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**STRENGTHENING THE ELEMENTS OF OFFICIAL  
ANIMAL WELFARE CONTROL ON FINNISH CATTLE  
AND PIG FARMS**

**Sofia Väärikkälä**

ACADEMIC DISSERTATION

To be presented, with permission of the Faculty of Veterinary Medicine, University of Helsinki, for public examination in Auditorium 1041, Biocenter 2, Viikinkaari 5, Helsinki, on 6th of August 2021, at 12 o'clock.

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*We must fight against the spirit of unconscious cruelty with which we treat the animals. Animals suffer as much as we do. True humanity does not allow us to impose such sufferings on them. It is our duty to make the whole world recognize it. Until we extend our circle of compassion to all living things, humanity will not find peace.*

*Albert Schweitzer*

## ABSTRACT

The European Union (EU) began to provide legislation on farm animal welfare four decades ago. Farmers working in the EU are required to comply with standards to ensure that the welfare of animals is managed, and no unnecessary pain, suffering or injury is inflicted on the animals. EU member states (MS), on the other hand, are obligated to control the compliance of the farmers. The competent authorities of the MS must conduct on-farm controls regularly, on a risk basis and with appropriate frequency, and apply appropriate enforcement measures to secure the rectification of non-compliance. Since official animal welfare control plays a pivotal role in the enforcement of animal welfare legislation, it is of the utmost importance that the control functions in practice.

This research investigated how Finnish official animal welfare control appears at the farm level. Official veterinarians as enforcers and farmers as targets of the controls were surveyed to examine their views on the matter, and the reports from animal welfare inspections and court decisions regarding animal welfare crimes were analysed to explore the outcomes of the controls.

Animal welfare control work caused stress to official veterinarians. High levels of stress were associated with threatening situations at work, the inconvenience of working alone, disrupted work–life balance, and a large amount of overtime work. The more stress the official veterinarians experienced, the more poorly they perceived their job satisfaction. Nevertheless, the job satisfaction was positively influenced by the provision of support and sufficient resources, an opportunity to work in pairs and well-functioning collaboration with other officials.

Farmers experienced animal welfare inspections on their own farms negatively. Over half of the responding farmers saw the inspection as unnecessary and one in three considered it as violating their legal protection. Easy interaction with the visiting official veterinarian and the comprehensibility of inspection documents improved the attitude of the farmers towards the inspection. The farmers reported appreciating explicit reasons for the inspections, adequate reasoning for non-compliance detected, and the provision of appeal directions.

Our results show that a quarter of cattle and pig farms inspected based on sampling was non-compliant during 2010-2015. The most frequently reported non-compliance on cattle farms included wet and dirty lying areas, inadequate weather protection and the deficient housing conditions of calves, while on pig farms they included the insufficient provision of enrichment material and incomplete records of medical treatments. Non-compliance was reported more frequently on cattle farms with small herds, tie-stall housing or outdoor rearing, and on pig farms with a farrow-to-finish unit.

Our investigation identified slowness in criminal procedures and illogicality in penalties regarding animal welfare crimes during 2011-2016. In most cases, animal welfare violations had continued for a long time before the case was heard in court. The median span was nearly two years from the beginning of an offense to a conviction. Of the accused individuals, 96% were found guilty and punished for an animal welfare crime. The court frequently applied the lower end of penal scale; however, they still imposed a ban on animal keeping for every second perpetrator.

Our research uncovered certain weaknesses in Finnish official animal welfare control, including unsuccessful targeting of animal welfare inspections, inadequate guidelines for ambiguous animal welfare standards, official veterinarians' high workload and insufficient safety at work, limited collaboration between official veterinarians and officials for social and health welfare, and inefficiency in criminal procedure regarding animal welfare matters.

The findings yield the following recommendations: i) Inspections should be more accurately targeted. ii) Official veterinarians should aim at a constructive dialogue with a farmer and ensure that they understand the outcome of an animal welfare inspection and the progress of the matter. iii) Guidelines for implementing ambiguous animal welfare standards should be improved. iv) Official veterinarians should be offered the opportunity to conduct controls with a partner, be strongly supported by their supervisors, and receive training in communication skills. v) Collaboration between official veterinarians and other officials, such as the police and social welfare and health officials, should be consolidated. vi) The official veterinarians' role as an expert during criminal procedures should be strengthened.

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## LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original publications, referred to by Roman numbers in the text:

- I Väärikkälä, S., Hänninen, L. & Nevas, M. (2020) Veterinarians experience animal welfare control work as stressful. *Frontiers in Veterinary Science*, 7, 77. <https://doi.org/10.3389/fvets.2020.00077>
- II Väärikkälä, S., Artukka, S-M., Hänninen, L. & Nevas, M. (2018) Finnish cattle and pig farmers' perceptions of animal welfare inspections. *Animal Welfare*, 27, 369-377. <https://doi.org/10.7120/09627286.27.4.369>
- III Väärikkälä, S., Hänninen, L. & Nevas, M. (2019) Assessment of animal welfare problems in Finnish cattle and pig farms based on official inspection reports. *Animals*, 9, 263. <https://doi.org/10.3390/ani9050263>
- IV Väärikkälä, S., Koskela, T., Hänninen, L. & Nevas, M. (2020) Evaluation of criminal sanctions concerning violations of cattle and pig welfare. *Animals*, 10, 715. <https://doi.org/10.3390/ani10040715>

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The author had the main responsibility for analysing the data, interpreting the results and writing the scripts of all publications. The author was responsible for collecting the data in Study III and participated in data collection for Studies I, II and IV. All co-authors participated in designing the studies and editing the scripts.

## **ABBREVIATIONS**

DG SANTE	Directorate-General for Health and Food Safety
EEC	European Economic Community
EFSA	European Food Safety Authority
EU	European Union
Evira	Finnish Food Safety Authority (Finnish Food Authority from 2019 on)
FAO	Food and Agriculture Organization of the United Nations
MAF	Ministry of Agriculture and Forestry, Finland
MS	EU Member States
OECD	Organisation for Economic Co-operation and Development
OFS	Official Statistics of Finland
OIE	World Organisation for Animal Health
RSAA	Regional State Administrative Agency

# 1 INTRODUCTION

The Treaty of Rome (1957), establishing the European Economic Community (EEC) in the 1950s, identified animals as goods or agricultural products. Concerns for animal welfare began to be voiced as late as 1974, when the first European-level legislation took effect, addressing the protection of animals at slaughter (Council Directive 74/577/EEC). Since then, the European Union (EU) has recognised animals as sentient beings (Treaty of Amsterdam, 1997), establishing a wide range of legislation on animal welfare and introducing a legal obligation to consider animal welfare in the key areas of European law and policy.

The EU legislation on farm animal welfare now covers all the steps of livestock production from farming to transport and killing. All animals kept for farming purposes are protected by Council Directive 98/58/EC. The directive is supplemented by species-specific directives for laying hens (Council Directive 1999/74/EC), calves (Council Directive 2008/119/EC), pigs (Council Directive 2008/120/EC), and chickens kept for meat production (Council Directive 2007/43/EC). Furthermore, council regulations (EC 1/2005 and EC 1099/2009) lay down minimum standards for the transport and killing of animals. By laying down minimum requirements and by the introduction of prohibitions such as a ban on veal crates, battery cages and sow stalls, the current EU legislation aims to ensure that no unnecessary pain, suffering or injury is inflicted on animals.

The primary duty of complying with the EU legislation on animal welfare is imposed on operators in the field (EC Regulation 178/2002); however, the operators at times fail to comply with the standards (Lomellini-Dereclenne et al., 2017; Lundmark Hedman et al., 2018; European Commission, 2019). An official animal welfare control therefore plays a critical role in the enforcement of the legislation. The enormous number of animal premises underlines the importance of identifying non-compliant ones and allocating the control resources to these (Hultgren, 2009; Blanc, 2013; Organisation for Economic Co-operation and Development [OECD], 2014).

Previous research has established that farmers perceive animal welfare controls as an important way to expose non-compliant counterparts (Bracke et al., 2005; Anneberg et al., 2012). However, the control and animal welfare legislation has also attracted negative criticism (Ådahl, 2007; Bock & van Huick, 2007; Hubbard, 2007; Anneberg et al., 2012). Farmers' views of animal welfare controls should be further examined to discover ways to improve their perceptions, since it is likely that more successful control outcomes could be achieved with more favourable perceptions.

EU member states (MS) are required to conduct official animal welfare controls regularly, on a risk basis and with appropriate frequency. To accomplish this, the MS are expected to employ enough suitably qualified and experienced staff (EU Regulation 2017/625). In many MS, as in Finland, official veterinarians conduct the animal welfare control. The well-being of official veterinarians conducting this work is of particular

interest as psychological well-being is linked to job performance (Wright & Cropanzano, 2000; 2004; Wright, 2010). The rates of suicidal behavior (Platt et al., 2010), stress (Hatch et al., 2011; Shirangi et al., 2013; Volk et al., 2018) and mental health problems (Hatch et al., 2011; Nett et al., 2015) have been affirmed to be elevated among veterinarians. However, earlier studies have mainly concentrated on the well-being of clinical veterinary practitioners. The well-being of official veterinarians conducting the animal welfare control remain unreported.

In Finland, the EU legislation on animal welfare has been implemented with the Animal Welfare Act 247/1996, Animal Welfare Decree 396/1996 and species-specific decrees. Besides providing minimum requirements for animal keeping, the Animal Welfare Act (1996) defines the competent authorities for animal welfare control, their duties and the available control measures. The Finnish control system for animal welfare was reformed at the end of 2009 when new official veterinarian posts for approximately 15 provincial veterinary officers and 60 municipal veterinarians, concentrating predominantly on control work, were created (Nurminen, 2014). The annual animal welfare inspection rate has nearly doubled since the reform, being now approximately 6,000 per year (Finnish Food Authority, 2019; 2020a). Wahlberg (2010) and Koskela (2013) showed the inefficiency of the Finnish animal welfare control but their studies investigated control before the reform. Data on the efficiency of current Finnish animal welfare control is lacking.

This research investigates how the Finnish official animal welfare control has appeared at a farm level since the reform of the control system. The study inquiries about the well-being of official veterinarians at work, and about farmers' perceptions of animal welfare controls. Furthermore, the study investigates the types and frequencies of non-compliance on Finnish cattle and pig farms and imposing sanctions on them by analysing the reports from animal welfare inspections and court decisions regarding animal welfare crimes. The ongoing legislative reform of the Finnish Animal Welfare Act (1996) makes the study a burning question. It is hoped that the results can be exploited in the reform work.

## 2 REVIEW OF LITERATURE

### 2.1 History of animal welfare legislation in Europe

The first law prohibiting cruelty to animals for their own sake was passed in Ireland more than 300 years ago (Hanlon & Magalhães-Sant'Ana, 2014). The approbation of the law involved a major step from property protection to animal protection since other rudimentary laws on animal protection expressed only the urge to protect human interests in their property or to maintain public order (Radford, 2001; Robertson, 2015). In the early 20<sup>th</sup> century, as many other European countries were evolving their laws on animal protection, progress was interrupted by the Second World War (Hardouin-Fugier, 2006).

The publication of *Animal Machines* by the British author and animal welfare advocate Ruth Harrison in 1964 (Harrison, 1964) emerged as a significant event for the development of animal welfare legislation (Ransom, 2007; Woods, 2012). Harrison raised many negative aspects of intensive livestock production (Harrison, 1964). As a response to the concern evoked by Harrison's book, the British Parliament appointed the Brambell Committee to examine conditions in which intensively housed farm animals were kept and to advise whether new standards should be set to safeguard the welfare of animals. The Committee Report, published in 1965, substantiated Harrison's findings and concluded that domestic animals were capable of suffering and experiencing feelings, and that animals should be protected as far as possible from conditions that may cause suffering. Furthermore, the Committee recommended that animals should have the freedom to '*stand up, lie down, turn around, groom themselves and stretch their limbs*' and that they must be provided with '*adequate food and drink to prevent them suffering from hunger and thirst*' (Brambell, 1965). The freedoms formulated by the Brambell Committee were later modified to 'Five Freedoms', namely, 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 (Farm Animal Welfare Council, 2009). The 'Five Freedoms' have formed a framework for the animal protection in Europe (Ransom, 2007; Vapnek and Chapman, 2010).

The need for harmonised animal protection actions and a belief that respect for animals belongs to the European cultural heritage, prompted the Council of Europe to begin working at a supranational level on animal protection in the 1960s (Caporale et al., 2005; Veissier et al., 2008). During the period from 1968 to 1987, the Council of Europe achieved a consensus on several animal welfare questions, resulting in five conventions that were approved by many European countries. The conventions laid down supranational principles for the protection of animals during international transport (1968), farm animals (1976), animals for slaughter (1979), vertebrate animals used for experimental and other scientific purposes (1986), and pet animals (1987)

(Veissier et al., 2008). The conventions have provided a basis for animal welfare legislation within the EU (Caporale et al., 2005; Dalla Villa et al., 2014). Besides, the Council of Europe has provided several recommendations on the welfare of various animal species (Veissier et al., 2008).

The Treaty of Rome (1957) that established the EEC identified animals as ‘goods’ or ‘agricultural products’ and the first European-level rules concerning animals were related to trade and free movement of personnel and goods, including live animals, disease control, meat inspection, and animal feedstuffs (Ray & Scott, 1973). The protection of animals was excluded from the EEC objectives at that time. Only disparities between the MS on the protection of farm animals, giving rise to unequal conditions of competition and resulting in a negative effect on the functioning of the common market, were worried about (Council Decision 78/923/EEC). Interest in animal protection expanded after the Council of Europe issued the first conventions on the protection of animals and the United Kingdom joined the EEC in the 1970s (Simonin & Gavinelli, 2019). The first piece of animal welfare legislation was adopted in 1974 (Council Directive 74/577/EEC) but it was only in 1992 that a Declaration called upon the European institutions and the MS ‘*to pay full regard to the welfare requirements of animals*’ when drafting and implementing EU legislation (Treaty on European Union, 1992). The Declaration included only a little indirect legal effect, however (Camm & Bowles, 2000).

Major advancement for animal protection within the EU occurred in 1999 when the Treaty of Amsterdam took effect, with an annexed Protocol on the protection and welfare of animals (Camm & Bowles, 2000). The Treaty introduced a legal obligation to consider animal welfare in the key areas of European law and policy for the first time, and recognised animals as sentient beings (Treaty of Amsterdam, 1997). In the Treaty of Lisbon (2007), which took effect in 2009, the Protocol was upgraded to an Article within the Treaty. Animals are in any case considered as property in most legislation (Radford, 2001; Robertson, 2015).

At the beginning of the 21<sup>st</sup> century, the EU held its first conference on animal welfare, passing a decision concerning the collection of information on animal welfare inspections of calf, pig, and poultry farms (Commission Decision 2006/778/EC). Furthermore, a Community Action Plan on the Protection and Welfare of Animals was adopted by the European Commission in 2006. The Action Plan laid out specific measures to be taken from 2006 to 2010 to improve animal welfare in the EU and to further promote it internationally, including upgrading existing standards and introducing animal welfare indicators (European Commission, 2006). The Action Plan was followed by the EU Animal Welfare strategy 2012–2015, which aimed at improving and simplifying animal welfare standards and ensuring that they were applied and enforced equally in the MS (European Commission, 2012). Moreover, the EU established Reference Centres for animal welfare (Commission Implementing Regulation 2018/329), for pigs in 2018 (EURCAW-Pigs) and for poultry and other small farmed animals in 2019 (EURCAW-Small Animals). The reference centres provide

scientific and technical expertise on animal welfare questions and aim at developing methods for improving and assessing animal welfare.

Non-governmental animal welfare organisations have played a crucial role in the development of animal protection from the 19<sup>th</sup> century on (Wilkins et al., 2005; Bonbon, 2012). International organisations, such as the World Organisation for Animal Health (OIE), Food and Agriculture Organization of the United Nations (FAO) and the World Bank, on the other hand, began to consider animal welfare at the beginning of 21<sup>st</sup> century (Bonafos et al., 2010; Fraser, 2014). The first OIE standards on animal welfare were published in the Terrestrial Code in 2004, addressing animal transport, the slaughter of animals, and killing for disease control purposes (OIE, 2011). The first OIE Global Conference on animal welfare was held in the same year (Vapnek & Chapman, 2010; Bonbon, 2012).

## **2.2 EU legislation on farm animal welfare**

The European Commission possesses the ‘right of initiative’, mandating the Commission to plan, prepare and propose new EU laws. The Commission may initiate the law-making process by itself or at the request of other European institutions or citizens. Animal welfare belongs under the responsibility of the Commission’s General Directorate for the Health and Food Safety (DG SANTE). Before drafting a new law, DG SANTE consults the European Food Safety Authority (EFSA) on matters related to animal welfare (Veissier et al., 2008). Scientific opinions of the EFSA Panel on Animal Health and Welfare represent a scientific basis for the legislation (Vannier & Berthe, 2012). Furthermore, potential economic, social and environmental consequences of the new law are assessed before sending the draft to the European Parliament and the Council, which need to approve the new law before it can be adopted (European Commission, 2001).

The first animal welfare law at the European level, adopted in 1974, addressed the stunning of animals before slaughter (Council Directive 74/577/EEC). A directive on the protection of animals during international transport was adopted three years later. The first European law protecting animals on farms, namely, laying hens, was adopted in 1986, followed a few years later by directives on the protection of calves and pigs (Veissier et al., 2008). In 1998, Council Directive 98/58/EC laid down minimum standards for the protection of all animals bred or kept for farming purposes.

The EU legislation on farm animal welfare covers all phases of production from farming to transport and killing. The current legislation consists of five directives imposing minimum standards for animals on farms and two regulations protecting animals during transport and at the time of killing (Table 1). According to Veissier and others (2008), the general trends of the EU legislation on animal welfare include: i) increasing space allowance per animal, ii) decreasing isolation and confinement of



animals and enriching their environments, iii) feeding animals according to their needs, and iv) limiting painful procedures.

**Table 1.** *Current EU legislation on farm animal welfare.*

<b>Production phase</b>	<b>Act</b>	<b>Content</b>	<b>Year</b>
Farming	Council Directive 98/58/EC	Protection of animals kept for farming purposes	1998
	Council Directive 1999/74/EC	Protection of laying hens	1999
	Council Directive 2007/43/EC	Protection of chickens kept for meat production	2007
	Council Directive 2008/119/EC	Protection of calves	2008
	Council Directive 2008/120/EC	Protection of pigs	2008
Transport	Council Regulation (EC) No 1/2005	Protection of animals during transport	2005
Slaughter	Council Regulation (EC) No 1099/2009	Protection of animals at the time of killing	2009

Finland became a member of the EU in 1995, and a need to harmonize national legislation with the EU legislation arose. In Finland, the EU legislation on farm animal welfare has been implemented by the Animal Welfare Act (1996) and Animal Welfare Decree (1996). The Animal Welfare Act (1996) is currently undergoing a major legislative reform. The Animal Welfare Act (1996) and the Animal Welfare Decree (1996) apply to all animal species and set general principles for animal keeping. More specific rules are laid down in species-specific decrees, such as the Government Decree for the protection of cattle 592/2010 and the Government Decree for the protection of pigs 629/2012. The Finnish Food Authority reports the compliance of Finnish farms with the animal welfare legislation annually, based on official animal welfare controls (Finnish Food Authority, 2020a); however, no longitudinal studies have investigated the compliance rates.

### **2.3 Legislative basis for official animal welfare control in the EU**

In 2002, the European Parliament and the Council adopted EC Regulation 178/2002, which lays down the general principles and requirements of food law, establishing the EFSA and laying down procedures in matters of food safety. The aim of this regulation is to ensure a high level of protection of human life and health whilst also considering the protection of animal health and welfare, plant health and the environment. The regulation imposes a primary legal responsibility for complying with the laws covering food and food safety in general, and all the stages of food production, including primary production, processing and distribution on operators in the field.

EC Regulation 178/2002 stipulates that the MS enforce the food laws and organise a system for verifying the compliance of the operators. Regarding organising official controls, the EC Regulation 882/2004 was adopted in 2004. This regulation, now replaced by EU Regulation 2017/625, provided a framework for the MS to organise a system for official control related to food matters. The aim of the EU Regulation 2017/625 is to further ensure that the legislation concerning food matters is implemented correctly and uniformly in all MS. The regulation requires that the competent authorities of the MS conduct controls regularly, on a risk basis and with an appropriate frequency. The competent authorities are also required to verify the effectiveness, impartiality, quality and consistency of the controls (EU Regulation 2017/625).

The MS have established various systems for official animal welfare control (see the Commission's website [https://ec.europa.eu/food/audits-analysis/country\\_profiles/index.cfm](https://ec.europa.eu/food/audits-analysis/country_profiles/index.cfm)). To verify that the systems are appropriately established and put into effect, DG SANTE performs audits and inspections on the MS (Horgan & Gavinelli, 2006; Bonafos et al., 2010). Apart from the reports of the official audits (found on the Commission's website [http://ec.europa.eu/food/fvo/ir\\_search\\_2\\_en.cfm](http://ec.europa.eu/food/fvo/ir_search_2_en.cfm)), only a few scientific studies have investigated the efficiency of animal welfare control in the MS.

## **2.4 Official animal welfare control in Finland**

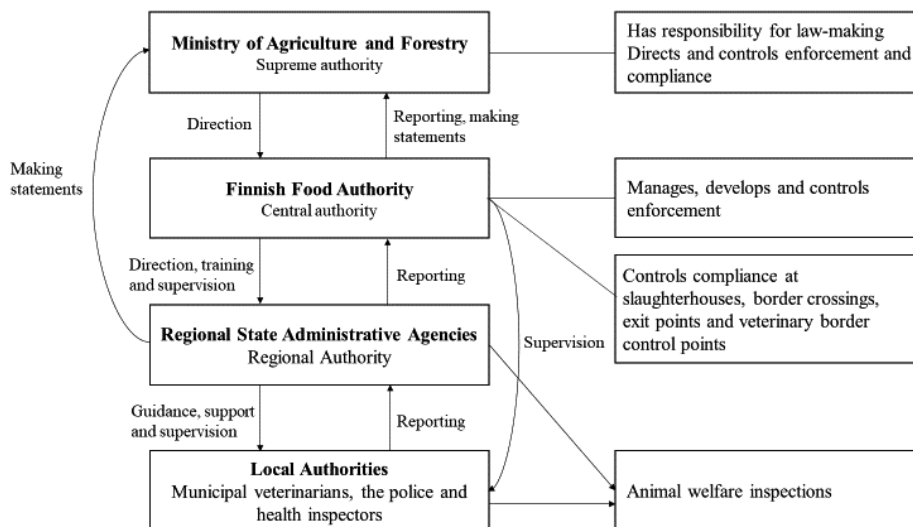
### **2.4.1 Reform of the control system**

A reform of the Finnish system for official animal welfare control was conducted at the end of 2009. The reform was founded on suggestions made by a working group appointed by the Ministry of Agriculture and Forestry (MAF) in 2007 (Aho et al., 2007). At that time, MAF pledged to finance approximately 15 new provincial veterinary officers and 60 municipal veterinary posts for animal welfare control (Nurminen, 2014). The aim of the reform was to increase resources in control, to prevent a conflict of interest by separating control work from clinical veterinary practice, and to create better opportunities for specialization and expertise (Aho et al., 2007; Nurminen, 2014).

### **2.4.2 System for animal welfare control**

Currently, the Finnish system for official animal welfare control is composed of four administrative levels (Figure 1). At the local level, the responsibility for organizing the control lies with municipalities in which municipal veterinarians, the police and health inspectors are assigned to control compliance with the animal welfare standards (Animal Welfare Act, 1996). The local control is mostly conducted by the municipal veterinarians. Intensified collaboration between municipalities have led to 62 co-operation districts, in which one or two municipal veterinarians usually concentrate full-time on control work (Nurminen, 2014). The municipalities operate under the supervision and guidance of six Regional State Administrative Agencies (RSAA).

Provincial veterinary officers employed by the RSAA participate in animal welfare control independently and together with municipal veterinarians (henceforth municipal veterinarians and provincial veterinary officers are referred to as official veterinarians). The Finnish Food Authority (formerly Finnish Food Safety Authority [Evira]) directs, coordinates and develops animal welfare control as a central organisation. The Finnish Food Authority controls compliance with the animal welfare standards at slaughterhouses, border crossings, exit points and veterinary border control points. The MAF is the supreme authority for animal welfare control, carrying responsibility for legislative standards, general planning and supervision.



