted that these scholarly approaches rest on distinctly different ontologies (Moon & Blackman 2014, Figure 6); while knowledge in the natural sciences is created on the premise that reality is directly available for scientific enquiry and an understanding of the "truth" is possible, the social sciences rest on assumptions, which acknowledge the existence of multiple realities and question the possibility for any truth claims (Bird 1987). This dichotomy is highly relevant for the present study.

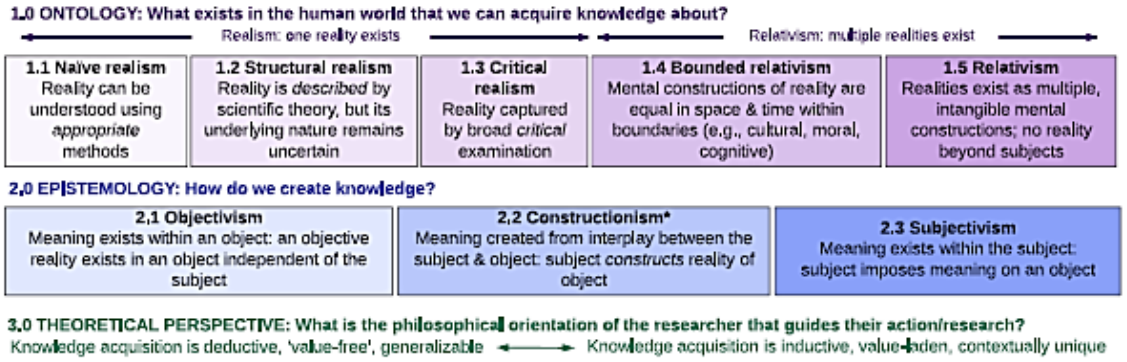


Figure 4. Ontological and epistemological differences between the natural and social sciences
Extract (Moon and Blackman 2014 p. 1169)

It is well known in the social sciences why a realist approach is overly limiting. Blumer's (1969) method of enquiry and the notion of "symbolic interaction" laid the foundations for a new way of thinking: by proposing that the creation of knowledge was only possible with "action" and "interaction", it became possible to scientifically conceptualize and study the sometimes subtle differences between individuals or groups of people with different thoughts and values towards the same subject, object or phenomena (Blumer 1986; Schuetz 1953; Strauss & Corbin 1990).

With this liberating approach came new and unexpected problems for the natural sciences. Applied to the context of animal welfare the following issues have been noted. Even though animal welfare science has been able to break away from the traditional positivist approach, especially regarding studies on the emotional states of animals, which are seen as legitimate subjects for scientific enquiry, some "discipline specific" findings are still not accepted as facts (Crist 2004; Latimer & Miele 2013). Hence, any "truth claims" made by animal welfare science or advocacy on "behalf of animals" may be disregarded as unscientific.

Second, constructivism necessitated the ability of "self-reflection" of its study subjects (Crist 2004; Latimer & Miele 2013; Strauss & Corbin 1990), which was generally unproblematic for human subjects, who freely exchange information through language and are thus capable of providing sufficient "evidence" for such abilities, however in the case of animal subjects this was not possible. Even though the science of animal welfare applies direct and indirect indicators to assess the subjective mental and physical states of animals, with a failure to prove with certainty the capacity of self-reflection or indeed any other mental state (e.g. sentience, animal cognition or emotions, see Bekoff *et al.* 2002; Latimer & Miele 2013; Masson & McCarthy 1996), animals may easily become problematic subjects for enquiry.

Finally, Crist (2004) and Tovey (2003) find that social constructivist enquiries may potentially present species conservation and animal welfare issues as *"*human problems*"* (p. 14) only, failing to identify damage or harm caused to non-human life forms (Fraser 1999). Hence, "instead of attending to the degradation of natural systems, constructivism focuses exclusive attention to human discourses about it" (Crist 2004 p. 14). Therefore, animal welfare scientists try to understand what the animals want and need to thrive, not what people think is good for them (Blockhuis *et al.* 2010; Webster 1994a).

Due to the above outlined limitations, Crist (2004) claims that "strong constructivism…is as oppressive as the positivism it has sought to discredit" (p. 10). In an effort to prevent "a naturalistic account of human society" from being the mainstream approach to the social sciences, the unfortunate turn to "a social account of nature" (p. 13) has taken place. Crist (2004) therefore emphasises the need to approach environmental or animal welfare problems in the following manner: "instead of an exclusive meta-discoursive focus on how scientific "claims" are made, there is receptivity to the validity of biological findings; and instead of focussing on how scientific assessments are "contested"…what scientists are agreeing on is (also) attended to" (p. 15). This issue is therefore clearly relevant in a study of animal welfare where the social realities and manifestations of the problem need to be synthesised with the lived realities of animals experiencing the problem. The need to do so is highlighted by many scholars from different disciplines, who call for a holistic, multi-disciplinary approach (Miele *et al.* 2011). Therefore, the constructionist perspective is essential when studying social processes in which knowledge and meaning is constructed, however can only be applied with caution when studying *"*the lived reality of the animals themselves*"* (Stibbe 2005 p. 15, see also Latimer & Miele 2013).

The above dichotomies establish the need to apply different types of ontologies when studying human and animal subjects necessitating the application of a pluralist scientific perspective (Moon & Blackman 2014, see also Latimer & Miele 2013). Pluralism enables the researcher to study the multi-faceted issue of animal welfare (Anderson 2011; Miele *et al.* 2011). This point is also emphasized by Fraser (1999), who finds that scientific findings may potentially be unauthorized by the cultural differences observed in different schools of thought. Indeed, Fraser (1999) proposes the integration of conflicting scientific fields via the synthesis of their foundational premises (see also Crist 2004; Cruickshank, 2011; Greenawalt 1986; Latimer & Miele 2013; Miele *et al.* 2011). Therefore, to achieve sufficient progress in the field and provide meaningful results, there seems to be a fundamental need to remain open towards "other ways of knowing" (Bekoff 2006 p. 33).

Fraser (1993) highlights that "the tools available to assess animal well-being include a mixture of common sense and cutting-edge science" (p. 37); it is therefore acceptable to assume that subjective physical and mental states of animals led to welfare outcomes, which may be studied scientifically. Hence the realist approach of animal welfare science permits the creation of "facts" as we know them. Within its disciplinary boundaries or indeed the overall umbrella of the "natural sciences" the validity of such facts will not be problematized. Indeed, to study the perspectives of key participants an inter-disciplinary approach will also enable the acceptance of a constructed nature of reality. Therefore, the present research project will rest on assumptions that treat animal welfare problems as "facts", while acknowledging the role and influence of social constructivism.

By adopting a pragmatic approach, it is possible to explore currently unexplored areas of interaction between empirical "facts" and human perceptions within the overarching context of animal welfare. Identified as „an American philosophical tradition that views reality as characterized by indeterminacy and fluidity, and as open to multiple interpretations…Pragmatists see facts…as linked rather than separate and truth as relativistic and provisional" (Charmaz 2006 p. 188). Indeed, Moon and Blackman (2014) finds that "as a technique, pragmatism is used to clarify concepts and hypotheses of inquiry by considering their practical considerations in an effort to dissolve ontological disputes" (p. 9). Essentially this means that by adopting a pragmatic ontology, a researcher is able to apply a contextual focus, use a diverse set of research methods to collect empirical data in order to understand, and, if possible, positively contribute to a research problem. Pragmatism has therefore been found the most suitable approach to knowledge, enabling the researcher to overcome the unfortunate dichotomies of positivism and constructivism, and yet be able to raise questions of significant scientific interest within the scope of both major ontologies.

2.4. Theoretical considerations

2.4.1. Theoretical problems

There are a number of competing discourses on animals and depending on the theoretical approach or the "lens" of enquiry, perceptions on the importance of the animal welfare problem may also greatly differ (Fraser *et al.* 1997). This point is clearly evident in the case of competing discourses of animal welfare and environmentalism. Although shared features in the origins of environmental and animal welfare problems have already been illustrated, current discourses fail to capture all externalities induced by conventional agricultural practices and are framed in a way that distance and weaken, rather than unite and empower them. Greenawalt (1986) captures this problem by stating that "someone who is concerned

about the interests of individual animals may be relatively indifferent to whether particular species or features of the physical world can survive over time, and someone who cares deeply about the preservation of species and natural settings may be indifferent to the survival of individual members of plentiful species. Indeed, for some ethical choices…an environmental ethic may point in an entirely different direction from an animal rights ethic. Nonetheless, both ethics, and the subjects they address, go beyond a morality that concentrated exclusively on relations among human beings. In doing so, the two ethics share common themes and raise common questions" (p. 1021).

Environmental Ethics, also known as ethical holism (Callicott 1980) is a relevant discipline to comprehend farm animals, because it is principally concerned with analysing a) moral relationships, and b) the moral value of non-human life forms and the environment (Brennan & Lo 2008). Values are all-important in human-animal interactions, and may be categorized into two distinct groups: a) instrumental value: "the value of things as means to further some other ends", and b) intrinsic or non-instrumental value: "the value of things as ends in themselves regardless of whether they are also useful as a means to other ends" (Brennan & Lo 2008; Klikenborg 2014a). For humans the above distinctions carry moral relevance, as both instrumental and intrinsic values characterize the ethics of human actions. When applied to non-human life forms intrinsic value is believed to generate "*prima facie* direct moral duties" (Brennan & Lo 2008; O'Neill 1992), denying that animals need be useful to humans to have value, and therefore granting non-human life forms the full recognition of their subjective interests. Instrumental value on the other hand represents animals as "raw materials" only; hence animal welfare interests are neglected especially when the interests of animals conflict with the interests of humanity. Therefore, by addressing the issue of value, it

is immediately evident that the welfare of animals will – in part - be determined by what values humans grant them and two major theories have been identified to need further attention (Hursthouse 2000; McShane 2007).

The "anthropocentric value theory" is a human-centred perspective. Callicott (1984) finds that it "by common consensus, confers intrinsic value on human beings and regards all other things, including other forms of life, as being only instrumentally valuable" (p. 299). Therefore ethical humanists (anthropocentric theorists) claim that non-human life forms are of no moral standing. Humans are contextualized as superior beings and a strong differentiation between "higher" and "lower" life forms is induced and often traceable in "speciesism" (Callicott 1980).

It is interesting to note that anthropocentric approaches are applied in a number of ways: the "strong" sense of anthropocentrism limits intrinsic value to humans alone (as described in the above definition), while the "weak" sense grants greater weight to human than to non-human interests, and can therefore justify the need to benefit humans at the expense of non-human "things" (Brennan & Lo 2008). In addition, some theorists have propagated a middle-ground, and have argued for what is called "prudential" or "enlightened" anthropocentrism (Brennan & Lo 2008). In this view moral obligations of humans as moral agents towards non-human nature and other life-forms arise from direct duties to humans, and therefore aim to ensure sound interactions via social policies (Brennan & Lo 2008). Although the above terms differ to some extent, they justify "use" claims and assume an unquestionable right for humans to use, modify, enclose, kill, consume or otherwise manipulate animals without any significant moral concern for the consequences of human actions on the lives and welfare of animals.

This concern is clearly articulated by Brennan & Lo (2008), who claim that "anthropocentric positions find it problematic to articulate what is wrong with the cruel treatment of nonhuman animals, except to the extent that such treatment may lead to bad consequences for human beings". Animal welfare and environmental problems are therefore comprehended as instrumental, rather than acts of intrinsic wrong-doing (Brennan & Lo 2008; Callicott 1984) and are easily overlooked or justified. Several determinants of animal welfare conditions, especially in the context of farm animals, are based on anthropocentrism. For example Harvey (2006) outlines that neo-liberal free market legislation and economies are clearly anthropocentric and damaging, while Stibbe (2005) also identifies anthropocentric technological discourses as oppressive and exploitative.

A number of important theories emerged in the early 1970's with an aim to challenge anthropocentric views by debating human supremacy, and by arguing for intrinsic value being assigned to non-human life-forms and the environment (Brennan & Lo 2008). These are identified collectively by Callicott (1984) as "non-anthropocentric value theory", and are defined as the counter-perspective to anthropocentric discourses, which "confers intrinsic value on some non-human beings" (Callicott 1984 p. 299) and the environment.

Eco-centrism is believed to be one of the major counter-discourses to anthropocentrism (Brennan & Lo 2011), while anthropomorphism provides an "animal centred" perspective (Rollin 2000, 2007; Wynne 2004). Anthropomorphic attitudes historically "stem" from Darwin, who liberally applied "mentalistic" terms to animals, however these were rejected with the development of positivist scientific approaches (especially behaviourism), which claimed that animals behaved on the basis of "mechanical laws" (Rollin 2007; Wynne 2004). Although later distinctions between "naïve" (common sense) and "critical" (scientific)

anthropomorphism were introduced, nonetheless anthropomorphism is still widely rejected (Serpell 2003, Epley *et al.* 2008, Waytz *et al.* 2010), needing a better understanding and application of explanatory frameworks (Wynne 2004). However, in anthropological studies, including philosophical enquiries, anthropomorphism is highly relevant and a theoretically valid approach to analyse the value, role and place of animals in society (Callicott 1980, 1984). In animal welfare science, the postulation of emotional states is not considered anthropomorphic, but represents more of an "affective approach" to subjective states of animals, whereby emotional and cognitive states are proposed as a way to understand how they act, and test these ideas by using them to generate predictions (see 2.4.2.).

Some of the most influential theories relevant to comprehend animals are outlined, and allow the identification of theoretical problems that may arise in an animal welfare related enquiry (Table 3.). Generally speaking, holistic eco-centric theories were found to overlap in terms of their main areas of concern and at the same time contrast anthropomorphic theories.

	A Brief Outline of Non-anthropocentric Theories				
	Holistic eco-centric views			Anthropomorphic views	
	Ecology	**Deep Ecology**	**Wildlife Conservation**	**Animal Liberation**	**Animal Rights**
Concern	The preservation of "ecosystems", natural and interdependent communities of plants and animals, which live in and interact with their physical environments	Similar to ecology - focuses on the "relational" interactions and "total field image" of interdependence	Similar to ecology – focuses on populations, communities and species including rare and endangered ones; uses these as indicators of naturalness and health, aiming to ensure the preservation of thriving natural populations	Contrast to wildlife conservation – focuses on animals that are directly used, exploited or abused by people	Similar to animal liberation – focusses especially on total abolition of animal use, ownership and oppression by humans
Humans	Co-inhabitants of ecosystems, thus the theory calls for more equitable interactions	Similar to ecology, but more emphasis on embeddedness of humans in nature	Exist as outside actors in the natural environment	"Persons", emphasis on just relations between human and non-human	Emphasis is on the ethically relevant similarity of humans and certain non-human animals mostly sentient vertebrates
Non-human life and the environment	Ethical beneficiaries are all naturally evolved non-human life and lifeless forms, which coexist in the biosphere	Non-human life forms are "knots in the biospherical net or field in intrinsic relations" (Naess 2008)	Ethical beneficiaries are populations and species, and through them, their communities, and people who use or appreciate wildlife. Focus is more on (certain) types of animals rather than individuals	Ethical beneficiaries are (some) animals regardless of species	Ethical beneficiaries are animals that meet specified criteria for "subjects of a life"; calls for extending rights to all of these
Farm animals	Ecology identifies farm animals as non-natural artefacts and the theory is therefore ignorant towards their protection and welfare	Highlights the inter-connectedness of living and lifeless, but emphasis is more on naturalness; farm animals are not in the focus	Similar to ecology, in addition, farm animals are identified as "lower" beings, which have less value due to the human impacts of domestication on behaviour and physiology	Current practices deny animals agency and removed them from sight and mind, therefore liberation movement focuses predominantly on freeing farm and laboratory animals	Similar to animal liberation, however calling for a ban on all use of animals and total veganism
Justification	Inter-dependence	Biospherical egalitarianism (in principle)	Extinction	Equal moral consideration for sentient beings	Moral concern for non-human life forms and equal rights

Table 3. Analysis of major anthropocentric and non-anthropocentric theories
Based on analysis of Stibbe (2005), Callicott (1980), Naess (2008).

The principal aim of eco-centrism was the long-term survival of a natural and - if possible - intact biosphere (Fraser 2010). Ecology has been found to address ecosystems, deep ecology the biosphere, and wildlife conservation the protection of habitats and populations including rare and endangered species to ensure that thriving natural populations are preserved. Anthropomorphic theories on the other hand are concerned with the morality of human-animal interactions, especially in those scenarios where animals are exploited and abused by humans, and while animal liberation focuses on the "most oppressed", animal rights theory calls for the total abolition of animal use by humans (Frank 1979). It is clear from this brief outline that all theories directly oppose anthropocentric value theories (Stibbe 2005), and grant intrinsic value to non-human life forms and the environment.

While the frameworks have been identified to reject assumptions on the superiority of humans and grant intrinsic value to non-human life forms and the environment, a detailed analysis identified a number of important criticisms (Callicott 1980; Naess 2008; Stibbe 2005). Although the theories call for radical change in human-nature and human-animal interactions, they were found to "first offer a path for liberation…that does not fully break away from assumptions of the oppressive discourse or provide complete solution" (Stibbe 2005). These problems give rise to the failure of non-anthropocentric discourses to unite and empower the reform effort, leading to the development of "…alternative hegemonic discourses" (Stibbe 2005), which compete with each other, thus fail to solve animal welfare problems (see Fraser 2010).

2.4.2. Premises of animal welfare science

Fraser (2012) and Fraser & MacRae (2011) have identified and categorised four types of scenarios in which animals are affected by humans. These are (Fraser 2012 p. 721, Table 1)

related to the keeping animals (e.g. on farms, in zoos, as companions), causing intentional harm (e.g. via slaughter, hunting, testing), causing direct but unintended harm (e.g. cropping, accidents) and finally harming animals indirectly by disturbing life-sustaining processes and balances of nature (e.g. habitat destruction, climate change, pollution, see Fraser 2010).

Types of activities that affect animals	Examples	Levels of biological organization	Types of harm (or benefit)[a]	Duration (within the animal's life)	Long-lasting or irreversible effects?	Opportunities for intervention
Keeping animals	Keeping companion animals, raising animals on farms and in zoos	Individuals, groups	1, 2, 3, and corresponding benefits; maybe others	Often entire life		Can control harm and provide benefits
Intentional harm	Hunting, slaughter, pest control, invasive research	Individuals, groups; maybe populations, ecological systems and species	Usually 2 or 4; often 1; maybe others	Often a small fraction of life	Sometimes causes extinction of species	Can often control or prevent associated suffering
Direct but unintended harm	Cropping practices, window strikes, vehicle collisions, unintended poisoning	Individuals, groups; maybe populations, ecological systems and species	1, 2, 4; maybe others	Often a small fraction of life		Can sometimes control or prevent harm
Indirect harms caused by disturbing life-sustaining processes and balances of nature	Destroying habitat, introducing species and pathogens, pollution, climate change	Individuals, groups, populations, ecological systems; maybe species	All	Often entire life	May cause extinction and irreversible effects to ecological systems	Little opportunity to control or prevent eventual harm to animals

[a] Harms are: *1* suffering, *2* disease, injury or other impairment of biological function, *3* depriving animals of what they need to live a full or natural life, *4* death, *5* depletion of animal populations, *6* disturbance of ecological systems, and *7* extinction of species

Table 4. Analysis of activities affecting animals
Types of activities affecting animals, in relation to induced effects and opportunities for intervention (from Fraser 2012 p. 734).

Ethical concerns range from those affecting animals on the level of the individual and extend to harm and damage caused to groups, populations and even species of animals (Fraser 2010, 2012). The animal welfare approach has been developed to address harms and therefore acts both as a scientific school aiming to study the needs, interests and welfare of animals (Webster 1994a), and a "movement" driven by ethical concerns for animals (Francione 1996). In light of the findings of the previous section (see 2.4.1.) the underlying premises of both the science and the ethical approach (see 2.4.2. & 2.4.3.) need to be examined in more detail.

Animal welfare is a well-established science (Bracke *et al.* 1999), which is primarily concerned with the assessment of the short and long term well-being or welfare of animals

(Fraser 1993) in various contexts including a vast array of human-animal interactions. Although there are several working definitions, emphasising different aspects, the review will use the following version: “the welfare of a sentient animal is determined by its capacity to avoid suffering and sustain fitness” (Webster 2005, see also Miele *et al.* 2011). This definition highlights the importance of an individual-based approach, incorporates subjective experiences, and emphasises the essential need for an animal to cope with internal and external challenges. Methods to assess welfare can be grouped into four distinct categories, as follows (Fraser 1993, Figure 7):

1. behavioural approaches focussed on the cause and expression of normal and abnormal behaviours, preference, aversion and motivational tests, with a goal of finding out how an animal reacts to its environment;
2. physiological approaches assessing pre-pathological states including immune reactions indicting a possible “breakdown” of biological functions and corroborative measures signalling the absence/presence of negative mental/physical experiences (e.g. pain, fear, stress);
3. veterinary approaches are focussed on pathological states and conditions where pathologies are likely to occur (i.e. epidemiology);
4. and finally, productivity measures indicating the level of “biological functioning”.

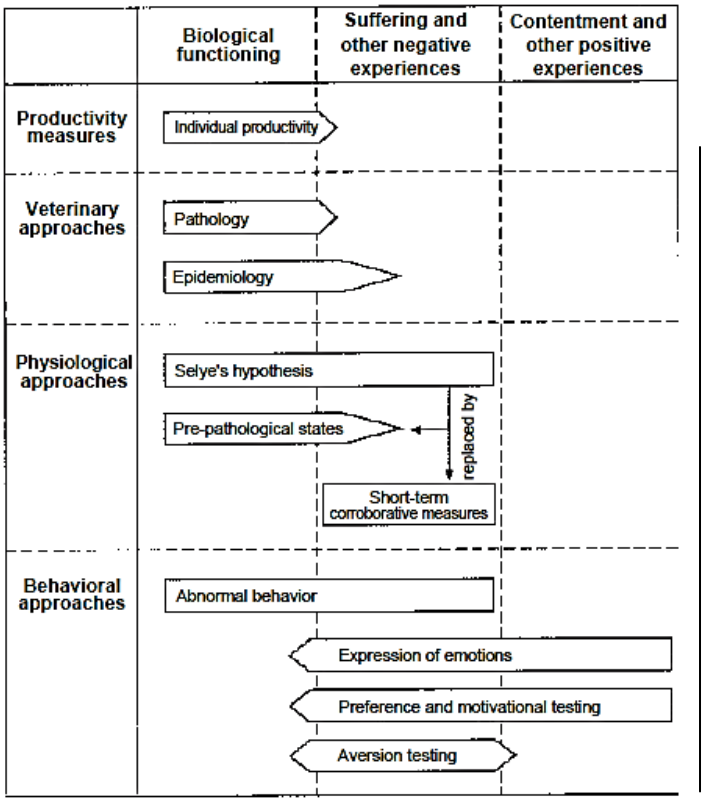


Figure 5. Animal welfare assessment methods
The most significant aspects of animal welfare shown in relation to research methods used and their potential contributions (Fraser 1993).

Assessment methods have been long been used to capture and define the subjective needs of animals. Efforts were triggered by the publication of the well-known book "Animal Machines" (Harrison 1964), which was the first to reveal the empirical realities of conventional livestock farming practices and their animal welfare outcomes. To assess the welfare of animals, the first list was formulated by the so-called Brambell Committee, the British Government's special unit, which listed the following essential needs of livestock: the need to stand up, lie down, turn around, groom and stretch their limbs (McCulloch 2013). These fundamental needs were called the "Brambell's Five Freedoms" and were published in 1965 (Brambell Report 1965).

As the original list was heavily criticized for concentrating on space requirements and comfort seeking behaviours only (McCulloch 2013; Webster 1994a), the UK Farm Animal Welfare Council revised and published a more complex list, commonly known as the "Five Freedoms" (Farm Animal Welfare Council 1979; McCulloch 2013; Webster 1994a). These are:

1. Freedom from Hunger and Thirst: by ready access to fresh water and a diet to maintain full health and vigour;
2. Freedom from Discomfort: by providing an appropriate environment including shelter and a comfortable resting area;
3. Freedom from Pain, Injury or Disease: by prevention or rapid diagnosis and treatment;
4. Freedom to Express Normal Behaviour: by providing sufficient space, proper facilities and company of the animal's own kind;
5. Freedom from Fear and Distress: by ensuring conditions and treatment which avoid mental suffering.

The Five Freedoms have had an important effect on animal welfare policy, but some scholars have also identified important weaknesses of the framework. McCulloch (2013) highlights that the Five Freedoms are focused on negative states (poor welfare and suffering) and are thus based on prohibitions and prescriptions, and emphasizes that the list should include the fulfilment of more positive needs and preventive measures also. Another important criticism argues that the Five Freedoms represent ideals that humans are unable to achieve. While Webster (1994b) agrees with this view, finding that the "absolute attainment of all five freedoms is unrealistic, indeed they are to some extent incompatible" (p. 266), the FAWC acknowledges this limitation arguing that "in considering the conditions under which farm animals are kept, the Council is guided by ideals" (McCulloch 2013). In principle, this review finds that it is scientifically acceptable to use a set of ideals (Winter *et al.* 1998, Table 2) to

clearly conceptualize and comparatively analyse animal welfare conditions. Indeed, ideals seem to be an important driving force in pursuing reform efforts (Anderson 2011).

Factor	*Welfare ideal*
Animal husbandry	
Breed-environment compatibility	Adapted breeds only
Level of stockmanship and skills	High quality stockmanship
Feeding regime	Diets higher in fibre, lower in energy and protein
Mutilations	No mutilations
Yield and growth promoters	No use of yield or growth promoters
Embryo transfer technology	No use of embryo transfer technology
Genetic engineering	No use of genetic engineering
Enterprise characteristics	
Access to outdoors	Unhindered access to outdoors
Access to appropriate shelter	Unhindered access to appropriate shelter
Confinement	No confinement (i.e. no use of stalls, crates etc.)
Head per herd/flock	Small flocks and herds (appropriate for species)
Head per unit land area or building area/volume	Low stocking densities (outdoors and in-house)
Yield per head	Lower yield per head
Stockmen per head	High stockmen to animal ratios
Social group stability	Stable social groups
Structure of agriculture	
Enterprises per farm	High frequency of mixed farming
Production efficiency	Lower productivity
Unit value	High unit values

Table 5. Livestock welfare ideals in farming
The conceptualization of farm animal welfare determinants, in relation to livestock welfare ideals (Winter *et al*. 1998).

While critics may claim that the Five Freedoms are idealized goals, nonetheless they are in no way perfectionist. Neither human, nor animal welfare has been identified as a static state; welfare in this sense would clearly be unrealizable. Indeed, hunger, thirst, pain, and even fear for example, were identified as natural sensations stimulating adaptive behaviours (Krebs & Davies 1981). However, on the condition that an animal is limited in its capacity or even prevented from fulfilling its needs, significant welfare problems may and do occur. Hence, the role of the Five Freedoms, and other important animal based measures are to act as indicators of welfare (Blockhuis *et al.* 2010). By "offering a comprehensive framework whereby welfare can be built into any system" (Webster 1994b p. 266) it would prevent the occurrence of substantial animal welfare problems, including but not limited to instances of

malnutrition, dehydration, pathology and distress. Finally, while some scholars have noted that the "rigid framework" of the Five Freedoms is unable to provide readymade answers (Fraser *et al.* 1997; McCulloch 2013), it is able to guide daily interactions with livestock

2.4.3. Premises of an animal welfare ethic

Animal "wefarism" is "the prevailing model of animal advocacy" (Ibrahim 2006 p. 178), yet is often critiqued for allowing humans the possibility to interact with and use animals for their own benefit (Brennan & Lo 2008; Garner 2006; Ibrahim 2006; Francione 1996, 2010; Singer 1975; Regan 1984). The main premise of animal welfarism is that the subjective state of welfare matters to animals, and that given the possibility they are ready to contribute to their own individual state of well-being, including the achievement of pleasure and the avoidance of pain (Broom 1988a, 1988b, 1991; Fraser 1993; Webster 1994a, 2005). A welfarist perspective is therefore predominantly concerned with the quality of an animals' life-span, rather than its quantity (unless longevity is used as an indicator of welfare), hence death in terms of an interest in continued existence is not highlighted, and rather interest in not suffering while alive is the centrepiece of the approach (Morris 1990; Webster 1994a). But while animal welfarism is often portrayed to allow for the use of animals as means to human ends provided that they are treated "humanely" and without causing "unnecessary suffering", in reality the animal welfare call extends to ensuring "good lives" for animals irrespective of their use or value (Fraser 2016; Fraser *et al.* 1997; Webster 1994a). The approach focuses on establishing and ensuring proper human-animal interactions via legislation, education, capacity-building and correct practice (Garner 2006).

Premises of animal welfare ethics and their implications on daily interactions with animals may raise a number of ethical concerns, especially to those schools of thought where

foundational principles strongly prevail (Fraser 2012). Most significant ethical frameworks challenging the animal welfarist approach (see 2.4.1.) can be categorised into two distinctive schools of thought: (1) the consequentialist, utilitarian animal liberationist ethic developed by Peter Singer (Singer 1975) and (2) the categorical animal rights theory proposed by Tom Regan (Regan 1984), further developed into what is now called the abolitionist theory proposed by Francione (1996, 2009). These ethical approaches are founded on the belief that human-animal interactions are inherently wrong and will inevitably cause harm to the welfare of animals. Therefore, many argue that any welfare-based reform effort to deliver animals from human induced suffering is bound to fail. Indeed some scholars argue that subordination, oppression, objectification, speciesism (Singer 1975), commodification (McLeold-Kilmurray 2012), compromise, denial, and hence the overall neglect of animal interests (Callicott 1980; Garner 2006; Stibbe 2005; Taylor 1984) are widely apparent problems, directly induced by this principle.

In an effort to overcome the above outlined problems and ensure ethical relationships with non-human life forms, the application of "non-interference rights" (Fraser 2012) has been proposed. In its most extreme form, non-interference rights prescribe the total abolition of any and every type of interaction and/or use of animals (Francione 1996, 2010; Regan 1984). However, some theories apply non-interference rights to varying degrees. For example in the case of animal liberation, non-interference rights are proposed for species that are comparable to humans in their mental capacities. This means that some interactions should be abolished, while others may remain the same (Singer 1975). Another approach proposes the abolition of damaging types of interactions, which in practice means that other forms that are not perceived damaging may proceed (Bekoff *et al.* 1992).

Although these categories are over-simplified they do illustrate that in order to achieve moral human-animal interactions, the above mentioned ethical theories offer entirely different solutions (Fraser 1999). One important shared feature of most rights-based arguments, however, is a firm prescription for (globally) shifting the human diet to veganism or at least vegetarianism (Singer 1975; Regan 1984; Francione 2010). While the human health benefits are critically assessed (White & Frank 1994) and some emphasize the need to continue meat consumption (Webster 1994b), the core of the ethical dilemma, especially for farm animal welfare, is whether interactions with and use of animals should be allowed or abandoned, and this is the point where the welfarist perspective clashes most with its counter-perspectives (Anderson 2011).

Although welfarism may seem to present a strong political stance and some philosophical incoherencies, many scholars believe that it is a framework that is fit to prepare the way for change (Garner 2006). Some argue that it represents a middle ground between "animals…having no direct moral standing and treating animals as morally equivalent to humans" (Garner 2006 p. 162). Some scholars argue that the adoption of rights or abolitionist perspectives will not eliminate harms being caused to animals (Callicott 1988, 1998; Garner 2006), and emphasize that human-animal interactions (e.g. farming) and their animal welfare consequences (e.g. meat eating) are "not inevitably immoral" (Webster 1994b p. 264). These scholars point out that morality of animal use and consumption depends on "the animals' own perception of life" (Webster 1994b, p. 266). So, the question raised by Te Velde, Aarts & Van Woerkum (2002) therefore remains (see 2.2.1.): "whose values and norms should form the basis of the domestic contract" (p. 203)? How can ethically sound interactions between humans and animals be ensured?

To make progress in the field, Fraser (1999) identifies the need for more integrated scientific enquiries to bring "premises…closer together" (p. 186), arguing that "from philosophers, we need better developed theories that articulate the ethical significance of care and community involving other species" (p. 186), and from science the revision of premises that "alienated the ethicists by taking the view that suffering and other subjective experiences of animals are not amenable to scientific enquiry, and by the claim that science could 'measure' animal welfare as if it were a purely empirical concept*"* (p. 171). Therefore the literature clearly indicates that more work is necessary in pragmatic animal welfare ethics to solve important theoretical dilemmas and contribute to better day-to-day human-animal interactions.

2.4.3. Implications of the Anderson model

Anderson (2011) finds that "the division between animal rights and animal welfare principles…weakens the overall reform effort…these two groups, which seem to have much to gain by cooperation, may not be able to find enough common ground to achieve their goals" (p. 44). Using a "political economy" framework Anderson (2011) presents a model of how truly powerless groups gain legal protection. Anderson (2011) identifies children and animals as truly powerless, as they cannot "seek reform directly, because they have no direct access to the political system. Neither group is able to effectively organize and protest the conditions of their confinement/employment" (p. 5) and claims that animal welfare problems brought about by the agricultural revolution mirror those that the industrial revolution caused for humans and especially for children.

Anderson (2011) proposes that it is possible to establish a predictive model of how truly powerless groups are delivered from an "unjust" arrangement and finds that the process

"follows a remarkably consistent path" (p. 7) with recognisable, but often overlapping stages (Figure 8).

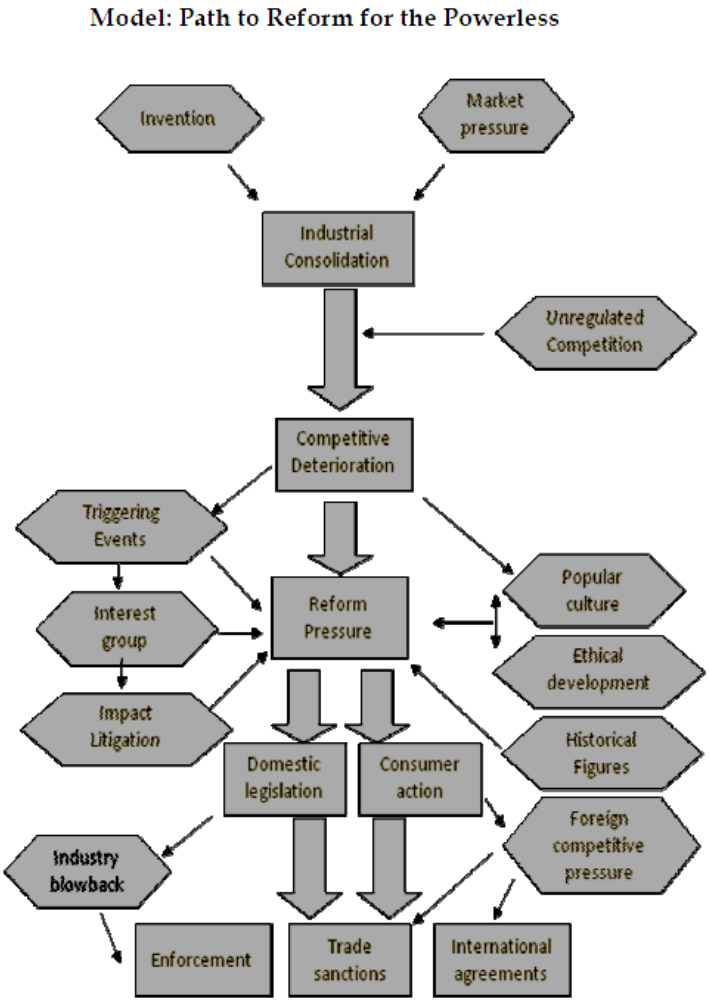


Figure 6. The Anderson model
A model illustrating how powerless groups, such as children and animals, gain societal protection (Anderson 2011 p. 63)

The first stage of the model finds that in a race for economic optimization provoked by "economic pressures of market industrialization" (Anderson 2011 p. 8), the "competitive deterioration" of welfare conditions for both humans and animals arises. In this initial stage of the model, the industry relies heavily on "free market ideologies" to back up their practices and lobbies against any meaningful change in conditions.

The second stage of reform sees the rise of "a new ethical/moral imperative" (Anderson p. 8) to counteract unjust societal arrangements via a combination of factors, especially "the development of new norms, popular culture, triggering events, and the leadership of historical figures…coupled with the formation of an adequate interest group structure to achieve effective political pressure" (Anderson 2011 p. 8). The second stage also requires the development of a new language and philosophy articulated by progressive theorists, and leading figures that challenge free-market ideologies and provide alternative scenarios. In addition, "marshalling economic forces that may benefit by reform legislation may be crucial to significant reform" (Anderson 2011 p. 9), which may also be achieved by consumer actions such as boycotts.

The final stage may provide the necessary level of legislative reform to grant full protection of a powerless group, however, the model indicates a need to prevent a "backlash from those economic interests threatened by change" (Anderson p. 9) including efforts to weaken legislation especially via "exceptions or loopholes (by legislative amendment or administrative interpretation) or by the failure to provide funds for adequate enforcement" (Anderson 2011 p. 9). In the case of the European child labour reform, children were successfully liberated from factories, mining operations and other forms of hard labour, increasing their welfare, overall health and chances for an education (see Anderson 2011).

In constructing the model and applying it to the animal welfare context, Anderson (2011) finds a number of issues that are of interest. In all stages of reform the interplay of factors is of key importance, however Anderson (2011) also finds that "the complex forces necessary to effect change seem to be swirling around us, and the success of reform efforts depends on

whether they can be marshalled correctly*"* (p. 62, see Elzen *et al.* 2011). Anderson (2011) highlights that in an effort to protect the powerless, "moral concerns rather than economic self-interest" (p. 17) are key determinants. However, Anderson (2011) has also found that "if the model is correct, then the prospect for animal welfare reform based solely on moral concerns, seems unlikely, if not impossible" (p. 6) and emphasises that any reform movement must focus its attention to "carry forward group goals, attract financial support and create political relationships" (p. 16). Finally, Anderson (2011) finds that *"*even in cases like child labour and slavery…reformers relied not only on moral suasion, but also developed economic arguments to counteract the *laissez-faire* arguments of factory owners and slaveholders*"*.

Therefore, in order to ensure the protection of a truly powerless group, Anderson (2011) argues for the following forces: a) moral concern and the development of a new and united ethical imperative "as the primary spur to action" (p. 32), b) the development of a critical mass carrying forward group goals and strategically coordinated efforts to present the need for the protection of animals as a mainstream and legitimate, rather than radical or marginalized objective, and finally c) the development of economic arguments and alternative economic models, counteracting *laissez-faire* arguments and enabling the adoption of an alternative socio-economic arrangement. Based on the model and the present literature review, it may be stated that the animal welfare reform effort at present does not possess a comprehensive, generally accepted ethical framework, a united critical mass, and an alternative economic model able to deliver the potential level of protection (from an "unjust" to a "just" arrangement) that the model indicates. Indeed, it is possible that "it will not be easy to reach a consensus on what animal welfare is and how it should be achieved/improved" (Miele *et al.* 2011 p. 116), however it is likely that without these efforts, the present status quo will remain

and the animal welfare reform effort will only be able to ensure limited progress in the field (Elzen *et al.* 2011).

The need for a united ethical and advocacy approach is therefore highly relevant. While progress in the field can be noted, neither animal welfare nor its counter-perspectives have been able to achieve a radical shift in the existing paradigm; hence the desired change may depend on the development of a "new ethic" linking animal welfare and rights (Anderson 2011). Indeed, the moral imperative and ultimate goal for farm animal welfare is not as clear as the abolitionist call to end slavery or the 19th century child labour reform (Anderson 2011). The need to unite and empower animal protection ethics and reform efforts is therefore all the more important (Elzen *et al.* 2011).

This need has been highlighted by welfare scholars. Fraser (1999) finds that "some of the best known ethical writing created barriers for [animal welfare] scientists, because it tended (1) to focus only on the level of the individual rather than making some decisions at the level of the population, ecosystem or species, (2) to advocate single ethical principles rather than balancing conflicting principles, (3) to ignore or dismiss traditional ethics based on care, responsibility and community with animals, (4) to seek solutions through ethical theory with little recourse to empirical knowledge, (5) to lump diverse taxonomic groups into single moral categories, and (6) to propose wholesale solutions to diverse animal use practices*"* (p. 171). Rollin (2008) also claims that traditional care principles are becoming a newly emerging social consensus ethic demanded by society and states "I will now argue that the notion of animal rights in fact captures the new ethic emerging in society in general for the treatment of food and research animals. It is not an ethic of abolition of animal use; it is an ethic designed to assure that the animals we use live happy lives consonant with their natures and as free as

possible of pain, suffering, and distress" (p. 9). This "old-new" ethic of traditional care may rule out abolitionist efforts, unite animal welfare and rights, and lay the foundations of a just socioeconomic arrangement by ensuring fundamental interests of all parties concerned. However, more work is needed to trace the emergence of a new ethic, especially to relate its theoretical foundations to commonly held principles and realistic practice (Fraser 1999). A similar framework has also been proposed by Fraser (2012), who argues for a "Practical Ethic" via the following "*mid-level principles*" (Fraser 2012 p. 721): which are a) to provide good lives for animals under our care, b) treat suffering with compassion, c) be mindful of unseen harm, and d) protect the life-sustaining processes and balances of nature. Fraser (2012) acknowledges that the practical ethic runs contrary to the theory-based approach of many normative ethicists and claims that these principles are able to "provide a system of deciding on moral action and evaluation based on ethical concerns that people have" (p. 741). Other emerging frameworks, such as the "Reverence for Life" (Schweitzer n.d.; Van Hooft 2008), "Biosocial Communitarianism" (Callicott 1988, 1998), "Compassionate Conservation" (Bekoff 2014) or the "One Health" initiative (Monath *et al.* 2010) point towards a similar direction, and aim to establish a functional moral imperative (Fraser 2010).

Anderson (2011) concludes that *"*once a new ethic is firmly established…it can be…as powerful as legal reform in changing behaviour. Without this ethical shift, in fact, mere legislative reform will probably be ineffective" (p. 62). Hence, more attention should be granted to the current scientific debate on the moral imperative, and the fragmented vision of the ultimate goal (see also Miele *et al.* 2011). In order to contribute to a more complex understanding of the above issues, it is vital to gather empirical evidence in the context of animal welfare from those directly interacting with and making decisions on the welfare of

animals. In this process the Anderson model (2011) has provided the adequate analytical framework for outlining the research problem and analysing results.

2.5. Theoretical framework

Out of a number of possibilities available to qualitative researchers (Creswell 2003) grounded theory (Glaser & Strauss 1967) was found to be most aligned with a pragmatic ontology (Strauss & Corbin 1990) offering the widest, least limiting approach needed for exploration, and the most systematic method for data collection and analysis (Charmaz 2006).

Based on a pragmatist foundation (Charmaz 2006), grounded theory was originally developed by Glaser and Strauss (1967) who provided "dual roots…in mid-century positivism and Chicago school sociology", allowing for its "its reliance on emergence" (Charmaz 2006 p. 183). The "pragmatist heritage" of grounded theory thus enables "openness", "curiosity" and "empathy", along with a "focus on meaning and process" (p. 184). These qualities of Grounded Theory are essential in a problem-driven exploratory research project. Indeed, Charmaz (2006) points out that a constructivist Grounded Theory approach is "congenial with other approaches" (p. 184), including critical realism and critical enquiry, which further highlight the benefits of its application (see 2.4.1.).

Grounded Theory is defined as "one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon*"* (Strauss & Corbin 1990 p. 23). In essence, the above definition describes the theory through its process, which is best captured by Charmaz (2006, Figure 9).

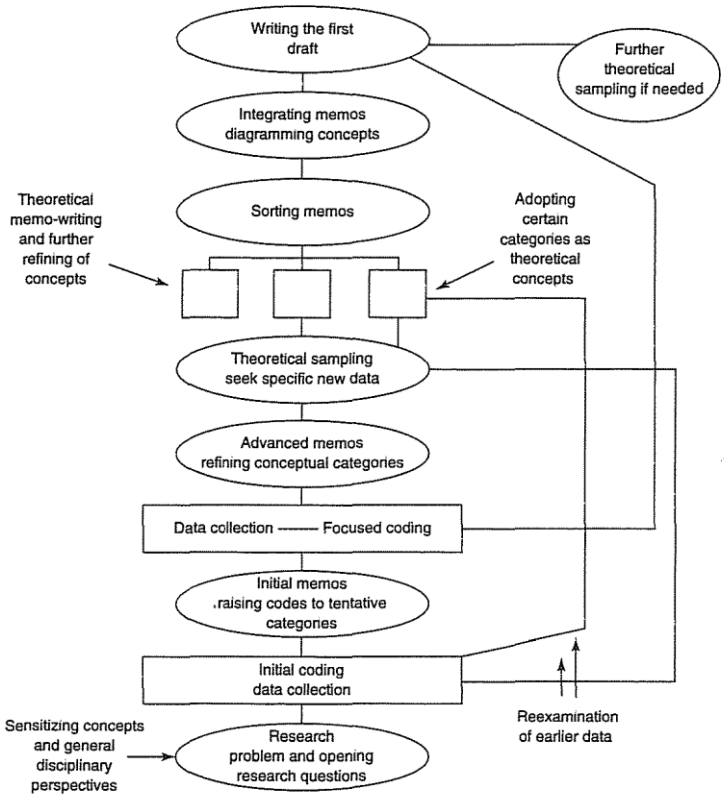


Figure 7. The Grounded Theory process
The researcher departs from the base of the model with "sensitizing concepts" and a research problem working upwards through systematic and inductive phases of data collection, analysis and interpretation (i.e. 'theoretical sampling') until reaching the desired aim of constructing and writing up a "grounded theory" (Charmaz 2006).

The methodological implications of the Grounded Theory approach are far reaching: counter to most social science methods, the Grounded Theory process allows the researcher to pursue an area of personal and scientific interest where there is a clear gap in knowledge (Strauss & Corbin 1990), but without having to apply a "pre-conceived theory" (p. 46). Strauss and Corbin (1990) argue that *"*data collection, analysis and theory stand in reciprocal relationship with each other. One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge" (p. 23). This way, it is possible to depart from a tradition of "deductive logic" (Charmaz 2006 p. 168) and use a theoretical framework to "demonstrate how your grounded theory refines, extends, challenges or supercedes extant concepts" (Charmaz 2006 p. 169). By doing so, theory is applied in a scientific, yet creative fashion acknowledging prior theoretical knowledge, explaining and

positioning own findings in relation to these, with an overall desire to positively contribute to the field of interest.

The outcome of a rigorously applied grounded theory approach through the process of "theoretical sampling" (Charmaz 2006 p. 96) and the constantly evolving "theoretical sensitivity" (Strauss & Corbin 1990 p. 42) of the researcher is the development of "a substantive theory that meets the criteria for doing 'good' science: significance, theory-observation compatibility, generalizability, reproducibility, precision, rigour, and verification…that enables the researcher to ask pertinent questions of the data and to make the kind of comparisons that elicit…new insights into phenomenon and novel theoretical formulations" (Strauss & Corbin 1990 p. 31).

2.6. Conclusions

The present review chapter has shown that the causes of major agricultural transitions, the concentration and consolidation of the slaughter and processing industries are well understood (Fraser 2008b; Rollin 2002) and livestock welfare problems are clearly conceptualized (Fraser *et al.* 1997; Webster 1994a). But in an effort to address problematic human-animal interactions a number of important issues have been identified, which affect the animal welfare reform effort (Anderson 2011).

A critical assessment of existing knowledge

1. In order to address problematic human-animal interactions the need to renew an "ancient contract" (Dawkins & Bonney 2008; Morris 1990; Rollin 2008), an unwritten law of ethical conduct whereby people are expected to provide good care for animals in their charge has been proposed. But research on lay and farmers perspectives finds

that societal norms and values differ greatly (Lund *et al.* 2006; Miele & Bock 2007; Te Velde *et al.* 2002), and a universally accepted framework is yet to be identified (Anderson 2011). While poor welfare conditions are collectively opposed by relevant stakeholders (Spooner *et al.* 2014b; Te Velde *et al.* 2002), the non-producing public was found to strive for natural living conditions and positive affective states (Miele *et al.* 2011), while producers were believed that no welfare problem existed, and that they only worked to ensure livestock welfare by safeguarding overall health and functioning (Spooner 2013; Spooner *et al.* 2014a; Te Velde *et al.* 2002; Vanhonacker *et al.* 2007, 2008). These findings indicate a clear-cut dichotomy between the perceptions of lay and farmer's perspectives. The consequences of conflicting understandings were not sufficiently assessed (Anderson 2011) to understand how they could be resolved and identify whose norms could form the basis of an upgraded "domestic contract" (Miele *et al.* 2011; Te Velde *et al.* 2002).

