Mind the Gaps!

From Intentions to Practice in Animal Welfare Legislation and Private Standards

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Abstract

There is a movement away from government governance of farm animal welfare towards more private governance. As a result, many farmers need to comply with both legislation and private standards simultaneously. The overall aim with this project was to study the intentions of different animal welfare regulations, and how effective these systems can be in improving animal welfare. The first study examined the intentions and values of various animal welfare regulations. The second study analysed the content and structure of different sets of Swedish regulations, and the last study focused on controls at the farm level, to identify common remarks and risk factors of non-compliance at dairy farms in official (CAB) and private (Arla) control.

We found that the aim of a regulation could be quite vague, and more ambitious than what is included in the detailed requirements. Policymakers had different views on what constitutes '*necessary suffering'* and '*natural behaviour'*. These differences were seen both between countries, between regulations in a country, and between species in a regulation. The second study illustrated that private standards for dairy cows in Sweden partly covered the same requirements as the legislation, with the exception of the organic standard. However, due to vague wordings and different ways of measuring it was not always clear if the requirements were truly identical between the regulations. In the third study we identified that inspections focused on different areas; dirty dairy cattle being the most common non-compliance in official controls, and dirty cowsheds being most common during Arla audits. The highest risk for non-compliance was, however, similar for CAB and Arla; tie-stalls during winter. Organic farms had a lower risk for non-compliance compared to conventional farms.

This project identified the need to clearly define concepts and desired animal welfare outcomes in order to reduce the gaps between intentions, requirements and assessments within a regulation. Also gaps between different animal welfare regulations need to be illuminated with the purpose of either clarifying the differences or reducing the gaps provided that the aims are similar. The presence of both similarities and differences between different regulations and control systems puts extra high demands on transparency, predictability and clarity during inspections.

Keywords: audits, animal law, animal welfare, assurance schemes, control, official, policymaking, private, standards, values

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Dedication

To all non-human animals out there, more or less protected through a regulation…

The greatness of a nation and its moral progress can be judged by the way its animals are treated.

Mahatma Gandhi

Contents

List of Publications

This thesis is based on the work contained in the following papers, referred to by Roman numerals in the text:

I Lundmark, F., Berg, C., Schmid, O., Behdadi, D. & Röcklinsberg, H. (2014). Intentions and Values in Animal Welfare Legislation and Standards. *Journal of Agricultural and Environmental Ethics*, 27(6), pp. 991-1017.

II Lundmark, F., Berg, C. & Röcklinsberg, H. (2013). 'Unnecessary suffering' as a concept in animal welfare legislation and standards. In: Röcklinsberg, H. & Sandin, P. (eds), *The ethics of consumption – the citizen, the market and the law*. Wageningen: Wageningen Academic Publishers, pp. 114-119.

III Lundmark, F., Röcklinsberg, H., Wahlberg, B. &. Berg, C. (2016). Content and structure of Swedish animal welfare legislation and private standards for dairy cattle. *Acta Agriculturae Scandinavica, Section A - Animal Science,* 66(1), pp. 35-42.

IV Lundmark, F., Berg, C., Wahlberg, B. & Röcklinsberg, H. (2015). 'One animal is no animal' – consequences of measuring animal welfare at herd level. In: Dumitras, D.E., Jitea, I.M. & Aerts, S. (eds), *Know your food – Food ethics and innovation*. Wageningen: Wageningen Academic Publishers, pp. 31-35.

V Lundmark, F., Hultgren, J. Röcklinsberg, H., Wahlberg, B. &. Berg, C. Non-compliance and follow-up in Swedish official and private animal welfare control of dairy cows. (Manuscript)

The contribution of Frida Lundmark to the papers included in this thesis was as follows:

I Responsible for the planning, execution and analyses of the work. Main responsibility for writing and completing the manuscript with regular input from co-authors and support from supervisors.

II Responsible for the planning, execution and analyses of the work. Main responsibility for writing and completing the manuscript with regular input from co-authors and support from supervisors.

III Responsible for the planning, execution and analyses of the work. Main responsibility for writing and completing the manuscript with regular input from co-authors and support from supervisors.

IV Responsible for the planning, execution and analyses of the work. Main responsibility for writing and completing the manuscript with regular input from co-authors and support from supervisors.

V Responsible for the planning and execution of the work, was involved in the data analyses. Main responsibility for writing and completing the manuscript with regular input from co-authors and support from supervisors.

Abbreviations and definitions

AWA	Animal Welfare Act
AWO	Animal Welfare Ordinance
CAB	County Administrative Board (Länsstyrelsen)
CCA	Central Competent Authority
DSK	The Animal Welfare Control Register (in Sweden)
EFSA	The European Food Safety Authority
EU	The European Union
FAO	Food and Agriculture Organization of the United Nations
FAWC	Farm Animal Welfare Committee
FVO	Food and Veterinary Office (recently also referred to the Health and Food, Audits and Analysis)
LRF	The Federation of Swedish Farmers
OIE	World Organisation for Animal Health
SAWA	The Swedish Animal Welfare Agency (Djurskyddsmyndigheten)
SBA	The Swedish Board of Agriculture (Jordbruksverket)
Swedac	The Swedish Board for Accreditation and Conformity Assessment
WHO	World Health Organisation
WTP	Willingness to pay
QoL	Quality of Life

In this thesis the word *animal* refers to non-human animals. The word *legislation* refers to the legal system and the legally binding legislation, i.e. the written law and its decrees concerning animal welfare and protection. The word *standard* refers to all other kinds of regulatory systems, such as assurance schemes, animal welfare programmes, policies, certification schemes etcetera, which are usually voluntary or market driven. The term *regulations* covers both legislation and standards. A *control case* (case) in this thesis refers to an inspection or a sequence of inspections made at a farm, from the first to the last additional inspection, when compliance should have been met and recorded. Furthermore, the term *inspector* is used for the person carrying out such inspections, regardless if that person is employed by the official authorities, by a private standards' organisation or by a third party audit provider. In this thesis a *requirement* is the text written in a regulation, i.e. what is prescribed by the policymaker. A corresponding *measure* is then a measurement or an observation taken or made during inspections for controlling compliance with the requirement.

Abbreviations related to legislation

Dir 2008/120/EU	Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs. OJ L 47, 18.2.2009, pp. 5–13.
Reg 882/2004/EU	Regulation No 882/2004 of 29 April 2004 of the European Parliament and of the Council on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. OJ L 165, 30.4.2004, pp. 1–141.
Reg 834/2007/EU	Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91. OJ L 189, 20.7.2007, pp. 1–23.
Reg 889/2008/EU	Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control. OJ L 250, 18. 9. 2008, pp. 1–84.
SFS 1988:534	Djurskyddslagen [The Swedish Animal Welfare Act].
SFS 1988:539	Djurskyddsförordningen [The Swedish Animal Welfare Ordinance].
SJVFS 2008:67 (L 44)	Statens jordbruksverks föreskrifter om offentlig djurskyddskontroll [The Swedish Board of Agriculture's regulations on official animal welfare control]. Case No L 44.
SJVFS 2010:15 (L 100)	Statens jordbruksverks föreskrifter och allmänna råd om djurhållning inom lantbruket m.m. [The Swedish Board of Agriculture's regulations and general recommendations on animal husbandry in agriculture]. Case No L 100.
SJVFS 2013:42 (D 9)	Statens jordbruksverks föreskrifter om läkemedel och läkemedelsanvändning. [The Swedish Board of Agriculture's regulations related to pharmaceuticals and the use of pharmaceuticals]. Case No D 9.

1 Introduction

1.1 A historical perspective on human approaches to non-human animals

1.1.1 Religion – Judaism, Christianity and Islam

Religion can be considered as being the first *law* that prescribed how animals should be treated (Robertson, 2015). Within Judaism, Christianity and Islam some argue that the traditional view was that humans have a unique position because of our close relation to God, since we were formed in God's own image (Radford, 2001). The Bible says that God gave humans '*dominion over the fish in the sea, and over the birds in the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth*' (Genesis 1:26-28). The most common interpretation of this scripture is that humans have the right to use and to abuse animals in any way they please, with no limitations (Robertson, 2015). This way of looking at the world is *anthropocentric*, i.e. humans are the centre of the world, and does not translate into a high degree of protection for animals. However, this quite simplistic way of interpreting biblical messages has been challenged, and there are a number of alternative approaches (Röcklinsberg, 2001). For example, there are passages in the Bible that urge humans to consider the welfare of animals, to prevent harm to animals and that instruct humans to learn from animals (Spalde & Strindlund, 2005; Preece, 2002). The Bible says, '*For six days you will do your work, and on the seventh you will rest, so your ox and your donkey may rest…*' (Exodus 23:5), or '*You have only to ask the cattle, for them to instruct you, and the birds of the sky for them to inform you…*' (Job 12:7-9). Some have considered man´s *dominion* over creation to include a duty to actually consider the suffering of other species (Radford, 2001), even if most argue that the primary biblical message is that humans have the right to use but not *abuse* animals (Robertson, 2015). Of course also other religions around the world influence the human perspective on animals and may hence also influence the level of general and legal protection of animals in different countries.

1.1.2 Philosophy

The moral status of animals has also been shaped by philosophers (Preece, 2002). The French philosopher René Descartes (1596-1650) argued that animals were *automata* ('machines') without souls, minds, or the ability to reason or feel pain or to suffer (Robertson, 2015; Preece, 2002). In contrast, humans were linked to God as the human mind was separated from the rest of the physical universe. John Locke (1632-1704) and Immanuel Kant (1724-1804) both argued

that animals had feelings and could suffer, and that cruelty to animals was morally wrong (Preece, 2002). However, they did not primarily consider this because of empathy for the animals, but in relation to the possible effects on people's minds of being cruel to animals, and how this might in turn affect the relation between humans (Kant, 1963).

The philosophers mentioned above argued that humans had a higher moral status due to differences between humans and animals, e.g. humans' ability to develop a complicated language, to think in the abstract and to reason. However, other philosophers questioned if it were these sorts of abilities that determined if animals were to be given moral status or not. The English philosopher Jeremy Bentham (1748-1832) argued that animals should be protected for their own sake, and wrote the famous phrase '*The question is not, can they reason? Nor, can they talk? But, can they suffer?'* (Preece, 2002). His view that humans have a responsibility to protect animals from unnecessary suffering is still today the founding principle of all animal protection legislation (Robertson, 2015). Within the legal philosophical field, an increasingly common view is that humans must respect animals' intrinsic values. Following from this point of view, Wahlberg (2011) has concluded that '*It is not a question of how they can suffer, nor what they can feel. It is all about that they Are*.'

Bentham´s notion that '*the greatest happiness of the greatest number is the foundation of morals and legislation*' is shared by the present day Australian philosopher Peter Singer (Robertson, 2015). In 1789, Bentham described the hedonistic utilitarian view as the idea of maximizing happiness and preventing suffering of sentient individuals, but accepting some suffering if necessary to maximize overall good (Bentham, 1789). In his book *Animal Liberation,* Singer follows the utilitarian tradition while developing a preference theory, in which he suggests that to strive for the greatest good and an absence of suffering is all that matters when trying to act good or better (Singer, 1975). He argued that all persons (sentient beings; human or non-human with some qualifications), have basic interests that cannot be denied, and that we have to balance the burdens and benefits of all actions, taking all persons into consideration. Combined with the idea of maximisation, suffering can be accepted in one individual or smaller group if this is a prerequisite for the good of a larger group.

Bentham's and Singer's utilitarian views are regarded as *consequentialism*, i.e. it is the presumed consequences of an act that will determine how to act (Sandøe & Christiansen, 2008). For those having a *non-consequentialist* view, like Kant, the consequences do not matter, and the goal will not always justify the means (Sandøe & Christiansen, 2008). For example, the use of laboratory animals for the development and testing of pharmaceuticals can be justified by a utilitarian if the suffering of the animals is regarded as counting less than the

benefit to humans of the resulting treatments. On the other hand, for a non-consequentialist, it can be wrong *per se* to use animals or cause any animal suffering, even to a small degree. Tom Regan is a modern day philosopher, widely known for his non-consequentialist views. Regan has developed the so-called *animal rights* philosophy on the basis of Kant's duty ethics. In his book *The Case for Animal Rights* Regan argues that some animals have moral rights since they are '*subject-of-a-life'*, possesses inherent values, and must be treated as ends in themselves (Regan, 1988).

There are also ethical views that neither focus on the amount of suffering and welfare of the animal, nor on who has the right to be a part of the moral community, but focus instead on the kind of person someone want to be in relation to the animal, and pose the question – how do I want to act in relation to other beings? (Hursthouse, 2006). *The virtue ethic* proposes that one should develop certain favorable character traits, e.g. generosity, courage, justness, self-control, sympathy, loyalty, patience and honesty (Rachels, 2007). It is not a virtue to cause suffering and you are not a good and compassionate person if you do so (Abbate, 2014). Subsequently suffering is deemed unnecessary for a virtue ethicist. Virtue ethicists such as Nussbaum and Hursthouse question the intensive animal husbandry systems of today where animals have few opportunities to develop and '*flourish*' as the animals/species they are (Hursthouse, 2006; Nussbaum, 2006).

To conclude, from historical and philosophical perspectives there are two extreme views on how animals should be treated. On one hand, some believe that animals have no moral status and consider humans to have the right to use and treat animals as they please. At the opposite end, others give animals the same strength of rights as humans and do not recognize the rights of humans to use animals. However, most people in the Western world probably view the moral status of animals as lying somewhere in between these two extremes.

1.1.3 Public awareness

Since the end of the second World War, the world's population has shifted from being largely agrarian to be dominantly urban and suburban with a loss of contact between the average person and agriculture. Livestock farming underwent major changes, as well, during this same period (Rollin, 1995). The keeping of farm animals was strongly intensified, partly as a consequence of the experience of food shortage during the war, and partly because of technical advancements leading to rapid mechanisation of agriculture. The small family-runned farms were replaced by larger farms specialising on one type of production only, where the level of production per animals had increased tremendously (Miele *et al*., 2013). Therefore, people's idea of agriculture did

not keep pace with reality and the average person's knowledge about animal production dwindled to almost nothing (Miele *et al*., 2013).

In 1964, the British author and animal welfare advocate Ruth Harrison launched her book *Animal Machines* (Harrison, 1964). In this book Harrison described the negative aspects of modern intensive farming, and informed the public and authorities, who were often ignorant of intensive farm practices and their consequences on animal welfare. In 1971 the Swedish environmental journalist Barbro Soller wrote *Djurfabriken* ('*Animal factory*') (Soller, 1971) which described the industrialisation of animals during the 1950's and 60's. Her book resulted in an accelerated debate on animal welfare and the routine use of prophylactic antibiotics in animal feed in Sweden. Soller was one of the first to raise concerns about the use of antimicrobials in animal production and the associated risk of antibiotic resistance, which is still of great concern (WHO, 2015).

These early works contributed to a wider, on-going public debate about animal welfare (Blokhuis, 2004). For example, according to the *Eurobarometer* (European Commission, 2016) a majority (94%) of European citizens think that it is important to protect the welfare of farm animals, 82% believe that the welfare of farm animals should be better protected, and 74% believe that the welfare of companion animals should be better protected.

1.2 The moral status and protection of animals

Although a majority of Europeans believe that farm animals deserve to be protected there are different opinions regarding which animals should be afforded moral status, and to what level they should be protected. Since Bentham's time, which animals have the capability to suffer and feel pain has been used as the main argument when deciding which animal species should be part of our moral circle, and hence protected. Lund and co-workers (2007) concluded that *sentience*, i.e. the capacity to feel both pain and pleasure, is the single most important criterion for moral status of an animal in the Western world. Recognition of animals as *sentient beings* is also the basis of the present European animal welfare legislation. For example, according to the Treaty of the Functioning of the European Union (OJ C 326, 26.10.2012) '*…the Union and the Member States shall, since animals are sentient beings, pay full regard to the welfare requirements of animals…*'. Burghardt (2009) reasoned that understanding the level of consciousness and awareness in other species is one necessary element to make informed decisions on what treatment can be ethically justifiable. The question is then – which species are sentient and can suffer if mistreated?

According to Gregory (2004) suffering is '*an unpleasant state of mind that disrupts the quality of life. It is the mental state associated with unpleasant experiences such as pain, malaise, distress, injury and emotional numbness (e.g. extreme boredom)*'. In general, scientists agree that birds and mammals can feel pain and distress and hence are capable of suffering (Gregory, 2004; Rutherford, 2002; Underwood, 2002). Some question if invertebrates and fish are capable of suffering, but several researchers have over the last decades showed that some species of fish have the ability to feel pain and fear and can adapt their behaviour in response to pain (EFSA, 2009c; Chandroo et al., 2004), and that crustaceans can feel pain (Elwood et al., 2009).

Even if there is evidence that a variety of animal species can feel pain and suffer, the reality is that some animals are treated differently than others (Spencer *et al.*, 2006). There are several factors that will affect the treatment of animals, including the type of animal, a human individual's history and background (e.g. age, location, and educational status), and what the animal is used for (Spencer *et al.*, 2006). For example, a pet dog can be treated as a beloved family member, while a stray dog can be perceived as a pest. A farm animal or laboratory animal may be treated as the means to an end (food production or medical results), while other individuals of the same species can be kept as pets. Society has a quite ambivalent attitude towards animals, since some animals tend to be '*Disney-fied*' while others are *objectified* (Cserhalmi, 2004), which is mirrored by for example media. Media debates often illustrate that it is easier for people to feel empathy for cute vertebrates than for fish and invertebrates.

Quite a number of studies have been carried out on different attitudes to animals. Several studies have revealed differences between men and women in how they view animals, women being more concerned about animals and their welfare than men (Heleski *et al.*, 2006; Kendall *et al.*, 2006; van Poucke *et al.*, 2006). Kendall and co-workers (2006) saw that place, social structural location (income, education, age, gender etc.), and individual experiences affected how concerned people were about animals. Heleski and co-workers (2006) did not see any differences in attitudes towards farm animals between different age categories, but found in their study that more religious people showed less concern than less religious, and that people with liberal political views were more concerned than those with a conservative political view. This can be explained, partly, due to differences in ethical values between the different groups. In addition, differences in attitudes towards animals stems from peoples different perceptions of what '*animal welfare*' actually involves in the first place. Whether or not an animal is considered having a good welfare or not will partly depend on the definition of animal welfare (Lund, 2007).

1.3 Defining and measuring animal welfare

There is no definitive, universal definition of animal welfare (Mellor, 2016); however, there are several definitions and approaches used to understand the concept of animal welfare. Fraser and co-workers (1997) described three different overlapping approaches used to understand and frame animal welfare: 1) physical health and biological functioning, 2) affective states, and 3) natural living.

The biological functioning approach, which initially dominated, aligns with the definition of animal welfare from Broom (1986), who defines animal welfare as the animal's ability to cope with its environment. This approach is based on the idea that animals have good welfare if they can rely on physiological and behavioural mechanisms to successfully cope with challenges in their environment (Hemsworth *et al.*, 2015). This definition has, however, been criticised for not considering what animals are feeling while coping with various negative aspects of the environment (Mellor, 2016; Hemsworth *et al.*, 2015). However, Broom (2008) later clarified that positive and negative feelings are important aspects of welfare in addition to health and the ability to cope.