**Figure 1.** Competent animal welfare authorities and their duties in Finland, defined by the Finnish Animal Welfare Act 247/1996.

There has been continuous discussion on opportunities to reorganize the system for food and environmental health control, under which the official animal welfare control belongs (Hirn, 2011; Nurminen, 2014; Nevas & Lepistö, 2015; Niemi et al., 2016; Tarasti, 2016). However, the effects of the reform conducted at the end of 2009 have not been investigated. More information is required on the pros and cons of the current system for animal welfare control before it is reformed again.

### 2.4.3 Animal welfare controls on farms

Animal welfare control emerges as an efficient way to verify on-farm compliance and highlight major animal welfare problems. However, the competent animal welfare authorities may require no more than the minimum legislative standards, despite the standards at times failing to secure the welfare of animals. It has been questioned

whether the emphasis of official controls should only be on verifying compliance or also on preventing future problems (Anneberg et al., 2013; Lundmark, 2016).

EU Regulation 2017/625 urges the MS to verify the compliance of a representative sample of farms annually, without, however, providing an interpretation for the term 'representative sample'. Most of the MS apply a risk-based approach to decide the frequency of controls and conduct inspections commonly on five to 10 per cent of farms per year (Food Policy Evaluation Consortium, 2010). In comparison, Directive 2010/63/EU on the protection of animals used for scientific purposes strictly stipulates that at least one third of the establishments using animals for scientific purposes shall be inspected each year. Eckert (2004) and Rousseau (2007) have argued that the probability of increased inspection may be a deterrent to non-compliance in general. Van Asselt and others (2012) have argued that the probability of detection can be considered as an even better deterrent than the probability of inspection.

According to EU Regulation 2017/625 MS shall also take account of identified risks that can influence animal health or welfare when planning official controls, indicating that identified risk factors affecting animal welfare at farm level determine the control frequency for a specific farm (Hultgren, 2009). The information required to estimate the risk of non-compliance includes past outcomes of official or other controls and 'any information that might indicate non-compliance' (EU Regulation 2017/625). Other potentially valuable and useful information for risk assessment can be obtained from many different databases and registers (Hultgren, 2009). Lundmark Hedman and others (2018), for example, identified farm-related risk factors by applying data from animal welfare inspections.

In Finland, animal welfare controls required by the EU, so-called sampling-based animal welfare inspections, began in 1998 with calf and pig farms. The inspections have expanded to include fur farms, laying hen, duck, goose and broiler farms as well as sheep, goat and adult cattle farms (Finnish Food Authority, 2018). Since 2008, farms to be inspected have been selected both by random sampling (20-25%) and by risk basis (75-80%). The compliance history of a farm, previous deficiencies related to identification and registration of animals, the number of missing animals, and herd size are examples of factors that the Finnish Food Authority takes into consideration when conducting a risk analysis (Evira, 2013). From 2017 onward, the sampling-based animal welfare inspections have been targeted at one or two species per year, meaning that a higher proportion of farms with specific animal species are chosen for inspection, whereas the proportion of farms with other species is less in that year. The total number of farms inspected has remained relatively constant, being approximately 400 farms per year (Finnish Food Authority, 2020a).

Finnish farms may also be subjected to an inspection based on suspicion, complaint, or on surveying determined by Finnish Food Authority or RSAA (Animal Welfare Act, 1996). The number of suspicion-based inspections has doubled since the reform in the control system; from 3,223 to 6,358 inspections per year (Evira, 2010; Finnish Food Authority, 2020a).

To date, inspection data has been insufficiently exploited, although the competent authorities conduct numerous inspections every year in the MS. Nevertheless, in Sweden, for example, inspection data has been successfully applied to determine the incidence of specific welfare conditions and risk factors for poor welfare (Keeling, 2009; Hitchens et al., 2017; Lundmark Hedman et al., 2018).

#### **2.4.4 Administrative procedure in animal welfare control**

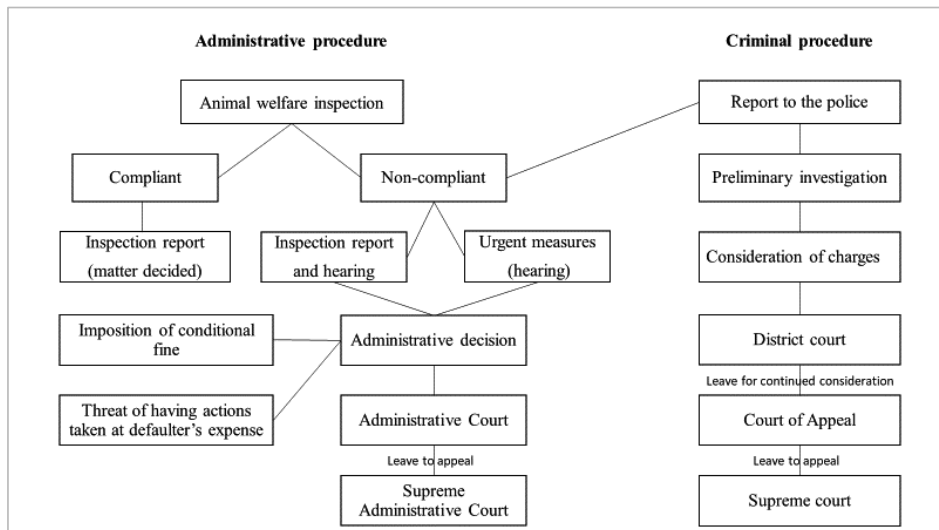
A general principle '*Everyone is equal before the law*' laid down by the Constitution of Finland 731/1999 underpins the work of the competent animal welfare authorities. The authorities must also follow administrative formalities laid down in the Administrative Procedure Act 434/2003 so that good administration and legal protection in administrative matters are ensured.

An animal welfare matter becomes pending when an animal welfare authority receives a document or an oral notification on the matter, and registers the information needed to begin consideration of the matter (Administrative Procedure Act, 2003). On-the-spot controls frequently constitute the only and most effective way to ensure that the animal welfare issue is sufficiently and appropriately investigated. The animal welfare controls are primarily conducted without giving prior notice to the target (EU Regulation 2017/625). This is not always possible in practice as the parties concerned should be present at the inspection (Administrative Procedure Act, 2003). In urgent or serious cases, animal welfare authorities may, however, perform an inspection without anybody present.

If detecting non-compliance, the authority should apply appropriate control measures to ensure that non-compliance is rectified, and further non-compliance is prevented (EU Regulation 2017/625). The Finnish Animal Welfare Act (1996) defines administrative enforcement measures at the disposal of animal welfare authorities, including an order to rectify non-compliance within a specific time limit and a prohibition on continuing non-compliant action. To enhance the effectiveness of an order or a prohibition, the authority may impose a conditional fine or the threat of having actions taken at the defaulter's expense. In cases of non-compliance severely compromising the welfare of animals, the authority has the right to apply urgent measures, such as ensuring care for the animal elsewhere or euthanising it (Animal Welfare Act, 1996). The authority makes the decision based on legislation, their own observations and the interpretation of a specific situation. Before applying enforcement measures or otherwise deciding on the matter, the authority must provide parties directly affected an opportunity to be heard, express their opinion on the matter and submit an explanation and other information which may influence the decision on the matter (Administrative Procedure Act, 2003). Only in urgent animal welfare matters may the authority diverge from the hearing requirement (Animal Welfare Act, 1996).

The authority is required to provide a written enforcement decision, which must contain specific information about required action and their deadline with adequate reasoning, as well as instructions for appeal. The Administrative Court may review the

legality of the enforcement decision based on an appeal. If the appellant is unsatisfied with the review of the Administrative Court, they may apply for leave to appeal to the Supreme Administrative Court (Administrative Procedure Act, 2003). Figure 2 represents the administrative procedure regarding animal welfare matters.



**Figure 2.** *Administrative and criminal procedure regarding animal welfare matters in Finland.*

Studies have shown deficiencies in administrative formalities regarding Finnish animal welfare control procedures, such as the hearing process being ignored (Wahlberg, 2010; Koskela, 2013). These studies are, however, based upon data before the reform in the animal welfare control system. It is unclear whether the possibility of concentrating on and specializing in control work have improved the competence of official veterinarians in administrative matters.

## **2.5 Sanctioning as a tool for strengthening the enforcement of animal welfare legislation**

The EU legislation on animal welfare aims at protecting animals from unnecessary suffering, harm and injury by the imposition of obligations and prohibitions. The enforcement of the EU legislation is primarily a task of the MS (Horgan & Gavinelli, 2006). To strengthen the enforcement, the MS are required to impose proportionate, dissuasive and effective sanctions for the violations of the standards (EU Regulation 2017/625). That is to say, the sanctions must be appropriate, necessary to achieve their objectives and sufficiently strict so that an offender is prevented from reiterating violations and that others are urged to comply (Tridimas, 2006; Meeus, 2010). Furthermore, for the sanctions to be effective, they should eliminate any financial gain

or benefit from violations (OECD, 2009), be inevitable and unavoidable and administered immediately or speedily (McGuire, 2002).

Animal welfare authorities at times detect animal welfare violations. Still, only a few studies have investigated the sanctions. Luke and Arluke (1997), for example, showed that less than half of the accused animal abusers are found guilty in the USA and Morton and others (2018) questioned whether animal abusers are punished effectively enough in South Australia after examining penalties for animal welfare crimes. The Food Policy Evaluation Consortium (2010) suggested that a more uniform approach to address the animal welfare violations across the EU should be established. To achieve this, more knowledge of the sanctioning systems and sanctions imposed by the MS is needed.

In Finland, sanctions are imposed through a national criminal procedure (Figure 2). The Animal Welfare Act (1996) obliges the animal welfare authorities to report suspected animal welfare violations to the police. Bystanders also report suspected animal abuse or neglect cases to the police (Koskela, 2013). If they suspect a crime, the police conduct a preliminary investigation. The police or a prosecutor, at the request of the head investigator, may decide to waive or discontinue the preliminary investigation if they find no evidence of the suspected crime or the maximum punishment expected is a fine and the crime, assessed as a whole, is to be deemed manifestly petty (Criminal Investigation Act 805/2011). The preliminary investigation also discontinues where the police issue a fine directly. Otherwise, a prosecutor decides, based on the investigation, whether to bring or waive charges, or issue a fine directly. If the prosecutor brings charges, the case is heard in a district court, where a judge hands down a judgement. If the prosecutor and/or the defendant are unsatisfied with the judgement, they can appeal the case to a court of appeal. To be further considered by a court of appeal, the appellant needs permission, with few exceptions (Code of Judicial Procedure 4/1734).

In Finland, animal welfare crimes are categorised into four classes based on the severity of the offence. The sanctions depend on the type of the crime and vary from a fine to a prison sentence (Table 2). The fine is imposed as day-fines, i.e., the amount of the fine depends on the income of the person sentenced, being a maximum of 120 day-fines for a single crime. A sentence of up to two years of imprisonment may be imposed conditionally, indicating that the enforcement of the sentence will be postponed for a probation period (Criminal Code of Finland 39/1889). As a precautionary measure, an offender may also be subjected to a ban on animal keeping, which aims at preventing the offender from committing a new animal welfare crime and protecting animals from further suffering. The ban, which is discretionary, is imposed at the request of a prosecutor. The ban may pertain to particular animal species or all animals and may be imposed for a fixed period or permanently. Prerequisites for a permanent ban include i) the person has been convicted of an aggravated animal welfare offence, ii) an earlier ban on animal keeping was imposed for a fixed period, or iii) the health of the person is poor, and a perpetrator is permanently unfit or unable to own, keep, or care for animals. The person banned from the keeping of animals is enjoined from owning, keeping or

taking care of animals or otherwise being responsible for their welfare (Criminal Code of Finland, 1889).

**Table 2.** *Types of animal welfare crimes and related sanctions according to the Finnish Animal Welfare Act 247/1996 and the Criminal Code of Finland 39/1889.*

<b>Type of crime</b>	<b>Legal background</b>	<b>Basis for conviction</b>	<b>Criminal sanction</b>
Animal welfare infringement	Animal Welfare Act Chapter 6, section 54	A person who intentionally or through negligence fails to comply with animal welfare standards	A fine
Petty animal welfare offence	Criminal Code Chapter 17, section 15	A person whose offence, in view of the nature of the suffering, pain or torment caused or the other circumstances of the offence, is petty when assessed as a whole	A fine
Animal welfare offence	Criminal Code Chapter 17, section 14	A person who intentionally or through gross negligence, by violence, excessive burdening, failure to provide the necessary care or food or otherwise in violation of animal welfare standards treats an animal cruelly or inflicts unnecessary suffering, pain or anguish on an animal	A fine or imprisonment (max 2 years)
Aggravated animal welfare offence	Criminal Code Chapter 17, section 14a	A person whose offence is committed in an exceptionally brutal or cruel manner, the offence is directed at a considerable number of animals, or the intention is to obtain considerable financial benefit, and the offence is also aggravated when assessed as a whole	Imprisonment (min 4 months, max 4 years)

A farmer may also receive a financial sanction for animal welfare violations based on the Common Agricultural Policy, implementing agricultural subsidies in the EU. The agricultural subsidies are linked to compliance with specified EU requirements concerning animal welfare, the environment, maintaining land in good agricultural condition, and public, animal and plant health through the cross-compliance system (EU Regulation 1307/2013). Regarding animal welfare, farmers are required to comply with the Council Directive 98/78/EC on protection of farm animals and the species-specific directives laying down minimum standards for the protection of calves (Council Directive 2008/119/EC), pigs (Council Directive 2001/88/EC) and chickens kept for meat production (Council Directive 2007/43/EC) to receive subsidies. In a case of



non-compliance, a reduction or cancellation of the subsidies may be a consequence (EU Regulation 1306/2013).

## **2.6 Challenges in contributing to animal welfare through official control**

### **2.6.1 Multidimensional nature of animal welfare**

Initially, animal welfare science investigated animal behaviour (Marchant-Forde, 2015) and adopted a conventional scientific approach with experiments concentrating on the effects of individual factors under controlled conditions (Fraser, 2003; Sandøe et al., 2003; Veissier & Miele, 2014). Since then, it has evolved into an interdisciplinary science (Lund et al., 2006; Veissier & Miele, 2014; Marchant-Forde, 2015). The animal welfare science centres on natural sciences (Lund et al., 2006) but the concept of animal welfare also inherently comprises ethical (Fraser, 1999; Rollin, 2005; Vapnek & Chapman, 2010) and societal values (McInerney, 1991; Lund et al., 2006; Marchant-Forde, 2015), and is influenced by economics, technology, and regulation (Fraser, 1993). Animal welfare science has become established as a research field of its own (Mench, 1998) aiming to clarify the capability of animals for emotions, their perceptions of their environment, the welfare consequences of the ways humans treat animals and how to assess animal welfare in a given situation (Veissier & Forkman, 2008).

By 1965, the Brambell Committee recognised that ‘*welfare is a wide term that embraces both the physical and mental well-being of the animal*’ (Brambell, 1965). Ever since, scientists have employed several definitions for animal welfare (Stafleu et al., 1996; Veissier et al., 2011), without achieving a consensus on the matter (Mellor, 2016). Some researchers have argued that it is pretty well impossible to precisely define the term ‘animal welfare’ scientifically (Duncan & Dawkins, 1983; Fraser et al, 1997) as different understandings of value-laden concepts appear even within the scientific community (Fraser et al, 1997; Sandøe et al., 2004).

According to Fraser and others (1997), three main conceptual frameworks for animal welfare has been established. The first approach emphasises the biological functioning of animals, the second one animals’ emotions and the third one natural living (Fraser et al., 1997; Fraser, 2003). The biological functioning approach emphasizes the ability of an animal to cope with its environment (Broom, 1986; 1991), i.e., an animal will have good welfare when it has behavioural and physiological mechanisms to cope with challenges in their environment successfully (Broom, 1991; McGlone, 1993). Furthermore, an animal that grows well, is physically healthy, reproduces, and is relatively stress-free is considered to have good welfare according to this approach (Barnett & Hemsworth, 2003; Fraser, 2003; Mellor et al., 2009).

Along with the development of affective neuroscience in humans, scientists began to take an interest in the affective states that animals could have (Boissy et al., 2007; Mendl et al., 2009; Mellor, 2015). The affective state approach to animal welfare

accentuates the importance of animals' feelings and emotions for their welfare (Duncan, 1993; 1996; 2004; Fraser et al., 1997; Dawkins 1998). While scientists initially investigated the impacts of negative emotions, such as suffering, positive emotions are now considered equally important (Fraser & Duncan, 1998; Duncan, 2004; Yeates & Main, 2008). The affective states of animals have been studied mainly by investigating their preferences, aversions, and motivations (Dawkins, 2006; Kirkden & Pador, 2006), and by observing their natural behaviours (Dawkins, 2006; Mellor, 2015).

The third approach to animal welfare prioritises the natural life of an animal (Kiley-Worthington, 1989; Rollin, 1993) and its ability to fulfil its ethological needs (Kiley-Worthington, 1989). According to some interpretations of this approach, all the natural behaviours are equally important, indicating that those behaviours that may result in negative affective states as well, such as fear, are acceptable (Hewson, 2003). The three approaches to animal welfare are not seen as conflicting as before (Fraser, 2009). The OIE, for example, combines the approaches in their definition of animal welfare

*Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear and distress. (OIE, 2011).*

Other than scientists, stakeholders including animal welfare organisations, citizens, politicians, farmers, retailers, and authorities, attend discussion on animal welfare. Stakeholder values (Vapnek & Chapman, 2010) and experience with animals (Boogaard et al., 2006; Kendall et al., 2006) and how they position themselves with animals (de Greef & Bos, 2007) affect their understanding of animal welfare. Several studies have established that farmers usually stress the biological functioning approach, while public citizens emphasise the importance of natural living (Table 3). Differing opinions on animal welfare may conflict and cause practical and ethical challenges (Hewson, 2003); for example, in the enforcement of the animal welfare legislation.

**Table 3.** *Most significant factors of animal welfare perceived by farmers and public citizens.*

Factor	References	
	Farmers	Public citizens
Good health	Velde, 2002; Bock & van Hulk, 2007; Menghi, 2007; Vanhonacker, 2008; Phillips, 2009; Kauppinen et al., 2010; Franz et al., 2012; Hansson & Laqerkvist, 2012; Tuytens et al., 2014	Frewer, 2005; Vanhonacker, 2008; Ventura et al., 2016
Basic needs (such as water, feed and climate) satisfied	Bock & van Hulk, 2007; Ole Borgen & Aadnegard Skarstad, 2007; Bruckmeier & Prutzer, 2007; Vanhonacker 2008; Kauppinen et al., 2010; Franz et al., 2012; Hansson & Laqerkvist, 2012; Spooner et al., 2012; Tuytens et al., 2014	Frewer, 2005; Hall & Sandilands, 2007; Vanhonacker 2010; Ellis et al., 2009; Miele, 2010
Human-animal relation (stockmanship)	Dockés & Kling-Eveillard, 2006; Vanhonacker, 2008; Phillips et al., 2009	Vanhonacker 2008; Ellis et al., 2009; Ventura et al., 2016
Natural living and/or behaviour	Bruckmeier and Prutzer, 2007; Bock and van Hulk, 2007; Menghi, 2007	Velde, 2002; Ellis et al., 2009; Vanhonacker, 2010; Verbeke, 2010; Miele, 2010; Spooner et al., 2014; Clark et al., 2016; Ventura et al., 2016; Yunes et al., 2017

### 2.6.2 Various ways to assess animal welfare

It has proven challenging to draw a clear line between good and bad animal welfare (Mendl, 1991; Dawkins, 2006) and several ways to assess animal welfare have been introduced (Mason & Mendl 1993; Spoolder et al., 2003; Dawkins, 2006) including TGI 35 L Austrian Animal Needs Index (Bartussek, 1999; 2001), the assessment scheme for littered loose housing systems of dairy cows (Hörning, 2001), and systems based on ethical accounts (Sørensen et al., 2001), observations on animals (Capdeville & Veissier, 2001), and farm data and animal observations (Tosi et al., 2001). Welfare Quality®, one of the newest assessment protocols, was funded by the EU and developed in international collaboration. Welfare Quality® aims to evaluate the overall welfare of animals (Blokhus, 2008; Botreau et al., 2009; Veissier et al., 2011).

Measures that are adopted in assessing animal welfare are frequently categorized into resource- and management-based and animal-based requirements (EFSA, 2012), known also as design and performance criteria respectively (Rushen & de Pasille, 1992). Resource-based requirements are related to the resources in the animals' environment, such as space allowance, group size, floor type, and feeding and drinking facilities and management-based requirements for actions required from the animal keeper, such as handling and use of medication (Keeling et al., 2013). Animal-based requirements focus on animal behaviour, body condition, cleanliness and injuries (EFSA, 2012).

The current EU legislation on animal welfare is largely founded on resource- and management-based requirements (Rushen & de Pasillé, 1992; Main et al., 2003; Hultgren, 2009). These requirements affect the welfare of animals (Lidfors et al., 2005; Bracke & Hopster, 2006; EFSA, 2009) and measuring them can identify causes of poor welfare (Bowell et al., 2003; Main et al., 2003; Rushen et al., 2011; EFSA, 2012; Keeling et al., 2013). The advantages of applying the resource- and management-based requirements in assessing animal welfare include ease of checking compliance with a requirement (Rushen & de Pasillé, 1992) and high repeatability (Johnsen et al., 2001; Napolitano, 2009; EFSA, 2009; Keeling et al., 2013). However, many researchers recommend that resource- and management-based measures should be applied in combination with animal-based measures (Rushen & Pasillé, 1992; Johnsen et al., 2001; Rousing et al., 2001; Spoolder et al. 2003; Botreau et al. 2007; Rushen et al. 2011; EFSA, 2012). Animal-based measures are believed to provide more accurate information on the actual welfare state of an animal (Capdeville & Veissier, 2001; de Passillé & Rushen, 2005; Blokhuis et al., 2010; Viksten et al., 2016).

### **2.6.3 Veterinary ethics**

Veterinarians are linked with animal welfare in many ways, such as contributing to animal welfare by providing veterinary care and knowledge (Odendaal, 1998; Smith, 1998; Edwards & Sneider, 2005). In some countries, veterinarians enforce animal welfare standards (Lomellini-Dereclenne et al., 2017; European Court of Auditors, 2018) and drive animal abuse cases forward in criminal procedure (Benetato et al., 2011; Arkow, 2015). The role of veterinarians in animal welfare is, however, demanding as Rawles (2000) has pointed out:

*In short, vets are not just at the front line, they are also on an ethical high-wire, constantly balancing their concern with animal welfare against the demands of the industries, clients and practices they work for, without necessarily having been given any training in how to do this. (p. 15)*

Data from several studies suggest that veterinarians should be educated more in animal welfare (Millman et al., 2004; Beaver, 2005; Edwards & Sneider, 2005; Hewson, 2005; de Boo & Knight, 2005; de Briyne, 2020), especially from the perspective of science, ethics, and law (Main et al., 2005).

Within the framework of official animal welfare control, the animal welfare legislation provides a strong basis for acceptable animal care. Ambiguous standards, however, make it challenging to control compliance (Rushen et al., 2011; Anneberg et al., 2012). For example, the phrase ‘unnecessary suffering’ is frequently inadequately explained (Wahlberg, 2008; Forsberg & Forsberg, 2011; Lundmark, 2016), although the phrase frequently appears in legislative texts (Lundmark Hedman et al., 2013). Consequently, different stakeholders may interpret it differently in terms of their own

ethical values. Different interpretations may conflict and provoke emotional reactions, which makes discussion of the animal welfare questions even more challenging.

Some literature has been published on veterinary ethics. A frequently raised question is who, owner or animal, veterinarians should primarily serve when their interests conflict (e.g. Rollin, 1978; Edwards & Sneider, 2005; Morgan & McDonald, 2007). Ethical conflicts and moral distress have been shown to be one of the reasons for the high levels of stress among veterinarians (Batchelor & McKeegan, 2012; Kahler, 2015; Moses et al., 2018). Stress, in turn, is known to adversely affect job performance and escalate turnover intentions (Motowidlo et al., 1986; Khorshidifar & Abedi, 2011; Arshadi & Damiri, 2013; Yozgat et al., 2013). The research to date has predominantly investigated the stress levels of veterinarians conducting clinical practice. However, the ethical challenges experienced by veterinarians enforcing animal welfare standards have remained understudied.