2. The discrepancy between the views of producers and the non-producing public induced theoretical debates on the animal welfare approach (Fraser 2010; Miele *et al.* 2011). While animal welfare science aims to ensure good lives for animals (Fraser 2012, 2016; Fraser & MacRae 2011), as an ethical framework it is heavily debated (Greenawalt 1986). Counter discourses of the welfare perspective originate from the consequentialist, utilitarian animal liberation ethic, and the categorical animal rights and abolitionist ethic (Bekoff *et al.* 1992; Francione 1996, 2009; Singer 1975; Regan 1984), which critique the moral imperative of welfarism (Callicott 1980; Fraser 2012; Garner 2006; Stibbe 2005; Taylor 1984). By arguing that human-animal interactions with animals cause inevitable harm, they present the need to either liberate certain species from any harmful interactions, or adopt non-interference rights for all animals. While Singer (1975) focussed on certain elements of welfare and believed that most

use of animals did not ensure a "perfect" balance between pleasures and pains, the liberation ethic did engage with some parts of the welfarist approach. On the other hand the animal rights ethic proposed by Regan (1984) fails to sufficiently engage with the practical aspects of welfare, rather focuses on providing non-interference rights. In this respect, rights may not advocate, nor ensure better welfare conditions. Hence, while the core of the dilemma involves a debate on the quality and quantity of interactions with animals, this review found that animal liberation and rights discourses presented categorical, competing, hegemonic discourses that fail to unite and empower the livestock welfare reform effort (Callicott 1980; Stibbe 2005). The welfare literature did not seem to critically assess these frameworks and point out the weaknesses of their premises.

3. Current problem-solving approaches in Europe addressed the outlined discrepancy between public and producers views and behaviours, but have not sufficiently engaged with the theoretical debates driving reform-efforts (Miele *et al.* 2011). It has focussed to strike a balance between conflicting mandates, partially via a legislative approach to ensure that producers and products meet minimal production requirements (Miele *et al.* 2005), and partially via a market-based approach allowing consumers the freedom to purchase according to their own ethical principles (Dryzek 2013; Eurogroup for Animals 2016; European Commission 2016). But studies indicate that a predominantly legislative approach (Anderson 2011) and market-based solutions were unable to resolve ethical issues (Hobbs *et al.* 2002; Falk & Szech 2013b; McLeold-Killmurray 2012; Miele *et al.* 2005). Critics of the market approach claimed that ethical purchasing behaviours were compromised by WTO rules of conduct (Hobbs *et al.* 2002; McLeold-Killmurray 2012) and limited by inconsistent consumer awareness (Wicks 2011), behaviours (Ibrahim 2006), and implicit societal consent (Stibbe 2001).

But while some scholars suggested that many forms of harm inflicted on animals were possibly unintended (Klikenborg 2014b), others found that even full transparency on production methods was not sufficient to ensure the ethical competence (Harper & Henson 2001; Miele & Evans 2010) of consumers. Critics of the legislative approach illustrated a lack of consensus on the needs (Miele *et al.* 2011) and values of animals, which induced a difficulty to balance out competing interests (Rose 2010). Findings therefore indicate that current problem-solving mechanisms were unable to resolve major livestock welfare issues (Fraser 2008 a,b; Fraser *et al.* 1997; Rollin 2008). Both the legislative and the market-based approach failed to ensure that all aspects of the livestock welfare problem was critically and consistently addressed, and society was enabled and empowered to act according to their ethical principles.

4. Livestock welfare was found to depend on a number of crucial factors (Arey & Brooke 2006; Grandin 2015) including the quality of stockmanship (Biovin *et al.* 2003; Fraser 2014), the environment (Broom 1991; Dawkins 2006; Duncan 2005; Webster 1994a), disease control measures (Broom 1991) and livestock genetics (Grandin & Deesing 2013), the level of coherence between the above factors and the adaptability of animals (Baxter 1989; Webster 1994a). Empirical evidence has found that while pigs are highly adaptable animals (Baxter 1989) their adaptations often corresponded imperfectly to challenges faced (Fraser *et al.* 1997) in current conventional farming practices. A number of significant animal welfare problems were induced by overriding the coping mechanisms of livestock (Fraser 1993; Grandin 2010a). Findings indicate that current problem-solving approaches addressed livestock welfare issues most successfully where there was a direct overlap between human and animal interests, such as basic health and functioning (Scientific Veterinary Committee 1997), while issues in which the interests of humans and animals did not fully correspond to

or were in conflict with one another, such as affective states and abilities to use natural adaptations (Grandin 2010a; Webster 1994a), were harder to solve. This problem was identified as the most prominent weakness of the current livestock welfare reform effort indicating a need to pursue methods that are able deliver a more systematic and holistic contribution to the cause.

Therefore, in line with the arguments of Fraser (2008) to make sufficient progress and achieve good lives for farm animals the need for a more complex, reflective and targeted reform effort was found necessary. The Anderson (2011) model on how truly powerless groups gain societal protection illustrated that a successful livestock welfare reform depended on the interplay of a number of crucial factors, including: a) moral concern and the development of united ethical imperative as the primary spur to action, b) the development of a critical mass carrying forward a clearly defined ultimate goal for animal welfare, presenting the need for the protection of animals as a mainstream and legitimate, rather than a radical and marginalized objective, and c) the development of economic arguments and/or an alternative economic model to counter *laissez-faire* arguments preventing change. Shared values on why the protection of animals was necessary, and a vision of what level of protection should be achieved to deliver livestock welfare, were essential elements of reform; however as Anderson (2011) highlights these were the issues in which welfare and its counter discourses disputed the most.

Positioning the current research project

Based on existing knowledge presented in the chapter illustrates the need to contribute to the identified research gaps especially to:

1. Study the perceptions of farmers and comprehend their understanding of the livestock welfare problem beyond the generalized dichotomy presented in earlier works.
2. Understand the consequences of conflicting discourses on the moral imperative and ultimate goal of livestock welfare reform efforts.
3. Assess the value and contribution of current problem-solving methods, especially legislative and market-based approaches.
4. Evaluate the consequences of the current status quo on livestock welfare, and understand the level in which the current livestock welfare reform has been able to transform human-animal interactions and livestock welfare conditions.

Finally, the review has found that a pluralist scientific perspective and a pragmatic ontology allow the researcher to overcome ontological dichotomies between realism and constructivism, thereby enabling a study of human perceptions and empirical facts in the context of animal welfare (Charmaz 2006; Fraser 1999; Moon & Blackman 2014; Sayer 1992). Grounded theory (Glaser & Strauss 1967) was well aligned with the pursued pragmatic ontology (Strauss & Corbin 1990) offering the widest, least limiting approach for an inter-disciplinary exploratory study, and the most systematic method for data collection and analysis (Charmaz 2006) to a research project that does not rest on a pre-existing theoretical framework (Charmaz 2006; Strauss & Corbin 1990).

Chapter 3. Research Methods

The chapter will aim to outline and attempt to reflect on research methods used. It will depart by justifying the case study choice, and aim to outline data compiling techniques that have been applied. Next, it will introduce the types of evidence used, namely interviews, farm observations and photographs, objective and reflective notes and research memos. This will be followed by a description of data disassembling and reassembling methods, limitations and validity issues. The chapter will close by drawing brief conclusions on research methods.

3.1. Justification for case study choice

As outlined, several scholars have emphasised that the multi-faceted nature of animal welfare issues require complex scientific approaches (Miele *et al.* 2011) preferably based on both quantitative and qualitative evidence. However, growing scholarly interest on the welfare of farm animals has predominantly resulted in studies on the "non-producing public" (Spooner *et al.* 2014a p. 570) such as lay persons or advocates making claims "on behalf of" animals, and "willingness to change" (p. 570) studies, most relevant when examining the values and purchasing behaviours of consumers (Spooner *et al.* 2014a).

The values and perceptions of both the general public and consumers were found highly relevant, but those "stakeholders" directly interacting with farm animals and making decisions on their welfare, are believed to be highly significant in studying ethically problematic human-animal interactions (Sayer 2011). In these situations, direct interaction facilitates a deeper understanding of the complex interplay between the "needs of animals" and the values and perceptions of those who eventually define levels of their welfare. Spooner *et al.* (2014a) find that "producers may have quite different concerns about proper care" (p. 570 also highlighted

by te Velde *et al.* 2002; Vanhonacker *et al.* 2008; Miele & Evans 2010), hence more work is needed to adequately understand the causes and implications of the problem at hand.

In order to study emerging social conflicts and their empirical manifestations, it was essential to engage in an in-depth study of a context-specific case (The University of Melbourne 2010). To do this, a number of important considerations were made, which directly (scope and species) or indirectly (audience, feasibility and geographical range) affected the research. Davies (1993, see also Flyvbjerg 2004) claims that a case study design helps facilitate a deeper and broader understanding of an issue at hand, enables an engagement with the study and finally provokes the audience to "take a position" on the issue presented. As the current project is essentially problem-driven, the importance of depth and reader engagement cannot be over-emphasized.

Another set of considerations were based on feasibility. Yin (2009) emphasized that a case must provide sufficient access to data, including participants and sites for observation. Due to limited time and funds, but good access to data, sites and participants, Hungary (Figure 10) was chosen as the location of the study. The country is relevant and is therefore a good case because of its political, legislative status as an EU Member State, the emerging interest in animal welfare issues, its "turbulent" history resulting in multiple transitions being imposed on the farming sector, and finally the fact that it is historically an agrarian country, which status has been strengthened by the current government, and farming has recently become a key strategic area for development (Vidékfejlesztési Minisztérium n.d.).

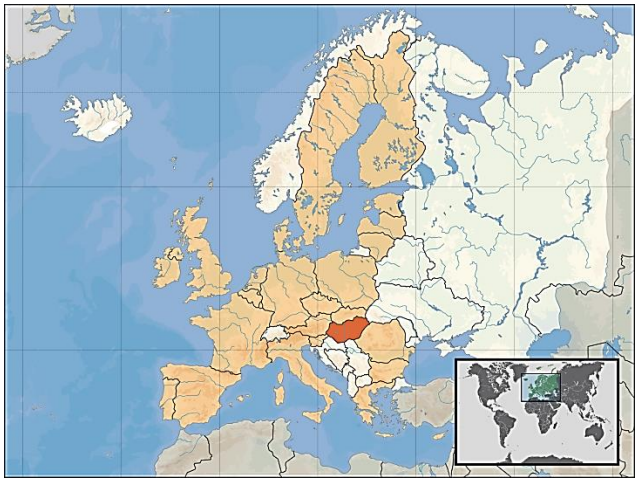


Figure 8. Global map positioning Hungary in the territory of the European Union (source: https://commons.wikimedia.org/wiki/Atlas_of_Hungary).

The next set of case study considerations relate to the scope of human-animal interaction and the choice of the species of animal. Once again Davis (1993) notes that a case must be presented with an interesting "conflict" but without a clear "solution", presenting key-players at time of decision-making and promoting empathy for the subjects involved. To address the above considerations, it was first of all noted that out of a large range of animal welfare issues, the "farming issue" was one of key interest, due to the scale of the industry, the distinctive human-animal interactions in farming, and the nature and extent of its animal welfare effects. In addition, livestock farming is a topic, which generates profound ethical debates on animal use, sustainability and environmental conservation. Capturing the perspectives of key stakeholders (experts, conventional and alternative farmers) in this still unresolved, ongoing debate, identifying their values, and observing factors, which affect their decision-making are issues of significant scientific interest (Blockhuis *et al.* 2010; Miele *et al.* 2005; Miele *et al.* 2011).

Finally, pig (*Sus scrofa domestica*) farming was chosen due to its controversial nature (i.e. the animal welfare and environmental effects conventional pig farms), but also because of the

known intelligence of pigs and the recently introduced measures to develop the pig farming sector in Hungary (Vidékfejlesztési Minisztérium n.d.). In addition, Hungary possesses different pig farming systems. Most conventional farming operations work with strains of white pigs, while semi–intensive operations house either white pigs or mangalica pigs. The least intensive, near-extensive farms also house wild boars. While all these animals belong to the same species and possess comparable welfare needs, the case study was able to capture how perspectives on livestock welfare changed depending on the farming method the animals were kept in.

3.2. Data compiling

The research was carried out between the 1 September 2015 and the 30 June 2016 and was based on an iterative process (Charmaz 2006, Creswell 2003, O'Leary 2004; Ruane 2005; Strauss & Corbin 1990) in which data collection, data handling, analysis and reflective writing was carried out in repetitive circles. The following sections will outline and reflect upon the research methods applied.

3.2.1. Reflection on the recruitment process

Participants were recruited to cover a diverse, but non-representative sample (Creswell 2003; Spooner *et al.* 2014a). Initially the following 4 groups of interest were envisioned for this research: "scientific expert", "advocate expert", "conventional pig farmer", "mangalica farmer" and "wild boar farmer", aiming to carry out comparative studies within groups (e.g. scientific and advocacy experts) or the species of *Sus scrofa*, but using different strains of *Sus scrofa domestica*, kept in different degrees of confinement and technology.

Early on in the research process the following categories emerged: "expert"[3], "conventional farmer"[4] and "alternative farmer"[5]. Reasons for such a shift in samples were due to the following: first of all, there was an observable overlap in the assignments of scientific and advocacy experts; most of the scientists were welfare advocates, indeed many of the participants also engaged in the work of non-governmental organizations. In addition, many of the welfare advocates also pursued an additional professional career; hence due to the difficulty of establishing clear cut categories, the umbrella term "expert" was adopted. Second, wild boar farmers often kept mangalica pigs and sometimes even white pigs hence it was meaningless to treat them as an individual group based on the strain of animal farmed.

Finally, in terms of housing technology only two major farming systems were identified: the fully confined conventional system for white pigs (Figure 11), which relied heavily on automated equipment, and the semi-intensive alternative system for white pigs, mangalica and wild boar (Figure 12) with little or no automated equipment. It is important to point out that in terms of feeding and breeding technologies, alternative farmers applied systems of varying degrees of intensity.

[3] The "expert" category applied to scientists, advocates, and non-political decision makers actively working in relevant organizations with a principal or major focus on animal welfare issues.
[4] The „conventional farmer" category applied to livestock farmers with 50+ white breeding sows, housed in an indoor farming operation, with high-efficiency breeding, feeding and housing technologies.
[5] The „alternative pig farmer" category applied to livestock farmers with 50+ white, mangalica or wild boar breeding sows, housed in a predominantly outdoor farming operation, with semi-intensive feeding and breeding technologies.

Photograph 1 & Photograph 2. Illustrations of conventional and alternative farming systems
Group housing technologies for pregnant sows. Differences between the systems were identified by "visible" (housing, feeding) and visually indistinguishable (breeding) technological elements (source: the author).

Participants were identified via a snowball sampling method, which "relies on people identifying other people or cases to investigate" (Taylor-Powell 1998 p. 7) and were invited to engage in the research voluntarily. To launch the recruitment process, first a "key" participant was identified, interviewed and following the interview, was asked to provide relevant contacts. In the case of new participants, it was easier to gain access to further contacts within a pre-constructed group, while finding a participant from another group was more challenging. However, once the first participants of each group were identified, the recruitment process was unproblematic. Farms observations were carried out on the farms of interview participants, hence were not recruited separately.

During the recruitment process further important issues emerged that are worth reflecting on. First, special care was taken to create and as far as possible maintain a relaxed, non-threatening atmosphere for participants. This approach was vital when dealing with livestock farmers, as their general perception of an "animal activist" or any person interested in animal welfare was negative. For this reason it was essential to be transparent and professional,

emphasising that the study aimed to contribute to scientific knowledge. In response, participants shared deeper and richer interview and farm observation data.

Second, experts or farmers had a tendency to provide contacts of their close affiliates, whom they sympathized with. Methodologically this could have been problematic, if the aim of a study was to identify animal welfare problems manifesting due to poor husbandry. However, in the course of the present research the aim was to interview farmers who operated by "best practices", shifting emphasis from legislative enforcement to the subjective perceptions of farmers. Hence, all participants worked by "high" legislative and industrial standards. This observation is not highlighted to create a dichotomy between "caring" and "carefree" farmers; results suggest a situation much more complex, but more to note that participants have consciously or unconsciously chosen to provide contacts to farmers they trusted or could connect with.

Third, research oriented on a livestock enterprise requires the observation of certain – written or unwritten - hygiene rules and expectations, which may affect both the recruitment and data collection processes. Most if not all farmers expected the researcher to keep 3-4 full working days between farm visits, wear clean (if possible sterilized) footwear, and be in good health. In addition to the above, the disinfection of hands, shoes and/or boots, partial or total changing into workers clothes and in some cases 1-2 showers (before and after farm visit) were requested. All of the above obligations were observed by the researcher without hesitation, and it was noted that a willingness to cooperate with farmers further contributed to easing the atmosphere of interviews and farm visits. A failure to observe any of the above requirements could severely affect the farmers' enterprise, animal health and welfare

conditions. Hence, it was in the full interest of the researcher to obey and observe health and hygiene related requests of the farmer.

Finally, during the recruitment process, farmers required at least 1 week notice before the actual visit. It was obvious that farmers, especially those who were involved in diverse farming operations (livestock farming, crops and/or fruit production) were very busy, and finding a date for the interview and farm observation was often challenging. However, at the same time it was evident that farmers made an effort to "tidy up". Sometimes farmers would postpone visits for up to 3 weeks after the first appointment, hence the question of how much (visual) data was lost due to "tidy up" had to be raised.

In the present research, it is important to acknowledge that some important animal welfare related visual data was possibly lost due to the interviews and farm visits being carried out in an expected time. However, it is also important to acknowledge that this was the only way in which access could be ensured. Therefore, the amount of bias induced by pre-arranged visits did not seem significant, as the study aimed to focus on the values of farmers' and the manifestations of their values in built technologies that are visible and which cannot be changed from one day to the next. By "allowing" farmers this extra time, their integrity was maintained and they were open to communicate about problems they were facing.

3.2.2. Sample size, study groups, types of evidence

The research was based on a snowball sampling strategy, and aimed to provide a non-representative sample (non-probability sampling) with a purposive and saturated sample size.

To ensure the collection of high quality, reliable data the research was based on a technique proposed by Guest *et al.* (2006 p. 59) in which saturation was operationalized and "non-probabilistic sample size[s] for interviews" were decided via evidence-based recommendations. Guest *et al.* (2006) found "basic elements for metathemes were present as early as six interviews" (p. 59), while "data saturation had for the most part occurred by the time we had analysed twelve interviews" (p. 74). Francis *et al.* (2009) found data saturation at a sample size of 17; hence these numbers were used as an indication, rather than a general rule for saturation (Bowen 2008; Francis *et al.* 2009).

However, a more important methodological issue was the question of homogeneity especially due to its correlation with data saturation. Guest *et al.* (2006) claim that the number of interviews leading to saturation should greatly depend on the quality of data, group "coherence" (i.e. heterogeneous or homogeneous) and whether the "domain of inquiry is diffuse and/or vague" (p. 79), and points out that in the case of research aiming to identify common themes and experiences of a "relatively homogeneous" (p. 79) group of individuals, then 12 interviews/group should provide an appropriate sample size. To ensure homogeneity, the researcher strived to define study groups and "categorize" participants as accurately as possible.

As outlined (see 3.2.1.), the following groups of interest were sampled: "conventional pig farmer" and "alternative pig farmer", which are homogeneous on the basis of the in the intensity and main methods of production. The group "expert" was sampled to enable additional comparative studies of participants who had an important, but indirect impact on the welfare of farm animals. For each of the two farmers groups, data saturation was reached early (around 6-7 interviews), however sampling continued until the completion of 12

interviews each (Σ = 24). In total 16 interviews were carried out with experts, hence overall 40 interviews represent the sources of primary data. In terms of farm observations, data saturation was not a useful methodological tool, therefore observations were carried out only on farms where the farmer was interviewed (Σ = 24). The primary data set also included a large number of photographs taken on observed farms.

Secondary data included detailed objective and reflective notes written-up directly after interviews and farm observations. All together 64 such notes were taken (40 interviews + 24 farm observations). Finally, a multitude of research memos were produced during the course of collecting, transcribing, coding and analysing the data.

3.3. Data source 1: Interviews

3.3.1. Interview protocol and ethical considerations

The Interview Protocol (Appendix I. Interview Protocol) was prepared on the basis of a format proposed by Arskey & Knight (1999 p. 99). Pilot testing was carried out with an experienced researcher, who was knowledgeable of pig farming. The pilot test allowed the possibility: to gain feedback on the interview approach or techniques, the order and content of questions, the layout of the interview process, ethical issues and data recording practices. The pilot test also facilitated major refinements in the Interview Protocol, which – after a final round of testing - was deemed fit for use.

Once the research was launched the Interview Protocol remained predominantly stable. This was due to two different factors: first, questions were designed to guide interviews and provide a “check list” of areas that had to be addressed, and the research strategy enabled the use of questions in a flexible manner, hence during the interviews the researcher aimed to

follow the logic of the participant. This approach provided more freedom to share personal narratives, and so research themes naturally emerged. In addition, after the 5th and 10th interviews a detailed review of the research process and progress was carried out. This exercise was based on a post-interview reflective notes sheet adapted from Arskey & Knight (1999; Appendix I), and was useful to critically examine whether the research design ensured the collection of relevant data and that ethical principles were met. As the two review exercises found no major diversions from the intended research goals, the Interview Protocol remained unchanged and was consistently observed throughout the research process.

Moreover, the present research project has been conducted in full observance of the Central European University Ethical Research Policy[6] rules and regulations. Before interviews, participants were informed of the academic rules, provided with a copy of the signed Confidentiality Form (Appendix I. Confidentiality Form) outlining basic information on the areas of interest, research objectives, possible outputs, and a guarantee of anonymity for participants. The form also granted participants the right to withdraw from the study without having to justify reasons for doing so. Due to the sensitive nature of the research, this form was a very useful tool in outlining the obligations of the researcher and ensuring that participants were aware of the research they contributed to. The form was accepted by participants, and was especially well received by farmers.

In addition to the confidentiality form, a form establishing the Level of Consent was also presented to participants before the interviews. Participants were informed that the form can be signed by the participant after the interview. Once again this approach was also beneficial, as experts and farmers were aware that they could base their decision of granting consent once

they were fully aware of the content of the discussion. All participants agreed to the process by which consent was granted, and none had an inclination to withdraw from taking part in the research.

3.3.2. Design and length

The length of semi-structured interviews was not determined. During the pilot study the length was estimated to be around an hour, however during the research some experts and most farmers took on average 50% more time to interview. Participants over the one hour time "limit" were asked for consent to continue, and all of the participants agreed. In addition, the majority of farmers expressed their "gratitude" for the opportunity to speak. Many expressed that they were never consulted, and that their voice was not as powerful as their "opponents" (i.e. the slaughter and meat industry, see 4.2.). This was probably why interviews were longer than expected.

3.3.3. Interview questions and process

Interviews were based on the Interview Protocol (see 3.3.1.), with a clear outline of the areas that had to be addressed (Appendix I, Interview Questions). Prompts (Appendix I, Interview Prompts) were used to aid discussions and achieve the desired level of clarity. To keep track of emerging issues, notes were taken during interviews. It was interesting to note that some participants were uncomfortable and became self-conscious when notes were taken, so in later interviews participants were informed that notes may be taken. This extra information further eased the atmosphere of interviews.

[6] see http://documents.ceu.hu/documents/p-1012-1v1211

For an immediate self-assessment on interview content and validity (i.e. that participants were content with their own replies), and for evaluating whether the interview questions were broad enough to include all relevant issues, participants were asked to make any further observations or provide follow-up information at the end of the interviews. Only in a few (3-4) cases did participants wish to add further comments. Post-interview farm observations also provided the opportunity to further discuss or "demonstrate" issues mentioned during interviews.

3.4. Data source 2: Farm observations and photographs

3.4.1. Pre-observation considerations

In addition to ethical and hygiene related issues (see 3.3.1.), the following important considerations were made: first observations facilitated a general understanding of the farming methods used and their animal welfare consequences. In order to "objectively" capture the scale and/or intensity of various animal welfare problems, different qualitative (e.g. ethnography) and quantitative (e.g. physiological, behavioural) sampling methods should have been adopted (i.e. systematic observations, Yin 2016), enabling the researcher to be present on the farm for an extended period of time. However, as there is ample scientific evidence to conceptualize livestock welfare problems (see 2.1.), which quantify the scale and intensity of animal welfare issues, such data was not collected. Nonetheless, by acting as a "participant-observer" (Yin 2016), the aim of pursuing a comparative study of perceptions with the lived realities of livestock through the "lens" of the researcher was possible.

Second, by aiming to "go beyond typical observations and interviews" (Creswell 2003 p. 188) and carry out the comparative analysis of different data sets it was important to ensure systematic data collection during farm observations , hence the following "categories" were systematically observed (based on Yin 2016, e.g. Figure 13):

- Individual participants: general appearance, verbal and non-verbal behaviour;
- Interactions between "subjects": human-human, human-animal, animal-animal;
- Additional actions and interactions: human, animal, technical/mechanical;
- Physical surroundings: the landscape, weather, buildings and internal environment (including furnishings, smells, dust, light), animal and enclosure clensiness and additional visual and audio cues.

Photograph 3. Observation of human-animal interactions
While farmer was explaining the relationship between climate, environment and sow instincts and their influences on piglet mortality, the farmer went up to two sows to give them a friendly patting. He pointed out that they were both 'good mothers'. While noting his presence, the sows remained calm and continued sucking their young. This indicated that the farmer and the sows were in regular, "positive" interaction. Interestingly the farmer pointed out during the interview (note: before the farm visit) that "*they* (i.e. the pigs) *know exactly who they can trust*" and emphasized the connections between good husbandry and good welfare (source: the author).

Data collection provided an opportunity for "triangulating observational evidence with other sources" (Yin 2016 p. 154), which was an important objective of the study (see 3.8.).

3.4.2. Design, length and process

Farm observations took place immediately after the interviews with conventional and alternative farmers (Figure 14).

Figure 9. Geographical location of farms visited (source:https://www.google.hu/search?q=map+of+hungary&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiCuK3h88XXAhWCmLQKHQvyCdUQ_AUICigB&biw=1366&bih=620#imgrc=Sg4YRRoAOjFzeM:&spf=1510931866166)

There was no pre-defined method for going around premises; the farmer was given full authority and control over "inspecting" both farming technology and livestock welfare conditions. Discussions during observations were also unstructured; whatever the farmer wanted to discuss was followed-up to achieve the required depth and clarity of the data. Photographs however were regularly taken to provide evidence and "capture" important observations. Farmers were asked for permission before taking pictures.

3.5. Data source 3: Objective and reflective notes, research memos

During the research a high number of "objective" notes and "reflective", "analytical" memos were taken. The difference between these categories was in line with a qualitative research paradigm and a grounded theory approach (Charmaz 2006, Strauss & Corbin 1990, Yin 2016). The objective of note taking was to extend the enquiry to any emerging issue (Yin 2016), while the use of "reflective" or "analytical" memos was fundamental to the Grounded Theory

approach (Charmaz 2006, Strauss & Corbin 1990), aiding both data collection and analysis. These sources of data were influenced by the researcher's subjectivities; hence a clear need for stringent self-reflection, on initial and evolving assumptions, and possible biases was necessary. Yin (2016) states that "no lens is free from bias" (p. 286) and no research is value-free (Fraser 1999), hence the issue of validity (see 3.8.) was assessed via a critical and "self-reflexive" approach through the entire research project.

Therefore, the benefit of using notes and memos in the project clearly outweighed the risks of introducing unwanted biases (Yin 2016), hence additional data supplementing interviews and farm observations were: a) objective notes and reflective memos on interview participants, processes and settings, b) farm observations, production methods and animal welfare conditions, and finally c) photographic evidence and reasons for taking each picture. Notes were taken on the basis of the research Protocol (Appendix I) and were immediately written-up after interviews and farm observations. Analytic memos however, were taken systematically, but following a less structured format. Further analytical memos were made during data analysis. Charmaz (2006) conceptualizes the differences between "early" and "advanced" (p. 80) memo writing, which - based on the stage of research or the level of analysis – categories were useful in both sorting and using memos during data analysis and interpretation.

3.6. Data disassembling and reassembling

3.6.1. Data disassembling

Interview data was recorded with an Olympus VN-731PC digital voice recorder and photos were taken with a mobile phone (Lenovo A6000). After returning from the field an excel database of participants (Appendix I, Participant Database) was used to keep trach of

participants, while raw data (audio-, photographic evidence and written notes) were saved in appropriate files, ensuring ease of access and the possibility to save backup versions of the project (i.e. OneDrive provided by CEU). Data analysis was carried out with the Atlas.ti software (version 7.5.16.). It is beyond the scope of this project to reflect on the importance of using qualitative data analysis software; however it necessary to point out that Atlas.ti provided all the tools necessary for systematic data handling and analysis. Finally, interview data (audio files) were transcribed verbatim and individual transcriptions were uploaded into Atlas.ti for coding.

3.6.2. Data reassembling and initial analysis

In line with a grounded theory approach, transcribed interview data was coded in several rounds. The first, initial phase of coding took place with a random sample of 10 interviews (3 "conventional" and 3 "alternative" farmers, 4 "experts") that were coded by an "open coding" strategy. Open coding is "the part of the analysis that pertains specifically to the naming and categorizing of phenomena through close examination of data" (Strauss & Corbin 1990 p. 62) and was found to be useful to extract a detailed list of emerging themes from the raw data in the form of initial codes. During this process "by which concepts are identified and developed in terms of their properties and dimensions" (Strauss & Corbin 1990 p. 74) the original research questions, subjects of the study, initial findings, their theoretical implications and comparisons between data segments were made (Charmaz 2006, Strauss & Corbin 1990). Based on findings, the initial list of codes was re-examined and revised into – as termed by Atlas.ti - a list of "code families" and "codes" (or "themes" and "codes").

In the second round of "focussed coding" (Charmaz 2006, Strauss & Corbin 1990) all of the 40 interviews were coded (or re-coded) based on the revised set of code families and codes.

Focussed coding is "using the most significant and/or frequent earlier codes to shift through large amounts of data. Focussed coding requires decisions about which initial codes make the most analytic sense to categorize your data incisively and completely" (Charmaz 2006 p. 57). The second, focussed round of coding was therefore a non-linear, "emergent process" (Charmaz 2006 p. 59) carried out to further refine the constructed code families and to "determine the adequacy of those codes" (Charmaz 2006 p. 57). The output of focussed coding allowed the researcher to finish handling raw data sets, outline a consistent list of code families and codes (Appendix II, Code Families and Codes), and create a substantial amount of analytic memos.

3.6.3. Data analysis

Charmaz (2006) finds that "interpretative theory calls for the imaginative understanding of the studied phenomenon" (2006 p. 126), hence in contrast to positivist theory, which "favours deterministic explanations…emphasizes generality and universality" (p. 126) data reconstruction in a grounded theory approach is based on the interpretation of the researcher.

Analysis and reconstruction of the data was carried out via an iterative working process. First, the coded data and analytical memos were freely explored to a) identify grounded findings, and b) differentiate these from speculations (Charmaz 2006). Early and advanced memos allowed a deep engagement with the data, and enabled the possibility to comparatively assess coded data segments with other data segments, codes, and code families.

Next, comparing and contrasting disassembled parts of the data allowed the establishment of affirmed conceptual categories (or themes) and provided the basis for data reassembling (Charmaz 2006). Data sorting and analytical procedures were ongoing throughout data

reassembling and writing, and included the critical interrogation of themes, assessments of validity, the identification of connections, overlaps and gaps in the data. This process was carried out to achieve emergent theoretical sampling and "elaborate and refine categories" (Charmaz 2006 p. 96), until theoretical saturation (i.e. no new data or properties emerged) was achieved (Charmaz 2006). Representative data segments (e.g. interview quotes, photographic evidence) were chosen to demonstrate findings with empirical evidence (Charmaz 2006). Finally, in the development of theory grounded in data, possible empirical and theoretical explanations were assessed, speculations were re-examined, disregarded or affirmed, to enable "the most plausible explanation" (Charmaz 2006 p. 104) of findings.

3.7. Limitations

The present research project aimed to study the perceptions of farmers who interact with farm animals on a daily basis and who make decisions on the welfare of livestock, and contrast and compare these to the assertions of "experts" (see Chapter 4, 5, 6) and the "lived realities" of animals (see Chapter 7). To ensure the validity of findings the project was designed to explore a context-specific case, namely the "conventional" and "alternative" pig farming industry in Hungary, applying a predominantly qualitative approach and triangulating data sources (interview, farm observations, reflections, scientific publications).

Therefore, it can be said that the boundaries of the project were firmly established: while examples of other species of animals and livestock emerged, the study did not aim to follow-up on the "lived realities" of any other animals outside the scope of the case study. Similarly, comparative studies were developed within the geographical range of Hungary, and while illustrations from other EU countries, Russia, the US and other EU Member States were mentioned, the study refrained from providing a comprehensive analysis of these cases.

Finally, “smallholders” have not been sampled in the study. This decision was made primarily to ensure validity; as smallholders fall under a different set of legislative standards and face indifferent challenges than relatively large-scale commercial enterprises, a comparative study would have been problematic.

Another issue of methodological significance was concerned with the design of the research; as the project aimed to establish a scientifically sound inter-disciplinary approach to study “social” and “animal” “realities”, which rest on important scientific and theoretical assumptions (see 2.4. & 2.5.). The approach therefore explores the possibility of carrying out an integrative study and extending a strictly discipline-specific focus. In order to explore the “livestock welfare problem” in its complexity, methodological tensions, disciplinary traditions and their implications on research had to be addressed (see 2.4. & 2.5.) and settled. The researcher acknowledges that the theoretical sophistication of the arguments for a holistic ontology may require further work, but identifies that this issue is of significant importance, especially for problem driven research in areas where human and non-human interests collide, and attitudes greatly diverge.

Finally, a need to include intermediaries (see 4.2.) as a study group clearly emerged from the data. Ideally a Grounded Theory approach requires the investigation of all emerging issues, however due to limited funds and a restricted timeframe; this issue could not be followed-up. By acknowledging this limitation, it is possible to highlight this area that needs further exploration (see 8.3.).

3.8. Validity

Creswell (2003) emphasises that "reliability and generalizability play a minor role in qualitative inquiry", nonetheless internal and external validity (Miles *et al.* 2014) are issues that must be sufficiently addressed. Yin (2016) finds that depending on the ontology of the study, there may be differences in methods to ensure validity, hence it is sometimes presented as a "contested term" (Miles *et al.* 2014). At the same time Miles *et al.* (2014) note that "a pragmatist orientation might lead to the serious consideration of all four sub-choices" (p. 86), namely: "trustworthiness", "triangulation", "rival thinking" and "validity".

To limit biases and achieve credibility the following principles have been reflected on (Creswell 2003, Miles *et al.* 2014, Yin 2009, 2016): first, important "attitudes" of researchers, such as trustworthiness or authenticity were found to ensure that data and findings are communicated clearly, and limitations are acknowledged (see 3.7.). These attitudes also ensured that the reader could differentiate between "data" and the researcher's narratives. Second, data triangulation, an important "vehicle for cross-validation when two or more distinct methods are found to be congruent and yield comparable data" (Jick 1979 p. 602), was identified as an essential tool. While some conceptualize data triangulation as a principle rather than a research method (Yin 2016), it was nonetheless an important objective to provide as many sources as possible underlining (or indeed conflicting with) data retrieved in the present research project. Third, the identification and consideration of "negative evidence" or rival explanations (see Chapters 2 & 8), facilitates the critical thinking of both researcher and audience. This was achieved by constant "scepticism", especially towards research assumptions, results and conclusions interpreted by the researcher. Yin (2016) claims "the sceptical attitude would cause you to collect more data and do more analysis than if you were not concerned about rivals" (p. 90), which was noted and observed in the research process.

Finally, external validity was achieved through methods of peer debriefing, external auditors, and "member checking". While the PhD process provided excellent opportunities for the first two methods (Research Committee, external readers, conference attendance, research update presentations), participant checking was not designed as a separate circle of consultations, but was carried out at the end of interviews (see 3.3.).

3.9. Conclusions

The present chapter gave an outline of research methods used. It departs by justifying the case study choice, outlining reasons why the study of conventional and alternative pig farming in Hungary could facilitate the assessment of the defined research problem. It presents data compiling techniques applied, highlighting important aspects of the recruitment process of participants and considerations on sample size, study groups and types of evidence. This was followed by an introduction of the types of empirical evidence gathered (interviews, farm observations and photographs, objective and reflective notes, research memos) detailing information on interview questions and processes, the Interview Protocol, ethical and farm observation related considerations, design and length related issues. Next, data disassembling, reassembling and data analysis techniques have been outlined. The chapter was closed by listing study limitations and validity issues.

The chapter demonstrates that a qualitative research process is fit to provide a systematic approach to data collection, yielding in-depth results and insights into the studied problem. The approach of data triangulation enables the researcher to ensure sound data analysis processes, and a high level of reliability during the interpretation of findings.

Chapter 4. External pressures on livestock farming

The present chapter aims to provide a general account of major external pressures on livestock farming by experts, conventional and alternative farmers, in particular to describe difficulties induced by larger forces of agriculture, the market, societal, political and legislative issues, and demonstrate how these may hinder the animal welfare reform effort.

Although several scholars working in animal welfare science have made essential contributions to study livestock welfare problems induced by farming methods, assess the effects of inconsistent consumer behaviour, and analyse the difficulties of legislative implementation, previous work has not specifically explored how larger external forces may influence the animal welfare reform effort and induce significant vulnerabilities to farmers and livestock enterprises. Assuming that the role of farmers was essential to ensure good welfare conditions to livestock, it was important to acquire as much information as possible on perceived difficulties. To do so, the chapter was based on major themes derived from in-depth semi structured interview data with experts, conventional and alternative farmers enabling the researcher to outline and comparatively analyse findings.

This chapter begins by studying major agricultural influences. It will depart by positioning the importance for agricultural production, then studying how externalities, environmental and animal welfare problems were understood, and concluding with the examination of a product quality and assessment related dispute. Next, significant effects of the current market will be explored, departing from defining the priorities of the market, then reviewing power relations between farmers and traders, and finishing the section by examining unique aspects of livestock farming in comparison to other industries. The following section will discuss

societal issues, departing from assessing human-animal interactions, exploring the perceived value of animals and agricultural production, and arriving to welfare advocacy related dilemmas. The final section on political and legislative issues will depart by studying political priorities, assessing welfare legislation related challenges, and closing with the problems of legislative implementation. The chapter will be concluded with a short discussion of findings.

4.1. Agriculture

4.1.1. The importance of agriculture

Participants unanimously agreed that agriculture was the most essential foundation of human existence. It was identified as a highly valuable activity, a service, practised to achieve a clearly identified common good, the wellbeing of humanity by providing people with their most basic and fundamental needs:

> "We can live without a mobile phone, but none of us can live without food, right?"
> Conventional Farmer Philip, post-interview notes

Participants also perceived agriculture as a highly sensitive issue, emphasizing that it was both a political and a strategic matter. While these will be addressed later in this chapter (see 4.4.), it is important to note that the continuation of agriculture was understood as an issue of political priority. Participants claimed that people had to be fed; hence in addition to conceptualizing it as a matter of human welfare, the state of agriculture was often presented as one of national security and sovereignty:

> "Food production is an interesting issue…It is important to note that all states…all politicians will strive to ensure that agricultural production is ongoing. It is so [valuable], that they are also motivated to continue supporting farming, even if it is not justified economically…No; production has to stay"
> Conventional Farmer Harry

This thought often gave rise to important deliberations, including the recurring consideration that national interests exceeded common goods. It was therefore important to find out how farmers perceived common interest to change into a "struggle" of nations?

By adopting a historical perspective almost all conventional farmers and the majority of alternative farmers reflected on how the role and value of agriculture changed over the last century: while food (or the lack of it) was seen as a highly significant matter ever since humanity existed, large-scale private business interest in food was perceived as the invention of the 20st century, and farmers were highly critical of all political and legislative processes that served corporate interests over basic human rights. Even though they earned their living in the sector, the majority of participants still found the logic and the functioning of the market in agricultural products very problematic. They claimed that corporate interest in food led to severely contradictory arrangements, inducing major conflicts of interest, political and social unrest, tensions, which in their understanding could potentially eliminate the principal cause of food production: the well-being of humans. On the other hand, some participants disagreed with the above conclusions and presented more subtle understandings. They claimed that the logic of the market did serve human interest, but only for very narrowly interpreted short-term benefits:

> "We have an agricultural company working on 300 hectares, and we wanted to use manure on our lands…It required a huge effort…We could accomplish about 20 hectares a day, while 80-100 hectares can be done with spreading [artificial fertilizers] from a tractor…So we gave up, because we could not afford it, and it is very difficult to make people understand this problem…We know that in the long-term artificial fertilizers will harm the natural environment…but people need what is here today. It is not only about what the future will bring, we need today also…"
> Conventional Farmer Richard

The idea that short-term gains were preferred over-long term benefits was the key issue why participants claimed that the true purpose of agriculture was not achieved to its full potential. Indeed, many forecasted a substantial backlash induced by the way agriculture and food was dealt with. Participants could not forecast the exact processes by which an envisaged "crisis" would come about, but they agreed that it would include significant political, socio-economic and environmental elements. Therefore, participants agreed that agriculture and food production was a priority, its state and its future determined human and animal welfare, along with the health and integrity of the natural environment.

4.1.2. Externalities

Almost all participants addressed the issue of externalities, and experts gave a long list of overlapping issues from environmental protection, sustainability and animal welfare issues. Many experts believed that farmers, especially conventional farmers were responsible for using destructive farming methods:

> "In summary, the problem is that we are devouring the planet"
> Expert Thomas

Experts were also highly critical of society, especially in terms for upholding an unjust system. Nonetheless, they still framed this issue as if farmers were free to make technological choices any time, and it was only their lack of knowledge or lack of concern that stopped them from acting ethically, refraining from using harmful environmental and animal welfare practices (see Chapter 6). This type of blame was clearly imposed on the farming community.

Externalities were an issue of great importance to farmers, and participants indicated ample knowledge on the subject. Farmers clearly identified the environmental impacts of agriculture and debated a number of issues, including land, energy and water use, pollutants (especially

airborne substances and wastewater), and the effects of different technologies. While the observations of conventional and alternative farmers generally corresponded, it was evident that they disagreed on the relevance of scale:

> "If you come in to our village, you will see a small farm with 5-10 cows, and a small river…They accumulate a relatively small amount of manure, which is stored there, and it washes into the water…This is a problem…We abide the regulations, and use expensive technologies. We collect, store and dispose of the manure that we produce…and I can tell you our pigs and 2000 cows do not cause as much pollution as that small farm"
> Conventional Farmer Harry

Conventional farmers generally argued that the environmental impacts of farms not an issue of scale, but rather the quality of technology and management. Farmers claimed that by applying good management techniques, reliable and efficient technologies, they were able to minimize externalities and optimize production. Alternative farmers on the other hand greatly disputed such views and claimed that only small-scale, low-intensity, and near-natural farming methods were able to sufficiently decrease the negative environmental and animal welfare effects of farming.

The above point clearly illustrates the overall frameworks by which conventional and alternative farmers perceived externalities, however in more detailed discussions it became evident that these clear-cut categories did not always prevail. In the case of drug usage, for example, conventional farmers claimed that the use of advanced technologies allowed them to decrease the routine administration of antibiotics and increase emphasis on preventative measures, especially via vaccination, parasite treatment and sterilization. Conventional farmers also claimed that protocols, industrial standards and assurance programs (see 5.1.3.) allowed them to reduce their environmental footprints:

> "We…have been examined by the Swiss SGS Institute and have officially qualified as a sustainable farming enterprise…In about 4-5 years we have managed to halve our chemical inputs"
> Conventional Farmer Harry

So, data indicated that the majority of conventional farmers were aware of the need to address major externalities induced by the sector. Alternative farmers on the other hand opted to apply farming methods that did not require the standard administration of antibiotics:

> "I will always strive to get the sow and her piglets out on pasture by the time they are two weeks old…This way they acquire a natural immunity"
> Alternative Farmer Edmond

Alternative farmers were highly critical of conventional methods, and their ability to significantly decrease antibiotic use; indeed, several claimed to know conventional farms where medication (e.g. antibiotics) was still routinely administered:

> "I know of large-scale enterprises where the morning starts with the need to inject animals…not just when the animals are sick, but routinely…Sometimes medication is connected into the water…and livestock are treated continuously, until 21 days before slaughter"
> Alternative Farmer Edith

Alternative farmers stated that the only observable improvement in drug usage was that withdrawal times were set and observed. It is possible that their perception depended on individual farms they knew or substances which were replaced by other drugs. In addition to antibiotic use, the hormonal treatment of animals was a highly debated issue, and a number of conventional farmers claimed that they applied reproductive hormones to synchronize sow breeding (Sigma system). Others mentioned new substances for the chemical castration of boars. Interestingly, while many farmers advocated the Sigma system, none of the farmers agreed with the chemical castration of boars:

> "For a long time now people have advocated to stop pig castration…I have a substance on my shelf that will stop the secretion of

> testosterone…but to be honest I would not like to eat from that meat. There it is, unopened"
> Conventional Farmer Geroge

Alternative farmers therefore highly contested the notion that scale was irrelevant and that technology and management were the ways to solve environmental externalities. While agreeing that skilled management was, they also claimed that in order to decrease agricultural externalities, the entire system of agriculture needed to change. Yet, in most cases even their vision did not mean a chemical-free future. Farmers claimed that in the present scenario this was only a hypothetical option. They believed that chemical free farming of food and crops was only possible if all farmers consistently transitioned to ecological farming methods, and more livestock were farmed to ensure the chemical free fertilization of farmland. They also highlighted that the use of chemical inputs depended on whether the market honoured the production of chemical free products (see 4.2. & Chapter 6). Without a market for these goods losses induced by a drop in efficiency or loss of crops due to pests, were believed to exceed the resilience of farmers and stay in business. Rapid climate change was another issue that farmers thought to prevent a sufficient decrease in chemical inputs. While a high number of alternative farmers expressed their concerns over large-scale chemical use, only two alternative farmers still believed that ecological farming was possible, while only one participant considered switching to ecological farming methods:

> "We treat our arable lands with chemotherapy…But nature is throwing back all the grime and curse we have placed on it, which we identify as scientific inventions…I also take the herbicides home on my pickup, and I admit I feel sick when I spray the land…And then people moan when if they get cancer…So I say, ladies and gentlemen, if you feel that you are dedicated to quality life…you can get out of your armchairs and take part in the work. You can hoe half a hectare a day and clear weeds. Oh, so it is [hard work] and more expensive? Yes, well this is why you need to pay more…So that the farmer can make a living by producing decent food…I am seriously considering to change my practices"
> Alternative Farmer Walter

Finally, in terms of animal welfare externalities, two issues were of most concern to farmers: the issue of death as a "harm" and practices relevant for animal welfare. First, all farmers agreed that death was a harm to animals, but at the same time they also claimed that it was better for livestock to live, that not to live at all:

> "I think that it is a thousand times better for a piglet to have 1-1 ½ years to experience life. What it is like to be born, to suckle, to grow, and to eat well. Yes, they end up in the slaughterhouse, but I would not exchange this one day torment with 365 or 450 days of [good] life"
> Alternative Farmer Walter

In terms of practices relevant for animal welfare, there were greater differences in the opinions of farmers. The majority of alternative farmers were highly critical towards conventional technologies, and were especially hostile towards methods requiring high production intensity, achieved in constrained, unhealthy, indoor environments. They believed that these features of conventional farming were unnecessary and severely compromised the welfare of animals. Conventional farmers on the other hand perceived conventional technologies as one which provided an adequate balance between conflicting interests (see Chapter 5) and ensured sufficient livestock welfare conditions. However in the case of invasive practices, such as the castration of male piglets, both conventional and alternative farmers agreed that these were necessary:

> "I once suffered an accident abroad…and my forehead was stitched up without an analgesic, and I had to cope…Another time I was cut up from side to side and from my pelvis to my navel. The next morning I was up and I had to cope…The castration of a piglet takes a minute. It heals very quickly. If the piglet also gets an analgesic and anti-inflammatory treatment, then it is not that bad…as it is portrayed by animal welfare advocates, who want to ban it"
> Conventional Farmer George

It was evident that farmers were prepared to apply some invasive practices, as long as there was a valid reason for doing so and no lasting harm was caused. Another example was the ear tagging and notching of pigs. All farmers understood that individual identification was necessary, however those who had to tag the ears of their livestock more than once (sometimes up to 3-4 times) severely objected to the need to repeat this painful procedure. Farmers claimed that the difference between the two issues was that the latter was preventable, while castration had to be carried out. Nonetheless, both conventional and alternative farmers were open to alternatives, including the use of newly selected breeds of pigs, which did not require castration to solve the boar taint problem. However, transitioning the sector to "castration free" stocks was understood to take some time.

Therefore, farmers seemed to understand the problem of externalities, including environmental and animal welfare problems, and were ready to negotiate these. But results suggested that the individual perceptions of farmers were important to consider and therefore findings could not be generalized. These subjectivities indicated that there was a personal threshold by which farmers decided to pursue or reject production standards and/or practices. This threshold seemed to influence technology-related decisions of farmers (see Chapter 6), and impact environmental and animal welfare outcomes.