Duncan (1993) claimed that all that matters is what an animal feels, i.e., the welfare of an animal depends primarily on what it experiences, and that neither health, lack of stress or fitness is necessary or sufficient to make any conclusions of an animal's welfare. This theory is focused on minimizing or eliminating negative affective states (e.g. pain, fear etc.) while providing more opportunities for positive experiences (e.g. pleasure, play). This definition has been criticised for being impossible to use in practice due to the difficulties in knowing how another being is feeling, and for ignoring all early states of disease not yet perceivable by the animal. However, during the last decades there is increasing evidence that aspects such as basic brain structure, chemistry and behaviour are similar in humans and a large number of animal species, which make it possible to draw some conclusions about affective states in animals and, therefore, support Duncan's approach to defining animal welfare (Mellor, 2015; Boissy *et al.*, 2007a; Boissy *et al.*, 2007b).

The third approach to understanding animal welfare is that animals will have good welfare if they can live reasonably natural lives, consistent with their evolutionary history (Rollin, 2007; Rollin, 1993; Kiley-Worthington, 1989). Rollin (2007; 1993) interpreted this natural living approach to involve certain characteristics for specific types of animals which he calls *telos*, – '*the pigness of the pig*', *'the cowness of the cow'* etc. Kiley-Worthington (1989) argues that it is important that an animal can perform its full range of behaviours, and that the animal's ethological needs must be considered. If taken to the extreme, this

definition results in all feelings occurring in the wild, e.g. fear due to being attacked by a predator, may be acceptable (Hewson, 2003).

According to Fraser (2009) these different views on animal welfare will also affect how animal welfare is thought to be preferably measured and improved. If the emphasis is on health and functioning measures of diseases, injuries, life expectancy, growth rate, reproduction success, body condition etc. can be used. If the emphasis is on affective states indicators of pain, frustration, distress and positive emotions are preferred. An emphasis on natural living will use research results about animals' natural behaviours and how motivated they are to perform this different species-specific behaviours.

Today it is generally accepted that the first two approaches, biological functioning and affective states, are dynamically integrated elements (Mellor, 2016). Mellor (2016) argues that the approach of natural living can be used as a reference point to identify imposed environmental and other restrictions, asking questions like is it possible for social species to engage in bonding and bond affirming activities. Nevertheless, even if these three approaches are not seen as competing to the same level as before, there can still be different opinions which approach is most important (Fraser, 2009). For example, Rodenburg and co-workers (2008) compared the welfare of lying hens between furnished cages and non-cage systems. Birds in non-cage systems were, for example, more active, and made greater use of resources like perches and scratching areas than birds in furnished cages. On the other hand, birds in the furnished cages had lower mortality rates and lower incidence of bone fractures. Which birds had better welfare? It will depend on which approach is used. Using biological functioning, the birds in cage systems had better welfare. Using the natural living approach, birds in non-cage systems had better welfare.

There have been several studies exploring different stakeholders' views on animal welfare. Researchers found that citizens believe that good welfare depends on animals being kept under *natural living* conditions (Miele *et al.*, 2011; Lassen *et al.*, 2006), while scientists considered good welfare to depend on the absence of suffering (Miele *et al.*, 2011), and farmers focused on production traits (Bracke *et al.*, 2005), health and biological functioning (Te Velde *et al.*, 2002). However, differences can also be seen between individuals and sub-groups within a stakeholder group. Bock and van Huik (2007) found, for example, that organic pig farmers highly valued the animals' opportunity for expressing natural behaviour, while conventional farmers defined animal welfare in terms of animal health and production-performance. It is important to realize that all three views on animal welfare exist and when working to improve animal welfare a balance between these views needs to be achieved (Fraser, 2009). At the same time since animal welfare is not a permanently fixed idea,

but a socially constructed concept that express how humans position themselves in relation to other animals, the definitions can also be changed over time due to societally changes (de Greef & Bos, 2007; Watanabe, 2007).

1.3.1 Other animal welfare related concepts

There are other terms or concepts that are sometimes used in relation to or instead of animal welfare. For example, according to Reynnells (2004) *animal well-being* can be used interchangeably with *animal welfare*, claiming that they are roughly equivalent. Keeling and co-workers (2010) pointed out that *welfare* is used in Britian and *well-being* in North America. Appleby and Sandøe (2002) seem to use the concepts of *well-being* for humans and *welfare* for animals, even if they claim that well-being and welfare are more-or-less synonymous, as are *Quality of Life* (QoL). QoL has been a common and fashionable concept in the human context, but has lately also been transferred to the animal sphere (Nordenfelt, 2006). Broom (2007) suggested that QoL is essentially the same thing as welfare even though QoL usually refers to a time-scale longer than a few days, whilst welfare can be considered both for the short-term or the long-term perspective. Furthermore, it has been claimed that *well-being* is a short-term concept, describing an animal's status at a given moment, while *welfare* describes the animal's status over a longer time period (Keeling *et al*., 2010). The Farm Animal Welfare Committee, FAWC, (2009a) has in its report *Farm Animal Welfare in Great Britain: Past, present and Future* used the concept of QoL, and further divided it into '*a life not worth living*' – '*a life worth living*', and – '*a good life*'. A life worth living is then a statement about an animal´s QoL during its entire lifetime, including how it dies (Wathes, 2010). If a life worth living is a life worth having is then dependent on how many pleasant and unpleasant experiences the animal has had during its lifetime (Yeates, 2011).

Animal welfare can also be defined in a more political way, addressing human responsibility and areas of concern. The OIE (World Organisation for Animal Health) has, for example, developed the following definition; '*Animal welfare is a complex international public policy issue, with important scientific, ethical, economic, cultural, religious and political dimensions and which also raised important international trade policy considerations*' (Bayvel & Cross, 2010). It is worth mentioning that even if there is no general, global agreement on how to define and measure animal welfare, this has not hindered the development of animal welfare legislation and private standards (Barnett, 2007).

1.4 The development of animal welfare legislation

One way of securing a minimum level of animal welfare is by developing and enforcing government legislation. Any legislation should mirror society's views on what is acceptable or not in a certain area of public concern, in this case animal welfare (Robertson, 2015). As mentioned above, the Treaty of the Functioning of the European Union has led to some important improvements for animal welfare, including the recognition of animals as sentient beings. This is an improvement on the original foundation of the European Union cooperation (the Treaty of Rome), which categorized animals as nothing more than *agricultural products* (Radford, 2001).

However, the first governmental pieces of animal related legislation, regardless of country, were not focused on the protection of animals for their own sake. Instead the purpose of these Acts were to maintain public order and to give owners protection from damage being done to their property, i.e. their animals (Radford, 2001). The first legislation actually prohibiting cruelty to animals (for the animals' own sake) was passed in the English Parliament in 1822 (Vapnek & Chapman, 2010; Radford, 2001). This piece of legislation was formally titled *An Act to prevent the cruel and improper Treatment of Cattle*, but usually referred to as *Martin´s Act*, after the creator Richard Martin (Radford, 2001). Still today, the *anti-cruelty* perspective is the most common theme in the legislation concerning animals. However, from early to mid-20th century a number of countries developed so-called *animal welfare* legislation. The purpose with animal welfare legislation was, and still is, generally about the prevention of cruelty and unnecessary suffering, with a focus on how animals should be treated in a humane way (Robertson, 2015), i.e. the focus was now not only to punish people who had performed cruel actions towards animals, but also to prevent cruel actions from occurring in the first place. The idea that it is wrong to cause animals unnecessary suffering, harm or pain, including the anti-cruelty perspective, is sometimes called the *welfarist view* (Aaltola & Wahlberg, 2015; Francione & Garner, 2010). The first national animal welfare legislation of this kind was developed in England 1911, after which, for example, Denmark followed in 1916, Germany in 1933, Finland in 1934, Norway in 1935 and Sweden in 1944.

An important event for the development of animal welfare legislation was the publication of Ruth Harrison's book *Animal Machines* in 1964. As a reaction to this book the English Parliament requested that the Brambell Committee examined the critique of modern farming methods and defined animal welfare (Radford, 2001). The Brambell report gave a definition of animal welfare and the first version of the Five Freedoms, which have since then been modified by the FAWC to what they are today; e.g. freedom from hunger and thirst, freedom

from discomfort, freedom from pain, injury and disease, freedom to express normal behaviour and freedom from fear and distress. The Five Freedoms have been adopted and incorporated both in various national legislation and in EU legislation (Robertson, 2015; Vapnek & Chapman, 2010), even if they are not necessarily directly mentioned in legislative texts (Brown, 2013).

The Council of Europe became involved in animal protection in the 1960s, claiming that respect for animals was closely linked to human dignity and that harmonisation between countries was necessary (Veissier *et al.*, 2008). The Council of Europe has adopted six Conventions on animal welfare (Vapnek & Chapman, 2010) and a number of more specific Recommendations. These Conventions and Recommendations have influenced the national animal welfare legislation in the countries which adopted the Conventions, and they have also influenced the EU directives (Veissier *et al.*, 2008). The EU has protected animals since the 1970s with the main goals of a) controlling the disparities between national legislation that could compromise fair competition within the common market (Veissier *et al.*, 2008), and b) ensuring that legislation protects the welfare of animals and ensures that animals are not subjected to any unnecessary pain, suffering, or injury (Bonafos *et al.*, 2010). Other international organisations have also started to consider animal welfare, such as the OIE (World Organisation for Animal Health), FAO (Food and Agriculture Organization of the United Nations) and the World Bank (Bonafos *et al.*, 2010). The OIE has, for example, developed guidelines for the slaughter/killing and transport of animals respectively (Caporale *et al.*, 2005; Petrini & Wilson, 2005).

However, animals are still considered as property in most animal welfare legislation, indirectly giving humans the right to use animals for different purposes, e.g. food, clothes, sport, companionship etc. (Aaltola & Wahlberg, 2015; Robertson, 2015; Adams, 2009; Radford, 2001). Some are critical of this present form of animal welfare legislation and worry that as long as animals are considered to be objects, as long as the fundamental moral question about our right to use animals is not asked, as long as the legislation regards animals as having less moral value than humans (i.e. having an anthropocentric view), and as long as the economic efficiency expected in the industry is linked to the exploitation of animals, animals will be treated as resources for human purposes and will never be protected enough (Aaltola & Wahlberg, 2015; Francione & Garner, 2010). Others claim that there are both advantages and disadvantages of animals having legal status as property (Robertson, 2015; Favre, 2010, Radford, 2001). On the one hand, an owner has the right to use, destroy (e.g. kill), sell, and profit from use of property (Robertson, 2015; Radford, 2001). On the other hand, it is important to note that even if animals are legally classified as property, they should not be treated like any other object, since we acknowledge animals

as living, sentient beings and therefore *animate* or *living* property (Robertson, 2015, Favre, 2010).

Attempts have been made to introduce a more positive view in animal welfare legislation by not only protecting animals from unnecessary suffering but also giving them a quality of life that is worth living (Mellor, 2016; Wathes, 2010; FAWC, 2009a; Yeates & Main, 2008). Some European countries have also adopted an '*intrinsic value*' view, e.g. in Switzerland and Norway, using wordings like '*respect for dignity*' and '*respect for animals*', with a clearer aim to protect animals for their own sake (Aaltola & Wahlberg, 2015). In practice, however, the intrinsic value view so far tends to be similar to the welfarist view, partly because the legal status of animals as objects (Aaltola & Wahlberg, 2015; Schindler, 2013; Forsberg, 2011).

Animal welfare legislation exists around the world (www.globalanimallaw.org), but the intent and the level of welfare targeted may differ between the legislations, and we know that the actual level of welfare differs between countries and in practice. Therefore, it is of utmost interest to investigate both the intentions behind different pieces of legislations and how the intentions are mirrored in the more detailed requirements.

1.5 The development of private standards

Today, farmers within animal production do not only have to meet animal welfare legislation, they may also have to meet certain kinds of private animal welfare standards in order to sell their products (Maciel, 2015; Vanhonacker & Verbeke, 2014; Veissier *et al.*, 2008). There are at least 67 animal welfare standards within the EU, out of approximately 440 within the food safety area (Areté-Research & Consulting in Economics, 2010). Most of these standards have been established during the last decades (Anon., 2010; Ransom, 2007; Fraser, 2006; Bayvel, 2004). These private animal welfare standards have been initiated by different stakeholders in the food chain, including the processing industry (slaughterhouses and dairy plants), the industry organisations (farmer organisations, organic farming organisations), retailer organisations, and governmental and non-governmental organisations (Veissier *et al.*, 2008). There are several reasons why standards are developed (Butterworth & Kjaernes, 2007), but one general reason for food companies to establish standards is to prove that the products they produce, handle and sell are of a high quality and safe for human consumption (Maciel, 2015). Bock and van Huik (2007) reported that the main incentive for farmers to participate in any standard was to get higher prices for their products and better access to the market, but the farmers affiliated to an organic standard or to a specific animal welfare standard were

mainly motivated by ethical concerns and the possibility of improving animal welfare.

There are four different types of private animal welfare standards/schemes (Bock & van Huik, 2007; Bock & van Leeuwen, 2005):

1. *Basic (farm) quality assurance schemes*: contain an animal welfare module, but mainly focus on other areas, like food safety, product quality and traceability. The animal welfare criteria follow only the basic legal requirements (EU or national legislation).
2. *Top (farm) quality assurance schemes*: contain an animal welfare module, but with focus on other areas, like food safety, product quality and traceability. The animal welfare criteria are more stringent than the basic legal requirements.
3. *Specific animal welfare schemes*: focus only on animal welfare and claim to ensure significant improvements in animal welfare. Generally the animal welfare requirements exceed European or national legislation.
4. *Organic schemes*: follow the basic organic philosophy for farming, focusing on animal welfare, environmental health, food safety and quality. The animal welfare requirements exceed European or national legislation for non-organic husbandry.

However, there is also a fifth type of private standard that is unique to Sweden:

5. *Schemes sanctioned through legislation*: these so-called *control programmes* include a few extra controls and requirements above the minimum legislation. In return producers are allowed through legislation and by the Swedish Board of Agriculture (central competent authority, CCA, responsible for the detailed animal welfare regulations) to include requirements that are at a level below the common legislative level. For example, an affiliation to *the Broiler programme* (owned by the Swedish Poultry Meat Association) will allow producers to stock up to 36 kg chicken/m^2 instead of 20 kg/m^2 which is the maximum stocking density according to Swedish animal welfare legislation for farms not affiliated to the industry-initiated programme (Berg & Algers, 2004).

Several researchers have noticed a shift in food safety and animal welfare governance away from government to the market place and consumers (Maciel, 2015; Asdal, 2006; Cohen, 2004). This shift is not unique for the agricultural and food safety area (Webb & Clarke, 2004). However, the shift towards a more private governance has not developed equally around the world. For example, in the UK consumers have confidence in the marketplace standards and, therefore, there have been many more private animal welfare standards implemented

compared to Sweden, where there is more trust in government (EconWelfare, 2011; Roex & Miele, 2005). However, such differences are not necessarily specific to animal welfare legislation, but to the entire legal approach and legal system of different countries.

1.6 Designing requirements and measures

How requirements are expressed and designed in a regulation will influence how a farmer will comply, how the control will be carried out to ensure compliance (i.e. which measures to use for controlling compliance), as well as the actual level of animal welfare when compliance is reached. The choice of requirements in legislation and standards will depend on the animal welfare view of the policymakers. If, for example, policymakers are convinced that physical health is more important than the ability to carry out natural behaviours they will include requirements and measures related to disease status, vaccination etc., versus including requirements and measures that look at the expression of natural behaviours.

1.6.1 Input and outcome requirements and measures

Animal welfare requirements and measures are often categorized as either *animal-based* or *non-animal-based*; the latter category can be divided into *resource-* or *management-based* requirements and measures (EFSA, 2012b) (Figure 1). Management-based requirements are related to actions required from the animal keeper, and can, for example, cover feeding regimes, handling requirements and biosecurity (Keeling *et al.*, 2013). Resource-based requirements are related to the resources in the animals' environment, and can cover requirements related to space allowance, type of floor or bedding material, ventilation systems etc. (Keeling *et al.*, 2013). Animal-based requirements are focusing on animal appearance, and require observations and measures to be conducted on the animals, *in vivo* or *post-mortem*, and can either be direct indicators, such as behaviour, body condition, cleanliness etc., or indirect indicators, such as records of growth, culling rate etc. (EFSA, 2012a; EFSA, 2012b). Resource- and management-based requirements and measures are regarded as *input* and animal-based requirements and measures as *outcome* (Keeling *et al.*, 2013).

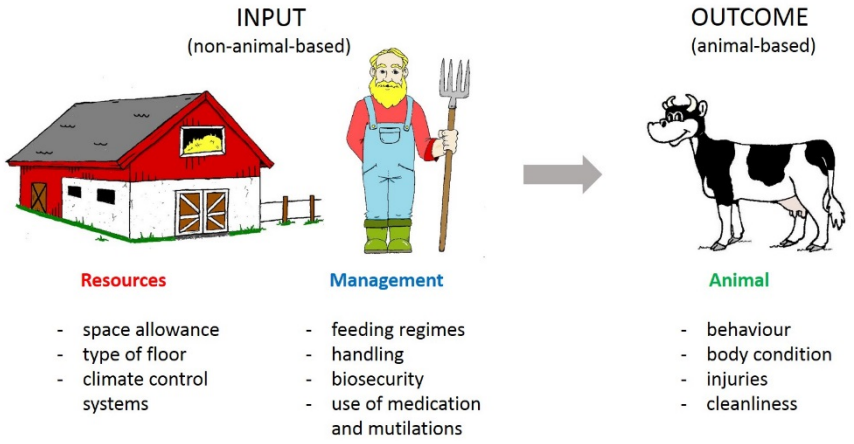

Figure 1. Examples of resource- and management-based (input) requirements and measures, and animal-based (outcome) requirements and measures, which all can be used when drafting regulations and guidelines for control. (Illustration: Frida Lundmark)

Also other concepts are used in the literature. For example Mollenhorst and co-workers (2005) used the term *environment-based* as a synonym for non-animal-based requirements, i.e. management-based and resource-based in one category. Grandin (2010) and Mench (2003) used the term *engineering-based* instead of resource-based. Mench (2003) also introduced the concept of *performance-based* standards, which is a standard focusing on the outcomes for the animals, i.e. goal-oriented and animal-based. The approach commonly used in Sweden is slightly different, talking about goal-oriented regulations or not, using the terms *function requirement* and *supply requirement* (SOU 2011:75). A function requirement states what function (goal) that should be reached; e.g. the possibilities for the animals to move, root or preform other specified behaviours, whereas a supply requirement states what resources that must be provided to fulfil a function; e.g. a certain space allowance, access to feed, straw etc. A function requirement can be animal-based, but it can also describe the goal of a certain resource or management routine, which makes a requirement more flexible than if it is expressed as a supply requirement (SOU 2011:75). For example, the threshold values for air pollutions (ammonia, carbon monoxide etc.) in a stable is a function requirement since it does not require a certain type of resource (i.e. ventilation equipment), but set up a goals that need to be achieved independently of the equipment or resources installed.