## **2.7 Cattle and pig farms as targets of official animal welfare control**

### **2.7.1 Changes in farming since the 1950s**

Since the Second World War, many changes have taken place in livestock farming (Fraser et al., 2001). After the War, an urgent call went out to increase the availability of cheap food to satisfy the needs of a rapidly expanding population in Europe (Cronin et al., 2014). To enhance efficiency and productivity at minimum cost, farmers adopted an industrial production model from other types of industries (Harfeld, 2010). There is no exact definition of industrialised agriculture but it is frequently characterised by a structural change involving intensification of housing systems, the amount of output and agricultural management desired (Fraser, 2008; Harfeld, 2010); livestock production is concentrated on fewer, larger and more specialized farms (Fraser, 2005; 2008; Steinfeld et al., 2006) where the level of confinement and animal density is higher (Fraser et al., 2001) and productivity increased. This kind of intensive livestock production gradually became widespread throughout Europe and North America (Nierenberg, 2005). In Finland, the intensification of livestock production started in the late 1960s and has been seen as fewer but larger and more specialised farms (Hassinen, 1980; Kupsala, 2011; Niemi & Väre, 2018). For example, the number of dairy and pig farms was approximately 300,000 and 100,000 respectively in the 1960s (Hassinen, 1980), while in the 2010s the numbers were less than 10,000 and just over 1000 (Official Statistics of Finland [OFS], 2019a). The Finnish production is still relatively minor compared to many other MS (Eurostat, 2020).

The changes in livestock production was enabled by several scientific innovations. Firstly, new technological devices and automation were introduced to optimise feeding and monitor animals, replacing the need for expensive human labour (Fraser et al., 2001; Harfeld, 2010). Secondly, advances in medical science reduced the incidence of various diseases and made higher animal density possible (Fraser et al., 2001).

The changes in animal housing and nutrition provided both benefits and costs for the welfare of animals. In the intensive housing systems, animals are frequently kept indoors at high density, and their freedom of movement and opportunity to perform natural behaviours are limited, but they are better protected from predators, harsh weather and pathogens (Fraser, 2001; Fraser et al., 2001). The confinement also enables frequent and closer inspection of animals, better health management and more precise feeding than when kept outdoors. However, high animal density, transport of animals, and poor management and hygiene practices expose animals to certain diseases (Kimman et al., 2013), and harmful behaviours (Fraser et al., 2001). To adjust animals to fit into confined housing systems better, mutilations such as tail-docking, dehorning, castration, and teeth cutting have been developed (D’Silva, 2006; Nordquist et al., 2017).

To achieve maximum productivity, selective breeding was adopted as a part of intensive livestock production. Selective breeding has resulted in better yield and faster growth, but also in animal health and welfare problems (Rauw et al., 1998; D’Silva, 2006; Oltenacu & Broom, 2010). For example, selection for high milk yield in dairy cattle has resulted in susceptibility to mastitis, metabolic disorders, and lameness (Rauw et al., 1998; Oltenacu & Broom, 2010). In pig production, selection has been mainly for high growth rate, minimum backfat thickness, low feed conversion and large litter size (Rauw et al., 1998). Examples of the consequences for pigs are morphological and physiological changes resulting in leg disorders (Rauw et al., 1998; Prunier et al., 2010) and greater piglet mortality (Weber et al., 2007; Rutherford et al., 2013).

Intensive livestock production has its own challenges, but extensive production is also associated with welfare issues. For example, malnutrition, parasites, predators, stress due to handling and extreme weather conditions pose threats to the welfare of animals reared in extensive systems (Petherick, 2005; Fraser, 2008).

### **2.7.2 Cattle and pig farms in the EU and Finland**

In 2019, around 22 million dairy cows were reared in the EU (Eurostat, 2020), of which approximately 262,000 were in Finland (OFS, 2019a). The EU produces around 20 per cent of the world’s milk (FAOSTAT, 2020; Eurostat, 2020). European dairy cattle production is characterised by a high milk yield and a high level of specialisation (Sørensen et al., 2006). The number of farms has decreased considerably in recent decades, while herd size has increased at the same time (van Arendonk & Liinamo, 2003); this trend is expected to continue (Sørensen et al., 2006).

In 2019, the EU produced 7.8 million tons of bovine meat (Eurostat, 2020), corresponding to approximately 15 per cent of world production (FAOSTAT, 2020). Finnish beef production was 87 million kg (OFS, 2019b). The main source of beef meat is by-products from dairy cattle (approximately 2/3) and the rest originates from beef suckler herds. Approximately 12 million suckler cows are reared within the EU (Hocquette & Chatellier, 2011), of which approximately 60,000 are in Finland (OFS, 2019a).

The pork production has intensified faster and more efficiently than that of dairy and beef production (Fraser, 2005). Apart from being strongly intensified, the pork production is characterised by a high level of biosecurity and management control (Sørensen et al., 2006), albeit the styles of production vary substantially among the MS (Eurostat, 2018). Pork production is divided into three phases: breeding, nursery, and finishing. These may all take place on the same farm or different, specialised farms. In 2019, nearly 250 million pigs were slaughtered in the EU and approximately 24 million tons of pork was produced (Eurostat, 2020). Finland's share of EU pork production was less than one per cent (171 million kg) (OFS, 2019b). A total of 1.1 million pigs were reared on Finnish farms in 2019 (OFS, 2019a).

### **2.7.3 Viewpoint of farmers on official animal welfare control**

The viewpoints of farmers can be investigated using interviews and questionnaire-based surveys. Anneberg and others (2012), for example, gained information about farmers' experience of animal welfare inspections by interviewing farmers, while Kauppinen and others (2012) applied interviews and a questionnaire to elucidate farmers' views on improving animal welfare. One of the most frequently applied techniques in measuring attitudes in the social sciences include a Likert scale (Croasmun & Ostrom, 2011; Joshi et al., 2015), on which individuals are allowed to express how much they agree or disagree with a particular statement on five- or seven-point scales (Likert, 1932). Attitudinal components can also be assessed using open-ended questions (Haddock & Zanna, 1998). These allow individuals to respond in their own words and, thus, in more detail than if being asked to select the response from a limited number of options. The responses to open-ended questions can be analysed by conventional content analysis, for example, in which individual words and expressions from the response are picked out and common themes or patterns identified (Hsieh & Shannon, 2016).

Studies have shown that farmers generally support animal welfare legislation (Bock & van Huick, 2007; Hubbard, 2007), but are worried about subjectivity in interpreting the legislation (Anneberg et al., 2012) and the possible imbalance between national legislation and legislation elsewhere (Bock & van Huick, 2007). In addition, farmers are concerned about the economic consequences of the standards (Bracke et al., 2005; Bock & van Huick, 2007) and feel insecure because of the multiplicity of standards and regulatory details (Anneberg et al., 2012). Some animal welfare standards, such as a ban on tail-docking of piglets and restriction on tethering calves, have been criticized for being redundant or even harmful to the health of animals (Bock & van Huick, 2007; Hubbard, 2007; Veissier et al., 2021). Since compliance with a rule is usually better when it is known, approved and recognised as legitimate (Uphoff, 2019), providing information on the basis of legislative requirements for farmers is essential (Veissier et al., 2021).

Farmers perceive animal welfare controls as a vital way to discover non-compliant farms (Bracke et al., 2005; Anneberg et al., 2012), while at the same time perceiving them as obtrusive and disturbing (Ådahl, 2007; Anneberg et al. 2012). Sørensen and

Fraser (2010) have emphasised the importance of taking farmers into deliberations on animal welfare questions for them to engage with control schemes better. More research is, however, needed on how the perceptions of farmers about animal welfare control could be improved in practice. Improving the perceptions could achieve better animal welfare outcomes.



### **3 AIMS OF THE STUDY**

This research investigated how official animal welfare control has appeared on Finnish cattle and pig farms since the control system reform. The main research question was whether there are practical opportunities to develop official control. The subject was approached by investigating the viewpoints of official veterinarians and farmers, and by exploring the inspection data and assessing the criminal processing of violations. The specific research goals were

- 1) to examine the experiences of official veterinarians about animal welfare control work and the possibility of improving their job satisfaction (I-IV)
- 2) to investigate the perceptions of farmers about official animal welfare control and identify measures to increase their receptivity to controls (II)
- 3) to explore the most frequently reported non-compliances on cattle and pig farms and identify farm characteristics associated with a higher risk of non-compliance (III, IV)
- 4) to assess the criminal procedure as an element within official animal welfare control and its effectiveness (IV).

## 4 MATERIALS AND METHODS

The research material consisted of surveys of official veterinarians on their experiences of animal welfare control work (I) and of farmers on their perceptions of animal welfare control (II), reports from animal welfare inspections (III), and court decisions regarding animal welfare crimes (IV). The data were primarily analysed by quantitative analysis; however, in Studies I and II qualitative data analysis methods were applied to extend the understanding of specific topics. Table 4 represents the summary of the material and methods applied in Studies I-IV.

**Table 4.** *Overview of material and methods applied in Studies I-IV.*

<b>Study number</b>	<b>Study design</b>	<b>Material</b>	<b>Study period</b>	<b>Methods</b>
I	Questionnaire survey of official veterinarians	73 responses (out of 92)	2017	Quantitative and qualitative analysis
II	Questionnaire survey of cattle and pig farmers	201 responses (out of 500)	2015	Quantitative and qualitative analysis
III	Retrospective study on animal welfare inspections on cattle and pig farms	1908 reports of sampling-based animal welfare inspections	2010-2015	Quantitative analysis
IV	Retrospective study on cattle and pig welfare crimes	196 court decisions	2011-2016	Quantitative analysis

Based on the ethical principles issued by the Finnish Advisory Board on Research Integrity (<http://tenk.fi/en>) no ethical review was required for Studies I-III. These studies were based on public archived data (III) and did not deviate from the principle of informed consent (I, II). Court decisions include sensitive data so an ethical review for the Study IV was applied. The University of Helsinki Ethical Review Board in the Humanities and Social and Behavioural Sciences provided a favourable statement in 2020.

### **4.1 Electronic questionnaire for official veterinarians conducting animal welfare control (I)**

A questionnaire was developed in cooperation with the Finnish Veterinary Association, to examine the working conditions of official veterinarians. All six RSAA were

requested to provide an email address list of official veterinarians currently working in their region, or who had recently done so. The survey was sent to these veterinarians (n = 98) in autumn 2017. A single reminder about responding to the questionnaire was sent before the deadline for reply.

The questionnaire was mainly composed of closed questions with a fixed number of given answer options. Most of the questions also included the ‘Other, please specify’ option and a few were followed by the open-ended question ‘Why?’ (Appendix 1). At the beginning of the questionnaire, the respondents were asked about their work experience, current position, work content and other factors related to their work, such as the number of animal welfare inspections per week and acute welfare cases outside office hours. Moreover, respondents were asked about the application of enforcement measures, the fluency of cooperation with various partners, and their educational needs. They were also asked to assess their job satisfaction, levels of stress and commitment to work, to evaluate the frequency of overtime work, loneliness experienced and sleeping disorders, and whether their work-life balance has been disrupted. The questionnaire included three specified open-ended questions: i) ‘What are the best elements of your work?’, ii) ‘What kind of support do you receive?’ and iii) ‘What kind of support do you wish to receive?’

## **4.2 Electronic questionnaire for farmers (II)**

To acquire information about the perceptions and experiences of farmers about official animal welfare control, a questionnaire (E-lomake, Eduix Oy, Finland) was developed. The survey was conducted in summer 2015. A hyperlink to the inquiry was sent by email to cattle (n = 500) and pig farmers (n = 500) who were randomly selected by the National Land Survey of Finland, with the preconditions of having more than 10 cattle or pigs and an email address. Two reminders about responding to the questionnaire was sent before the hyperlink was closed.

The questionnaire consisted mainly of closed questions, such as five-point Likert scale and multiple-choice questions, which were followed by an open-ended question ‘Why?’ or ‘Other, please specify’. A summary of the questions is provided in Appendix 2. Farmers were asked about their background, opinions on the necessity and sufficiency of official animal welfare control and views on the animal welfare standards. A special section aimed at those respondents who had undergone an animal welfare inspection after 2009 inquired about the type and outcome of the inspection, the personal experiences of the inspection situation and the perceptions of the interplay with a visiting official veterinarian. In addition, the questionnaire included the following two specified open-ended questions i) ‘Would you like to add, change or remove something from the current animal welfare legislation?’ and ii) ‘Would you like to comment on anything else related to animal welfare control?’

### **4.3 Reports from animal welfare inspections (III)**

The National Land Survey of Finland provided the reports from cattle and pig welfare inspections conducted based on sampling in mainland Finland for a six-year period (2010-2015). The reports consisted of basic background information on the inspection and the farm inspected, followed by a checklist composed of 38 items for adult cattle, 39 items for calves (cattle under 6 months of age) and 43 items for pigs (Appendix 3). The items inspected were based on the national animal welfare standards. The visiting official veterinarian had marked the items either as compliant, non-compliant or irrelevant for the farm. The study examined a total of 1908 inspection reports.

### **4.4 Court decisions regarding animal welfare crimes (IV)**

A total of 196 court decisions decided in 2011-2016 were received from the district courts when requested for cattle and pig welfare cases on farms. Each court decision was analysed to determine the type and persistence of violation(s) within a case, the number and species of animals in question, and whether animal welfare inspection(s) and urgent enforcement measures preceded the court hearing. The durations of the stages of the criminal procedure were determined by adopting the dates court had set. Furthermore, information was collected on prosecutors' experience and witnesses, offenders' previous animal welfare convictions (when apparent from the decision), arguments for violations, and penalties.

### **4.5 Statistical analysis (I-IV)**

The Kolmogorov-Smirnov test of normality was applied to indicate whether the data were normally distributed (I-IV). Based on the result, either non-parametric (I-IV) or parametric (II) methods were applied. The 'don't know' responses and responses that could be misinterpreted were excluded from the survey analysis (I, II). Statistical significance was accepted at two-tailed p-values  $< 0.05$ . Statistical analyses of the data were conducted using IBM SPSS Statistics for Windows Version 22.0 (IBM Corp., Armonk, NY, USA) (I-IV).

#### **4.5.1 Responses of official veterinarians (I)**

The responding veterinarians were categorised based on their work history, current position, and whether they worked alone or not. The differences in job satisfaction and levels of stress between the categories created were examined by conducting the Mann-Whitney U-test and the Kruskal-Wallis test for ordinal variables and Fisher's exact test for nominal variables. The Spearman's rank order correlation was applied to examine the strength and direction of the association between the level of stress, job satisfaction, and factors induced by or related to work.

The content of responses to open-ended questions was determined by the conventional content analysis described by Hsieh and Shannon (2016). After reviewing the complete text data, individual words and expressions were picked out and coded. The codes were then sorted into categories based on their relationships and the frequency of the categories was measured (O’Cathain & Thomas, 2004; Vaismoradi et al., 2013; Hsieh & Shannon, 2016).

#### **4.5.2 Responses of farmers (II)**

The responding farmers were categorised according to inspection history following the reform in the control system at the end of 2009 and the significance of the difference between the responses of these groups was analysed with the independent samples *t*-test. The inspected farmers were further categorised based on whether their farm had been inspected with or without prior notice, and whether they had been detected as compliant or non-compliant. The Mann-Whitney U-test was applied to compare the differences in the responses of the categorised farmers.

To explore the perceptions of farmers about the visiting official veterinarian and the inspection circumstances, two sum variables were created by applying farmers’ responses to specific statements on a five-point Likert-scale. The first sum variable consisted of statements on the professionalism and communication skills of the official veterinarian, and the relevance of the actions and observations of the official veterinarian. The second sum variable consisted of statements on the atmosphere during the inspection, the usefulness and necessity of the inspection and whether the inspection was perceived as obtrusive or insulting. The reliability of the sum variables thus created was examined with Cronbach’s Alpha. Spearman’s rank order correlation was applied to evaluate the associations between the sum variables, the farmers’ sense of legal protection, statements related to interaction between a farmer and a visiting official veterinarian, and statements related to the perceived clarity of the administrative procedure.

To extend the information gained through the closed questions, the open-ended questions were analysed by applying content analysis, in which the text data were coded and categorized as explained in Section 4.5.1.

#### **4.5.3 Reports from animal welfare inspections (III)**

The occurrence of non-compliance for each inspected item, i.e., the legislative requirement, was counted by dividing the number of farms not complying with the item with the number for which the item was relevant. To evaluate and compare the occurrence of non-compliance for different farm types, the cattle farms were grouped based on the number of animals (< 50 = small, 50–100 = medium sized, or > 100 = large), production type (dairy cattle, suckler cow herd, or other), rearing type (outdoor or indoor), and housing type (tie-stalls or loose housing). Similarly, the pig farms were grouped based on the number of animals (< 250 = small, 250–750 = medium sized, or > 750 = large) and production type (farrowing, farrow-to-finish, or fattening).

To determine regional differences in compliance rates and, thus, possible differences in enforcing the animal welfare standards, the farms were grouped based on their regional location. One region was excluded from the regional analysis concerning pig farms as only a single pig farm had been inspected in this region during the study period. Moreover, to evaluate the impact of the season on the compliance rates, the inspections were categorised into winter (Dec-Feb), spring (Mar-May), summer (Jun-Aug) and autumn inspections (Sep-Nov), based on the date.

The Kruskal-Wallis test was conducted to determine the differences in the occurrence of non-compliance between cattle and pig farms grouped by size and production type, and to analyse regional and seasonal differences in compliance rates. The groups that the Kruskal-Wallis test indicated to differ statistically significantly were further analysed by the Mann-Whitney U-test with Bonferroni corrections. The Mann-Whitney U-test was also applied to compare the compliance rates of cattle farms with different rearing and housing types.

#### **4.5.4 Court decisions regarding animal welfare crimes (IV)**

The court decisions were grouped by the species and number of animals into cases concerning small (< 50 cattle or < 250 pigs), medium sized (50-100 cattle or 250-750 pigs), or large cattle and pig farms (> 100 cattle or > 750 pigs). The accused individuals were categorised by whether they had denied or confessed the violations.

To compare penalties, only court decisions resulting in conviction for a single animal welfare crime were applied. The penalties for several animal welfare crimes or other crimes other than an animal welfare crime were considered not comparable.

The Kruskal-Wallis test was applied to determine the difference between different farm types in conviction rates. The Mann-Whitney U-test was applied to compare the confession rates for different violations and to analyse differences in the severity of penalties for a violation. The Chi-Square exact test with crosstabs was applied to test the association between different violations, applied enforcement measures, penalties and the types of offence.

## 5 RESULTS

### 5.1. Background information on survey respondents, animal welfare inspections and court decisions (I-IV)

The questionnaire for official veterinarians (I) yielded altogether 73 responses (response rate 74%). All the official veterinarians responding to the survey worked in animal welfare control, but most also had duties related to animal health and disease control (90%; 66/73), and/or by-product control (68%; 50/73). On average, 70% of working time was spent on animal welfare control. Table 5 shows background information on the responding veterinarians and their work.

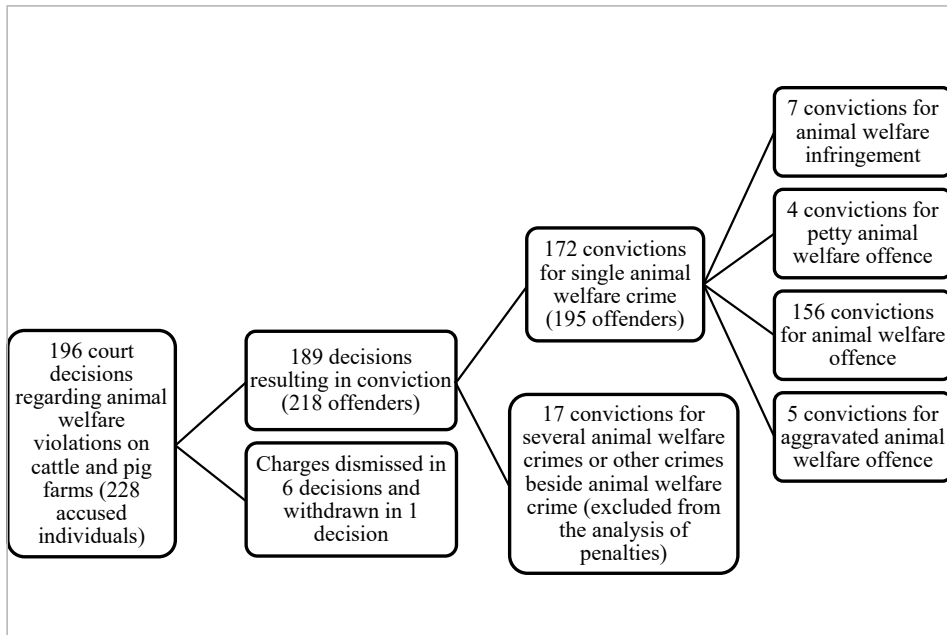
**Table 5.** Background information on the responding Finnish official veterinarians ( $n = 73$ ) working in animal welfare control and on their work (I).

Factors related to official veterinarians and their work	Number of respondents, n (%)	
	Yes	No
≤ 5 years since graduation	30 (41)	43 (59)
≤ 3 years of experience as official veterinarian	37 (51)	36 (49)
Current position at local level	63 (86)	10 (14)
Animal welfare inspections are mostly performed alone	55 (75)	18 (25)
Number of animal welfare inspections performed per week > 5	23 (31)	50 (69)
Acute animal welfare cases outside office hours in past year	29 (40)	43 (60)

Surveys returned from 96 cattle and 101 pig farmers yielded a response rate of 20% in Study II. The responding farmers were from 21 to 65 years of age. The farmers had on median 21 (range 0 to 62) years of previous work experience in farming. The responses covered the regions of all six RSAA and the regional distribution of the responses corresponded moderately well with the distribution of cattle and pig farms in Finland (OFS, 2019a).

During 2010-2015, 1546 cattle farms, of which 1520 had adult cattle and 1345 calves, and 362 pig farms had been inspected based on sampling in mainland Finland (III). The inspections covered approximately 12% (1546/12 869) and 34% (362/1070) of the existing Finnish cattle and pig farms respectively, and their regional distribution corresponded well with the overall distribution of farms in Finland (OFS, 2019a).

District courts had handed down 196 decisions concerning cattle and pig welfare cases during 2011-2016 (IV). Of the decisions, 92% (180) concerned cattle, 5% (10) pigs, and 4% (6) both cattle and pigs. The number of cases ranged from 22-40 per year with a median of 33. Most of the cases resulted in conviction for a single animal welfare crime (Figure 3).



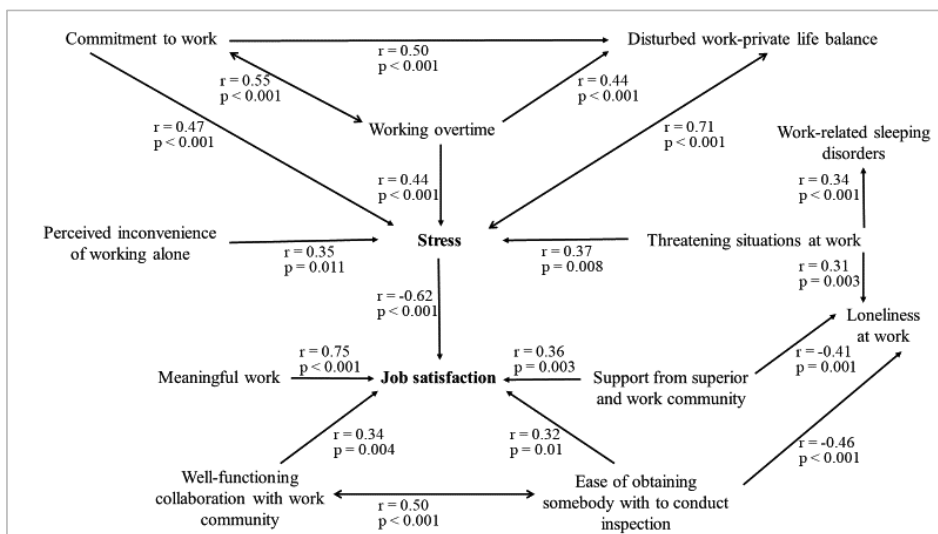
**Figure 3.** Flow chart of court decisions regarding animal welfare violations on cattle and pig farms handed down by Finnish district courts in 2011-2016 (IV).