4.1.3. The quality dispute

Participants recognized different factors that contributed to the quality of final products. In terms of production methods, conventional farmers believed that the use of up-to-date technologies combined with "textbook" management approaches or protocols ensured quality production, while alternative farmers thought that quality could only be ensured via "traditional", semi-natural farming methods (see 5.2.). Livestock genetics was also

understood as a major contributor, and while conventional farmers perceived that optimal growth and lean meat were important indicators, alternative farmers assumed that slow growth and mature meat ensured the production of quality products. Views on farming technology were consistent among producer groups, but the quality of end products was an issue where individual opinions greatly diverged.

While animal health (i.e. product safety) was identified as an essential factor of quality production, other measurable quality attributes of meat were debated. Many farmers argued that it was difficult to capture what quality meant, while others admitted that they simply did not know what it was. Some participants claimed that they were confident that indicators (e.g. colour, thickness of fat layer or intermuscular fat content, water content, maturity) were able to define and differentiate quality products from substandard products and these individuals pointed out the need to establish and apply objective standards:

> "How can you tell what good quality meat is?...How can we connect the way it was produced to the final outcome? Take a ham for example, how can you tell that it really is good? If I take a pig from…a farm where it was kept in a confined conventional system…but the ham looks amazing, how will I be able to compare it to...the ham from my friends mangalica farm. Is there really a difference, is one really better that the other?...We need professional objective measurements, reflective of the whole production method and the whole animal"
> Expert William

The majority of alternative farmers agreed with the above opinion, emphasizing that every aspect of production affected the quality of the end product and that indicators of quality were not just to be measured in the meat of the animal. But these notions were generally disputed by conventional farmers, who claimed that differences between conventional and alternative products were due to genetics (differences in genotype and phenotype) and the length of the fattening process. While white pigs had less intramuscular fat and more water in their meat in

comparison to mangalica pigs, some argued that this was only because white pigs were kept until they were 5-8 months old, while mangalica pigs were often "finished" at the age of 18 months. Conventional farmers who raised white pigs for their own consumption often kept them to the same age as mangalica pigs, and insisted that their white pigs were just as high quality as the mangalica pigs farmed in alternative operations. Yet when participants were asked to share their intuitions on what good quality food meant, farmers unanimously agreed that it was a product with high nutritional value, free from additives (with the exception of natural spices), produced in a small-scale, low intensity, near-natural systems.

The importance of the quality debate was therefore highly relevant. Many conventional and alternative farmers shared their concerns, especially regarding quality assessments at slaughterhouses, processing methods of animal products, and finally the consumer evaluation of food. Farmers believed that all three issues had important influences on farming and animal welfare conditions. However, in terms of quality assessments, both conventional and alternative farmers agreed that while technological methods for evaluation were in place (e.g. ultrasound and electric probes), current meat qualification or grading processes in slaughterhouses were not based on quality attributes, but rather on quantity measurements:

> "Since 1993 the EUROP grading system is employed in our slaughterhouses, however it is very elusive. When we talk about it we are thinking of EUROP as a quality grading scheme, but in actual fact it has nothing to do with quality. The most important indicator of carcass quality used is meat volume. An animal [carcass] with high meat volume is considered a good quality piece by EUROP standards. But this has absolutely nothing to do with its quality. Dealers, Gordon Ramsey, all other gastronomes and excellent chefs know very well what quality meat really is"
> Alternative Farmer Walter

In addition to applying inadequate quality evaluation methods at slaughterhouses, farmers also claimed that the industry did not reward their efforts; hence there was no real incentive in

place to ensure quality production (see 4.2.). Farmers also found that the processing industry further decreased the quality of animal products:

> "Our butcher told us, that 20 years ago the slaughterhouses included the processing plants, and they prepared the final products. After work, the workers all sat down with a loaf of bread and happily ate some of the cold cutlets they just made. Today, they do not even touch it…They know what they are made of…Back then products were made from meat, now…they are made from leftovers, a lot of water, soy, some water retaining agents and aromas. That is our average cutlet…ham is just the same, they make 1 kilo 80 grams of final product from a kilo of meat…There are an unbelievable amount of additives used"
> Alternative Farmer Colin

> "I asked the boys, how on Earth do you produce 800 HUF/kg [2.46 €][7] sausages from 1000 HUF/kg [3 €] meat?...And they opened my eyes and I was unable to touch anything ever again, because I knew it was unhealthy…So I told my wife that she could not buy anything from the food stores"
> Alternative Farmer Ryan

Here, conventional and alternative farmers alike shared their deep concerns regarding the amount of artificial components used, including additives, preservatives, stabilizing agents, colourings, and so on. Indeed, farmers claimed that the large scale use of chemical agents also further decreased the need for good quality products. Participants highlighted how additives reduced the prices of food; because of the relative cheapness of additives in comparison to meat, farmers claimed that these "diluted" products required less meat and derivatives, and were sold at an even cheaper price than those products made with "proper" ingredients. These had knock-on effects on meat prices (see 4.2.1.). The discrepancy between the prices of poor quality products and good quality raw meat "predestined" their purchase and consumption:

> "My wife does not want to hassle with pig slaughter, processing and freezing. It's perfect for her if the food is half done. She is not lazy, but we have 3 children…So she does not want to stand in the kitchen for 2 hours… But the solution is there. What I am saying is that if I

[7] Exchange rate: 324.88, based on CIB Bank rates (24 November 2017)

> can take the bus or the metro from A to B, why should I run? Why should I suffer?...Assuming that in the professional processing plant, the frozen hamburger really does not contain any anthrax"
> Conventional Farmer Harry

Based on the above outlined problems, the final issue noted by farmers was the inability of the average consumer to evaluate the quality of final products (see 4.3.2.):

> "The consumer cannot differentiate between meat qualities or products. The majority are very ignorant to what good meat quality is and cannot even differentiate parts of an animal"
> Conventional Farmer Henry

> "Consumers are totally dependent upon what they are given. They have no real choice"
> Alternative Farmer Stephen

Thus, without proper quality assessments and processing practices in the mainstream food market, farmers inevitably claimed that the ability of consumers to evaluate the quality of food and make informed choices was greatly limited.

But how, could the production of quality products be ensured in livestock farming? The majority of experts and conventional farmers claimed that observing legislative standards was essential (see 4.4.2.), but in addition they highlighted the importance to engage in voluntary and independent quality assurance programs (incentivized by some large food processors). However, at the same time farmers were often disillusioned; some claimed these programs were only a marketing tool delivering no real quality contribution, while others found the programs beneficial in terms of quality, but with no chance for financial compensation:

> "We use an ISO 21000, 22000-2005 scheme…It all started in 2000, when we thought that the market will value it. We have not reached this yet. Even though we spend a few million HUF [3000 €/1 million HUF] on it per year, we don't get more for our products. However, there is an additional benefit of this system…The protocols provide us with useful advice on documentation, how to deal with complaints and

> partners…How to make production safe. So it gives us an ease of mind"
> Conventional Farmer Peter

While alternative farmers agreed that quality production required proper payment, many also emphasized that quality was only possible when the farmer and the consumer where in a direct, mutually beneficial partnership with one-another (see 5.1.3.). In their understanding a direct and transparent system allowed consumers to be informed of production methods, and ensured farmers a reasonable rate of stability and predictability.

4.2. The market

4.2.1. Priorities

To be able to understand the difficulties farmers face in the marketplace, it is important to address the conflicting priorities of the two sectors. Early in the research it was already noted that the current interests of livestock farmers and the market they produce for are contradictory. Both experts and farmers claimed that this was a relatively new feature of trade in agricultural goods, and reflected post WWII changes in production, sale and consumption trends:

> "There is a hierarchy in what people can afford…Take fur for example…The fur of certain species is very valuable and cannot be purchased by everyone. If we make fur fashionable, and here comes the essence of consumerism, we want more people to buy such products. And those working in trade found out that the more, the better. It was not the best strategy to sell 5 fur coats at a very high price, but sell 15 or even 50 at a lower price, so they needed to find out how to ensure lower prices for products. Consequently, the artic fox coat you can see in magazines on the rich and famous was made available in the Nyugati underpass, but that one was produced in Asia from dogs and rabbits...I am assuming that the artic fox was kept in better conditions…However to make the product cheaper, conditions of production had to decrease…while the visual impression had to stay. The coat has to look as much as possible, like the one in the magazine. This is not negotiable. And the fur cannot be substituted

> with fake fur often because good quality fake fur is also more expensive"
> Expert Naomi

The market (i.e. slaughter and meat companies) was understood by both experts and farmers to prioritize the purchase of raw materials (finished pigs) that were cheap, yet visually similar to any other pig on the market. This meant that while some quality attributes of products (e.g. uniformity) were prioritized, overall production methods and quality related characteristics were not considered. The most important goal identified by farmers, was the ability to source finished animals as cheaply as possible. All things being equal, participants found that price was the key determinant in the trade of finished livestock.

Farmers on the other hand claimed that production costs determined the price of the product, and their ability to produce for the market. Initially, all farmers used a simple calculus: all input costs were aggregated to determine a figure of production. Anything below this figure would mean that there was a deficit; anything above it however would act as income or profit. However, during the interviews, farmers claimed that this calculus did not work anymore, and they needed to constantly adjust their production strategy to stay in business. But what was an acceptable income for conventional and alternative farmers?

During interviews farmers clearly differentiated between income and profit, and it was noted that an acceptable income did not necessarily mean that the enterprise was also profitable: farmers claimed that acceptable meant the standard production cost, plus 10% income would ensure continued operation. Profitability meant that the farmer had to realize the standard production cost and approximately an additional 25%, which was seen as an ideal income. This meant that if a finished pig (ranging between 105-120 kg's) from a conventional system cost 400 HUF/kg (1.23 €) to produce, then an acceptable income would be 440 HUF/kg (1.35

€), and an ideal income would be 500 HUF/kg (1.54 €). At the time of the interviews however, the price of finished pigs on the market was around 280-290 HUF/kg (0.86-0.89 €) on the free market, well below the average production cost, which was estimated between 350-400 HUF/kg (1.08-1.23 €) for conventional and 450-470 (1.39-1.45 €) for alternatively produced livestock:

> "In 2007 there was a horrible year, pigs fetched a very small amount on the market…it was similar to this year, we were under 300 HUF [0.92 €], around 285 HUF [0.88 €], but feed cost 1.5 times as much as now. There was a serious drought, which raised the price of everything, so we finished the year with a 50 million HUF [153 903 €] minus…Many farms could not continue to operate…We only survived that year, because we were able to take a bank loan"
> Conventional Farmer Alex

While finished livestock from conventional systems fetched a low price, livestock from alternative farms were also in a difficult situation. First of all, production costs were found to be higher. To comprehend how production costs on alternative farms could exceed conventional operations, it is important to point out that by applying little or no automated technologies, farmers claimed that production cost was increased by the most expensive input: manual labour. Both (minimal) salaries and associated taxes, fees and the lower efficiency of human labour substantially raised production costs. In addition, animal feed and other inputs were often of higher quality, sometimes even produced by or purchased from ecological farms, hence other inputs further raised production costs. Finally, outputs were also smaller: breeding livestock produced smaller litters and were of slower growing and fattening strains, which meant that they were often kept, fed, handled, treated, etc. for at least double the time than in conventional systems. With all the above in mind, it was also noted that the mainstream market of finished livestock did not differentiate between animals coming into the abattoir from different production methods:

> "This is business. I can produce paprika and farm mangalica the way I want to, the way it should be done, but the market will never honour that"
> Conventional Farmer Norman

Hence, both conventional and alternative farmers found the need to seek ways to counter-balance major pressures that induce the production of cheap products. During interviews a commonly emerging dilemma was how to decrease input costs:

> "The economics of a farm depends on the building structure, the economic structure, specific production parameters, and the market…It is difficult for us to change the building structure and greatly enhance production parameters…and impossible for us to change the market. We are left with the only possibility of fine-tuning the economic structure of the farm by decreasing input costs"
> Conventional Farmer Oliver

Therefore, once a farm was up and running, farmers were left with the only possibility to decrease input related costs, and at the same time strive to further increase the efficiency of the farm and maximize outputs. Interestingly these processes were evident in both conventional and alternative farms, with obvious differences in the extent of pressures, but the overall trends were similar. Only a small number of alternative farmers claimed to resist these trends and maintain a focus on balancing out human and animal interests:

> "In terms of the economics of the farm, it is obviously the best solution to minimize morbidity and mortality related losses. But at the same time we avoid buying expensive medicated feed…and strive for the 'golden middle'. We do not want an enormous profit, so we will not decrease our input costs and give our animals poor quality feed. No, we will try to find our own benefits along with the benefits of our livestock"
> Alternative Farmer Angela

As great differences between farms were observed in how they were structured and managed, solutions to these problems were also highly diverse. In essence, the market was found to adopt a reverse logic of pricing than farmers, constantly aiming to decrease the value of raw

materials, which greatly affected the quality of inputs and the intensity of methods used in livestock production.

4.2.2. Power relations

The different priorities of traders and producers affect business relations between them. All livestock finished in conventional systems were sold to slaughter or meat processing companies, but animals produced in alternative systems were only sold to slaughter and meat companies if there was some special need or circumstance (i.e. in shortage of space); otherwise these animals were predominantly slaughtered at abattoirs and then either processed by the farmer, sold directly on the food market, to special consumers (e.g. hotels, restaurants), or were exported.

Finished pigs were sourced by slaughter and meat companies in two ways: in the first case, farmers signed a contract for one year, and all aspects of the business were agreed on (e.g. the frequency and scale of shipment) beforehand, including the price of finished livestock for the whole period of the contract. The other possibility was that farmers did not sign a contract, but would sell their livestock on the free market. In practice this meant that the same slaughter and meat processing companies purchased the stock, but in this case prices were based on the German stock market. In both cases, farmers argued that the price of finished livestock was not negotiable:

> "I had a business partner…who became very successful…And I told him 'you are robbing me'! I said 'leave us a little also…Your job is easy…It is like in the army, you are the commander in chief, and you are sitting in your cushioned chair…While your soldiers are lined up before your door and they cannot even go to the washroom without your permission'…So soldiers are vulnerable...I told him…'You were also a soldier…And now you are sitting in your chair and we, your producers are standing on your corridor…10-20 people waiting quietly

> in the line, afraid even to speak…They tell you what they are doing and you either send them away, or if you see an opportunity, you don't listen to them. You tell them how much you need, when you need it, what you will pay for it, deal or no deal? If they say yes, you send them to the 12th office where the secretary will prepare the contract'. This is how it all works"
> Alternative Farmer Ryan

Both conventional and alternative farmers therefore claimed that the mainstream market of livestock did not provide them with an opportunity to negotiate the prices of their products. Such an arrangement resulted in a comparative advantage of traders over producers. Farmers claimed that in addition to reducing profit margin the lack of price negotiation also induced the need for the farmer to adjust his/her business strategy to maximize efficiency and increase scale. Many conventional farmers firmly believed that the more efficiently they produced the more power or influence they had on the market. Yet, while some producers found ways to adhere to these trends, others claimed that there was no need to do so because pressures on them were never ending:

> "[The consequences of] globalization are incredible. Why should it concern me that a drought here would mean that I am not paid anything for my products…if there was drought here production prices go up. They do not follow the weather anymore. So, if there was drought here, but amazing production in Argentina and Canada, they bring two ships of produce into Hamburg…And then we can starve. This is unbearable"
> Alternative Farmer Kevin

Farmers therefore argued that the interests of traders were ensured by free trade agreements; however this meant that the comparative advantage of traders over farmers was fixed. Traders were able to source the amount of finished pigs from wherever they wanted to, wherever farmers produced them more efficiently, or had some other advantage, like good weather giving rise to higher crop yield, which decreased the production prices of many agricultural products. Therefore, farmers claimed that an unattainable scale of competition was induced by the free market (see 4.2.1.) of food.

In addition, farmers also found that slaughter and meat processing companies often exercised power over farmers in other ways. Some conventional and alternative farmers claimed that after shipping in their stock, companies did not adhere to their own contracts and pay the farmer on time. Other companies also insisted on hypothecation to ensure that if the farmer was late to deliver products, collateral would be used. Farmers on the other hand had no such payment guarantees:

> "As the price of pig meat is dropping at an incredible rate…We are facing the problem of being unable to sell our pigs. There are companies who would buy them, but we do not feel secure that we will be paid…In the past years, we have been 'stuck', owed large sums, so we are careful. We only ship if we can be paid in advance or on the spot, but this is not possible with the large [slaughter and meat] companies"
> Conventional Farmer Alex

> "There are 3 major companies…We have access to only two of these. One wanted us to sign a contract for 2 years and we did not sign because this demand was outrageous. No one is able to tell what will happen in 2 years. With the other company we could not sign a contract for all of the stock, because two years ago it nearly went bankrupt. The company owed us about 30 million HUF [92 341 €], which took a huge effort and about 8 months of hard work to get that money back. So, we are afraid, and agreed to give them only about a third of our stock and sell the rest on the free market"
> Conventional Farmer Oliver

These issues motivated farmers to work in coalitions to be empowered, to negotiate or resist certain prices, to ensure that farmers with a smaller stock could also sell their animals, and to be able to pursue mutual cooperation and beneficial arrangements in the sector (see 6.1.). However, due to historical reasons (see 5.1.3.) many farmers claimed that cooperation was still not possible in Hungary or not practised to the extent that would be desirable. Nonetheless, some farmers highlighted examples from which they were able to learn from:

> "There is an important feature here in Hungary…the majority of farmers are independent…especially pig farmers: 95% are totally independent from slaughter and meat companies. In the Netherlands or Denmark for example, there has been a change. In 10-20-30 years farmers have achieved to collectively own their slaughterhouses. In the Netherlands there are approximately 30 million pigs, in Hungary 3 million. They have 2 slaughterhouses, one of which is owned by the farmers. It slaughters 90% of all pigs…So they just run the pigs through the slaughterhouse knowing that they still own them…Denmark is a little different…But here it is not so. The interests of farmers and slaughterhouses are totally different…and there are more steps [in the food chain], so the slaughterhouse will always opt to buy pigs as cheap and in as crude form as possible"
> Conventional Farmer Mark

Due to the above outlined problems, many farmers claimed that pig farming could not continue to operate without major governmental support. Some believed that the government had an important role in empowering the industry, keeping Hungarian producers on the market and protecting them from undue pressures. Hence these farmers claimed that the future of pig farming was in the hands of decision makers (see 4.4.1.).

4.2.3. The uniqueness of livestock farming

After reflecting on above outlined problems, farmers often confessed that the rational thing to do, would be to temporarily cease production, balance out demand and supply, and normalize prices. Yet, they highlighted that in the case of livestock farming, this was a hypothetical solution only, unattainable in practice.

The majority of conventional and alternative farmers found that the industry was unable to react fast enough to changes in trends or shifts in the market. Farmers highlighted that while days could change everything for finished pigs, and turn an efficient fattening process into an unprofitable venture (due to losses realized by keeping pigs longer), in terms of production, they could only plan for several months ahead:

> "All we can do is to produce more efficiently…We do not know how much we will be able to sell our pigs for and whether there will be a market. If I fertilize a sow today, it will take approximately 10 months from now until I can sell the fattened pig"
> Conventional Farmer Alex

> "Even if I decide to stop pig farming, I will still have to operate at least for another 6 months as if nothing happened…I cannot slaughter a pregnant sow…And in this amount of time, the market may even take a turn"
> Conventional Farmer Richard

Farmers therefore found that a significant time lag prevented the livestock industry to make any adjustments, which was especially true for enterprises farming larger animals with longer gestation and growth periods. Farmers therefore claimed that they were unable to react to the market in a rational way:

> "Any other industry, cars, electricity, or a million other things can be adjusted. Take shoes for example. We make as many shoes, as can be sold to consumers. We don't immediately make double the amount. But due to the nature of animal agriculture, this is not as simple. Take milk production. Cows will continue to lactate even if we do not need it anymore, even if it goes to the store. To stop it there is only one solution: slaughter the cow if you want to end milking. But if you slaughter the cow, it will not come back. Because you can always switch back the production line of shoes or cars, but you cannot switch an animal back on"
> Conventional Farmer Harry

> "You cannot treat [farming] by creating models. This is not like a match factory; I have a whole lot more duties than just thinking about where I purchase my inputs from and how can I minimize production costs and maximize profit. Because one year I will have 200 millimetres of rainfall and the other year I will have 700 millimetres. As the old saying goes; what God took away from the banks, He gave back on the edges, and next year what He gives on the edges, He will take away from the banks…This is why the old farmers knew that they had to adjust all their plans to the environment"
> Alternative Farmer Walter

Hence, constraints preventing farmers from making rational decisions were understood to arise from ecological and/or biological challenges, and farmers found that neither the market,

nor legislation adequately reflected on these difficulties. Farmers claimed that it was essential to account for constraints induced by working with "living matter", which was in many respects incomparable to inanimate materials used by other industries. Farmers found that initially, the industry (and the market) was able to function in a way that was advantageous for farmers. Before major changes (see 5.1.), production was structured to ensure some level of resilience to farming communities, especially to endure ecological challenges and also to reward them for the amount of work they invested in a certain product. This meant that prices were adjusted to the "harvest". If there was a bad year and harvests were low, the price of a certain commodity went up; if there was a generous harvest, prices went down. In addition, plant production, which required conventional labour for certain limited periods of time, yielded a smaller income than livestock farming which required continuous labour:

> "As the old saying goes…the wise farmer will sell his produce 'wrapped' in skin"
> Expert Thomas

Farmers claimed that in the past the more a farmer worked to produce a certain product and the less there was of the product in question, the higher price it fetched on the market. However, participants found that this logic was "artificially" eliminated (see 5.1.3.). The majority of farmers claimed that currently arable farming was more profitable than livestock farming, and it was more likely that farmers were able to realize an acceptable income (see 6.2.1.) from selling plants (e.g. crops, fruit) than animals. Others claimed that instability was continuous in both sectors and therefore only a mixed strategy of farming plants and animals was most viable (see 6.3.). Alternative farmers in particular highlighted that that a diverse production strategy was necessary to ensure the resilience of farmers:

> "From the start I built a system that was not depended upon 'one leg'. There came a crisis on the pig market in 2006 and 2007, which would have eliminated us. After that, there was a severe drought. If I only

> had grain, we would have gone bankrupt that year…because you simply cannot get by a year if you have no income…so we tried to balance things out. When we had 20 sows, we were able to possess 30 hectares of land…and every 'leg' had to be of the same scale and grow evenly…so I must emphasize that balance and diversity are crucial…this is how it all came together for us…ensuring some stability and continuation"
> Alternative Farmer Frank

Farmers therefore claimed that farming was an industry, which required a differentiated approach, possibly even different regulatory principles than other industries using inanimate inputs. In addition, they claimed that – in terms of business approach – the livestock industry was at its best, providing the farmer with some freedom and opportunities for development, when there was a market following local/regional environmental conditions, honouring "additional" investments, ensuring a balance and a certain level of stability, through a diverse farming system and strategy.

4.3. Societal issues

4.3.1. Human-animal interactions

The majority of participants emphasized the importance of human interactions with animals, highlighting many beneficial consequences, including positive psychological and physiological reactions, but most importantly a sense of "connectedness" with the natural environment:

> "Animals provide us with the last connection to the natural environment…which we all need. This manifests in different types of interaction in rural and urban settings, but the outcome is always the same"
> Expert Jack

Connection was thus framed as if it was able to provide humans with a sense of "belonging", a sense of "harmony" and "tranquillity". Many participants also emphasized that animals were fit for this role, because unlike humans they operated without "selfish" interests:

> "Animals are companions…and natural beings who are able to connect with us and love us without interests. In my opinion this deserves respect"
> Expert Jack

> "Because animals operate without selfish interest, it is good to be around them, it is good to look after them"
> Expert Kate

But while a connection and continuous interaction was perceived to be greatly beneficial for humanity, many participants honestly proclaimed that it was not always favourable for animals (or the natural environment), and participants found that humans were prone to causing harm:

> "With this coffee and this slice of cake I have caused a significant amount of animal suffering that I and most of the people around me did not want to cause"
> Expert Naomi

Hence, participants found that many significant harmful interactions with animals were a result of "unintended harm", and that it was important to separate intentional from unintentional harmful interactions, especially to tailor possible solutions for effective change (see 2.2). Intentional harm was found to be very disturbing to experts and farmers alike, who claimed that inflicting significant physical and mental damage on animals was "cruel" and "abnormal":

> "Anyone abusing defenceless animals, is – in my opinion – an unhealthy individual"
> Expert Kate

Hence, experts, conventional and alternative farmers found that while a decreased amount of empathy was possible in situations where there were many animals to attend (see 5.1.3.), a complete lack of empathy, extreme forms of physical and psychological "dominion", extending to single or repeated instances of torture were understood as abnormal human

behaviours. Farmers claimed that they did not engage in any such activities; indeed, many expressed their serious concern:

> "I had a beautiful bull, which I could not keep anymore …So, I sold it to a slaughterhouse. But on arrival, when they unloaded the animal, its leg got caught…and it fell over and struggled to stand up…slaughterhouse workers were alerted, but they could not get the animal back on its feet, so they started to beat my bull…and I told them 'What on Earth are you doing? You can't stand up a bull like that', but they told me to mind my own business. The deal was done, I had my money and they asked me to leave… So I did, but I cried"
> Alternative Farmer Kevin, post-interview notes

Hence, both conventional and alternative farmers claimed to respect the "dignity" of their animals (see 5.1.1.). Even though farmers kept livestock and made a living from them; they expressed that their own lives and own welfare depended on their livestock. So, farmers perceived their interests to be mutual.

4.3.2. The value of animals

Both experts and farmers found that the societal evaluation of animals was inconsistent: depending on the quality, the level of interaction between humans and animals, the look, the age, the behaviour, and the use of an animal, its perceived value could easily change. This discrepancy highlighted by some experts, conventional and alternative farmers was found to be problematic:

> "The way people relate to animals has changed with time. Children who grew up in villages were socialized with livestock. They saw their behaviour, how they interacted with humans…and understood their worth…But this was never possible in urban surroundings"
> Alternative Farmer Walter

But while participants claimed that the "valuation" process of animals depended on a number of criteria, they had a different understanding about the outcome of the evaluation process. Experts thought that the high number of livestock, their inaccessibility, and inconspicuous

nature also caused a significant societal de-valuation of them. Conventional and alternative farmers agreed that livestock were generally not interesting for the non-producing public. ,.At the same time some claimed that in the eyes of society it was not livestock that lost its value, but more that the value of rural life, agriculture and raw materials changed:

> "Animals have not lost their value…but the lives of humans has changed…changing attitudes towards animals…The new global order removed profitability from the producers of raw materials. Why is this important? People in the sector quickly realized that while 5 years ago they could make a living [from farming], they were unable to do so anymore…No profit meant that there was pressure to merge…Drastic subsidizing became necessary…And it boiled down to this:…living in the country and working in agriculture basically means I either watch a film or clean peas. If I clean peas I have to struggle, but my reward will be the joy of achievement…and I will be happy to eat the pea stew knowing that I gave my own merit into the job. But if you ask people, which they prefer doing, everyone will want to watch the movie…Someone else can do the cleaning. It has always been done anyway, so why should I bother. This is how [agricultural] systems have lost their value"
> Alternative Farmer Walter

Hence, farmers agreed that in rural areas livestock were not valued less than before, but societal change led to the erosion of the value attached to agricultural labour and agricultural raw materials. Indeed, participants, and especially farmers, found this change to devastate rural communities, further increasing the speed, the scale and the intensity of production, decreasing the need for a high number of skilled labourers and the chance to realize an acceptable income from agriculture:

> "I recently went to a larger farm and found one of my students there. He was working for 10 days…as a farrowing assistant, which – apart from the pay of inseminators - is the best. It really is the most honoured job in the sector. And he did not even have to work for 12 hours. There was no need for night shifts due to breed synchronization …Still he was not satisfied. He did not like the pay…the work conditions…and the obligation"
> Conventional Farmer Bruce

Farmers consistently found it a major challenge to hire knowledgeable, skilled, reliable and motivated people to work in agriculture. They perceived these trends to be further strengthened by both urban and rural communities greatly appreciating certain goods over food:

> "I firmly believed in an all extensive system, but there are serious problems in people's heads…If I keep my mangalica extensively…I will not be able to sell it economically. Everyone wants 1000 HUF [3 €/per kg] kolbász [salami-type meat] and extensive pigs…which in reality costs 10 000 HUF [30 €]…but they want a 40 million HUF [12 300 €] Land Rover…and 50-100 000 HUF [153-307 €] shoes, because they look good. But they'll only pay 1 000 HUF [3 €] on food…So in large-scale retailers all you can see on the shelves is garbage, not food"
> Alternative Farmer Kevin

Farmers claimed that the appreciation of certain "valueless" goods over the most important commodity, food, was due to harmful societal processes, which had detrimental effects on agriculture:

> "These 3 drinks we are having right now cost about 3 000 HUF [9 €], right? Now let us see this in context. A month ago a kg of live pig cost 300 HUF [0.92 €]. If you worked very well, you could make 5 HUF [0.01 €] income on ever kg, this means that 500 kg's of live mass has to be produced by a farmer to be able to have 3 lemonades in this place. The half-ton production could be achieved in a conventional system by using approximately 1.5 tons of feed…Today the national average of wheat production is around 5 tons/Ha, so all in all, 2 000 m² of farmland has to be harvested by a farmer, and work for half a year with 6 pigs to be able to have our drinks…This is the current state of the World"
> Alternative Farmer Walter

Therefore, farmers claimed that in order to stop harmful processes, there was a need for major societal reform, the proper valuation of essential needs such as food, and the better appreciation of farming and of livestock.

4.3.3. Animal advocacy

With an important societal dispute over the value of farm animals and agriculture, animal advocacy has also taken a stand. Here it is interesting to know how farmers have perceived the contributions of advocates to the cause of animal welfare. While some experts applauded the achievements of animal advocacy by providing a forum, an impetus and notable change for farm animal welfare, many of them were still highly critical of the actual effect of their achievements:

> "People are either greatly concerned for animals and disregard human welfare, or they are concerned with humans but are not interested in the welfare of animals…What an insensible society we live in!…I really think we have to come to terms with the wrongdoings we have done"
> Expert Thomas

This critical view and the sometimes disillusioned or even desperate remarks of experts were often noted in discussions. In addition Hungarian non-governmental organizations were predominantly working on pet welfare issues. Experts claimed that this was a significant problem, as the majority of the organizations properly trained or motivated staff to work on livestock. This problem was also noticed by farmers. While acknowledging certain achievements of animal advocacy (especially in mitigating harm during natural disasters and rescuing livestock from financially or otherwise instable farmers), the overall majority of farmers were very critical of advocates, raising two issues in particular: the objectives of welfare groups and the work ethic of advocates.

In terms of the objectives of animal advocates, farmers claimed that there were a number of distinct advocacy approaches. The following quote is from an expert, but clearly summarizes this point:

> "The first type of animal advocate is rational…Ready to think on how to adjust technological parameters and base their arguments on science...Prioritizing the mutual benefit of the farmer and the animal…The second group approaches parameters in a very subjective manner…Usually these organizations represent their own viewpoints, which is not always backed up with scientific evidence…The third, most dangerous type strives for animal rights and equality, and their aim is to eliminate livestock farming…They belong to the vegan and vegetarian movements…It is impossible to consult them, they do not present any evidence to their arguments…They are emotional and cause a lot of damage"
> Expert Matthew

Farmers recognized these three types of animal advocates, but argued that the overwhelming majority were extreme, and belonged to the second and third groups. Farmers were only able to connect or confine in the imagined "rational" animal welfare expert. So, while both conventional and alternative farmers argued that they would be ready to work with proactive and professional organizations, they also claimed – that in the meantime – they needed to be defensive to prevent any additional harm or pressure being inflicted on them by radical advocacy groups.

Farmers hoped to work with experts, who were ready to understand the economic consequences of obligatory and/or voluntary animal welfare measures, and work with them on high ethical standards:

> "Advocates are not there [on the farm, on a day to day basis]. If they hear something, they say 'oh, let's run, record it, and send it to the media'…I am not saying that there aren't any awful places that need to be revealed, but the truth is…that context is very important…It has to be examined in detail before someone may be [justifiably] attacked…Certain things are highlighted by advocates and they become generalized…This is unacceptable…and is an exaggerated approach"
> Alternative Farmer Edith

> "You must remember…None of us by nature wants to belong to the group of 'bad guys', or those who are in any way disagreeable"
> Conventional Farmer Harry

Hence, farmers understood the need to work in partnership with professional animal welfare experts to address issues of concern as long as joint efforts would not, in any way, endanger the continuation of their farming operation. They hoped that instead of imposing further legislative bans, advocates would help them find ethical and feasible alternatives, allowing the industry a reasonable timeframe to adapt these solutions. Many of the farmers believed that the task required creativity and original ideas, but most importantly good working relations:

> "Due to the harshness of the market…farming is a sector…in which you depend on good human relations…cooperation…and reciprocity. It takes a very long time to build such a network, and these networks are very fragile. But if you are genuine and trustworthy, your network will support you, and you will have help, when you need it"
> Alternative Farmer Frank, post-interview notes

This hope of farmers coincided with the aspirations of some experts (advocates), who realized that radical advocacy approaches disconnected them from their subjects:

> "My personal life has taught me that…if I adopt Singer's principles, I am able to ease my own conscience, but I will not be able to achieve much change for animals…Groups who engage in conversation with producers…Who break away from an elitist position…and open their eyes to see the complexity of the problem…will – like Temple Grandin – provide significant pragmatic solutions to animal welfare problems in the livestock industry…So now I believe that the solution is not to retreat from animals and nature, but to engage in closer interaction with them…We must keep this vital connection"
> Expert Naomi

Hence, in order to support the cause of farm animal welfare, participants identified the need for producers and advocates to engage in long-term collaborations, materializing through a departure from extremist and elitist views, ensuring good human relations, continuous interactions with animals, and the development of pragmatic, context specific solutions. The above strategy was understood to successfully address farm animal welfare issues.

4.4. Political and legislative issues

4.4.1. Political priorities

Agricultural production was conceptualized as a highly political and politicized issue of strategic importance. The need to sustain farming was believed to originate from complex socio-economic reasons, and was identified as the number one political priority of all nations. However, other international and national issues were also noted, which defined how livestock welfare was addressed.

Participants perceived that animal welfare was an issue of great concern in the European Union, one which could not be disregarded. In the case of livestock this meant that the EU possessed an important role - highly regarded by participants - in commencing a culture of political dialogue on animal welfare, and initiating "protective" legal measures to ensure higher standards. And while participants acknowledged many aspects of the EU approach, they were critical of others. First, many identified a significant tension between important, yet conflicting political mandates:

> "If we keep our livestock in [welfare] friendly farming systems…We benefit ourselves, our animals and the environment. But the only thing we do not advance is our economies…This is where compromise originates from…And this is where we need to be careful, so that money will not be the only initiator of our actions"
> Expert Samuel

Indeed, the tension between a need to ensure economic growth and prosperity and at the same time safeguard a high level of welfare was found problematic not only on the EU level, but also for individual Member States. To find a balance between different, often conflicting interests, experts and farmers found that agriculture (with the exception of food safety and food sovereignty issues) was an issue where economic concerns were often primary to all other interests:

> "Large corporations rule…Free trade…and politics define our everyday existence…These interests determine whether I can make any money on my pigs or not"
> Alternative Farmer James

Hence, participants found that current economic structures defined political agendas, and were even capable to induce compromised arrangements. Compromise for farm animal welfare meant that while aiming to ensure high welfare through higher production standards (see 6.1.), the present political approach was able to provide a socio-political and legislative basis for defining only minimum production and welfare standards (see 6.2.). Participants believed that in some cases improvements or adjustments were delivered, but on the whole, the sector did not transition to what farmers perceived as an ideal scenario (see 6.1.). In other words while the EU was seen to slow down or even buffer some negative effects of World production trends, it did not have the ability to induce major reforms:

> "It's like striving to remain 'clean', but at the same time wanting to become 'dirty'…You cannot have both"
> Conventional Farmer Richard

In addition to the above presented conflict and a need to balance different interests, participants found that additional national political priorities were to increase the production and consumption of pig meat, decrease the share of the black market, modernize and technologically upgrade farms, increase food safety issues, address further threats induced by the lack of EU funding from 2020 and a possible free trade agreement with the US. In theory farmers genuinely agreed with the above listed priorities, but in practice they found that the ways in which these problems were addressed were problematic and difficult to achieve (see 2.2.3.). In addition, they noted that political ideology often surpassed these goals or prevented their delivery. Political ideology was therefore found to be an important obstructing force:

> "An ex-agriculture minister asked me once…'Where did we get [the agricultural reform] wrong?' I told him the problem was that we abandoned our eastern market…purely on the basis of political ideology"
> Conventional Farmer Geroge

> "Our current over-production crisis is once again due to political reasons. 30% of the gross output of EU produced [pigs] was originally exported, and approximately 20% went to Russia. Now with this embargo [caused by the political conflict over Ukraine between the EU and Russia]…is destroying the industry…Causing significant problems even in the internal market"
> Conventional Farmer Oliver

Hence, farmers found that an emphasis on political ideology over common sense decision-making was causing damage to the industry. Yet, most farmers were grateful for any political efforts to mitigate undue pressures on farmers and on farming. Participants highlighted that under the framework of the Common Agricultural Policy – seen as a cohesive system – livestock farming was supported in the form of development grants, direct, and indirect payments. Out of all funding possibilities, animal welfare payments for the pig industry were set under the National Pig Strategy, with the aim to honour producers who have achieved higher welfare standards than the EU defined minimum standards. While the system was still quite new (first payments were made in 2015 and 16), it was evident that all three groups of participants perceived these subsidies differently. Many experts were highly critical:

> "In my opinion it is absurd…that farmers should be paid for properly watering, feeding or moving their animals…It is like giving a mother money to prevent her from killing or depriving her children…And this is what we call animal welfare payments"
> Expert Thomas

Conventional farmers on the other hand expressed the importance of animal welfare payments initially by stating that payments were a method to compensate them for animal welfare related investments:

> "As I said animal welfare payments are granted when farmers voluntarily exceed basic legislative requirements. This costs money for the farmer. If I give more space for my fattening stock, I spend at least 100 HUF [0.31 €] more on each pig. If I was only given 100 HUF's per pig…I may not do it…But if I get 120-130 HUF [0.37-0.4 €]…then everyone benefits. The state supports the farmer, the farmer has a bit of extra money, and the…animals are better cared for"
> Conventional Farmer Peter

However, it soon became evident that in harsh market conditions (see 4.2.) animal welfare payments did not necessarily support the cause of raising standards on conventional farms, but served another purpose:

> "If I told you the truth…Then I would have to tell you that sow welfare payments…were designed knowing that on conventional farms all of the conditions are already there…Because you cannot directly support pig farming in the EU"
> Alternative Farmer Frank

> "In the current harsh market conditions, it is possible to break-even with the sow welfare payments…That's all"
> Conventional Farmer Richard

Finally, alternative farmers perceived other problems with the animal welfare payments:

> "When we submitted our application for animal welfare payments…the bureau did not know what to do with it. We had to report the size of the barn, the sow barn, the size of sow enclosures. When we told them there were no square meters to report, because our animals were free, they said that we cannot get the money…Even though our livestock have much higher standards…So I don't think payments should keep the industry going, but rather the proper payment for products"
> Alternative Farmer James

Hence, participants claimed that it was a clear political priority in the European Union and in Hungary to stabilize pig farming and support those who aim to raise industrial standards. At the same time farmers found that without creating stability and predictability on the market (see 4.2.), and without a clear system differentiating between farms, and supporting those who

truly advance welfare conditions, even if animal welfare was a political priority, the practical outcome was of questionable value to the cause.

4.4.2. Legislating welfare

The majority of participants - experts, conventional and alternative farmers - believed that legislation was an important, beneficial tool to define industrial standards and ethical norms. Legislation was perceived to outline the duties and responsibilities of producers and a method for authorities to assess whether these obligations were met (see 2.2.3.), creating an important incentive to observe standards. However, when participants were asked whether EU and national animal welfare standards actually ensured the proper treatment of animals, the majority claimed that they did not. Quite often, the problem was presented as an implementation challenge; farmers however, identified difficulties to ensure livestock welfare via a purely legislative approach.

Experts claimed that legislation was a good tool, which was based on science, and was most importantly delivering a "reasonable balance" between conflicting interests (see 2.2.3. & 4.4.1.). On the other hand farmers highlighted that welfare legislation defining standardized environmental conditions and prescribed levels of care, was a "one size fits all" approach that was unable to fully achieve welfare goals. Both groups of participants agreed that the system had its weaknesses. First of all, several participants highlighted that minimum standards did not necessarily improve animal welfare:

> "Standards are evolving. But if I increase the space allowance of a chicken from 350 m^2 to 550 m^2, is it really better off? There is always a lot of debate on the actual welfare contribution of legislation"
> Expert Jack

An increase in industrial standards has always been perceived as an important achievement for farm animals; however the actual welfare contribution was often questioned, even by farmers. Indeed, several participants emphasized that minimum standards addressed some aspects in which animals were kept, yet instead of ensuring an increase from the bare minimum of conditions, in practice, minimum standards were only fit to prevent them from going below the bare minimum. And while this achievement was appreciated by participants, especially when discussed in the context of global standards, the moment livestock welfare conditions were compared to what they "ought to be", legislation was immediately presented differently: in its current form as an imperfect and inconsistent tool, a "blunt instrument".

> "Initially, when we joined the EU it was difficult for some of us to meet the legislative requirements, but since we managed to upgrade our farms, animal welfare standards are not a challenge anymore…In fact sometimes, for our own business interests we have to exceed them"
> Conventional Farmer Philip, post-interview notes

The point that even conventional farmers found welfare legislation to be of no particular challenge suggests that the current approach did not ensure a reform process to its full potential, but facilitated a certain level of technological upgrading. However, farmers claimed that in doing so it was selective in its focus; addressing particular issues of concern, while ignoring others:

> "Tell me why is the castration of piglets or sow stalls the most important welfare issues, while there is no legislation to address the problem of group mixing? It is left entirely to farmers when and how often they group their livestock, and if done badly; it can cause an incredible amount of suffering, serious injuries and even death. But no one seems to care about that"
> Conventional Farmer George, post-interview notes

Indeed, many farmers claimed that some legislative requirements were excessive or even unrealistic. While the majority of farmers agreed that regulation to set minimum standards

was necessary, they opposed over-regulation, self-regulation and legislative bans. They claimed that all of these tools were counter-effective for the animal welfare cause: over-regulation and legislative bans, because they displaced production to areas where standards were lower, and self-regulation, because it gave too much room for the industry to adjust production standards to the market:

> "3-4 years ago fur farming was banned in The Netherlands…and farmers…objected, but eventually said that it was not a problem, because the market was still there. Someone will do it, and will go to Norway or Russia…But not like before when they had very high animal welfare regulations to abide…No, it will be three times worse. The indication came from the welfare organisations, and politics gave in…So if you look at it from the perspective of a European farmer, can we say that the ban won the case? Yes, there are fewer animals kept in Europe, but the industry has been moved to places where welfare conditions are much worse. Can we really call that a victory? I do not think so. We are flexible, and believe in a golden middle, accepting that nobody has a perfect life, but it was better here than it is there"
> Conventional Farmer Harry

> "Instead of imposing legislative bans [on the livestock industry]… displacing production, it would be much better to develop acceptable alternatives"
> Expert Matthew

Many farmers agreed with this position and claimed that radical legislative approaches were unable to forward the animal welfare agenda. They claimed that it displaced production, leaving farmers unable to comply with standards and animals had to live in lower welfare conditions. Participants therefore highlighted the need to achieve a social consensus on production standards and the development of realistic legislative standards beneficial to all parties concerned.

This issue was also relevant when farmers spoke about the current inability of legislative standards to capture specific and often subjective elements of welfare. Farmers in particular emphasized that livestock welfare was not a static state, hence, the legislative method of

"assessing" the presence (or absence) of all aspects of welfare via a standardized list of concrete physical attributes, was - in their understanding - only a theoretical possibility. Not only did it make the assessment of legislative implementation a subjective exercise, it also meant that uniform standards were impossible to fully transpose on significantly different farms (see 6.3.). Indeed, farmers highlighted that the physical (building design, technology applied), climatic (weather and micro-climatic differences) and human-related (the personality and management style of farmer and staff) differences between farms were very important determinants of animal welfare conditions, and these differences were not addressed properly by the current legislative approach:

> "Standardized legislation only provides a framework. It almost works like a point of reference for what needs to be done…But without acknowledging the differences between farms, and working on the emerging welfare issues, it does not take us very far. So, approaching animal welfare by giving a list of physical and some vague management related rules – in my opinion – will not ensure that livestock will be properly cared for"
> Conventional Farmer Philip, post-interview notes

Hence, participants found that animal welfare legislation possessed an important role as an indicator for some aspects of animal welfare, which was most useful during the assessments of on-farm standards and as a benchmark for evaluating development grants or other forms of agricultural subsidies. To ensure farm animal welfare, farmers claimed that there was a need to ensure that well educated and well-meaning producers engaged in farming. In addition, the assistance of farmers was also found necessary. Many farmers believed that the help of welfare experts was essential to identify problems they could not see or perceived differently, and find ways to solve them.

4.4.3. Implementing welfare legislation

It is interesting to note that much of the scientific literature, policy documents and advocacy reports emphasise that farm animal welfare can only be ensured if existing policies are fully implemented. Many experts agreed that efforts were in the right direction and even if progress was slow, they were positive that present legislative standards (see 2.2.3.) would eventually lead to a transition in farming standards and provide animals with the necessary level of welfare. They highlighted the continued need for educating the public, increasing the capacity of responsible authorities, and while this report will not question the authority these claims, it has been found vital to assess further problems associated with the implementation of animal welfare legislation.

EU animal welfare legislation is intended to standardize animal welfare conditions across the territory. To achieve this, implementation procedures, inspection and sanctioning should also be of uniform consideration, yet those conventional and alternative farmers who have been able to visit farms in other EU Member States reported that the emphasis on animal welfare legislation, inspection and enforcement varied across borders and cultures:

> "A couple of years ago…we visited a 600 sow farm in Italy. Now, Italy is also a member of the EU, so the Italian farmers need to observe the same legislation as we do…and by law, 30 days after insemination, sows should be kept in group housing. On this 600 sow farm…none of the sows were kept in group housing…I also found that only few places fully observe space requirements…I went to a pedigree farm in Sweden where the animals could barely lie down. In another farm, I could hardly close the door because of the accumulated rat faeces…I saw a number of farms where the manure storage did not meet any legislative criteria…So, many animal welfare legislative standards are not observed in the World. We do the best we can to implement as much as possible, but I honestly declare, we are sometimes also unable to do so…For example, when we calculate with an 80% pregnancy rate and have 100%, what can we do?…We stock 25 piglets in enclosures fit for 20"
> Conventional Farmer George

Experts, conventional and alternative farmers also noted that the extent of legislative implementation varied within Hungary. As the above quote illustrates, some farmers argued that this was partially due to the challenge of working with livestock (see 4.2.3.), yet the majority of participants claimed that legislative implementation was greatly hindered due to an inability of authorities to objectively assess welfare conditions. Enforcement agencies were found to face capacity problems and problems on-farm assessments. A number of experts and conventional farmers claimed that indicators did not assess welfare, but were more focussed on the physical surroundings of livestock:

> "The system does not work, because it assesses only one aspect of welfare. By looking at a limited range of environmental and hygienic measurements, it is unable to indicate the real welfare state of an animal…To give an example…if I tell a homeless person, here is a bathroom it does not mean that s/he will use it. Similarly, if I tell an animal you have to feel good in so and so conditions, it does not mean that the animal will actually feel good. This is very relevant for both welfare legislation and methods of inspection; with only few exceptions, all we do is look whether there is a bathroom"
> Expert Michael

Hence, the legislative problem outlined in the previous section (see 4.4.2.) was also noted for legislative implementation: indicators were found to provide information on the environments where animals were kept irrespective of animal welfare conditions or quality indicators (see 4.1.3.). Moreover, assessment methods were also criticized. Ideally, indicators were hoped to provide objective results, but participants claimed that their examination was a highly subjective and often flawed exercise:

> "Air quality measurements are taken as a service…and whatever the smell, it is possible to measure to get the result you need. Alternatively, when interests are shared, it is possible to fill in the forms as if the measurements were in line with legislative standards"
> Expert James

Indeed, many participants were critical of auditors, especially companies working to accredit animal welfare related environmental conditions (needed to apply for animal welfare payments). In addition, some experts and farmers pointed out that the established system of official veterinary service was also facing challenges; inspectors were often the private veterinarians of the farms. Many participants claimed that implementation problems were probably the most significant failures of the established system. In fact, farmers claimed that it was in their business interest to have a more consistent approach to legislative implementation; if "bad" farmers were "punished", "good" farmers could "benefit" from less competition and a higher appreciation of their efforts:

> "I think that those people who do such things should go to prison and be banned for life from keeping animals…But even this almost never happens. This is a problem for animal welfare and a problem [for business], because we can see sometimes the scandals of meat processing plants, often illegal processors…And they are only punished with a modest fine of a couple of million HUF [3 000 €/million HUF]…This is a human welfare issue also, and the system does not work, because authorities are too forgiving"
> Conventional Farmer Henry

The majority of conventional and alternative farmers agreed with this opinion, but some still argued that authorities should not be as harsh. Nonetheless, the implementation of animal welfare legislation was presented by participants as a highly relevant and very challenging issue with consequences extending far beyond the scope of livestock welfare.