Input requirements, if valid and well-chosen, are important for the prevention or rectification of welfare problems (EFSA, 2012a; Main *et al.*, 2003a). Traditionally the animal welfare legislation is aiming to protect animals from suffering and to reduce welfare risks mainly by setting up input requirements

(Hultgren, 2009). However, if the policymaker is aiming also at measuring the level of animal welfare there is a need of including animal-based requirements in addition to the input requirements. Another reason suggested for including goal-orientated animal-based requirements is that they are more flexible and may stimulate innovation, since detailed and restrictive resource-requirements may hinder farmers to use and find new animal welfare solutions (Blokhuis *et al.*, 2013). More flexibility in animal welfare legislation has actually recently been requested both by the Swedish Government (SOU 2011:75) and the EU Commission (European Commission, 2012). During the last decades discussions have been held about developing and introducing more animal-based requirements and measures into the legislation (Keeling *et al*., 2013). The EU Commission have stated that they '*will consider the feasibility and the appropriateness of introducing science-based indicators based on animal welfare outcomes as opposed to welfare inputs as has been used so far*' (European Commission, 2012).

1.6.2 Validity, reliability and feasibility

The way in which a requirement is written will determine what type of measure (i.e. management-based, resource-based or animal-based measure) to use during an on-farm inspection to assess the level of compliance (EFSA, 2012a). A policymaker must also consider if a given requirement can be measured. Requirements related to resources, e.g. space allowance, are often relatively easy to assess, having a high inter- and intra-observer repeatability and assessors requiring comparatively little training (Keeling *et al.*, 2013; EFSA, 2009b). Animal-based requirements can be more time consuming and costly to measure (Viksten *et al.*, 2016; de Vries *et al.*, 2013a), require a lot of training to perform (Vasseur *et al.*, 2013; EFSA, 2012b), and imply a risk of limited inter- and intra-observer reliability (Bokkers *et al.*, 2012). Within the Welfare Quality® animal welfare assessment project, animal based measures were chosen if they met three criteria; *validity*, *reliability* and *feasibility* (Veissier *et al.*, 2013; Knierim & Winckler, 2009). Validity is defined as the extent to which one can measure what is supposed to be measured, i.e. the measure must mirror the requirement. Reliability means that the results will largely be the same when one (intra-observer reliability) or several inspectors (inter-observer reliability) repeat the same assessment. Feasibility is about how realistic and easy the measure is to apply, including practical aspects and associated costs. For example, it may not be feasible to take blood samples of all animals in a herd in order to measure the cortisol levels. One of the goals of the Welfare Quality® system was to ensure that one single observer could carry out a farm assessment during a one-day visit (Veissier *et al.*, 2013). A Welfare Quality® assessment of a herd of 60 dairy

cows takes, for example, approximately six hours to carry out (Knierim & Winckler, 2009). However, a one-day visit may be considered to be far too time consuming, and therefore too costly, to be feasible and realistic for an animal welfare control or audit (Heath *et al.*, 2014; de Vries *et al.*, 2013b). It is important to stress the difference between welfare assessment systems, such as Welfare Quality®, versus animal welfare regulations. The main goal of the Welfare Quality® project was to develop a standardised system for the assessment of on-farm animal welfare across the EU and to provide information to consumers about which products came from animals with good or excellent animal welfare on the farm (Blokhuis et al., 2013), whereas the legislation mainly focuses on preventing poor animal welfare. Since regulations are designed to ensure that basic requirements are met, i.e. the lowest acceptable animal welfare level achieved, this means that compliance with a regulation is not necessarily equivalent to a particularly high level of welfare, and inspections pursuant to a set of regulations are only designed to assess compliance with minimum requirements.

1.7 To control compliance

In addition to choosing requirements and measures, policymakers must develop control and audit systems, i.e. decide how compliance with a regulation is to be verified through reliable inspections at farm level, including systems for handling non-compliances. Trust in a regulation and its control and auditing system is crucial for public confidence (Rushen *et al.*, 2011; Jahn *et al.*, 2005). To secure a trustworthy official control the EU legislation requires that Member States have a competent authority to carry out the official animal welfare control impartially and effectively (Reg 882/2004/EU). To assure that Member States have a well-functioning official control, the European Commission's inspection service Food and Veterinary Office (FVO, recently also referred to as the Health and Food, Audits and Analysis) conducts regular audits (Bonafos *et al.*, 2010). These control systems can and do vary between Member countries (see the country profiles at the FVO webpage; ec.europa.eu/food/audits_analysis).

In response to the rapid development of private standards the EU has created best practice guidelines for voluntary certification schemes to ensure transparency, credibility and effectiveness across standards (Anon., 2010). Main and co-workers (2014) stated that in order for a private standard to be trustworthy, reliable inspections must be carried out on farm. There are different ways of organising a control and audit system, and depending on how this is done there are different levels of independence and trustworthiness. Tanner (2000) divides different control systems into four levels of independence. On the

basis of Tanner's definitions, translated to the animal welfare control arena, a first party control is a self-assessment made by the farmer owning the animals, a second party control is carried out by someone that the farmer is dependent on, e.g. an advisory person or someone from the company to which the farmer delivers the products produced at the farm. A third party control is carried out by an independent control body, which is often accredited by national or international institutions (Hatanaka *et al.*, 2005). A fourth party control is, according to Tanner (2000), the official control for which the government is responsible. It is recommended that private animal welfare standards are assessed by a third party to ensure trustworthiness (Anon., 2010; Hatanaka *et al.*, 2005).

All animal welfare regulations, regardless of who is responsible, require that inspections are carried out at the farm level by employed individual inspectors. These inspectors need to be competent and well trained as well as having a general understanding of the applicable animal welfare regulation. Training should include exercises to establish acceptable levels of intra- and inter-observer agreement (Ruddat *et al.*, 2014; Butterworth *et al.*, 2012; Mullan *et al.*, 2011a; Rushen *et al.*, 2011). This could be a challenge due to different views, values and back-grounds of inspectors (Butterworth *et al.*, 2012). Duijvesteijn and co-workers (2014) investigated the influence of various backgrounds on the assessment results using several different stakeholders carrying out the same welfare assessment of pigs. They found that the assessment results were affected by the animal welfare view of the observer, e.g. the farmers showed a more biological functioning approach (health, fertility and productivity) while animal scientists and average consumers were more focused on natural behaviour and good mental wellbeing. There is also a risk of different outcomes if a requirement is measured differently (Andreasen *et al.*, 2014; Anneberg *et al.*, 2013). In order to prevent poor intra- and inter-observer agreement it is recommended that policymakers creates guidelines and standard protocols to be used during inspections (Mullan *et al.*, 2011b).

Other key considerations are how frequently farms or other animal premises should be inspected, and whether or not farmers and other animal owners should be notified in advance. According to Reg 882/2004/EU article 3(1a) the official control shall be risk-based and without prior warning. A risk-based control system means that identified risk factors affecting animal welfare and health at farm level determines the control frequency for a specific farm. This means that farms with more risk factors will receive more inspections than farms with fewer risk factors. However, farms with high risk factors can reduce their inspection frequency (from the official control) through affiliation with a private animal welfare standard (Hultgren, 2009). The EU advises private policymakers to

implement risk based inspections according to their standards, but also to determine a minimum inspection frequency (Anon., 2010).

In addition to the risk-based inspections the EU also urges member states to make ad-hoc official inspections at the farms (Reg 882/2004/EU). According to Hultgren (2009) there are two good reasons for including a random selection of controls in addition to the risk-based sample; 1) a possibility to compare random and risk-based inspections in order to validate the control scheme, and 2) random controls are more difficult for animal owners to anticipate and be prepared for.

1.8 The Swedish animal welfare regulation and control arena for dairy cows as an example

In Sweden, as in many other countries, the number of dairy farms is decreasing while herd sizes on the remaining farms is increasing. In year 2000 Sweden had 12 676 dairy farms and 427 621 dairy cows, in 2015 this number had declined to 4 161 dairy farms and 338 379 dairy cows (SBA, 2015). Subsequently, the average number of cows per farm has increased from 33.7 to 81.3 cows. Furthermore, the predominant housing and management system for dairy cows has changed during this period in time. In Sweden, dairy cows have traditionally been kept in tie-stalls. However, there is now a rapid increase in the number of loose-housing systems. This is in part due to Swedish animal welfare legislation which prohibited the construction of new tie-stall barns after 2007. In 2005 approximately 60% of the Swedish dairy cows (86% of farms) were housed in tie-stalls, but by 2015 this number had decreased to 32% (56% of farms) (Agneta Schultzberg, Växa Sweden, pers. comm. 2016-03-17).

1.8.1 The Swedish animal welfare legislation and official control

The present Swedish Animal Welfare Act was adopted in 1988, and the entire animal welfare legislation consists of three levels. The Animal Welfare Act (SFS 1988:534) was developed by the parliament, the Animal Welfare Ordinance (SFS 1988:539) by the government, and the more detailed regulations by the Swedish Board of Agriculture (SBA), which is also the CCA for animal welfare. The specific regulations about housing and management for dairy cows can be found in the Swedish regulation and general recommendations on animal husbandry in agriculture (SJVFS 2010:15, latest amendment in SJVFS 2016:13, Case No L 100). The competent authority carrying out the official animal welfare control at farm level in Sweden is the County Administrative Board (CAB) (FVO, 2015). Sweden is divided into 21 counties and each county has its own CAB (FVO, 2015). The SBA guides the CABs in order to reach inter-observer agreement among the different parts of the country. The CABs conduct

several different types of inspections; 1) risk-based standard inspections, 2) random (ad-hoc) standard inspections, 3) acute inspections based on public complaint, or 4) cross-compliance inspections (Hultgren, 2009). Cross-compliance inspections cover the requirements originating from the EU legislation related to animal welfare or other aspects covered by EU legislation, and these inspections are also risk-based (SBA, 2014). A non-compliance recorded as a cross-compliance failure can lead to a reduction of the EU subsidies to the farmer.

At least 10% of the Swedish animal premises with animal production (not just dairy farms, but also for example pig, cattle or poultry farms) are subject to official controls each year, in accordance with the official Control Plan (Livsmedelsverket *et al.*, 2015), and at least 50% of these controls should be planned standard inspections, including cross-compliance inspections, according to the regulations concerning official control (SJVFS 2008:67). SBA has developed a risk classification model, *STORK*, to be used by the CABs when planning and calculating the control frequency. All control objects, i.e. farms and other known animal premises, are registered in the Animal Welfare Control Register (DSK), and STORK is connected to this. STORK contains eight different risk modules that are calculated for each control object (SBA, 2013a). These models are; 1) animal species, 2) type of activity, e.g. dairy farm, riding school, lab animals etc., 3) recent control result, 4) the most serious decision during the last five years, 5) size of activity, e.g. number of animals, 6) number of control cases the last five years, 7) time passed since the previous control, and 8) any affiliation to a private standard.

The persons carrying out animal welfare inspections in Sweden are usually not veterinarians, but instead specially trained in animal welfare control. They usually have experience as biologists (e.g. from the university programme in Ethology and Animal Welfare), environmental health inspectors or agronomists. However, at each CAB there is at least one official veterinarian employed as a part of the animal welfare group. Practicing veterinarians in Sweden do not participate in routine official animal welfare controls. However, when animals are neglected or suffering the CAB usually contacts a practicing veterinarian to write a certificate detailing the level of suffering and possibilities for recovery. During the last few years it has also become more common for ethologists to be involved in animal welfare cases when the level of mental suffering has to be assessed. This development is in line with Christiansen and Forkman (2007), who concluded that there is a need for ethologists to complement the knowledge of veterinarians in clinical situations. Veterinarians, as well as other licensed professionals, e.g. veterinary nurses, also have a responsibility according to section 28a in the AWA to report to CAB if they suspect that animals are not

being kept in accordance with animal welfare legislation. There is, however, currently one situation when practicing veterinarians do perform a type of animal welfare inspection at dairy farms. Starting on January 1st 2016 dairy farmers are allowed to keep some pharmaceuticals at home and to treat animals without a veterinarian present, so-called *conditional medication use* (SBA, 2016). The farmer must pass a training course before handling medications, and also pass an animal welfare inspection (called *animal welfare declaration*) performed by the prescribing practicing veterinarian. The veterinarian reviews the animal welfare declaration on the basis of some predetermined requirements from the animal welfare legislation at least every twelfth week (SJVFS 2013:42).

1.8.2 Private standards for dairy cows in Sweden

In addition to complying with Swedish legislation, dairy farmers can also be certified under various private animal welfare standards. All dairy farmers delivering milk to the dairy company Arla Foods AB must comply with the quality assurance programme *Arlagården*. Arla is the biggest dairy processor in Sweden and accounts for approximately 50% of the Swedish dairy market (Arla, 2015a). Since Arla dominates the Swedish dairy market they also have a legal duty to collect milk from any farmer wanting this, i.e. Arla is not allowed to deny a farmer membership and cannot refuse to collect the milk from very small and distant farms (Bernt Andersson, Arla Foods AB, pers. comm. 2015-02-15). Arla is an international company and Arlagården also operates in e.g. Denmark, Germany, Luxembourg, Belgium and the UK (Arla, 2015b). Arlagården also includes requirements related to food safety, milk composition and environmental considerations (Arla, 2016). The inspectors carrying out Arlagården's inspections in Sweden are hired by Arla from the advisory organisation Växa Sweden (Bernt Andersson, Arla Foods AB, pers. comm. 2015-02-15), hence this is a second party audit. Arlagården inspections are carried out approximately once every three years (Arla, 2015c), but sometimes more often or less frequently depending on previous inspection performance (Bernt Andersson, Arla Foods AB, pers. comm. 2015-02-15).

Farmers in Sweden providing milk to other dairy processors can or must (depending on dairy company) comply with the requirements in the quality standard *Seal of Quality* (*IP Sigill*) for Swedish food and flowers. Similar to Arlagården, Seal of Quality includes requirements for other areas besides animal welfare. There are different levels of certification in Seal of Quality, one *base level certification* and one *Sigill certification* (Sigill, 2016a). There are currently 190 dairy farmers following the base level and approximately 50 dairy farmers' affiliated with the Sigill certification level (Sigill, 2016b). Swedish Seal of Quality is owned by the Federation of Swedish Farmers (LRF) and the private

standard and labelling programme is run by the subsidiary Sigill Kvalitetssystem AB. A farmer can either be group affiliated through the dairy processor, or individually affiliated on request from the dairy processor. It is also possible for other individual farmers to voluntary join the Seal of Quality standard. The inspections and audits are normally carried out at least every two years by independent certification bodies, authorized by the Swedish Board for Accreditation and Conformity Assessment (Swedac) (Sigill, 2015), i.e. third party audits. However, for farmers affiliated in a group through a dairy processor it is the dairy processor that is responsible for the inspections (Sigill, 2015), i.e. second party audits. The independent certification body must, however, conduct random inspections at farm level to guarantee the quality of the dairy processors own control activity.

If a Swedish farmer chooses to produce organic milk they will need to comply with the requirements of the Swedish organic production standard KRAV. Even if there is a possibility for an organic farmer to be EU organic in accordance with Reg 834/2007/EU and Reg 889/2008/EU, this is very unusual for Swedish dairy farmers (SBA, 2012). For example, Arla Foods demands organic Swedish dairy farmers to be affiliated with KRAV in order to be labelled as organic (Bernt Andersson, Arla Foods AB, pers. comm. 2015-02-15). KRAV is an incorporated association with 27 members representing farmers, processors, trade, consumer, environmental and animal welfare interests (KRAV, 2015). Like Seal of Quality and Arlagården the KRAV standard cover several other areas apart from animal welfare. There are almost 600 organic Swedish dairy farms affiliated with KRAV (Paula Quintana Fernandez, KRAV, pers. comm. 2016-04-27). KRAV is using independent certification bodies, authorized by the Swedac to carry out the third party audits at the farm level (KRAV, 2015). An organic KRAV-affiliated farmer is inspected at least once annually (KRAV, 2015).

Although private animal welfare standards are not as common in Sweden as in some other countries, a Swedish organic farmer delivering milk to the largest dairy company in Sweden, i.e. Arla, will be inspected by three different animal welfare systems at the farm level, i.e official control and two private controls. Usually, the farmer will have a private control more often than a government one. If the farmer wants to medically treat his or hers animals without a veterinary present each time there will also be additional animal welfare inspections carried out by a veterinarian. Consequently, one can conclude that a shift towards a more market-driven system and private governance of animal welfare leads to a more complex animal welfare arena both in Sweden and other countries, where some producers have more private standards and controls to consider than government legislation and official controls. Therefore, when

evaluating the effect of animal welfare regulations and controls, private standards need to be considered.

2 Aims of the thesis

The general aim of this project was to investigate and describe what intentions different stakeholders have with their various types of animal welfare regulations (both governmental legislation and private standards), and how efficient these systems are in improving animal welfare both in theory and in practice, including their reciprocal relations and interplay. The overreaching hypothesis was that there would be similarities in the expressed aims of most regulations, an intermediate level of agreement with respect to the actual content, but greater differences with respect to on-farm control approaches and results.

The three studies presented in this thesis each addressed specific objectives about the regulations and control of animal welfare:

- Study I – *Intentions and values*: The aim was to describe the intentions and values found in different animal welfare regulations, to discuss if the legislation and standards actually accomplish what they claim, and if these regulations can contribute to a higher level of animal welfare. (Papers I and II)

- Study II – *Content and structure*: The aim was to analyse different sets of animal welfare regulations, including any corresponding audit or control guidelines, regarding animal-, resource- and management-based requirements for dairy cattle, and to analyse the actual content of the regulations at the general level in order to identify similarities and differences between different regulations with respect to structures and approaches chosen. (Papers III and IV)

- Study III – *Control at farm level*: The first aim was to identify common types of non-compliances at dairy farms in official animal welfare controls and Arla private audits, quantify risk factors influencing the probability and level of non-compliance, and compare different private standards with respect to the effect of membership in a private standard on the level of compliance with the legislation. Our second aim was to investigate the timeframe farmers were given for rectifying non-compliances related to the legislation and to the Arlagården standard, and how many additional inspections it takes before full compliance is reached. (Paper V)

3 Material and methods

3.1 Study I

The aim of this study was to describe the intentions and values found in different animal welfare regulations, to discuss if the legislation and standards actually accomplish what they set out to achieve, and if these regulations may contribute to better animal welfare. As a starting-point for this study, data was taken from information that already had been collected in an on-line questionnaire during the research project EconWelfare (Good animal welfare in a socio-economic context, www.econwelfare.eu).

3.1.1 The on-line questionnaire

The EconWelfare questionnaire included questions regarding different public and private initiatives for improving animal welfare in eight European countries. Animal welfare researchers in each country were responsible for selecting initiatives according to specific criteria that were set up by the EconWelfare project group (Kilchsperger *et al.*, 2010). Four countries were selected for our study in order to have a manageable number; Sweden, the UK, Germany and Spain. These four countries were selected since they had previously been shown to have slightly different approaches and attitudes towards animal welfare (Keeling *et al.*, 2012), and the regulations were written in languages that we could manage and understand.

From the four countries the animal welfare legislation was chosen to be analysed together with ten private standards, i.e. 14 regulations (Figure 2). The private standards chosen in this study covered one or more species of farm animals. The pieces of legislation included not only animals kept for farming purposes, but also other animals kept by humans and sometimes even wildlife and invertebrates.