## 5.2 Factors affecting the well-being of official veterinarians conducting animal welfare control (I-IV)

### 5.2.1 Work-related stress factors (I)

Over half (41/73) of those official veterinarians surveyed reported that they experience work-related stress or fatigue at least weekly. ‘Sometimes’ and ‘rarely or never’ were reported by 37% (27/73) and 11% (8/73) of the veterinarians respectively. No significant differences in the levels of stress were found between the official veterinarians with different lengths of veterinary experience (Mann-Whitney U-test  $p > 0.05$ ), different current positions or whether they worked alone or with a pair (Fisher’s exact test  $p > 0.05$  for both). The high levels of stress were associated with disturbed work-life balance, too much commitment to work, working overtime, threatening situations at work, and with the perceived inconvenience of working alone (Figure 4).





**Figure 4.** Associations between stress, job satisfaction and factors related to or induced by the work of official veterinarians conducting animal welfare control ( $n = 73$ ) (I). Associations between the variables were examined by applying Spearman's rank order correlation.

Work-life balance was perceived to be disturbed 'a lot' or 'somewhat' by 62% (45/73) of the official veterinarians. This disturbance was linked with excessive commitment to work and overtime (Figure 4). Half the veterinarians (53%; 38/72) reported working overtime 'daily' or 'weekly'. Field work, including inspections and sampling, was chosen as the most challenging element of the work by nearly half (30/73) of responding veterinarians. The main arguments for the choice ( $n = 30$ ) were challenges related to working alone, such as work safety issues and communication problems. In addition, in response to an open-ended question concerning the inconvenience of working alone, most of those surveyed (93%; 63/68) indicated that they were concerned about their work safety. Other themes that emerged were concerns regarding sufficient capability to make observations alone and their own legal protection. Of the official veterinarians, 88% (64/73) had encountered threatening situations at work such as death threats, assaults and disturbance of domestic peace in the past year. The threatening situations were mostly settled by 'discussion', 'escaping the situation', or by 'calling the police'. Threatening situations were linked to sleeping disorders and loneliness (Figure 4).

### 5.2.2 Support and further training (I)

Up to 26% (19/73) of the responding veterinarians reported that they 'always' received support from their superior and work community, whereas 'often', 'sometimes' and 'never' were reported by 37% (27/73), 29% (21/73) and 1% (1/73) of the respondents respectively. The support received had a positive impact on the job satisfaction of the official veterinarians (Figure 4). Apart from receiving support from their superior and

work community, the official veterinarians listed the exchange of views with counterparts and guidance from the RSAA as the main forms of support. The most desired forms of the support, on the other hand, were the opportunity to work in pairs, supervision of work, and readily available judicial assistance.

When asked about the application of enforcement measures and educational needs, over 60% (43/69) of the responding veterinarians stated that they ‘can apply enforcement measures well’. Of the official veterinarians, 66% (48/73) wished to apply enforcement measures together with a colleague at least in difficult cases and 22% (15/69) to obtain more training in the application of enforcement measures. Other significant topics for further training were legislative education (chosen by 82% of the official veterinarians), education on animal welfare and husbandry (78%), and training in communicative skills (46%).

### **5.2.3 Collaboration with other authorities (I)**

Two thirds (49/73) of the official veterinarians reported that they ‘always’ or ‘often’ have an opportunity to obtain a co-worker with whom to conduct an inspection, and even more (86%; 61/71) stated that cooperation with the work community functions ‘well’ or ‘very well’, both influencing job satisfaction positively (Figure 4). Still, almost half (45%; 33/73) experienced loneliness at work ‘always’ or ‘often’. Less loneliness was experienced by those who worked mostly in pairs and those who easily obtained somebody with whom to conduct an inspection (Spearman’s rank  $r = 0.36$  and  $r = 0.46$  respectively;  $p = 0.01$  for both). The responding official veterinarians listed a counterpart, an official veterinarian working as a practitioner, the police and a health inspector as the most essential partners in animal welfare control.

A relatively high proportion of official veterinarians’ opinions on how collaboration with prosecutors functions, (27%; 20/73), were ‘don’t know’. Of those veterinarians who evaluated the collaboration, 64% (34/53) perceived it as functioning ‘well’ or ‘very well’. Collaboration with the police was perceived to be functioning ‘well’ or ‘very well’ by 69% (50/72) of the official veterinarians surveyed. The better the collaboration with the police, the more meaningful these veterinarians considered their own work (Spearman’s rank,  $r = 0.31$ ,  $p < 0.02$  for all).

Approximately a third (23/72) of official veterinarians responded ‘don’t know’ when questioned about the functioning of the collaboration with officials for social welfare and health. Of the official veterinarians who evaluated the collaboration, 57% (28/49) saw it as functioning ‘well’ or ‘very well’. Similarly, a little under 40% (28/72) of the official veterinarians reported that they ‘don’t know’ how the collaboration with child welfare inspectors was functioning, while more than half (25/44) of those evaluating it perceived it as functioning ‘well’ or ‘very well’.

### **5.2.4 Challenges in implementing animal welfare standards (I-IV)**

Of the responding official veterinarians (I), 15% (11/73) listed interpretation of legislation as the most challenging part of their work and more than 80% (56/69) of

official veterinarians wished to obtain more training in legislation. Reported non-compliance rates between regions varied significantly (III): the non-compliance rate on cattle farms ranged from 12% (9/73) to 33% (139/420) and on pig farms from 5% (1/19) to 38% (48/127) (Kruskal–Wallis  $p < 0.01$  for both). Dirty, wet and otherwise inadequate lying areas, untreated hooves and overly small individual pens for calves were significantly more frequently reported in some regions (Kruskal–Wallis  $p < 0.01$  for all).

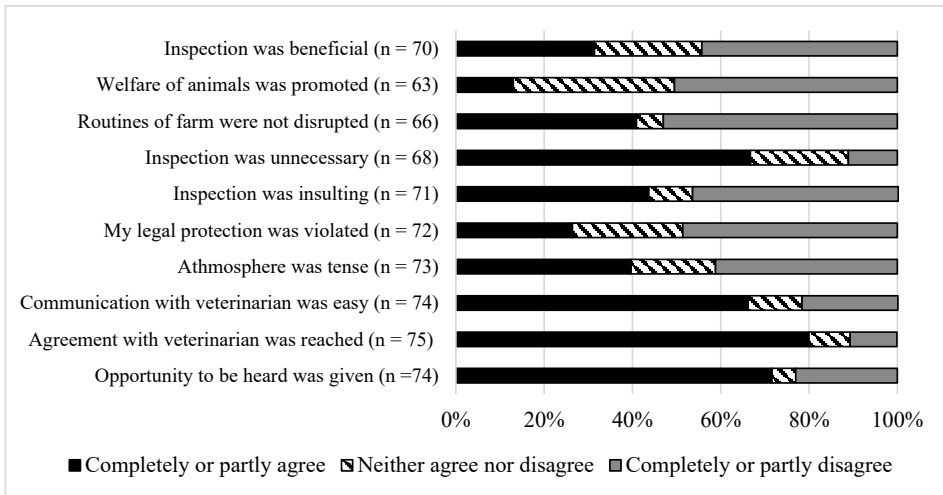
Most (81%; 161/199) of the farmers responding our survey thought that they were sufficiently familiar with animal welfare standards (II). Yet, the content analysis of the responses to the open-ended question ( $n = 95$ ) on animal welfare standards identified concerns related to the impracticality and injustice of the implementation of the standards as the main themes. Less than half (43%; 32/75) of the farmers considered the observations of the visiting veterinarian as appropriate. Furthermore, half (113/218) of the farmers accused of animal welfare crime denied the violations they were accused of, most of which official veterinarians had detected (IV).

### **5.3 Stance of farmers on official animal welfare control (II)**

#### **5.3.1 Perceptions and experiences of farmers about animal welfare controls (II)**

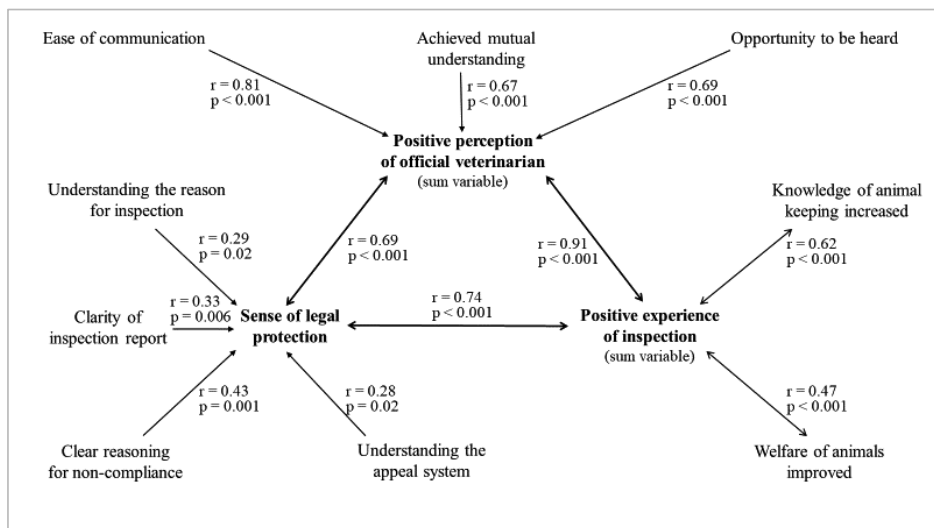
Animal welfare control was perceived as necessary by the majority (72%; 142/198) of farmers responding to the survey, while only 15% (29/198) of them perceived the control as ‘partly’ or ‘completely’ unnecessary. When asked about the sufficiency of animal welfare control in Finland, 91% (175/193) of the farmers stated that the control was sufficient. However, fewer than 50% (98/201) had heard that the control system had been reformed at the end of 2009 and only 37% (75/201) had self-undergone an animal welfare inspection since the reform.

Inspected farmers had rather negative personal experiences of the inspections, although a majority (83%; 62/75) of them had been found compliant. More than half stated that the inspection of their own farm was unnecessary. Further, only a third considered that the inspection was beneficial, and even fewer considered that the inspection promoted the welfare of animals (Figure 5). The inspected farmers were also more pessimistic about the necessity of animal welfare control in general than the non-inspected farmers ( $t$ -test  $p = 0.045$ ).



**Figure 5.** Opinions of farmers about the usefulness and obtrusiveness of animal welfare inspection on their farm and their experience of interaction with a visiting official veterinarian (II).

The majority of the responding farmers agreed that the inspection on their farm had been conducted in agreement, it had been easy to communicate with a visiting official veterinarian, and that they had been given an opportunity to be heard (Figure 5), all of these influencing their attitude towards the official veterinarian positively (Figure 6).



**Figure 6.** Factors influencing farmers' perceptions of a visiting official veterinarian (sum variable), experience of inspection (sum variable) and sense of legal protection (II). Associations were examined by applying Spearman's rank order correlation.

Of the inspected farmers, 86% (62/72) stated that they had been given an explicit reason for the inspection. According to the farmers, the inspections had been conducted based on sampling (36%; 26), suspicion (27%; 20), or control of cross-compliance (13%; 9). For 14% (10/72) of the farmers, the reason for the inspection had remained unclear. Understanding the reason for the inspection was associated with the sense of better legal protection (Figure 6).

In the opinion of 79% (55/70) of the farmers, the inspection report was comprehensible. Less than half (32/70) stated that they are aware of the right of appeal and that they knew how to appeal against the activity of an official veterinarian. The comprehensibility of inspection documents, including appeal instructions, influenced the perceptions of farmers about their legal protection (Figure 6).

Another factor that influenced the farmers' sense of legal protection was notice given prior the inspection. Prior notice had been given to approximately half (37/73) of the farmers. The farmers who had received a prior notice considered less frequently that the inspection violated their legal protection than those who had been inspected without prior notice (9% vs 40%, Mann-Whitney U-test  $p = 0.03$ ). Similarly, the inspection was not perceived as so obtrusive when prior notice had been received (40% vs 63%, Mann-Whitney U-test  $p = 0.02$ ). The prior notice was not related to compliance status (Mann-Whitney U-test  $p = 0.74$ ).

## **5.4 Non-compliances on cattle and pig farms (III, IV)**

### **5.4.1. Occurrence of non-compliance (III, IV)**

Of the cattle farms inspected, 24% (374/1546) were non-compliant with one or more animal welfare standards (III). Wet, dirty or otherwise inadequate lying areas were the most frequently reported non-compliance for adult cattle and the third most common for calves. Other frequently reported non-compliances in cattle farms included lack of cleanliness of premises, inadequate weather protection, incorrect housing of calves, untreated hooves, and insufficient access of tie-stalled dairy cattle to the outdoors in summer (Table 6). Similarly, 28% (101/362) of the pig farms inspected were non-compliant. Insufficiency of enrichment material was reported most frequently, followed by incomplete records of medical treatments, routine cutting or grinding of piglet teeth, and excessive stocking density (Table 6).

**Table 6.** Items for adult cattle, calves and pigs that were most frequently reported as non-compliant on Finnish cattle and pig farms during sampling-based animal welfare inspections in 2010-2015 (III).

Subject	Inspected item	Prevalence of non-compliant farms % (n/N <sup>a</sup> )
Adult cattle	Each animal has a clean and adequate lying area	8.5 (128/1506)
	Animals outside year-round have adequate weather protection	8.1 (24/296)
	Cleanliness of facilities and equipment are adequately taken care of	4.9 (73/1490)
	Hooves are checked frequently enough and treated when necessary	4.5 (66/1467)
	Tie-stalled dairy cows and heifers have access to the outdoors in summer	4.2 (34/810)
Calves	Group boxes for calves are large enough	7.3 (83/1137)
	Calves over 8 weeks of age are kept in a group box	5.9 (67/1136)
	Each animal has a clean and adequate lying area	5.7 (75/1316)
	Cleanliness of facilities and equipment are adequately taken care of	3.6 (47/1306)
	Individual pens for calves are large enough	3.2 (24/750)
Pigs	Pigs have straw or other suitable enrichment material	12.4 (45/362)
	Record of medical treatment is kept	4.8 (17/354)
	Teeth of the piglet are not cut or ground routinely	4.4 (8/182)
	Pigs kept in groups have enough space	4.0 (14/350)
	The boar has enough space	3.7 (7/189)

<sup>a</sup>Number of farms in which the requirement was relevant.

The five most common animal welfare violations reported in court decisions (IV) included lack of cleanliness of premises and animals (85%; 161/189), inadequate feeding (56%; 106), inadequate watering (56%; 105), unsafe premises (47%; 89), and inadequate care for sick or injured animals (43%; 81). The negative welfare outcomes for lack of cleanliness of animals (pain and/or suffering due to manure covering on skin), inadequate feeding (hunger), and inadequate watering (thirst) were emphasised in 23% (37/161), 38% (40/106), and 22% (23/105) of the decisions involving the violation respectively (IV).

#### 5.4.2. Characteristics of farms at higher risk of non-compliance (III, IV)

The occurrence of non-compliance was higher in small cattle farms than large farms (Table 7). Untreated hooves (7.6% vs 2.7% vs 2.9%), overaged calves kept in individual pens (11.2% vs 6.5% vs 1.6%), and tie-stalled calves (5.4% vs 0.9% vs 0.2%) were reported more frequently on small cattle farms than medium sized or large farms (Kruskal-Wallis test  $p < 0.05$  for all). Of the court decisions regarding cattle welfare cases (IV), 61% (79/130) concerned small farms, while the prevalence of medium sized and large farms was 21% (27) and 18% (24) respectively (Kruskal-Wallis test  $p = 0.006$ ).

**Table 7.** Occurrence of non-compliance with animal welfare standards on different types of Finnish cattle and pig farms inspected based on sampling in 2010-2015 (III).

Group	Farm characteristic	Cattle farms, n (%)		Pig farms, n (%)	
		Total	Non-compliant	Total	Non-compliant
Herd size	Small	542 (35)	150 (28) <sup>A</sup>	117 (32)	38 (32)
	Medium	494 (32)	123 (25) <sup>AB</sup>	154 (43)	34 (22)
	Large	510 (33)	101 (20) <sup>B</sup>	91 (25)	29 (32)
Production type	Dairy cattle	939 (61)	241 (26)	N/A <sup>a</sup>	N/A
	Suckler cow herd	263 (17)	57 (22)	N/A	N/A
	Other cattle	344 (22)	76 (22)	N/A	N/A
	Farrow-to-finish unit	N/A	N/A	169 (37)	59 (35) <sup>A</sup>
	Farrowing unit	N/A	N/A	69 (19)	14 (20) <sup>B</sup>
	Fattening unit	N/A	N/A	124 (34)	28 (23) <sup>B</sup>
Housing type	Tie-stall	1065 (69)	290 (27) <sup>A</sup>	N/A	N/A
	Loose	481 (31)	84 (17) <sup>B</sup>	N/A	N/A
Rearing type	Indoor	1251 (81)	287 (23) <sup>A</sup>	N/A	N/A
	Outdoor	295 (19)	87 (30) <sup>B</sup>	N/A	N/A

<sup>A, B</sup> Different capital letters indicate a significant difference between different farm types in the group (Mann-Whitney U test  $p < 0.05$ ). <sup>a</sup> Not applicable.

As Table 7 shows, tie-stall housing of cattle was linked to a higher occurrence of non-compliance than loose-housing. Non-compliance related to the housing of calves, such as excessive stocking density in calf group boxes (8.7% vs 3.5%), overaged calves in individual pens (7.7% vs 0.4%) and calves on wet, dirty or otherwise inadequate lying areas (6.3% vs 4.1%), was more frequently reported on farms with tie-stalls than on farms with a loose housing system (Mann-Whitney U test  $p < 0.02$  for all).

Farms that reared cattle at least partly outdoors year-round were more frequently reported as non-compliant than farms with indoor rearing (Table 7). Farms with outdoor rearing had more problems with lying areas (13.1% vs 7.4%), cleanliness of premises (9.2% vs 3.7%), weather protection (7.1% vs 0.6%), safety of premises (5.4% vs 1.0%), and cleanliness of water and/or feed (5.8% vs 0.7%) than farms with indoor rearing (Mann-Whitney U test  $p < 0.01$  for all).

Regarding pigs, a higher occurrence of non-compliance was reported on small and large farms compared to medium sized farms (Table 7); however, the difference was insignificant (Kruskal-Wallis test  $p = 0.105$ ). Of the court decisions on pig welfare cases (IV), 80% (8/10) concerned small farms, while only one decision concerned medium sized and one decision large farms; however, this difference was also insignificant (Kruskal-Wallis test  $p = 0.086$ ). Farms with a farrow-to-finish unit, on the other hand, were significantly more frequently reported as non-compliant than farms with a farrowing unit or a finishing unit (Table 7).

### 5.4.3. Seasonal influence on non-compliance (III, IV)

The majority (78%; 1485/1908) of the animal welfare inspections had been conducted during summer and autumn (III). Cattle farms were reported as non-compliant most frequently in winter and autumn inspections, while the highest prevalence of non-compliant pig farms was reported in summer inspections. The difference in compliance rates of cattle farms between the seasons was significant (Kruskal-Wallis test  $p = 0.002$ , Table 8). Furthermore, a third (62/189) of animal welfare cases that resulted in conviction in court had begun in winter, whereas least cases (13%; 24/189) had begun in summer (IV).

**Table 8.** Seasonal distribution of sampling-based animal welfare inspections on Finnish cattle and pig farms in 2010-2015 and the prevalence of non-compliant farms per season (III).

Farm type	Season	Share of inspections % (n/N)	Prevalence of non-compliant farms % (n/N)
Cattle	Winter	8 (119/1546)	29 (34/119)
	Spring	14 (215/1546)	21 (46/215)
	Summer	40 (625/1546)	21 (133/625)
	Autumn	38 (587/1546)	27 (161/587)
Pigs	Winter	12 (43/362)	26 (11/43)
	Spring	13 (46/362)	20 (9/46)
	Summer	33 (120/362)	33 (39/120)
	Autumn	42 (153/362)	27 (42/153)

On cattle farms (III), the insufficiency of water was more frequently reported in the winter inspections than the summer inspections (7.0% vs 1.1, Mann–Whitney U test  $p < 0.01$ ). The occurrence of wet, dirty or otherwise inadequate lying areas (11.5% vs 6.5%) and inadequate weather protection (4.3% vs. 1.1%) was greater in the autumn inspections than the summer inspections (Mann–Whitney U test  $p < 0.01$  for both) and the occurrence of inadequate ground of outdoor area was greater in the autumn inspections than the spring inspections (6.7% vs. 0.0%,  $p = 0.008$ ).



## **5.5 Criminal procedure relating to animal welfare violations (IV)**

### **5.5.1 Progress of criminal procedure (IV)**

Animal welfare violations had lasted a median 7 months before a person was convicted of an animal welfare crime, and in the worst case four years. The majority (98%; 192/196) of the violations were reported to the police by an official veterinarian. Further, official veterinarians had conducted a median 4 (range 1-17) animal welfare inspections before a case proceeded in the criminal courts. Urgent measures antedated the court hearing in almost a third (54/196) of cases.

The animal welfare cases were prosecuted by 102 prosecutors, of whom only a third (34/102) were engaged in more than two cases during the six-year study period. The prosecutors demanded a ban on animal keeping in 70% (137/196) of the cases and employed official veterinarians as witnesses in 82% (160/196) of the cases.

The median time span from the last animal welfare inspection to the initiation of court proceedings was 10 (range 0-51) months and the median time spent in a court 86 (range 14-494) days. The median for the total time from the beginning of an offence to a conviction was 22 (range 3.5-98) months.

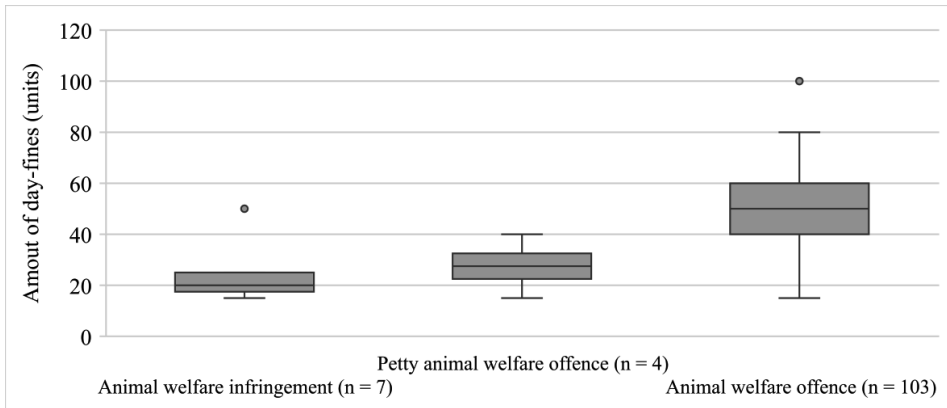
### **5.5.2 Arguments for animal welfare violations (IV)**

Half (101/196) of the farmers accused of animal welfare crime gave one or more arguments for the violations, mostly related to the farmer's own health issues (56%), economic difficulties (16%), and an excessive number of animals (16%).