4.5. Discussion and conclusions

The present chapter aims to provide a general account of major external pressures on livestock farming by experts, conventional and alternative farmers, in particular to describe difficulties induced by larger forces of agriculture, the market, societal, political and legislative issues.

How do experts and farmers perceive external pressures on livestock farming? How can these affect livestock farming operations?

This chapter outlines the reflections of producers on external pressures impacting livestock farming that are perceived to:

1. Generate the need to apply increasingly intensified agricultural methods, to prioritize the production of quantity rather than quality products, and operate in systems that induce a number of externalities and harms to humanity, nature and animals;
2. Create a competitive advantage to traders over producers and thus induce multiple vulnerabilities to livestock farmers, especially those, who apply conventional farming methods and pursue the "mainstream" market;
3. Decrease the possibility for producers, especially conventional livestock farmers, to directly interact with their livestock, and disrupt the possibility for the public to collaborate with farmers in an open, stable, positive and mutually beneficial manner;
4. Initiate the application of political and legislative problem-solving methods that strive to balance out conflicting human-animal interests, thus induce compromised arrangements to all parties concerned.

The above outlined findings shed light on a more complex set of livestock welfare problems than generally conveyed in scientific literature. Earlier work emphasizes that in order to make substantial progress in the protection of livestock and ensure good lives for farm animals, perceptions of the problem brought about a need to a) legislate farm animal welfare conditions, b) compensate and/or "reward" farmers for investments leading to increased livestock welfare conditions, c) raise the awareness of consumers, and d) provide them with an opportunity to make informed choices ((Blockhuis *et al.* 2010; Camm & Bowles 2000; Caporale *et al.* 2005; Eurogroup for Animals 2016; European Commission 2016; Garner

2006; McLeold-Killmurray 2012; Miele n.d.; Miele *et al.* 2005). However, like Anderson (2011), Fraser (2005, 2008b) and Fraser & MacRae (2011), data presented in this chapter illustrates that there are a number of highly significant factors beyond the influence of farmers, which have marked effects on the livestock industry.

Findings highlight the need to approach the livestock welfare reform effort in a more complex and reflective manner. Consistent with the findings of Anderson (2011), in order to make substantial progress to the welfare of farmed livestock, the chapter presents the necessity to account for some of the important limitations of the current reform process. In particular, further reinforcing the findings of Blockhuis *et al.* (2010), Ibrahim (2006) and Fraser (2014), it highlights that in isolation, a predominantly legislative, "enforcement-based" approach, relying on minimum standards is unable to sufficiently transition the sector and provide good lives for animals. Similarly to Garner (2006), the present chapter find that political and legislative narratives will focus on livestock welfare and will aim to ensure "best possible" conditions to livestock by striving for the accountability of farmers and the law enforcement capacity of authorities. But, as Grandin (2010a), the Scientific Veterinary Committee (1997) and Webster (1994a) find, in an effort to strike a balance between broader human and narrowly interpreted animal interests, it will principally deliver only those aspects of livestock welfare, which directly overlap with human interests. But, like Webster (1994a) and Rose (2010), findings also illustrate that good lives for animals extend into realms that induce a human-animal conflict of interests.

These conflicts arise especially due to the current system of trade in agricultural products. As Anderson (2011), Falk & Szech (2013 a,b), Fraser (2008b), Hobbs et al. (2002), and McLeold-Killmurray (2012), this chapter also finds that mainstream markets, which are based

on neo-liberal free trade principles, predispose the construction of agricultural systems that ignore many important, unique features of the livestock farming industry and impose fierce competition in an area where an emphasis on transparency, morality and societal cooperation seem more advantageous. These findings suggest, similarly to Fraser (2005, 2008b) and Fraser & MacRae (2011), that the livestock welfare reform effort needs to consider major external pressures outside of the control of farmers, identifying those that significantly impact the industry and prevent the adoption of farming methods that ensure good lives for livestock. In this process, as Anderson (2011) & Gruen (2011) emphasize, it is necessary to adopt a more targeted, complex and strategic approach to initiate a transition in the current trade of agricultural goods, via integrated legislative and market-based problem-solving mechanisms.

Conclusions

In spite of all the efforts to safeguard the welfare of farm animals, a number of important context-specific problems are identified. Results suggest that major external pressures induce significant vulnerabilities to farmers and farming operations, which – due to the interconnected nature of human well-being and animal welfare - greatly hinder the livestock welfare reform effort. In order to make further progress, external pressures on farmers and livestock operations need to be identified and targeted in a complex, strategic and reflective manner.

Chapter 5. Internal norms of livestock farmers

In an effort to identify a possible moral imperative and ultimate goal for livestock welfare, the present chapter aims to explore the internal deliberations of livestock farmers. While the previous chapter has shed light on how conventional and alternative farmers viewed major external influences, imposing significant vulnerabilities, the current chapter will discuss in particular the personal convictions of livestock farmers on the norms of production and ethical duties towards animals.

Concerns have been widely expressed about the ethical problems of livestock farming, and while there is a remarkable amount of highly valuable philosophical work available, pragmatic ethics is an emerging field in animal welfare science. Some studies have already started to explore ethical principles, especially the perceptions of consumers and farmers. In the latter case different groups of farmers have been questioned regarding their ethical convictions on various aspects of livestock production, yet in an effort to identify ethical principles, there has been little discussion about how external pressures on farmers and farming influences their ethical beliefs. Hence, the present chapter is based on major themes derived from in-depth semi structured interview data with conventional and alternative farmers allowing for the possibility to outline and comparatively analyse findings.

During interviews, farmers spoke freely about ethical perceptions primarily through first hand experiences, but found it very challenging to clearly articulate their own ethical perspectives. This meant that during data analysis, it was necessary for the researcher to "heavily" interpret findings. In addition, by reflecting also on ethical limitations, many farmers claimed that the

current ethic of farming has departed from an ideal ethical scenario and their norms applied to an ethically compromised scenario.

With these challenges in mind, the present chapter will begin by outlining the personal convictions of farmers, departing by identifying norms on emotional attachment and intentional detachment, discussing different expressions of ownership and presenting how livestock ethics has departed from an ideal scenario. The following section will consider how farmers presented ethical duties towards animals, departing from studying the ethics of good livestock welfare, then reviewing essential welfare needs, and closing with methods to ensure livestock welfare. The chapter will be concluded with a short discussion of findings.

5.1. Personal convictions

5.1.1. Emotional attachment and intentional detachment

Conventional and alternative farmers clearly articulated that feelings such as "love", "respect" and "empathy" were fundamental reasons why the welfare of livestock had to be considered. Feelings allowed them to have "compassion" for their livestock; it guided them to avoid inflicting "unnecessary pain" and allowed them the ability to provide the "best possible care":

> "Animals are not kept by anyone who does not love them. If you love your animal, you will not cause unnecessary suffering. You will keep it according to its needs"
> Conventional Farmer Peter

Therefore participants in both groups unanimously claimed that they personally "engaged" with livestock emotionally and that this "connection" was the prime reason for considering the welfare of their livestock. Interestingly farmers did acknowledge that unintended harm may be caused due to limited knowledge or awareness. However, farmers believed that due to their inherent drive to "provide" livestock with their needs, such problems could be corrected.

That said, both conventional and alternative farmers clearly articulated that to continue farming, they had to "manage" the level of their emotional involvement and in certain well-defined situations make a semi-conscious decision to "disconnect". Farmers claimed that this did not prevent them from a determination to provide animals with their needs, but once the animals were sold for further fattening or for slaughter, or were in any other way "out of their hands", farmers were determined to "cope" and "move on":

> "When my first ever batch reached slaughter weight…and the truck left, I stood outside and I cried. I was thinking that every animal born here goes through my hands. I mark them, I castrate the non-breeding boars, I attend the ill animals …Obviously, I am not saying that I become attached to every single animal – we have far more than that – but I still know that they were born here and if I look at them and their numbers, I know which box they were born in…I know who their mothers are…So, my feelings had to be artificially managed and I realized that our pigs have to somehow provide us with an income, so we cannot…love and keep all of them, because if we do, then we will also starve"
> Alternative Farmer Nick

Another method of detachment was related to the amount of time spent with animals, especially individual pigs. Both conventional and alternative farmers claimed to spend most time with the breeding stock and neonate piglets, while least time was spent with pigs destined for further fattening. Although time spent with animals was also clearly associated to on-farm duties, the technology and to the scale of the enterprise, nonetheless it was noted that the more farmers had to interact with animals, the more individual personalities were identified, which often resulted in deep attachment often manifested in naming. Any animal that had a name was perceived differently and a closer bond was established; hence this level of attachment was consciously limited with methods of intentional detachment:

> "If I name an animal, it is not going anywhere…With a name I believe to secure the animals place...I have a personal connection…It has a life, it has a story…There is a sow here called Rambo…She was named by our vet when she was born with crooked legs. We did not kill her, I took her to the vet, and

> she was given a plaster and grew up beautifully. And so, she was named. We have given her so much time and energy that we will look after her as long as we can"
> Alternative Farmer Angela

Hence, intentional detachment was most obvious for animals destined for further fattening in both systems. The phenomenon of intentional detachment was clearly associated with scale; an increase in livestock numbers decreased the amount of personal attachment.

5.1.2. Expressions of ownership

Both groups of conventional and alternative farmers unanimously agreed that farming was essentially a "business" (a means to make money) and a "service" (by providing society with its "needs"), and that in this process, the primary role of livestock was a "means to a human end":

> "My personal way of thinking about ethics, which defines the way I work, is to provide my pigs with the best possible conditions, so that I can also have the best possible outcome. It is like a symbiosis: if I am in symbiosis with my pigs, then it is good for all of us. But if I am parasite that is not good for my pigs, and eventually will not be good for me either"
> Conventional Farmer Martin

Participants recognized that claims for business and human interest potentially contradicted statements made on emotional attachment; however both conventional and alternative farmers stated that they were in no way inconsistent. Farmers made both emotional and pragmatic arguments illustrating that farming was a very challenging "way of life", an occupation that required a strict, disciplined life, constant vigilance, dependence, flexibility, multitasking, and adaptive "survivor skills". Farmers claimed that the work was often extremely straining and that – if purely measured in monetary terms – the remuneration was not in balance to the physical and emotional "investment". So, why were they doing it?

While highlighting the outlined emotional attachment to animals, farmers also emphasized that they consciously choose, and were determined to continue farming as a lifestyle due to their own life histories and personal values. Both conventional and alternative farmers were connected to farming as a way of life and were interested in "nature", "land" and "animals". They genuinely disapproved of mainstream societal values (especially consumerism), and were disappointed by increasingly urban lifestyles; hence, they were determined to maintain – as far as possible – this connection and continue farming. While the above arguments were dominant, a minor group of farmers with exceptionally profitable, large-scale conventional livestock operations made fewer emotional claims, and emphasized business opportunities more:

> "We did not always measure [profitability]. But we were always profitable, so somehow we met our objectives. We made many more emotional decisions – which cannot be supported with numbers – then, and now that we are bigger I have a very professional finance manager. Now we have things to loose. 20 years of our lives is in it, obviously we do not want to go bankrupt tomorrow. So, emotional decisions are only a small part of our decision-making processes and numbers dictate. Everything can be calculated"
> Conventional Farmer Harry

Therefore a tendency to take emotional decisions was based on emotional attachment, which decreased as scale and the profitability of the enterprise substantially increased. It is important to note that these farmers worked in large-scale conventional systems in highly specialized roles and spent little time with animals. On-farm duties were attended by a hierarchy of staff (from managers to farm hands), hence with regards to livestock, their perspectives were mainly based on earlier direct experiences and current "indirect" indicators. At the same time, these farmers expressed a determination to assign "experts" on all managerial levels to ensure that their operations and business decisions in no way conflicted with other interests, including animal welfare goals:

> "For us, relatively large-scale livestock farmers, it is necessary to fight against prejudice, an assumption that animal welfare and environmental conditions are worse here than on a small-scale family farm…I can prove that it is indeed the opposite…I have high working-standards and requirements towards my manager. I am happy with him and he is with me, otherwise we could not work together. This system goes down in the pyramid…We have the official vet…specialized vets…experts…They come in 3 week to 6 month intervals…and work until we can solve a problem…and come to a consensus"
> Conventional Farmer Harry

This business approach was only possible with sufficient scale, and was therefore depending upon high numbers of livestock and very efficient technologies. But, while reasons for the differences between major and minor views on business were apparent, the majority of farmers purposefully limited the scale of their livestock enterprises. On-farm decision-making was found to be a complex issue (see Chapter 6), however a clear majority of farmers expressed a desire to personally supervise their livestock operations, to ensure that it was run up to their own professional and ethical standards:

> "We are now reaching a point when even a 400 sow farming operation is small...Hence, we are going back to where we departed from, when state farms and producers co-operatives had several thousand sows. I believe that whatever your technology if you have several thousand sows, you will never be able to supervise your operation as a 400 sow farm like this one"
> Conventional Farmer Martin

Therefore, even though farmers acknowledged that in terms of business potential large-scale operations were more successful and dominant, still most of them emphasized a different expression of "ownership", for which two overall strategies were identified: ownership that led farmers to limit the scale of their operations, and thus work, manage and supervise them directly, and another in which ownership led to a scale in which the farmer managed and supervised the duties of staff and external experts. Both groups firmly believed in the strategy they adopted, and reasoned that their personal role was crucial to secure the achievement of and a sufficient balance between business interests and ethical principles:

> "What is the most important in working with animals? It is attention. You have to take care and realize that…there are always exceptional or unique cases"
> Alternative Farmer Edith

For farmers ownership was therefore much more than an issue of legislative or financial status: ownership was both a rational choice in response to emerging business opportunities, and a personal, emotional determination in which internal norms were also taken into consideration.

5.1.3. Departing from the ideal

While the internal norms of livestock farmers were stable, farmers perceived multiple limitations to the ethic of farming and farm animal welfare. The first significant limitation was a departure from what they understood as the ideal ethical scenario, predominantly induced by external forces so great that they as individuals could not change or influence. But, what was this ideal welfare ethic mentioned?

Differences between "traditional" and present-day farming practices are well documented, and most accounts present a scenario where there was close interaction between farmer, farmland and livestock, and production was carried out on a comparatively small-scale and on low-intensity. While these views were often romanticized, findings of this study indicate that the marked shift in land ownership and farming practices, including the scale, intensity and technologies of production did have an overwhelming effect on peasantry and society at large (see Chapter 4). Interestingly, while conventional farmers acknowledged these changes, it was alternative farmers who conceptualized them most clearly. First, they claimed that the level of personal engagement was substantially "different": in a "traditional" farming culture, where norms were passed on from "father to son", children learned through example the

pragmatic ethics of interacting with animals. Quite often this meant that the needs of animals were prioritized:

> "Humanity…In those days farmers were brought up with that in mind. The peasant would get up in the morning and go out to feed the animals. There were [unwritten] rules, and farmers would stick to them. They would not eat until the animals were fed…A farmer learned from his father and others around…Children would take out the geese or the pigs to graze, and would learn…This is long gone"
> Alternative Farmer Kevin

Hence, an important feature of an ideal ethic was one in which the needs of animals were prioritized. This ethic did not limit interactions to a complete absence of harms (i.e. slaughter was permitted) nonetheless, welfare had to be secured. Interestingly the ideal ethic also defined societal interactions:

> "How much has the world changed? Yes, you can either use a HACCP [Food safety tool - Hazard Analysis and Critical Control Point] system with 287 stamps and 48 members of staff or you can do as those social groups who learned from experience, where honour and trustworthiness were the certificates and trademarks. If somebody was found to sell weevil infested beans for consumption or a scabby animal for slaughter…then they had a negative record and were immediately outcast from producer groups. Nobody went to purchase from them, because they said this person is a 'tramp'. This only works if you can name the person attending the animal…This type of reference has been completely degraded"
> Alternative Farmer Walter

While the issue of accountability was found to be interrelated with traditional lifestyles and production methods, one important feature of the ideal ethic was that it induced a clearly defined level of societal "pressure" on farmers. In order to make a living, producers had to intensively interact with both livestock and consumers, and be accountable for their actions. If they applied such an ideal societal norm, then they were "respected" by society and "rewarded" by consumers, if not, they were unable to continue to make a living from agriculture. So, the values of society in this system seemed highly important: alternative farmers claimed that in addition to respecting "good" producers, the traditional societal norm

also encompassed a high appreciation of food. Food was a commodity that was appreciated, and its worth was not limited to expensive products such as meat, but included all kinds of products:

> "When our old folks ate, they paid attention, until the last bite. They even collected the breadcrumbs like this. They did not throw it to waste; instead they used it, made something from it. I grew up with this mentality, everything was looked after, and there was no wastage"
> Conventional Farmer Philip

The traditional norm or ideal ethic was therefore perceived by farmers to be consistent, defining the quantity and quality of interactions between producers, land, livestock and consumers, upholding structure of mutual respect and common interest. With these issues in mind, it is important to identify reasons for change and the consequences of a departure from the perceived ideal ethical scenario.

Farmers found that relatively sudden, large-scale political, cultural and economic transitions trickled down and significantly affected societal norms and values to the individual. It is beyond the scope of this chapter to comprehensively review these issues of concern (see Chapter 2 & 4); however one of the key issues identified was an inconsistency between the norms of producers and consumers, which negatively influence or "disturb" the outlined traditional structure of mutual respect and common interest and induces significant pressures on farmers (see 2.2.). Apart from the hardship staying faithful to a traditional or ideal welfare ethic, another important challenge of staying "in business" was also identified:

> "We did not have a chance: there was reasonable stability before the [II. World] War, then came the communists and emptied our attics, took away everything from our grandfathers: our farms, lands, livestock and livelihoods…Our fathers had to work for next to nothing on their [former] properties and saw them disintegrate. Then in the 90's we, the grandchildren had a chance to go back, but we had to start everything all over again. It was not like in the West of Europe, where the grandfather, the father and the son all contributed their share

> and could 'reap the harvest' of their efforts. And while the World was changing, we had to do rebuild everything from its ruins…And now we have to compete on the market with those who could invest and develop over generations…No wonder we are struggling"
> Alternative Farmer Edmond, Post-interview discussion notes

Hence, in addition to large scale cultural changes, farmers also had to cope with other pressures induced by challenges of multiple transitions in ownership, which instead of an ideal steady and continuous possibility for investment and development ultimately led to profound instability and a "time lag" in technological progress and financial potential. This time lag is relevant in understanding the differences between farmers working in the East or West of the European Union, and is a post-communist heritage that even today has its mark.

Hence, a departure from an ideal scenario leading to the emergence of a "disturbed ethic" induced a significant limitation; farmers understood that they will not be able to revive a system that they "believed in", but realized the necessity to move on and – in order to continue with the preferred lifestyle of farming – adapt to change in both ethical and pragmatic terms. To further examine these issues the norms applied in this ethically compromised scenario will now be examined.

5.2. Ethical duties towards animals

5.2.1. The ethics of good livestock welfare

Clearly, both conventional and alternative farmers viewed animals as "production tools" although alternative farmers were more subtle in expressing this point:

> "A farmer does not keep an animal to protect it, rather to produce economic outcome with it, so in this sense an animal is an object, a production tool. Now I protect even my production tool, so that I will be able to produce well with it, so I will also protect my livestock. I don't know whether I need to protect it more. What could be the question is that apart from economic interest, could there be any other reason to consider?"

Conventional Farmer Peter

The end of the quote elaborates on the point raised. But while both group of farmers stated that animals were a means to an end, they differed in their understanding of what this meant. Their views diverged significantly on issues related to ethics of livestock welfare and how good welfare should be ensured. While the latter point will be addressed in more detail later, here it is important to find that conventional farmers highlighted the need to ensure that the ”genetic potential” of animals is fully expressed and in this process farmers were most concerned with optimizing production to ensure efficiency. Good welfare was seen as an integral part of this process, which was due to the strong underlying assumption that in the absence of good welfare an animal would be unable to produce:

> “I am an agricultural engineer, and as I have mentioned…It is in the interest of breeders, to provide the maximum comfort for animals, because if they failed to do so, the animals would not be able to produce. So, a sick animal will not produce. I think this is simple and clear. ”
> Conventional Farmer Norman

Hence, conventional farmers used production as an indicator of welfare. Essentially this meant that a level of mutual interest for the farmer and livestock was an important determinant for providing animals with good welfare conditions.

Alternative farmers also emphasized the need to enable livestock with the full expression of genetic potential; however, in this process farmers were most concerned with the outcome, namely the quality of the final product. Due to a clear underlying assumption that poor welfare negatively affected product attributes, alternative farmers emphasized that good livestock welfare were the only ways to achieve their objectives:

> “All I can tell you is that…to produce a good product, you must ensure that the animal feels well”
> Alternative Farmer Walter

In addition, alternative farmers also mentioned that good welfare was a mutual interest for both farmer and livestock. Views ranged from a common sense understanding of what "felt right" to a sense of "mutual enjoyment" of both the environment they shared and the time they spent together:

> "I believe that the animal feels good if I also feel good with it…If the animal and I both feel good…Then [the system] has to work"
> Alternative Farmer David

Hence, alternative farmers claimed that the reason to provide animals with good welfare conditions was driven by a mutual interest for high farmer well-being and livestock welfare manifested in the production of good quality products.

5.2.2. Essential welfare needs

After identifying the differences between the views of conventional and alternative farmers on the most basic principles regarding livestock welfare, it was interesting to find that their views broadly corresponded on essential welfare needs (Table 3).

	'Conventional farmers'	**Both groups**	**'Alternative farmers'**
Perceptions and emphasis on the needs of livestock	**Feed:** Optimal components, efficient conversion rates, applicability to housing technology	**Feed:** Calorie, nutrient, vitamin intake, palatability, portioning, low wastage, ease of availability, storage, handling	**Feed:** Naturalness, quality, freshness, variety
	Water: -	**Water:** *Ad lib* access, fresh, clean	**Water:** -
	Light: Natural light substitution, pre-defined time, intensity, and lighting patterns	**Light:** -	**Light:** Sunshine, natural patterns, *ad lib* access to effective shade or indoor housing
	Air: Optimal temperature, dust levels, humidity, the presence and/or concentration of noxious gases, air flow, active ventilation	**Air:** -	**Air:** Natural air circulation, temperatures and humidity, passive ventilation for indoor housing
	Space: -	**Space:** No over-crowding	**Space:** -

Table 6. Perceptions of conventional and alternative farmers on the fundamental needs of livestock

First of all, all farmers agreed that animals required good quality feed, however as in the case of product quality, feed quality was also a heavily disputed issue. Both groups of farmers mentioned the need to apply a systematic technology to feeding to ensure good livestock welfare and production objectives, and considerations included calorie, nutrient and vitamin intake (the latter supplemented especially in conventional systems), palatability and, depending on the phase of production, rationing. Nonetheless, conventional farmers were found to be highly concerned with other measurable attributes of feed and sought to find optimal components, efficient conversion rates and low wastage:

> "Our feed protocol includes a detailed list of the nutritional needs of animals for each production phase. Depending on the production phase, the animals have different requirements in terms of proteins or amino-acids…Feed is very expensive, so the aim is to have the highest conversion rates per 1 kg meat"
> Conventional Farmer Henry

> "Naturally, in a modern livestock farm, it is essential to have professional feed technology. By this I mean that the most price-efficient or cheapest raw material is used to feed animals…with pre-defined nutritional values"
> Conventional Farmer Philip

Alternative farmers on the other hand considered naturalness and quality more important:

> "I believe that the more naturally animals are kept, the better quality meat they produce. The land which I farm and where the animals graze is free from chemicals and fertilizers…If this kind of feed enters the food chain, then livestock will be healthy…and of course we all are what we eat. If I eat food that is full of additives and chemicals, practically I will also be full of it…This is not good for neither the animal nor the consumer"
> Alternative Farmer Nick

In addition, alternative farmers also highlighted the need to minimize wastage, but at the same time emphasized further issues of importance such as feed freshness and variety. Issues such as ease of availability, storage and handling were noted for both groups. Some conventional farmers with slatted floor operations or roman canal systems highlighted that housing and manure handling technology severely limited their choices. In an effort to prevent blockages,

they also needed to consider the shape and size of animal feed. This way roughage could not be provided, even though several farmers would have preferred to offer livestock fresh feed for increased health and welfare.

Second, all farmers agreed on providing livestock with *ad lib* access to clean water, and some even mentioned that the issue of good quality drinking water was a fundamental and often an underestimated animal welfare issue:

> "I find the question of water extremely underestimated in animal welfare. Inadequate provision of drinking water is one of the most significant causes of animal suffering, which is rarely investigated, and is not even considered as a major issue"
> Expert William

The technology for providing animals with water – as expected - was different between conventional and alternative systems and the quality could also be different. Farmers predominantly provided tap water to their livestock; however some farms possessed their own wells that were assessed regularly to ensure that the animals were given clean, contaminant-free water. But the systems clearly differed in terms of technologies used to water the animals:

> "The up-to-date drinking system will be installed to provide sufficient pressure and hygienic conditions for livestock"
> Conventional Farmer Philip

Third, all farmers agreed on the need to provide farm animals with adequate lighting. Appropriateness was measured by time (hours) and intensity (lux) in conventional systems, and as part of the breeding technology lighting patterns were also applied. Hence, conventional farmers agreed that lighting provided an acceptable substitute to natural light and livestock welfare was not compromised:

> "Every animal's reproductive cycle is regulated by the Sun. We know exactly how much Lux they need for fertilization and to keep the pregnancy. We can control that…we are able to model natural lighting patterns"
> Conventional Farmer Richard

On the other hand all alternative farmers firmly believed that sunshine was a fundamental need of livestock, irreplaceable with artificial light, due to natural patterns and animal health benefits (e.g. disinfection, vitamin secretion). Alternative farmers thus claimed that without providing animals with sunshine the welfare of their livestock would be significantly compromised:

> "The importance of sunshine deserves a detailed study…I do not agree with exposing animals to sunshine all the time, but they most certainly need daily access…to sunshine"
> Alternative Farmer Walter

In addition, all conventional farmers and the majority of alternative farmers agreed that exposure to sunshine imposed health and welfare risks also (e.g. sunburn, miscarriage), hence only well adapted strains of pigs (e.g. duroc pigs, mangalica, wild boar) could be exposed. In the case of white pigs, welfare could only be ensured if the animals were protected from excessive solar radiation. A minor group of alternative farmers however, who kept white pigs in semi-intensive systems unanimously agreed that keeping white pigs outdoors was possible, if (as any other livestock) they could effectively shelter from the sun if/when needed.

Fourth, all farmers claimed that good air quality was associated with good welfare. Conventional farmers were most concerned with temperature, dust levels, humidity, the presence and/or concentration of noxious gases and air flow, striving to set these at a pre-defined optimum for the season. In extraordinary scenarios (e.g. extremely hot summer) farmers identified the need to ensure that air quality was managed in a way to reach this optimum as far as possible. They also claimed that air quality was a very significant issue for

pig welfare, especially in terms of livestock health; the need to provide animals with good air quality was therefore a clear welfare priority:

> "In a modern building it is possible to provide animals with optimum temperature, which (depending on the season) means that in the summer the humidifiers are operating, while in the winter we provide additional heating. In the best buildings the incoming air is filtered, cooled in the summer through a water curtain, and the outgoing air is also cleaned"
> Conventional Farmer Philip

Alternative farmers on the other hand thought that – in terms of indoor housing - passive ventilation was appropriate to ensure adequate air quality and thus good welfare conditions. In terms of outdoor housing, farmers once again mentioned that animals had to be well adapted to the local climate. Even so, views and management techniques diverged somewhat. Either animals were kept outdoors, hence the moderation of "harsh" climatic conditions (e.g. wind shelters) was necessary, or animals were allowed to move between indoor and outdoor housing, allowing them to cool down in hot weather (wallow or move indoors) and warm up in cold weather or rain (kept or allowed the freedom to move indoors):

> "I cannot over emphasize the importance of fresh air; I always say you do not only feed an animal with foodstuff, but also with air. It is so important….it would be ideal to have every single animal spend at least 2 hours per day on pasture and fresh air"
> Alternative Farmer Walter

Hence, overall alternative farmers perceived natural air circulation, temperatures and humidity to be adequate for well-adapted or habituated animals. Finally, both conventional and alternative farmers thought that the provision of adequate space was crucial to achieve good welfare, and both agreed that high stocking density was problematic:

> "We need to provide adequate space"
> Conventional Farmer Peter

In relation to space additional welfare needs, such as natural behaviour were also mentioned. Conventional farmers debated the need to decrease social stress and increase environmental enrichment in the form of "toys":

> "We provide toys, a piece of wood and a chain, for animals on a slatted floor system. It is our interest otherwise we do have instances of cannibalism. It does not eliminate the problem, but it helps reduce it"
> Conventional Farmer Oliver

However, enrichment was found to be absent in a high number of conventional farms. On the other hand, alternative farmers were concerned with providing livestock with ample straw for indoor housing and a "natural" or "near-natural" enclosure in the case of outdoor runs:

> "Our animals are able to move around here. There is ample space and the outside runs provide them with the possibility even to wallow. Nothing like it really"
> Alternative Farmer Edith

Hence, space was identified by participants as an important aspect of livestock welfare. While the views of both conventional and alternative farmers generally corresponded to one-another, the differences between their perceptions illustrated a process by which the technology they adopted was rationalized. These differences become more substantial when on-farm conditions are presented (see Chapter 7).

5.2.3. Methods to ensure livestock welfare

Conventional and alternative farmers and some experts claimed that fully-extensive farming systems were rarely economically viable and delivered questionable animal welfare outcomes:

> "If you go on the Internet you will find ecological farms for goats, and I tell you that goat milk has become something like a religion. It is the symbol of health…But goats are undemanding; their guts are 25 times their body length, they can digest virtually anything…Farmers can use bad quality fodder, because it spends a lot of time in them. So, you can keep goats in a simple way…keep them for milk, and make cheese and curd. But goats are also small

> animals, and it is a fiddly job, which takes a lot of time…If there are many animals then certain duties will be prioritized. Milking is a priority, cleaning and hygiene is not a priority; you can leave that until tomorrow or the day after. So, you will end up with poor conditions…will have significant welfare problems and increased mortality. But you claim to produce an ecological and healthy product, because you say that there are no additives in it. Of course, apart from the dirt on your hands…Still people buy it…because when they hear what you are doing, it's like they are blinded, and forget that just because an animal is kept naturally, it still has to be healthy…So all of the problems stay, and they led to bad animal welfare outcomes and mass human health issues, which we have seen many times in Hungary"
> Expert William

Farmers mentioned a number of issues explaining how fully extensive systems "can go wrong" and presented the characteristics of farms that "did it right" (see Chapter 6). In these discussions the important link between production methods and markets clearly emerged, and farmers claimed that due to economic, legislative, climatic and social constraints, they were unable to consider adapting an ecological farming system in Hungary.

Second, a high number of participants assumed that essential welfare needs could be both naturally or artificially provided for:

> "Livestock need provisions…that may be naturally or artificially provided"
> Alternative Farmer James

Interestingly, while both groups of farmers claimed that in principle, there was no substantial difference between natural or artificial methods, and alternative farmers still clearly articulated that semi-intensive systems were much better for livestock than automated indoor systems.

Third, the majority of farmers argued that the strain of livestock pre-defined farming methods. There were only a few exceptions to this understanding: some alternative farmers who had first hand experiences of various technologies and strains of farm animals claimed that

animals were more flexible that usually perceived, and that in terms of welfare strains did not necessarily pre-define farming methods. However, there was an unquestionable belief in most farmers that due to selection and adaptation, white pigs could only be kept in conventional, highly controlled environments:

> "Wild boars are wild boars, because they have lived in the wild for, who knows, millions of years. They have developed an immunity that knocks down all illnesses. But not an over-selected white pig, which has been bred to produce as much meat as possible on a square meter of space either directly or through its offspring. These are two entirely different things"
> Conventional Farmer Henry

Interestingly, at the same time mangalica farmers also perceived their animals to be "sensitive". When farmers were asked to compare the two strains, they claimed that while white pigs were "over-sensitive" and mangalica were generally pictured as "undemanding", in reality they were in need of "special" level of care and attention:

> "Mangalica is the most sensitive pig breed. I used to keep white pigs…but I realized I could not do it. I …believed that white pig sows were the most difficult to keep. And then I met the mangalica. A white sow is…[much easier] in comparison to a mangalica. You don't need much knowledge for that, everything goes by itself. Mangalica are much more difficult, more challenging"
> Alternative Farmer Ryan

Finally, farmers also acknowledged that whatever farming strategy was adopted to provide animals with their needs, if it was not managed adequately, it would be unable to deliver positive animal welfare outcomes. Indeed, farmers claimed that livestock farms were not fully comparable, because of human factors (e.g. different characters of farmers and farm hands) and environmental circumstances (e.g. building design, microclimate), all of which could significantly influence farm animal welfare conditions:

> "Every farm is different…You have to find out what works for you"
> Conventional Farmer Norman

Hence, farmers highlighted the need to reflect on important characteristics of their own farming enterprises and adopt methods of production accordingly. Many farmers claimed that this process was a duty they continuously needed to work on.

Farmers had different perceptions on how to ensure livestock welfare. Conventional farmers claimed that the best possible technologies had to be applied to serve the highest number of animals with the least amount of human labour:

> "In this farming environment we must introduce the best technologies, in order to manage a [high] number of livestock with the few farm hands we have"
> Conventional Farmer Philip

Conventional systems were therefore conceptualized by farmers to provide animals with their essential needs, optimal health and welfare via a dual strategy: heavily automated technologies and "specialized" human labour. As all farmers agreed that high quality labour was a significant challenge, an additional effort to minimize human incompetence or failure was noted further increasing the need to optimize farms. Conventional farmers believed that livestock had "adequate" or "good" welfare conditions in all production phases. Farmers focussed to provide livestock with their essential needs, optimal health and welfare, and such provisions were consistently applied in all three technological areas, including feeding, breeding and housing:

> "The industry of technologies is able to react to every kind of need…they will deliver whatever development. They have specialized feeders for dry feed, liquid feed, they are really prepared for everything. They serve genetics…They can tell by the minute what the animal will need and how quickly it will grow…You just set it in the computer and that day the animals will be fed 5-6 times in the dose you wish…tailored to the needs of sucking piglets, weaned piglets, boars and breeding sows"
> Conventional Farmer Bruce

Farmers therefore claimed that standardized welfare provisions consistently delivered to all the stock was a clear priority in conventional systems. Indeed, they believed that automated systems could be set to the known physical and physiological needs of animals, especially defined by the protocols of breeding companies from which the farmers bought their sow stock, and/or housing and feeding technologies. There was a clear intention of farmers to follow these guidelines, because the breeding companies were perceived to "know better" what the needs of the strain really were. Consequently, the conventional approach to ensure farm animal welfare was perceived to depend on automatization, to minimize the need for human attendance and decrease bad welfare instances induced by a number of different factors, including human error. It was further understood that conventional systems provided controlled environments set to the needs of animals, which distributed welfare provisions systematically and evenly among the entire stock.

Even though the views of conventional farmers seemed to be coherent, it was soon noticed that their arguments were inconsistent on one crucial issue. While conventional farmers expressed full confidence in conventional, automated systems, claiming that optimized technologies balanced out livestock welfare needs and economic interests, some were found to articulate different ethical imperatives depending on whether they spoke about producing for the market or for their own consumption:

> "Any animal derivatives that I consume most definitely will come from an ideal, near-natural rearing system"
> Conventional Farmer Philip

Hence, findings suggested that some conventional farmers applied double standards. The ethical imperative that applied to producing for the market was much weaker than the ethic of producing for personal consumption, which was comparable to the ethic of alternative farming

practices. Indeed, a large number of farmers claimed they did not consume meat from their own farms, suggesting that they were aware of ethical and quality related problems induced by conventional production methods.

Alternative farmers were openly critical of conventional farming methods and emphasized that they strived to pursue production methods that were fully in line with their personal values. To fulfil animal welfare needs many claimed that the most "natural" and "simple" technologies need to be applied to serve the highest number of animals predominantly via human labour, and by providing livestock with some freedom to act upon their own needs (i.e. ensure agency):

> "I am always trying to provide harmony between the animal and its environment, because if I want to produce the best meat possible, I cannot do it by imposing my own agenda or view of 'goodness' on my livestock. This is exactly why I have to think with the animal; to understand what it really wants…just an example: it's raining in the summer and we have a roof above the building so the animals don't get wet. OK, but this pig wants to go out into the rain. Why? Because it feels good…I don't need to protect it from that, but if it is raining for 2 weeks, the animal does not want to stand in the rain anymore. It wants to go in a dry place, and so I have to provide it with this opportunity also…This is the logic farmers must follow"
> Alternative Farmer Walter

Farmers therefore claimed that welfare provisions in semi-intensive alternative systems provided animals with their essential needs, extending into positive welfare outcomes. Natural and simple technologies were understood to include technological diversity, indoor and outdoor housing, a limited amount of inbuilt automatic technologies, and a high rate of human labour and attendance. Outdoor runs were only indirectly controlled, especially to mitigate environmental challenges and provide the most even distribution of provisions. Although farms often varied in the technologies they adopted, they were still believed to

provide livestock with a certain degree of freedom, necessary to ensure good animal welfare conditions:

> "I want my pigs to be on the land….And I provide them the opportunity to think…This [method] needs a lot of attention…But it works very well"
> Alternative Farmer Nick

These features together were possible because farmers actively pursued a system that was flexible and adaptable, highlighting that a combination of personal attendance and animal agency were the way to ensure farm animal welfare needs. Farmers believed in providing near-natural environments, and strived to distribute provisions as systematically and as evenly as possible. Thus farmers firmly believed that while compromise was apparent in the ethic of livestock farming, nonetheless alternative systems were able to ensure that the interests of farmers and livestock were more evenly balanced out.

5.3. Discussion and conclusions

The present chapter aimed to explore relevant "internal deliberations" of livestock farmers. While the previous chapter shed light on how farmers conceptualize major external pressures, the current chapter presents in particular the personal convictions of farmers on norms of production and welfare.

How do farmers conceptualize their ethical duties towards livestock? How do the views of conventional and alternative farmers align to or conflict with each other?

This chapter outlines the internal norms of livestock farmers, which are perceived to:

1. Rest on positive emotions, a sense of connectedness and mutual dependence;

2. Incorporate the need to manage emotional involvement: attach to and empathise with livestock while under the direct care of the farmer, but intentionally detach from livestock once sold;
3. Include the obligation to "artificially" or "naturally" provide the best possible care for farm animals;
4. Represent norms that are relevant in an ethically compromised scenario, hence the ethics of welfare and norms for production were different, especially in the case of conventional livestock farming.

In line with the work of Miele *et al.* (2011), Spooner (2013), Spooner *et al.* (2014 a,b), Te Velde *et al.* (2002) and Vanhonacker *et al.* (2007, 2008) on the perceptions of farmers outlines a clear-cut dichotomy between the views of producers and the non-producing public. Findings of this chapter however illustrates that both conventional and alternative farmers believe in the need to go beyond the provision of basic health and functioning, and provide good lives for animals. Confirming the findings of Fraser (2008b), who summarized the "Standard Critique" on livestock farming, which presents that profit motivation replaces traditional care values, this chapter also finds the need for an "Alternative Hypothesis", which acknowledges the impact of major external pressures and incorporates a more complex explanation for the present difficulties in ensuring a good life for animals especially in conventional livestock systems.

In contradiction to the findings of McLeold-Killmurray (2013), and further to the results of Spooner (2013), Spooner *et al.* (2014a), Te Velde *et al.* (2002) and Vanhonacker *et al.* (2007, 2008), this chapter finds that both conventional and alternative farmers reflect on their ethical duties and understand their moral obligations to provide the best possible care for livestock.

In the process of self-reflection, farmers are concerned with achieving an adequate balance between business interests and animal welfare aims, and claim only to detach from their livestock when they are sold or otherwise out of their hands. One possible reason for this unexpected similarity in findings between the views of conventional and alternative farmers is that the life histories and personal interests of producers show important, widely shared features. But, while the views of farmers greatly corresponded on ethical duties towards animals, it was evident that the methods they adopted fundamentally diverged.

It is possible that this marked difference in the adopted farming methods were only in part related to assumptions held by the different producer groups. While scientific interest aims to conceptualize different working definitions of livestock welfare and their observable impacts on livestock welfare conditions, in contrast to Spooner *et al.* (2014a) this chapter shows that the attitudes of farmers and their farming methods were impacted, but not determined by diverging welfare definitions. Data suggests that conventional farmers believe to ensure livestock welfare by adopting progressive technologies and alternative farmers assume that livestock require near-natural conditions and agency. But in addition, findings also highlight that both groups of farmers rationalize their production methods, emphasizing how welfare is ensured in the different systems.

The aim of both conventional and alternative farmers is to synthesize production and welfare goals; however data reveals that indicators used to "measure" their delivery were also substantially different. Conventional livestock farmers focus on the expression of genetic potential, which rests on the premise that in the absence of welfare, livestock would be unable to produce. Alternative farmers on the other hand extend this focus and emphasize that poor welfare negatively affects product attributes; hence alternative farmers are most concerned to

ensure high welfare standards via the provision of near-natural conditions and animal agency. So, while the internal norms of farmers impact technology related decisions (Chapter 6) they do not explain how farmers apply conventional or alternative production methods. Within the system they adopt, it makes "sense" to deliver welfare the way they do.

In addition, farmers struggle to express how they came to these conclusions: many articulate the impact of personal experiences and their education; however findings also indicate that a combination of additional influences possibly have their mark. While the personal experiences and educational backgrounds of conventional and alternative farmers are comparable, their norms on production are quite different. Findings also indicate that farmers are influenced by general industrial standards and "cultures" of production. In conventional farming systems industrial guidelines and protocols are widely used. These present notions, which portray pigs to "rely" on industrial, highly automated technologies and emphasize that "optimal" health and welfare is necessary to achieve efficient production. On the other hand alternative farmers do not apply industrial guidelines, but rather directly observe livestock and discuss their experiences with other alternative farmers. The outlined differences in production norms suggest that both conventional and alternative farmers are thus influenced by "external" sources of information, and production norms are able to reinforce the "visibility" of some issues and render others "invisible".

Finally, in spite of the differences outlined in earlier publications and the similarities presented in the chapter, the norms of conventional farmers are still found to be inconsistent: norms of production are substantially different from the ethics of livestock welfare they truly believe in. This was most apparent when the ethical principles of production for "the market" was contrasted with that of "own consumption". Many conventional farmers expressed that

they do not consumer from their own products, and keep livestock they consume in "ideal" conditions. This finding illustrates an important "internal conflict" of producers identifying that farmers were somehow (see Chapter 6) constrained in their technological choices. Indeed, conventional farmers emphasize that norms of production do not reflect their imagined ideal, but represented an ethically compromised scenario, which negatively impact interactions between producers, with farm land, livestock and consumers.

Conventional farmers therefore reflect on the differences between ideal standards and the consequences of a disturbed ethic, but due to their inability to change the status quo (Chapter 4 & 6) acknowledge their willingness to "adapt" to change. Findings indicate that alternative farmers are less open to "adapt" and more willing to "break-away" from current trends, and consistently pursue production standards they believe in.

Conclusions

Results suggest that conventional and alternative farmers clearly identify ethical duties towards animals, but their norms differ according to the production method they apply. With an overarching theme of duty to provide the best possible conditions for animals, both groups acknowledge that the outlined perspectives are representative of a current, ethically compromised scenario. It is suggested that the norms of alternative farmers are more consistent that those of conventional farmers.

Chapter 6. Deliberations on farming and livestock welfare

The present chapter aims discuss the understandings of conventional and alternative farmers with regards to ideal and realistic livestock farming methods, illustrating in particular how farmers navigate between external pressures and internal deliberations on farming and livestock welfare already introduced in the previous chapters.

Previous work in the field has addressed perceptions of farmers on various aspects of farming technologies and their animal welfare consequences; however, insufficient attention has been paid to understanding how significant external forces and internal deliberations affected the views of farmers, especially in terms of technology-related decisions they took. Assuming that the farmer possessed the power to make important decisions, determining the farming method, the technology applied and the animal welfare outcomes, it was essential to understand how they perceived the extent of their possibilities. To do so, the chapter was based on major themes derived from in-depth semi structured interview data with experts, conventional and alternative farmers allowing for the possibility to outline and comparatively analyse findings.

The present chapter will attempt to remedy this gap in knowledge, first of all by studying an imagined ideal future of livestock farming. It will depart by identifying standard assumptions of conventional and alternative farmers on an ideal farming system, then outlining emerging thoughts on how they perceived ideal farming standards and animal welfare conditions, and concluding with the examination of a working example, a farm perceived to work by the ideal scenario. Next, the realistic future of livestock farming will be explored, forecasting how conventional and alternative farmers comprehended the future of farming and animal welfare.

It will depart once again by identifying standards assumptions, outlining emerging thoughts on how farmers perceived realistic farming standards and animal welfare conditions, and concluding with the examination of a working example, another farm perceived to operate by what the realistic future was imagined to bring. The final section will aim to discuss actual decisions on technology and welfare, departing by outlining initial decisions, next by investigating actively pursued and constrained choices of farmers. The chapter will be concluded with a short discussion of findings.

6.1. An ideal future of livestock farming

An ideal future of livestock farming was at first difficult to imagine for the majority of participants. Some claimed that the ideal "did not exist" while others said that they gave up hoping for "the best outcome" long ago. Eventually, participants did consider ideal scenarios and were able to share their thoughts. It was interesting to note that experts were more ready and willing to engage in such discussions, and they had a more dominant vision of the future (both ideal and realistic), while in terms of farmers, it was more challenging to derive meaningful answers. Many of the farmers would even say that the topic was frustrating, some expressed bitterness, disappointment or fatigue. But the question did resonate with all of the participants, achieving most emotional involvement from farmers. Once initial obstructions were overcome, participants expressed a number of interesting ideas.

To conceptualize their understanding, it was necessary to differentiate between ideal scenarios reported for the social context and for animal welfare conditions. Analysis of the data showed that in the case of ideal scenarios, all groups of participants spoke at length about how human values and behaviours, governance, decision-making, legislation, education and trade should be, while in the case of animal welfare, very brief, simple and clear messages were conveyed.

Therefore, to adequately re-construct the imagined ideal future of livestock farming, expectations for the social context and for animal welfare conditions will be discussed separately. Finally, a working example of the ideal scenario will also be introduced as an embedded case study.

6.1.1. Standard assumptions

For the social context, an ideal arrangement meant a radical change from the current *status quo* in both principles and practice. All participants hoped for consistency, accountability and stability as principal building blocks of society, leading to an ideal future for livestock. Experts hoped for regained control over "one's life", fairness and justice, along with a positive view on the future as fundamental elements of a good future, while alternative farmers highlighted the importance of more personal traits, such as empathy and humbleness, as the way forward. However, the overwhelming majority of experts and farmers agreed that the most crucial element of an ideal scenario was the possibility for society to make informed choices. This meant a financial capability for purchasing good quality and high welfare products, an awareness and determination to reject low quality, poor welfare products:

> "In an idealized future people would be able to afford what semi-intensive, animal welfare friendly farming methods cost"
> Conventional Farmer Oliver

In addition, even in an ideal arrangement, it seemed acceptable for some experts to prioritise the production of quality goods for human interest. Nonetheless, to achieve the above outlined ideal scenario, experts and conventional farmers found it absolutely necessary to update education, so that biological knowledge would be part of general literacy. This meant that reasons for a more complex, holistic approach to farming could be communicated, and was understood and accepted (i.e. validated) by society. While alternative farmers agreed

with this view, they also highlighted the need for an ongoing direct interaction with nature. Indeed, participants found that knowledge of and interaction with nature and natural "subjects" (i.e. animals) would offer the benefit of "normalizing" the values and expectations of society, and achieve harmonious, mutually beneficial arrangements. These arrangements would include consistent, but not radical and properly implemented, but not standardized legislation, allowing more freedom for farmers and lay persons to keep/farm livestock. But most importantly, all participants claimed that the ideal scenario would legislatively prevent the mass production of poor quality products:

> "We must produce quality products…[The production of] poor quality, poor welfare goods…should be banned "
> Conventional Farmer Mark

> "Let's compare meat quality for animals kept in conventional…and near-natural [semi-intensive] managlica farms…Is there a difference?...There must be…And if I examine the differences, then I will be able to tell what is needed to produce good quality meat"
> Expert William

Although quality was identified as a heavily debated issue (see 4.1.3.), in an ideal scenario participants still perceived it as a desirable attribute of products.