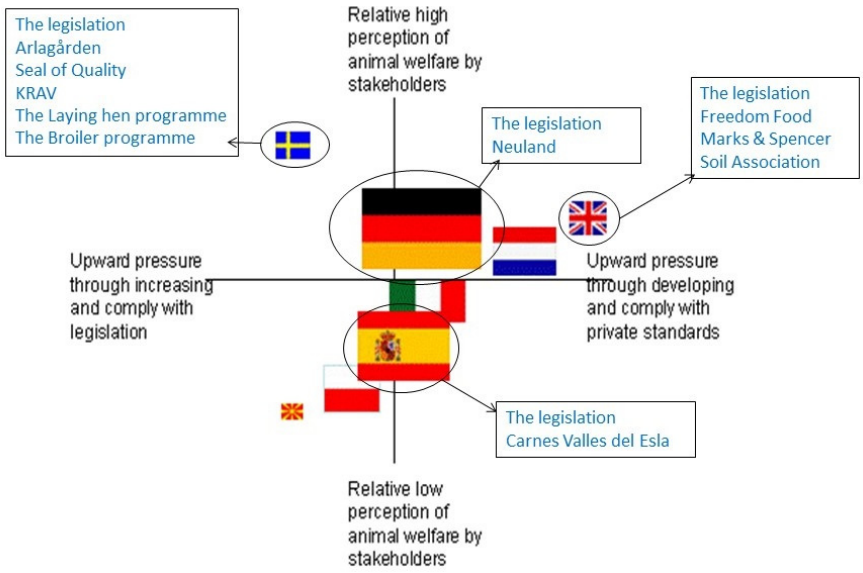

Figure 2. The four countries and 14 regulations selected for the first study. The countries are Sweden, Germany, Spain and the UK. The flag diagram derives from the EconWelfare project, and illustrates that stakeholders in different countries may have different attitudes to animal welfare and different strategies to improve it. The flags are of different size to show the relative size of livestock production in each country, based on pig and broiler production (from: Immink *et al.*, 2010).

3.1.2 Text analyses

The questionnaires provided basic information for this study, however, in addition to the questionnaires, the text of the farm animal regulations was analysed as well as any preparatory work, explanatory notes, web pages and brochures that were published. The standard from Marks & Spencer could be analysed from the basis of the summarized information on the web page only, as the company refused to provide us with the actual standard despite repeated efforts.

To make a first attempt to identify ethical values within animal welfare legislation (in the UK, Spain, and Argentina) and evaluate the method of text analyses a pilot study was carried out (Behdadi, 2012). The type of analysis used was so-called *argument analysis*, including value theory and concept analysis. In an argument analysis, a search for explicitly and implicitly expressed premises (arguments) is made in relation to a specific conclusion or statement (Feldman, 1999). The arguments used were examined in order to establish whether they were built on facts (for example, scientific research or long experience) or values, or both. During the argument analysis common concepts were identified.

Based on the pilot study and first text analysis a total of seven focus areas were identified and outlined in a schematic structure. These focus areas were identified in the majority of the regulations and were areas where similarities and differences in values were obvious. The focus areas were: intentions with the regulation, the concept of animal welfare, the five freedoms, unnecessary suffering, natural behaviour, the stock-keeper´s role and the killing of animals.

3.2 Study II

With a better knowledge about intentions and values behind the regulations we wanted to dig deeper into the actual structure and content of different regulations. The aim of the second study was to analyse different sets of animal welfare regulations, including any corresponding audit or control guidelines, with respect to the proportions of animal-, resource- and management-based requirements for dairy cattle, and to analyse the actual content of the regulations at the general level.

Four Swedish regulations were analysed: the national animal welfare legislation and the animal welfare related sections of Seal of Quality (dairy cows, edition 2012:1), Arlagården (version 4.0) and the organic standard KRAV (edition 2013). The pieces of legislation were the Animal Welfare Act (1988:534), the Animal Welfare Ordinance (1988:539) and the Swedish regulation and general recommendations on farm animal husbandry (SJVFS 2010:15, latest amendment in SJVFS 2012:13, Case No L 100). We focused on the animal welfare requirements related to on-farm housing and management of dairy cattle, including calves.

Content analyses were used in this study (Hsieh & Shannon, 2005). Initially, a *summative* content analysis was completed by organizing all requirements from the four regulations by headings and paragraphs, to make it possible to compare the content between the different regulations. After comparing the content each requirement was analysed and classified, based on all text fragments, as animal-, resource- or management-based, or as a combination, i.e. a *directed* content analysis. The search also identified if a requirement was more important than others within a regulation. Finally, corresponding audit or control guidelines were analysed, when available, applying the same classification system as described above (animal-, resource- or management-based, or as a combination), plus the suggested method of measuring, i.e. what kind of assessments that were suggested for each requirement.

3.3 Study III

A regulation is never better than the actual compliance achieved. The third study involved determining the actual outcomes from different animal welfare controls using the same regulations as in study II but focusing on the official control of the legislation and Arla´s control of the Arlagården standard. The control results from KRAV and Seal of Quality were more difficult to get access to because of several different certification bodies owning the results, and confidentiality contracts between individual farmers and certification bodies. Arla, on the other hand, provided their control results for a complete analysis after we had written a contract about not revealing any individual details or control results, and agreed on not publish any results without their permission. All Arla documents were analysed on-line at the Arla Foods AB office in Jönköping. The CAB documents were analysed at the university, since CAB mailed us all photocopies of the official control results.

Firstly, the most common non-compliance in official animal welfare controls and Arla private audits were identified, risk factors influencing the probability and level of non-compliance were quantified and, the private standards (i.e. Arlagården, KRAV, and Seal of Quality) were compared with respect to their effect on the level of compliance with legislation. The second step was to investigate the timeframe farmers were given for rectifying non-compliances of legislation and Arlagården, and how many additional inspections were needed before full compliance was reached.

3.3.1 Data collection

Two separate sets of data were developed by collecting information from all official animal welfare controls conducted by CAB and all Arla audits made on dairy farms in the county of Västra Götaland in south-western Sweden during 2010-2013. The study covered data from one county only to ensure a high degree of farm inspection overlap (i.e. between the regulations), and to limit the amount of data and the number of inspectors involved. Västra Götaland had a particularly high number of dairy farms (SBA, 2015b). Both the official control and Arla audits resulted in a control report every time a farm was visited. These control reports were the main documents analysed, but also other documents and decisions were collected and analysed, i.e. injunctions (decided by CAB), prohibitions to keep animals (CAB), decisions about seizure of animals (CAB) and temporary blocking of milk delivery (Arla). The data collected from each case included information on the control system (CAB or Arla), inspection date, control type (reason for starting a control case, e.g. planned standard inspection or public complaint), identity of inspectors, cow housing system (cubicle, tie-stall or mixed), affiliation with Arla, affiliation with KRAV (organic

production), affiliation with Seal of Quality, notification (whether the farmer was notified in advance of the inspection), herd size (number of dairy cows on farm), number and types of non-compliances, type of decision (made by CAB or Arla), deadlines for rectifying non-compliances, number and types of additional inspections (resulting from non-compliance, on farm or administrative), and whether compliance was reached before the case was closed.

3.3.2 Data editing and analyses

Descriptive statistics were produced in Excel 2013 (Microsoft Corp., Redmond, WA, USA). The data were edited and analysed using StataIC 13 (StataCorp, College Station, TX, USA). Non-compliance was analysed for CAB and Arla controls separately, using control case as the unit of analysis. Two dependent variables were constructed, one expressing whether or not non-compliance was found and the other expressing the number of non-compliances found. Mixed-effects logistic regression was applied to model the probability of one or more non-compliances in a control case. In addition, mixed-effects negative binomial regression was used to model the number of non-compliances per case. Consideration was given to clustering by farm by including a random farm effect.

Initially, the independent variables were tested in univariable models. Only effects that were significant at $P \leq 0.20$ univariably were considered eligible for further analysis. Multivariable models were constructed by backward stepwise elimination, retaining effects that were statistically significant at $P \leq 0.05$, or effects that modified the coefficients of other covariates by more than 10%, indicating confounding. Already eliminated variables were tested for re-entry into the model at each step.

The effect of Arla inspector identity was estimated by constructing empty models of the probability of one or more non-compliances and the number of non-compliances, including a random inspector effect and calculating the intra-class correlation coefficients, disregarding clustering by farm. The effect of CAB inspector identity could not be estimated due to the large number of inspectors involved, often more than one at the same inspection and up to nine inspectors during the same case.

Chi-squared analysis was performed in Minitab 16 (Minitab Inc., State College, PA, USA) to test differences regarding types of non-compliance during official control between KRAV (organic) and non-organic conventional farms, and between Arla and Seal of Quality farms, respectively, using case as the unit of analysis.

4 Summary of results

In this chapter a brief summary of the results is given. For full details se paper I and II for study I, paper III and IV for study II, and paper V for study III.

4.1 Study I

4.1.1 Different initiators, areas of concern, and reasons for development of regulations

The owners of the regulations represented different parts of society; the government, the industry, retailers, farmers, and animal welfare groups. Data highlighted that there are several reasons for the development of legislation and standards in the four countries evaluated. Analysis showed that current animal welfare legislation in Sweden and the UK was written mainly because of public concern about animal welfare, the negative impacts of intensification of livestock production and new knowledge, whereas the current legislation in Spain mainly exists as a result of demands from the European Union. For private standards, welfare scandals in media, public or consumer concern, widespread animal disease outbreaks and the need for a trustworthy labelling were some of the reasons identified for the existence of various standards.

A majority of the regulations in this study included other areas besides animal welfare, such as food safety, disease control, environmental protection and milk quality. During the development of a regulation, the animal welfare level was adjusted to be in line with other areas of interest, e.g. ensuring a strong and competitive agricultural sector, financial restrictions and practical restraints. This led to a risk of goal conflicts between these different areas when covered by the same regulation. For example, the organic standard of the Soil Association, and to some extent KRAV, did not approve the use of synthetic substances, such as synthetic amino acids, although these may be beneficial or sometimes even necessary for animal health and welfare. However, there was evidence that regulations related to different areas also could have some synergetic effects. The goal of quality products can, for example, translate into positive welfare since this demands healthy udders in dairy cows and clean animals in general. Our interpretation is actually that the main goal conflicts can be seen within the same area, in this case animal welfare, where the content of the specific paragraphs can sometimes be questioned in relation to the intentions and values expressed in the overreaching Act or preambles.

4.1.2 (Un)necessary suffering

The prevention of animal suffering was a central theme in the national legislation of all the four countries. However, the only suffering that should be prevented was identified as '*unnecessary*' (Sweden, UK and Spain) or '*avoidable*' (Germany), implying that there is suffering that is necessary or unavoidable and therefore acceptable. The private standards also aimed to prevent suffering but they consistently used other terms than suffering; e.g '*stress*', '*distress*', '*discomfort*' or '*fear*'. In some of the regulations it was clarified that both physical and mental suffering were included.

The notion of (un)necessary or (un)avoidable suffering was not defined in the regulations. It was clear that different initiators made different decisions as to whether an action or situation would result in suffering, and had different views on what kind of suffering was considered unnecessary. After examining procedures known to cause pain (e.g. beak trimming, castration, and slaughter without prior stunning), and therefore suffering, an interesting pattern emerged. The differences between what actions/situations a regulation allowed or banned could be seen on four levels; (1) between countries, (2) between different regulations within a country, (3) between different species of animals covered by the same regulation and (4) between individuals of the same species covered by a regulation (e.g. different procedures allowed for different ages and different rules depending on the purpose of the keeping of the animal; production, companion, zoo etc.).

4.1.3 Natural behaviour

All of the initiators behind the legislation and standards mentioned that the animals' natural behaviour must be taken into considerations. However, different approaches to natural behaviour were identified in this study; from desiring animals to live as close to the wild as possible, to accepting a confined indoor environment as long as it allowed animals to perform only some crucial behaviours. Slightly different expressions were sometimes used besides *natural behaviour*; for example *species-specific behaviour*, *natural or near-natural lifestyles*, *biological and behavioural needs*, in this text subsumed to *natural behaviour*. Generally, authors very rarely defined *natural behaviour* or more precisely, what was meant by providing '*the opportunity to perform natural behaviours*'. Although the initiators wanted natural behaviour to be perceived as a broad concept it was usually used as a rather narrow concept in the regulations. This concept mostly focused on the design of the animals' husbandry system and environment, and less on social structures, weaning, feed, mutilations or mating behaviours.

4.1.4 The stock-keepers responsibility

All initiators mentioned, in one way or another, that the owner of the animal or the stock-keeper had a responsibility to comply with the regulations and take proper care of the animals, but how much focus the stock-keeper was given differed. The majority of initiators stated that the stock-person should be competent, skilled, experienced, etc., while others merely stated that the stock-keeper has a responsibility for the animals. Some initiators provided a detailed description of the ideal stock-person, and there were varying explanations provided regarding the importance of the stock-person. Some initiators simply mentioned that it is *obvious* that the owner or stock-person is responsible for treating the animals well, while others specified that it is a *moral duty* to treat animals well. Some also included arguments around the importance of maintaining good welfare for economic reasons, and that good stockman-ship is necessary for good meat, milk and egg quality, and of importance to consumers to make them confident that the animals have had a good life. The RSPCA (Freedom Food) standard required that stock-keeping should be carried out in a compassionate way because if you treat your animals well this will probably mean that you also treat humans compassionately.

4.1.5 The view on killing animals

The initiators very rarely discussed or questioned the right of humans to kill animals. Implicitly it was clear that all initiators behind these regulations accepted the tradition or convention to kill animals for meat. However, for animals which have not yet reached the desired slaughter weight or were not at all intended for slaughter there were some alternative patterns of reasoning. For example, the Soil Association and Freedom Food discouraged the killing of healthy new-born calves, and the RSPCA was opposed to the killing of animals '*in the name of sport, entertainment or fashion*'. In the Swedish bill to the Animal Welfare Act it was stated that if animals are sick or injured killing is the last resort. At the same time there was no ban against killing perfectly healthy animals in Sweden since animals are seen as someone's property.

The majority of regulations also considered killing of animals to be an option for preventing further suffering, i.e. euthanasia. Even if the euthanasia of an animal can be seen as a way of preventing further suffering, and therefore favourable for the welfare of the individual animal, the herd or flock mortality on farm level was sometimes used as an animal welfare assessment parameter. An unacceptably high mortality level on farm could obviously be seen as a welfare problem, since it indicates problems related to the health or management of the animals, most likely resulting in suffering prior to death.

4.2 Study II

The Swedish legislation contained more detailed, specific requirements than the private standards. Both the legislation and Arlagården had guidelines linked to the regulations to facilitate the inspectors' assessments, covering almost all requirements. Seal of Quality had written guidelines for some of their requirements, whereas KRAV only provided information at meetings between certification bodies.

4.2.1 Animal-, resource- or management-based requirements

The legislation mainly focused on the availability of resources in the animals' environment (Table 1), and Arlagården focused on what actions were required from the animal keeper (i.e. had the most pure management-based requirements). Both the legislation and the private standards contained low numbers of purely animal-based requirements, i.e. focusing only on the appearance of the animals.

Table 1. *Percentage of requirements classified as pure resource-, management-, or animal-based, or as a mixture of these, in the animal welfare legislation and three private standards in Sweden. The sums do not reach 100% for each regulation due to the existence of requirements about administration or other not-classifiable requirements.*

Type of requirement	Legislation	KRAV	Seal of Quality	Arlagården
Pure resource-based	35%	17%	19%	11%
Pure manage-based	23%	30%	28%	40%
Pure animal-based	0%	1%	1%	4%
Resource- and management-based	13%	22%	21%	17%
Resource- and animal-based	9%	4%	3%	13%
Animal- and management-based	6%	6%	15%	11%
Resource-, management- and animal-based	7%	14%	6%	2%

It was quite common that a requirement contained two or all three categories (Table 1). When the requirements contained two categories the most commonly identified combination was resource- and management-based in all four regulations. In general, animal-based requirements were actually more commonly expressed in a mixture with other requirements than alone. KRAV had the highest proportion of requirements that contained all three types.

Since so many requirements was a mixture between two or three categories it would be suitable to also consider the proportions of paragraphs in a regulation containing resource-, management- and animal-based requirements (Figure 3). As shown in figure 3, this for example meant that all regulations contained of

20-30% requirements that partly was animal-based (compared to 0-4% pure animal-based requirements in table 1). The main difference between legislation and private standards was that a larger proportion of the requirements in the private standards (approximately 70%) were at least partly management-based as compared to legislation (49%) (Figure 3).

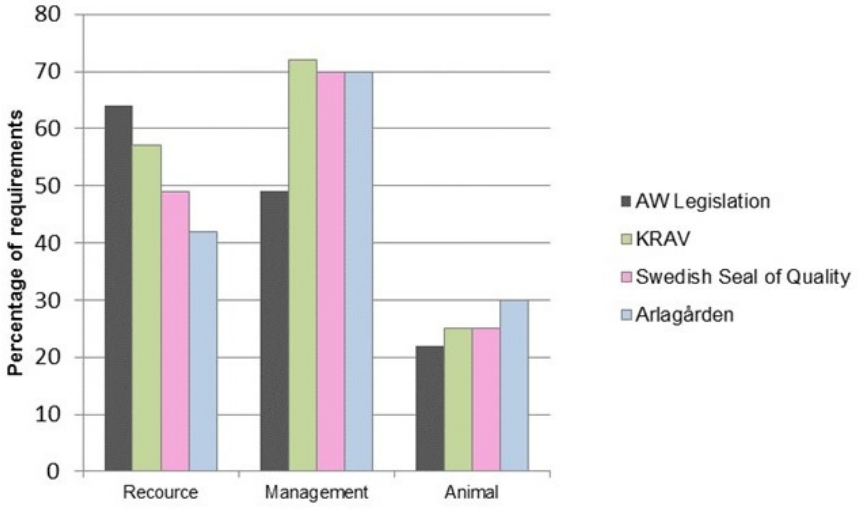

Figure 3. Percentage of requirements in the animal welfare legislation and private standards that contains of resource-, management- and animal-based requirements. The total sum is above 100% due to mixing of categories in several paragraphs.

In addition to resource-, management- or animal-based requirements there were also demands of documentation or administrative tasks mentioned in all four regulations. In general the private standards had a higher proportion of documentation requirements and record keeping than the legislation, often with the purpose to verify compliance with a management-based requirement, e.g. that the stable had been cleaned annually, that no calves had been exported etc. However, we have not analysed these documentations requirements further.

4.2.2 Discrepancies between the regulations and guidelines

A certain requirement may be expressed in slightly different ways but in the end still be measured or evaluated in the same way. For example, the requirement '*Animals shall be kept satisfactorily clean*' (L100, chapter 1, section 7) could be seen as a mixture of management-based and animal-based requirements. In Seal of Quality the requirement is that '*Animals shall be clean*' (Seal of Quality 17.4M), a requirement that when expressed in this way was classified as purely animal-based.

Requirements could also be expressed in one way in a regulation but suggested to be assessed in other ways according to the corresponding guidelines. For example, a pure management-based requirement could be suggested in the corresponding guidelines to be assessed using also animal- and resource-based measures. For example, the requirement '*Animals should be attended to at least once a day*' (L100, chapter 1, section 5), was recommended to be assessed using animal-based measures such as; animal cleanliness or untreated injuries, which would indicate failure of proper attention, and resource-based measures ensuring that the facilities enabled all animals to be attended to without difficulties. Hence, the measures used during inspections were generally more complex than indicated in the regulation paragraphs.