### **5.5.3 Penalties for animal welfare crimes (IV)**

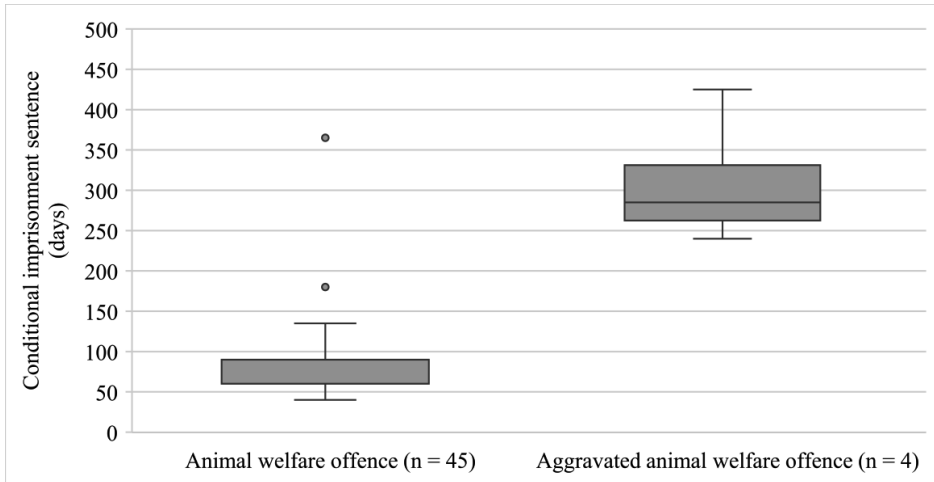
Most of the animal welfare crimes were convicted as an animal welfare offence (91%; 156/172) (Figure 3). Only 5 cases were convicted as aggravated; however, this type of offence was a bit more likely if animal feeding had been neglected (5% vs. 0%,  $\chi^2$ -test  $p = 0.04$ ) or if urgent measures had been executed (10% vs. 0%,  $p = 0.003$ ).

A fine was the commonest form of penalty, an offender(s) being fined in 66% (114/172) of the cases. The median number of day-fines was 20 for an animal welfare infringement, 28 for a petty animal welfare offence and 50 for an animal welfare offence (Figure 7). The median number of day-fines was higher if feeding had been neglected (50 [15-100] vs. 40 [20-100], Mann-Whitney U-test  $p = 0.03$ ) or if urgent measures had been executed (50 [25-100] vs. 40 [15-100],  $p = 0.004$ ).



**Figure 7.** Median (range) number of day-fines imposed by Finnish district courts in 2011-2016 for different types of animal welfare crimes concerning cattle and pig welfare violations (IV).

The second commonest form of penalty was a conditional imprisonment (28%; 49/172). An offender was more likely to be sentenced to imprisonment if they had a previous animal welfare conviction (69% vs. 26%,  $\chi^2$ -test  $p = 0.001$ ), had neglected feeding (46% vs. 13%,  $p < 0.001$ ) or watering (41% vs. 16%,  $p = 0.006$ ), and if urgent measures had been executed (53% vs. 20%,  $p < 0.001$ ). The median period for the conditional imprisonment was 90 days for the animal welfare offence and 285 for the aggravated animal welfare offence (Figure 8). The median length of imprisonment was longer if watering had been neglected (90 [50-425] vs. 60 [40-120], Mann-Whitney U-test  $p = 0.04$ ), dead animals had been found (105 [60-425] vs. 60 [40-270],  $p = 0.005$ ), or urgent measures had been executed (90 [50-425] vs. 60 [40-120],  $p = 0.02$ ). An ancillary fine, median 40 (range 35–60) day-fines, was included in one in ten (5/49) of conditional imprisonment penalties.



**Figure 8.** Median (range) length of a conditional imprisonment (days) imposed by Finnish district courts in 2011-2016 for animal welfare offences and aggravated animal welfare offences concerning cattle and pig welfare violations (IV).

The rarest form of penalty was an unconditional imprisonment (3%; 5/172), the median length of which was 140 (120-180) days for animal welfare offence (n = 4) and 120 days for an aggravated animal welfare offence (n = 1). Moreover, 3% (5/172) of the cases resulted in conviction without penalty. Reasons for impunity were the poor health of an offender, the death of a spouse who had been in charge on a farm, and the efforts of an offender to improve the situation on a farm.

A ban on animal keeping was imposed in 48% (82/172) of the cases. The ban was imposed in 74% (22/30) of the cases involving dead animals due to negligence and in 67% (35/52) of the cases where urgent measures had been executed, whereas without dead animals or urgent measures a significantly smaller proportion of cases resulted in a ban (42% and 40% respectively,  $\chi^2$  -test,  $p < 0.02$  for both). The majority (94%; 77/82) of the bans were imposed for a fixed period, while the rest were permanent (6%; 5/82). The median length of a temporary ban was 5 (range 1-15) years in the animal welfare offences (n = 73) and 5 (range 5-6) years in the aggravated animal welfare offences (n = 4). Of the bans, 35% (29/82) applied only to cattle or pigs, while 29% (24) and 21% (17) of the bans applied to all farm animals or all animals respectively. A forfeiture was included in 54% (44/82) of the bans: in 11 cases the animals were forfeited to the state directly, and in 33 cases, the owners were offered the opportunity to sell animals before the forfeiture. The remaining bans lacked any mention of forfeiture.

## 6 DISCUSSION

### 6.1 Official animal welfare control in practice

Our results showed that one in four Finnish cattle and pig farms inspected based on sampling was found to be non-compliant during the study period. Recent reports by the Finnish Food Authority (2019; 2020a) have pointed out that non-compliance rates are even higher when suspicion motivates inspection. The most frequent non-compliances on Finnish farms included inadequate lying areas and weather protection for cattle, deficient housing conditions for calves, and insufficient provision of enrichment material for pigs. These deficiencies directly affect the welfare of animals and require prompt intervention. Further, results emphasize that official animal welfare control is fundamental to ensuring that no unnecessary pain, suffering, or injury is inflicted on the animals.

The farmers surveyed acknowledged the need for animal welfare control. They had difficulty, however, in recognising the benefits of a control visit for their own farm. A disparity in the interpretation of legislation between farmers and official veterinarians was apparent. Veissier and others (2021) have argued that requirements are more likely perceived negatively when farmers know them only through official controls. Farmers should be provided with comprehensive information on requirements, and especially their interpretation. Moreover, highlighting the importance of the requirement for the welfare of animals could perhaps motivate farmers to comply more (Veissier et al., 2021).

One of the aims of the control system reform in 2009 was to increase control resources (Aho et al., 2007; Nurminen, 2014). Our results indicate that the resources are still somewhat inadequate. Official veterinarians reported working overtime frequently and having an excessive work commitment, and control work seemed to burden them unduly. Official veterinarians' intervention in non-compliances were found at times to be inefficient although self-interest is no longer involved. Our study showed that cattle and pig welfare violations heard in the court had continued for a median of seven months, ranging from one day to four years. Repetitive follow-up animal welfare inspections without permanent compliance frequently antedated the court session. Similar inefficiency in animal welfare control was found by Wahlberg (2010) and Koskela (2013). Inefficient control is problematic and needs to be further addressed. The continuance of violations most likely affects the welfare of animals on the farm adversely and diminishes the confidence of citizens in animal welfare control. Additionally, inequality among farmers ensues from someone continuing illegal actions over a long period and prolonged cases create plenty of work for already over-stretched official veterinarians.

Official animal welfare control is a permanent part of Finnish animal farming. Although the number of farms has significantly decreased since the 1960s (Hassinen, 1980; Niemi & Väre, 2018), it is impossible to control everything. The probability of being inspected should be maximised for its possible deterrent effect (Eckert, 2004; Rousseau, 2007), emphasising the risk-based approach (Hultgren, 2009; Blanc, 2013; OECD, 2014). Our results show that there are several other practical ways to develop official control.

## **6.2 Prerequisites for official veterinarians to work efficiently**

### **6.2.1 Opportunity to work in pairs**

Three quarters of the responding official veterinarians worked, for the most part, alone and nearly all experienced loneliness at work at least at times. Since the main underlying causes of the stress, namely high workload, the inconvenience of working alone and work safety issues, were closely associated with lone working, the single most effective measure to reduce the stress and, hence, improve the job satisfaction of official veterinarians would be an opportunity for them to work in pairs. Many responding veterinarians also explicitly hoped for a colleague as a provider of support, especially when applying enforcement measures in challenging animal welfare cases. This confirms the finding of Anneberg and others (2013), who report that the opportunity to meet and interact with colleagues is favoured by animal welfare inspectors. Peer support has been argued to form an integral factor for the psychological well-being of veterinarians (Moir & Van den Brink, 2020).

Pair-working could improve the efficiency and quality of animal welfare control. Firstly, more courageous application of enforcement measures is likely when the burden of making difficult decisions, such as having negative economic consequences for the farmer or killing animals, is shared, and less hostility is directed at a single veterinarian. Secondly, inspection observations would be more accurate and less subjective, and the quality and clarity of inspection documents improved while inspection notes are more complete, and papers are reviewed by two people. This would improve the legal protection of farmers. Thirdly, a smoother interaction is probably achieved when one veterinarian can concentrate on a conversation with a farmer and the other observes and takes notes. Farmers who responded to our survey significantly valued ease of interaction. Better opportunities to achieve compliance offer official veterinarians meaningful experiences, which can enhance their motivation and job engagement (Fairlie, 2011).

There are, however, possible drawbacks to working in pairs. Farmers may perceive this set up as ‘two against one’ and, hence, unfair and menacing. In addition, working in pairs also includes a financial question. More information on the benefits and long-term economic effects of working in pairs would help us to establish a greater degree of understanding on this matter.

### **6.2.2 Supervisor support and collaboration with other officials**

Support from the supervisor and work community turned out to be a significant part of the job satisfaction of official veterinarians. Our result is consistent with other studies (Babin & Boles, 1996; Brough & Pears, 2004; McCalister et al., 2006; Hon, 2013), which identified the potentially positive effect of support from the supervisor on job satisfaction and stress. Over half of the responding veterinarians considered they were receiving support from their supervisor and co-workers at least frequently. Most of the respondents described their relationship with them as functioning well. Supervisors should ensure that official veterinarians are not left alone and without support but are included in the work community, as isolation creates the risk of poor psychological well-being (Lambert et al., 2013). Another significant point is that almost half of the responding veterinarians had five or fewer years since graduation, which involves a higher risk for psychological distress and depression (Gardner & Hini, 2006; Shirangi et al., 2018; Volk et al., 2018). The difference between genders was not analysed, as male official veterinarians are a minority and could thus be identifiable. It is known from previous studies (Hatch et al., 2011; Shirangi et al., 2018) that female veterinarians are more prone to mental strain and stress than their male counterparts. Consequently, it is of the utmost importance that official veterinarians receive sufficient support and adequate orientation to their work.

Almost all official veterinarians surveyed reported that they had encountered threatening situations at work, indicating that the enforcement of animal welfare standards may culminate in such an outcome. Although most of the threatening situations reported were managed through discussion, effective collaboration with the police is crucial to ensure safe inspections on the premises of a threatening person. Collaboration is also required for the criminal procedure regarding animal welfare cases to proceed. If nationwide distribution of police units specialized in animal welfare crimes was established as suggested by Koskela (2015) and Lahtinen (2020), the police could create more uniform procedural routines for collaboration with official veterinarians, and for conducting criminal investigations regarding animal welfare cases.

Severe farm animal welfare problems were frequently linked with farmers' other problems such as health and financial issues. This finding is consistent with the literature (Kelly et al., 2011; Andrade & Anneberg, 2013; Devitt et al., 2015). Veterinarians may possess inadequate professional qualifications to deal with farmers who are having other related problems. Veterinarians would, therefore, benefit from working in close connection with social welfare and health officials (Devitt et al., 2015). These officials could help farmers with the underlying causes behind the animal welfare problems and thus official veterinarians would be better placed to achieve compliance on farms. However, in our study around 30% of the responding veterinarians were unable to assess their collaboration with officials for social welfare and health, and child welfare inspectors, probably indicating lack of collaboration. The confidentiality restricts the opportunity for social welfare and health and child protection officials to report on

animal welfare problems they have observed. Devitt and others (2013) have also argued that inadequate guidelines for providing advice and cross-reporting, as well as confidentiality concerns may explain the lack of collaboration between veterinarians and other officials. The collaboration between official veterinarians and social welfare and health officials requires more consideration in Finland. Overall, our study strengthens the idea of a multidisciplinary approach to animal welfare cases (Devitt et al., 2013; Pinillos et al., 2016).

### **6.2.3 Training and uniform rules for implementation**

The official veterinarians requested more education on legislation, legal advice and support in making administrative decisions, indicating that they may be unsure of applying enforcement measures correctly. This study excluded evaluation of the lawfulness of administrative actions; however, previous studies have identified deficiencies in administrative formalities regarding animal welfare control procedures (Wahlberg, 2010; Koskela, 2013). Official veterinarians should have judicial assistance available when needed, to ensure adherence to the administrative formalities and to avoid the invalidation of an enforcement decision in the appellate courts. Official veterinarians could also benefit from practical training in administrative law. For example, a broader perspective on the clarity and lawfulness of their own inspection documents could be achieved through peer reviewing.

Quite contrary to Irish governmental veterinarians who did not want to receive more training to deal with farmers in complex animal welfare cases (Devitt et al., 2014), Finnish official veterinarians listed these skills as one of their most significant educational needs. They also stated that communication problems are linked to perceiving fieldwork as the most challenging part of their work. Chin (2016) argued that poor communication and deficient interpersonal skills are more likely to result in complaints against veterinarians. Other studies have shown that the way a veterinarian interacts with clients in veterinary practice is linked with adherence to the recommendations made (Abood, 2007; Kanji et al., 2012; Bard et al., 2017). Taken together, veterinarians having adequate competence in communication skills, among other qualifications, should be ensured when they are employed for control work. In addition, all official veterinarians would benefit from training in communication skills.

Various results in our study highlight the need to create uniform guidelines for ambiguous animal welfare standards. Examples of ambiguous expressions which frequently crop up in Finnish animal welfare legislation include 'sufficient', 'suitable' and 'appropriate'. These expressions permit flexibility in the implementation, but interpretations may vary more than with precise, measurable engineering standards. Ambiguous standards make animal welfare control more challenging (Rushen et al., 2011) and increase the risk of diverging views on interpreting and implementing standards in practice (Schindler, 2013; Viksten et al., 2016; Lundmark Hedman et al., 2021). The degree of difference in the reported non-compliance rates between regions may indicate that standards are implemented differently by Finnish official

veterinarians. Our results are in line with those of previous studies which found subjectivity among French (Lomelline-Dereclenne et al., 2017; Veissier et al., 2021) and Swedish animal welfare inspectors (Lundmark Hedman et al., 2021). The subjectivity in assessing animal welfare is no surprise, however, taking into consideration the multidimensional nature of the term (Fraser, 2009).

Variation in the interpretation of animal welfare standards was observed also between official veterinarians and farmers. Less than half of the farmers inspected concurred with official veterinarians' inspection observations and half the individuals accused of animal welfare violations rejected the accusations. This discrepancy may be due to different opinions on animal welfare in general (Hewson, 2003). Farmers' understanding of animal welfare is affected not only by legislation but also by their values (Vapnek & Chapman, 2010) and experience with animals (Boogaard et al., 2006; Kendall et al., 2006). The prevailing perception of the responding farmers about having sufficient knowledge of animal welfare standards indicate that farmers are self-confident in implementing the standards, whereas, without uniform guidelines, official veterinarians form their own way to enforce the standards (Mullan et al., 2011). Divergent views on the implementation of the animal welfare standards can result in the continuation of violations as farmers resist more if they disagree with an interpretation (Anneberg et al., 2012).

The current guidelines for animal welfare standards provided by the Finnish Food Authority (2020b) appear to be at least partly inadequate. Uniform guidelines for ambiguous standards would be beneficial for the efficacy and consistency of the official animal welfare control and thus the current guidelines should be developed. To engage farmers with the guidelines, they should be included in deliberation on the borderline between acceptable and nonacceptable (Sørensen & Fraser, 2010; Veissier et al., 2021).

### **6.3 Better targeting of control resources**

One approach to tackling inadequate control resources is to target controls more accurately (Hultgren, 2009; Blanc, 2013; OECD, 2014), i.e., at animal premises which have a higher risk of non-compliance. Targeting is also crucial as only a minority of farms are inspected each year (Finnish Food Authority, 2020a) and, consequently, several years may pass before the farm is inspected. For example, less than 40% of the farmers responding to our survey had undergone an animal welfare inspection in the previous seven years.

A risk-based approach to animal welfare controls has been applied in Finland since 2008 (Evira, 2013). Despite this, 75% of the sampling-based inspections were conducted on compliant farms during the study period, imposing a concomitant administrative burden on official veterinarians and farmers. Furthermore, a notable disparity in compliance rates between Finland and, for example, France appears (75% vs 60%) (Lomellini-Dereclenne et al., 2017). Although this discrepancy could be attributed to



differences in legislation and control methods, poorer risk analysis may be another reason for the relatively high compliance rate in Finland. To assess the accuracy of the Finnish risk analysis, the non-compliance rates of farms chosen randomly and on a risk basis should be compared (Hultgren, 2009; DG SANTE, 2019). The Finnish Food Authority has followed the recommendations given by DG SANTE and begun to conduct statistical comparisons in 2019 (Finnish Food Authority, 2020a).

Our study revealed that non-compliance is more likely on small cattle farms than on larger farms. This outcome is contrary to that of previous studies (Andrade & Anneberg, 2014; Otten et al., 2014; Lundmark Hedman et al., 2018), which found no consistent relationship with farm size and animal welfare violations. However, some evidence suggests that smaller farms may be at greater risk (Hess et al., 2014). The number of small cattle farms inspected was minor in relation to the total number of farms of this size in Finland (OSF, 2019a), although our finding would suggest targeting inspections of farms of this size.

A significant seasonal distribution of sampling-based inspections was found. Only a quarter of inspections had been conducted during winter and spring. Another important finding was that the reported non-compliance rate on cattle farms was significantly higher during winter. Likewise, a third of animal welfare cases that proceeded to court had begun in that season. These results are consistent with those from Sweden (Lundmark Hedman et al., 2018). Although our findings suggest that the occurrence of non-compliance at Finnish cattle farms is higher during wintertime, this data must be interpreted with caution because the number of winter inspections was very low.

Our study confirmed that inspection data can be adopted to identify farm characteristics associated with a higher risk of non-compliance. This is in accordance with previous studies (Hitchens et al., 2017; Lundmark Hedman et al., 2018). In our investigation, besides small herd size, tie-stall housing and outdoor rearing were found to be cattle farm characteristics associated with a greater occurrence of non-compliance. Similarly, pig farms with a farrow-to-finish unit had more non-compliance. Inspections should be targeted at farms with these characteristics and the timing should be carefully considered. We recommend that the Finnish Food Authority press for constant and thorough analysis of the inspection data in operations so that more factors affecting compliance could be identified and thus more accurate targeting of inspections achieved.

## **6.4 Demand for more efficient criminal procedure**

The minor number of animal welfare cases heard in court together with the low prevalence of acquittals and a relatively high number of bans imposed on animal keeping probably indicate that only severe cases proceed in the criminal procedure. Furthermore, penalties for animal welfare crimes were surprisingly lenient considering that the cases were relatively severe. This result is parallel with previous studies on animal welfare

crimes in the USA, Finland and South Australia (Luke & Arluke, 1997; Koskela-Laine, 2012; Morton et al., 2018).

It is of concern if animal welfare cases remain unreported to the police and/or cases are dismissed without proper arguments; this obstructs the formation of case law and uniform conventions on penalties, leading to diminished efficacy of standards (Lepistö, 2008). Veterinarians may trust that there will be improvements following their intervention and therefore delay making investigation requests to the police. On the other hand, police officers may interrupt a preliminary investigation, or a prosecutor waive prosecution if they perceive a case as too minor or evidence as deficient.

Our results indicated that, since official veterinarians play a key role in initiating the criminal procedure, they should invest in writing investigation requests. Early initiation of the criminal procedure is essential, especially in severe cases and when compliance is not achieved on a quick schedule with enforcement measures. In addition, official veterinarians should focus on providing sufficient evidence of the violations so that the police have an adequate starting point at the outset and continue the criminal investigation. Since official veterinarians have an integral part in assisting the police in animal specific crimes, it is of great importance that the competence of veterinarians in identifying, collecting, and preserving evidence be strengthened (Touroo & Fitch, 2016).

Our study indicated that harsher penalties are imposed when the welfare outcomes of violations are pronounced. Since the police, prosecutors and judges may possess little or no knowledge of animal welfare, the expertise of official veterinarians on animal welfare should be more strongly emphasised. Official veterinarians should routinely evaluate the nature and seriousness of the welfare outcomes in animal welfare cases (Benetato et al., 2011; Arkow, 2015; Ledger & Mellor, 2018). Ledger and Mellor (2018) have compiled negative welfare outcomes relating to animal nutrition, environment, health and behaviour into a 'Five Domains model'. By encouraging official veterinarians to apply the model, more consistent assessment and grading of animal welfare outcomes could be achieved. Animal welfare cases could also be centred on particular prosecutors and judges to ensure sufficient knowledge of animal welfare matters (Koskela, 2015). In our study, two-thirds of the prosecutors had been involved only in one or two cases. Minor experience in animal welfare cases may cause insecurity among prosecutors which, in turn, may result in slowness and a lenient penal order.

## **6.5 Towards a more interactive approach during control visits**

Easy interaction with a visiting official veterinarian emerged as a significant factor in positively affecting the perceptions of farmers about animal welfare controls. A positive attitude towards the official animal welfare control is probably linked to better receptivity to advice and required actions and, hence, better animal welfare at the farm. The farmers valued a collaborative and interactive approach during the control visit. A responsive, negotiative and educative approach has also previously been identified as

encouraging inspectees to achieve and maintain compliance (Fairman & Yapp 2005; Lääkkö-Roto & Nevas, 2014; OECD, 2014). A certain level of formality should, however, be maintained (Winter & May, 2001). The flexibility of an inspector may contribute to inconsistency, leading to weakened understanding of standards or to the manipulation of an inspector, both resulting in diminished compliance (May & Wood, 2003).

Farmers' knowledge of the administrative procedure was another noteworthy factor affecting their attitude towards animal welfare controls. If the farmer considered that a reason for the inspection, the contents of the inspection documents, and/or the appeal process were unclear, they were more likely to see the inspection as violating their legal protection and see the control visit adversely. Veterinarians should explain the reason for the inspection, the inspection outcome and required actions explicitly, both directly in the concluding discussion and in writing. One way to support farmers' understanding of the severity of the matter is to adopt a severity scale for animal welfare control, meaning that official veterinarians would rank farms based on the inspection outcome. For example, inspected French farms are categorised into compliant, slightly non-compliant, moderately non-compliant, or severely non-compliant by an animal welfare inspector (Lomellini-Dereclenne et al., 2017).

A more positive perception among farmers about animal welfare controls was observable when inspections had been agreed on beforehand. However, EC Regulation 2017/625 requires that '*official controls shall be performed without prior notice, except where such notice is necessary and duly justified for the official control to be carried out.*' Unfounded deviation from this demand puts farmers at a disadvantage as the prior notice may influence the inspection outcome (Hitchens et al., 2017; Makofske, 2018). Based on our study, prior notice is frequently given to Finnish farmers. A need for national agreement on criteria for giving prior notice arose. In any case, giving prior notice routinely is impracticable as a way of improving the perceptions of farmers about animal welfare controls.

## **6.6 Limitations**

There are two major limitations in this study that could be addressed in future research. First, the farmers' questionnaire produced a low return rate (20%), causing possible sample bias. Although the age and geographical distribution of the responding farmers corresponded moderately well with the whole population of Finnish farmers, it is not possible to generalize the results with certainty to all Finnish farmers. For some parts, the sample size (i.e., only 75 farmers had undergone an animal welfare inspection) was too small for statistical measurements. Secondly, we acknowledged that other methods such as focus groups or semi-structured interviews could have been used in combination with the surveys to gain a deeper understanding of the perspectives of farmers and official veterinarians. However, the aim of the surveys was to investigate generalized

factors and, hopefully, establish a basis for further research. Notwithstanding the limited methodology, this work offers insights into the viewpoints of farmers and official veterinarians about official animal welfare control and the elements that emerged to be developed were by nature worthy of attention in any case.

## 7 CONCLUSIONS

Non-compliances directly affecting the welfare of animals and requiring prompt intervention occur on Finnish cattle and pig farms. Official control burdens both official veterinarians and farmers and hence needs to be developed. The results of this thesis identified several practical ways to develop this control.