Another important issue identified by farmers was that an ideal scenario meant the revival of mutually beneficial social networks, through decentralized governance mechanisms and strong connections between cities and the countryside. To ensure this, participants hoped to re-connect consumers with producers, through stable, long-term relationships. In their imaginations, this social structure would eventually benefit "good" producers, who would outcompete "bad" ones. In addition to stable social relations, participants found that stability on the market was also fundamental. Stability in this sense was understood as both a market possibility (to ensure the sale of products when they were "ready") and income stability (to

ensure guaranteed payment above production cost and the realization of some profit). To achieve these aims, both groups of farmers identified the need to establish more "control" in agricultural sectors, especially slaughterhouses and processing plants. Along with restored export possibilities and a differentiation in market value of higher and lower quality products, farmers thought that an ideal trade arrangement would be fair and predictable:

> "I don't want to repeat myself, but the ideal would be to ensure that farmers realize an income above production costs. Nothing else. Honestly, nothing...But don't ask me how [this would be possible], because I don't know"
> Alternative Farmer James

> "I firmly believe that in the short-term we must stop the constant instability of the sector. One way to achieve that would be to invest in a collectively owned slaughterhouse. We did try…but we did not succeed…However, this is what we need to do. It could really help stabilize the continuous fluctuation and unpredictability of the market, and ensure a more predictable price [of finished animals]…Currently every three months there is either a feeling of Armageddon or a sense of hope that we will not go bankrupt"
> Conventional Farmer Mark

Predictability was therefore seen as the only way to ensure equality and a way to return prospect to farming communities. Indeed, a restored sense of perspective in farming was a clear priority desired by experts, conventional and alternative farmers. In addition, perspective was seen by conventional farmers as a way to balance out individual interests with the interests "others". Therefore, a returned sense of perspective in farming was a crucial element of an imagined ideal future for society at large.

The final element of an ideal social arrangement was identified by experts, who found that decision-making processes also needed to be reformed. They claimed that ideal decision-making processes were reflective: they would approach problems in a holistic way, assessing and accounting for long-term consequences of decisions, seeking "optimal" arrangements for all parties concerned. Issues of "necessity" would be prioritized over "extravagant" human

desires; hence in an ideal scenario food production, as the basis of human existence, would be prioritized over other industries (e.g. fashion), resulting in political and administrative measures advancing welfare friendly and sustainable agricultural practices.

6.1.2. Farming and animal welfare

When talking about ideal arrangements for animals, the opinions of conventional farmers greatly diverged. Some of the farmers believed that to achieve an ideal scenario further farm "modernization", the use of better technologies was necessary, while others claimed that conversion to "natural" production methods was the only way forward. In the latter case, farmers described systems similar to those alternative farms that were visited during the course of this research:

> "I would keep my livestock in natural environment, in small groups, and I would provide them with large space, an outside run and lots of straw"
> Conventional Farmer George

Yet, to achieve this imagined ideal, farmers had to face the difficulty of articulating how this would be possible. In many cases imagining that "money did not matter" was a logical option, however, some conventional farmers suggested a number of explicit ideas: to achieve this ideal they thought it necessary to allot more farmland to pig farmers (note: for both livestock and manure disposal), to "normalize" scale (by ensuring that all scales remain competitive), and increase "local" processing capacity and market opportunities. These opinions resonated with the view of experts, who also claimed that safeguarding diversity in farm scale was an important element to ensure welfare. Other initiatives, such as technological innovation or providing the non-producing public access to farms (directly or via online CCTV) were understood to ensure a transition to welfare friendly systems.

On the other hand, the majority of alternative farmers thought that current practices were providing animals with conditions that were close to or already achieving the imagined ideal. Therefore, alternative farmers highlighted the strengths of their farming strategies, and claimed that in an ideal scenario, these values and practices would continue. So, the narrative of alternative farmers was not about a need to switch to a "better" system, but to preserve and expand an already existing "good" system:

> "[Ideally] what I would like to see…is that while we, humans and animals, live on this planet Earth, we all live in conditions ensuring a life of dignity"
> Alternative Farmer Walter

A life "worth living" also encapsulated the need to address the future of the natural environment, which as experts and alternative farmers claimed, defined the welfare of all living beings, humans and animals alike. Hence, an ideal scenario meant that environmental protection was properly addressed. Therefore, in the imagined ideal scenario any agricultural practice or method in support of these aims was "prescribed".

6.1.3. Working example of the ideal scenario

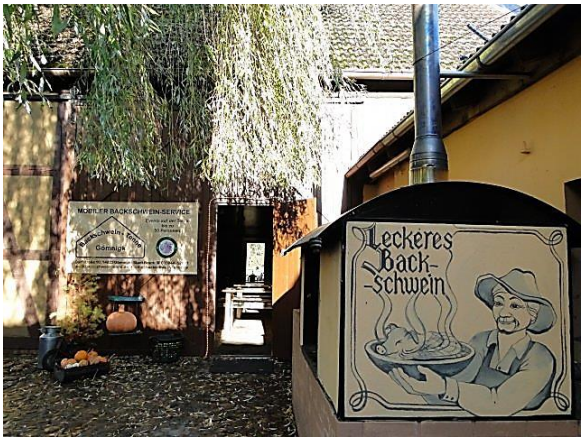
Based on the above outlined criteria, it was interesting to find that some farmers believed that the ideal scenario was possible:

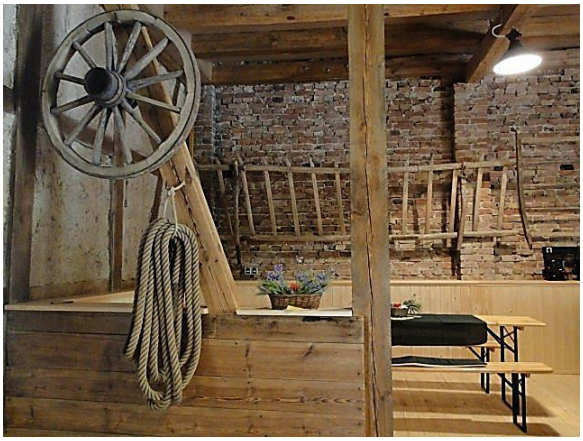
> "We went to Germany…and visited a farmer who kept a traditional pig breed on an organic farm. He had 30 hectares of land, a lot of electric fences, a caravan, and litter here and there. And he roasted his pigs. Two pieces of land were planted… and the third piece of land was where the pigs were roaming freely. Every year, he swapped the parcels. I think this was a truly alternative system. The old man did it very well…he roasted the pigs, at home in a small oven. When he opened the gates, there were heavenly scents around. He…was able to sell his roasted pigs locally to the villagers. He was also selling the pigs in Berlin as street food, and he was very successful…He had absolutely no technology…He had nothing, truly nothing. But at the same time, the pigs were well off, and you could see they enjoyed being there"
> Conventional Farmer George

Hence, in this embedded case, the participant was outlining a scenario in which a farmer did not invest in expensive technologies, but had a fair amount of farmland and was committed to a diverse farming approach (Figure 15). Two-thirds of land was used for plant cultivation and one third for keeping pigs (Figure 16) using an extensive, organic, rotation based farming method. In this process farm land was used for different purposes, with phases of cultivation and "rest".

Photograph 4 & Photograph 5. Farm representing "ideal" scenario
The farm representing an ideal scenario adopted a diverse strategy of cultivating plants (left) and farming a traditional breed and white pigs (right). Note that the enclosures offered large shelters and were covered with grass, indicating that the grassland was not over-used (source: www.backschwein-tenne.de/bilder-galerie).

It was important to note that the farmer was able to process the pigs and sell "home-made" products (Figure 17) to the local and urban communities. Hence, the farmer did not sell the pigs off to a slaughterhouse, but dealt with promotion and sale directly. By visiting the web-page of the farm (contact was provided by the participant), it was evident that the farmer actively advertised the operation, reinforcing an ideal image, which was "open" (Öffene Höfe) and "welcoming" (Figure 18). The photographs suggested that this image was intentional: the buildings, the surroundings of the farm and public areas were all consistently well-kept and idyllic, ready to host both visitors and customers.





Photograph 6 & Photograph 7. Characteristics of the ideal scenario I.
Pigs were roasted on the farm in an oven visible to consumers (left). The enterprise was advertised to create a simple, yet "natural", hospitable, small-scale, and idyllic impression (right) (source: www.backschwein-tenne.de/bilder-galerie).

The idyllic impression was further emphasized with pictures indicating the lack of technology (Figure 19) and the reliance on manual labour (Figure 20).


Photograph 8 & Photograph 9. Characteristics of the "ideal" scenario II
Images of watering cans (left) and farm worker hoeing vegetables (right) indicate the lack of "modern" technologies on the farm (source: www.backschwein-tenne.de/bilder-galerie).

Finally, the ideal scenario also meant that the animals were kept in near-natural environments. The production method was based upon an outdoor system; farrowing sows were provided

individual, and group housed animals with larger shelters accommodating several animals. All livestock were ear tagged with one tag only, and piglets were not tail-docked (Figure 21 & 22). It is not known whether other invasive practices, such as castration or tooth clipping were practised.

Photograph 10 & Photograph 11. Characteristics of the ideal scenario III.
Sow with piglets in an individual shelter filled with straw (left). Note that all of the pigs were tagged with one tag only, ear notching was not practised. None of the animals visible on the photographs were tail-docked (right, source: www.backschwein-tenne.de/bilder-galerie).

Hence, the working example of an ideal scenario was very different from mainstream farming practices in terms of both farming methods and marketing approaches applied by the farmer.

6.2. The realistic future of livestock farming

Contrary to an understanding of the ideal future of livestock farming, the realistic future was perceived as certainty, a future that was identified "troubling" by all three groups of participants. Once again, experts gave the most detailed outline of the imagined future, while conventional and alternative farmers spoke at length about certain key aspects of farming, especially the effects of technology, trade and decision-making processes. To adequately re-construct the perceived realistic future of livestock farming, here again expectations for the social context and for animal welfare conditions will be discussed separately.

6.2.1. Standard assumptions

Participants assumed that the future will bring a continued increase in human populations, leading to larger pressures on agriculture to meet demands. Therefore the main future agenda identified was to further increase the scale and efficiency of food production. None of the participants thought that the diet of humans will shift radically, but presumed that meat eating will continue and with it new challenges were seen to emerge. Some experts addressed the issue of land availability and the sustainability of agriculture, while others were concerned with climatic influences of agriculture and the impacts of climate change on food production. Nonetheless, all participants agreed that there will be a constant need for cheap meat:

> "What will not change in the future is cheap meat production. This is a major problem. Meat eating is taken for granted to such an extent that those unable to afford good quality meat…will continue to eat the cheapest, poorest quality products…There is statistics to show that proportions of meat eating are the same in poorer and in richer societies, but it is the quality of the produce consumed that differs greatly"
> Expert Naomi

Indeed, the majority of experts and farmers thought that the bulk of food on the market will come from farms producing quantity rather than quality:

> "We have no choice…Anyone wanting to make a living from agriculture…will have to produce quantity"
> Conventional Farmer Philip

While a number of participants firmly believed that large scale farms were unable to produce quality products (see 4.1.3.), some farmers envisaged an increase in the quality attributes of conventionally farmed products. In addition, participants unanimously forecasted that the market share of "unconventional" protein sources would increase, including meat substitutes and insect consumption. Participants agreed that this trend will further increase competitiveness within the sector, inducing further pressures on livestock farming. However, some participants agreed that the future depended on the interplay of so many important and

unpredictable factors - including cultural aspects, political agendas, legislative possibilities and the influence of the media on consumer choice - that a definite prognosis was difficult to outline:

> "We are living a very interesting time, and so it is difficult to give any accurate prediction. I see that the chances for an unexpected crisis resulting in major improvements are just as possible, as the odds for enormous backsliding. Not only for animal welfare, but generally speaking I think Europe is in incredible turbulence…But whether it will benefit or harm of Europe and our values, that is another question…And once more very significant ethical questions come to the forefront"
> Expert Naomi

So, while there was no mutual agreement on the interplay of factors affecting agricultural production in general, participants presented a cohesive view on the future of pig farming: the overall majority of experts, conventional and alternative farmers agreed that in Hungary a great number of conventional pig farms will go out of business in the near future, and thus the concentration and intensification of the sector will continue (see below).

Many conventional farmers believed that such changes in the sector were advantageous for business; however the overwhelming majority of participants, experts and farmers identified a number of additional threats to human and animal welfare. Issues included increased competition, the displacement of livestock farming, increased urbanization and a further decreased availability of agricultural land, local ownership, and the availability of educated and motivated work forces. In addition, participants thought that if people continued "business as usual", then the realistic scenario would threaten aspirations of a sustainable future and would (further) prioritize the creation of "permanent consumers" depending on goods, regardless of how they were made. To ensure a more positive outcome than the worse-case scenario, all groups of participants found an increasingly important role of "the state" was needed to define "acceptable" methods of production and trade:

> "Business is a very nice thing and an important part of human freedom, but globally speaking the interests of humanity are different…To ensure this we would need some kind of global 'order', at least on the scale of continents…But we always come up against free trade [principles]"
> Expert Thomas

Hence, while the majority of participants were quite pessimistic about the future, they also clearly highlighted that all was not lost: visions of a "strong state", along with powerful alliances and coalitions were envisaged to prepare the way for more just and equitable socio-economic arrangements. Nonetheless, while participants found this to be a future possibility only in theory (note: not only in ideal circumstances), in practice the majority of participants claimed that economies and corporate interests would continue to define the level of human and animal welfare.

6.2.2. Farming and animal welfare

As mentioned above, participants envisaged that the future was to bring about increased concentration in all industries, including food production. Continued agricultural concentration was conceptually linked to increased efficiency; however the majority of conventional farmers agreed that radical technological change was not foreseeable:

> "I cannot see any evidence for major technological change in livestock housing or production"
> Conventional Farmer Peter

Thus increased efficiency was understood to derive from a number of factors, including selection for improved livestock genetics, better management practices and more efficient buildings. In terms of genetics many participants argued that food conversion qualities, the size and shape of the animals were less likely to change, however health and durability were clear selection priorities:

> "In the short run technology is progressing…towards efficiency…Genetics is improving the durability of animals…Today we keep livestock very different from the way we kept them 30 years ago…and are favouring animals that are more durable and easier to manage. By durable I mean that animals are more tolerant, their needs are not as specific, their comfort zone in wider than in the case of more sensitive animals"
> Conventional Farmer Peter

A drive to "simplify" the needs of animals coincided with the belief of conventional farmers on the future need to further optimize human labour and replace manual labour with automated technologies. The rate of change was seen to depend on productivity measures, which would continue to have significant effects on conventional technologies:

> "There is no doubt about it: we must all follow world trends and increase piglet production from each sow…The question is how many piglets will we lose if we do not have supervision, and how many can we save if there is supervision"
> Conventional Farmer Peter

With this prediction in mind, it was interesting to note that all farmers agreed that it will be increasingly difficult to employ educated and motivated people to work on farms, and also to pass on farms to successors. Hence, the need to further automatize livestock production was also induced by societal problems.

Finally, in terms of building efficiency, conventional farmers predicted the need for the technological upgrading of farms. In this process an increase in the use of sustainable energy sources was also envisaged. Technological upgrading however was seen to depend on whether farmers were able to access funding, especially EU or national grants, and low interest rate loans. Nonetheless, several farmers claimed that in the long term, building design will be modified:

> "Buildings will change, and all animals will be kept in large blocks…making operation simple, cheaper and more transparent…Energy costs, heating, ventilation, etc. will all become cheaper and more efficient,

> because there will be less doors, windows that open to the outside. So, we will go into one large barn where animals will be housed, which will standardize the temperature and air quality. We can calculate that on a block pig farm we will need fewer employees, because there will be no outside part to deal with. Additional tasks, such as lawn mowing, tidying, and yard duties will be eliminated, and we will not need winter clothing because we will be indoors all day"
> Conventional Farmer Peter

While this farm design was predicted to take over current farms, it was evident that at the time of data collection only one farmer claimed to afford such major investments. In terms of animal welfare conditions on conventional farms, participants agreed that the future will not deliver major improvements. Experts and conventional farmers envisaged that animals will be healthier, but their welfare interests will be of less consideration:

> "Any measure that will increase profitability and efficiency will remain, and if I can label it as an animal welfare contribution, then it will be treated as a priority…[But] those animal welfare parameters that do not have an economic contribution or those that increase production costs will be singled out by the system. If we do not single them out, then they will do so in China. There people will not worry whether pigs are happy or not…So if a parameter may be improved with minimal input and at the same time have an economic contribution, then it will be a rational choice to pursue it, if not, then that will also be a straightforward economic decision, but not in the favour of animal welfare"
> Expert Matthew

Hence, participants claimed that in the case of conventional operations it will be a rational choice to prioritize economic contributions over the well-being of livestock. While all alternative farmers and the majority of experts and conventional farmers agreed that in the long-run such a preference may also harm human welfare, they still agreed that this scenario was most likely to take place. Interestingly this view coincided with the general view of participants in that the future will prioritize human needs and disregard non-human interests. While there seems to be a contradiction between the above arguments, it was found that views on decision-making processes favouring short term interests (see 2.1.1.) and failing to account for long term consequences (see 5.1.3.) of decisions seems to resolve this dispute and

economic interests of humanity will exceed welfare interests. Participants therefore found that the realistic future will maintain an arrangement that will cause harm to animals.

In the case of alternative farms, participants also did not expect significant changes in farming practices. Indeed, farmers stated that new technologies were unnecessary and often even unrealistic to for them to invest in:

> "The farming community cannot afford technologies…In the future, we will not have any funding, and I don't know what kind of restructuring this will bring…We need tractors, and I need to change some every year to continue going on for 5 or 6 years. But in the 5th and 6th years, I am constantly repairing them. A 300 horse power tractor costs 56 million HUF [17 240 €], an automatic sprayer 120 million HUF [370 000 €]. We cannot purchase these. Look at what a family farmer works with, at least 50 year old machines, because they cannot afford just the rock-bottom of technologies. What can I tell you? The future I foresee is a very bad one"
> Alternative Farmer James

Hence, partially due to a lack of possibility for investment, partially due to a conviction, a strong held principle that livestock "ought to" be kept by semi-intensive methods (see 6.1.), alternative farmers were reluctant to pursue measures greatly increasing the efficiency of their farms. Only some minor technological adjustments were foreseen increasing the efficiency of human labour, while overall production efficiency would remain unchanged. Therefore, the rejection of highly efficient technologies was understood by experts and alternative farmers as a key factor allowing alternative production methods to "flourish" in the future. As no significant change was envisaged in farming methods, animal welfare conditions on alternative farms were understood to remain the same (see 6.2.1.).

6.2.3. Working example of the realistic scenario

As in the case of the embedded ideal scenario, it was interesting to find that the realistic scenario envisaged by participants was also already apparent:

> "We visited a farm in Denmark, which demonstrates how I see the future. The farmer had a large stock of animals with every stage of pig farming organized within one substantial building. It was a very efficient system"
> Conventional Farmer Philip, Post-interview notes

Hence, in this embedded case, the participant was outlining a scenario in which – in contrast to the ideal case - a farmer invested in new type of building able to house the entire stock of animals and expensive indoor technologies to operate the enterprise. While it was not possible to find information about land ownership, it was evident that the farm was large-scale, fully conventional and highly specialized (Figure 23).

Photograph 12. Farm representing the "realistic" scenario
The farm representing a realistic scenario adopted a specialized strategy for keeping a high number of livestock in a fully conventional indoor system. Note that all phases of pig farming were found in a single building (source: Farmer Philip).

The farming strategy aimed to maximize the production of pigs. Consumers could not interact directly with farmers and livestock, indeed the farm indicated that it was closed and inaccessible (Figure 24). Another interesting feature of the farm was that its surroundings were completely barren: there were no plants nor any other features present (Figure 25).

Indeed, it seemed that this level of simplicity was due to the functionality of the space and there were no attempts to create any sort of "natural" image or impression. Therefore it is possible that the majority of investments, contrary to the previously described ideal example, where inside the building and that any type of work outside, was of little or no concern to the farmer.

Photograph 13 & Photograph 14. Characteristics of the "realistic" scenario I
The realistic example of a pig farm seemed closed and the pigs were obscured from view. The enterprise did not invest in creating any image of "naturalness" or hospitability, and indicated that work indoors was prioritized over any outdoor activities (source: Farmer Philip).

The realistic example pictured the use of highly specialized technology (feeding, breeding and housing) relying on automated apparatuses and a relatively small number of farm hands, hence manual labour was minimized (Figure 26).

Photograph 15. Characteristics of the "realistic" scenario II.
The amount of automated technologies on the farm indicate that human-animal interactions were minimal and most work was focussed on supervising pigs, maintaining the technologies, and other specialized tasks involving animal handling (source: Farmer Philip).

In terms of animal welfare conditions, the realistic scenario meant that livestock were kept indoors throughout their lives. Depending on the stage of farming, the breeding stock was moved between areas of specialized housing, but in comparison to current observations (see Chapter 7) there were important differences noted. For example, areas for gestation crates were designed to group house dry or pregnant sows, hence the animals were probably kept in more stable social groups and were moved on fewer occasions. Photos also indicate that sows were possibly kept in gestation crates for longer, and were allowed access to an outside run area in turns and in small groups (Figure 27). In the breeding cycle, it is possible that sows kept on the farm were only moved between gestation and farrowing crates (Figure 28)

Photograph 16 & Photograph 17. Characteristics of the "realistic" scenario III
Pregnant sows in the combined individual and group housed system were allowed access to the run area in small groups for a limited amount of time (left). Apart from farrowing and sucking the young (right), sows were predominantly housed in this system. Note that sows were both ear tagged and notched, and even though they were kept on slatted flooring, it allowed the provision of some silage (source: Farmer Philip).

The scale of the breeding enterprise suggests that a large number of animals were produced for further fattening. While there are no images of these animals (only weaned piglets) the interview material suggests that further fattened pigs were also kept in the same barn until they were finished. Alternatively the piglets were sold to another farm for further fattening.

With only one exception observed, all livestock were tail-docked (Figure 29), in terms of ear tagging however, there were noticeable differences: young piglets were tagged in one ear (Figure 29), while sows had tags in both ears and were also ear-notched. It is not known whether other invasive practices, such as castration or tooth clipping were practised, but the farms did have efficient technologies in place for routine practices (Figure 30).

Photograph 18 & Photograph 19. Characteristics of the "realistic" scenario IV.
All piglets were tail-docked and had one ear tag (left). It is possible that animals destined for further fattening were not required to possess additional individual tags or that further tagging took place later in the life cycle of the pigs. Efficient technologies were present for routine practices such as ear-tagging, tail docking and vaccination (right, source: Farmer Philip).

Finally, additional photos from the farm suggest further important features of the realistic scenario: first of all, a number of photographs give an insight into medication used, which include anti-inflammatory drugs (Loxicom), antibiotics (Noropen Prolongatum Vet) and an unknown substance (Hallumgade Aps). By reading up on these substances it was possible to note their use; hence medication was applied to treat: various inflammations (pneumonia, joints), pain, depressive states (post-castration), fever, exudation, wounds or injuries (from tail bighting). The participant also mentioned that post-partum sows were routinely given beer to help them relax, ease milk production and suckling (Figure 31). Second, strict hygiene rules were implemented, to ensure the disinfection of hands, workers clothing and footwear, the cleaning of buildings and technology, and the disinfection of drinking water pigs were provided with (CID water and mixing appliance connected to the water system). Efficiency was highly monitored and productivity measures were in place for both individuals and groups of animals. Farming protocols were also visible (Figure 32), and finally possibly invested in sustainable energy sources (e.g. NIBE heating device).

Photograph 20 & Photograph 21. Characteristics of the "realistic" scenario V.
Farm worker taking beer for post-partum sows (left). Protocols of the farming technique were prepared and made visible for farm workers (right, source: Farmer Philip).

Hence, the example of a realistic future suggests that in terms of animal welfare conditions, the observed farm was similar to current conventional farming practices. Nonetheless, findings also suggest that the operation was larger and more efficient than the average conventional farm observed in Hungary. On the condition that such operations become the standard method of pig farming in Western Europe, Hungarian farmers may be outcompeted on the market.

6.3. Decision-making on technology and animal welfare

6.3.1. Initial decisions

Interview data suggest that two major issues affected initial decision-making processes of farmers. Data indicates that childhood experiences, and arising education and/or business opportunities oriented them to farming.

Many farmers claimed that a decision to engage in farming was rooted in their personal life histories; while the majority of participants were brought up in a family of farmers, and had the possibility to interact with animals at a very young age, a number of participants were

driven by their own personal interests and gave evidence of an individual determination to engage in farming. Almost all farmers claimed that they possessed some kind of emotional bond to nature, animals in general or a particular species, a breed or an individual animal, which experiences helped them to develop their interest and deepen their engagement. Another important factor was that the majority of participants grew up with important role models before them; parents and grandparents who engaged in farming. Quite often the lifestyles, farming methods, and principles of these people significantly affected the views of conventional and alternative farmers, and they would often refer to such examples:

> "This is a very long story…my mother was a German minority peasant woman…Who had 200 acres of land. She farmed crops, but also cattle and pigs, so I think I take the love of animals and agriculture after my mother's ancestors. My father's ancestors were also from the peasantry…And so while we have always had a few fattening pigs and breeding sows around the house, my father and I started faming pigs in 1980. We kept 16 breeding sows and their offspring, and the price of pigs then allowed us to make a living from them and further develop the farm every year"
> Conventional Farmer George

The other issue relevant for initial decision-making was the response of participants to arising opportunities to engage in farming. Here it was important to note that by this stage the majority of farmers consciously chose faming as a future career and responded positively to education or business opportunities, and during the research, all but 2 farmers owned or co-owned their farms:

> "After the democratic transition in 1994, when the farming cooperative was liquidated, I had the opportunity to buy the farm on an open auction. I always emphasize that it was an open auction, I was not 'in the right place and the right time', no, I bought it…before several hundred people, and I was the only bidder because the farm was in such a state…Several people came up to me after the bidding was over, to ask me whether I had thought it through and they even said: 'Are you out of your mind? What on Earth do you want to do with that place?'…'How are you going to get this farm back into operation?'. But I started in a good time, because pig prices were going up, so I could finish with the refurbishment faster than I expected. And then

> several grant opportunities, which I successfully applied for, and they told me I could wait for the money. Well this is how it was in the beginning" Conventional Farmer George

Hence, opportunities to purchase a farm or a piece of land, and apply for financial support were all-important elements of initial decision-making process, and conventional and alternative farmers shared similar experiences.

The process of deciding on technology was found much less straightforward as the above outlined decision-making processes. It is a challenging task to give a comprehensive insight into the factors which resulted in farmers pursuing conventional or alternative farming methods. Given that the overwhelming majority of farmers were all highly educated in veterinary or agriculture related subjects, and given that there seemed to be a roughly even spread of age in both groups, it is possible, that these decisions were highly personal and therefore should be examined on a case-by-case basis. However, for the purposes of this study, it is important to attempt to outline a provisional explanation, and there seems to be evidence to suggest that the combination of the following factors greatly affected decision-making on farming technology: the objective measure of available capital, the subjective determination of what felt "right", and the rational choice to produce for a certain market. These will be examined in more detail in the following section.

6.3.2. Actively pursued choices

Participants claimed to consider the objective measure of available capital when starting up their farming enterprise, which affected their technology-related decisions. But at the same time conventional and alternative farmers were also influenced by their subjective determinations of what felt "right" (see 7.2.5.) and their rational choices to produce for a certain market niche (see 7.1.3.), which they believed would give them the opportunity to

pursue a successful farming enterprise. Based on the findings of this study it may be suggested, that the interplay of these three factors determined whether a farmer engaged in conventional or alternative farming methods:

> "Well you see the first thing to consider is how much money I have for development. There is no point in having ideas about what you want to do if you do not have capital to do it. The next thing is how much income could be realized. These two [factors] are very closely connected. In considering how animals will feel, it is important to contemplate how much manual labour I can ensure in the system. These are the main issues"
> Conventional Farmer George

The above quote clearly illustrates actively pursued choices made when starting up a livestock farming operation. Interestingly both conventional and alternative farmers shared these considerations, but at the same time, the rate of emphasis between them was found to be different: while conventional farmers claimed that available capital and market niches were more dominant factors, and what felt "right" was a secondary consideration, alternative farmers reasoned that market niches and what felt "right" were the more dominant factors, and available capital was secondary. Reasons behind these differences are clear; conventional farms were expensive to set up and alternative farms were relatively inexpensive to initiate. Hence, in the case of starting up a conventional farm substantial capital was necessary to build or refurbish buildings, update or purchase new furnishings and technologies:

> "It is evident that the sector needs a huge investment. If someone wants to start-up a [conventional] farm from scratch, I would advise the person not to do it. It takes approximately…1.2 million HUF/breeding sow [3 700 €] to build an up-to-date farm and 100 000 HUF/fattening pig [300 €]. At present you can make about 1500-2000 HUF [4.6-6 €] on a [finished] pig, so you can easily calculate how many pigs you will need to keep. Also, the time will come when you need to modernize your farm. So, you can see that this is not the best investment at the moment"
> Conventional Farmer Bruce

> "To meet current standards, farms built in the 1960's-70's can only be refurbished for a huge amount of money…to provide animals with better housing environment, better crates, better space allowances, etc. It is very

> difficult to meet animal welfare minimum standards, not to mention higher standards. It is possible to meet them, but it would take a large investment. You could spend the money on indoor environments, throw out everything and buy new technologies, etc. however the truth is that the refurbishment or updating of these buildings cost the same amount of money than building a new one from scratch. While the refurbishment of old buildings always leads to compromise, in new ones you can do whatever you want….Given that you have enough money"
> Conventional Farmer Peter

In addition to the above costs – depending on the scale of the enterprise – a relatively large amount of expensive breeding sows had to be purchased, along with feed and medication, tools, and so on. Other considerations and investments were needed to ensure safe fencing, good quality roads around the farm, and a trained and reliable work force. Interestingly, as all of the conventional farms visited were started up in the early 1990's, when there were ample business and funding opportunities for industries, hence the majority of farmers applied for major bank loans and development grants to help them establish their operations. These opportunities were perceived as essential elements of their decision-making process. Alternative farms on the other hand required a smaller initial investment:

> "I had a plot that I wanted to farm on….And… it was very important for me that [mangalica] faming did not require a major investment. We started with 4 animals, and I built…4 mobile farrowing sheds and a little weaning pen. We did not have any electric fencing or posts, we did not have a well, we used [tap] water. So, basically we invested in the farm when we could take a little money from here and there. But we are not talking about a huge amount, only in the range of 10 000 HUF [30 €] worth, so we did not have to invest 2 billion HUF [600 000 €] for housing 600 breeding sows. No, we stopped at 120"
> Alternative Farmer Nick

> "I knew a farmer…who was very ill…We spoke a lot about his animals, and was worried about what would happen to the sows when he dies. Then we had 32 sows…and in February we bought his stock. First 90 animals, then later we bought another 15 and finally 53 sows. This was a huge investment, it was a big undertaking, but we knew that…With this investment we would own every 4th registered swift bellied mangalica breeding sow in the country…So it was a vast genetic pool. We made a big step, but we managed to cope"
> Alternative Farmer Edmond

Hence, the greatest initial investment alternative farmers faced were the purchase of land (if they did not already own farmland) and their breeding stock. In addition, some farmers claimed that spent on fencing, and their workforce. So, it is important to emphasize that there was no major difference in the financial background of most conventional and alternative farmers at the time of starting up their livestock operations. While there is no hard evidence to support this claim, the interview data indicates that many early investments carried out on conventional and alternative farms were pursued from external sources. In monetary terms, differences between conventional and alternative livestock operations were noted in the scale of these initial investments; nonetheless all farmers felt that starting up their farms required a substantial investment, which was a major step in their lives, often bold and uncertain. In this process farmers were greatly influenced by business opportunities they foresaw:

> "It is enough to be on the 'good' side of farm efficiency. Everyone will not go bankrupt. There is over-production now…So if half of the farms go bankrupt, then the other half will do very well. We think we belong to the other half, who will survive. It is not more complicated than this…We believe in ourselves, because we are better than the average. Just a little, but that is enough"
> Conventional Farmer Harry

> "The founder of our Federation [of Mangalica Farmers] is working very hard to establish the market for our products, and find even further opportunities. So, all of us are working together to stay afloat…And there is growing interest in mangalica products"
> Alternative Farmer Nick, post-interview notes

Hence, similarities in investment strategies cannot seem to account for the differences in the "outcome", i.e. the contrasting farming systems. These quotes clearly show that while both conventional and alternative farmers reflected on the market niche they wished to produce for, other factors were also clearly influencing decision-making at the time. Hence it is important to emphasize that business opportunities were crucial elements of the decision-making process

for all farmers, often underestimated by producers in these early days of establishing their farms.

So far, it was possible to show how farmer's investment strategies (regarding available capital and market niches) oriented/guided farmers towards conventional or alternative technologies. However, an important element of decision-making was the subjective determination of what felt "right" for the farmer. In this process farmers would contemplate how they would strike a balance between different aspirations. It was very interesting to find that in terms of technology-related decisions (and thus animal welfare conditions), both groups of farmers truly believed in the farming system they adopted. Many conventional farmers would list how much time, money and labour they invested in their farms to ensure good technologies and animal welfare conditions:

> "As I said, when we bought the farm, it was not in its ruins, because it was built relatively late in the 1980's…It did not have time to disintegrate…However, there were some horror farming methods, like we immediately changed sow housing technologies. After weaning, sows were kept…in an individual stand, tied with a thick belt to a feeder. No movement was allowed…The other problem was that it was a dark technology. There were no windows on the buildings, only lamps installed…The buildings also had an old Bábolna liquid feeding system…Colleagues told me that it did not work from the time it was installed. It did not produce homogenous feed…Some animals would be served with water only, while the others also had feed, so these all had to be changed immediately"
> Conventional Farmer Alex

While it is very difficult to conceptually separate how far these investments were perceived to serve farm efficiency purposes (see 2.2.1.), yet farmers genuinely believed they made a good effort to ensure multiple objectives and strike a good balance between conflicting interests. Farmers often claimed that animal welfare was not and could not be compromised, otherwise livestock would be unable to produce (see 5.2.), yet it was also evident that at the time of

starting up conventional farms, efforts were to ensure best possible facilities and care within the already established framework of conventional farming, and so were not based on ethical deliberations. Participants often claimed that to do it "right" meant to do it by the textbook: by working as they were taught, by following the protocols of breeding companies, and by observing legislative requirements (see 5.2.1.). Hence, while knowing and openly acknowledging that conventional farming methods were not perfect, the majority of farmers claimed that they were acceptable given that neither human, not animal life was perfect.

When talking about what felt "right" alternative farmers were much more inclined to reflect on their own individual needs, the needs of livestock and also the environment, and pursue some kind of harmonious relationship between these different interests. The majority of alternative farmers were found to reflect on balancing out needs, both present and future, human as well as animal, and claimed to make technology-related decisions based on what they felt was "normal" or "natural". Indeed, what felt "right" was guided by a sense of achieving production aims with the least amount of human "interference"; farmers were especially determined not to "rush" their animals in order to maximize production outputs, which essentially meant a true separation from conventional systems:

> "To us this [system] is normal"
> Alternative Farmer David

> "We have to balance out everything…Keep it small…Keep it slow…Otherwise we end up in a conventional system, we will harm the environment, we will kill off wild animals and poison the Earth…We will end up producing mass quantities with absolutely no value"
> Alternative Farmer Kevin, interview and post-interview notes

In this process of decision-making farmers were unable to refer to textbook methods partially because they did not exist or were not available to them, and also because farmers were inclined to share knowledge and learn in more direct ways. While legislative requirements

also played an important part in technology related decisions, alternative farmers were much more influenced by their ethical convictions. This was possible, because alternative farmers perceived a higher sense of agency than conventional farmers: they truly believed that they could resist certain production methods and overcome associated problems by avoiding the "mainstream" market.

Hence, findings indicate that ethical perspectives guided decision-making for both groups of participants; however - when starting up their farms - alternative farmers harmonized their ethical convictions with actual decision-making on technology and welfare standards to a higher degree than conventional farmers.

6.3.3. Constrained choices

It is important to point out that while farmers had the liberty to pursue certain choices when setting up farms, it is equally important to note that these early decisions had a number of large-scale and long-term effects on later decision making processes. After initial decision-making and actively pursued choices, eventually resulted in the farmer making constrained choices: evidence suggests that the chosen technology defined animal welfare conditions (see 2.1.), and as a consequence destined the quality (see 4.1.3) and the market (see 4.2.1.) of products, which was very hard to change later on.

First and foremost, all participants unanimously agreed that farming technologies and methods greatly determined animal welfare conditions:

> "How much does technology affect animal welfare conditions? Well, I think by 80%, 80 or 90. If the technology is appropriate and management is good…Obviously bearing in mind that proportions are also relevant. If I

> have 1500 pigs…or cattle and there are 3 lame individuals, then overall my system is acceptable"
> Expert Joanna

Therefore, decisions related to farming technologies and methods were highly relevant and it was noted that once farms were established, and the technology was decided, subsequent choices available to farmers were increasingly limited and the adjustment of animal welfare conditions were much constrained. While both groups of participants claimed that common sense also had its share, many farmers seemed to constantly engage in experimenting with or fine-tuning their technologies or farming methods. Farmers therefore claimed to "tweak" technologies; however it was soon evident that adjustments were only able to address a certain, limited range of issues. For example, famers would modify the content or amount of feed that animals were provided with, change or upgrade the watering system to improve access to water, or ensure higher space allowances to group housed animals by stocking one pig less in each pen. These adjustments of an established system addressed the emerging needs of the stock; however they were all carried out within the well-defined frame of the farming method chosen. Any adjustments beyond these would require major alterations, which were only possible if certain pre-conditions were met:

> "We make adjustments, but once the system is up and running, we have to keep it running. This means that we can only make adjustments that keep the system going…which will definitely be advantageous…Otherwise the project could easily backfire…So we do experiment, but we cannot take major risks…With welfare, I really don't know how we could progress. We do not have the capacity to work on it, and our farms offer limited possibilities for major adjustments…Honestly, I think we need help…We need the support of well-meaning experts to find solutions on how we could make thigs better for our pigs"
> Conventional Farmer Peter, post-interview notes

So, while fine-tuning was possible, important constraints were noted for both conventional and alternative operations. First, farmers needed time, available capital for development and financial security to ensure the continuous operation of the enterprise, even if the investment

negatively affected productivity measures, and most importantly the help of well-meaning experts, who would assist them in their endeavours. Second, it was noted that available space was also needed to make major improvements. In this case, due to farm efficiency measures and the fixed nature of in-built technologies, conventional farms seemed to lack the physical capacity to make major adjustments, while alternative farms were more able to address emerging needs. Third, the cost of existing, in-built and new conventional technologies severely limited the possibility for investment in any provision that was not clearly identified as a necessity or a legislative requirement. This point was less relevant for alternative farms.

As the continuous operation of farms was also understood as a technical and financial necessity (see 4.2.3.) and an ethical obligation (see 5.1.1.), it was found important to reflect on the consequences of these constrained choices farmers were experiencing: once a farm was up and running, farmers had a strong drive to progress within the boundaries of the established farming method. This meant that development was pursued in ways that was – economically speaking – safe, ensuring some sort of technical, management, or welfare advantage without risking the future operation of the farm. The willingness and enthusiasm of conventional farmers, and in some cases even alternative farmers, was therefore greatly affected. The majority of participants were preoccupied with day-to-day problem-solving, and so were consciously or unconsciously postponing plans and innovative ideas to the indefinite future.

Hence, it was evident that once a farming operation was running, technological adjustments were severely constrained on conventional farms, and somewhat challenging on alternative farms:

> "Different farmers are trying to change things; to see [for example] what stocking densities they could ensure that meet animal welfare standards and

> still be economically viable…They need to prioritize economic goals, [conventional farmers] have to settle in with compromised animal welfare standards…To achieve optimal conditions…and to balance out…animal welfare, animal health and economic interests is an art"
> Expert Samuel

This compromise, illustrates the inclination of conventional farmers to put up with standards lower than what they perceived as the ideal, while in the case of alternative farmers, a clear determination to resist any such farming method was noted.

6.4. Discussion and conclusions

The present chapter aims to explore deliberations on ideal and realistic farming methods articulated by experts, conventional and alternative farmers. While the previous chapters outline major external pressures on livestock farming and internal norms of livestock farmers, the current chapter presents in particular how farmers navigate between these two important influences, especially regarding technology-related decisions, and how they perceive the extent of their possibilities.

How do farmers comprehend the ideal and realistic future of farming and livestock welfare? How do these views influence the current decisions of farmers?

This chapter outlines deliberations of farmers on farming and livestock welfare, which are perceived to:

1. Present a shared understanding of conventional and alternative farmers on the "ideal scenario", which represents the most welfare friendly livestock production system and is close to current alternative production methods, and the "realistic scenario", which represents the least welfare friendly livestock production system and is close to current conventional production methods;

2. Indicate factors which possibly determine how farmers make technology related decisions and choose to pursue conventional or alternative farming methods;
3. Enable alternative farmers to navigate between external pressures and internal norms, and harmonize their ethical convictions with actual decision-making to a higher degree than conventional farmers.
4. Identify that the possibility for technological adjustment is more feasible on alternative farms, but is heavily constrained in conventional livestock operations;

Findings illustrate that farmers struggle to imagine a transition in the livestock sector to the "ideal scenario", especially in the current, ethically compromised scenario and highlight that their shared understanding that a radical transformation is necessary to decrease the effects of major external pressures (Chapter 4) and enable the possibility for all livestock farmers to respond to their internal norms (Chapter 5). Based on the findings of Anderson (2011) reform in this case means the establishment of a structure in which social principles, agricultural practices and trade methods are consistent and deliver a system that is stable, controlled, transparent, coherent and mutually beneficial for all parties concerned, ensuring the delivery of human, animal and environmental interests alike, even if current "powerful economic forces" oppose the change (Chapter 4).

Findings also indicate that ideal conditions are imagined to ensure these goals via the adoption of near-extensive, diverse, organic, rotation based farming systems, comparable to the alternative farms observed in the present study (see Chapter 7). They highlight the adoption of principles that both enable interaction with animals, but at the same time ensure good lives for animals, and in this sense reinforce the premises of an animal welfare ethic as outlined by Fraser (1999, 2008a, 2010, 2012, 2016), Fraser *et al.* (1997), Winter *et al.* (1998). The core of

the ethical dilemma, namely whether interactions with livestock may continue, seems to be resolved in an attempt to provide good lives for farm animals. Alternative farmers reinforce this point, and also emphasize that the ideal scenario allows the continuation of their established practices. In this case the narrative is not about facilitating a transition to a "better" system, but preserving and if possible spreading an existing "good" system. Hence, these findings are distinctly different than those "ideals" offered by the counter-discourses of a welfarist perspective, especially presented by Bekoff *et al.* (1992), Francione (1996, 2010), Singer (1975), and Regan (1984).

In agreement the work of a number of welfare scholars (Chapter 2) but Fraser (2012) in particular, the practical example of the ideal scenario illustrates a farming system that operates in the absence of restrictive technologies and limits the use invasive practices. Products are both locally and regionally sold through a process of active marketing, which reinforces an idyllic, open and welcoming image of livestock farming operations, and the accessibility of both the farmer and livestock. Findings therefore suggest that the ideal scenario is imagined to be unlike current mainstream farming methods and marketing approaches.

In contrast, the realistic scenario of livestock farming is framed as an inevitable outcome of present practices and arrangements, and findings indicate that most participants find this imagined future to be highly problematic. Findings indicate that in absence of a structural reform, the continued increase of human populations, and environment induced challenges elevate pressures inflicted on agriculture, strengthening socio-economic processes that favour a further increase in the production of "safe", "affordable" and "abundant" food, on less land and using more "sustainable" practices to decrease the environmental footprint of livestock agriculture. While data suggests an increase in the market share of unconventional protein

sources (alternative products, such as insects, and meat substitutes), in contrast to the theories of Bekoff *et al.* (1992), Francione (1996, 2010), Singer (1975), and Regan (1984), it is widely assumed that the human diet will not shift radically, and as Webster (1994b, 2005) finds, meat eating will continue.

Hence, findings indicate that a continued concentration and intensification of the sector may take place. This drive for efficiency is imagined to arise from the same "forces" that have brought about conventional livestock systems resulting in changes such as further "improved" livestock genetics, health, and management practices as captured by Fraser (2008b), Perfecto *et al.* (2009) and Rollins (2008). In addition, a drive for increasingly efficient buildings, refined automated technologies and the use of sustainable and/or renewable energy sources is also highlighted, which potentially deliver environmental protection benefits, but at the same time further induce the separation of environmental and animal welfare agendas highlighted by Greenawalt (1986), and enhance the process of technological "lock-in" described by Cowan & Gunby (1996), Foray (1997) and Perkins (2003). In this scenario livestock welfare is only considered if productivity and economic contributions are ensured, in agreement with the findings of Brennan & Lo (2008) and Callicott (1984). Therefore, the realistic scenario suggests that animal agriculture will not transition into a mutually beneficial arrangement and business interests will further impact traditional care principles, and define the level of human and animal welfare. In the imagined realistic scenario, these may only be counter-balanced through "protective" state interventions that decrease competitive pressures.

The working example of the realistic scenario demonstrates a farming system already operating by a highly efficient, fully conventional and further specialized method. The farm provides the impression of being closed and inaccessible, and neither the farmer, nor livestock

are observable or accessible. In addition, specialized housing enables the wide application of restrictive technologies and invasive practices. Findings therefore indicate that the realistic scenario is believed to be more efficient, but in terms of livestock welfare is otherwise similar to current conventional practices.

Findings also reveal that early, direct experiences (personal interaction with animals, role models) and arising opportunities (education, business) influence decisions taken by farmers. Technology-related decisions however, are not straightforward and data suggests that a combination of several influences (see Chapter 5) such as available capital (objective), a determination of what feels "right" (subjective) factors, as well as opportunities to produce for a certain market niche (rational) all had their effect. While evidence suggests that conventional farmers are more inclined to reflect on external pressures and business opportunities and alternative farmers are more driven by their internal deliberations (Chapter 5), in contrast to the findings of many social science studies it does not provide solid evidence to suggest that one group of farmer makes more ethical "initial decisions" than the other. Indeed, data suggests that alternative farmers possess a higher sense of agency than conventional farmers and therefore believe they can resist mainstream production trends, while conventional farmers are often overwhelmed by external pressures and aim to adapt. Hence, these personal traits may also influence decision-making processes enabling alternative farmers to make more consistent decisions, striking a better balance between external pressures and internal norms than conventional farmers.

In line with the works of Cowan & Gunby (1996), Foray (1997) and Perkins (2003), results indicate that once livestock farms are in operation, conventional farmers in particular can only make constrained choices. Earlier work in animal welfare carried out by Fraser (2014),

Gonyou *et al.* (1986), Hemsworth *et al.* (1987 a,b), Jones (1993), Rushen (1986), Seabrook (1984) finds that technology and the skills of the farmer are able to determine livestock welfare conditions; in addition they can affect the quality and the market of livestock products. Technological adjustment or upgrading was found to emerge when regulatory standards changed or the need to further optimize production emerged. Otherwise farming methods are only possible to transition if there is ample time, space, capital (for investment and continued operation), and the help of well-meaning experts to assist the process. As the majority of conventional farmers are vulnerable (Chapter 5) and do not possess any of these elements, the possibility for major technological change is severely constrained, and farmers are only able to "tweak" their farming methods to increase productivity or animal welfare standards. Hence, conventional farmers engage in technological adjustments within the boundaries of the established farming strategy, while alternative farmers are less restricted to make technological alterations.

Conclusions

The present chapter provides an example of how external pressures and internal norms affect the perspectives of farmers. Results suggest that the ideal scenario is the most, while the realistic scenario is the least livestock welfare friendly outcome envisioned. To be able to ensure the best-possible outcome for livestock, findings indicate the need for a more complex and strategic reform-effort. Both conventional and alternative farmers reflect on their personal ethical perspectives, but alternative farmers possess a higher sense of agency and are thus more able to harmonize personal convictions with the farming methods they apply.

Chapter 7. Observations of pig farming methods and livestock welfare

The present chapter is based on observations carried out by the researcher on conventional and alternative farms after conducting interviews with farmers. It aims to outline present day pig farming methods and animal welfare conditions, to assess in particular the ability of farmers to respond to their ethical convictions.

Significant concerns have emerged over the welfare of livestock farmed in conventional and alternative systems, and there are many publications available analysing the state of pig faming and welfare conditions, including academic papers, advocacy documents, and position papers by authorities. These reports contain a multitude of evidence, descriptive, quantitative and visual data; however, to date insufficient attention has been committed to triangulating such evidence to other sources of information. This chapter therefore aims to provide descriptive and visual data in order to analyse the extent of farmers' ability to pursue - in practice - their ethical convictions, to comparatively assess the level of correspondence between interview data and on-farm observations.