Requirements often contained vague language which would be difficult for inspectors to interpret consistently such as '*satisfactory*', '*dignity*' and '*appropriate*'. The guidelines to Arlagården and Seal of Quality did provide more precise information than the guideline to the legislation in relation to when the cows were to be considered as being too dirty, too thin or emaciated. In contrast, the guidelines to the legislation referred to existing animal-based scoring systems but did not specify the acceptable thresholds.

4.2.3 Similarities and differences between legislation and private standards

All milk producers in Sweden must comply with the animal welfare legislation (Swedish and EU), and this fact was also declared in all three private standards. Nevertheless, the private standards partly covered the same requirements as the legislation, and all regulations had fundamental requirements about good animal environments and proper care and management of the animals to ensure good general condition, clean and healthy animals. Due to the less detailed regulations and fewer requirements, the private standard did not always have such specific requirements as the legislation. The legislation included requirements for dimensions (e.g. space allowance/stocking density), but not the private standards, with some exceptions for KRAV. Compared to the legislation, the private standards contained very few requirements about interior design and equipment. The legislation and, in particular, KRAV emphasized the importance of natural behaviour. The majority of requirements for dairy cows in Arlagården and Seal of Quality were equivalent to the legislation. It was mainly KRAV that had more stringent, or at least different, animal welfare requirements. The most obvious difference between the standards and the legislation was the requirement/recommendation in all the standards mandating membership in other programmes, such as the database *Swedish official milk recording scheme* (Växa Sweden, 2014a), various preventive health care programmes, or carrying out assessments of animal welfare at herd level by, for example, using existing

advisory packages such as *Ask the Cow* (Växa Sweden, 2014b) or *Animal Welfare Signals* (Växa Sweden, 2014c). The legislation did not include any such requirements, as participation in these programmes is legally voluntary.

It was not always clear if the requirements in the regulations were practically identical or whether there was a difference. This was, for example, the case with the amount of straw. All regulations required straw – but to the same extent, or does the difference in wording indicate a true difference in what is actually required (Figure 4)?

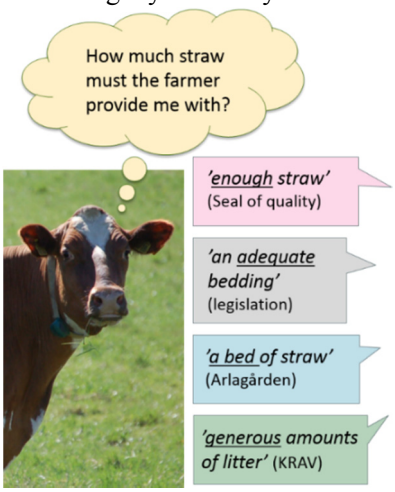

Figure 4. All four regulations required straw for dairy cows - but did they require the same amount or was there a difference? Vague expressions may lead to uncertainties both within and between regulations. (Photo: Frida Lundmark)

Even when requirements were similar, there were differences in assessing compliance. According to the legislation animal welfare requirements apply to individual animals. Seal of Quality and Arlagården took a slightly different approach. Even if the standards required every animal to be cared for by the stock-keeper and checked upon during a control visit, it was sometimes stated

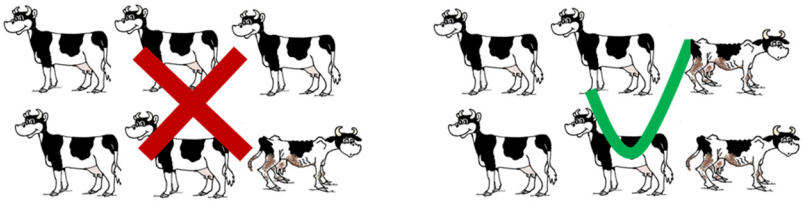

Figure 5. Left: each individual animal indicating a non-compliance is a problem. Right: Unless a set proportion of the animals indicate non-compliance this is not considered a problem. Hence, requirements that are expressed in the same way may not be equal if they are measured differently. According to the legislation each animal should be protected, meaning if one animal is in a condition below the legislation this is considered to be a non-compliance that need measures to be taken. According to Arlagården and Seal of Quality a certain proportion of animals sometimes need to be in poor condition before it is considered a non-compliance. (Illustration: Frida Lundmark)

that non-compliance should not be reported until a certain percentage of the animals were observed (e.g. a certain number of dirty or soiled animals) (Figure 5).

4.3 Study III

4.3.1 Number of farms and cases

The number of farms inspected by CAB and Arla during the years 2010-2013 was similar (Table 2). In total, 328 farms were inspected by both CAB and Arla during this period. Of these, 47% were inspected within the same 6-month period and 14% had ongoing cases from both CAB and Arla overlapping in time. The number of cases per farm ranged from 1 to 7 with an average of 1.3 for CAB and from 1 to 4 with a mean of 1.4 for Arla. CAB had 58% cases with non-compliance, the corresponding number for Arla was 51% (Table 2).

Table 2. *Information about the number of farms, cases and inspectors, and prevalence of non-compliance, in the official animal welfare control (CAB) and Arlagården private standard (Arla) on dairy farms in the Swedish county of Västra Götaland during 2010-2013.*

	CAB	Arla
Number of farms visited	458	472
Number of cases	599	665
Cases with non-compliance	347 (58%)	336 (51%)
Number of inspectors	76	11

4.3.2 Types of non-compliance

Dirty dairy cattle was the most common non-compliance in the CAB controls and the second most common in Arla (Figure 6). Compared to CAB controls, the Arla inspections resulted in greater numbers of non-compliances related to the cleanliness of cowsheds, inadequate feed and water supply, and overgrown claws (Figure 6). The CAB controls had, on the other hand, in addition to dirty animals, more non-compliances related to missing ventilation alarm systems, the housing of calves, overstocking, floors in poor condition, and insufficient access to pasture.

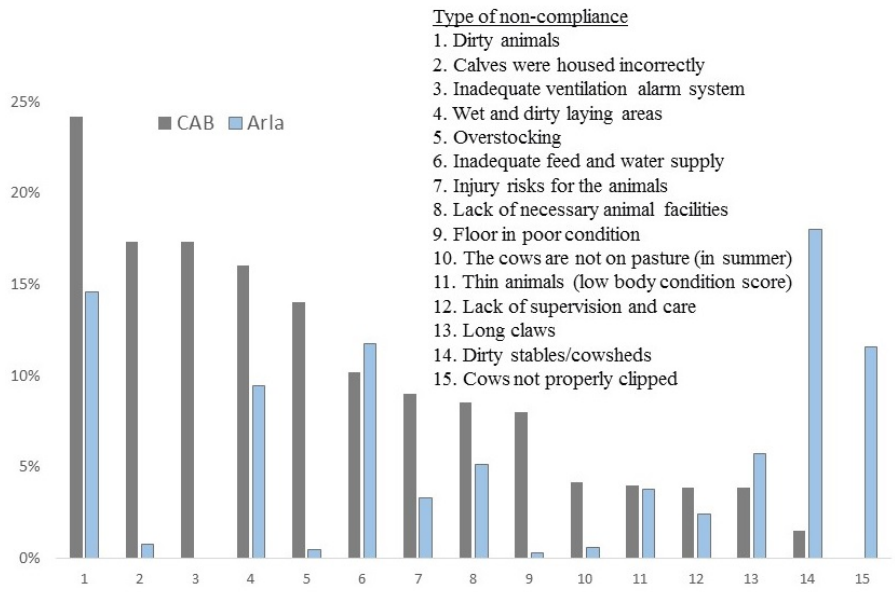

Figure 6. The proportion of control cases that have a certain type of non-compliance according to the official animal welfare control (CAB) and the audits made by Arla on the private standard Arlagården in the Swedish county of Västra Götaland during 2010-2013.

Of Arla's cases with issues, 53% had non-compliances concerning animal-based requirements (e.g. too dirty or thin animals, animals with overgrown claws, untreated sick or injured animals); the corresponding numbers for CAB were 47%. Of the CAB cases with issues, 93% had non-compliances concerning input requirements, i.e. resources- or management-based requirements, the corresponding number for Arla was 77%.

4.3.3 Risk factors for non-compliance

The presence of tie-stall housing resulted in the highest risk for incidents of non-compliance and the highest risk for a high number of non-compliances, both for CAB and Arla. The probability of non-compliance was lower at CAB thematic inspections concerning pasture and cross-compliance inspections, compared to random inspections. The odds of finding non-compliances were higher if the farmer was notified prior to a CAB inspection. However, notification did not have any effect on the number of non-compliances.

There were more incidences of non-compliance during winter (Dec.–Feb.) in both CAB and Arla cases, compared to summer (Jun.–Aug.). There was a lower probability of finding one or more non-compliances at a KRAV farm during an Arla inspection. The incidence of non-compliance was also lower when inspecting a KRAV farm both in CAB and Arla cases, compared to a

conventional farm. However, the outcome of a CAB inspection did not differ if the farm was a member of Arla or Seal of Quality. Neither herd size nor year affected the CAB's or Arla's inspection results.

4.3.4 Time periods for correction and additional inspections

The time period given to the farmers for achieving compliance varied. In general the farmers were given longer time periods for correction after a CAB inspection than an Arla inspection. Arla inspectors always set an exact deadline while CAB inspectors frequently expressed the time imprecisely in words. It was also quite common for CAB inspectors not to set any deadline at all.

CAB performed more additional inspections than Arla, regardless of the type of non-compliance. CAB carried out additional inspections in 42% of all the cases, and Arla in 45%. It was most common for both CAB and Arla to make one additional inspection when non-compliance had been documented. In 27% of cases where there was a non-compliance issue, CAB did not conduct any additional inspections; in 2% of the cases Arla did not perform an additional inspection. In one case, CAB performed twelve additional inspections – the most additional inspections conducted by Arla was six. CAB performed additional on-farm inspections in 44% of the cases with issues; Arla 28%. Arla performed administrative additional inspections in 64% of the cases of non-compliance, while the CAB performed such inspections for 39% of cases.

Additional inspections did not necessarily indicate that total compliance was achieved. Not all non-compliances were always checked during additional inspections, and some cases were closed despite outstanding non-compliances. Thirty percent of the CAB cases (Arla 0%) had outstanding non-compliances when they were closed, and 31 % of the CAB cases (Arla 11%) hade non-compliances that 'disappeared' during the handling of cases (i.e. the outcome of the non-compliance was not recorded). Of the CAB cases 42% were closed when a total compliance was reached and documented; the corresponding number for Arla was 89%.

5 General discussion

There are several aspects that could be discussed on the basis of our studies. However, based on the results, in this discussion I have chosen to focus on some of the general aspects I regard to be important to illuminate concerning the intentions, content and control of animal welfare legislation and private standards. For a more thorough discussions about the results from each separate study please see paper I-V.

5.1 High minded intentions, minimal requirements

Information gathered from this study highlighted that the aims of animal welfare legislation and private standards are often more ambitious from an animal welfare perspective than what is actually achieved through compliance with the requirements. More specifically, while they often promised to provide animals with natural lives, without unnecessary pain or suffering, they accepted that animals were confined, young animals taken from their mothers at birth, and the killing of healthy animals (e.g. slaughter), as well as allowing painful procedures without the use of anaesthesia or analgesia.

The basic value found in both legislation and standards about giving the animals possibilities to behave naturally was not unexpected since it is a common theme in animal welfare legislation (Brown, 2013; Segerdahl, 2007; Bracke & Hopster, 2006). However, in this study different approaches to natural behaviour were discovered. From desiring animals to live as close to the wild situation as possible to accepting a confined indoor environment, as long as the animals could still perform some crucial behaviours in this housing system, e.g. pigs having access to manipulable material to root on, hens having access to nests to lay the eggs in, and cows having the possibility to rise and lay down in a natural way without being restricted by the environment. Our interpretation is that even if it could sometimes seem as if the policymakers want natural behaviour to be perceived as a broad concept it was used as a rather narrow concept in the actual texts of the regulations. This concept mostly focused on the design of the husbandry systems and environment, and less on aspects such as social structures, weaning, feed, mutilations or mating behaviours. However, it is probably strategically important to include the ability to perform natural behaviours as a claim when trying to appeal to consumers and to satisfy citizen requirements, since a natural life is important for lay people (Lassen *et al.*, 2006). The requirement for natural behaviour may also be included as a way to prevent poor welfare outcomes; i.e. to prevent abnormal behaviours, frustration and suffering. Lidfors and co-workers (2005) concluded that even if there is no

consensus on the concept of *natural behaviour* there is enough knowledge for giving science-based recommendations on housing systems to support essential animal behaviours.

Another basic value found in both legislation and standards was that animals should not be exposed to *unnecessary* suffering. This was not unexpected either since this is a common principle in animal welfare legislation (Brown, 2013). The exact phrase '*unnecessary suffering'*, however, was rarely used in the private standards in this study. There could be three reasons for this: a) suffering is a negative value-laden word and hence it is avoided, b) having higher ambitions with voluntary private standards, i.e. only preventing unnecessary suffering is a too low standard, and c) private standards often complement national legislation and therefore there is no need to repeat basic requirements and concepts. However, when looking at procedures known to create a certain level of pain, distress or anxiety and therefore suffering for the animals, it became clear that the regulations in this study differed as to whether a procedure should be identified as necessary or not. For example, beak trimming of laying hens was allowed in German and Spanish legislation but not by Neuland and not by any of the initiators in Sweden. Castrating piglets before seven days of age without anaesthetics, analgesia or veterinary involvement was permitted by all legislation at the time of the study; however, castrating piglets without analgesia and local anaesthesia has been banned in Sweden as of January 1st 2016. In the UK castrating piglets was prohibited according to the Soil Association standard. However, the Soil Association standard accepted castration and tail docking of sheep and goats with rubber rings before seven days of age. The castration and tail docking of sheep using a rubber ring has been practiced for decades in the UK (French *et al.*, 1992), but the castration of piglets is not a tradition since the pigs are slaughtered at an earlier age (when boar-taint has not yet developed) (FAWC, 2011).

There are numerous other examples like the ones mentioned above which make it clear that the identification of what is *necessary* differs between countries, within countries and within the same regulation depending on the animal species covered. All stakeholders basically have access to the same research but have drawn different conclusions with respect to what is considered to be necessary suffering, and therefore legal or acceptable. Culture and tradition, economics, consumer demands, food quality, ethics and religion all play a role when deciding if something is unnecessary or not, as is the case for the general aspects of how animals can be kept and used by humans (Aaltola & Wahlberg, 2015; Wahlberg, 2011). Landera-Luri (2010) argues that the main objective of the EU animal welfare legislation is to protect human economic interests and that the protection of animal welfare is secondary. This study, in

agreement with several other researchers, has shown that what policymakers actually define as *unnecessary* or *necessary* is usually not adequately explained (Bilchitz, 2012; Forsberg, 2011; Landera-Luri, 2010; Wahlberg, 2008; Radford, 2001; Hurnik & Lehman, 1982). Our study identified four factors affecting the interpretation of (un)necessary suffering in legislation and standards: (1) the intensity and duration of the suffering, (2) the intent behind an act that caused the suffering (i.e., was it wilful?), (3) the fulfilment of human interests, or (4) the weight given to animals' interest. Whereas the first factor is empirically assessable, but still subject to judgment, the other three are entirely value based, and hence open to interpretation. In reality a combination of these factors is probably used, but how to prioritize and balance between these factors relies on the values of the policymakers and of those who must interpret the regulation (Yeates *et al.*, 2011), e.g. inspectors, farmers, courts.

We argue that there is a risk that generous (high animal welfare level) intentions, but vague and undefined concepts in combination with relatively lax (lower animal welfare level) requirements increase the risk for perceived goal conflicts within a regulation. When there is a contradiction between intentions and requirements it may be difficult to understand what the values behind a regulation truly are. Such contradictions were possibly easier to detect in national legislation and the organic standards than in the other private standards, probably as a result of the former regulations stating aims more explicitly. Some of the private standards were vague about their animal welfare intentions but clear about the fact that consumer and producer interests mattered, apart from the animals' interests. Other researchers have argued that there are risks for goal conflicts within organic farming (Vaarst & Alrøe, 2012; Padel *et al.*, 2009; Waiblinger *et al.*, 2007; Alrøe *et al.*, 2001), that the organic core values are not always implemented by national organic standards and that external economic pressures may lead to outcomes that do not coincide with agreed core values (Padel *et al.*, 2007). Studies focusing on organic farming have shown that the concept of *natural living* is important within organic farming (Lund, 2006; Lund & Röcklinsberg, 2001). Researchers have also seen a challenge for producers to live up to the core values when organic production becomes large-scale and intensive (Kulö & Vramo, 2007; Verhoog & de Wit, 2006). Little research has focused at goal conflicts in other standards and legislation, but our studies have shown that such contradictions exist.

Even if the organic standards emphasised the *natural living* definition of animal welfare also the other definitions of *biological functioning* and *affective states* could be seen in the organic standards, as well as in the other regulations. There were regulations that emphasised biological functioning more than natural living. It was, however, not always easy to identify what point of view the

policymakers had, since several different terms were used, for example *animal well-being*, *animal protection*, a*nimal fitness*, *animal care* and *animal friendly*. These terms sometimes seemed to be synonymous with *animal welfare* and sometimes not. Lerner (2008) investigated the concepts of *animal welfare*, *animal well-being* and *animal health* and found different theoretical definitions for all of them. Vapnek and Chapman (2010) discussed the choice of definition from an economic point of view, arguing that if a policymaker emphasized biological functioning and improving basic health by reducing, for example, disease, injury and death rates, this would improve the efficiency and reduce production costs. If the focus was instead on natural living this may increase production costs if it results in requirements about more space and outdoor access to the animals. However, such housing systems may lead to improved welfare and therefore lower costs and better production. Alvåsen (2015) and Ekesbo (2015), for example, concluded that cows kept on pasture had better health than cows kept permanently indoors, and Högberg (2016) concluded that both milk production and milk composition actually improved when goats and kids were kept together instead of being separated. It can be concluded that all these definitions or approaches can be useful in improving animal welfare and that they are often combined even within the same regulation.

5.2 To prevent, to detect or to do both?

5.2.1 Input and outcome requirements

The animal welfare regulations cited in this project had intentions related to both preventing poor animal welfare and assessing at least some aspects of the actual animal welfare level, in order to be able to evaluate the effectiveness of the preventive efforts. The private regulations in the second study did, however, focus somewhat more on assessing animal welfare at the farm level (in addition to prevention) in comparison to the legislation. This was not totally unexpected since one of the main aims of any animal welfare legislation is to reduce welfare risks (Hultgren, 2009), while the private standards (i.e. KRAV, Arla Foods and Seal of Quality) want to assure consumers of good animal welfare. This is probably also why the legislation had a slightly higher proportion of input-based requirements (i.e. management- and resource-based), and the private standards had a greater proportion of animal-based outcome requirements. However, all types of regulations evaluated had a higher proportion of input-based requirements compared to animal-based. One explanation for this could be that input requirements and measures are considered to be more practical to use and easy to assess (Keeling *et al.*, 2013; EFSA, 2009b), i.e. score high on validity, reliability and feasibility. Our results agree with Lin (2015) who found that the

focus was on input-based requirements during the animal welfare control of two private standards (i.e. The Red Tractor Farm Assurance Dairy scheme and Soil Association organic standard), and the legislation (focus on cross-compliance requirements) in the UK. Well-chosen input requirements are important in order to identify risks to animal welfare and causes of poor welfare and thereby preventing welfare problems (Keeling *et al.*, 2013; EFSA, 2012a; Bowell *et al.*, 2003; Main *et al.*, 2003a). Prevention has failed when animals are found to be in poor body condition, dirty or soiled, not able to perform natural behaviours or generally miserable.