- 1) A high workload and challenges related to working alone cause stress for official veterinarians conducting animal welfare control. Stress, in turn, impairs their job satisfaction and strains their private lives. Job satisfaction can be improved by ensuring that official veterinarians are strongly supported by a supervisor, are included in a work community, and work in close collaboration with the police and social welfare and health officials. Official veterinarians would also be more satisfied with their work if they worked in pairs, which would enable more efficient application of enforcement measures, more accurate observations during an inspection, and better interaction with a farmer. Uniform rules of interpretation for ambiguous animal welfare standards would reduce conflicts between official veterinarians and farmers and ensure more consistent control.
- 2) Farmers approve of animal welfare inspections in general, but they experience inspections on their own farms negatively. Farmers appreciate dialogic and collaborative approaches during the inspection. Hence, it is of the utmost importance that official veterinarians possess excellent communication skills and the capacity to listen to the opinions of farmers. However, official veterinarians are required to apply appropriate enforcement measures to secure the rectification of non-compliance, even where compromising the interaction with a farmer. Official veterinarians should focus on the comprehensibility of inspection documents; they must follow the administrative formalities and ensure that the documents are understandable to farmers. The inadequate reasoning for required corrections and lack of appeal directions imperil the legal protection of farmers.
- 3) Finnish cattle and pig farms fail at times to comply with animal welfare standards. The most frequently reported non-compliances on cattle farms include wet and dirty lying areas, inadequate weather protection, and deficient housing conditions for calves, and on pig farms the insufficiency of enrichment material, incomplete records of medical treatments and the routine manipulation of piglet teeth. Our analysis of inspection data indicated that a greater occurrence of non-compliance is recognised on cattle farms of small herd sizes, tie-stall housing, or outdoor rearing, and on pig farms with farrow-to-finish units. The more factors affecting compliance are identified, the more precisely inspections can be targeted, and the earlier and more efficiently non-compliant farms be discovered.
- 4) Only rarely do animal welfare cases end up in court, typically the most severe ones. Most offenders are found guilty; however, the sanctioning of animal welfare crimes

seems lenient and illogical. Actual penalties are from the lower end of penal scale, yet a ban on animal keeping is frequently imposed. To enhance the efficacy of criminal procedure, official veterinarians should focus on the quality of requests for criminal investigation and the sufficiency of evidence. The official veterinarians' role as an expert in the criminal procedure should be strengthened, albeit the police and prosecutors should also have basic knowledge of animal welfare standards.

## REFERENCES

- Abood, S. K. (2007). Increasing adherence in practice: Making your clients partners in care. *Veterinary Clinics of North America: Small Animal Practice*, 37(1), 151-164. <https://doi.org/10.1016/j.cvsm.2006.09.011>
- Ådahl, S. (2007). *Good Lives, Hidden Miseries: An Ethnography of Uncertainty in a Finnish Village* [Academic Dissertation, University of Helsinki]. HELDA - Digital Repository of the University of Helsinki. <http://hdl.handle.net/10138/23383>
- Administrative Procedure Act 434/2003; amendments up to 893/2015 included. (2003). <https://www.finlex.fi/fi/laki/kaannokset/2003/en20030434.pdf>
- Aho, M., Hielm, S., Suihkonen, K., Nurminen, A., Eriksson Rolf, Puurula, V., Kjerp, A., Pyyhtiä, A., Kaisa, H., Skuttinab, P., & Salo, M. (2007). *Eläinlääkintähuoltotyöryhmän loppuraportti* [Final report from the working group of veterinary services] (MAF 2007/15). Ministry of Agriculture and Forestry. [https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160285/trm%202007\\_15\\_EI%20c3%a4inl%20c3%a4kint%20c3%a4huoltoty%20c3%b6ryhm%20c3%a4n%20loppuraportti.pdf?sequence=1&isAllowed=y](https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160285/trm%202007_15_EI%20c3%a4inl%20c3%a4kint%20c3%a4huoltoty%20c3%b6ryhm%20c3%a4n%20loppuraportti.pdf?sequence=1&isAllowed=y)
- Andrade, S. B., & Anneberg, I. (2013). Farmers under pressure. Analysis of the social conditions of cases of animal neglect. *Journal of Agricultural & Environmental Ethics*, 27(1), 103-126. <https://doi.org/10.1007/s10806-013-9456-9>
- Animal Welfare Act 247/1996; amendments up to 1430/2006 included. (1996). <https://www.finlex.fi/fi/laki/kaannokset/1996>
- Animal Welfare Decree 396/1996; amendments up to 401/2006 included. (1996) [https://www.finlex.fi/fi/laki/kaannokset/1996/en19960396\\_20060401.pdf](https://www.finlex.fi/fi/laki/kaannokset/1996/en19960396_20060401.pdf)
- Anneberg, I., Vaarst, M., & Sandøe, P. (2013). To inspect, to motivate — or to do both? A dilemma for on-farm inspection of animal welfare. *Animal Welfare*, 22(2), 185-194. <https://doi.org/10.7120/09627286.22.2.185>
- Anneberg, I., Vaarst, M., & Sørensen, J. T. (2012). The experience of animal welfare inspections as perceived by Danish livestock farmers: A qualitative research approach. *Livestock Science*, 147(1-3), 49-58. <https://doi.org/10.1016/j.livsci.2012.03.018>
- Arkow, P. (2015). Recognizing and responding to cases of suspected animal cruelty, abuse, and neglect: What the veterinarian needs to know. *Veterinary Medicine (Auckland, N.Z.)*, 6, 349-359. <https://doi.org/10.2147/VMRR.S87198>
- Arshadi, N., & Damiri, H. (2013). The relationship of job stress with turnover intention and job performance: moderating role of OBSE. *Procedia, Social and Behavioral Sciences*, 84, 706-710. <https://doi.org/10.1016/j.sbspro.2013.06.631>
- Babin, B. J., & Boles, J. S. (1996). The effects of perceived co-worker involvement and supervisor support on service provider role stress, performance and job satisfaction. *Journal of Retailing*, 72(1), 57-75. [https://doi.org/10.1016/S0022-4359\(96\)90005-6](https://doi.org/10.1016/S0022-4359(96)90005-6)

- Bard, A. M., Main, D. C. J., Haase, A. M., Whay, H. R., Roe, E. J., & Reyher, K. K. (2017). The future of veterinary communication: Partnership or persuasion? A qualitative investigation of veterinary communication in the pursuit of client behaviour change. *PLoS One*, *12*(3), e0171380. <https://doi.org/10.1371/journal.pone.0171380>
- Barnett, J. L., & Hemsworth, P. H. (2003). Science and its application in assessing the welfare of laying hens in the egg industry. *Australian Veterinary Journal*, *81*(10), 615-624. <https://doi.org/10.1111/j.1751-0813.2003.tb12506.x>
- Bartussek, H. (1999). A review of the animal needs index (ANI) for the assessment of animals' well-being in the housing systems for Austrian proprietary products and legislation. *Livestock Production Science*, *61*(2), 179-192. [https://doi.org/10.1016/S0301-6226\(99\)00067-6](https://doi.org/10.1016/S0301-6226(99)00067-6)
- Bartussek, H. (2001). An historical account of the development of the Animal Needs Index ANI-35L as part of the attempt to promote and regulate farm animal welfare in Austria: An example of the interaction between animal welfare science and society. *Acta Agriculturae Scandinavica, Section A - Animal Science*, *51*(sup30), 34-41. <https://doi.org/10.1080/090647001316923036>
- Batchelor, C. E. M., & McKeegan, D. E. F. (2012). Survey of the frequency and perceived stressfulness of ethical dilemmas encountered in UK veterinary practice. *Veterinary Record*, *170*(1), 19. <https://doi.org/10.1136/vr.100262>
- Beaver, B. V. (2005). Introduction: Animal welfare education, a critical time in veterinary medicine. *Journal of Veterinary Medical Education*, *32*(4), 419-421. <https://doi.org/10.3138/jvme.32.4.419>
- Benetato, M. A., Reisman, R., & McCobb, E. (2011). The veterinarian's role in animal cruelty cases. *Journal of the American Veterinary Medical Association*, *238*(1), 31-34. <https://doi.org/10.2460/javma.238.1.31>
- Blanc, F. (2013). *Inspection reforms: Why, how, and with what results*. Organisation for Economic Co-operation and Development. <http://www.oecd.org/regreform/Inspection%20reforms%20-%20web%20-F.%20Blanc.pdf>
- Blokhuis, H. J. (2008). International cooperation in animal welfare: The Welfare Quality® project. *Acta Veterinaria Scandinavica*, *50*, S10. <https://doi.org/10.1186/1751-0147-50-S1-S10>
- Blokhuis, H. J., Veissier, I., Miele, M., & Jones, B. (2010). The Welfare Quality® project and beyond: Safeguarding farm animal well-being. *Acta Agriculturae Scandinavica. Section A, Animal Science*, *60*(3), 129-140. <https://doi.org/10.1080/09064702.2010.523480>
- Bock, B. B., & van Huik, M. M. (2007). Animal welfare: The attitudes and behaviour of European pig farmers. *British Food Journal*, *109*(11), 931-944. <https://doi.org/10.1108/00070700710835732>
- Boissy, A., Arnould, C., Chaillou, E., Desire, L., Duvaux-Ponter, C., Greiveldinger, L., Leterrier, C., Richard, S., Roussel, S., Saint-Dizier, H., Meunier-Salaun, M. C., Valance, D., & Veissier, I. (2007). Emotions and cognition: A new approach to animal welfare. *Animal Welfare*, *16*(Supplement 1), 37-43.



- Bonafos, L., Simonin, D., & Gavinelli, A. (2010). Animal welfare: European legislation and future perspectives. *Journal of Veterinary Medical Education*, 37(1), 26-29. <https://doi.org/10.3138/jvme.37.1.26>
- Bonbon, E. (2012). *Regional steps towards a common animal welfare approach in Europe* [Conference presentation]. World Organisation for Animal Health. <https://www.oie.int/doc/ged/D13888.PDF>
- Boogaard, B. K., Oosting, S. J., & Bock, B. B. (2006). Elements of societal perception of farm animal welfare: A quantitative study in The Netherlands. *Livestock Science*, 104(1), 13-22. <https://doi.org/10.1016/j.livsci.2006.02.010>
- Botreau, R., Bonde, M., Butterworth, A., Perny, P., Bracke, M. B. M., Capdeville, J., & Veissier, I. (2007). Aggregation of measures to produce an overall assessment of animal welfare. Part 1: A review of existing methods. *Animal*, 1(8), 1179-1187. <https://doi.org/10.1017/S1751731107000535>
- Botreau, R., Veissier, I., & Perny, P. (2009). Overall assessment of animal welfare: Strategy adopted in Welfare Quality. *Animal Welfare*, 18(4), 363-370.
- Bowell, V. A., Rennie, L. J., Tierney, G., Lawrence, A. B., & Haskell, M. J. (2003). Relationships between building design, management system and dairy cow welfare. *Animal Welfare*, 12(4), 547-552.
- Bracke, M., & Hopster, H. (2006). Assessing the importance of natural behavior for animal welfare. *Journal of Agricultural & Environmental Ethics*, 19(1), 77-89. <https://doi.org/10.1007/s10806-005-4493-7>
- Bracke, M., Greef, K., & Hopster, H. (2005). Qualitative stakeholder analysis for the development of sustainable monitoring systems for farm animal welfare. *Journal of Agricultural and Environmental Ethics*, 18(1), 27-56. <https://doi.org/10.1007/s10806-004-3085-2>
- Brambell, F. W. R. (1965). *Report of the Technical committee to enquire into the welfare of animals kept under intensive livestock husbandry systems*. <https://library.wur.nl/WebQuery/groenekennis/402257>
- Broom, D. M. (1986). Indicators of poor welfare. *British Veterinary Journal*, 142(6), 524-526. [https://doi.org/10.1016/0007-1935\(86\)90109-0](https://doi.org/10.1016/0007-1935(86)90109-0)
- Broom, D. M. (1991). Animal welfare: Concepts and measurement. *Journal of Animal Science*, 69(10), 4167.
- Brough, P., & Pears, J. (2004). Evaluating the influence of the type of social support on job satisfaction and work-related psychological well-being. *International Journal of Organisational Behaviour*, 8(2), 472-485. <http://hdl.handle.net/10072/5572>
- Bruckmeier, K., & Prutzer, M. (2007). Swedish pig producers and their perspectives on animal welfare: A case study. *British Food Journal*, 109(11), 906-918. <https://doi.org/10.1108/00070700710835714>

- Camm, T., & Bowles, D. (2000). Animal welfare and the Treaty of Rome: A legal analysis of the protocol on animal welfare and standards in the European Union. *Journal of Environmental Law*, 12(2), 197. <https://doi.org/10.1093/jel/12.2.197>
- Capdeville, J., & Veissier, I. (2001). A method of assessing welfare in loose housed dairy cows at farm level, focusing on animal observations. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 62-68. <https://doi.org/10.1080/090647001316923081>
- Caporale, V., Alessandrini, B., Dalla Villa, P., & Del Papa, S. (2005). Global perspectives on animal welfare: Europe. *Revue Scientifique Et Technique (International Office of Epizootics)*, 24(2), 567-577. <https://doi.org/10.20506/rst.24.2.1594>
- Chin, A. (2016). *Why good communication is key to good veterinary practice*. Veterinary Practice News. <https://www.veterinarypracticenews.com/why-good-communication-is-key-to-good-veterinary-practice/>
- Clark, B., Stewart, G., Panzone, L., Kyriazakis, I., & Frewer, L. (2016). A systematic review of public attitudes, perceptions and behaviours towards production diseases associated with farm animal welfare. *Journal of Agricultural and Environmental Ethics*, 29(3), 455-478. <https://doi.org/10.1007/s10806-016-9615-x>
- Code of Judicial Procedure 4/1734; amendments up to 732/2015 included. (1734) [https://www.finlex.fi/en/laki/kaannokset/1734/en17340004\\_20150732.pdf](https://www.finlex.fi/en/laki/kaannokset/1734/en17340004_20150732.pdf)
- Commission Decision 2006/778/EC concerning minimum requirements for the collection of information during the inspections of production sites on which certain animals are kept for farming purposes. (2006). *Official Journal of the European Union*, L314, 39-47. <http://data.europa.eu/eli/dec/2006/778/oj>
- Commission Implementing Regulation (EU) 2018/329 designating a European Union Reference Centre for Animal Welfare. (2018). *Official Journal of the European Union*, L63, 13-14. [http://data.europa.eu/eli/reg\\_impl/2018/329/oj](http://data.europa.eu/eli/reg_impl/2018/329/oj)
- Constitution of Finland 731/1999; amendments up to 817/2018 included. (1999). <https://www.finlex.fi/en/laki/kaannokset/1999/en19990731.pdf>
- Council Decision 78/923/EEC concerning the conclusion of the European Convention for the protection of animals kept for farming purposes. (1978). *Official Journal of the European Communities*, L323, 12-13. <http://data.europa.eu/eli/dec/1978/923/oj>
- Council Directive 74/577/EEC on stunning of animals before slaughter. (1974). *Official Journal of the European Communities* L316, 10-11. <http://data.europa.eu/eli/dir/1974/577/oj>
- Council Directive 98/58/EC concerning the protection of animals kept for farming purposes. (1998). *Official Journal of the European Communities*, L221, 23-27. <http://data.europa.eu/eli/dir/1998/58/oj>
- Council Directive 1999/74/EC laying down minimum standards for the protection of laying hens. (1999). *Official Journal of the European Communities*, L203, 53-57. <http://data.europa.eu/eli/dir/1999/74/oj>

- Council Directive 2007/43/EC laying down minimum rules for the protection of chickens kept for meat production. (2007). *Official Journal of the European Union*, L182, 19-28. <http://data.europa.eu/eli/dir/2007/43/oj>
- Council Directive 2008/119/EC laying down minimum standards for the protection of calves. (2008). *Official Journal of the European Union*, L10, 7-13. <http://data.europa.eu/eli/dir/2008/119/oj>
- Council Directive 2008/120/EC laying down minimum standards for the protection of pigs. (2008). *Official Journal of the European Union*, L47, 5-13. <http://data.europa.eu/eli/dir/2008/120/oj>
- Council Regulation (EC) No 1/2005 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No 1255/97. (2005). *Official Journal of the European Union*, L3, 1-44. <http://data.europa.eu/eli/reg/2005/1/oj>
- Council Regulation (EC) No 1099/2009 on the protection of animals at the time of killing. (2009). *Official Journal of the European Union*, L303, 1-30. <http://data.europa.eu/eli/reg/2009/1099/oj>
- Criminal Code of Finland 39/1889; amendments up to 766/2015 included. (1889). [https://www.finlex.fi/en/laki/kaannokset/1889/en18890039\\_20150766.pdf](https://www.finlex.fi/en/laki/kaannokset/1889/en18890039_20150766.pdf)
- Criminal Investigation Act 805/2011; amendments up to 736/2015 included. (2011). [https://finlex.fi/en/laki/kaannokset/2011/en20110805\\_20150736.pdf](https://finlex.fi/en/laki/kaannokset/2011/en20110805_20150736.pdf)
- Croasmun, J.T., & Ostrom, L. (2011). Using Likert-type scales in the social sciences. *Journal of Adult Education*, 40(1), 19.
- Cronin, G. M., Rault, J. L., & Glatz, P. C. (2014). Lessons learned from past experience with intensive livestock management systems. *Revue Scientifique Et Technique (International Office of Epizootics)*, 33(1), 139. <https://doi.org/10.20506/rst.33.1.2256>
- Dalla Villa, P., Matthews, L. R., Alessandrini, B., Messori, S., & Migliorati, G. (2014). Drivers for animal welfare policies in Europe. *Revue Scientifique Et Technique (International Office of Epizootics)*, 33(1), 39-46. <https://doi.org/10.20506/rst.33.1.2266>
- Dawkins, M. (1998). Evolution and animal welfare. *The Quarterly Review of Biology*, 73(3), 305.
- Dawkins, M. (2006). A user's guide to animal welfare science. *Trends in Ecology & Evolution (Amsterdam)*, 21(2), 77-82. <https://doi.org/10.1016/j.tree.2005.10.017>
- de Boo, J., & Knight, A. (2005). "Concepts in animal welfare": A Syllabus in animal welfare science and ethics for veterinary schools. *Journal of Veterinary Medical Education*, 32(4), 451-453. <https://doi.org/10.3138/jvme.32.4.451>
- De Briyne, N., Vidović, J., Morton, D. B., & Magalhães-Sant'Ana, M. (2020). Evolution of the teaching of animal welfare science, ethics and law in European veterinary schools (2012–2019). *Animals (Basel)*, 10(7), 1238. <https://doi.org/10.3390/ani10071238>

- de Greef, K. H. & Bos, A. P. (2007). Can animal science meet the expectations in the animal welfare debate? In Zollitsch, W., Winckler, C., Waiblinger, S., Haslberger, A. (Ed.), *Sustainable Food Production and Ethics* (pp. 293-298). Wageningen University Press.
- de Passillé, A. M., & Rushen, J. (2005). Food safety and environmental issues in animal welfare. *Revue Scientifique Et Technique (International Office of Epizootics)*, 24(2), 757. <https://doi.org/10.20506/rst.24.2.1599>
- Devitt, C., Kelly, P., Blake, M., Hanlon, A., & More, S. J. (2013). Veterinarian challenges to providing a multi-agency response to farm animal welfare problems in Ireland: Responding to the human factor. *Revue Scientifique Et Technique (International Office of Epizootics)*, 32(3), 657. <https://doi.org/10.20506/rst.32.2.2225>
- Devitt C., Kelly, P., Blake, M., Hanlon, A., & More S. J. (2014). Dilemmas experienced by government veterinarians when responding professionally to farm animal welfare incidents in Ireland. *Vet Rec Open*. 1:e000003. <https://doi.org/10.1136/vropen-2013-000003>
- Devitt, C., Kelly, P., Blake, M., Hanlon, A., & More, S. J. (2015). An investigation into the human element of on-farm animal welfare incidents in Ireland. *Sociologia Ruralis*, 55(4), 400-416. <https://doi.org/10.1111/soru.12069>
- Directive 2010/63/EU of the European Parliament and of the Council on the protection of animals used for scientific purposes. (2010). *Official Journal of the European Union*, L276, 33-79. <http://data.europa.eu/eli/dir/2010/63/oj>
- Directorate General of Health and Food Safety. (2019). *Final report of an audit carried out in Finland from 11 February 2019 to 15 February 2019 in order to evaluate the use of quality controls and indicators for animal welfare*. (DG SANTE 2019-6590). European Commission. [https://ec.europa.eu/food/audits-analysis/audit\\_reports/details.cfm?rep\\_id=xxx&rep\\_inspection\\_ref=2019-6590](https://ec.europa.eu/food/audits-analysis/audit_reports/details.cfm?rep_id=xxx&rep_inspection_ref=2019-6590)
- Dockès, A. C., & Kling-Eveillard, F. (2006). Farmers' and advisers' representations of animals and animal welfare. *Livestock Science*, 103(3), 243-249. <https://doi.org/10.1016/j.livsci.2006.05.012>
- D'Silva, J. (2006). Adverse impact of industrial animal agriculture on the health and welfare of farmed animals. *Integrative Zoology*, 1(1), 53-58. <https://doi.org/10.1111/j.1749-4877.2006.00013.x>
- Duncan, I. J. H. (1993). Welfare is to do with what animals feel. *Journal of Agricultural & Environmental Ethics*, 6(2), 8-14.
- Duncan, I. J. H. (1996). Animal welfare defined in terms of feelings. *Acta Agriculturae Scandinavica Section A-Animal Science*, 27, 29-35.
- Duncan, I. J. H. (2004). A concept of welfare based on feelings. In Benson, G. J. & Rollin, B. E. (Ed.), *The well-being of farm animals* (pp. 85-101). Blackwell Publishing. <https://doi.org/10.1002/9780470344859.ch5>
- Duncan, I.J.H., & Dawkins, S. (1983). The problem of assessing “well-being” and “suffering” in farm animals. In D. Smidt (Ed.), *Indicators relevant to farm animal welfare. Current topics in veterinary medicine and animal science* (pp. 13-24). Springer.