The chapter begins by outlining observations on the countryside, the landscape and farm exteriors. Next, a detailed examination of farm interiors will be presented, with special reference to farming technologies employed on conventional and alternative farms. In addition, observations will be outlined on white pigs, mangalica and wild boar, with special reference to animal welfare issues for breeding livestock, piglets and fattening pigs. The following section will present final impressions of the researcher. The chapter will be concluded with a short discussion of findings.

7.1. The countryside, landscape and farm exterior

In comparison to earlier experiences and observations of rural life until around the mid-2000's, by 2015-16 the countryside has been found to undergo major transformation. The change was most apparent for households, and resulted in the abandonment of small-scale, self-sustaining agricultural practices. The majority of gardens where formerly chicken and pigs were kept, fruit and vegetables grown were now either neglected or were transformed from functional into more aesthetic spaces. Thus it was evident that small-scale, subsistence food production was relocated and that only a fraction of backyards were used for agricultural purposes. Even in villages the keeping of livestock has become a rarity (Figure 33).

Photograph 22. A rare sighting of small-scale, self-sustaining practices
While in the mid-late 1990's livestock would be kept in village households, by 2015 and 2016, the possibility to observe farm animals, including larger species like cattle would be a very rare sighting, indicating the displacement of small-scale, self-sustaining agricultural practices (source: the author).

At the same time of reporting a negative trend in small-scale livestock farming, a positive trend in the number of grocery shops and other service oriented businesses was noted. The growth of service industries was apparent from the early 1990's onwards and during the course of the research was widely observable. Both the number of retail entities and the availability of products increased: two decades ago only the essentials were found in

countryside shops, but at the time of data collection customers were offered both a wide choice, and large stocks of products.

While the above described trends were noted, an issue that remained unchanged was the paucity of livestock on pasture. In the 1990's as well as in 2015 and 16, apart from the occasional sight of a small herd of cows, flock of sheep, or horses, farm animals were almost absent from the landscape. Land used for agricultural purposes was used for monoculture crops; wheat, corn and sunflower being the most apparent and widely available. Orchards and vegetable fields were very rarely observed, and several sightings of abandoned greenhouses were also noted. In addition, land was worked by machinery and manual labour was only observed on one occasion (Figure 34) during the entire course of this research.

Photograph 23. Observation on manual labour
Throughout the course of this research only one person was observed to practice manual labour (hoeing vegetables, see arrow) out in the fields. Note that the scale of the open field surrounding the person was extensive, which the photograph was unable to capture adequately (source: the author).

Leading up to farms, a number of interesting features were observed. The typical conventional pig farm seemed easy to describe: these enterprises were located at the edge of smaller villages, often surrounded with some area to buffer production externalities, such as environmental pollution and the smells, traffic, and dust associated with the livestock

operation. Farms would often be located near to or with good access to highways, aiding transit of in and output "materials". The fences surrounding the farms indicated their importance, and information signs were also widely apparent. Some of these would inform passers-by that the area was used for livestock farming operation, stating that access was not permitted. Reasons for limiting access ranged from "biosafety", "guard dogs" or "dangerous animals", even extending to "high value livestock". Many farms also displayed billboards indicating that the farm underwent technological upgrading, refurbishment or other types of development (Figure 35). Farm surroundings were always functional: the rows of almost uniform buildings were noteworthy. Also, buildings were often able to indicate specialization, and provide a clue to the scale and the technologies applied (Figure 36).

Photograph 24 & Photograph 25. External features of conventional farming operations
Photograph of a billboard indicating technological upgrading (left) were characteristic sightings. Large-scale conventional pig farms had long and narrow buildings in close proximity from each other (right). They did not possess outdoor enclosures, but had a number of relatively small windows and large silos installed. Often the indoor ventilation system was also apparent from the outside (source: the author).

Alternative farms were much harder to characterize (Figure 37). While they would also be located near smaller villages, they were often away from major roads or highways. Some of the farms were located within village neighbourhoods, while others were either on the edges of villages or well away from any neighbourhood, "hidden" at a forest rim. Fencing was again an apparent feature of these farms, but there were less visual indications of the type of

operation or the acquisition of funding than in the case of conventional farms. Alternative farms were clearly different from conventional operations (and other alternative farms) in terms of the buildings they possessed, hence, leading up to farms it was very difficult to predict the technology applied. Visual clues such as the presence of outdoor runs or the absence of silos finally gave some indication of the method, which was confirmed only on inspection of the whole farm. In addition, there was a tendency for alternative farms to engage in small-scale, non-commercial agricultural production (Figure 38) indicating a more diverse approach than in the case of conventional farms.

Photograph 26 & Photograph 27. External features of alternative livestock operations
Alternative pig farms were difficult to characterize: the plots, the buildings and their arrangement greatly diverged. Some of the operations possessed buildings with outside runs (left, note: the water tower in the background belonged to a neighbouring conventional poultry farm), others also engaged in a more diverse agricultural approach, such as a small-scale, self-sustaining vegetable garden (source: the author).

7.2. Farm interior

7.2.1. Air quality

Air quality was to ensure conditions, climatic and air quality attributes that were sufficient to sustain the health of livestock. The more time animals spent indoors, the more technological solutions were found in place, thus conventional and alternative farms applied different approaches to ensure that these objectives were met.

All of the conventional farms applied mechanical ventilation: indoor air was predominantly moved by fans installed either on the roofs or side walls of sheds (Figure 39 & 40), creating a constant flow of air. Farmers claimed that good ventilation prevented the build-up of unwanted, potentially noxious gasses (especially of carbon dioxide, methane, ammonia and hydrogen sulphide the "typical" manure gasses), dust, odours, and positively contributed to thermoregulation.

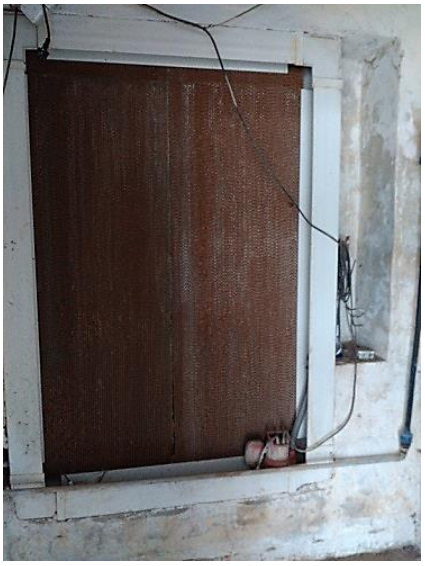
Photograph 28 & Photograph 29. Air ventilation systems of conventional livestock units
Fresh air was predominantly picked up through the windows, while used air left the buildings via a mild air current that was generated by fans installed on the sidewalls (left) or the ceilings (right) of the buildings (source: the author).

During farm observations it was not possible objectively measure indoor air quality, however, important differences where observed. The size of buildings, the number and size of animals housed in them, the efficiency of the fans, outdoor temperatures or humidity all determined what the environment "felt like", and this differed greatly from farm to farm.

Conventional farmers aimed to ensure constant, near optimum air quality. During moderate temperatures, farmers could easily rely on the automatic system, however it was noticed that during "extreme" outdoor temperatures[8] (cold winter and hot summer) additional attention

[8] While on-farm observations took place from November 2015, until July 2016, it is important to note that the winter was mild, with temperatures ranging between +8 °C and -8 °C and the average was 0-1 °C (see:

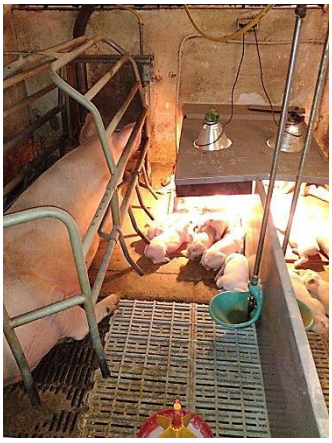
was taken to mitigate any negative outcomes. In the case of heat for example, some farms applied extra cooling systems (Figure 41) or would try to manage heat by opening barn doors or windows to create a passive air current.



Photograph 30. Water filter system in conventional farming operation
The system was designed to increase the sensation of indoor thermal comfort on warm summer days, but pulling through a curtain of water clean, moistened air (source: the author). Note that the filter was not in operation.

In the case of moderately cold weather, farmers did not heat the buildings (note: cooling was more challenging) but kept the barns warm with the excess heat pigs were giving off. Only in the case of extreme or prolonged cold weather was additional heating necessary. It is unsure how barns were heated, as the direct observation of permanently installed heaters in enclosures of the breeding and fattening stock was limited. Piglets however were all provided with heating from birth until some-time after weaning (differed from farm to farm) either in the form of infra-red lights (Figures 42) and/or via purposefully installed areas of floor-heating (Figure 43).

http://www.met.hu/omsz/OMSZ_hirek/index.php?id=1521&hir=Eghajlati_visszatekinto_%E2%80%93_2015/16-es_tel_idojarasa).



Photograph 31 & Photograph 32. Piglet heating systems
On the left young piglets are kept on a concrete floor with an infra-red lamp surrounded by an "open shelter" creating a warmer micro-climate. On the right, recently weaned piglets were trying to gain access to the floor-heated surface of the pen. Note how both groups of piglets were huddling together in the most preferred areas of their enclosures (source: the author).

In addition to outdoor temperatures, farmers emphasized that building design, technologies adopted and the quality of maintenance also greatly affected indoor climatic conditions and air quality attributes.

It is important to note here that the majority of farms operated in "partially" or "fully" refurbished, old buildings, which farmers claimed imposed a number of challenges affecting air quality. Issues such as the size of windows and the capacity of fans were central, visible and – given the availability of funds – were also relatively easy to adjust. However, the most significant technological problem emerging during the observations was related to the depth of slotted floor operations. The majority of the barns were refurbished, but the ceiling, walls and foundation, including the sewage system remained unchanged. The technology is known: excretory falls and accumulates underneath buildings, eventually being led out into storage tanks. The deeper the pit and the lower the outlet canal the better; managed adequately it would prevent the build-up of manure gasses within the housing environment, thus

contributing to better indoor air quality. However, the majority of the observed buildings were outdated, thus often failed to have deep systems (Figure 44).

Photograph 33. Manure pit under slotted floor operation
The depth of the manure pit was an important element of slotted floor operations. A number of refurbished buildings possessed shallow, outdated sewage systems. Note that in the present case the farmer aimed at finding the best possible technologies for ventilation, feeding, and flooring, however the roof, walls and the foundations of the building, including the pit and canal system, remained unchanged (source: the author).

Farmers were unable to replace outdated buildings, hence faced constant challenges imposed on them by poor building design, which was found to be difficult to compensate or mitigate. But some farmers claimed to manage such inherent challenges. Based on the observations, it was possible to suggest that the quality of management was able to compensate "imperfect" buildings and technologies to a certain degree sufficient to maintain the health of animals and keep the farmer in production. However, this was found to be a "costly" solution; while the whole purpose of conventional systems was to decrease input costs, the need for increased management meant that the system was not operating "efficiently" and farms with more efficient technologies, would be able to outcompete these farms. At the same time, farmers claimed that the opposite was also true: the most perfect, state of the art technology was unable to function without careful management. Yet during observations, all farmers agreed

that there was a race in technological inventions manifesting in decreasing production costs, and air quality was a good example of that.

When looking into air quality on alternative farms, the picture was found to be quite different: as the overwhelming majority of the animals were kept outdoors or had *ad lib* access to outside runs, so the question of air quality was predominantly an issue of limiting and/or mitigating climatic challenges (Figure 45 & 46) to which the animals were exposed to.

Photograph 34 & Photograph 35. Outdoor alternative farming operations
Air quality was not a problem under alternative livestock systems. Animals were well adapted to the climate, were provided by farmers with provisions tailored day-by-day to the existing challenges or needs of the animals (e.g. water to wallow in warm, straw for warmth and shelter in cold weather), and finally the animals were free to respond to and act upon their own motivations (source: the author).

Nonetheless, some farms kept animals indoors. Sows for example, would farrow indoors, but on the majority of farms would only spend days inside. Some farms would keep fattening pigs indoors or in semi-covered sheds for a sufficient amount of time (Figure 47). Due to the lack of any mechanical ventilation these animals were observed to be susceptible to air quality related challenges: indoor temperatures would depend on outdoor climatic conditions, and air quality attributes would depend on how the buildings/enclosures were managed. Most of the animals were kept on concrete flooring, with or without bedding (depending on both the farm and/or the season) hence more intense management was necessary to prevent the build-up of

dust or manure gasses. Draft could also be an issue of concern. Hence, during observations it was noted that in warmer weather, all doors and windows would be open to provide passive ventilation and barns would also be cleaned every day to prevent the build-up of excretory (Figure 48), while in cold winters farmers would prevent passive ventilation and provide the animals with more bedding.

Photograph 36 & Photograph 37. Indoor alternative farming operations
Further fattening pigs in semi-intensive alternative farming systems were found to be prone to air quality related problems. Note the lack of ventilation technology and the observed need for constant passive ventilation through open doors and windows (source: the author).

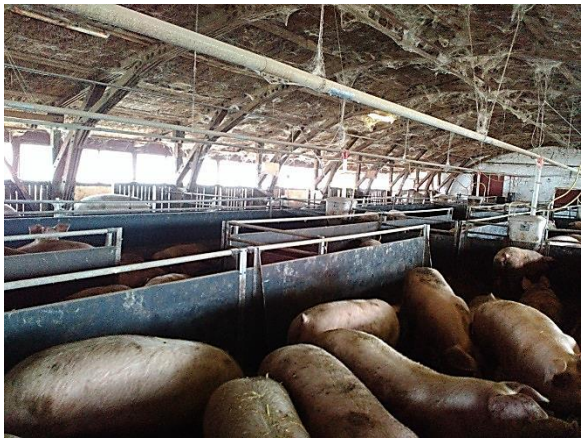
Hence, animals kept indoors on alternative farms would be very intensively monitored and managed to ensure adequate air quality attributes, yet it is evident that this approach depended on the quality of management, acknowledged to be both costly and also prone to human failure. At the time of farm observations no such malfunctioning was noted, and farmers claimed that they were highly committed to prevent any instances from occurring.

7.2.2. Light

Observations took place during working hours and in daylight. The main purpose of providing animals with light, as opposed to keeping them in darkness included a number of issues: the adequate “functioning” of animals, the facilitation of on-farm duties, including the

day-to-day managing of the farm, the maintenance and inspection of buildings, appliances and the animals also emerged. In terms of breeding sows, the synchronization of sow reproduction was also a clear objective of farm lighting.

On-farm observations suggested that standards of lighting greatly differed between farms. Some partially or fully refurbished conventional operations pursued lighting buildings in a way that would ensure all purposes (functioning, managing, and synchronization of breeding), yet others seemed unable to meet some or any of the requirements (Figure 49 & 50).



Photograph 38 & Photograph 39. Lighting in conventional farming operations
Lighting appliances on the left seem to compensate for the lack of adequate natural light (due to small windows) and enabled sound management. Note that the installed appliances were able to light each box without leaving shaded areas. While there is ample natural light coming in through the large windows on the right, from the eye level downwards, the animals were shaded. The infrequently and inappropriately installed light appliances therefore were unable to achieve their purpose (source: the author).

Hence, lighting was only sufficient if appliances were installed in a purposeful manner. In ideal circumstances during daytime bright lights should be used to evenly light up enclosures and provide adequate lighting for the animals and the workers. However, at dusk and dawn dim light sources should be used, while for night time inspection and/or treatment portable spot-lights would be necessary. None of these appliances were observed on the farms, suggesting that animals with little natural light sources were either in bright lighting or in

relative darkness with rapid, maybe even unexpected alternations. Another important observation was that the majority of farmers turned off lights when leaving barns. This practice greatly endangered all three purposes of lighting, but especially the possibility for animals to adequately "function" in indoor environments. While farmers claimed an increasing interest in renewable energy sources, it was evident that the main objective was to decrease input costs related to electricity.

Alternative farms did not synchronize the reproduction cycles of sows by "artificial" means; nonetheless the issue of lighting was still relevant. Outdoor enclosures did not require any lighting during the day and only in special circumstances (inspection or treatment) during the night. Farm observations indicated that lighting was generally problematic for both indoor and outdoor facilities (Figure 51): some of the indoor facilities did not have any or had very small windows (Figure 52).

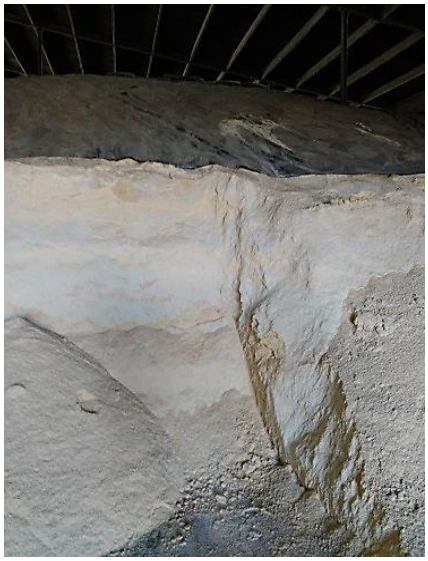
Photograph 40 & Photograph 41. Lighting on alternative farming operations
There was no need to light outdoor enclosures during daytime; however it may have been necessary to provide some outdoor lighting for management related duties (left). Indoor environments were often poorly lit and in some cases lighting was missing completely (note, this was an issue for the run area, not the shelter, source: the author).

It may be suggested that lighting on alternative farms was often problematic, especially for animals kept indoors. However, as natural light sufficiently facilitated functioning and sow

synchronization purposes, ineffective artificial lighting only seemed to influence farm management only.

7.2.3. Feeding technologies

The farming approach affected feed sourcing, composition and distribution technologies. Conventional farms aimed to minimize production time, hence opted for protein rich feed with high conversion rates (Figure 53), easy palatability and even quality. To counterbalance low vitamin content, the supplementation of certain components was found necessary. In contrast, alternative farms, especially those using more traditional, slow growing breeds of animals, did not aim to minimize production time (fattening was on average double the time than on conventional farms), hence they provided a more "balanced" and diverse diet to animals, including the provision of silage (Figure 54), surpluses (from other farming operation) or even edible "wastes" (donated by supermarkets).



Photograph 42 & Photograph 43. Observations of animal feed in conventional and alternative operations
Animals kept in conventional systems were fed with a stable, pre-defined diet rich in proteins (left), while animals on alternative farms were fed with a more diverse diet (right), which often included silage/roughage and forage (source: the author).

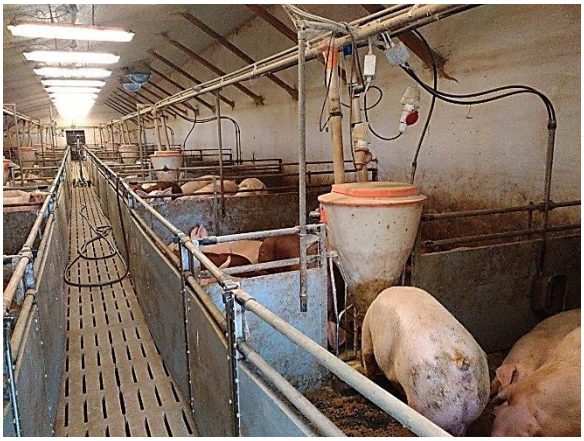
The majority of conventional farms and some alternative farms sourced feeds from specialized companies. It was interesting to note that only a minor group of alternative farmers were determined to provide livestock with organic feed (though they did not possess organic certification). In general, feed would arrive to farms ready for consumption: it would be ground or pelleted, in bags that were easy to store and handle. Some farmers purchased grains separately and mixed their own feed by grinding and/or pelleting it on the farm. This method was more laborious, but it allowed farmers to define the contents of the feed. Farms opting for this strategy required large-scale storage to keep the feedstock clean and dry, and appropriate machinery fit for the scale of the farm and maintained to ensure frequent operation (Figure 55 & 56).

Photograph 44 & Photograph 45. Feeding machinery in conventional and alternative operations
A conventional farm feed grinder (left) and alternative farm pelleting apparatus (right) illustrate the differences between the scales of the farms. Note both machines were in operation (source: the author).

Feed would be channelled through automated systems from storage and delivered directly to livestock (Figure 57). In some cases the feed was manually taken to the dispenser, especially for neonatal and young piglets, but the tendency was to use automated technologies where possible. Although the latter system required more time and physical work, it was found that irrespective of the feeding system, both automated and manual feeders needed constant

monitoring and management. An important difference between the two methods of delivery was that automatic systems offered the much appreciated possibility of portioning and monitoring feed intake. Portioning was claimed an essential element especially for pregnant sows, which were not fed *ad libitum* while housed individually, and feed intake monitoring was used as an indirect indicator of health and weight gain, especially for fattening animals.

Livestock in alternative systems were allowed to feed *ad libitum* and animals kept in large, outdoor enclosures were observed to supplement feed with forage (Figure 58). Alternative farms predominantly used regular feed dispensers; however a small number of operations either had or were planning to install automatic feeders for the fattening stock (kept indoors) only.



Photograph 46 & Photograph 47. Automated conventional and manual alternative feeders
Conventional livestock systems fed livestock via automated systems taking feed from storage to the animals. Neonatal piglets and in some rare instances young piglets were fed manually. Alternative systems predominantly fed livestock manually, moving feed from storage to the dispensers with manual labour. Only some farms experimented with automated feeding systems for the fattening stock (source: the author).

While the feeding technology seemed to depend on available capital, the preferences of farmers were also evident. The primary objective of dispensers was to provide animals with feed, but at the same time another priority was to minimize losses in both conventional and alternative operations. The majority of dispensers were for dry feed, while some allowed the

animals to mix feed with water. Some farms offered feed that was readily available, while on one conventional farm livestock had to "work" for their feed (press leaver, making pigs apply "rooting behaviour"). Only one conventional farm fed livestock (pregnant sows) with feed that was portioned automatically for individual animals (Figure 59).

It was not possible to make any clear judgements on the performance of the dispensers observed, especially with regards to preventing aggression over food. Nonetheless, conventional farmers claimed that the intake of white pigs needed to be managed, while alternative farmers claimed that animals did not overeat, hence they could be fed *ad lib*. Methods to overcome food aggression in conventional systems included several options: dispensers that would allow animals to feed at the same time, provide *ad lib* feeding, or to house animals individually. On alternative farms *ad lib* feeding and dispensers allowing the consecutive feeding of more than one animal seemed to solve the problem of food aggression. Nonetheless farmers did make comments during the observations on whether they thought the dispenser they used was appropriate or not (Figure 60). It was noted that conventional farmers were more critical about feeders than alternative farmers.

Photograph 48 & Photograph 49. Observations of automated sow feeding systems
The photograph on the left shows a system that was much preferred by the farmer (source: farmer Peter). Sows were fed a standard amount of feed, dispensed at the same time into the troughs, and – due to the individual compartments - allowed sows to eat undisturbed from each other. On the right is a system that the farmer clearly disliked. Although the manufacturer of the technology claimed it had many benefits, in practice the system was found to be disadvantageous. Dominant sows stationed themselves at the entrances of the feeders, preventing subordinate sows from entering, or even rushing these sows to pick up their leftovers (source: the author).

While some conventional farmers were critical of their own feeding technologies, they also acknowledged that installed feeders "were to stay" to "serve their time". Hence, conventional systems once again seemed difficult to adjust.

7.2.4. Watering technologies

Watering technologies were simple in all operations and are therefore probably the easiest technological element to describe. The aim of watering was found to be straightforward: to provide fresh drinking water to all animals at all times.

The overall strategy on conventional farms was to provide animals with water through automated systems. Water consumption was often monitored and used as an indicator. Increased intake would alert farmers to check upon animals for e.g. fever or signs of heat stress. The source of water varied between regular tap water and water taken from wells (assessed and approved by authorities). Depending on the age of the animals, watering

technologies would include drinking nipples or troughs, and there would be some variation in the number of water sources per enclosure. A large number of group housing facilities only offered one water source, some offered 2, and only in the case of large groups (about 20 animals) were animals provided with more (Figure 61).

Photograph 50. Water source in conventional group housing operation
Group housed animals were provided with one water source for on average every 20 individuals (source: farmer Peter).

Another interesting feature noticed on some conventional farms was that medication was connected to the water system and administered to all of the animals, indicating large scale and regular use.

Alternative farms were distinctly different in their methods of watering animals (Figure 62 & 63). Automated systems were very rarely used, and animals were provided with water in troughs. Water consumption was not applied as a health indicator, and monitoring seemed to be focused only on ensuring that water was available. In some rare cases the source of water was not obvious.

Photograph 51 & Photograph 52. Water source in alternative group housing operation
The majority of alternative livestock farms watered their animals by using different types of troughs (left). Note that after heavy rainfall, water also accumulated in the enclosure and pigs were drinking from these pools. Some farms possessed automatic watering systems, in this case (right) the farmer used a large plastic bucket and installed a toilet refilling device to ensure the continuous availability of fresh drinking water (source: the author).

The quality of water was another issue in which conventional and alternative systems differed greatly: a number of alternative farms provided water that was already soiled or stale. Keeping troughs clean is an obvious challenge and continuous task in livestock farming, which may explain some of the instances observed, however with time it gave the impression that water quality was either not a priority or the farmers did not have enough capacity to ensure it constantly on a number of alternative farms.

Photograph 53. Drinking trough in alternative system
This photograph was taken after heavy rainfall nonetheless the colour of the water indicates that even though the trough was connected to a water pipe, it has not been cleaned for some time (source: the author).

Finally, it was interesting to note that the issue of watering rarely emerged during interviews and on-farm observations, even though some experts believed that it was a crucial, often underestimated issue.

7.2.5. Flooring and manure

Conventional and alternative systems greatly differed in terms of flooring; while conventional systems operated with slotted floor enclosures, alternative systems predominantly applied solid floor technologies. It is important to point out however, that differences also occurred within systems.

Conventional operations differed in terms of materials they used for flooring. Depending on the age of the farm or the time it was refurbished, the older operations would use metal flooring for piglets and concrete flooring for the breeding and fattening stock (Figure 65). Modern or modernized farms would apply different types of plastic flooring (especially slot size) for young piglets and larger pigs. Also, old and new technologies would apply vary in the amount of floor provisions given to the animals, with piglets having had the most, and fattening livestock the least chances of resting on non-slotted areas. Finally, slotted floor systems were unable to accommodate bedding materials, and semi-slotted and slotted floor operations did accumulate manure, hence the more intensive management of these combined systems was found necessary.

Alternative farms predominantly kept animals “on the ground”, in natural enclosures. Here it was evident that the longer the animals used these outside runs, the more signs of overuse were evident. Only one farm possessed enclosures, which were frequently “rested” to allow the recovery of the soil and grassland. Animals that were kept indoors or had *ad lib* access to

outdoor enclosures were predominantly kept on concrete flooring (Figure 66). Depending on the overall strategy of the farm and/or the season, animals would be provided with bedding continuously or seasonally. It was evident that open runs were not cleaned at all, while concrete flooring was regularly cleaned and bedding (if provided) was changed on a daily basis. The only exception of frequent cleaning was the deep litter system observed for fattening animals on two alternative farms. Here fresh bedding would be placed on top of old bedding, accumulating until the animals were taken to slaughter.

Photograph 54 & Photograph 55. Flooring in conventional and alternative operations
Observations of flooring included the use of concrete in conventional slotted floor operations (left) and alternative technologies (right), in the latter case the animals were provided with bedding.

It was evident that the flooring system also pre-defined manure handling and storage methods. The conventional systems conveyed liquid manure into storage tanks (Figure 67). Only one farm still operated with an open pool system. Alternative farms produced a mix of straw and manure that was collected in heaps (Figure 68), while in some cases manure was collected in a concrete storage area.

Photograph 56 & Photograph 57. Manure storage on conventional and alternative operations
Conventional farm liquid manure storage tank (left) and alternative farm manure heap (source: the author).

Farmers spoke at length about the importance of manure as a fertilizer, and highlighted difficulties associated with storage and disposal. The main strategy of conventional farms was to use manure on arable lands injecting liquids into the ground with special machinery. Depending on the size of the enclosure, manure in outdoor operations would stay on the ground, while manure in indoor operations would be distributed on nearby plots. In this case no special machinery was used.

7.2.6. Partitions, walkways and space allowance

Partitions and walkways were identified as principal features of conventional farms (Figure 69). Their aim was to constrain livestock to a certain area and a particular group. Partitions were easy to handle (open and close) and clean, and were built of non-corrosive, non-toxic material, unable to injure or harm animals. Walkways within buildings were wide, clear spaces where animals were able to pass easily, without injuring themselves or others. Outdoor walkways were often created of special, portable partitions, but some farms also had fixed structures in place (Figure 70). While the aim of these was to keep the moving stock together and to prevent animals from breaking out, nonetheless, the quality of partitions and walkways differed considerably between farms.

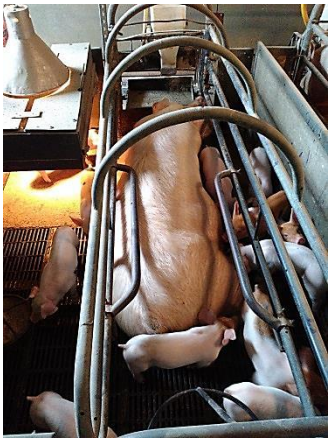

Photograph 58 & Photograph 59. Partitions and walkways on conventional farms
Conventional farm partitions defined enclosure and group size (left), while walkways needed to be open and clean of any obstacles (right) (source: the author).

In terms of space allowances the construction of specialized housing was found to primarily serve key phases of livestock production, especially to maximize output from the phase in question and minimize inputs. To achieve these aims, animal enclosures were fully functional: they were purposefully built to ensure production goals (Table 4), thus space allowances were greatly determined by the aim of the production phase in question and how it was best achieved. Therefore, space allowances represented more of what was efficient rather than what was "good" for livestock.

Characteristics of pig accommodation in conventional farming operations								
Phases	**Breeding**				**Fattening**		**Transition**	
Function	Boar housing	Sows in heat	Dry or pregnant sow	Farrowing sows	Weaned piglets	Fattening pigs	Movement between functional spaces or departure	Sick housing
Animal housing	Individual box	Gestation crate	Group housing	Farrowing crate	Group housing		Indoor, outdoor passage	Individual box
Aim	To stimulate or identify non-conceived sows	To inseminate sows and ensure conception	Prepare to breed and retain pregnancy	To ensure farrowing, piglet safety, suckling, handling and treatment	To ensure efficient fattening, easy handling if/when necessary		To safely move animals between spaces or upload on truck	To stabilize, treat, isolate or prepare for departure
Time spent	Years	Weeks	Months	Weeks	Months		Minutes	Hours-days
Standard duties	Supervision	Supervision Insemination Assess conception	Supervision	Supervision Assisting farrowing (if necessary) Attending to and handling piglets	Supervision Castration Tail docking Early shots (vaccination and iron)	Supervision	Moving	Supervision Treatment
Features	Loose pen	Full restriction	Loose pen	Full restriction	Loose pen		-	Loose pen
Housing	Individual	Individual	Group	Individual	Group		-	Individual

Table 7. Main features of pig accommodation in conventional farming operations

Space allowance was a limiting feature not only for animals kept in full restriction, but (apart from boars and animals kept in sick pens) for all animals kept in conventional systems. It was evident that gestation crates and farrowing crates offered the least space (Figure 71), and in general young piglets were provided with the most space, however in these cases, animals were anticipated to grow quickly and thus take up the "extra" provisions (Figure 72). Space allowances for fattening animals seemed to show some variation, however as a general rule it was observed that the larger the animals, the less space they were provided with.

Photograph 60 & Photograph 61. Space allowances for dry and farrowing sows on conventional farms
The smallest space allowances for indoor housed livestock were for sows in gestation (left) and farrowing crates (right). These animals required the most care and attention for the operation to remain economically viable, hence the technologies ensured that work was carried out efficiently and animals were safe from conspecifics and well fed (source: the author).

The specialized functions of animal housing and the inflexible nature of built technologies resulted in the regular moving of animals. The breeding cycle of sows required the movement or rotation of groups between three different types of accommodation (group housing, individual gestation and farrowing crates) and pigs destined for further fattening were moved at least twice, sometimes also three times. Boars (if kept) were housed continuously in the same individual pens, often in close proximity to dry sows. Sick pens were found within the same buildings as the other stock, often the last in a line of pens. Animals were therefore moved between these specialized areas frequently and many farmers emphasized that in addition to specialized housing and the problem of space allowances, the welfare outcomes of frequent mixing and moving from one system to the next was a greatly underestimated welfare issue that required further attention.

Alternative farms were quite different to conventional systems in all the above features. Most animals kept outdoors were in extensive areas, surrounded by wooden, electric or wire fencing. Often the runs were so spacious, that any physical barriers seemed “invisible” or insignificant (Figure 73). Those farms which kept their stock with outdoor access possessed

partitions that were less apparent that on conventional farms (Figure 74). It was noted that the size of enclosures, the frequency of partitions and the building materials all had a part in creating an impression of the quality of animal housing. In the case of indoor partitions, wood was most frequently used, but in some cases non-corrosive metal structures were also applied. The enclosures and thus the space allowances per animal were significantly larger than on conventional farms, and it seemed that these farms represented more of what was "good" than what was efficient. In some rare exceptions where outdated conventional farm technologies were applied, the impression of these spaces immediately changed. Fences and partitions seemed easy to handle, and overall were found unable to injure or otherwise harm animals, but on some occasions they were found to be of poor quality. Fixed outdoor walkways were not observed and portable partitions were also rarely seen, hence overall fences and partitions were less apparent features of alternative farms.

Photograph 62 & Photograph 63. Partitions on alternative farms
The majority of alternative farms kept livestock in relatively large enclosures, which rendered fences and partitions almost "invisible". On the left, fattening mangalica's were kept in a 2 Ha large run, while the photograph on the right shows partitions in system where animals have outdoor access, illustrating that even in smaller enclosures, partitions were not as dominant features of farms as in the case of conventional operations (source: the author).

In terms of the breeding stock, the majority of alternative farms kept sows in stable groups until farrowing and the bulls were moved between groups and enclosures. Sows would also

be provided with individual farrowing pens (Figure 75). While two of the observed farms did apply farrowing crates and one of these also used gestation stalls, these were uncommon features in the sector (Figure 76). Farmers applying them articulated mixed feelings, and made self-critical, even self-degrading remarks, but emphasized that it was a "necessary compromise" to use such technologies. They also highlighted that restraining equipment was cheap and outdated technology, and was purchased from refurbished conventional farms.

Photograph 64 & Photograph 65. Space allowances for farrowing sows on alternative farms
Farrowing pens (left) and stalls (right) on alternative farms were different from conventional technologies. There was enough space to allow the free movement of sows within the pen. Protective barriers on the sidewalls would ensure the safety of piglets from accidental crushing. Farms that used outdated conventional technologies seemed to provide lower standards than conventional operations, especially in terms of flooring, provisions for piglets, automatic feeding and watering of sow were missing (source: the author).

Therefore the majority of piglets on alternative farms were born indoors, but were socialized into groups and allowed outdoors at an early age. After the young pigs spent some time outside there were farms which applied an indoor method to finish fattening pigs, while others kept them outdoors until slaughter. Space allowances therefore differed considerably for these two alternative systems, but nonetheless, in both cases they were dissimilar to those of conventional farms.

As indicated, space allowance was a highly important feature of alternative farms (Table 5). The most significant dissimilarity from conventional farms was that, while phases of livestock farming were the same, the spaces associated with them were not. Alternative farms were not as functional as conventional farms, but certain areas possessed more multi-purpose roles. Piglets were raised until slaughter weight often in the same enclosures, and sows would predominantly be kept in the same groups and in the same fields or enclosures throughout their reproduction cycles. Hence, neither farm duties, nor the spaces associated with them were as specialized as on conventional farms and there were no "permanent" features observed. Space allowances were the smallest (but overall not restrictive) for farrowing animals and the fattening stock in systems where they were kept indoors. However, space allowance on alternative farms seemed a very relative feature, difficult to define or otherwise associate to conventional systems. Hence, the majority of farms kept animals in the same, generally unrestricted areas for the bulk of their lives.

Characteristics of pig accommodation in alternative farming operations								
Phases	**Breeding**				**Fattening**		**Transition**	
Function	Boar housing	Dry sows or sows in heat	Pregnant sows	Farrowing sows	Weaned piglets	Fattening pigs	Movement between spaces or departure	Sick housing
Accommodation	Group housing		Group housing	Farrowing stall	Group housing		Outdoor passages (if applied)	Individual box
Aim	Breeding		Retain pregnancy	To ensure farrowing, piglet safety, suckling, handling and treatment	To ensure efficient fattening, easy handling if/when necessary		To safely move animals between spaces or upload on truck	To stabilize, treat, isolate or prepare for departure
Time spent	Months	Months	Months	Days	Months		Minutes	Hours-days
Standard duties	Supervision	Supervision Assess conception	Supervision	Supervision Assisting farrowing (if necessary) Attending to and handling piglets	Supervision Castration Early shots (vaccination, iron)	Supervision	Moving	Supervision Treatment
Features				Loose pen	Predominantly outdoor housing, some farms adopting semi-intensive indoor phase for finishing pigs		-	Loose pen
Housing	Individual	Individual	Group	Individual	Group		-	Individual

Table 8. Main features of pig accomodation in alternative farming operations

7.2.7. Additional allowances and facilities

During observations enrichment on conventional farms was very rarely practised. In cases when enrichment was used, a tendency to apply techniques only for a particular phase of production was noted. The most common form of environmental enrichment was the use of a single string of chain installed on the sidewall of enclosures, especially of group housed piglets or young pigs (Figure 77). In some cases sows were also provided with chains in gestation crates. One farm experimented with rubber balls (Figure 78) and finally only one farmer mentioned the use of wood as an enrichment tool, that pigs were allowed to chew apart (not observed). This farmer firmly believed that enrichment was only meaningful if the animals could physically engage with or otherwise manipulate the materials provided, and

chose wood because it did not damage the sewage system, was cheap, easy to acquire and dispose of.

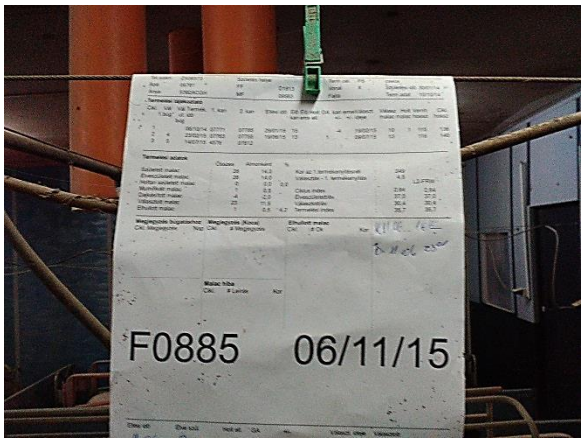
Photograph 66 & Photograph 67. Environmental enrichment on conventional farms
Piglets on conventional farms were most commonly provided with a chain, installed on the sidewalls of enclosures (left, source: the author). Some farms experimented with other enrichment techniques such as a rubber ball (right, source: farmer Peter).

Alternative farms also rarely applied additional environmental enrichment in the form of tools or objects. Instead, the majority were allowed outdoor access, allowing the animals a greater level of agency and interaction with their environments. Some farms installed scratch poles (Figure 79), while on others, the animals were seen to scratch on the wooden fencing. The most frequent form of environmental enrichment applied in indoor or semi-indoor systems was the generous provision of straw (which also served other purposes).

Photograph 68. Environmental enrichment on alternative farms
Apart from the company of conspecifics, environmental enrichment was present in the form of a scratch pole and the generous provision of straw (source: the author).

Hence, the farming system and its inbuilt technological elements defined the quality of space the animals were kept in. It was concluded that environmental enrichment was a key issue that needed attention especially on conventional farms or those alternative operations where animals were kept indoors for a sufficient amount of time.

Further important elements of livestock farming observed included the individual identification of animals, and the collection and use of production statistics. With the exception of wild boars, all white and mangalica pigs kept on conventional and alternative farms would be individually tagged and/or ear notched (Figure 80). However, while identification was similar in both systems, the use of production statistics would be very different. On conventional farms individual production efficiency of sows would be very closely monitored (Figure 81) and significant decisions – including the fate of the sow - would be determined by these numbers. In contrast, production efficiency of the fattening stock would be monitored on a group basis, and production related decisions would be made on such aggregate and generalized sources of information.



Photograph 69 & Photograph 70. Individual identification and productivity measures on conventional farms
Pigs were individually tagged and/or ear notched for identification (left), which also enabled the collection of production statistics. In the case of breeding sows (right) the breeding cycle of individual sows, their fertilization rate, number of born piglets (live, stillborn, dead), the number of piglets nursed, dead and weaned piglets would be measured and triangulated with other data to provide a complex production index (source: the author).

Surveillance on conventional farms was therefore found to be primarily concerned with production-related issues. In addition to indirect indicators, the direct monitoring of the stock was also found necessary. Farm hands would inspect the animals during day-to-day duties, and this information would be supplemented with the daily inspection by the farmer or farm manager. In comparison to the larger scale decisions taken on the basis of data, it seemed that observations influenced smaller scale decision-making processes, for example the need to foster weak piglets, treat sick or injured animals, or maintain equipment. However, overall monitoring and decision-making seemed a highly rigid, yet effective practice, achieving no less but no more than what "had to be done".

The monitoring of production efficiency for breeding and fattening animals was also noted on alternative farms; the farmer was just as aware of breeding cycles, fertilization rates, the rate of born and weaned piglets, but it was evident that "production index" was not the primary source of information on which decisions were made. As these systems were not or only very modestly automated, both the farmer and farm hands were directly inspecting the animals. This combined with a lower stock number, resulted in an increased time in close proximity of

the stock that was made up of freely moving individuals, able to initiate interaction and present a more diverse set of behaviours. It therefore seemed that direct indicators were just as important as efficiency measurements, and there was a more "organic" and sometimes even more spontaneous link between monitoring and decision-making processes.

The final issue was observed on alternative farms, many of which did not sell their entire stock to slaughterhouses, but chose alternative ways to market their products. Some of these farmers would process their meat and derivatives into products (Figure 82) and sell them to retailers or directly to consumers on the market (Figure 83). In the latter case farms would also possess small processing plants and specialized storage facilities where products would be kept until distribution. Reasons for doing so are also relevant in terms of the strains used: while white pigs, duroc pigs and wild boar were sold primarily for meat, in the case of mangalica pigs, high intermuscular fat resulted in the leg or ham (*Biceps femoris*) being the most valued body part, while other parts would only sell after processing. Some of the fat would be packaged and sold directly, while the rest was used in products (e.g. salami, sausages, cutlets). Even though this solution decreased any losses, there was still a tendency for mangalica farmers to consider or even engage in a mixed farming strategy to keeping pure-bred mangalica's for ham and mangalica-duroc hybrids to increase meat output.

Photograph 71 & Photograph 72. Processing and sale of products from alternative farms
Some alternative farms would process meat into products (left, source: the author), and sell them to retailers or take them to the market (right, source: Farmer Edith).

None of the conventional farms possessed any of the above described strains of pigs or processing facilities, illustrating that these operations were entirely set up to produce meat and "raw materials" for products prepared elsewhere.

7.2.8. Atypical practices and innovative technologies

Although the categorization of conventional and alternative farms did capture broad similarities, it failed to reflect on the differences between farms in each group. Before entering the field, it was assumed that conventional farms would apply similar technologies, and alternative farms would be different from one another. Observations confirmed the dissimilarities of alternative enterprises, and in addition an unexpected level diversity in both objective (e.g. size and orientation of windows, microclimatic conditions) and subjective (e.g. management approach of farmer, behaviour of farm hands) features of conventional farms were noted. The importance of appraising differences within a farm (e.g. in terms of different buildings and installed technologies) and between farms (e.g. new farm, fully refurbished farm, partially renovated farm) was an issue that clearly emerged from the data. This

observation was important in the light of farmers reflections on how small differences also "mattered".

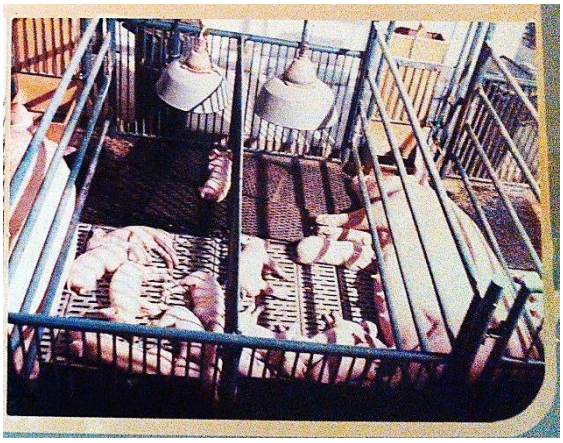
Nonetheless, while it is far beyond the scope of the present study to reflect on all differences noted (some indicated throughout this chapter), it remains important to point out that a number of farms did engage in "atypical practices": in rare cases, conventional farms possessed features of alternative practices (Figure 84) and alternative farms possessed phases of production that exemplified conventional production (Figure 85).

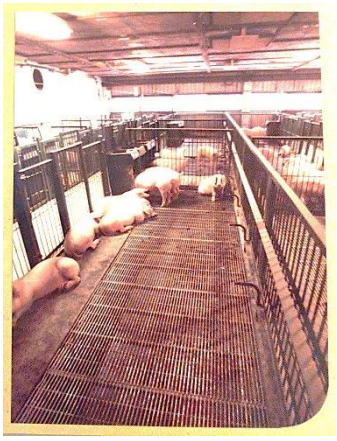
Photograph 73 & Photograph 74. Atypical practices on conventional and alternative farms
A number of pregnant sows on a fully-conventional farm were kept in an enclosure representing an alternative approach (left): the animals were outdoors in a shed that had open walls, the pen had solid flooring and bedding that was changed daily. During the observation, the farmer said that this was an ideal way of keeping pigs, but in this case, it was only possible because there was not enough space indoors for these sows (rotation had an excess), and the farmer wanted to keep them in production. In the other example, an alternative farm adopted conventional technologies for newly weaned piglets (right, source: the author).

In the case of conventional farms, atypical practices usually took place in "special" circumstances (Figure 84), where the farmer had a sudden excess of breeding sows but no space and/or funds to develop further indoor enclosures. So, although the animals were provided with higher standards, the *status quo* on the farm remained unchanged: it continued to operate as a conventional farm and the sows were sold with the remaining stock. In the cases of alternative farms, differences was more observable for certain phases of production,

mostly farrowing and fattening, and was carried out to minimize losses and/or maximize output. In this case the *status quo* clearly did change: the farm operated as semi-intensive system with phases ranging between near-extensive and near-intensive, yet – as in the case of the conventional stock - the animals deriving from this operation were also sold with the remaining stock. Hence, higher and lower standards within farming systems seemed an empirical-reality with significant animal welfare outcomes, a reality that seemed overlooked, but one which should be addressed to provide an accurate picture of the state of livestock welfare.

Finally, in terms of innovation, another important observation was made. Farmers working in conventional systems claimed that they continuously needed to assess production and welfare related issues, and often had to "experiment" (applying methods of trial and error) to improve their approaches. Issues were very diverse, for example some farmers contemplated the use of pain management for farrowing sows, while others considered types of feeders available on the market. However, refinements were not found to systematically and completely transform conventional systems; again, their main features remained unchanged (Figure 86 & 87) but certain elements were "tweaked" leaving the impression that opportunities for major change and true innovation were severely limited. This point was not to contradict the first point of the present section that any adjustment – especially to livestock provisions - had an overall contribution to the success (or failure) of a farm, yet at the same time, it was observed that dominant trends in conventional livestock farming were strong and inflexible.





Photograph 75 & Photograph 76. Conventional operations in the 1980's
Photographs of a farrowing crate (left) and group housed fattening pigs (right) taken at an experimental farm in the early 1980's, still on the wall of the establishment. While these production phases have seen major changes, especially since the 1960's, it is important to note that visually, there seems to be little difference between methods applied then and now (source: the author, original source unknown).

On the other hand, alternative farms possessed many elements of traditional mangalica keeping, but in an effort to optimize production and increase outputs certain facilities or technologies were adapted. As stated, in some instances this meant that alternative farms adopted "modern" technologies, but in other cases innovative technological solutions were developed (Figure 88).

Photograph 77. "Innovative" farming practices
A farrowing system developed by the grandfather of an alternative farmer, would allow pregnant sows kept in the same group, to farrow in boxes next to each other. After some time, the piglets would be socialized and sows re-introduced to their groups in an open, shared area (source: the author).

Most of these ideas or developments were – in comparison to conventional technologies – accomplished from a relatively low budget and often by using natural materials (e.g. wood). Any solution that did not work was not retained, hence there seemed to be more flexibility in the system, and the farming method would be easily adjustable. It is likely that the prime reason for this, was the small amount of built technologies on these alternative farms, which allowed the farmer both space and freedom to evolve farming methods and livestock.