The European Food Safety Authority (EFSA) carries out systematic risk assessments of animal health and welfare in order to provide scientific advice on what to include in the EU legislation and other policy initiatives (Smulders & Algers, 2009; Blokhuis *et al.*, 2008). The current EU legislation largely relies on input requirements (Blokhuis *et al.*, 2013), and several studies have concluded that the husbandry system, equipment design and management all impact animal welfare outcomes (Kielland *et al.*, 2010; EFSA, 2009b; Lidfors *et al.*, 2005; Veissier *et al.*, 2004). For example, inadequate stall/cubicle design for dairy cows (e.g. too narrow cubicles that increase the risk for teat trampling) and poor bedding hygiene increase the risk of dirty cows, which can lead to mastitis in dairy cows and results in pain and suffering (Manzi *et al.*, 2012; Sant'Anna & da Costa, 2011; EFSA, 2009a). In the third study the results showed that dirty animals were a common non-compliances both at CAB and Arla inspections.

However, there are also studies of housing system design that reached different conclusions about the animal welfare benefits. Bernardi and co-workers (2009), for example, concluded that changes in one type of design improved hoof health and cow comfort while it impaired cow and stall cleanliness. In addition to such ambivalent research results, scientists can also draw different conclusions about the benefits of different housing systems depending on which animal welfare indicators they favour on the basis of how they define animal welfare and balance between different features, e.g. health vs. behavioural restriction (Rushen *et al.*, 2011). Bracke and co-workers (2008) saw, for example, that veterinarians and ethologists had different views on the animal welfare effect of different calf housing systems. These diverging results and advices related to resource-based requirements from the scientific community of course makes policymaking quite complex.

Animal-based requirement can also to some extent contribute to a preventive approach if the measures used can detect the start of a cascade of potential negative welfare outcomes (EFSA, 2012a). It has, for example, been concluded that a low body condition score in dairy cows increase the risk for lameness (Randall *et al.*, 2015; Green *et al.*, 2014). Animal-based measures also reflect

how the animal is coping with its environment (Whay *et al.*, 2003), and are important when monitoring an expected progress in animal welfare. Another feature often mentioned in relation to outcome based requirements is that they stimulate farmer innovation since they allow producers to use different methods to achieve the same outcome (Blokhuis *et al.*, 2013). However, from an animal welfare point of view it is important that the legislation and requirements are interpreted from an animal perspective in accordance with the aim of the animal welfare law, or else these flexibility may lead to arbitrariness and *de facto* risk poor animal welfare outcomes (Wahlberg, 2011). The private standards in the second study were industry and farmer driven, which may be the reason why they partly avoid input requirements, especially requirements about measures and dimensions, since they could be costly to achieve. Since legislation applies to all holdings, private policymakers can chose to leave out resource requirements and still find them implemented as result of the legislative requirements.

5.2.2 A mixture of input and outcome within requirements and measures

The regulations were quite complex, and any statement about them being only non-animal-based and resource focused tends to over-simplify the situation. Firstly, the requirements in the regulations were often a mix of resource-, management-, and animal-based requirements. Secondly, the choice of measures was not limited to the type of requirement *per se*. A resource-based requirement could be suggested in the control guidelines to be measured in several different ways using both resource-, management-, and animal-based measures. The legislation, for example, consisted of more animal-based outcome measures in the corresponding guidelines than animal-based requirements in the actual regulation. According to EFSA (2012a) the exact formulation of a requirement should determine what type of measure (resource-, management-, or animal-based) to be used. This was, however, not found to be the case in our study, even if our view is that the measures listed in the guidelines mirrored the requirements (i.e. the measures were valid for the requirements). Our result leads us to two conclusions, 1) it is impossible to say anything about the proportions of input and outcome mechanisms in a regulation without analysing both the regulation and any corresponding guidelines, and 2) it is important to stress the difference between prescribing preventive input requirements (with a purpose to reduce the welfare risks) and identifying and applying various measures to assess the actual welfare outcomes. We agree with, for example, Viksten and co-workers (2016), Main and co-workers (2014) and Rushen and co-workers (2011) that the assessment of animal welfare will need both animal and non-animal-based mechanisms, and that it is important to utilize the available scientific knowledge

about the relationships between input and outcome in order to assess animal welfare (Bracke, 2007). Input requirements are suitable mainly to prevent poor welfare and identify risk factors, and outcome measures are useful to assess the actual state of welfare and assure that the preventive efforts have been effective, i.e. resulted in the state of welfare that is aimed for. It is, however, in the end up to the policymaker to decide what the purpose of a regulation should be, and if the emphasis should be on preventing poor animal welfare or measuring animal welfare outcomes, or both.

We also saw that various requirements could be expressed slightly differently but suggested to be measured in the same way, or expressed in the same way but suggested to be measured differently. One example when the requirements seemed to be similar, but measured differently, concerned the cleanliness of the animals, where the guidelines to the Swedish legislation stated that; '*Even if only one animal is affected by poor welfare this requires appropriate measures to be taken, since the animal welfare legislation is written with a perspective of an individual animal*.' (SBA, 2013b). Sweden is not the only country with an individual approach to animals in the legislation (Stenevik & Mejdell, 2011; Wahlberg, 2011; Radford, 2001). However, the private standards Seal of Quality and Arlagården showed a slightly different approach while sometimes stating in their guidelines that non-compliance should not be reported until a certain proportion of the animals were affected (e.g. a certain number of dirty or soiled animals, see Figure 5).

Hence, even if similar requirements were stated, differences were found as to when compliance was considered to be achieved or not, depending on if the assessment was made at the individual animal or herd level. An animal in poor condition does not suffer less just because the assessment at farm level indicates an overall high welfare level. Already in 1980, Dawkins concluded that measures that mirror productivity, e.g. mortality, are unreliable indicators of animal welfare because they are applied to a group of animals rather than to individuals (Dawkins, 1980). Since animal welfare is by definition a characteristic of an individual animal (EFSA, 2012a; Butterworth, 2009), and the basic general animal welfare legislation aims at protecting individuals, it seems contradictive to measure welfare only on a herd level if evaluating compliance. If a given private standard only assesses animal welfare at a herd level, it could actually be questioned if this standard does in fact offer a protection level that lies below the legislative level with respect to the individual animal. According to Yeates (2013) both individualistic and non-individualistic approaches can be useful when developing policies. We argue that as long as the legislation cares for individual animals, group assessments cannot replace individual assessments. However, measuring welfare at group level can be a

useful complement to identify systematic problems (e.g. why a certain proportion of the animals in a herd is lame, dirty, suffering from mastitis etc.), to make improvements at a farm, and for benchmarking farms (i.e. to facilitate comparisons between different farms), which could contribute to preventing poor welfare for future animals at a given farm.

5.3 The art of controlling compliance and making consistent assessments

The findings from the third study confirmed the findings from the second study – a complex mixture of resource-, management- and animal-based requirements and measures were used for controls. In the CAB reports, a non-compliance was rarely explained and motivated from one point of view only. On the contrary, a non-compliance was commonly described as a combination of several problems. For example, dirty animals was not always only an animal-based problem, but also management-based through poorly cleaned lying areas, and resource-based through insufficient amounts of straw supplied or poor housing design. Furthermore, the resource- and management-based non-compliances were quite often described in terms of alleged negative effects on the animals if corrections were not made, i.e. the risk of poor animal welfare outcomes was explicitly mentioned.

As indicated previously, the intentions and aims of a regulation could be quite vague, and be more ambitious from an animal welfare perspective than what is described in the detailed requirements. In our third study we saw that the CAB inspectors did not focus on the overall intentions and requirements from the Animal Welfare Act (e.g. the requirement related to the ability to perform natural behaviour), but only on the detailed requirements from the second level legislation. This finding is in agreement with Wahlberg (2011) who concluded that Finish authorities mainly audited the second level and did not enforce the aims stated in the general law. Rushen and co-workers (2011) argued that animal welfare control is challenging when there are ambiguous requirements within a regulation. Hence, it would be advantageous if the underlying values are well known as it would make it easier to understand and interpret vague expressions (Sandøe *et al.*, 2003), both for inspectors and farmers.

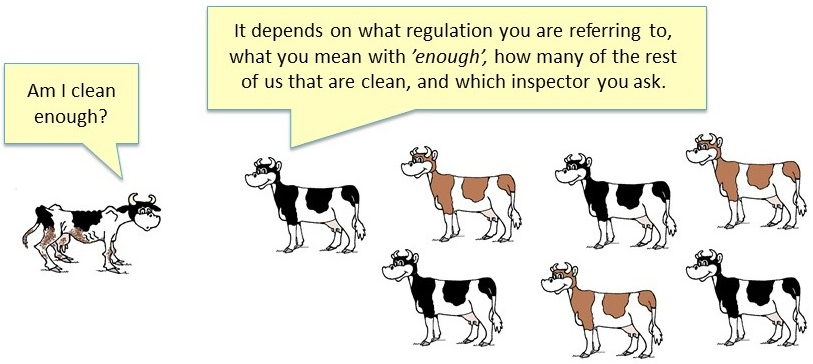

Figure 7. Vague wordings and use of different measures does not increase the level of intra- and inter-observer agreements. (Illustration: Frida Lundmark)

In the second study we found that not only the intentions were vaguely expressed, but that also the more detailed requirements in the regulations were sometimes expressed quite imprecisely, using expressions such as '*good enough*', '*dignity*', or '*satisfactory*' (Figure 7). The guidelines were useful for interpreting some of these more unspecific concepts, but not all of them. In a recent study Viksten and co-workers (2016) found that also the Swedish animal welfare legislation for horses and the corresponding control guidelines lack clear definitions. Unclear words and vague concepts in a regulation increase the risk that different opinions will evolve about how to interpret and implement these in practice (Viksten *et al.*, 2016; Schindler, 2013), leaving the determination of compliance entirely up to the inspector. If there is no well-defined regulation, guideline or assessment protocol there is a risk that the inspectors' personal attitudes and values will affect the assessment, leading to disagreements on what is important and which animal welfare level there should be, since all inspectors will feel that they have interpreted the regulation correctly (Bilchitz, 2012; Mullan *et al.*, 2011b). It has been argued that it is in the meeting between the street-level bureaucrat (e.g. an inspector) and the inspected citizen (e.g. a farmer) that the actual level of a regulation is decided upon, since unclear requirements and goal-orientated regulations leave more room for manoeuvring to single inspectors (Johansson 2006; Lipsky 2010). Anneberg and co-workers (2013; 2012) reported that both animal welfare inspectors and inspected farmers had noticed inter- and intra-observer disagreement during inspections in Denmark. However, although the farmers wanted the control to be more standardised they also wanted to be treated more individually during the inspections (Anneberg *et al.*, 2012), which is in itself a contradiction.

Policymakers need to decide if all requirements in a regulation need to be auditable. Stafleu and co-workers (1996) argued that if restricting animal welfare

regulations to cover only what is easily measurable there is a risk of losing the moral aspect of the concept of animal welfare, and hence part of the normative function will be lost. As previously mentioned, animal welfare legislation should mirror society's views on animal welfare, not necessarily restricted to what is practically feasible to inspect. At the same time regulations trying to be normative, including requirements difficult to measure, may be considered vague and unclear (Schindler, 2013; Forsberg, 2011; Wahlberg, 2011; Thompson *et al.*, 2007; McEachern & Tregear, 2000).

In our second study we found that the guidelines to Arlagården and Seal of Quality did draw a more precise line between acceptable and unacceptable animal welfare when compared to the legislation's guidelines, in relation to identify cows that are too dirty, too thin or emaciated. In contrast, the guidelines to the legislation referred to existing and well-established animal-based scoring systems but did not specify a precise threshold in relation to what would be acceptable or not. When there is no single standard protocol (scoring system) to use when assessing a welfare parameter it will be difficult to have good inter- and intra-observer agreement (Schlageter-Tello *et al.*, 2014). High inter-observer agreement can also be difficult to reach when there is no *gold-standard* observer (Ruddat *et al.*, 2014). Vasseur and co-workers (2013) showed how important training programmes and regular repeatability checks are to ensure inter- and intra-observer agreement over time.

On the basis of the above reasoning the result from our third study was not a total surprise; we found a difference in control outcomes depending on which Arla inspector carried out the inspection. We have no reason to believe that the CAB inspectors, being higher in numbers, having more diverse backgrounds, and sometimes using more imprecise guidelines, applied a more standardized evaluation framework; rather the opposite after have gone through all the control documents. Arla is actively working to improve intra- and inter-observer agreement using two gold-standard observers in all countries where Arlagården is used, to educate and unify all auditors (Bernt Andersson, Arla Foods AB, pers. comm. 2016-02-19). Despite these efforts there will still be some differences between the assessments, which illustrates how difficult it is to reach total agreement. Worth noticing is also that Arla's focus is to reach inter-observer agreement between the Arla member countries, but not with the legislative authorities in each country, despite the fact that several requirements in Arlagården are taken directly from the Swedish legislation. It should, however, be noted that Arlagården is adjusted to national legislation when applied in other countries. There is, for example, no requirement for dairy cow grazing when the standard is applied in Denmark.

There are also problems when different policymaking bodies establish their own thresholds for comparable requirements, since this may result in different animal welfare levels at farms (Souza & Molento, 2015), and frustration among farmers. Viksten (2016), who recorded different animal welfare outcomes on horse premises after using two different assessment protocols, argued that such differences might affect the horse owners' attitudes towards animal welfare control and assessments in general, claiming them to be unreliable.

5.4 Legislation and private standards – towards a complex animal welfare arena

5.4.1 The relationship between legislation and private standards

The existence of both legislation and private standards means that famers are subject to both official and private controls. Even if such private standards are not legally binding, many farmers have to comply with them in order to gain market access (Richards *et al.*, 2013). In our third study we found that several dairy farmers not only had to comply with the animal welfare legislation, but also with KRAV, and Arlagården or Seal of Quality standards simultaneously. In our second study we found that there was an overlap between requirements from these different regulations, and that it was mainly KRAV that had better or at least different animal welfare standards. This result agrees with Annen and co-workers (2011) who found that private standards in Germany often overlapped with national legislation, but not necessarily provided better animal welfare, except for the organic standards. In situations like these, it is important that farmers know the differences between the regulations, how assessments are conducted and which regulation has the most stringent requirements. This study has highlighted the need to discuss how standards and regulations are interpreted and how assessments are conducted both within and between different regulations to ensure they are understood (Figure 8).

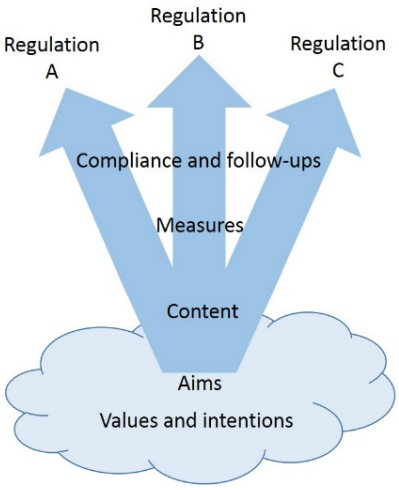

Figure 8. Behind all regulations are values and intentions, more or less explicitly expressed as aims. Even if the written content of various animal welfare regulations is similar there is variation in measures, inspectors and follow-up strategies used to control compliance, which makes the gaps within and between animal welfare regulations apparent.

The relationship between a private standard and the government legislation is a complex issue, as is to what extent the private standards should cover the same areas and requirements as the legislation (Cohen, 2004). Private standards in Sweden can directly influence the legislation and official control in two particular ways. Firstly, Sweden has a couple of private standards that have been classified as *control programmes*, which are sanctioned through legislation. These programmes give members some benefits, e.g. allowing them a higher stocking density. Secondly, official control must be risk based (Reg 882/2004/EU) and the Board of Agriculture has therefore included membership in a private standard into their risk classification system (SBA, 2013a). The assumption is that farmers affiliated with a private standard will automatically comply better with the legislation and can hence receive official control at a less frequent interval. There are indications both from our study, but also from KilBride and co-workers (2012), that this risk calculation is accurate. In our study the organic farms (i.e. KRAV farms) had fewer non-compliances than conventional farms, both at official and Arla control. However, since all farmers in the third study were affiliated with either Arla or Seal of Quality we cannot come to a general conclusion on the overall effect of affiliation to a private standard or not, since this study did not include any farms that were not enrolled in a private standard.

5.4.2 Improving animal welfare

It is important to acknowledge that the level of animal welfare legislation and standards differs between countries. For example, Arlagården is considered a *basic quality assurance scheme* (according to Bock and van Leeuwen's (2005) definition) in Sweden, primarily equal to national legislation. However, if exactly the same version of Arlagården was implemented in another country it would be considered as a *top quality assurance scheme*, if that country had a lower legislative standard for animal welfare than Sweden. Hence, a top scheme in one country could be considered a basic scheme in another; it all comes down to what legislation you compare it with.

Private companies generally have the opportunity to improve animal welfare by including requirements in their standards above the legislative level (Maciel & Bock, 2013; FAWC, 2009b; Fulponi, 2006; Grandin, 2001). Fulponi (2006) reported that 33% of the private standards had requirements significantly higher, and 50% slightly higher than the legislation when she interviewed retailers covering a geographic area from US and Canada to Europe, South Africa and Australia, i.e. countries with very different levels of animal welfare requirements in government legislation. She also discovered that some requirements had originated in private standards but later were adopted by governments and

included in national legislation. In countries where animal welfare legislation is limited or the official control insufficient, private standards have improved the general animal welfare level, for example in Brazil (Souza & Molento, 2015) and Canada (Fraser, 2015). Thus, private standards can definitely be used to improve animal welfare. However, according to Keeling (2009) and Main and co-workers (2003b) it is difficult to guarantee the implementation of a consistently high animal welfare standard, as different farms may be having different problems irrespectively of being affiliated to a private standard or not. Main and co-workers (2003b) discovered that farms affiliated with Freedom Food had fewer problems with mastitis and dirty cows, but more lame cows (even if the farmers' own estimation was a lower incidence), and more cows experiencing severe raising restrictions when compared with farms not affiliated with Freedom Food. Keeling (2009) reported that organic farms had more non-compliances (both animal- and resource-based) than conventional farms during official controls in Sweden. This contradicts our third study which showed the opposite result; organic farms had fewer non-compliances than conventional farms, both during official and Arla controls.