- Eckert, H. (2004). Inspections, warnings, and compliance: The case of petroleum storage regulation. *Journal of Environmental Economics and Management*, 47(2), 232-259. [https://doi.org/10.1016/S0095-0696\(03\)00079-2](https://doi.org/10.1016/S0095-0696(03)00079-2)
- EC Regulation 178/2002 of the European Parliament and of the Council laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. (2002) *Official Journal of the European Communities*, L31/1-24. <http://data.europa.eu/eli/reg/2002/178/oj>
- EC Regulation 882/2004 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. (2004) *Official Journal of the European Union*, L165, 1-140. <http://data.europa.eu/eli/reg/2004/882/oj>
- Edwards, J. D., & Schneider, H. P. (2005). The World Veterinary Association and animal welfare. *Revue Scientifique Et Technique (International Office of Epizootics)*, 24(2), 639-646.
- Ellis, K. A., Billington, K., McNeil, B., & McKeegan, D. E. F. (2009). Public opinion on UK milk marketing and dairy cow welfare. *Animal Welfare*, 18(3), 267-282.
- EU Regulation 1306/2013 of the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008. (2013). *Official Journal of the European Union*, L347, 549-607. <http://data.europa.eu/eli/reg/2013/1306/oj>
- EU Regulation 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009. (2013). *Official Journal of the European Union*, L347, 608-670. <http://data.europa.eu/eli/reg/2013/1307/oj>
- EU Regulation 2017/625 of the European Parliament and of the Council on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products, amending Regulations (EC) No 999/2001, (EC) No 396/2005, (EC) No 1069/2009, (EC) No 1107/2009, (EU) No 1151/2012, (EU) No 652/2014, (EU) 2016/429 and (EU) 2016/2031 of the European Parliament and of the Council, Council Regulations (EC) No 1/2005 and (EC) No 1099/2009 and Council Directives 98/58/EC, 1999/74/EC, 2007/43/EC, 2008/119/EC and 2008/120/EC, and repealing Regulations (EC) No 854/2004 and (EC) No 882/2004 of the European Parliament and of the Council, Council Directives 89/608/EEC, 89/662/EEC, 90/425/EEC, 91/496/EEC, 96/23/EC, 96/93/EC and 97/78/EC and Council Decision 92/438/EEC. (2017). *Official Journal of the European Union*, L95, 1-142. <http://data.europa.eu/eli/reg/2017/625/oj>
- European Commission. (2001). European Governance — A white paper. *Official Journal of the European Communities*, C287, 1-29. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52001DC0428&from=EN>
- European Commission. (2006). *Communication from the Commission to the European Parliament and the Council on a community action plan on the protection and welfare of*

- animals 2006-2010*. (COM 2006 13 final). <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006DC0013&from=EN>
- European Commission. (2012). *Communication from the Commission to the European Parliament, the Council and the European Economic and Social Committee on the European Union strategy for the protection and welfare of animals 2012-2015*. (COM 2012 6 final/2). [https://ec.europa.eu/food/sites/food/files/animals/docs/aw\\_eu\\_strategy\\_19012012\\_en.pdf](https://ec.europa.eu/food/sites/food/files/animals/docs/aw_eu_strategy_19012012_en.pdf)
- European Commission. (2019). *Inspection reports from EU countries*. Retrieved June, 4, 2020, from [https://ec.europa.eu/food/animals/welfare/practice/transport/inspection-reports\\_en](https://ec.europa.eu/food/animals/welfare/practice/transport/inspection-reports_en)
- European Court of Auditors. (2018). *Animal welfare in the EU: Closing the gap between ambitious goals and practical implementation* (Special report no 31). European Union. <https://data.europa.eu/doi/10.2865/583298>
- European Food Safety Authority. (2009). Scientific report on the effects of farming systems on dairy cow welfare and disease. *EFSA Journal*, 1143, 1-284. <https://doi.org/10.2903/j.efsa.2009.1143r>
- European Food Safety Authority. (2012). Scientific Opinion on the use of animal-based measures to assess welfare of dairy cows. *EFSA Journal*, 10(1), 2554. <https://doi.org/10.2903/j.efsa.2012.2554>
- Eurostat. (2018). *Archive: Pig farming sector - statistical portrait 2014*. The statistical office of the European Union. Retrieved September 17, 2020, from [https://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Pig\\_farming\\_sector\\_-\\_statistical\\_portrait\\_2014](https://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Pig_farming_sector_-_statistical_portrait_2014)
- Eurostat. (2020). *Agriculture - overview*. The statistical office of the European Union. Retrieved September 17, 2020, from <https://ec.europa.eu/eurostat/web/agriculture>
- Fairlie, P. (2011). Meaningful work, employee engagement, and other key employee outcomes. *Advances in Developing Human Resources*, 13(4), 508-525. <https://doi.org/10.1177/1523422311431679>
- Fairman, R., & Yapp, C. (2005). Enforced self-regulation, prescription, and conceptions of compliance within small businesses: The impact of enforcement. *Law & Policy*, 27(4), 491-519. <https://doi.org/10.1111/j.1467-9930.2005.00209.x>
- FAOSTAT. (2020). *Livestock Primary*. Food and Agriculture Organization of the United Nations. Retrieved September 17, 2020, from <http://www.fao.org/faostat/en/?#data/QL>
- Farm Animal Welfare Council. (2009). *Farm animal welfare in Great Britain: Past, present and future*. <https://www.gov.uk/government/publications/fawc-report-on-farm-animal-welfare-in-great-britain-past-present-and-future>
- Finnish Food Authority. (2018). *Animal welfare inspections based on sampling*. Retrieved September 20, 2020, from <https://www.ruokavirasto.fi/en/farmers/animal-husbandry/animal-welfare/animal-welfare-control/animal-welfare-inspections-based-on-sampling/>

- Finnish Food Authority. (2019). *Eläinten hyvinvoinnin valvonta 2018 [Animal welfare control in 2018]*. (2692/00.01.02.00.01/2019). Retrieved February 14, 2020, from [https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten-hyvinvoinnin\\_valvonta\\_2018.pdf](https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten-hyvinvoinnin_valvonta_2018.pdf)
- Finnish Food Authority. (2020a). *Eläinten hyvinvoinnin valvonta 2019 [Animal welfare control in 2019]*. (241/00.01.02.00.01/2020). Retrieved September 14, 2020, from [https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten\\_hyvinvoinnin\\_valvonta\\_2019.pdf](https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten_hyvinvoinnin_valvonta_2019.pdf)
- Finnish Food Authority. (2020b). *Otantaan perustuvat eläinsuojelutarkastukset ja täydentävien ehtojen eläinten hyvinvointivalvonta [Sampling-based animal welfare inspections and cross-compliance control regarding animal welfare]*. (1432/04.01.00.01/2020). Retrieved September 24, 2020, from [https://www.ruokavirasto.fi/globalassets/tietoa-meista/asiointi/oppaat-ja-lomakkeet/viljelijat/taydentavat-ehdot/eviran\\_ohje\\_15703\\_10\\_fi.pdf](https://www.ruokavirasto.fi/globalassets/tietoa-meista/asiointi/oppaat-ja-lomakkeet/viljelijat/taydentavat-ehdot/eviran_ohje_15703_10_fi.pdf)
- Finnish Food Safety Authority. (2010). *Eläinten hyvinvoinnin valvonta 2009 [Animal welfare control in 2009]*. (Evira/7307/4011/2010). Retrieved February 14, 2020, from [https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten\\_hyvinvoinnin\\_valvonta\\_2009.pdf](https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten_hyvinvoinnin_valvonta_2009.pdf)
- Finnish Food Safety Authority. (2013). *Eläinten hyvinvoinnin valvonta 2012 [Animal welfare control in 2012]*. (Evira/2908/0411/2013). Retrieved February 14, 2020, from [https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten\\_hyvinvoinnin\\_valvonta\\_2012.pdf](https://www.ruokavirasto.fi/globalassets/viljelijat/elaintenpito/elainten-hyvinvointi/elainten_hyvinvoinnin_valvonta_2012.pdf)
- Food Policy Evaluation Consortium. (2010). *Final report: Evaluation of the EU policy on animal welfare and possible policy options for the future*. [https://ec.europa.eu/food/sites/food/files/animals/docs/aw\\_arch\\_122010\\_full\\_ev\\_report\\_en.pdf](https://ec.europa.eu/food/sites/food/files/animals/docs/aw_arch_122010_full_ev_report_en.pdf)
- Forsberg, E., & Forsberg, E. (2011). Inspiring respect for animals through the law? Current development in the Norwegian animal welfare legislation. *Journal of Agricultural and Environmental Ethics*, 24(4), 351-366. <https://doi.org/10.1007/s10806-010-9263-5>
- Franz, A., Deimel, I., & Spiller, A. (2012). Concerns about animal welfare: A cluster analysis of German pig farmers. *British Food Journal*, 114(10), 1445-1462. <https://doi.org/10.1108/00070701211263019>
- Fraser, D. (1993). *Assessing Animal Well-Being: Common Sense, Uncommon Science*. *Food animal well-being*. In Purdue University, Office of Agricultural Research Programs (Ed.), (pp. 37-54).
- Fraser, D. (1999). Animal ethics and animal welfare science: Bridging the two cultures. *Applied Animal Behaviour Science*, 65(3), 171-189. [https://doi.org/10.1016/S0168-1591\(99\)00090-8](https://doi.org/10.1016/S0168-1591(99)00090-8)
- Fraser, D. (2001). Farm animal production: Changing agriculture in a changing culture. *Journal of Applied Animal Welfare Science*, 4(3), 175-190. [https://doi.org/10.1207/S15327604JAWS0403\\_02](https://doi.org/10.1207/S15327604JAWS0403_02)

- Fraser, D. (2003). Assessing animal welfare at the farm and group level: The interplay of science and values. *Animal Welfare*, 12(4), 433-443.
- Fraser, D. (2005). *Animal welfare and the intensification of animal production: an alternative interpretation*. Food and Agriculture Organization of the United Nations. [www.fao.org/3/a-a0158e.pdf](http://www.fao.org/3/a-a0158e.pdf)
- Fraser, D. (2008). Toward a global perspective on farm animal welfare. *Applied Animal Behaviour Science*, 113(4), 330-339. <https://doi.org/10.1016/j.applanim.2008.01.011>
- Fraser, D. (2009). Assessing animal welfare: Different philosophies, different scientific approaches. *Zoo Biology*, 28(6), 507-518. <https://doi.org/10.1002/zoo.20253>
- Fraser, D. (2014). The globalisation of farm animal welfare. *Revue Scientifique Et Technique (International Office of Epizootics)*, 33(1), 33-38. <https://doi.org/10.20506/rst.33.1.2267>
- Fraser, D., & Duncan, I. J. H. (1998). 'Pleasures', 'pains' and animal welfare: Toward a natural history of affect. *Animal Welfare*, 7(4), 383-396.
- Fraser, D., Mench, J., & Millman, S. (2001). Farm animals and their welfare in 2000. In D.J. Salem & A.N. Rowan (Eds.), *The state of the animals 2001* (pp. 87-99). Humane Society Press.
- Fraser, D., Weary, D. M., Pajor, E. A., & Milligan, B. N. (1997). A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare*, 6(3), 187-205.
- Frewer, L. J., Kole, A. P. W., Kroon, v. d., S.M.A., & Lauwere, d., C. (2005). Consumer attitudes towards the development of animal-friendly husbandry systems. *Journal of Agricultural and Environmental Ethics*, 18(4), 345-367. <https://doi.org/10.1007/s10806-005-1489-2>
- Gardner, D., & Hini, D. (2006). Work-related stress in the veterinary profession in New Zealand. *New Zealand Veterinary Journal*, 54(3), 119-124. <https://doi.org/10.1080/00480169.2006.36623>
- Government Decree for the protection of cattle 592/2010. (2010) <https://www.finlex.fi/fi/laki/alkup/2010/20100592>
- Government Decree for the protection of pigs 629/2012. (2012) <https://www.finlex.fi/fi/laki/alkup/2012/20120629>
- Haddock, G., & Zanna, M. P. (1998). On the use of open-ended measures to assess attitudinal components. *British Journal of Social Psychology*, 37(2), 129-149. <https://doi.org/10.1111/j.2044-8309.1998.tb01161.x>
- Hall, C., & Sandilands, V. (2007). Public attitudes to the welfare of broiler chickens. *Animal Welfare*, 16(4), 499-512.
- Hanlon A. J. & Magalhães-Sant'Ana M. (2014) Zoocentrism. In: ten Have H. (Ed.), *Encyclopedia of Global Bioethics* (p. 1-10). Springer International Publishing. [https://doi.org/10.1007/978-3-319-05544-2\\_450-1](https://doi.org/10.1007/978-3-319-05544-2_450-1)
- Hansson, H., & Lagerkvist, C. (2012). Measuring farmers' attitudes to animal welfare and health. *British Food Journal*, 114, 840. <https://doi.org/10.1108/00070701211234363>



- Hardouin-Fugier, E. (2006). From animal suffering to animal welfare: The progressive attainment of animal rights in Europe. In Council of Europe (Ed.), *Ethical Eye: Animal Welfare* (pp. 171-185). Council of Europe.
- Harfeld, J. (2010). Husbandry to industry: Animal agriculture, ethics and public policy. *Between the Species: An Online Journal for the Study of Philosophy and Animals*, 13(10), 132-162. <https://doi.org/10.15368/bts.2010v13n10.9>
- Harrison, R. (1964). *Animal machines*. Vincent Stuart Publishers.
- Hassinen, S. (1980). *Maatalouden tuotantorakenteen kehitys [The development of agricultural production structure]*. (Research reports no. 66). The Agricultural Economics Research Institute, Finland. <http://urn.fi/URN:ISBN:951-9199-64-0>
- Hatch, P., Winefield, H., Christie, B., & Lievaart, J. (2011). Workplace stress, mental health, and burnout of veterinarians in Australia. *Australian Veterinary Journal*, 89(11), 460-468. <https://doi.org/10.1111/j.1751-0813.2011.00833.x>
- Hess, S., Bolos, L. A., Hoffmann, R., & Surry, Y. (2014). *Is animal welfare better on small farms? Evidence from veterinary inspections on Swedish farms*. [Conference presentation]. European Association of Agricultural Economists. <http://purl.umn.edu/182781>
- Hewson, C. J. (2003). What is animal welfare? Common definitions and their practical consequences. *The Canadian Veterinary Journal = La Revue Veterinaire Canadienne*, 44(6), 496-499.
- Hewson, C. J. (2005). Why the theme animal welfare? *Journal of Veterinary Medical Education*, 32(4), 416-418. <https://doi.org/10.3138/jvme.32.4.416>
- Hirn, J. (2011). *Päämääränä koottu ja tehokas ympäristöterveydenhuolto [Towards more consistent and efficient food and environmental health control]*. <https://mmm.fi/documents/1410837/1801184/JormaHirnToimeksiantomaaliskuu2011.pdf/f7c996eaf-d40b-4043-8542-c85c48188206/JormaHirnToimeksiantomaaliskuu2011.pdf>
- Hitchens, P. L., Hultgren, J., Frössling, J., Emanuelson, U., & Keeling, L. J. (2017). An epidemiological analysis of equine welfare data from regulatory inspections by the official competent authorities. *Animal*, 11(7), 1237-1248. <https://doi.org/10.1017/S1751731116002512>
- Hocquette, J., & Chatellier, V. (2011). Prospects for the European beef sector over the next 30 years. *Animal Frontiers*, 1, 20-28. <https://doi.org/10.2527/af.2011-0014>
- Hon, A. H. Y. (2013). Does job creativity requirement improve service performance? *International Journal of Hospitality Management*, 35, 161-170. <https://doi.org/10.1016/j.ijhm.2013.06.003>
- Horgan, R., & Gavinelli, A. (2006). The expanding role of animal welfare within EU legislation and beyond. *Livestock Science*, 103(3), 303-307. <https://doi.org/https://doi.org/10.1016/j.livsci.2006.05.019>
- Hsieh, H., & Shannon, S. E. (2016). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288. <https://doi.org/10.1177/1049732305276687>

- Hubbard, C., Bourlakis, M., & Garrod, G. (2007). Pig in the middle: Farmers and the delivery of farm animal welfare standards. *British Food Journal*, 109(11), 919-930. <https://doi.org/10.1108/00070700710835723>
- Hultgren, J. (2009). Animal welfare risk assessment and management from a national perspective. In Smulders, F.J.M. & Algers, B. (Ed.), *Welfare of production animals: assessment and management of risks* (pp. 461-482). Wageningen Academic Publishers.
- Hörning, B. (2001). The assessment of housing conditions of dairy cows in littered loose housing systems using three scoring methods. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 42-47. <https://doi.org/10.1080/090647001316923045>
- Johnsen, P. F., Johannesson, T., & Sandøe, P. (2001). Assessment of farm animal welfare at herd level: Many goals, many methods. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 26-33. <https://doi.org/10.1080/090647001316923027>
- Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396-403. <https://doi.org/10.9734/bjast/2015/14975>
- Kahler, S. C. (2015). Moral stress the top trigger in veterinarians' compassion fatigue: Veterinary social worker suggests redefining veterinarians' ethical responsibility. *Journal of the American Veterinary Medical Association*, 246(1), 16-18.
- Kanji, N., Coe, J. B., Adams, C. L., & Shaw, J. R. (2012). Effect of veterinarian-client-patient interactions on client adherence to dentistry and surgery recommendations in companion-animal practice. *Journal of the American Veterinary Medical Association*, 240(4), 427-436. <https://doi.org/10.2460/javma.240.4.427>
- Kauppinen, T., Vainio, A., Valros, A., Rita, H., & Vesala, K. M. (2010). Improving animal welfare: Qualitative and quantitative methodology in the study of farmers' attitudes. *Animal Welfare*, 19(4), 523-536.
- Keeling, L. J. (2009). An analysis of animal-based versus resource-based comments in official animal welfare inspection reports from organic and conventional farms in Sweden. *Animal Welfare*, 18(4), 391-397.
- Keeling, L., & Evans, A Forkman, B Kjaernes, U. (2013). Welfare Quality® principles and criteria. In Blokhuis, H.J., Miele, M., Veissier, I. & Jones, B (Ed.), *Improving farm animal welfare. Science and society working together: The Welfare Quality approach* (pp. 91-114). Wageningen Academic Publishers.
- Kelly, P. C., More, S. J., Blake, M., & Hanlon, A. J. (2011). Identification of key performance indicators for on-farm animal welfare incidents: Possible tools for early warning and prevention. *Irish Veterinary Journal*, 64(1), 13. <https://doi.org/10.1186/2046-0481-64-13>
- Kendall, H. A., Lobao, L. M., & Sharp, J. S. (2006). Public concern with animal well-being: Place, social structural location, and individual experience. *Rural Sociology*, 71(3), 399-428. <https://doi.org/10.1526/003601106778070617>
- Khorshidifar, M., & Abedi, A. (2011). An empirical study on the impact of stress on the relationship between locus of control and job satisfaction and job performance. *Management Science Letters*, 1(4), 511-516. <https://doi.org/10.5267/j.msl.2011.05.007>

- Kiley-Worthington, M. (1989). Ecological, ethological, and ethically sound environments for animals: Toward symbiosis. *Journal of Agricultural Ethics*, 2(4), 323-347. <https://doi.org/10.1007/BF01826810>
- Kimman, T., Hoek, M., & de Jong, Mart C. M. (2013). Assessing and controlling health risks from animal husbandry. *NJAS - Wageningen Journal of Life Sciences*, 66, 7-14. <https://doi.org/10.1016/j.njas.2013.05.003>
- Kirkden, R. D., & Pajor, E. A. (2006). Using preference, motivation and aversion tests to ask scientific questions about animals' feelings. *Applied Animal Behaviour Science*, 100(1-2), 29-47. <https://doi.org/10.1016/j.applanim.2006.04.009>
- Koskela, T. (2013). Eläinsuojelutarkastus ja eläinsuojelurikosepäilyistä ilmoittaminen - kansalaisaktiivisuutta vai viranomaisvalvontaan? [Animal welfare inspection and making a notification for suspicion of animal welfare crime—Is it civil activity or control by authorities?]. *Edilex*, 2013/22, 1-32.
- Koskela, T. (2015). Eläintenpitokieltorekisteri valvonnan välineenä – toteutuuko eläintenpitokieltorekisterilain tarkoitus ja tavoitteet? [Register for bans of animal keeping applied in control – are the aim and purposes of the law fulfilled?]. *Edilex* 2015/40, 1-38.
- Koskela-Laine, T. (2012). Onko eläimellä väliä? - Eläinsuojelurikosten empiirinen tutkimus [Does animal matter? - An empirical study on animal welfare offences]. *Edilex*, 2012/3, 1-35.
- Kupsala, S. (2011). *Eläinten aseman muuntuminen Suomessa. Yhteiskuntatieteellinen selvitys maa- ja metsätalousministeriölle eläinsuojelulain kokonaisuudistusta varten*. [Animals' changed position in Finland. Sociological survey for the Ministry of Agriculture and Forestry for the legislative reform in Animal Welfare Act]. <https://mmm.fi/documents/1410837/1858027/E1%C3%A4inten+aseman+muuntuminen+Suomessa.pdf/cde205e0-061d-4345-8156-02b9a860919e/E1%C3%A4inten+aseman+muuntuminen+Suomessa.pdf>
- Lahtinen, T. (2020). *Selvitys eläinsuojelupoliisin tarpeesta: Virkaeläinlääkäreiden näkökulma* [Survey on the needs of animal welfare police: Views of official veterinarians]. SEY Animal Welfare Finland. [https://sey.fi/wp-content/uploads/2020/02/RAPORTTI-FINAL-10.2.2020\\_Edit-13.2-2.pdf](https://sey.fi/wp-content/uploads/2020/02/RAPORTTI-FINAL-10.2.2020_Edit-13.2-2.pdf)
- Lambert, N. M., Stillman, T. F., Hicks, J. A., Kamble, S., Baumeister, R. F., & Fincham, F. D. (2013). To belong is to matter. *Personality and Social Psychology Bulletin*, 39(11), 1418-1427. <https://doi.org/10.1177/0146167213499186>
- Ledger, R., & Mellor, D. (2018). Forensic use of the five domains model for assessing suffering in cases of animal cruelty. *Animals (Basel)*, 8(7), 101. <https://doi.org/10.3390/ani8070101>
- Lepistö, O. (2008). *Hyvän hallinnon periaate ympäristöterveydenhuollon pakkokeinomenettelyssä* [Good governance in administrative procedure regarding food and environmental health control]. [Academic Dissertation, University of Helsinki]. HELDA - Digital Repository of the University of Helsinki. <http://urn.fi/URN:ISBN:978-952-10-4633-9>

- Lidfors, L., Berg, C., & Algers, B. (2005). Integration of natural behavior in housing systems. *Ambio: A Journal of the Human Environment*, 34(4), 325-330. [https://doi.org/10.1639/0044-7447\(2005\)034\[0325:IONBIH\]2.0.CO;2](https://doi.org/10.1639/0044-7447(2005)034[0325:IONBIH]2.0.CO;2)
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140(22), 55.
- Lomellini-Dereclenne, A., Miele, M., Mounier, L., & Veissier, I. (2017). Implementation of the European legislation to protect farm animals: A case study on French inspections to find solutions to improve compliance. *Animal Welfare*, 26(3), 311-321. <https://doi.org/10.7120/09627286.26.3.311>
- Luke, C., & Arluke, A. (1997). Physical cruelty toward animals in Massachusetts, 1975-1996. *Society & Animals*, 5(3), 195-204. <https://doi.org/10.1163/156853097X00123>
- Lund, V., Coleman, G., Gunnarsson, S., Appleby, M. C., & Karkinen, K. (2006). Animal welfare science: Working at the interface between the natural and social sciences. *Applied Animal Behaviour Science*, 97(1), 37-49. <https://doi.org/10.1016/j.applanim.2005.11.017>
- Lundmark, F. (2016). *Mind the Gaps! From Intentions to Practice in Animal Welfare Legislation and Private Standards*. [Doctoral Dissertation, Swedish University of Agricultural Sciences]. SLU Service/Repro. [https://pub.epsilon.slu.se/13669/1/lundmark\\_f\\_160919.pdf](https://pub.epsilon.slu.se/13669/1/lundmark_f_160919.pdf)
- Lundmark, F., Berg, L., & Röcklinsberg, H. (2013). 'Unnecessary suffering' as a concept in animal welfare legislation and standards. In S. P. Röcklinsberg H. (Ed.), *The ethics of consumption*. (pp. 114-119). Wageningen Academic Publishers.
- Lundmark Hedman, F., Hultgren, J., Röcklinsberg, H., Wahlberg, B., & Berg, C. (2018). Non-compliance and follow-up in Swedish official and private animal welfare control of dairy cows. *Animals (Basel)*, 8(5), 72. <https://doi.org/10.3390/ani8050072>
- Lundmark Hedman, F., Andersson, M., Kinch, V., Lindholm, A., Nordqvist, A., & Westin, R. (2021). Cattle cleanliness from the view of Swedish farmers and official animal welfare inspectors. *Animals*, 11(4): 945. <https://doi.org/10.3390/ani11040945>
- Läikkö-Roto, T., & Nevas, M. (2014). Restaurant business operators' knowledge of food hygiene and their attitudes toward official food control affect the hygiene in their restaurants. *Food Control*, 43, 65-73. <https://doi.org/10.1016/j.foodcont.2014.02.043>
- Main, D. C. J., Kent, J. P., Wemelsfelder, F., Ofner, E., & Tuytens, F. A. M. (2003). Applications for methods of on-farm welfare assessment. *Animal Welfare*, 12(4), 523-528.
- Main, D. C. J., Thornton, P., & Kerr, K. (2005). Teaching animal welfare science, ethics, and law to veterinary students in the United Kingdom. *Journal of Veterinary Medical Education*, 32(4), 505-508. <https://doi.org/10.3138/jvme.32.4.505>
- Makofske, M. (2018). Inspection regimes and regulatory compliance: How important is the element of surprise? *Economic Letters*, 177, 30-34. <https://doi.org/10.1016/j.econlet.2019.01.001>