7.3. Livestock

7.3.1. Pig strains used

There were distinct differences between strains of livestock used on conventional and alternative farms. First, conventional farms predominantly kept white pigs (Figure 89), throughout the entire operation. Farms differed greatly in which "genetics" they applied, some farmers opted to source their sows and/or sperm from major foreign breeding companies (e.g. Topigs Norsvin), while other continued to use "old" Hungarian breeds (e.g. Ka-Hyb). Infrequently, some conventional farmers would cross breed their F1 sow stock with Duroc boars (Figure 90), but only to produce animals for further fattening and not for breeding. None of the farms were observed to use breeding boars on their own stock, thus artificial insemination was routinely practised. Finally, all of the farmers worked closely with a particular breeding company to constantly refresh and "improve" their stock.

Photograph 78 & Photograph 79. White and duroc boars
White (left, note that the photograph was taken on an alternative farm) and duroc (right) breeding boars (source: the author).

Alternative farms on the other hand applied a very diverse strategy: the majority of farms kept mangalica pigs (either of the three strains – blond, swallow bellied, red, see Figure 91, 92, 93) while some of the others kept wild boars (Figure 94). Whatever their main strategy, alternative farms were very often keeping a number of different pig strains: wild boar operations would often house white and mangalica pigs, and some mangalica operations would keep white pigs and/or duroc pigs. The main stock would usually consist of F1 animals (both parents and offspring), and occasionally some farms would breed mangalica and duroc hybrids to produce a stock of further fattening animals.

Photograph 80 & Photograph 81. Blonde and swallow bellied mangalica pigs
(source: the author).


Photograph 82 & Photograph 83. Red mangalica and wild boar
(source: the author).

While all of the strains belonged to the same species (*Sus scrofa*) farmers often highlighted marked differences in the main characteristics of the strains as well as individual animals. Finally, it was evident that while alternative farms seemed to apply a more diverse and generalized farming practice, nonetheless both conventional and alternative farmers agreed that they were working with strains of animals that were appropriate for the specific farming system they pursued.

7.3.2. Welfare of the breeding stock

The welfare of the breeding stock will be discussed for the following groups of animals: boars, dry, pregnant and farrowing sows.

Methods of keeping boars on conventional farms has been briefly discussed, however boars used as stimulus were treated differently from boars used as breeding animals. It was evident that the latter group was of higher value; hence breeding boars would be housed separately from the regular stock, but in close contact to one-another. They were provided with individual boxes, higher comfort standards (straw bedding) and additional provisions, such as regular outdoor exercise and interactions with the farmer (for training purposes to allow easy

handling and for collecting semen). This group seemed to be in perfect condition: the animals were clean, noticed and made immediate contact with those passing by or were resting at ease. Boars used for stimulus however, were housed in close proximity of the breeding sows, but were usually found at the end of "the line", at the entrance or very back of the barn. Overall, these animals were provided with the same standards that the sows had, with the exception of more space allowance. Additional provisions did not include outdoor exercise, but did include interactions with the farmer (moving between sow enclosures). This group seemed to be in sufficient condition and no injuries or obvious welfare problems were evident. They also seemed to be alert and interested in passers-by, nonetheless, it is important to point out that the observations were carried out when the animals were in their enclosures, and did not extend to potentially problematic intervals of handling and moving.

Alternative farms on the other hand housed boars with sows, either rotating them between established sow groups or the boars remained in their enclosures and sows were moved. Future breeding boars were group housed and were generally sold off to other farms. These animals all seemed to be in good physical condition: there were no signs of injuries or other major welfare indicators.

On conventional farms dry and pregnant sows were generally housed in groups except for the time they were moved to gestation (for insemination until certain pregnancy) and farrowing crates (before giving birth and until weaning). Animals kept in gestation crates were highly alert of their surroundings, and as expected were either found standing, dog sitting or lying down. Their body condition was adequate, shoulder lesions or other external welfare indicators were absent. It was interesting to observe that in all but one case, sows did not engage in any stereotypic behaviour. The only case where animals did display severe

stereotypic behaviour was on one establishment where sows were kept in gestation crates in two different buildings. In one of the buildings, the animals were calm and behaved as the other sows previously observed, while in the other building all of the animals started vocalizing and crib biting at a very elevated rate (Figure 95).

As stated, these observations were brief and only provided general impressions, so it may not be possible for the researcher to provide an adequate explanation for the differences. During an interview with an alternative farmer, the treatment of conventionally farmed animals with Sedalin (sedative *acepromazine maleate*) was mentioned. While no signs of sedation were apparent, the total lack of stereotypic behaviour in gestation crates suggested that this option may have to be considered. Another explanation emerged during data analysis: the majority of animals may have been fed (though there was variation between the time of observations from farm to farm, nonetheless, most were carried out in the early afternoon) and were thus calm when observed, while animals in the other building had water and a wheelbarrow filled with feed right in front of them (Figure 95). Before entering the barn, the animals anticipated that the feed was in sight, but out of reach and so were calm (it was quiet before entering), however on entering, the animals may have anticipated that they will be fed and thus exhibited signs of stress and frustration.

Photograph 84. Feeding frenzy on conventional farm
Sows exhibited elevated level of vocalization and crib-biting when the farmer (and researcher) entered the building. While sows housed on the same farm but in a different building were calm, these animals may have engaged in stereotypic behaviour because a wheelbarrow full of feed was right in front of them, and seeing the farmer the animals anticipated to be fed (source: the author).

In terms of farrowing sows in conventional systems, most were lying on their sides suckling or sleeping. All of the animals observed were in good general condition ("old" or "spent" sows were only observed on one farm) and no animal was seen with injuries. While sows were all alert when entering buildings and did vocalise (barking sounds of warning others and "intruders"), keeping an eye on those going around, they seemed to be focussed on their piglets. The only time sows exhibited conspicuous signs of stress and vocalized continuously (soft but persistent grunting) was when their piglets were taken away (Figure 96) from them for tail docking and castration (see later). The sows did not settle until their piglets were returned.

Photograph 85. Conventionally housed sow waiting for the return of piglets
The piglets of the sow were removed for castration and tail docking. The sow was continuously vigilant and kept vocalizing until the piglets were returned (source: the author).

However, sows wanting to finish sucking had no means of getting away from the piglets: they stood up, relieving sows from the majority (if not all) of the piglets, while one or two were seen to persistently attempt to suckle. One conventional farm aimed to address this issue – and increase their efficiency – by experimenting with the use of an elevator system. This lifted sows when they stood up, creating an elevated area, which prevented piglets from suckling (Figure 97). The productivity, health and welfare consequences of this technological device were – at the time of writing this report – not known.

Photograph 86. Experimental technology to improve sow welfare on a conventional farm
The metal bars at the shoulder of the sow acted as levers, which operated a hydraulic system elevating the sow to an approximately 30 cm high platform (source: the author).

The body condition of group-housed dry or pregnant sows was good and the animals were predominantly observed feeding or resting. When the farmer (and researcher) went closer to inspect them, sows would be alert and some individuals would also come up to the side of the enclosures to interact. However, in the case of animals which were recently introduced or re-introduced into a group the picture was different: animals were observed to be restless and many of them would have scratches and bruises on their heads and sides, indicating that the animals were fighting. Open lesions were not visible and all body parts were found intact, hence there was no animal that physically required immediate attention. While no animals were observed to fight, it was evident that all of the sows engaged in fighting on all of the farms. Some farmers claimed that their animals settled down within a day, while others claimed that it took sows several days if not a week to establish their hierarchy. The differences between these reports indicate that the frequency of mixing groups on conventional farms and the time the groups engage in fighting was an issue that – as farmers also highlighted - requires more attention.

In the case of alternative farms, sows were observed to engage in a variety of behaviours; some would be interacting with one another or their environments (rooting, wallowing), while others would be feeding or resting. Fights or signs of fighting (injuries, lesions) were not observed and none of the animals were seen to engage in stereotypic behaviours. The overall physical condition of the animals was good, which some farmers claimed was a question of management and stable social groups. Farmers however pointed out that fighting did occur, and emphasised the importance of the "gentle" introduction of young animals into groups and making changes in established adult groups when absolutely necessary.

Only one alternative farm was observed in which both gestation and farrowing crates were in use. While observations were brief, it was noted that in comparison to an average conventional farm, the welfare conditions of these sows was to some degree further compromised. Sows in gestation crates (Figure 98) were kept on solid floors, without bedding, clearly affecting their cleanliness. Food and watering technologies were absent and there was no efficient lighting and ventilating technology installed. An additional difference from conventional systems noted was that the animals were taken in from, and later on returned to open pens. It may be possible, that the animals were habituated to conditions, as none engaged in any forms of abnormal behaviour. The sows were found standing or lying down with no signs of injuries or lesions. Sows in farrowing crates (Figure 99) were on slatted floors made of metal.

Photograph 87 & Photograph 88. Sows in gestation and farrowing crates on an alternative farm
Sows in farrowing crates were housed on concrete flooring but without bedding (in the summer), which affected their comfort and cleanliness (left). Gestation crates on the same farm had slatted floors (right). Livestock were not provided with automated feeding and watering systems (source: the author).

Before closing this section, it is important to mention the issue of longevity, which emerged for breeding animals in both interviews and observations. It is important to note that conventional farms all applied a policy of keeping breeding sows in production until they reach their production peak, at which time they will be classified as “wasted” and taken to

slaughter. In terms of the general strategy of these farms, "old" sows with a decreasing productivity rate were uneconomic to keep. Even though they were replaced by gilts, which in the beginning were also anticipated to produce at a lower rate, the constant fluctuation and maximization of a peak time phases was pursued by farmers. Hence, it was possible to assume that some welfare indicators were absent at the time of observations (wasted body condition, deformities, leg problems, etc.), which did not mean true absence, only indistinctness. It is possible to assume that if livestock stayed in conventional systems for longer periods of time more welfare indicators would be present and slaughtering pigs at their peak of production simply eliminates such indicators. Hence, (apart from good management) this issue may have induced the absence of certain welfare indicators. On the other hand, sows on alternative farms were kept in production much longer than sows on conventional farms without the substantial decrease in their physical condition and overall health. It is possible that in addition to good management, lower production rates allowed farmers to keep well producing sows in production, even after they peaked.

Finally, it is important to mention that no observations were possible on sows to study the welfare effects of weaning off piglets.

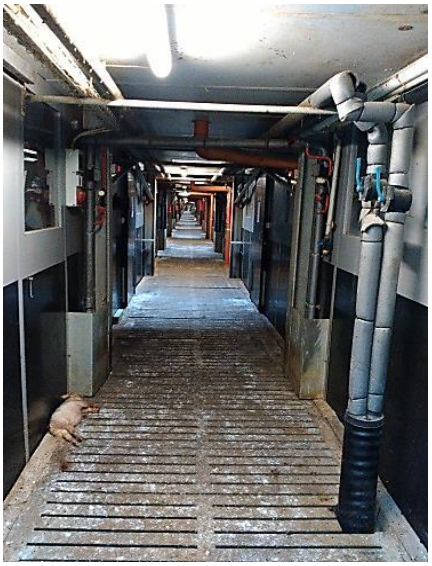
7.3.3. Piglet welfare issues

Two abilities of the sow immediately affect piglets: one is the ability to give birth to live piglets and the other is to successfully suckle them until weaning. The majority of sows give birth naturally, and only a small percentage required some form of assistance. Therefore, both the sows' performance as a mother and the person(s) assisting will be important for piglet welfare.

Once born, the great majority of farms leave all piglets with their mothers. In some cases this includes weaker and smaller individuals, likely to have less chance to engage in teat sampling and may be outcompeted from well positioned, higher-producing teats. Some farmers openly claimed to leave such piglets to "nature": either to die or to catch up with the others (Figure 100).

Photograph 89. Suckling piglets on conventional farm
Young piglets trying to establish a teat order. At the time of the observation, the sow lay down and slowly grunted inviting piglets to suckle. All of them ran from solid floored area on the right, and tried to attach to a teat and protect it. A piglet on the right hand side was too weak to even walk around the sow and was vocalizing loudly. The farmer said that they do not have time to nurse these piglets, so it was better for the animal to die. Note how the majority of piglets were aiming to suckle at the anterior teat positions (source: the author).

Another strategy applied on some conventional farms was to nurse weak piglets separately. Those farms engaging in piglet fostering used sows with smaller litters to do the job. However, in both cases dead piglets were visible in some of the farms (Figure 101) indicating that piglet mortality was an ever present feature of breeding facilities.



Photograph 90. Indicators of piglet mortality on conventional farm (source: the author).

Finally, none of the piglets were seen crushed by the sow, even though piglets were often seen running underneath them, hence it was possible that crates efficiently preventing piglet mortality from unintended (rather than intentional)crushing against the sidewalls of the farrowing pens.

The great majority of alternative farms did not engage in piglet fostering and did not apply restrictive sow housing (Figure 102), hence piglet mortality (while not observed) was also an apparent feature on alternative farms. Piglet mortality from crushing (in farrowing pens) was successfully prevented with the installed “safety” bars to keep the sow away from the sidewalls of the pen (Figure 103).

Photograph 91 & Photograph 92. Indicators of piglet mortality on alternative farm
One farmer explained that piglet crushing on alternative farms was rare and usually accidental. In one case, a sow farrowed into a deep hole (behaviour carried out in hot weather), and lay on the piglets (left, illustration). Accidental crushing is prevented with safety bars attached to the sidewalls of farrowing pens (right, source: the author).

The next issue of piglet welfare was related to invasive practices. First, neither conventional, nor alternative farms practised tooth clipping, and both sows and piglets were free of lesions (faces and teats). Several conventional farmers claimed that they did practice tooth clipping, but found it an unnecessary, even counterproductive practice and over time manged to phase it out.

Second, all of the piglets were tail-docked on conventional farms and on one alternative farm also. In the case of the alternative farm, white and duroc tail-docked piglets were housed together with mangalica piglets, which were not tail-docked. All of the magalica piglets tails were intact, free of any lesions. When questioning why the white and duroc piglets were tail-docked, the farmer said it was necessary and claimed that this was the acceptable practice. No other alternative farmer found tail docking for any pig strain necessary. Castration was carried out for all male piglets on both conventional and alternative farms.

Tail docking, castration and vaccination practices were observed on one conventional farm (Figure 104 & 105). All of these invasive practices were carried out on separate piglet litters

by two female workers, who divided up specialized tasks between them and carried out their duties in a matter of minutes. The animals were handled at such a speed that it was very difficult to take a picture to accurately document what was seen. First the animals collected into a basket (worker 1), and were vaccinated (worker 2). Then all of them were tail-docked (workers 1 & 2) using a hot iron and separated into two groups (male and female piglets). Male piglets were then placed into a restraining device and castrated (worker 2) by using a scalpel (2 incisions), revealing testicles and by cutting them off. The open wound would then be disinfected and all piglets would be returned to their mothers (worker 1).

Photograph 93 & Photograph 94. Invasive practices carried out on piglets in a conventional system
Early vaccination, tail docking and castration procedures documented for one litter of piglets. All of the procedures were carried out in a matter of minutes by two (female) workers. After the procedures, all piglets were returned to the sow (source: the author).

The handling of piglets was not only fast, but also quite rough: they were held strongly, yet "flung" between procedures and holding boxes. Considering that all of these practices were invasive and inflicted pain on very young animals, it did not seem a priority to minimize any additional stressors. Anaesthetics or analgesics were not applied. After observing the procedures all farmers were asked their opinion on preventing or mitigating pain for invasive practices, and all claimed that it was not necessary and emphasized that the animals recovered very quickly afterwards. While the piglets were observed to submit to both handling and

treatment in a quiet manner, when returned to their pens, they were found to indicate signs of pain (standing, shaking, unstable walking). It was not possible to make detailed observations on the piglets, nonetheless it was found that while the rationale for procedures were understood, the methods by which they were carried out were questioned. Hence, the issue of routinely administered invasive practices was an issue that clearly required more attention.

Next, piglets were identified to go through various diseases causing diarrhoea. Diarrhoea in young piglets was an important health and welfare issue, which - depending on the infection and how herds were managed – caused elevated morbidity and mortality rates. On conventional farms, piglets were treated in a reactive fashion and were often medicated (Figure 106), while alternative farms applied a more preventive approach, submitting young and thus still sucking piglets to "the ground", to be exposed direct and indirect immune stimulation and – as farmers said - to take "natural remedies" (Figure 107).

Photograph 95& Photograph 96. Piglet health on conventional and alternative farms
Conventional farm operations applied a reactive approach to diarrhoea infections and used disinfection and medication as a way to treat the animals and prevent serious outbreaks. Alternative farms opted to allow young piglets outdoors, in the hope that their immune systems would be challenged and the piglets would be able to naturally overcome infections (source: the author).

Both conventional and alternative farmers acknowledged that animals kept outdoors were more resilient to infections than animals housed indoors. During the observations a low

number (on average around 2-5 %) of conventionally housed piglet litters were observed to undergo treatment, while none of the piglets kept on alternative farms were seen with treatment. This may indicate that either piglet immunity was sufficient and litters rarely contracted diarrhoea-causing diseases, or that diarrhoea manifested in piglet mortality, which was not observed, but possibly was within an "acceptable" threshold.

The final observation was on the natural behaviours of piglets. In conventional systems very young animals would predominantly be observed to suckle, sleep, stand, walk around their enclosures, or interact with one-another. Piglets on alternative farms were able to express a much more diverse set of behaviours. The younger animals would be closer to their mothers, while the older piglets would engage in more exploratory behaviours, interact with their environments and other conspecifics. With an increased ability to move freely, the piglets would engage in more intense movements and activities.

7.3.4. Pig welfare issues

On conventional systems fattening pigs would be introduced into a new group, often in a different building from the one the piglets were born. Hence the animals were either moved or were taken across on small carts. Piglets observed after recent weaning had multiple injuries, scratches and bruises were observed in many areas, mostly observable on the faces, ears, necks and backs. Some animals were observed huddling and trying to rest. Piglets often seemed to trample each other in an effort to avoid or reach something of importance (e.g. food, "safety"), and would also be very vigilant, vocalized when the farmer (and researcher) entered the building, and were engaged in intense flight behaviours. Depending on their age, some of the younger animals would not recover from huddling together at the back of

enclosures, while after some time older piglets would come forward to interact with those observing them (Figure 108).

On alternative farms most of the piglets would be naturally weaned over a longer period of time, and thus be integrated into larger social groups and separated from their mothers gradually. Later in the fattening process animals would either remain in the group which they were socialized into, or would be taken to another enclosure (with or without outdoor access) until finished. Animals thus were rarely mixed and integrated into new social groups (Figure 109). Injuries were not observed on the animals, though it is important to note here that mangalica pigs and wild boar were covered in hair that could make injuries inconspicuous to the distant observer. They were also not observed to engage in intense flight behaviour, and were more prone to either come forward to interact or carry on with earlier activities.

Photograph 97& Photograph 98. Social behaviours of piglets in conventional and alternative systems
Young piglets escaped to the back of the enclosure when the farmer (and researcher) entered the building (left). Some of the braver piglets soon left the group and came forward, driven by their curiosity. Young wild boar living in a stable social group remained integrated until they were "finished" (right, source: the author).

Over time, animals kept in conventional systems would become more accustomed to their environments and conspecifics (Figure 110). Also, as the animals gained weight, they would be resting more. Nonetheless, enclosures especially for weaned piglets, but also of young pigs

would soon be outgrown (Figure 111), and pigs were regularly moved to new enclosures. This meant that they were most likely introduced into a new building and a new group, resulting in another phase of aggressive interactions. It was possible that on some farms the mixing and moving of groups continued in certain intervals and throughout the lives of pigs. Farmers were either selecting for even body size in pen, or had the possibility to sell off animals at different stages of the fattening process. This depended on market conditions and the overall strategy of the farmer. However, most animals were sold at about 130 kg body weight, by which time the animals were found with little floor space, either feeding or resting in their enclosures.

Photograph 99 & Photograph 100. Space allowance on conventional farms
As the animals grew, they were provided with less space. Though pigs spend an increased amount of resting as they gain weight, nonetheless, free movement was limited after a certain age and animals had to either all stand, or move across others (left and right, source: the author).

Space allowance on alternative farms was generally one of the least limiting factors for livestock. Aggressive interactions in stable groups were infrequent, but body size was very uneven in most enclosures. Poor body condition was not observed on either of the farms visited.

Animals in conventional operations were also in relatively good body condition; uneven body size or thin animals were not seen in pens, indeed animals were quite uniform in their overall appearance. Occasionally, it was possible to find animals with a swollen ear, or a lump most visible on the legs of animals, but these instances were rare. In terms of cleanliness however, it was noticed that while breeding animals and piglets were clean, fattening animals and their environments were often less clean. Cleanliness predominantly depended upon the flooring technology, yet the number of animals housed in the enclosures and the management strategy adopted by the farmer also seemed relevant. Fully slatted floor operations housed the cleanest animals, while semi-slatted or solid floor operations were observed with some of the dirtiest animals. Interestingly, cleanliness was an issue, which was identified as an important factor in the evaluation of livestock conditions (Figure 112): the dirtier the surroundings increased the likelihood of less favourable appraisals by the researcher.

Cleanliness on alternative farms was an issue that highly depended on subjective judgement. Overall animals in outdoor systems were identified as sufficiently clean, even if they were covered in mud or dust. This "type" of dirt seemed to fall under a different evaluation than the faeces animals were soiled with in conventional farms (Figure 113). It is possible that the free engagement in wallowing and the known rationale (of cooling, preventing sunburn, insect bites, etc.) behind doing so meant that "it made sense", while being covered with faeces seemed pointless and unhygienic.


Photograph 101 & Photograph 102. Animal cleansiness on conventional and alternative farms
In conventional systems it depended on a number of issues including the flooring, the number of animals in the pen, and the management strategy applied by the farmer. Pigs seen on the photograph (left) were kept on a solid floored pen, which was cleaned on a daily basis, yet the animals were soiled with faeces. On the other hand mangalica's engaged in wallowing were identified as clean, even if they were covered in mud or dust (right, source: the author).

It must however be mentioned here, that some alternative operations applying a deep litter or solid floor fattening system also resulted in livestock being soiled with faeces, sometimes to a more elevated rate than in conventional operations.

7.4. Final impressions

At the end of the observations a number of final impressions were noted. First of all, it was evident that the scale of the enterprises mattered in the judgement of each farming enterprise. The larger the enterprise or the smaller the space for animals meant that there was a striking tendency of the researcher to make less favourable judgements (Figure 114). While clearly larger scale and more conventional enterprises resulted in both physically and behaviourally restricting environments, nonetheless it was noticed that some of the issues could be addressed with good management practices. Similarly, the more space and more freedom the animals were provided with on alternative farms meant a tendency to make more favourable judgements (Figure 115). It is quite evident that keeping animals in any farming system has its advantages and disadvantages, however conventional systems seemed to inherently carry

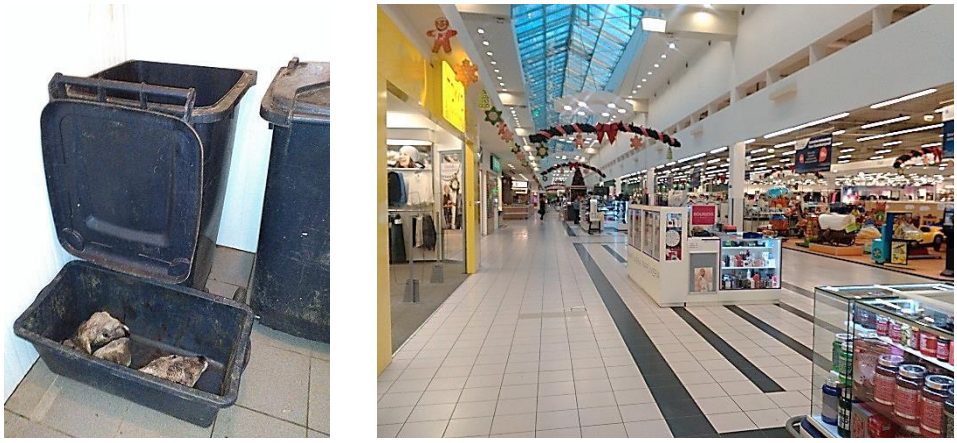
unfavourable animal welfare outcomes that needed to be counterbalanced, and likewise alternative farms seemed to fundamentally carry favourable animal welfare conditions, but depended upon constant high level involvement, otherwise they could quickly and easily result in significant disadvantages.

Photograph 103 & Photograph 104. Influences on researcher evaluation
Judgements of the researcher were noted to depend on and be influenced by important environmental indicators and notions of scale and space (source: the author).

Such important notions, impressions of scale and space were fundamentally important in the analysis of on-farm animal welfare conditions; however an additional effort had to be taken by the researcher to make self-reflective, complex evaluations. In this process certain "taboo" issues were noted and needed to be addressed. These included questions such as can a breeding sow for example experience some level of contentment when housed in a farrowing pen? The answer derived from observations was that it could, which gave rise to further difficult questions, such as: is the level of contentment in any way comparable to what sows experience in an alternative system? If openly acknowledging the presence of some positive emotions for sows housed in a stalled system, could the narrative of the industry further strengthen and out-compete the animal welfare call for higher industrial standards? This thought experiment raised a number of difficult issues that the present research will not be

able to fully capture or contribute to. Nonetheless, it was again concluded that clear-cut evaluations are very hard to make in an aggregate manner, and depending on the question assessed, in the present context, it was essential to work on a case-by-case, enclosure-by-enclosure, animal-by-animal manner.

Next, an observation on the differences between "on-farm" and "social" realities was noted. This thought occurred after a long day on a farm, where observations of "life" and "death", faeces, blood, animal noises and smells (Figure 116) were most apparent. On the same day, observations of a shopping mall, the seemingly sterile and "unnatural" environment (Figure 116) was found to obscure the biological realities, the processes by which products were made available became highly obvious to the researcher, and made it easy to understand the critiques of conventional and alternative farmers on modern-day lifestyles.



Photograph 105 & Photograph 106. Contrasting social and biological "realities"
Deer heads on the left are leftovers from processing outputs of an alternative farming enterprise to be disposed of was identified as a "biological reality" (left). The sterility of social spaces such as this mall seemed to obscure the biological realities of life (right, source: the author).

7.5. Discussion and conclusions

The present chapter aims to outline observations carried out by the researcher on the conventional and alternative farming operations of interview participants. While the previous

chapters explore external pressures, internal norms and how farmers navigate between these, the current chapter presents in particular the ability of farmers to respond to their ethical convictions and discovers how they address animal welfare issues in practice.

What kind of farming technologies and animal welfare standards are there on current conventional and alternative pig farming operations? To what extent do these indicate the ability of farmers to respond in practice to their ethical convictions?

This chapter outlines observations of the researcher on pig farming methods and livestock welfare conditions, which are perceived to:

1. Reveal that farms were not uniform in technologies, physical characteristics and management styles. Due to the diversity of farming methods animal welfare conditions cannot be generalized and need to be examined on a case-by-case basis;
2. Confirm that conventional farms do not correspond with the ethical perspectives of livestock farmers, but were more representative of a "locked-in" system, characterized by major trends in agriculture and trade. Farm animal welfare conditions are addressed, but only include needs that somehow contribute to farm efficiency;
3. Find that alternative farms are "flexible" and able to embody the ethical principles of livestock farmers. Farm animal welfare conditions are addressed and incorporate a broader set of welfare needs that conventional farms, including some that are neutral or even decrease farm efficiency. However, in some cases where old conventional technologies are incorporated, the welfare of livestock does not reach the level ensured on conventional farms;
4. Note that the intensity of farming methods affects the quality and quantity of human-animal interactions, and determine the range and scale of livestock welfare problems that are inconsistently addressed by current problem-solving efforts.

In agreement with the findings of Temple *et al.* (2012), on-farm observations confirm the diversity of farming methods and illustrate their dissimilarities in scale, farming system and technological approach. While the generalized categorization of farms as "conventional" and "alternative" is possible for the purposes of this project, it was unable to capture the differences between farms in each group. Due to an unexpected level of diversity in the objective and subjective features of farms, findings suggest the need to address livestock welfare problems by differentiating between those induced by major agricultural trends, especially external pressures on farming and livestock welfare, from those which arise due to farm-based (technology and/or husbandry) induced problems.

Observations on conventional farms highlight that while efforts to ensure livestock welfare is approached by standardized farm conditions, as in Chapter 4, findings indicate that it only enables the evaluation of welfare problems arising in certain production phases. As Rollin (2002) finds, basic animal welfare needs that directly contribute to production efficiency such as hunger, thirst, pain, injury and disease are prioritized, while other contributors, such as discomfort, aggression, pain, fear and the possibility to express natural behaviour are disregarded. However, data did capture that the more time animals spent indoors, the more automated equipment was necessary to ensure the delivery of prioritized welfare allowances. Observations also confirm findings of Chapter 6, especially in that increased intensity and use of automated equipment decreases the "flexibility" of farming methods, inducing inherent challenges for livestock welfare. The integral inflexibility or lock-in of conventional livestock operations was identified as a major factor preventing farmers to address major external pressures, and harmonize ethical norms on livestock welfare with the actual physical manifestations of farm animal welfare conditions.

Alternative farms are observed to face distinctly different challenges. Basic welfare needs are addressed in a more complex, flexible and holistic manner (Chapter 5 & 6) than on conventional farms, and data indicates that alternative farms rely on good management and animal agency to ensure high welfare standards. However, while animals are observed to express a wide range of natural behaviours, it was clear that the system is vulnerable to management induced failures and required the continuous involvement of the farmer. In addition, in those cases where production encompasses the use of indoor conventional methods and outdated technologies, observations confirm that welfare conditions are potentially more problematic (especially for restrained breeding sows or fattening pigs) than on conventional farms. While livestock are kept indoors for a limited time, the lack of "supporting technologies" such as lighting, ventilation, manure handling indicates that animal welfare problems induced by these systems should be further assessed. Nonetheless, it is important to emphasize that in comparison to conventional farms, alternative livestock farms provided higher standards of welfare by allowing animal agency and were more easy to adjust and as neither space, nor technology acted as a limiting factor (Chapter 6). The integral flexibility of alternative livestock operations was identified as a major factor allowing farmers to harmonize their ethical norms on livestock welfare with the actual physical manifestations of farm animal welfare conditions.

Highlighting the findings of Anderson (2011), Fraser (2008b), and Galanopoulos *et al.* (2006), farm observations also confirm that production intensity is a highly relevant factor for livestock welfare, as increased intensity potentially decreases the quantity and quality of human-animal interactions (Chapter 6). Findings indicate that increased production intensity also contributes to a decrease in small-scale, self-sustaining farming practices. In rural areas,

humans and livestock were generally absent from the landscape, while monoculture crops and heavy machinery were widely apparent. Data therefore indicates that the observed societal changes in rural areas especially are closely associated to the scale and methods of farming, and with it interactions between humans, livestock, and the natural environment.

Finally, observations confirm that while certain pig welfare problems receive much attention, others are overlooked or disregarded (Chapter 3, 5 & 6). Data indicates that apart from basic welfare needs along the lines of the Brambell's Five Freedoms (Brambell Report 1965), such as feeding, watering and health, conventional farming practices commit most attention to group housing sows (when possible) and fattening livestock, handling methods and invasive practices. Little attention is granted to the welfare of boars kept to stimulate breeding sows, the effects of mixing sow, piglet and fattening pig groups, and the lack of behavioural stimulus on the stock. These findings highlight the work of Fraser *et al.* (1997) who emphasized the importance to address a more complex set of livestock welfare issues and ensure that adaptations of animals correspond to the challenges faced under human care. In addition findings suggest that current, "selective" problem-solving approaches manifest in an inconsistent reform-effort, which is unable to systematically address and eliminate emerging welfare problems.

Conclusions

While the previous chapters outlined the perspectives of farmers, the present chapter set out to identify and comparatively analyse the views of participants with the actual manifestations of livestock welfare conditions. Results suggest that both conventional and alternative systems carry inherent limitations, which require a coherent, holistic approach, nonetheless, it is also noted that while alternative farms are flexible and relatively easy to adjust, conventional farms

are inflexible and almost impossible to transform. In addition, animal welfare conditions were only briefly observed, hence important animal welfare indicators, especially on conventional farms are possibly unaccounted for. In order to progress in the livestock welfare reform effort, it is important to address the long-term effects of production intensity, and the outcomes of selective legislative and advocacy efforts.

Chapter 8. "What is the right thing to do?"

The present study has aimed to contribute to the cause of finding a cohesive and feasible moral imperative and ultimate goal for farm animal welfare. Unlike earlier work in pragmatic animal welfare ethics, the focus was to analyse the need for a united, clearly articulated and practicable framework. This final chapter will attempt to answer the overall research questions, outline contributions and the applicability of findings, and will close by drawing final conclusions and further recommendations.

8.1. Overall discussion

8.1.1. Summary of main findings

The present research project identifies that "the right thing to do" for farm animal welfare is to ensure that animals have "good" lives. This principle is found to be mutually beneficial for both humans and animals, and is based on how animal subjects perceive their own welfare. The study finds that the subjectivities of livestock, their health and welfare are possible to assess using well-established scientific methods. However, the societal evaluation of animal needs and methods to ensure livestock welfare are more complex and more problematic issues (Miele *et al.* 2005).

Despite many efforts to safeguard the welfare of farm animals, a number of important context-specific, systems based problems are identified. Results suggest that current trends in agriculture impose major external pressures on farmers and farming operations, which decrease the resilience of conventional farmers in particular, and induce significant vulnerabilities to them. The most important pressure on livestock farmers is imposed by the market of agricultural products: priorities, power relations and a failure to reflect on the

unique features of agriculture are found to influence trade and induce competitive pressures that indirectly determine conventional farming standards. Significant periods of low incomes and ever increasing competition on the market force producers to apply more intensive, increasingly efficient and highly automated indoor technologies. Those who cannot keep up with these trends are potentially outcompeted.

Although EU farm animal welfare legislation, enforcement measures and payments ensure positive outcomes for livestock welfare and buffer some of the competitive pressures, especially induced by imports from non-EU Member States, current problem-solving efforts are unable to safeguard livestock welfare. Efforts focus especially to striking a "balance" between "conflicting" interests and contradictory mandates of the EU; free trade *versus* human and animal welfare, and environmental protection, and/or short-term individualistic benefits *versus* long-term common goods. Legislative "minimum standards" are therefore "compromised" and deliver especially those aspects of livestock welfare that ensure a reasonable economic contribution. Hence, while EU conventional farming practices address farm animal welfare, livestock operations are unable to transition to a system that grant good lives for animals.

EU legislative standards and the mainstream market have less of an impact on alternative farming standards; indeed alternative farmers seem to partially overcome major external pressures imposed on agriculture. While they also need to address issues related to farm scale and production efficiency, they consciously choose to pursue alternative methods that enable them (to some extent) break-away from the mainstream market. Their ability to distance themselves and their farming operations from current trends in agriculture allow farmers to engage in less-intensive and more welfare-friendly farming practices. This important

achievement is therefore not delivered by EU animal welfare legislation, but more the firm conviction of farmers that it is "the right thing to do" for themselves, consumers, livestock and the natural environment.

But where do these findings leave conventional farmers and their livestock operations? Are all farmers free to make technology related decisions? Results suggest that once a conventional farm is in operation, it is inherently difficult to modify and farmers can only make constrained choices; make adjustments within the boundaries of the established farming strategy. While conventional farmers do attempt to rationalize their farming method, they clearly conceptualize "ideal" farming conditions, which are almost identical to the understandings of alternative farmers, and believe in the need to ensure good lives for animals. The only problem is that farmers did not know how to achieve this imagined ideal.

Conventional farmers are therefore left in a scenario, where they are unable to act consistently and respond to their internal norms to deliver what they believe is "the right thing to do". They are pressured by the market, by legislation and societal expectations, and even though they are able to sell their products, the majority still find it hard to make ends meet. Hence, in the case of conventional farming practices the livestock welfare reform effort is only able to ensure minor adjustments. To deliver good lives for livestock however, major transitions are necessary: meaningful change can only be delivered if the whole system of agricultural production and trade is critically assessed and reformed. Therefore, results confirm the findings of the Anderson (2011) model, which indicates that the livestock welfare reform effort is still in transition until conventional farming systems are able to deliver the welfare needs of livestock. Evidence suggests that once a clear understanding of how major external pressures - especially those induced by the market - can be overcome it is possible to ensure a

reform process that “delivers” livestock from problematic farming systems. To do this, the moral imperatives and the ultimate goal of the livestock welfare reform need to be clearly conceptualized in a complex, strategic and reflective manner.

8.1.2. How do experts and farmers conceptualize the moral imperative and the ultimate goal of farm animal welfare?

In line with the findings of Fraser (2012) and Rollin (2008), the ultimate goal of livestock welfare encompasses “traditional care” principles. These ideals are believed to incorporate the mutual interests of humanity, animals and nature, but at the same time they do not necessitate the application of non-interference rights principles, hence are in no way utopian, impracticable goals. In agreement with Webster (1994b), the death of farm animals is regarded as a “biological reality” of life and therefore - on the condition that animals are provided with good lives and die “humanely” - the “use” or even the consumption of livestock, in contradiction with animal rights and liberation principles, are not identified as inevitably immoral actions.

In practice, this means that by applying animal welfare principles, reform efforts are possible as the emerging features of the ultimate goal of farm animal welfare mean that ideal interactions are pursued for all parties (humans, animals and nature) concerned. Confirming the findings of Winter *et al.* (1998) ideal livestock standards mean the application of small-scale, low-intensity, and near-natural farming methods. These are believed to provide the best-possible outcome for society, farmers and animals, and ensure the life-sustaining processes of nature. By providing livestock with outdoor access, professional stockmanship and the freedom to act on their own needs, farm animals are believed to have good welfare provisions ensuring positive affective states, good health, functioning and a sense of

"harmony" between the animals and their environment. Even though this arrangement is not entirely free of "harms", the ability to provide livestock with agency, somewhat longer and more "fulfilling" lives are essential elements of the ultimate goal of livestock welfare.

The moral imperative of livestock welfare rests on the assumption that farm animals – like children – depend entirely on human care and therefore humans are obliged to provide animals with their needs. Findings indicated that there is no need to address more complex reasons, such as sentience or consciousness, to "impose" this duty. But at the same time the moral imperative of livestock welfare is also founded on the belief that individuals (i.e. farmers, consumers) and society at large are both responsible for livestock welfare. While the personality and the skills of the farmer are understood as key determinants, the functioning of society is also perceived as an important factor, requiring almost equal attention and consideration. The moral imperative of livestock welfare is therefore just as concerned with the morality of interactions between humans as with the ethics of human-animal interactions. Immorality in the animal welfare context is associated with notions of injustice, subordination and oppression in the eyes of experts, while intentional harm, wasteful, ignorant and careless attitudes are important elements of unethical behaviour for the farming community.

Findings also indicate that the moral imperative necessitates a level of "societal consensus" to function: enabling farmers to act according to their internal norms, consumers to share the values of producers and "support" them in their endeavours. In order to achieve this aim more direct, positive and mutually beneficial interactions between farmers and consumers are required. Close cooperation means that the value of agriculture, livestock and food is more greatly valued by society, ensuring the necessary level of ethical competence and – possibly in the long run - the radical transformation of the agricultural sector.

8.1.3. What kind of opportunities and constraints can be identified? How can these impact farm animal welfare reform efforts?

This study finds that emerging features of the moral imperative and ultimate goal of livestock welfare provide a more complex, holistic, and realistic framework. It enables society to address the multi-faceted livestock welfare problem in a way to also deliver additional benefits, including human welfare, conservation and environmental protection. Findings indicate that while this ethic is not yet declared "universally", societal norms in the EU are beginning to advance in this direction. The welfare problem and environmental concerns are debated and there are important efforts to resolve these issues. What is not so well known is whether the legitimacy of the emerging ethic will be ensured or whether it will be seen as an "extreme" measure. Evidence once again confirms the Anderson (2011) model and suggests that if the importance of finding a united ethic is clearly articulated and "norm leaders" present why and how it may be pursued, a "new" livestock welfare movement may be initiated. This may present the need to a) find shared societal convictions on ethical interactions with livestock, b) ensure good lives for animals, and c) emphasize the mutually beneficial, "mainstream" and legitimate reasons of the reform effort.

Data suggests that even if the need to find a united approach is clearly and consistently articulated, differences in societal norms may still prevail. To date, conflicts in ethical principles are examined in detail without reflecting on the need to resolve them. It is possible to suggest that problems are so deeply embedded and conflicting interests are so persistent that opportunities for major societal change are also significantly limited. Data implies that due to (national and international) political, social and economic instability, scenarios for major improvements are just as probable as those of "enormous backsliding". While the need

to pursue the livestock welfare reform and ensure good lives for farm animals – in principle - should not depend on political and socioeconomic stability, it is important to comprehend these limitations in more detail.

8.1.4. How could further progress be ensured?

This study has suggested the need for a critical assessment of the current aims, objectives and methods of a predominantly legislation-based livestock welfare reform effort, highlighting the need to advance a united moral imperative and ultimate goal of livestock welfare, and at the same time resolve major external pressures, especially those imposed on farming by the market of agricultural products. Findings indicate that in an effort to ensure further progress or avoid backsliding the following measures may be necessary:

1. Scientific research:
    a. External pressures on livestock farming, and the internal norms and deliberations of livestock farmers should be further assessed and their consequences on the lived realities of animals in conventional and alternative farming practices should accurately be reflected upon;
    b. The impacts of competing, hegemonic moral imperatives and ultimate goals for farm animal welfare, and the effects of a fragmented reform effort should be further evaluated;
    c. Further studies should be carried out to refine existing (and identify additional) shared features of the emerging united moral imperative and ultimate goal for farm animal welfare. Studies should be extended to link or even apply ethical principles to production methods and standards, and include further studies into the perceptions of intermediaries, participants from the slaughter and meat industry, and major retailers;

d. On the basis of the Anderson (2011) model, findings of the above points (a-c) should be critically assessed to discover the pragmatic value of the emerging framework and assess further opportunities, constraints and potential methods of delivery.

2. Policy interventions:
    a. As EU political and legislative efforts continue to target the farming community to ensure higher standards for livestock especially those kept in conventional farming operations, and national authorities aim to support the continuation of livestock farming, it is essential to critically review the actual effects of a predominantly legislation-based strategy of livestock welfare and acknowledge its limitations in terms of compromised minimum standards, problems induced by conflicting political mandates, the subsidized oversupply of low-quality mass produced foods, and implementation related challenges, especially enforcement, enforcement capacity and accountability problems;
    b. In order to balance out conflicting interests in the farm animal welfare context, it is important to debate whether ethical issues should be "decided" by the market of animal products and food. As there is ample evidence to suggest that neither the market nor consumers are ethically competent, further political debates should be initiated to assess how contradictory principles of the free market and human rights, animal welfare and environmental preservation may be resolved, reflecting on the fundamental/true needs of all parties concerned.
3. Advocacy strategies:
    a. As expert and public debates are ongoing, and there is high interest in the livestock welfare problem, findings of the present and proposed scientific

assessments (1) and political/legislative challenges (2) should be communicated to key parties including experts, conventional and alternative farmers, political and legislative decision-makers and the general public in order to debate the need to negotiate a united moral imperative and ultimate goal for livestock welfare;

b. Based on the outcome of the above points (1-2) influencing reform strategy, the impacts on the reform process should be critically evaluated especially to ensure that the societal and legislative reform process is harmonized to and consistent with the welfare needs of livestock;

c. The advocacy approaches and work ethics of advocates contributing to the livestock welfare reform should be evaluated, and knowledgeable, well-meaning experts should engage in more direct contact and cooperation with conventional and alternative farmers, to identify individual farm-based problems and develop mutually agreeable methods to address these;

d. Finally, advocacy should aim to further assist emerging alternative production and processing methods of animal products, including the development of alternative markets through which farmers and consumers may directly interact and form long-term, mutually beneficial partnerships, delivering stability and accountability to farmers, higher quality products for consumers and better welfare conditions for farm animals.

The above points encompass recommendations for political and legislative decision-making, scientific enquiry and advocacy actions, which highlight a key element of the process: in line with the findings of Fraser (2008) and Anderson (2011) it may be stated that the success of the

livestock welfare reform will depend on the interplay of complex forces. Findings indicate that further progress will depend on how these individual "contributing factors" advance and come together to "deliver" farm animals from compromised welfare conditions and ensure good lives for them. Therefore, none of these issues can be addressed in isolation, but the reform should be viewed, evaluated and further developed in knowledge of its multiple components.

8.2. Contributions

This research has made contributions to the field of animal welfare science, in particular by providing empirical data that highlights important aspects of pragmatic ethics and the livestock welfare reform effort, as well as theoretical and methodological contributions.

8.2.1. Theoretical contributions

First, the need to address the differences between the ontologies of Rationalist philosophical enquiries, Positivist natural and Subjectivist social sciences are highlighted, which create important limitations for interdisciplinary scientific enquiry. In order to consider the subjective welfare states of animals, animal welfare science departs from the Positivist tradition of the natural sciences. Nonetheless, it rests on the premise that "reality" is directly available for scientific enquiry and that an understanding of the "truth" is possible. However, as Bird (1987) outlines, some of the social sciences rest on assumptions that acknowledge the existence of multiple realities and question the possibility for any truth claims. This dichotomy is found to be highly relevant for the present study, which aims to overcome these limitations and integrate knowledge from animal welfare science with findings presented by the social sciences.

Second, the analysis of major theoretical debates on livestock welfare, including the animal welfare, animal rights and animal liberation frameworks, emphasize the need to depart from the development of competing, categorical hegemonic discourses that fail to offer a solution to the livestock welfare problem. A need to evaluate and contribute to resolving moral disagreements is highlighted, adequately reflecting on challenges imposed by the "biological realities" of life, and the difficulties of achieving utopian moral principles in a world of "conflicting interests". The need to bridge divides between the welfarist perspective and its counter discourses is emphasized, highlighting the need to work on pragmatic principles that enable producers to continue farming livestock, and the non-producing public (especially consumers) to behave in an ethically competent manner.

Third, by analysing the premises of animal welfare science and the animal welfare ethic it has been possible to conceptualize important theoretical issues that major counter-discourses, animal rights and animal liberation, often critically assess. This preliminary attempt to capture the logic of welfarism may contribute to ongoing theoretical discussions and enquiries, helping to further-develop and better-articulate the goals and the vision of an animal welfare approach. By acknowledging the need to refine certain theoretical elements, it is hoped that scientific enquiry will critically assess the outcomes of the livestock welfare reform and engage in an understanding of how major change in day-to-day interactions with livestock may be ensured.

8.2.2. Methodological contributions

First, the study highlights the importance of applying a pragmatic scientific approach, enabling a predominantly qualitative mixed-methods research-strategy, which combined the use of in-depth interview data with observational data. This "first attempt" has allowed the

researcher to overcome disciplinary constraints that separate the relevant fields of enquiry and raise questions within the scope of both major ontologies. Therefore, data illustrating the socially constructed perceptions of certain interest groups was synthesized with observational data on the lived realities of animals, allowing a systematic study of sufficient "depth" and "breadth".

Second, the Grounded Theory approach was found to allow the researcher to pursue an open, unlimited exploratory study, aiming to comprehend the problem of livestock welfare, critically assess the technological and socio-economic reality of farming, and the livestock welfare reform effort. As findings were "grounded" in data and different data sets were triangulated, and cross-validation was ensured to provide a high level of accuracy and reliability.

Third, in-depth semi-structured interview techniques allowed the researcher to engage in discussions with participants that enabled the collection of rich data sets. By addressing and clearly differentiating "ideal" and "realistic" perceptions, by separating external pressures, internal norms and deliberations, participants, especially farmers were able to share their subjective and personal perceptions in detail. These narratives allowed the researcher to make deeper enquiries and refine overly-generalized arguments, which have presented clear-cut dichotomies between the values of consumers, conventional and alternative farmers.

8.2.3. Empirical contributions

Empirical contributions of the research project included data enabling a critical analysis of present-day problem-solving approaches, finding that even though the current, legislation-based approach was generally perceived to ensure welfare, it was still unable to eliminate livestock welfare problems and deliver good lives for animals. The project was able to

provide sufficient evidence to highlight the effects of major external pressures on the internal norms and deliberations of livestock farmers. It illustrated that in the case of conventional farms in particular farmers were severely limited and were thus prevented from acting on their ethical convictions and keep their livestock accordingly. However, while data highlighted that "ideal" farming methods were perceived to be the most welfare friendly, the majority of participants still believed that the "realistic" scenario will continue to severely compromise animal welfare conditions.

8.2.4. Applicability and study implications

While the research was carried out in the context of farm animal welfare, it was evident that findings strongly overlap with, and are therefore applicable to, issues concerning sustainability and environmental protection. The main focus of the project was to illustrate the weaknesses of the current animal welfare reform effort and find ways to improve it, but it soon became evident that the weaknesses of welfare reform correspond to the weakness of sustainability goals and environmental protection efforts also. As the analysis did not include an evaluation of the extended impacts of an improved welfare reform effort, it is possible that a refined welfare reform effort may also advance environmental protection and sustainability issues. Findings of the present study also apply to agricultural, social, political and economic sciences in the context of animal welfare.