As mentioned above, the Swedish private standards, except KRAV, did not require a welfare level much above the legislation. In fact, it appears that sometimes the Swedish private standards accepted an animal welfare level below the legislation, since, for example, the private standards more often measured animal welfare only at a group level and not at the individual level. Furthermore, the main idea with the control programmes, as defined in the Swedish legislation, is to open for some flexibility in the legislation by allowing affiliated producers to fall below the ordinary legislative levels for a given parameter, in exchange of meeting some other requirements above the legislated level. Berg & Algers (2004) concluded that general broiler welfare had improved since the introduction of the Broiler programme, even if the stocking density allowed can be almost twice as high (36 kg chicken/m^2) for a farmer within the programme than for a farmer not a member (20 kg chicken/m^2). In later years a control programme for outwintering cattle has been developed (Gård & Djurhälsan, 2016). The programme is owned by Sveriges Nötköttsproducenter (Swedish Beef Producers' association), and managed by the advisory company Gård & Djurhälsan (Farm and Animal Health). The farmers approved to be members do not need to provide man-made shelters to the animals during the winter season as stipulated in the legislation. In return the farms are inspected by a Farm and Animal Health inspector, to for example ensure that the animals' furs are in good condition as well as their body condition. Access to some forest/trees in the paddocks/fields for protection from the elements and dry laying places are also required (Gård & Djurhälsan, 2016). Also Sveriges

Grisföretagare (Swedish Pig Producers' association) have come up with an idea for a control programme, aiming for example for an approval to keep sows crated for shorter periods (Sveriges Grisföretagare 2016), which is currently banned in the Swedish legislation but accepted according to the EU legislation. However, the experts analysing the programme expressed some concerns related to pig welfare (Wallgren & Gunnarsson, 2015), and the programme is not yet accepted by the SBA.

To our knowledge there is no other county than Sweden applying this kind of control programmes, opening for such an exchange of welfare requirements. Several stakeholder groups in Sweden, including farmer organisations and the government, are keen to develop more control programmes in order to make the legislation more flexible (SOU 2011:75). However, there are also concerns about that these types of programmes could actually provide a lower animal welfare level, or at least a different one. According to Fraser (2009) and Webster (2003) a regulation should address all three approaches to animal welfare; biological function, affective state and natural living, to be accepted by society. In our first study we saw that the regulations did contain these different approaches, however, to varying degrees. The organic standards were more focused on natural behaviours, while the two control programmes for poultry had a strong focus on health and biological function. By replacing a requirement promoting natural behaviour (e.g. stocking density) with one promoting health (e.g. via improved ventilation, which is the case with the broiler control programme) this will change the focus in a regulation. It may also affect the acceptance level of a programme by society since the general citizen's opinion is that animal welfare should be defined as *natural living*.

It could also be questioned if a requirement that is allowed to be exceeded when affiliated to a programme will lead to a lower credibility and status even to those not affiliated to a control programme. The possibility to be granted exception (individually or via a control programme for outwintering cattle) has in fact been used as an argument by the court to allow even a non-affiliated farmer to keep cattle outdoors during the winter season without a shelter, with a motivation that this legislative requirement cannot be so important when there is a possibility to make exceptions (Anon., 2011).

Further, this situation shows the value dependence of legislation and implementation, i.e. that the animal welfare level in a regulation is not only dependent on the present knowledge about animal welfare. In our first study it became clear that neither animal welfare legislation nor the private standards were only considering animal welfare but were also based on several other factors, such as economy, culture, traditions, religion, consumer demands, environment, food quality, food safety, disease risks etc. Other studies have also

shown that not just science impacts decisions related to animal welfare standards (Yeates *et al.*, 2011; Croney & Millman, 2007; Sandøe *et al.*, 2004). Even if animal welfare legislation would focus only on animal welfare the responsible governments' and agencies' mandate descriptions involves also other focus areas than just animal welfare; for example ensuring a strong and competitive agricultural sector, food safety and environmental protection. So even if a specific piece of legislation covers animal welfare only, the policymakers have to consider several other areas. Areas that are also covered by a majority of the industry and farmer initiated initiatives.

Since animal welfare legislation is a political area, government directives to regulatory authorities will change over time depending on the current political situation and government in power. Twelve years ago the main goal for the Swedish Animal Welfare Agency (SAWA, then the CCA responsible for the animal welfare regulations) was to ensure good animal welfare and animal health, according to the directives issued by the relevant ministry (Jordbruksdepartementet, 2003). In addition SAWA's mandate included improving animal welfare, preventing animal welfare problems, increasing the knowledge about animal welfare, and increasing the efficiency in the official animal welfare control. Today, the goal of the Swedish Board of Agriculture (SBA, the present CCA responsible for the animal welfare regulations, since the SAWA does not exist any longer due to political decisions) is to ensure a vivid and strong agricultural sector. Hence, their current mandate is to make things easier for business owners without impairing animal health, and to analyse the effects of the animal welfare control (Näringsdepartementet, 2016). In other words, the political arena has change tremendously over the last decade, and the corresponding change in focus will of course effect the SBA's decisions, priorities and regulatory work, even if the Animal Welfare Act remains the same.

It can be argued that the legislation fulfils an important binding role by establishing a minimum animal welfare standard in a country or region (EconWelfare, 2011), since it applies to all animals and not only to animals that are raised on farms where the owner is part of a private standard (Aerts, 2007; Kanis *et al.*, 2003). Today, most of the private standards cover farm animals, with the aim to assure people consuming foodstuff with an animal origin that have a certain quality. However, the animal welfare legislation covers all animals kept by man, i.e. not only farm animals but also animals kept for other purposes, e.g. companion animals, laboratory animals, zoo animals etc. Therefore, if wanting to protect all type of animals in a country or region legislation will be needed unless there are voluntary programmes for all species, to which all animal holdings and pet-keeping households are affiliated, a situation which appears highly unlikely.

Nevertheless, legislation or private standards are only effective if the requirements are adhered to on farm. In our third study we saw that both CAB and Arla discovered non-compliances in approximately every second control case. Thus, quite a large proportion of the dairy farmers failed to comply with the regulations. However, the severity of the non-compliances needs to be considered, as well as to which extent corrections were made. Neither CAB nor Arla had to enforce harsh corrective actions (e.g orders, seizures of animals, or temporary block in milk delivery), and most non-compliances seemed to be corrected after the first inspection and notification. Lack of compliance has also been discussed at an EU level. The European Commission (2012) concluded in their animal welfare strategy for 2012-2015 that Member States are not adequately enforcing EU legislation. Lerner and Algers (2013) concluded that it was only Sweden, Finland and Lithuania that complied with the minimum standards for the protection of pigs (Dir 2008/120/EU), regarding the ban on tail docking of pigs. Hence, they argued, that by ignoring non-compliances, farmers who comply with the ban are faced with an economic disadvantage (having to compete on an unfair market).

5.4.3 The regulations impact on farmers

Affiliation to a private standard can be beneficial to the farmers as they gain a quality assurance of their production, and the possibility to sell their products at a premium, i.e. at a higher price (Konefal *et al.*, 2005; Bornett *et al.*, 2003). There are very few studies on the experience and expectation of farmers with respect to animal welfare controls, considering both official and private regulations. There are, however, indications that some UK farmers perceive private standards as a *necessary evil*, i.e. an economic necessity rather than a choice (Hubbard *et al.*, 2007) in order to get access to the market (Richards *et al.*, 2013). Some argue that the increased power within the private food sector through implementation of private standards increases the risk of small-scale producers being forced out of key-markets, and potentially out of business, as many small-scale producers can have difficulties to meet the volumes required to enter into commercial supply agreements or to meet the costs of extra technical requirements and the extra burden of controls (Richards *et al.*, 2013; Fulponi, 2006). Hubbard and co-workers (2007) concluded that pig farmers in the UK are faced with an increased burden of inspections and requirements, but are offered very little in reward for their efforts. An affiliation with a private standard often entails additional costs (e.g. membership, adjustments to higher requirement, and third party auditing) if the farmers do not receive a premium (Hubbard *et al.*, 2007; Menghi, 2007; Bornett *et al.*, 2003). Of the Swedish private standards in this study, only membership in KRAV offers a higher price to producers.

Dairy products labelled with Arla or Swedish Seal of Quality are considered basic levels foodstuffs, i.e. not premium products. The control programmes of laying hens and broiler chickens are not price premium standards, although these farmers may benefit economically due to higher stocking densities.

Danish farmers claim that official control is necessary but unfair (Anneberg *et al.*, 2012). Necessary mainly due to the belief that not all farmers would comply with national legislation unless there was a risk of sanctions. Unfair due to low reliability as they believe that different assessments are used on different farms, i.e. poor inter- and intra-observer agreement. Fraser (2006) suggested that legislation is seen as an '*unwanted government meddling*' by the industry, and the EconWelfare project concluded that most farmers, except from organic, have a negative view on animal welfare legislation (EconWelfare, 2011). There are no scientific studies carried out in Sweden on the expectations and experience of animal welfare controls, neither official nor private controls. However, the Swedish animal welfare control, especially the official control, is often criticised and questioned, mainly in the agricultural media (e.g. Anon., 2015; Grimsedt, 2015; Anon., 2012; Bergman, 2012). In relation to other studied areas (i.e. biosecurity and advisory services) Swedish farmers have mentioned problems to keep track of all the different controls performed on farm, and they believe that animal welfare regulations cause a too big administrative burden on the individual farmer (Ljung, 2007; Nöjd, 2014). The focus on the administrative burden that originates from the legislation has been discussed by the Swedish government and central authorities (SBA, 2015a), and the final report from EconWelfare (2011) mentioned the administrative costs associated with legislation as a disadvantage. However, according to our study, the private standards often had more administrative requirements than the animal welfare legislation. This may indicate that farmers do have difficulty distinguishing between the different regulations, and that they may perceive the controls taking place on their farms as a whole and not as single occasions carried out by different control bodies with different focuses and requirements. In our third study we found that many of the dairy farmers were inspected by both CAB and Arla within the same six month period, and sometimes even had cases overlapping in time. Worth mentioning is also the fact that several of the Swedish standards covered by this study originate as a result of farmer or industry initiatives. KRAV is a farmer initiatives and the other ones (Arla, Seal of Quality, and the two poultry control programmes) are industry based, where Seal of Quality is owned by the Federation of Swedish Farmers (LRF) and Arla Food is a member-owned company, i.e. owned by the dairy farmers. This means that the farmer organisations and the industry themselves have contributed to a higher burden of regulations and controls.

5.4.4 Flexibility, transparency and legal predictability

One of the advantage with private standards often mentioned is that they are flexible since they can be easily changed and adapted to new circumstances and developments within a sector, while the development of legislation can be a slow and bureaucratic process (Vanhonacker & Verbeke, 2014; Maciel & Bock, 2013; FAWC, 2009b; Cohen, 2004; Webb & Morrison, 2004; Mench, 2003). Vanhonacker and Verbeke (2014) argue that market driven initiatives are probably a faster way forward to improve animal welfare than through an upgrade in legislation. One reason for this is that the legislative process is inherently slower, as a result of requirements for negotiations and transparency. The current Swedish Animal Welfare Act was adopted in 1988, and a suggestion for a new Act was presented 2011 (SOU 2011:75), but has still not been enacted. However, the regulations from SBA have been amended several times since 1988. The private standards are updated more often. The KRAV standard is, for example, updated annually, but the extent of the revisions differs each years. When making amendments it is important to make these well-known to the farmers and other animal owners who have to comply with the regulations. In our third study we found an increase in non-compliances during Arla inspections following the introduction of a new Arlagården requirement in January 2012, changing the requirement for water for calves from at least twice a day to *ad libitum*. However, there was no evidence to suggest that this high level of non-compliance was due to a lack of awareness of the new requirement or failure to comply for other reasons.

Some argue that a disadvantage with private standards is that they do not need to be democratic or transparent (Maciel & Bock, 2013), since those responsible are out of the public sphere (Konefal *et al.*, 2005). Subsequently, there is an obvious risk that private standards are less transparent and credible when compared to legislation (Webb & Morrison, 2004). In the process of collecting material for the first study we asked for, but were denied, access to the Marks & Spencer standard, and were referred to the very general information on the webpage. This means that it is impossible for ordinary citizens to actually know the requirements of Marks & Spencer's animal welfare standard. According to Aerts (2007) some retailers are using the standard as a competitive advantage and therefore, keen on keeping the requirements confidential. In our third study we had to limit ourselves to study the control systems and results of Arlagården and the legislation, due to problems of obtaining the control results from the third party control bodies that Seal of Quality and KRAV uses. While Seal of Quality at least received the control result statistics annually from the control bodies, KRAV received no information, other than orally, related to how the farmers were perceived to comply with their standard. This means that the organic

labelling organization does not have access to systematic information about what types of non-compliances are commonly found on their member farms, about which requirements that are difficult for the farmers to meet, or about why farms fail audits. The lack of knowledge from the policymakers' side regarding the outcome of the controls is highly surprising. According to Mench (2003) a confidential approach is not unusual since the purpose of private inspections and audits is to provide retailers with information about compliance among their suppliers, rather than to provide consumers with such detailed information. However, we believe that it is necessary for private standards to be more transparent, open and subject to questioning and scrutiny if they want to be viewed as trustworthy and transparent.

Unlike the actors behind private standards the Swedish government and the public authorities, e.g. SBA and CAB, must follow the Administrative Procedure Act (1986:223). Since official control includes the exercise of public power against individuals this Act is regulating the actions taken by the governmental authorities to ensure legal security for individual citizens and provide them with service, support and information (Zedén Yverås, 2015). Private standards are, however, not part of the legal system and do not have the same requirement of transparency and predictability. Nevertheless, the Swedish private standards concerning dairy cows were all trying to create security for their affiliated farmers, as they had provided the famers with the control guidelines to increase the likelihood of compliance, and had created systems to make it possible for farmers to appeal a decision to the next level within the private organisation owning or managing the standard.

5.4.5 Consumer knowledge and private goods

Traditionally animal welfare has been considered a public good, a non-competitive issue concerning the whole society (Miele & Evans, 2010). A market driven approach tends to commodify animal welfare as a *private good* were consumers seek to satisfy their individual value preference, in contrast to a *public good* were all citizens can try to affect the political processes (Degeling & Johnson, 2015). *Citizens* is a wider concept than *consumers*, covering different groups in society, including the consumers (Degeling & Johnson, 2015). In a market driven system, people who are not consuming animal products are not able to affect how animals are kept and treated (Pirscher, 2016). However, private standards (if clearly labelled on the products) have the benefit of helping to increase consumer concern about animal welfare, enable consumers to buy and consume animal-friendly products, and increase the market share for higher animal welfare products due to consumer demands (Pirscher, 2016; FAWC, 2009b).

From an animal welfare point of view, the shift from state governance towards private governance is based on the assumption that consumers care for animal welfare and are willing to pay for premium products to improve the animal welfare level, i.e. vote with their fork. Several politicians and animal welfare researchers promote a market driven animal welfare approach (Degeling & Johnson, 2015; Heerwagen, 2010). However, some believe that there is an over-reliance on market mechanisms and consumer behaviours (Gjerris *et al.*, 2016; Degeling & Johnson, 2015); 1) because consumers are not knowledgeable about modern farming systems (Borkfelt *et al.*, 2015; Gjerris, 2015; Algers, 2011; Mayfield *et al.*, 2007), 2) because the consumers are not willing to pay for premium products (Maria, 2006), and 3) because the general consumer does not want to have this responsibility (European Commission, 2016; Weible *et al.*, 2013, Roex & Miele, 2005).

There are studies that show that some people believe that the better the welfare of an animal is, the more morally just it is to eat it (Schipper *et al.*, 2006). The '*willingness to pay*' (WTP) for premium products has been studied a number of times, often concluded that consumer are willing to pay a higher price (Van Loo *et al.*, 2014; Bennett *et al.*, 2012; Gracia *et al.*, 2011; Glass *et al.*, 2005). However, the WTP will differ between individuals (Caracciolo *et al.*, 2016; Grunert *et al.*, 2014), as well as between countries, production systems, and logos. Van Loo and co-workers (2014) found that consumers were more willing to pay a higher price for *free range* than for *organic* chicken breast. Janssen and Hamm (2012) discovered that consumers in different countries had different perceptions of organic labelling schemes; e.g. Danish consumers were willing to pay the highest price for a government logo, German consumer for the logo of the farmers' association Demeter, and UK consumers for the logo of the Soil Association. However, even if these studies show a theoretical WTP and a concern for animal welfare, others have shown that consumers do not always act as they say they would (Grunert *et al.*, 2014; Mayfield *et al.*, 2007; Maria, 2006), i.e. they are not actually buying premium products when shopping. Maria (2006) concluded that one reason for this may be low average incomes. Others have argued that *animal welfare* is not, and will not necessary be, the top priority for consumers, which means that in order to improve animal welfare it could be strategic to create regulations that also cover other consumer concerning topics, e.g. food quality and sustainability (EconWelfare, 2011; Verbeke, 2009). Several of the private standards covered by this thesis, in fact, included areas other than animal welfare.

In the most recent Eurobarometer study, the results showed that Europeans think that animal welfare is a concern not only for the consumers but for all citizens, and that government must be involved in some way (European

Commission, 2016). The Eurobarometer also showed that almost two thirds (64%) of the European citizens are interested in getting more information about the conditions under which farm animals are raised, and 59% are willing to pay a premium price for animal welfare products. However, the Eurobarometer also found that approximately one third of the European citizens are neither interested in knowing more about how animals are treated (33%), nor prepared to pay more for animal welfare (35%).

The gap between consumers' and producers' knowledge about animal production is sometimes obvious since the average consumers have become more and more disconnected from the livestock production (Algers, 2011; Kupsala, 2010), and sometimes consumers deny the fact that the meat they eat comes from living animals that had to be killed before ending up in the supermarket (Evans & Miele, 2012). Consumers also receive contradictory information about animal farming (Kupsala, 2010). Some researchers claim that industry commercials are often misleading, portraying production practices as being much more welfare-oriented or natural than it actually is (Borkfelt *et al.*, 2015; Gjerris, 2015; Parker, 2013). Borkfelt and co-workers (2015) took, for example, the Danish company Arla Foods and the Swedish Poultry Meat Association (the Broiler programme) as examples when demonstrating misleading commercials from industries managing their own private standards. Arla Foods present milk production as '*closer to nature'* with large green fields and grazing cows (*nota bene*: most dairy cows in the Arla member countries are kept in zero-grazing systems, since only Sweden has a requirement for pasture), and the Poultry Association uses a symbolic yellow chicken to attract consumers, avoiding providing information about the actual farming situation or the higher stocking densities allowed. To emphasise natural behaviour when marketing is smart since the *natural living* definition of animal welfare is important to many citizens (Lassen *et al.*, 2006). Hence, some farmer organisations have an interest in not showing the standard housing and handling routines as they contradict consumer beliefs (Borkfelt *et al.*, 2015). Studies have also shown that consumers values outdoor access and low stocking densities (Caracciolo *et al.*, 2016; de Jonge & van Trijp, 2013; Vanhonacker *et al.*, 2009). According to Lusk and Norwood (2011) most consumers in fact have an overly positive view of animal production, believing that many more animals are kept in free-range systems than actually are. This of course complicates any investigations about consumers' willingness to pay for higher animal welfare, and therefore how a change in a regulation may be received by consumers. In our study we found that some private standards were focusing on the consumers. For example, Arla Foods clearly stated that requirements based on national legislation were included in Arlagården because they ensure practices are

followed that are of special importance to consumers. A legitimate question for policymakers to ask themselves when writing regulations, is whether what consumers consider to be most important to animals is in fact what is actually most important from the animal's perspective.