Study implications of the present project include a need to critically assess significant elements of the animal welfare reform effort, including the political and legislative strategy, efforts of animal (welfare and rights) advocacy, findings of the social and natural sciences in order to address problematic political, legislative, economic, agricultural, scientific and social

trends, advocacy approaches and the work ethics of non-governmental organizations, problems producers face, and the impacts of all these factors on the welfare of livestock.

8.3. Conclusions and further recommendations

This study has found that the livestock welfare reform is in progress in Hungary, in the EU and even on a global scale. It has set out to identify issues that may hinder the process and has strived to share insights that may contribute to a successful reform effort. These aims have been driven to achieve the mutually beneficial "ideal" arrangement for farm animals; and while this study has found that ideals are driving forces in reform efforts, it also discovered that in absence of a societal consensus on such ideals, the full reform process is infeasible. Knowing that success depends on a clear understanding of the problem, the good-will, cooperation and consistent behaviour of society, it was important to consider whether farm animal welfare reform aims to push for the "ideal" or settle and make the most of the "realistic" scenario. In either case the study found evidence to suggest that it is essential for conventional and alternative farmers to join expert and public debates and take part in the reform process.

References

Anderson, J.L. 2011. Protection for the powerless: political economy history lessons for the animal welfare movement. *Stanford Journal of Animal Law & Policy*. 4 (2011): 1-63.

Appleby, M.C. 1993. Should cages for laying hens be banned or modified? *Animal Welfare*. 2 (1): 67-80.

Appleby, M.C. & Lawrence, A.B. 1987. Food restriction as a cause of stereotypic behaviour in tethered gilts. *Animal Production*. 45 (1): 103-110.

Arey, D. & Brooke, P. 2006. Animal welfare aspects of good agricultural practice: pig production. Petersfield, United Kingdom: Compassion in World Farming Trust.

Arluke, A., Levin, J., Luke, C. & Ascione, F. 1999. The relationship of animal abuse to violence and other forms of antisocial behaviour. *Journal of Interpersonal Violence*, 14 (9): 963-975.

Baxter, M.R. 1989. Intensive housing: the last straw for pigs? *Journal of Animal Science*. 67 (9): 2433-2440.

_____. 1994. The welfare problems of laying hens in battery cages. *The Veterinary Record.* 134 (24): 614-619.

Bekoff, M. 2001. The evolution of animal play, emotions, and social morality: on science, theology, spirituality, personhood and love. *Zygon*. 36 (4): 615-655.

_____. 2006. Animal emotions and animal sentience and why they matter: blending "science sense" with common sense, compassion and heart. In Turner, J. & D'Silva, J. (ed.) 2006. *Animals, ethics and trade: the challenge of animal sentience.* p. 27-40. Godalming, United Kingdom: Compassion in World Farming Trust.

_____. 2014. Why humanity must "rewild" (Op-Ed). *Live Science.* Expert Voices: Op-Ed & Insights. 12th June 2014. URL: http://www.livescience.com/46277-rewilding-society.html

Bekoff, M., Gruen, L., Townsend, S.E. & Rollin, B.E. 1992. Animals in science: some areas revisited. *Animal Behaviour.* 44: 473-484.

Bekoff, M., Allen, C. & Burghardt, G.M. eds. 2002. *The cognitive animal: empirical and theoretical perspectives on animal cognition.* Introduction. Cambridge, USA: A Bradford Book.

Biovin, X., Lensink, J., Tallet, C. & Veissier, I. 2003. Stockmanship and farm animal welfare. *Animal Welfare* 12: 479-492.

Bird, E.A.R. 1987. The social construction of nature: theoretical approaches to the history of environmental problems. *Environmental Review*. 11 (4): 255-264.

Blaney, E.C. & Walls, D.L. 2004. The influence of camouflage net barrier on the behaviour, welfare and public perceptions of zoo-housed gorillas. *Animal Welfare*. 13 (2): 111-118.

Blockhuis, H.J., Veissier, I, Miele, M. & Jones, B. 2010. The Welfare Quality® project and beyond: safeguarding farm animal well-being. *Acta Agriculturae Scand Section A*. 60 (2010): 129-140.

Blumer, H. 1986. *Symbolic interactionism: perspective and method*. Berkeley: University of California Press.

Bock, B.B. & Huik, M.M. 2007. Animal welfare: the attitudes and behaviour of European pig farmers. *British Food Journal.* 109 (11): 931-944.

Boogard, B.K., Oosting, S.J. & Bock, B.B. 2006. Elements of societal perception of farm animal welfare: a quantitative study in the Netherlands. *Livestock Science.* 104: 13-22.

Bowen, G.A. 2008. Naturalistic enquiry and the saturation concept: a research note. *Qualitative Research*. 8 (1): 137-152.

Bracke, M.B.M., Spruijt, B.M. & Metz, J.H.M. 1999. Overall animal welfare assessment reviewed. Part 1: Is it possible? *Netherlands Journal of Agricultural Science*. 47: 279-291.

Brambell Report. 1965. Report of the Technical Committee to enquire into the welfare of animals kept under intensive livestock husbandry systems. London, United Kingdom: Her Majesty's Stationery Office.

Brennan, A. & Lo, Y.Sz. 2008. Environmental ethics. In Edward, N.Z. (ed.) 2011. *The Stanford Encyclopaedia of Philosophy.* URL: http://plato.stanford.edu/archives/fall2011/entries/ethics-environmental/

Broom, D.M. 1983. Stereotypes as animal welfare indicators. *Current topics in Veterinary Medicine and Animal Sciences.* 23: 81-87.

_____. 1986. Indicators of poor welfare. *British Veterinary Journal*.142 (6): 524-526.

_____. 1988(a). Needs, freedoms and the assessment of welfare. *Applied Animal Behavioural Science.* 19 (3-4): 384-386.

_____. 1988(b). The scientific assessment of animal welfare. *Applied Animal Behavioural Science.* 20 (1-2): 5-19.

_____. 1991. Animal welfare: concepts and measurement. *Journal of Animal Science*. 69: 4167-4175.

_____. 2006. Behaviour and welfare in relation to pathology. *Applied Animal Behaviour Science*. 97 (1): 73-83.

Broom, D.M. & Johnson, K.G. 1993. *Stress and animal welfare*. Dordrecht, the Netherlands: Kluwer Academic Publishers.

Callicott, J.B. 1980. Animal Liberation: A triangular affair. *Environmental Ethics*, 2 (4): 311-338.

_____. 1984. Non-anthropocentric value theory and environmental ethics. *American Philosophical Quarterly*, 21 (4): 299-309.

_____. 1988. Animal liberation and environmental ethics: back together again. *Between the Species*. 4: 163-169.

_____. 1998. 'Back together again' again. *Environmental Values.* 7: 461-475.

Camm, T & Bowles, D. 2000. Animal welfare and the treaty of Rome: a legal analysis of the Protocol on animal welfare and welfare standards in the European Union. *Journal of Environmental Law* 12 (2): 197-205.

Caporale, V. Alessandrini, B. Dalla Villa, P. & Del Papa, S. 2005. Global perspectives on animal welfare: Europe. *Scientific and Technical Review of the Office International des Epizooties.* 24 (2): 567-577.

Charmaz, K. 2006. *Constructing grounded theory: a practical guide through qualitative analysis.* London, United Kingdom: Sage Publications Ltd.

Chilton, S.M., Burgess, D. & Hutchinson, W.G. 2005. The relative values of farm animal welfare. *Ecological Economics*. 59: 353-363.

Chourbaji, S., Zacher, C., Sanchis-Segura, C., Dormann, C., Vollmayr, B. & Gass, P. 2005. Learned helplessness: validity and reliability of depressive-like states in mice. *Brain Research Protocols*. 16 (1-3): 70-78.

Clubb, R. & Mason, G. 2003. Animal welfare: captivity effects on wide-ranging carnivores. *Nature*. 425: 473-474.

Compassion in World Farming. 2011. Antibiotics in animal farming: public health and animal welfare. Revised ed. November 2011. Compassion in World Farming.

Cowan, R. & Gunby, P. 1996. Sprayed to death: path dependence, lock-in and pest control strategies. *The Economic Journal*. 106 (436): 521-542.

Creswell, J.W. 2003. *Research design: qualitative, quantitative, and mixed method approaches*. 2 ed. Thousand Oaks, California: Sage Publications.

Crist, E. 2004. Against the social construction of nature and wilderness. *Environmental Ethics.* 26: 5-24.

Croney, C.C. & Millman, S.T. 2007. Board-invited review: the ethical and behavioural bases for farm animal welfare legislation. *Journal of Animal Science* 85 (2): 556–65.

Cruickshank, J. 2011. The positive and the negative: assessing critical realism and social constructionism as post-positivist approaches to empirical research in the social sciences. Working Papers, paper 42. International Migration Institute (IMI) & Oxford Department of International Development (QEH). Oxford, United Kingdom: the University of Oxford.

Dawkins, M.S. 2006. Through animal eyes: what behaviour tells us. *Applied Animal Behavioural Science*. 100 (2006): 4-10.

Dawkins, M.S. & Bonney, R. ed. 2008. *The future of animal farming: renewing the ancient contract*. Oxford, United Kingdom: Wiley-Blackwell Ltd.

Davis, B.G. 1993. *Tools for teaching*. San Francisco, USA: Jossey-Bass.

Dekkers, J.C.M. & Hospital, F. 2002. Multifactorial genetics: the use of molecular genetics in the improvement of agricultural populations. *Nature Reviews Genetics* 3 (1): 22–32.

Dryzek, J.S. 2013. *The politics of the earth: environmental discourses*. Third ed. Oxford: Oxford University Press.

Duncan, I.J.H. 2005. Science-based assessment of animal welfare: farm animals. *Rev. sci. tech. Off. int. Epiz.* 24 (2): 483-492.

Edwards, S. ed. 2011. Knowledge synthesis: animal health and welfare in organic pig production. CORE Organic Project No. 1904. Tjelen, Denmark: International Centre for Research in Organic Food Systems (ICROFS)

Elinder, L.S. 2005. Obesity, hunger and agriculture: the damaging role of subsidies. *BMJ.* 331 (7528): 1333–36.

Elzen, B., Geels, F.W., Leeuwis, C. & van Mierlo, B. 2011. Normative contestation in transitions 'in the making': animal welfare concerns and system innovation in pig husbandry. *Research Policy*. 40 (2011): 263-275.

Epley, N, Waytz, A., Akalis, S. & Cacioppo, J.T. 2008. When we need a human: motivational determinants of anthropomorphism. *Social Cognition*. 26 (2): 143-155.

Eurogroup for Animals. 2010. Areas of concern: analysis of animal welfare issues in the European Union. Brussels, Belgium: Eurogroup for Animals.

_____. 2016. Animal welfare top of mind: Eurobarometer 2016. Brussels: Eurogroup for Animals. URL: http://www.eurogroupforanimals.org/eurobarometer

European Commission. 2016. Attitudes of Europeans towards animal welfare. Special Eurobarometer 442. Brussels: European Commission.

Evans, A. & Miele, M. 2012. Between food and flesh: how animals are made to matter (and not matter) within food consumption practices. *Society and Space*. 30 (2012): 298-314.

Falk, A. & Szech, N. 2013[a]. Morals and markets. *Science*. 340 (2013): 707-711.

_____. 2013[b]. Organizations, diffused pivotality and immoral outcomes. DIW Berlin Discussion Paper No. 1305. URL: http://dx.doi.org/10.2139/ssrn.2294393

Farm Animal Welfare Council. 1979. Farm Animal Welfare Council: press statement. 5 December 1979. Surbiton, United Kingdom: Farm Animal Welfare Council.

Food and Agriculture Organization of the United Nations, 2006. Livestock's' Long Shadow: Environmental Issues and Options. Rome, Italy: FAO.

Foray, D. 1997. The dynamic implications of increasing returns: technological change and path dependent inefficiency. *International Journal of Industrial Organization*. 15 (1997): 733-752.

Flyvbjerg, B. 2004. Five misunderstandings about case-study research. In: Seale, C., Gobo, G., Gubrium, J.F. & Silverman, D. eds. 2004. *Qualitative Research Practice*. London and Thousand Oaks, CA: Sage.

Francione, G.L. 1996. Animal rights and animal welfare. *Rutgers Law Review*. 48: 397-469.

_____. 2009. Animal welfare and the moral value of nonhuman animals. *Law, Culture and the Humanities*. 6 (1): 1-13.

Francis, J.J., Johnston, M., Roberston, C., Glidewell, L., Entwistle, V., Eccles, M.P. & Grimshaw, J.M. 2009. What is an adequate sample size? Operationalizing data saturation for theory-based interview studies. *Psychology & Health*. 25 (10): 1229-1245.

Frank, J. 1979. Factory farming: an imminent clash between animal rights activists and agribusiness. *B.C. Envtl. Aff. L. Rev.* 7 (3): 423-463.

Fraser, D. 1985. Selection for bedded and unbedded areas by pigs in relation to environmental temperature and behaviour. *Applied Animal Behaviour Science*, 14 (1985): 117-126.

_____. 1993. Assessing animal well-being: common sense, uncommon science. In: Baumgardt, B.R. & Gray, H.G. ed. 1993. *Food Animal Well-being.* West Lafayette, USA: Purdue University Press.

_____. 1999. Animal ethics and animal welfare science: bridging the two cultures. *Applied Animal Behavioural Science*. 65: 171-189.

_____. 2005. Animal welfare and the intensification of animal production: an alternative interpretation. Rome, Italy: Food and Agriculture Organization of the United Nations.

_____. 2008(a). Toward a global perspective on farm animal welfare. *Applied Animal Behaviour Science* 113 (4): 330–39.

_____. 2008(b). Animal welfare and the intensification of animal production. In Thomson, P.B. (ed.) 2008. *The ethics of intensification*. Springer Science + Business Media B.V.

_____. 2010. Towards a synthesis of conservation and animal welfare science. *Animal Welfare*. 19 (2010): 121-124.

_____. 2012. A "practical" ethic for animals. *Journal of Agricultural and Environmental Ethics.* 25 (2012): 721-746.

_____. 2014. Could animal production become a profession? *Livestock Science*. 169 (2014): 155-162.

_____. 2016. Animal welfare. In Rowlinson, M.C. & Ward, C. (ed). *Routledge Handbook of Food Ethics*, pp: 264-273. Routledge, New York.

Fraser, D., Weary, D.M., Pajor, E.A. & Milligan, B.N. 1997. A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare.* 6: 187-205.

Fraser, D. & MacRae, A.M. 2011. Four types of activities that affect animals: implications for animal welfare science and animal ethics philosophy. *Animal Welfare*. 20 (2011): 581-590.

Galanopoulos, K., Aggelopoulos, S., Kamenidou, I. & Mattas, K. 2006. Assessing the effects of managerial and production practices on the efficiency of commercial pig farming. *Agricultural Systems*. 88 (2006): 125-141.

Galindo, F & Broom, D.M. 2002. The effects of lameness on social and individual behaviour of dairy cows. *Journal of Applied Animal Welfare Science.* 5 (3): 193-201.

Garner, R. 2005. *Animal Ethics*. Cambridge, United Kingdom: Polity.

_____. 2006. Animal welfare: a political defence. *Journal of Animal Law and Ethics*. 1: 161-174.

Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J. Robinson, S., Thomas, S.M. & Toulmin, C. 2010. Food security: the challenge of feeding 9 billion people. *Science* 327 (5967): 812–18.

Gonyou, H.W., Hemsworth, P.H. & Barnett, J.L. 1986. Effects of frequent interactions with humans on growing pigs. *Applied Animal Behaviour Science* 16: 269-278.

Grandin, T. 1989. Behavioural principles in livestock handling. Rev. ed. 1999, 2002. *Professional Animal Scientist*, 1989 (December): 1-11.

_____. 2010(a). The importance of measurement to improve the welfare of livestock, poultry and fish. In: Grandin, T. 2010. Improving animal welfare: a practical approach. Wallingford, United Kingdom: CABI Publishing.

_____. 2010(b). Auditing animal welfare at slaughter plants. *Meat Science*. 86 (2010): 56-65.

_____. ed. 2015. *Improving animal welfare: a practical approach.* 2 ed. Wallingford, United Kingdom: CABI.

Grandin, T. & Deesing, ed. M.J. 2013. *Genetics and the behaviour of domestic animals*. 2 ed. London, United Kingdom: Elsevier Inc.

Greenawalt, K. 1986. The limits of rationality and the place of religious conviction: protecting animals and the environment. *William and Mary Law Review*. 27: 1011-1065.

Gruen, L. 2011. *Ethics and animals: an introduction*. Cambridge applied ethics. Cambridge, United Kingdom: Cambridge University Press.

Guest, G., Bunce, A. & Johnson, L. 2006. How many interviews are enough? An experiment with data saturation and variability. *Filed Methods*. 18 (1): 59-82.

Gustafsson, M., Jensen, P., de Jonge, F.H. & Schuurman, T. 1999. Domestication effects on foraging strategies in pigs (*Sus scrofa*). *Applied Animal Behaviour Science,* 62 (1999): 305–317.

Harper, G. & Henson, S. 2001. Consumer concerns about animal welfare and the impact on food choice. EU FAIR CT98-3678, Final Report. Centre for Food Economics research (CeFER), Department of Agricultural and Food Economics. Reading, the United Kingdom: The University of Reading. URL: http://ec.europa.eu/food/animal/welfare/eu_fair_project_en.pdf

Harrison, R. 1964. *Animal Machines*: *the new factory farming industry*. London, United Kingdom: Vincent Stuart Publishers Ltd.

Harvey, D. 2006. Neoliberalism as creative destruction. *Geogafiska Annaler*. 88 (2): 145–158.

Hemsworth, P.H. 2014. Behavioural principles of pig handling. In: Grandin, T. 2014. *Livestock handling and transport: theories and applications*. 4 ed. Wallingford, United Kingdom: CAB International.

Hemsworth, P.H., Barnett, J.L. & Hansen, C. 1987(a). The influence of inconsistent handling by humans on the behaviour, growth and corticosteriods of young pigs. *Applied Animal Behaviour Science.* 17: 245-252.

Hemsworth, P.H., Hansen, C. & Barnett, J.L. 1987(b). The effects of human presence at the time of calving of primiparous cows on their subsequent behavioural response to milking. *Applied Animal Behaviour Science*. 18: 247-255.

Hobbs, A.L. Hobbs, J.E Isaac, G.E. & Kerr, W.A. 2002. Ethics, Domestic Food Policy and Trade Law: Assessing the EU Animal Welfare Proposal to the WTO. *Food Policy* 27 (5-6): 437–54.

Hovi, M., Sundrumb, A. & Thamsborgc, S.M. 2003. Animal health and welfare in organic livestock production in Europe: current state and future challenges. *Livestock Production Science*, 80 (2003): 41–53.

Humane Society International. 2014. An HSI report: the welfare of animals in the pig industry. May 2014. Humane Society International.

Hursthouse, R. 2000. *Ethics, humans, and other animals: an introduction with readings*. London, United Kingdom: Routledge.

Ibrahim, D.M. 2006. The anticruelty statute: a study in animal welfare. *Journal of Animal Law and Ethics*. 1: 175-202.

Ison, S.H., Clutton, R.E., Di Giminiani, P. & Rutherford, K.M.D. 2016. A review of pain assessment in pigs. *Frontiers in Veterinary Science*, 3(108): 1-16.

Jick, T.D. 1979. Mixing qualitative and quantitative methods: triangulation in action. *Administrative Science Quarterly*. 24 (4): 602-611.

Jones, R.B. 1993. Reduction of the domestic chick's fear of human beings by regular handling and related treatments. *Animal Behaviour* 46: 991-998.

Kehlbacher, A., Bennett, R. & Balcombe, K. 2012. Measuring the consumer benefits of improving aninal welfare to inform welfare labelling. *Food Policy.* 37: 627-633.

Kendall, H.A., Lobao, L.M. & Sharp, J.S. 2006. Public concern with animal well-being: place, social structural location, and individual experience. *Rural Sociology*. 71 (3): 399-428.

KilBride, A.L., Gillman, C.E. & Green, L.E. 2009. A cross-sectional study of the prevalence of lameness in finishing pigs, gilts and pregnant sows and associations with limb lesions and floor types on commercial farms in England. *Animal Welfare*. 18 (3): 215-224.

Kittawornrat, A. & Zimmerman, J.J. 2010. Toward a better understanding of pig behavior and pig welfare. *Animal Health Research Reviews*, 12 (1): 25–32.

Klikenborg, V. 2014a. Animal personhood: muddled alternative to real protection. A new strategy of granting animals "personhood" under the law is being advanced by some in academia and the animal rights movement. But this approach fails to address the fundamental truth that all species have an equal right to their own existence. Op-Ed. Posted on the 30th of January 2014. Yale Environment 360. URL: http://e360.yale.edu/feature/animal_personhood_muddled_alternative_to_real_protection/2734/

_____. 2014b. True altruism: can humans change to save other species? A grim new census of the world's dwindling wildlife populations should force us to confront a troubling question: are humans capable of acting in ways that help other species at a cost to themselves? Op-Ed. Posted on the 9th of October 2014. Yale Environment 360. URL: http://e360.yale.edu/feature/true_altruism_can_humans_change_to_save_other_species/2813/

Krebs, J.R. & Davies, N.B. 1981. *An introduction to behavioural ecology*. 3rd ed., 1993. Oxford, United Kingdom: Blackwell Science LTD.

Lassen, J., Sandøe, P. & Forkman, B. 2006. Happy pigs are dirty! – Conflicting perspectives on animal welfare. *Livestock Science.* 103: 221-230.

Latimer, J. & Miele, M. 2013. Naturecultures? Science, affect and the non-human. *Theory, Culture & Society*. 30 (7/8): 5-31.

Lawrence, A.B. & Terlouw, E.M.C. 1993. A review of behavioral factors involved in the development and continued performance of stereotypic behaviors in pigs. *Journal of Animal Science,* 71 (1993): 2815-2825.

Lund, V. Coleman, G. Gunnarsson, S. Appleby, M.C. & Karkinen, K. 2006. Animal welfare science: working at the interface between the natural and social sciences. *Applied Animal Behaviour Science* 97 (1): 37–49.

María, G.A. 2006. Public perception of farm animal welfare in Spain. *Livestock Science*. 103: 250-256.

Marchant-Forde, J.N. & Marchant-Forde, R.M. 2005. Minimizing inter-pig aggression during mixing. *Pig News and Information,* 26 (3): 63N – 71N.

Masson, J. & McCarthy, S. 1996. *When elephants weep: the emotional lives of animals*. London, United Kingdom: Vintage.

McBride, S.D. & Long, L. 2001. Management of horses showing stereotypic behaviour, owner perception and the implications for welfare. *Veterinary Record*. 2001. 148: 799-802.

McCulloch, S.P. 2013. A critique of FAWC's five freedoms as a framework for the analysis of animal welfare. *Journal of Agricultural and Environmental Ethics* 26 (5): 959–75.

McGlone, J.J. 2001. Farm animal welfare in the context of other society issues: toward sustainable systems. *Livestock Production Science*. 72: 75-81.

McLeod-Kilmurray, H. 2012. Commoditizing nonhuman animals and their consumers: industrial livestock production, animal welfare, and ecological justice. *Bulletin of Science, Technology & Society.* 32 (1): 71–85.

McShane, K. 2007. Anthropocentrism vs. non-anthropocentrism: why should we care? *Environmental Values,* 16: 169-185.

Mellor, D.J. & Stafford, K.J. 2004. Animal welfare implications of neonatal mortality and morbidity in farm animals. *The Veterinary Journal*. 168 (2): 118-133.

Miele, M. n.d. Report concerning consumer perceptions and attitudes towards farm animal welfare. European Animal Welfare Platform report. URL: http://www.animalwelfareplatform.eu/documents/ProjOutput-consumerconcerns.pdf

Miele, M., Murdoch, J. & Roe, E. 2005. Animals and ambivalence: governing farm animal welfare in the European food sector. In: Higgins, V. & Lawrence, G. ed. 2010. *Agricultural Governance: globalization and the new politics of regulation*. Oxon, United Kingdom: Routledge.

Miele, M. & Bock, B. 2007. Editorial. Competing discourses of farm animal welfare and agri-food restructuring. *International Journal of Sociology of Food and Agriculture*. 15 (3): 1-7.

Miele, M. & Evans, A. 2010. When foods become animals: ruminations on ethics and responsibility in care-full practices of consumption. *Ethics, Place and Environment.* 13 (2): 171-190.

Miele, M., Veissier, I., Evans, A. & Botreau, R. 2011. Animal welfare: establishing a dialogue between science and society. *Animal Welfare*. 20: 103-117.

Mignon-Grasteau, S. Boissy, A. Bouix, J. Faure, J.M. Fisher, A.D. Hinch, G.N. & Jensen, P. 2005. Genetics of adaptation and domestication in livestock. *Livestock Production Science* 93 (1): 3–14.

Miles, M.B., Huberman, A.M. & Saldaña, J. 2014. *Qualitative data analysis: a methods sourcebook.* 3 ed. California, United States of America: Sage Publications, Inc.

Miller, G.T. 1996. *Living in the environment: principles, connections, and solutions*. California, USA: Wadsworth Publishing Company.

Moberg, J.P. & Mench, J.A. 2000. *The biology of animal stress: basic principles and implications for animal welfare*. Ed. CABI Publishing. London, United Kingdom: Guildford and Kings Lynn.

Monath, T.P., Kahn, L.H. & Kaplan, B. 2010. Introduction: One Health perspective. *ILAR Journal*. 51 (3): 193-198.

Moon, K. & Blackman, D. 2014. A guide to understanding social science research for natural scientists. A review. *Conservation Biology*. 28 (5): 1167-1177.

Morrison, R.S., Johnston, L.J. & Hilbrands, A.M. 2007. The behaviour, welfare, growth performance and meat quality of pigs housed in a deep-litter, large group housing system compared to a conventional confinement system. *Applied Animal Behaviour Science*, 103 (2007): 12–24.

Morris, D. 1990. *The animal contract: sharing the planet*. Warner Books - New York, NY: Warner Books.

Naess, A. 2008. The shallow and the deep, long-range ecology movement: a summary. *Inquiry: An Interdisciplinary Journal of Philosophy*, 16 (1-4): 95-100.

O'Connell, N.E. & Beattie, V.E. 1999. Influence of environmental enrichment on aggressive behaviour and dominance relationships in growing pigs. *Animal Welfare*. 8 (3): 269-279.

O'Leary, Z. 2004. *The essential guide to doing research*. Thousand Oaks, California: Sage Publications.

O'Neill, J. 1992. The Varieties of Intrinsic Value. *The Monist*. 75 (2): 119-137.

Overmier, J.B. 2002. On learned helplessness. *Integrative Physiological & Behavioural Science*. 37 (1): 4-8.

Perfecto , I., Vandermeer, J. & Wright, A. 2009. *Nature's matrix: linking agriculture, conservation and food sovereignty*. London, United Kingdom: Earthscan.

Perkins, R. 2003. Technological "lock-in". Internet Encyclopaedia of Ecological Economics. International Society for Ecological Economics. URL: http://isecoeco.org/pdf/techlkin.pdf

Price, E.O. 1999. Behavioral Development in Animals Undergoing Domestication. *Applied Animal Behaviour Science,* 65 (3): 245–71.

Prunier, A., Heinonen, M. & Quesnel, H. 2010. High physiological demands in intensively raised pigs: impact on health and welfare. *Animal,* 4 (6): 886–898.

Rauw, W.M. Kanis, E. Noordhuizen-Stassen, E.N. & Grommers, F.J. 1998. Undesirable side effects of selection for high production efficiency in farm animals: a review. *Livestock Production Science*. 56 (1): 15–33.

Regan, T. 1984. *The case for animal rights*. 1988 ed. London, United Kingdom: Routledge.

Reinhardt, V. & Rossell, M. 2001. Self-biting in caged macaques: cause, effect, and treatment. *Journal of Applied Animal Welfare Science*. 4 (4): 285-294.

Renton, A. 2013. Planet carnivore: why cheap meat costs the earth and how to pay the bill. Guardianshorts. URL: http://www.theguardian.com/lifeandstyle/2013/sep/04/why-chep-meat-costs-eath

Rollin, B.E. 2000. Scientific ideology, anthropomorphism, anecdote, and ethics. *New Ideas in Psychology*. 18 (2000): 109-118.

_____. 2002. An ethicist's commentary on animal rights versus welfare. *Canadian Veterinary Journal.* 43 (2002): 913.

_____. 2007. Animal mind: science, philosophy, and ethics. *The Journal of Ethics*. 11 (3): 253-274.

_____. 2008. Animal production and the new social ethic for animals. *Journal of Social Philosophy*. 25 (1): 71-83.

Royal Society for the Prevention of Cruelty to Animals. 2014. RSPCA welfare standards for pigs. November 2014. Horsham, United Kingdom: RSPCA.

Roots, C. 2007. *Domestication*. Greenwood guides to the animal world. Westport, Conn: Greenwood Press.

Rose, M. 2010. Challenges to the development and implementation of public policies to achieve animal welfare outcomes. *Animals* 1 (1): 69–82.

Ruane, J.M. 2005. Essentials of research methods: a guide to social science research. Oxford, United Kingdom: Blackwell Publishing Ltd.

Rushen, J. 1986. Aversion of sheep for handling treatments: paired-choice studies. *Applied Animal Behaviour Science.* 16: 363-370.

Rushen, J. & de Passillé A.M.B. 1992. The scientific assessment of the impact of housing on animal welfare: A critical review. *Canadian Journal of Animal Science*, 72 (December): 72I-743

Sayer, A. 1992. *Method in social science: a realist approach*. London, United Kingdom: Routledge.

_____. 2011. *Why things matter to people: social science, values and ethical life*. Cambridge, United Kingdom: Cambridge University Press.

Savory, C.J. 1995. Feather pecking and cannibalism. *World's Poultry Science Journal.* 51 (2): 215-219.

Scientific Veterinary Committee. 1997. The welfare of intensively kept pigs. Doc XXIV/B3/ScVC/0005/1997 final. Report of the Scientific Veterinary Committee adopted 30 September 1997.

Schröder, M.J.A. & McEachern, M.G. 2004. Consumer value conflicts surrounding ethical food purchase decisions: a focus on animal welfare. *International Journal of Consumer Studies*. 28 (2): 168-177.

Schuetz, A. 1953. Common-sense and scientific interpretation of human action. *Philosophy and Phenomenological Research*. 14 (1): 1-38.

Schweitzer, A. n.d. Reverence for life. Republished. In Seymour, P. ed. 1971. *Albert Schweitzer: Reverence for life*. Kansas City, USA: Hallmark Editions.

Seabrook, M.F. 1984. The psychological interaction between the stockman and his animals and its influence on performance of pigs and dairy cows. *The Veterinary Record* 115: 84-87.

Serpell, J.A. 1999. Sheep in wolves' clothing? Attitudes to animals among farmers and scientists. In Dolins, F.L., ed., *Attitudes to Animals: Views in animal welfare*, 129-143. Cambridge, United Kingdom: Cambridge University Press.

_____. 2003. Anthropomorphism and anthropomorphic selection – beyond the "cute response". *Society and Animals*, 11 (1): 83-100.

Singer, P. 1975. *Animal liberation*. 2nd ed. 1995. London, United Kingdom: Pimlico.

Stibbe, A. 2001. Language, power and the social construction of animals. *Society & Animals.* 9 (2): 145-161.

_____. 2005. Counter-discourses and the relationship between humans and other animals. *Anthrozoös*. 18 (1): 3-17.

Strauss, A.L. & Corbin, J. 1990. *Basics of qualitative research: grounded theory procedures and techniques*. California, United States of America: Sage Publications, Inc.

Špinka, M. 2006. How important in natural behaviour in animal farming systems? *Applied Animal Behaviour Science*, 100 (2006): 117–128.

_____. 2009. Behaviour of pigs. In: Jensen, P. 2009. *The ethology of domestic animals: an introductory text*. 2 ed. Wallingford, United Kingdom: CAB International.

Spooner, J.M. 2013. Canadian producer and citizen perspectives on farm animal welfare: identifying shared and differing values. PhD Dissertation, The Faculty of Graduate Studies (Animal Science). Vancouver, Canada: The University of British Columbia.

Spooner, J.M., Schuppli, C.A. & Fraser, D. 2014[a]. Attitudes of Canadian Pig producers Toward Animal Welfare. *Journal of Agricultural and Environmental Ethics.* 27 (2014): 569-589.

_____. 2014[b]. Attitudes of Canadian citizens toward farm animal welfare: a qualitative study. *Livestock Science*. 163 (2014): 150-158.

The Scottish Government. 2012. Pigs: codes of practice for the welfare of pigs. Edinburgh: The Scottish Government.

Taylor, P.W. 1984. Are humans superior to animals and plants? *Environmental Ethics*. 6 (Summer): 149-160.

Taylor-Powell, E. 1998. Sampling. Adapted from: Taylor-Powell, E. 1988. Sampling in Extension. Texas Agricultural Extension Service. Texas, USA: The Texas A&M University System.

Temple, D., Courboulay, V., Manteca, X., Velarde1, A. & Dalmau, A. 2012. The welfare of growing pigs in five different production systems: assessment of feeding and housing. *Animal*. 6 (2012): 656-667.

Te Velde, H., Aarts, N. & Van Woerkum, V. 2002. Dealing with ambivalence: famers' and consumers' perceptions of animal welfare in livestock breeding. *Journal of Agricultural and Environmental Ethics*. 15: 203-219.

The Pig Site. n.d. The pig site quick disease guide. 2000-2014. Sheffield: 5M Publishing. URL: http://www.thepigsite.com/diseaseinfo/

The University of Melbourne. 2010. Case studies: research methods. Helpsheet. Teaching and Learning Unit. Melbourne, Australia: The University of Melbourne. URL: http://library.unimelb.edu.au/__data/assets/pdf_file/0006/1232826/Casestudy_Research.pdf

Tovey, H. 2003. Theorizing nature and society in sociology: the invisibility of animals. *Sociologia Ruralis.* 43 (32): 196-215.

Tuyttens, F.A.M. 2005. The importance of straw for pig and cattle welfare: a review. *Applied Animal Behaviour Science*, 92 (3): 261-282.

Van Hooft, M.W. 2008. Review – Albert Schweitzer's Reverence for Life: ethical idealism and self-realization. By Martin, M.W. 2007. URL: http://metapssychology.mentalhelp.net/poc/view_doc.php?type=book&id=4587

Vanhonacker, F., Verbeke, W., Van Poucke, E. & Tuyttens, F.A.M. 2008. Do citizens and farmers interpret the concept of farm animal welfare differently? *Livestock Science*. 116: 126-136.

Vapnek, J. & Chapman, M. 2010. *Legislative and regulatory options for animal welfare*. Development Law Service, FAO Legal Office. Rome, Italy: Food and Agriculture Organization of the United Nations.

Vidékfejlesztési Minisztérium. n.d. Nemzeti Vidékstratégia 2012-2020: a vidék alkotmánya. [National Rural Development Strategy 2012-2020: the rural constitution]. Budapest: Vidékfejlesztési Minisztérium.

von Borell, E. & Sørensen, J.T. 2004. Organic livestock production in Europe: aims, rules and trends with special emphasis on animal health and welfare. *Livestock Production Science*, 90 (2004): 3 –9.

Waytz, A., Morewedge, C.K., Epley, N, Monteleone, G., Gao, J.H. & Cacioppo, T. 2010. Making sense by making sentient: effectance motivation increases anthropomorphism. *Journal of Personality and Social Psychology*, 99 (3): 410-435.

Webster, A.J.F. 1994(a). *Animal welfare: a cool eye towards Eden: a constructive approach to the problem of man's dominion over animals*. Oxford-Cambridge, United Kingdom: Blackwell Science.

_____. 1994(b). Symposium on 'The role of meat in the human diet'. Meat and right: the ethical dilemma. *Proceedings of the Nutrition Society*. 53 (1994): 263-270.

_____. 2005. The assessment and implementation of animal welfare: theory into practice. *Scientific and Technical Review of the Office International des Epizooties*, 24 (2): 723-734.

White, R. & Frank, E. 1994. Health effects and prevalence of vegetarianism. *Western Journal of Medicine.*160 (5): 465-470.

Wicks, D. 2011. Silence and denial in everyday life: the case of animal suffering. *Animals.* 1 (4): 186–99.

Winckler, C. & Willen, S. 2001. The reliability and repeatability of a lameness scoring system for use as an indicator of welfare in dairy cattle. *Acta Agriculturae Scandinavica*. Section A – Animal Science (51): 103-107.

Winter, M., Fry, C. & Carruthers, S.P. 1998. European agricultural policy and farm animal welfare. *Food Policy*. 23 (3-4): 305-323.

Wynne, C.D.L. 2004. The perils of anthropomorphism. *Nature*. 428: 606.

WWF, Zoological Society of London, Global Footprint Network & Water Footprint Network. 2014. Living Planet Report 2014: species and spaces, people and places. McLellan, R. Editor-In-Chief. WWF Report. Gland, Switzerland: WWF International.

Yin, R.K. 2009. *Case study research: design and methods*. 4th ed. Applied Social Research Methods Series. California, USA: Sage Publications Inc.

_____. 2016. *Qualitative research from start to finish*. 2 ed. New York, United States of America: The Guilford Press.

APPENDIX I.

Interview Protocol
(based on Arskey & Knight 1999 p. 99)

Preface:
Give a short introduction on the method and purpose of interview, the anticipated outcomes with special reference to publications and the CEU rules of confidentiality. Hand over the signed research information sheet (give time for participant to read it) and present the informed consent form mentioning that it will be singed at the end of the interview if/when the participant is confident about contributing. Ask for permission to record the interview. On agreement, switch on the recorder and thank the participant for the meeting. Start the interview.

Questions:

Interview Questions	Experts	Farmers
Opening question	Tell me about your work with animals: how did you become involved?	Tell me about your work: how did you start farming?
Identification of external pressures	What are the most important issues you address? What kind of challenges do farmers face? Why do these need to be addressed?	How does pig farming work? What kind of challenges do you face? Why do these need to be addressed?
Identification of technology-related decisions	Why are certain farming technologies applied and others not? Given a chance what would you change in livestock farming? Can you tell me why? What is the future of livestock farming? What could be an ideal future?	Why have you applied the farming method you use, why not another method? Given a chance what would you change about the way in which you farm pigs? Can you tell me why? What is the future of pig farming? What could be an ideal future?
Identification of pragmatic ethical frameworks	Can you tell me how can we decide what ethical human-animal interactions are?	Can you tell me how do you decide what is ethical in your interactions with your animals?
	Could you describe what animal welfare is? What kind of indicators do you use to assess the welfare of an animal?	Could you describe what animal welfare is? What kind of indicators do you use to assess the welfare of your animals?

List of probes used in oral history:
(Arskey & Knight 1999 p. 84)

- Detail oriented probes. For example: *'When did that happen? Who else was involved? What where you doing at the time? What was your involvement in that situation? How did that come about? Where did it happen?* (Patton, 1990: 324). *Did other people you knew think/act/feel etc. the same?*
- Disconfirmation probe to explore security of an answer and the reasoning behind it. *That's interesting. I've heard other people say [something rather different]. How do you feel about that? Why?*
- Amplification probe. *Can you help me understand better your position/why you felt that way/why you say that, etc.?*
- Clarification probe. *Could you give me an example of that please, or tell me a story about it?*
- Explanatory probe. *Could you help me to understand better why it happened/what happened/why you felt like that etc.?*
- Category probe, exploring distinctiveness. *Was that also true for another aspect of life/at another time/all the time?*
- Significance probe. *So, was this something you felt strongly/that was important to you/that had big effects/that mattered a lot then etc.?*
- Silent prompt, using a nod of the head, hand movement, silence or eye contact to encourage the informant to keep on talking.

Close:
To signal that the interview is over, thank the participant for it and switch off the recorder. Give time for the participant to ask any questions or follow up on anything said during the interview. Once again, present the informed consent form and ask for the participant to sign it.
Finish up by asking whether the participant would be willing to answer any follow-up questions or clarifications (if/when necessary) and expected feedback (regarding results, reports, etc).

Interview notes sheet

Interview notes – No.:	
Descriptive notes (themes) and follow up questions:	**Observations and reflective notes:**

Observation protocol

Field notes	
Demographic information: Time: Place: Date:	
Descriptive notes:	Reflective notes:

Participant information form I.

Expert	Information	Reflective notes
Name		
Organization		
Position		
Educational background		
Age		
Sex		
Willing to meet in the future	YES/NO	
Confidentiality form signed	YES/NO	
Contacts		
Expected feedback		
AOB		

Participant information form II.

Farmer	Information	Reflective notes
Name		
Age		
Sex		
Marital status/dependents		
Enterprise		
Species farmed		
Access to land		
Land surface		
Farming method		
Main productions		
Productions: • Consumed • Sold or traded locally • Sold to…?		
Main sources of income		
Other sources of income		
Estimated ratio		
Educational background		
Willing to meet in the future	YES/NO	
Contacts		
Expected feedback		
Confidentiality form signed	YES/NO	
AOB		

Further contacts:

Expert Farmer

Participant consent
(based on Arskey & Knight 1999 p. 131)

By signing this document you acknowledge that you are satisfied with the level of information you were provided with on the research, and as a participant, you are aware of your rights and affirm your participation in the project.

Please tick the box of your choice

	YES	NO
1. Have you read the confidentiality form?		
2. Did you have an opportunity to ask the researcher questions?		
3. Did you get enough information to evaluate your participation in the research project?		
4. Have you understood that you can refrain from answering certain questions during the interview?		
5. Have you understood that you can withdraw from participating in the project at any time during the research?		
6. Have you understood that the researcher will treat all the information you provide in a confidential manner and that your person will remain anonymous?		
7. Do you agree to participate in the research?		

I hereby grant my consent for the researcher to use verbatim quotes from the interview material in anonymous manner and publish these in the final documentation of the research (PhD thesis) and other scientific papers.

Signed _____ Date _____
Name (capitals)
_____

Confidentiality form

Budapest, Date:_____

I, the undersigned, hereby state that the research for which you have been invited to participate in is carried out within the framework of my doctoral research project. The work I am carrying out is funded by the Central European University (CEU, Hungary).

The research is focused on gaining an in-depth understanding of moral basis and future goals for the protection of the environment and farmed animals in Hungary. In this process you opinion and insights are of high interest.

The information you provide will form the basis of my research and will contribute to the ultimate product of the research: the PhD thesis. In addition, results may potentially be communicated in verbal (e.g. presentations) or written form (e.g. research papers, conference posters and proceedings).

The Central European University expects all students to observe CEU Ethical Research Policy and Guidelines, which I will adhere to in working with you. It is important to highlight that your consent will determine the level of confidentiality: I am only entitled to use information you share with me exclusively for the purposes of this scientific study. Your name and/or any other personal, identifiable data will remain anonymous. Please note that you may opt to withdraw or modify your consent at any stage of the research process.

Thank you for taking part in this project, and I look forward to working with you.

Yours sincerely,

Marian Molnar
PhD candidate

Post-interview reflective notes

Interview No.:	Descriptive notes	Reflective notes
Interviewee selection		
Interview setting		
The interview		
Interview questions		
Interview design		
Emerging themes		
Any other comments (e.g. need for follow up)		

APPENDIX II.

List of Participants

Name (alias)	Group	Age	Sex	Education
Expert Jack	Expert/advocate	40	M	Higher
Advocate Thomas	Expert/advocate	50	M	Higher
Expert Samuel	Expert/advocate	70	M	Higher
Expert Michael	Expert/advocate	40	M	Higher
Expert William	Expert/advocate	40	M	Higher
Expert Joanna	Expert/advocate	40	F	Higher
Expert Matthew	Expert/advocate	40	M	Higher
Expert James	Expert/advocate	70	M	Higher
Advocate Kate	Expert/advocate	30	F	Higher
Expert Colin	Expert/advocate	30	M	Higher
Expert Alison	Expert/advocate	60	F	Higher
Advocate Sam	Expert/advocate	70	F	Higher
Advocate Naomi	Expert/advocate	30	F	Higher
Advocate Sofia	Expert/advocate	30	F	Higher
Advocate John	Expert/advocate	50	M	Higher
Farmer Alex	Conventional pig farmer	40	M	Higher
Farmer Peter	Conventional pig farmer	40	M	Higher
Farmer Henry	Conventional pig farmer	60	M	Higher
Farmer Richard	Conventional pig farmer	60	M	Higher
Farmer Martin	Conventional pig farmer	50	M	Higher
Farmer Oliver	Conventional pig farmer	50	M	Higher
Farmer Mark	Conventional pig farmer	60	M	Higher
Farmer George	Conventional pig farmer	70	M	Higher
Farmer Philip	Conventional pig farmer	50	M	Higher
Farmer Bruce	Conventional pig farmer	40	M	Higher
Farmer Norman	Conventional pig farmer	60	M	Higher
Farmer Harry	Conventional pig farmer	40	M	Higher
Farmer Nick	Alternative pig farmer	40	M	Higher
Farmer Ryan	Alternative pig farmer	70	M	Higher
Farmer James	Alternative pig farmer	50	M	Higher
Farmer Edith	Alternative pig farmer	30	F	Higher
Farmer Stephen	Alternative pig farmer	40	M	Secondary
Farmer Colin	Alternative pig farmer	40	M	Secondary
Farmer Edmond	Alternative pig farmer	40	M	Secondary
Farmer Walter	Alternative pig farmer	40	M	Higher
Farmer Frank	Alternative pig farmer	40	M	Higher
Farmer Angela	Alternative pig farmer	30	F	Higher
Farmer David	Alternative pig farmer	70	M	Higher
Farmer Kevin	Alternative pig farmer	60	M	Secondary

APPENDIX III.

Atlas list of Codes and Sub-codes

Code Families

HU: PhD research and analysis 09.03.2016.
File: [C:\Users\szmm\Documents\Scientific Software\ATL...\PhD research and analysis 09.03.2016..hpr7]
Edited by: Super
Date/Time: 2016-09-27 11:00:16

Code Family: Advocacy
Created: 2016-03-09 14:34:54 (Super)
Codes (4): [Advocacy - challenge] [Advocacy - concern] [Advocacy - conflict] [Advocacy - opportunity]
Quotation(s): 120

Code Family: Agriculture
Created: 2016-03-09 14:35:00 (Super)
Codes (16): [Agriculture - alternative] [Agriculture - business, profit] [Agriculture - consumers] [Agriculture - drugs, chemicals] [Agriculture - efficiency] [Agriculture - environment] [Agriculture - extensive] [Agriculture - input, output] [Agriculture - intensive] [Agriculture - livestock, genetics] [Agriculture - market, prices] [Agriculture - over-production] [Agriculture - priorities] [Agriculture - scale] [Agriculture - semi-intensive] [Agriculture - sustainability]
Quotation(s): 611

Code Family: Finances
Created: 2016-03-09 14:36:23 (Super)
Codes (8): [Finances - animal welfare payments] [Finances - deficit] [Finances - first cost] [Finances - market competition] [Finances - power] [Finances - pressure] [Finances - priorities] [Finances - the market]
Quotation(s): 120

Code Family: Ethics
Created: 2016-03-09 14:36:30 (Super)
Codes (4): [Ethics - boundaries] [Ethics - defined] [Ethics - ethical basis for animal protection] [Ethics - inconsistencies]
Quotation(s): 94

Code Family: Farming
Created: 2016-03-09 14:35:13 (Super)
Codes (22): [Farming - administration] [Farming - animal welfare indicators] [Farming - animals] [Farming - challenges] [Farming - cleaning] [Farming - constraints] [Farming - decisions on method] [Farming - expertise] [Farming - investment] [Farming - mortality] [Farming - needs] [Farming - opportunities] [Farming - personal connection] [Farming - pride] [Farming - protocoll] [Farming - quality] [Farming - risk] [Farming - staff] [Farming - support] [Farming - technology] [Farming - the environment] [Farming - unlike other industries]
Quotation(s): 545

Code Family: National issues
Created: 2016-03-09 14:35:23 (Super)
Codes (6): [National issues - authorities] [National issues - grants] [National issues - historical perspective] [National issues - inspection & law enforcement] [National issues – politics, international relations] [National issues - priorities]
Quotation(s): 260

Code Family: Pigs
Created: 2016-03-09 14:38:10 (Super)
Codes (10): [Pig - behaviour] [Pig - duroc] [Pig - handling and invasive practices] [Pig - intelligence] [Pig - physiology] [Pig - selection] [Pig - welfare needs] [Pig - white] [Pig - wild boar] [Pigs - mangalica]
Quotation(s): 143

Code Family: Prognisis
Created: 2016-03-09 14:38:49 (Super)
Codes (4): [Prognosis - assupmtions] [Prognosis - doubts] [Prognosis - envisioned] [Prognosis - ideal]
Quotation(s): 148

Code Family: Social issues
Created: 2016-03-09 14:38:58 (Super)
Codes (7): [Social - aims] [Social - conflict] [Social - inconsistencies] [Social - norms] [Social - opportunities] [Social - priorities] [Social - problems]
Quotation(s): 268