Consumer knowledge is also dependent on transparent regulations. It is not necessarily easy to make well-informed choices if a regulation is confidential (Aerts, 2007). In our study we were, as mentioned before, denied access to the Marks & Spencer standard, however, most other standards were more or less available on the policymakers' webpages. For a consumer it is very difficult to recognise small differences between regulations, to understand differences in assessment methods, and to know how this will influence animal welfare in practice (Gjerris, 2015; Stull *et al.*, 2005). We also suspect that gaps between the ambitious aims and detailed requirements (as demonstrated in the first study) will confuse consumers, who will be unaware of the actual housing conditions that animals are raised in. Our perception is that policymakers (both government and private) are more often talking about the aims with a regulation than the actual detailed requirements, and even more rarely talking about what is being assessed at the farm level. We believe that there is a risk that the credibility of a regulation is undermined if the distance between the stated aims, the actual requirements and on-farm application is too large. Clarity and transparency are important so that citizens and consumers can trust a regulation. We argue that it is better to be clear about both the present level of welfare and the intended level instead of trying to present intentions and values that the consumers would like to hear. The latter implies a risks to disappoint consumers when actually reading the detailed regulation, or seeing its implementation on farms.

The consumer trust in different stakeholders (e.g. policymakers, farmers, and the industry) will differ between countries (Nocella *et al.*, 2010; Mayfield *et al.*, 2007), and since there are significant regional differences between countries, including differences in legal traditions in general, it is not likely that one single solution exists on how to promote trust and a higher animal welfare level, or how the relation between legislation and private standards should be designed (Keeling *et al.*, 2012).

5.5 Methodological considerations

5.5.1 To mix different scientific areas

Animal welfare has several dimensions, including scientific, ethical, economic, political (Lund *et al.*, 2006) and legal aspects (Wahlberg, 2011). This project has been a mixture of different disciplines; animal welfare, animal hygiene, animal ethics, animal law and others, using both natural science methods and methods

used in humanities and social science, including qualitative and quantitative approaches. A quantitative approach focuses on explanations, and a qualitative approach on understanding (Hjelmeland & Knizek, 2010). Several authors have concluded that animal welfare research would benefit from using arguments and methods from different disciplines; natural science will benefit from social sciences, including law, and vice versa, mainly due to the fact that the concept of animal welfare is dependent on both natural and social findings (Persson & Shaw, 2015; Rollin, 2015; Schmidt, 2011; Lund *et al.*, 2006). It is important that researchers from different scientific fields, policymakers and other stakeholders understand each other's arguments and results (Wahlberg, 2011), or else there is a risk that they will '*talk past each other*' (Lélé & Norgaard, 2005). In order for animal welfare legislation to set minimum standards, natural science and empiric results are needed for information on how animals behave, their preferences, and how their health and welfare will be affected by different housing or management systems. However, natural sciences cannot decide what the minimum acceptable level should be. This is a decision that has to be made by policymakers who will be influenced by their backgrounds, ethical views, and values when they weigh different aspects, considering not only the animals' perspective, but also the owner's, the consumers' and others (Yeates *et al.*, 2011).

To carry out a research project means that aims, questions and hypotheses needs to be formulated, and limitations on sample size, time period included etc. must be made to make the project feasible. These choices and limitations will, of course, influence the results, and it is important to be aware of the limitations before the conclusions are drawn, especially if they are supposed to be more general conclusions. It is also important to be aware of your own ethical values, since these can effect both the formulations of research questions and the conclusions drawn from the results if you are not careful and meticulous. There is no such thing as a value neutral research area or scientist even if some scientists, especially within the fields of natural science, have been brought up to believe so (Lélé & Norgaard, 2005).

5.5.2 Limiting the scope of the studies

In *study I* we used responses from an already existing questionnaire taken from the EconWelfare project. The responses available were limited to what countries participated in the EconWelfare project so our study was similarly restricted. It is, of course, possible that other countries (especially outside Europe) will have slightly different intentions and values behind their animal welfare regulations.

Another aspect that limited the choice of countries was the language issue. Regulations are often only published in the country´s own language.

In *study II and III* we chose to focus on Swedish regulations related to on-farm housing and management of dairy cattle, including calves. This choice was based on; 1) the fact that dairy cows were covered by several regulations in Sweden, 2) we knew that we would be given access to the dairy cow control reports from some of the regulations, and 3) dairy cow welfare was (and still is) a topic of current international interest since there are ongoing discussions about developing EU legislation specific for dairy cows, since such legislation is currently absent. Choosing another species to study might have given slightly different results when comparing content and control results. For example, while Seal of Quality was considered to be a *basic qualitative assurance scheme* for dairy cows in our study (i.e. the level was approximately the same as the legislation), Seal of Quality may be considered more of a *top qualitative assurance scheme* for other species, where the animal welfare standard is higher than in the corresponding legislation.

In *study III* the original plan was to use control results from the same four regulations as in study II. However, the control results from KRAV and Seal of Quality were owned by the different certification bodies and not by the policymakers themselves. Due to confidentiality contracts between the individual farmer and the certification body we were not given access to the individual control results, and to anonymise them would involve too much work for the certification bodies. Hence, we could not get access to any detailed control results from these two private standards. It would have been interesting to analyse additional control results from the same region, and farmers receiving overlapping inspections, not only from the CAB and Arla but also from KRAV and Seal of Quality, but unfortunately this was not possible.

In the third study we chose to limit the scope to only one county in Sweden. If we had just wanted to estimate the prevalence of non-compliance a simple random sample from the whole country would have generated more representative results. However, in addition to finding important non-compliances, we wanted to analyse risk factors for non-compliance as well as comparing different standards (i.e. an overlap for the different regulations was desirable). Such analyses do not rely heavily on representativity. Instead, sample size and data quality are more important aspects. The selected county met these criteria well. By choosing one region only, and all controls in that region, we were able to get a reasonable and feasible number of farms and controls for the regulations involved, making such a comparison possible in a reliable way. Furthermore, there are formal and practical limitations: it would simply not have

been feasible to ask 21 different regional CAB to randomly select a subset of controls for us.

5.5.3 Interpretations and analyses

Grasping different wordings and translations in an accurate manner is important when interpreting a text. Therefore, even if we limited the number of countries into four in *study I*, one person alone did not master all the languages. Therefore, the regulations used in the first study were analysed by different people, which strengthened the analysis since it demanded common agreement and fruitful discussions about focus areas and conclusions.

The argument analysis used for *study I* allowed for categories and concepts to flow from the data versus the use of preconceived categories; although, identifying the key categories unconditionally can be a challenge (Hsieh & Shannon, 2005). A strength in our study was that several people analysed the texts, thereby reducing the influence of each single person's experience and values. Unlike the first study, the content analysis in *study II*, utilized established categories. This kind of *directed* content analysis is a suitable tool when certain categories have been previously identified (in this case grouping regulations into animal-, resource- and management-based requirements), and when these categories will benefit from further descriptions and analysis (Hsieh & Shannon, 2005).

In *study II,* we organized the requirements from the four regulations (i.e. after the headings in the animal welfare legislation) to be able to compare and analyse them in a consistent manner. Of course, it is possible to organize the requirements differently or to count the number of requirements in different ways. In addition, it was not always easy to label the requirements as resource-, management- or animal-based. For example, we classified the requirement about the animals '*ability to eat and drink naturally'* as a combination between resource- and animal-based components. However, others have classified this as a solely resource-based requirement (Viksten, 2016). Even if such conflicting views do exist, we believe that this decision has not fundamentally influenced our results or conclusions.

In *study III* we were given access to the control results from CAB and Arla in different ways. If Arla had sent us, physically or electronically, all the documentation to the university these documents may have been considered *public documents,* which means that literally anyone would have had the right to ask for copies and we might have had to hand out these (i.e. breaking the contract about treating the individual farm inspection results confidential). The CAB on the other hand is a governmental and public agency, which means that

all their documents are already considered public. Therefore, the CAB could mail us all photocopies of official control results without increasing public exposure. The confidentiality of private standards is of course an interesting issue from a public transparency perspective. However, since we were given access to all Arla control results at the Arla Food office this was not an obstacle during the analysis.

If repeating or expanding the third study there are mainly two things that can be done differently. Firstly, when collecting data from the control documents it would be suitable to record the identity of inspectors per inspection occasion and not only per control case. This will make it possible to analyse the impact of individual inspectors also for CAB, since there were often several different inspectors involved in a case that consists of several inspections. Secondly, the third study could be improved if another farm animal species was included, where not all farms are members of a private standard. Thereby, more solid conclusions about the effect of compliance with the legislation, based on affiliation with a private standard could be made.

In studies *II* and *III* descriptive statistics were used to investigate the frequencies of different requirements and variations in time for corrections of non-compliances. We did not find it meaningful to carry out significance tests based on these figures, since it would require a different study design and testable hypotheses. To be able to draw general conclusions about private vs. government regulations sample from a number of different countries would need to be analysed, taken into consideration local traditions and different legal systems. Nevertheless, we have been able to show differences and similarities between the particular regulations in our studies. Our results can hopefully create awareness about different aspects of government and private regulations that need to be considered, and hence contribute to new ideas and approaches that will benefit future animal welfare regulations, both separately and in relation to each other.

6 Main conclusions

We found that there was a relatively high degree of similarity between the different international regulations covered with respect to the general aims expressed, although some differences were apparent due to various intentions and values. We found an intermediate level of agreement between the Swedish regulations covered with respect to the actual content, where the private standards were to a large extent written as a duplication of the governmental legislation, with only minor additions except for the organic standard, which had notably different animal welfare requirements. There were more substantial differences with respect to on-farm control approaches and results, in particular with reference to putting focus on the welfare of the individual animal versus the group or farm level.

Our overall conclusions are:

- The following gaps need to be considered by policymakers involved in drafting legislation or private standards, and either be bridged, highlighted or explained:
  - The gaps between intentions and requirements
  - The gaps between requirements and measures
  - The gaps between requirements/measures and on-farm assessment outcomes (i.e. individual inspector's assessment)
  - The gaps, duplications and overlaps between different regulations covering the same area

- The presence of both animal welfare legislation and private standards enforces the need for transparency, predictability and clarity.

- Policymakers need to clearly define core concepts such as *natural behaviour* and *unnecessary suffering* (or *necessary suffering*) in order to achieve transparency throughout a regulation.

- It is important to initially discuss and identify well thought-through values when developing legislation and standards.

- The way a requirement was formulated in a regulation was not necessarily the same as how it was to be measured on farm; if the focus was on input versus outcome requirements and measures, or on individual animals versus at the group level.

- Even if some requirements were written in a similar way in different regulations it was not always clear if the expected animal welfare outcome would be the same in practice, because of vague wording and differences in measuring methods and approaches.

Furthermore, we conclude that:

- Several of the policymakers seemed, at a first glance, to share similar intentions and values about the treatment of animals. However, due to the use of vague core concepts and more ambitious intentions towards animals than in the actual detailed requirements, it became clear that intentions and values did differ, and hence also the opportunity to improve animal welfare.

- When analysing the Swedish regulations for dairy cattle, it was mainly the organic KRAV standard that differed from the other regulations with respect to the content.

- All analysed Swedish regulations for dairy cattle had an emphasis on requirements formulated as resource- and management-based requirements, but there were still some differences in the proportions of these categories between the different regulations.

- The most common non-compliance recorded at CAB inspections at dairy farms was dirty dairy cattle. The most common non-compliance recorded by Arla was dirty stables/cowsheds.

- Tie-stall housing and winter season were common risk factors for non-compliances at both CAB and Arla inspections.

- In general, organic KRAV-affiliated farms had a lower number of non-compliances compared to conventional farms, regardless of inspection body.

- There was a huge variation in time allowed for reaching compliance after an inspection when non-compliances were identified. Even if the results at a first glance indicated that the Arla control was more effective than the official control, this conclusion cannot be drawn as there were substantial differences in the handling of non-compliances.

7 Future research

To further understand the effect different regulations and control systems have on animal welfare the following questions need to be studied:

- Does an affiliation to a private standard lead to an improved compliance with animal welfare legislation? There is a need to investigate this further as the official control will be carried out less frequently if a farmer is affiliated with a private standard. In our study all dairy farmers were affiliated with at least one private standard. It would be valuable to compare animal owners with no private affiliation to those affiliated to one or more private standards.

- What are the farmer expectations and experience of different animal welfare controls? How are the official and private control systems and inspections perceived by farmers? We may hypothesise that farmers perceive the control arena as a whole, i.e. confusing official and private control systems, and that the experience of a control will be dependent on the control result achieved.

- How best to design and formulate regulations and requirements in order to reach desired effects on animal welfare?

- Further studies are needed to investigate and find new requirements and measures in relation to animal welfare that are valid, reliable and feasible.

- How could animal welfare inspector inter- and intra-observer agreement be improved?

- Which are the most common reasons behind different types of non-compliances, and different aspirations to make corrections? Do farmers have difficulty understanding a non-compliance issue (due to gaps between e.g. requirements and measures), and why correcting it is important to improve animal welfare (e.g. due to different perceptions of animal welfare)?

- How effective are different types of penalties? Would it be beneficial to introduce some kind of reward system (‘carrot or stick’)?

- How trustworthy are different types of follow-up inspections? Is administrative follow-up as efficient in achieving compliance as on-farm visits, for example?

- How would a different approach to the legal status of domestic animals change the welfare of these animals in practice?

8 Populärvetenskaplig sammanfattning

Djurskydd och djurskyddskontroll diskuteras ofta i samhället idag och allmänhetens intresse för djurens välfärd har ökat. Historiskt sett har djurskyddet setts som en allmännytta där ett lands statsmakt har till uppgift att säkra djurskyddet genom lagstiftning och offentlig kontroll. Under senare år har man dock sett en förändring av djurskyddsarenan där privata aktörer tar allt mer plats och ansvar för djurskyddet. Allt fler privata regelverk tas fram av t.ex. näringen och handeln själva i syfte att kvalitetssäkra primärproduktionen. Även om dessa regelverk sägs vara frivilliga att ansluta sig till så är de inte alltid det i praktiken. Inte helt sällan krävs en anslutning till ett privat regelverk för att en producent ska få åtkomst till den marknad på vilken denne avser att sälja sina produkter. Det betyder att många lantbrukare både har statliga och privata regelverk att leva upp till, och att både offentlig och privat djurskyddskontroll äger rum på gården. För att förstå dagens djurskyddsarena är det därför viktigt att ta hänsyn till och analysera såväl lagstiftningen som privata regelverk.

Det övergripande målet med denna avhandling har varit att studera vilka intentioner olika intressenter har med sina respektive djurskyddsregelverk (både den statliga lagstiftningen och privata regelverk), och hur effektiva dessa system är när det gäller att förbättra djurvälfärden både i teori och praktik. Doktorandprojektet har bestått av tre delstudier. Den första studien syftade till att beskriva de intentioner och värderingar som finns bakom ett antal olika djurskyddsregelverk i Sverige, Storbritannien, Spanien och Tyskland. Den andra studien syftade till att analysera struktur och innehåll i olika svenska regelverk för mjölkkor, inklusive tillhörande kontrollvägledningar. Den tredje och sista studien fokuserade på djurskyddskontrollen på gårdsnivå hos mjölkgårdar när kontrollen utfördes utifrån lagstiftningen (länsstyrelsen) och utifrån Arlagården (av Arla anlitade revisorer från Växa Sverige). Syftet var dels att identifiera vilka brister som var vanligast förekommande samt vilka faktorer som bidrog till störst sannolikhet att påvisa brister vid en kontroll, dels att undersöka hur uppföljningar av brister gjordes fram till dess att efterlevnad kunde konstateras. De metoder som använts har främst varit olika typer av textanalyser av regelverken, förarbeten, hemsidor och dokument av kontrollresultat. Deskriptiv statistik och multivariabla logistiska regressionsmodeller har också använts.

Resultatet från projektet visar att regelverken har kommit till av olika anledningar. Intentionerna och portalparagraferna i regelverken var ofta mer generösa gentemot djuren än de efterföljande mer specifika och detaljerade kraven, t.ex. angavs målet att skydda djur från onödigt lidande samtidigt som flera smärtsamma företeelser tilläts. De olika regelverken gjorde också skillnad på vad ”onödigt lidande” egentligen är, och hur man ska tolka intentionen att

djur ska ges möjlighet att ”bete sig naturligt”. Dessa skillnader kunde ses både mellan länder, mellan olika regelverk i samma land, mellan olika arter i samma regelverk, samt mellan olika individer av samma art i samma regelverk beroende på varför det enskilda djuret hålls (produktionsdjur, sällskapsdjur, försöksdjur osv.).

Den andra studien visade att de privata regelverken i Sverige till stora delar täckte samma område som lagstiftningen. Alla regelverk innehöll regler om att djuren skulle hållas i en god miljö och ges tillräckligt med skötsel och tillsyn så att man kan säkerställer att djuren är rena, friska och i bra kondition. Dock så bidrog vaga formuleringar och olika sätt att mäta efterlevnaden till att det inte alltid var tydligt om kraven verkligen var desamma mellan regelverken eller om där faktiskt fanns en skillnad.

I den tredje studien såg vi även att det skilde sig i fokus mellan olika regelverk, eftersom förekomsten av olika brister på mjölkkogårdarna skiljde sig åt mellan den offentliga och den privata kontrollen. Smutsiga djur var den vanligaste bristen som registrerades vid länsstyrelsens kontroll. Bristande årlig rengöring (av ladugårdsutrymmena) var den vanligaste bristen enligt Arlagården. Däremot var resultatet delvis samstämmigt mellan länsstyrelsen och Arla gällande riskfaktorer för brister. Det var störst sannolikhet att de båda regelverken registrerade brister i uppbundna system under vintersäsongen. Det fanns även en lägre risk att de hittade många brister på ekologiska KRAV-gårdar i jämförelse med konventionella gårdar. Besättningsstorleken spelade däremot inte någon roll för kontrollresultatet. Generellt gav länsstyrelsen lantbrukarna längre tid på sig att åtgärda bristerna än vad Arla gjorde. Länsstyrelsen genomförde fler uppföljningar på gård än vad Arla gjorde, då Arla förlitade sig i större utsträckning på administrativa uppföljningar i form av lantbrukarnas egenkontroll.

Detta doktorandprojekt har visat att det finns ett behov av att definiera vanligt använda koncept i djurskyddsregelverk och att minska glappen mellan intentioner, regler och bedömningar för att bidra till att regelverken uppfattas som tydliga och trovärdiga. Även glappen mellan olika typer av regelverk bör belysas i syfte att antingen förklara skillnaderna eller minska dem om det är så att de faktiskt försöker uppnå samma mål. Förekomsten av både likheter och skillnader mellan olika regelverk och kontrollsystem medför extra stora krav på transparens, förutsägbarhet och tydlighet under inspektionerna. Både lantbrukaren och inspektören behöver känna till förutsättningarna och syftet med de inspektioner som genomförs. Om så inte är fallet finns det en risk att den samlade djurskyddskontrollen inte innebär en effektiv användning av tid och resurser, och att den avsedda djurskyddsnivån inte uppnås i slutändan.

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