- Marchant-Forde, J. N. (2015). The science of animal behavior and welfare: Challenges, opportunities, and global perspective. *Frontiers in Veterinary Science*, 2, 16. <https://doi.org/10.3389/fvets.2015.00016>
- Mason, G., & Mendl, M. (1993). Why is there no simple way of measuring animal welfare? *Animal Welfare*, 2(4), 301-319.
- May, P. J., & Wood, R. S. (2003). At the regulatory front lines: inspectors' enforcement styles and regulatory compliance. *Journal of Public Administration Research and Theory*, 13(2), 117-139. <https://doi.org/10.1093/jopart/mug014>
- McCalister, K. T., Dolbier, C. L., Webster, J. A., Mallon, M. W., & Steinhardt, M. A. (2006). Hardiness and support at work as predictors of work stress and job satisfaction. *American Journal of Health Promotion*, 20(3), 183-191. <https://doi.org/10.4278/0890-1171-20.3.183>
- McGlone, J. J. (1993). What is animal welfare? *Journal of Agricultural and Environmental Ethics*, 6, 26-36.
- McGuire, J. (2002). Criminal sanctions versus psychologically based interventions with offenders: A comparative empirical analysis. *Psychology, Crime & Law*, 8(2), 183-208. <https://doi.org/10.1080/10683160208415005>
- McInerney, J. (1991). A socio-economic perspective on animal welfare. *Outlook on Agriculture*, 20(1), 51-56. <https://doi.org/10.1177/003072709102000110>
- Meeus, R. (2010). Fill in the gaps: EU sanctioning requirements to improve member state enforcement of EU environmental law. *Journal for European Environmental & Planning Law*, 7(2), 135-162. <https://doi.org/10.1163/161372710X525064>
- Mellor, D. (2015). Enhancing animal welfare by creating opportunities for positive affective engagement. *New Zealand Veterinary Journal*, 63(1), 3-8. <https://doi.org/10.1080/00480169.2014.926799>
- Mellor, D. J., Patterson-Kane, E., & Stafford, K. J. T. (2009). *Sciences of Animal Welfare*. Wiley-Blackwell.
- Mench, J. A. (1998). Thirty years after Brambell: Whither animal welfare science? *Journal of Applied Animal Welfare Science*, 1(2), 91-102. [https://doi.org/10.1207/s15327604jaws0102\\_1](https://doi.org/10.1207/s15327604jaws0102_1)
- Mendl, M. (1991). Some problems with the concept of a cut-off point for determining when an animal's welfare is at risk. *Applied Animal Behaviour Science*, 31(1), 139-146. [https://doi.org/10.1016/0168-1591\(91\)90161-P](https://doi.org/10.1016/0168-1591(91)90161-P)
- Mendl, M., Burman, O. H. P., Parker, R. M. A., & Paul, E. S. (2009). Cognitive bias as an indicator of animal emotion and welfare: Emerging evidence and underlying mechanisms. *Applied Animal Behaviour Science*, 118(3-4), 161-181. <https://doi.org/10.1016/j.applanim.2009.02.023>
- Menghi, A. (2007). Italian pig producers' attitude toward animal welfare. *British Food Journal*, 109(11), 870-878. <https://doi.org/10.1108/00070700710835688>

- Miele, M. (2010). *Report concerning consumer perceptions and attitudes towards farm animal welfare*. *European Animal Welfare Platform*. European Animal Welfare Platform. Retrieved January 9, 2020, from [https://www.researchgate.net/publication/267250171\\_Report\\_concerning\\_consumer\\_perceptions\\_and\\_attitudes\\_towards\\_farm\\_animal\\_welfare](https://www.researchgate.net/publication/267250171_Report_concerning_consumer_perceptions_and_attitudes_towards_farm_animal_welfare)
- Millman, S. T., Duncan, I. J. H., Stauffacher, M., & Stookey, J. M. (2004). The impact of applied ethologists and the International Society for Applied Ethology in improving animal welfare. *Applied Animal Behaviour Science*, 86(3-4), 299-311. <https://doi.org/10.1016/j.applanim.2004.02.008>
- Moir, F. M., & Van den Brink, A. (2020). Current insights in veterinarians' psychological wellbeing. *New Zealand Veterinary Journal*, 68(1), 3-12. <https://doi.org/10.1080/00480169.2019.1669504>
- Morgan, C. A., & McDonald, M. (2007). Ethical dilemmas in veterinary medicine. *The Veterinary Clinics of North America. Small Animal Practice*, 37(1), 165-179. <https://doi.org/10.1016/j.cvsm.2006.09.008>
- Morton, R., Hebart, M. L., & Whittaker, A. L. (2018). Increasing maximum penalties for animal welfare offences in South Australia: Has it caused penal change? *Animals*, 8(12), 236. <https://doi.org/10.3390/ani8120236>
- Moses, L. (2018). Another experience in resolving veterinary ethical dilemmas: Observations from a veterinarian performing ethics consultation. *American Journal of Bioethics*, 18(2), 67-69. <https://doi.org/10.1080/15265161.2017.1409825>
- Motowidlo, S. J., Packard, J. S., & Manning, M. R. (1986). Occupational stress: Its causes and consequences for job performance. *The Journal of Applied Psychology*, 71(4), 618-629. <https://doi.org/10.1037//0021-9010.71.4.618>
- Mullan, S., Edwards, S. A., Butterworth, A., Whaf, H. R., & Main, D. C. J. (2011). A pilot investigation of farm assurance assessors' attitude to farm animal welfare as a confounding factor to training in pig welfare outcome measures. *Animal Welfare*, 20(3), 413-421.
- Napolitano, F., De Rosa, G., Ferrante, V., Grasso, F., & Braghieri, A. (2009). Monitoring the welfare of sheep in organic and conventional farms using an ANI 35 L derived method. *Small Ruminant Research*, 83(1), 49-57. <https://doi.org/10.1016/j.smallrumres.2009.04.001>
- Nett, R. J., Witte, T. K., Holzbauer, S. M., Elchos, B. L., Campagnolo, E. R., Musgrave, K. J., Carter, K. K., Kurkjian, K. M., Vanicek, C. F., O'Leary, D. R., Pride, K. R., & Funk, R. H. (2015). Risk factors for suicide, attitudes toward mental illness, and practice-related stressors among US veterinarians. *Journal of the American Veterinary Medical Association*, 247(8), 945-955. <https://doi.org/10.2460/javma.247.8.945>
- Nevas, M., & Lepistö, O. (2015). *Ympäristöterveydenhuollon valtiollistamisen esiselvityshanke [Preliminary study on the nationalization of food and environmental health control]*. (MAF 9/2015). Ministry of Agriculture and Forestry. <https://mmm.fi/documents/1410837/1720364/MMM-julkaisu-2015-9.pdf/adbc497-b09d-4ae8-beb0-c9e912960407>

- Niemi, J., K. Karhula, T., Ojanen, H. & Koikkalainen, K. (2016). *Selvitys eläinsuojeluvalvonnan toteutusvaihtoehtojen kustannuksista* [Survey on the costs of organizing official animal welfare control]. (MAF 251/03.01.01./2016) Natural Resources Institute Finland. [https://mmm.fi/documents/1410837/1858027/Raportti\\_el%C3%A4insuojeluvalvonnan\\_kustannukset\\_13-4-2017-FINAL.pdf/d51c0f0f-c902-44dc-82b8-4e9d0fee3bbc/Raportti\\_el%C3%A4insuojeluvalvonnan\\_kustannukset\\_13-4-2017-FINAL.pdf](https://mmm.fi/documents/1410837/1858027/Raportti_el%C3%A4insuojeluvalvonnan_kustannukset_13-4-2017-FINAL.pdf/d51c0f0f-c902-44dc-82b8-4e9d0fee3bbc/Raportti_el%C3%A4insuojeluvalvonnan_kustannukset_13-4-2017-FINAL.pdf)
- Niemi, J., & Väre, M. (2018). *Suomen maa- ja elintarviketalous 2018* [Finnish agriculture and food production in 2018]. (Research on natural resources and bioeconomy 34/2018). Natural Resources Institute Finland. <http://urn.fi/URN:ISBN:978-952-326-600-1>
- Nierenberg, D. (2005). *Happier Meals: Rethinking the Global Meat Industry*. Worldwatch Institute.
- Nordquist, R. E., van der Staay, F. J., van Eerdenburg, F. J. C. M., Velkers, F. C., Fijn, L., & Arndt, S. S. (2017). Mutilating procedures, management practices, and housing conditions that may affect the welfare of farm animals: Implications for welfare research. *Animals*, 7(2), 12. <https://doi.org/10.3390/ani7020012>
- Nurminen, A. (2014). *Eläinsuojeluvalvonnan järjestämisen vaihtoehdot* [Alternatives to organise official animal welfare control]. Ministry of Agriculture and Forestry. [https://mmm.fi/documents/1410837/1858027/Elainsuojeluvalvonnan\\_jarjestamisen\\_vaihtoehdot\\_2014.pdf/bffcc935-1d1a-4015-a101-80ceea93026f/Elainsuojeluvalvonnan\\_jarjestamisen\\_vaihtoehdot\\_2014.pdf](https://mmm.fi/documents/1410837/1858027/Elainsuojeluvalvonnan_jarjestamisen_vaihtoehdot_2014.pdf/bffcc935-1d1a-4015-a101-80ceea93026f/Elainsuojeluvalvonnan_jarjestamisen_vaihtoehdot_2014.pdf)
- O'Cathain, A., & Thomas, K. J. (2004). "Any other comments?" Open questions on questionnaires – a bane or a bonus to research? *BMC Medical Research Methodology*, 4(1), 25. <https://doi.org/10.1186/1471-2288-4-25>
- Ondendaal, J. S. J. (1998). The practicing veterinarian and animal welfare as a human endeavor. *Applied Animal Behaviour Science*, 59(1), 85-91. [https://doi.org/10.1016/S0168-1591\(98\)00123-3](https://doi.org/10.1016/S0168-1591(98)00123-3)
- Official Statistics of Finland. (2019a). *Number of Livestock* [web-publication]. Natural Resources Institute Finland. Retrieved January 9, 2020, from [http://www.stat.fi/til/klm/index\\_en.html](http://www.stat.fi/til/klm/index_en.html)
- Official Statistics of Finland. (2019b). *Meat production* [web-publication]. Natural Resources Institute Finland. Retrieved January 9, 2020, from <https://stat.luke.fi/en/meat-production>
- Ole Borgen, S., & Aadnegard Skarstad, G. (2007). Norwegian pig farmers' motivations for improving animal welfare. *British Food Journal*, 109(11), 891-905. <https://doi.org/10.1108/00070700710835705>
- Oltenu, P. A., & Broom, D. M. (2010). The impact of genetic selection for increased milk yield on the welfare of dairy cows. *Animal Welfare*, 19(Supplement 1), 39-49.
- Organisation for Economic Co-operation and Development. (2009). *Determination and application of administrative fines for environmental offences: Guidance for environmental enforcement authorities in EECCA countries*. <https://www.oecd.org/env/outreach/42356640.pdf>

- Organisation for Economic Co-operation and Development. (2014). *Regulatory enforcement and inspections: OECD best practice principles for regulatory policy*. <https://dx.doi.org/10.1787/9789264208117-en>
- Otten, N. D., Nielsen, L. R., Thomsen, P. T., & Houe, H. (2014). Register-based predictors of violations of animal welfare legislation in dairy herds. *Animal*, 8(12), 1963-1970. <https://doi.org/10.1017/S1751731114001918>
- Petherick, J. C. (2005). Animal welfare issues associated with extensive livestock production: The northern Australian beef cattle industry. *Applied Animal Behaviour Science*, 92(3), 211-234. <https://doi.org/10.1016/j.applanim.2005.05.009>
- Phillips, C. J. C., Wojciechowska, J., Meng, J., & Cross, N. (2009). Perceptions of the importance of different welfare issues in livestock production. *Animal*, 3(8), 1152-1166. <https://doi.org/10.1017/S1751731109004479>
- Pinillos, R. G., Appleby, M. C., Manteca, X., Scott-Park, F., Smith, C., & Velarde, A. (2016). One welfare: A platform for improving human and animal welfare. *Veterinary Record*, 179(16), 412-413. <https://doi.org/10.1136/vr.i5470>
- Platt, B., Hawton, K., Simkin, S., & Mellanby, R. J. (2010). Suicidal behaviour and psychosocial problems in veterinary surgeons: A systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 47(2), 223-240. <https://doi.org/10.1007/s00127-010-0328-6>
- Prunier, A., Heinonen, M., & Quesnel, H. (2010). High physiological demands in intensively raised pigs: Impact on health and welfare. *Animal*, 4(6), 886-898. <https://doi.org/10.1017/S175173111000008X>
- Radford, M. (2001). *Animal welfare law in Britain - Regulation and Responsibility*. Oxford University Press.
- Ransom, E. (2007). The rise of agricultural animal welfare standards as understood through a neo-institutional lens. *International Journal of Sociology of Agriculture and Food*, 15(3), 26-44.
- Rauw, W. M., Kanis, E., Noordhuizen-Stassen, E. N., & Grommers, F. J. (1998). Undesirable side effects of selection for high production efficiency in farm animals: A review. *Livestock Production Science*, 56(1), 15-33. [https://doi.org/10.1016/S0301-6226\(98\)00147-X](https://doi.org/10.1016/S0301-6226(98)00147-X)
- Rawles, K. (2000). Why do vets need to know about ethics? In G. Legood (Ed.), *Veterinary Ethics* (pp. 15). Continuum.
- Ray, P. M., & Scott, W. N. (1973). Animal welfare legislation in the E.E.C. *British Veterinary Journal*, 129(3), 194-201. [https://doi.org/10.1016/S0007-1935\(17\)36496-5](https://doi.org/10.1016/S0007-1935(17)36496-5)
- Robertson, I. A. (2015). *Animal law and welfare: Fundamental principles for critical assessment*. Routledge.
- Rollin, B. E. (1978). Updating veterinary medical ethics. *Journal of the American Veterinary Medical Association*, 173(8), 1015-1018.
- Rollin, B. E. (1993). Animal welfare, science, and value. *Journal of Agricultural & Environmental Ethics*, 6(2), 44.



- Rollin, B.E. (2005). Reasonable partiality and animal ethics. *Ethical Theory and Moral Practice*, 8(1/2), 105-121. <https://doi.org/10.1007/s10677-005-3297-1>
- Rousing, T., Bonde, M., & Sørensen, J. T. (2001). Aggregating welfare indicators into an operational welfare assessment system: A bottom-up approach. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 53-57. <https://doi.org/10.1080/090647001300004790>
- Rousseau, S. (2007). Timing of environmental inspections: Survival of the compliant. *Journal of Regulatory Economics*, 32(1), 17-36. <https://doi.org/10.1007/s11149-006-9013-9>
- Rushen, J., Butterworth, A., & Swanson, J. C. (2011). ANIMAL BEHAVIOR AND WELL-BEING SYMPOSIUM: Farm animal welfare assurance: Science and application. *Journal of Animal Science*, 89(4), 1219-1228. <https://doi.org/10.2527/jas.2010-3589>
- Rushen, J., & de Passillé, A. M. (1992). The scientific assessment of the impact of housing on animal welfare: A critical review. *Canadian Journal of Animal Science*, 72(4), 721-743. <https://doi.org/10.4141/cjas92-085>
- Rutherford, K., Baxter, E., D'Eath, R., Turner, S., Arnott, G., Roehe, R., Ask, B., Sandøe, P., Moustsen, V., Thorup, F., Edwards, S., Berg, P., & Lawrence, A. (2013). The welfare implications of large litter size in the domestic pig I: Biological factors. *Animal Welfare*, 22(2), 199-218. <https://doi.org/10.7120/09627286.22.2.199>
- Sandøe, P., Christiansen, S. B., & Appleby, M. C. (2003). Farm animal welfare: The interaction of ethical questions and animal welfare science. *Animal Welfare*, 12(4), 469-478.
- Sandøe, P., Forkman, B., & Christiansen, S. B. (2004). Scientific uncertainty: How should it be handled in relation to scientific advice regarding animal welfare issues? *Animal Welfare*, 13(Supplement 1), 121-126.
- Schindler, S. (2013). The animal's dignity in Swiss animal welfare legislation: Challenges and opportunities. *European Journal of Pharmaceutics and Biopharmaceutics*, 84(2), 251-254. <https://doi.org/10.1016/j.ejpb.2013.02.013>
- Shirangi, A., Fritschi, L., Holman, C., & Morrison, D. (2013). Mental health in female veterinarians: Effects of working hours and having children. *Australian Veterinary Journal*, 91(4), 123-130. <https://doi.org/10.1111/avj.12037>
- Simonin, D., & Gavinelli, A. (2019). The European Union legislation on animal welfare: State of play, enforcement and future activities. In S. Hild, & L. Schweitzer (Eds.), *Animal Welfare: From Science to Law* (pp. 59-70).
- Smith, C. H. B. (1998). Veterinarians and animal welfare: A New Zealand perspective. *Applied Animal Behaviour Science*, 59(1), 207-218. [https://doi.org/10.1016/S0168-1591\(98\)00135-X](https://doi.org/10.1016/S0168-1591(98)00135-X)
- Sørensen, J. T., Edwards, S., Noordhuizen, J., & Gunnarsson, S. (2006). Animal production systems in the industrialised world. *Revue Scientifique Et Technique (International Office of Epizootics)*, 25(2), 493-503.

- Sørensen, J. T., & Fraser, D. (2010). On-farm welfare assessment for regulatory purposes: Issues and possible solutions. *Livestock Science*, 131(1), 1-7. <https://doi.org/10.1016/j.livsci.2010.02.025>
- Sørensen, J. T., Sandøe, P., & Halberg, N. (2001). Animal welfare as one among several values to be considered at farm level: The idea of an ethical account for livestock farming. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 11-16. <https://doi.org/10.1080/090647001316922992>
- Spoolder, H., De Rosa, G., Horning, B., Waiblinger, S., & Wemelsfelder, F. (2003). Integrating parameters to assess on-farm welfare. *Animal Welfare*, 12(4), 529-534.
- Spooner, J., Schuppli, C., & Fraser, D. (2012). Attitudes of Canadian beef producers toward animal welfare. *Animal Welfare*, 21(2), 273-283. <https://doi.org/10.7120/09627286.21.2.273>
- Spooner, J., Schuppli, C., & Fraser, D. (2014). Attitudes of Canadian citizens toward farm animal welfare: A qualitative study. *Livestock Science*, 163, 150-158. <https://doi.org/10.1016/j.livsci.2014.02.011>
- Stafleu, F. R., Grommers, F. J., & Vorstenbosch, J. (1996). Animal welfare: Evolution and erosion of a moral concept. *Animal Welfare*, 5(3), 225-234.
- Steinfeld, H., Wassenaar, T., & Jutzi, S. (2006). Livestock production systems in developing countries: Status, drivers, trends. *Revue Scientifique Et Technique (International Office of Epizootics)*, 25(2), 505-516. <https://doi.org/10.20506/rst.25.2.1677>
- Tarasti, L. (2016). *Valtion aluehallinnon ja maakuntahallinnon uudistaminen - lukuun ottamatta sosiaali- ja terveydenhuollon uudistusta* [Reforming of the regional administration - except for reform in social welfare and public health services]. (Publication 3/2016). Ministry of Finance. <https://vm.fi/documents/10623/2033991/Valtion+aluehallinnon+ja+maakuntahallinnon+uudistaminen+-raportti.pdf/c18886c3-256f-4733-b0cb-1fb0b1f76db3/Valtion+aluehallinnon+ja+maakuntahallinnon+uudistaminen+-raportti.pdf?t=1576756244000>
- Tosi, M. V., Canali, E., Gregoret, L., Ferrante, V., Rusconi, C., Verga, M., & Carenzi, C. (2001). A descriptive analysis of welfare indicators measured on Italian dairy farms: Preliminary results. *Acta Agriculturae Scandinavica, Section A - Animal Science*, 51(sup30), 69-72. <https://doi.org/10.1080/090647001316923090>
- Touroo, R., & Fitch, A. (2016). Identification, collection, and preservation of veterinary forensic evidence. *Veterinary Pathology*, 53(5), 880-887. <https://doi.org/10.1177/0300985816641175>
- Treaty of Amsterdam amending the Treaty on European Union, the Treaties establishing the European Communities and certain related acts. (1997). *Official Journal of the European Communities*, C340, 1-144. <http://data.europa.eu/eli/treaty/ams/sign>
- Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community. (2007). *Official Journal of European Union*, C306, 1-271. <http://data.europa.eu/eli/treaty/lis/sign>

- Treaty of Rome (Treaty of establishing European Economic Community). (1957). *Official Journal of the European Communities*, C224, 6-130. [http://data.europa.eu/eli/treaty/tec\\_1992/oj](http://data.europa.eu/eli/treaty/tec_1992/oj)
- Treaty on European Union - Declaration on the protection of animals. (1992). *Official Journal of the European Communities*, C191, 103. [http://data.europa.eu/eli/treaty/teu/fna\\_1/dcl\\_24/sign](http://data.europa.eu/eli/treaty/teu/fna_1/dcl_24/sign)
- Tridimas, T. (2006). *The general principles of EU law* (2<sup>nd</sup> ed.). Oxford University Press.
- Tuytens, F., Vanhonacker, F., & Verbeke, W. (2014). Broiler production in Flanders, Belgium: Current situation and producers' opinions about animal welfare. *World's Poultry Science Journal*, 70(2), 343-354. <https://doi.org/10.1017/S004393391400035X>
- Uphoff, N. (2019). *Improving international irrigation management with farmer participation*. Taylor & Francis Group.
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, 15(3), 398-405. <https://doi.org/10.1111/nhs.12048>
- van Arendonk, J. A. M., & Liinamo, A. (2003). Dairy cattle production in Europe. *Theriogenology*, 59(2), 563-569. [https://doi.org/10.1016/S0093-691X\(02\)01240-2](https://doi.org/10.1016/S0093-691X(02)01240-2)
- van Asselt, E. D., Sterrenburg, P., Noordam, M. Y., & van der Fels-Klerx, H. J. (2012). Overview of available methods for risk-based control within the European Union. *Trends in Food Science & Technology*, 23(1), 51-58. <https://doi.org/10.1016/j.tifs.2011.08.009>
- Vanhonacker, F., Van Poucke, E., Tuytens, F., & Verbeke, W. (2010). Citizens' views on farm animal welfare and related information provision: Exploratory insights from Flanders, Belgium. *Journal of Agricultural and Environmental Ethics*, 23(6), 551-569. <https://doi.org/10.1007/s10806-010-9235-9>
- Vanhonacker, F., Verbeke, W., Van Poucke, E., & Tuytens, F. (2008). Farm animal welfare through the eyes of citizens and producers: Similarities and dissimilarities. In P. Koene (Ed.), *International Workshop on the Assessment of Animal Welfare at Farm and Group Level, 4th, Book of Abstracts*. (pp. 163-163). Ponsen and Looijen.
- Vannier, P., & Berthe, F. (2012). Editorial: The role of EFSA in animal welfare. *EFSA Journal*, 10(1), e1011. <https://doi.org/10.2903/j.efsa.2012.e1011>
- Vapnek, J., & Chapman, M. (2010). *Legislative and regulatory options for animal welfare*. (FAO legislative study 104). Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/i1907e/i1907e00.pdf>
- Weissier, I., Butterworth, A., Bock, B., & Roe, E. (2008). European approaches to ensure good animal welfare. *Applied Animal Behaviour Science*, 113(4), 279-297. <https://doi.org/10.1016/j.applanim.2008.01.008>
- Weissier, I., & Forkman, B. (2008). The nature of animal welfare science. *Annual Review of Biomedical Sciences*, 10, 15-24. <https://doi.org/10.5016/1806-8774.2008.v10pT15>

- Veissier, I., Jensen, K. K., Botreau, R., & Sandøe, P. (2011). Highlighting ethical decisions underlying the scoring of animal welfare in the Welfare Quality® scheme. *Animal Welfare*, 20(1), 89-101.
- Veissier, I., & Miele, M. (2014). Animal welfare: Towards transdisciplinarity – the European experience. *Animal Production Science*, 54(9), 1119. <https://doi.org/10.1071/AN14330>
- Veissier, I., Miele, M., & Mounier, L. (2021). Animal welfare official inspections: farmers and inspectors shared concerns. *Animal*, 15(1), 100038. <https://doi.org/10.1016/j.animal.2020.100038>
- Velde, H. T., Aarts, N., & Cees, V. W. (2002). Dealing with ambivalence: Farmers' and consumers' perceptions of animal welfare in livestock breeding. *Journal of Agricultural and Environmental Ethics*, 15(2), 203-219. <https://doi.org/10.1023/A:1015012403331>
- Ventura, B. A., von Keyserlingk, M. A. G., Wittman, H., & Weary, D. M. (2016). What difference does a visit make? Changes in animal welfare perceptions after interested citizens tour a dairy farm. *PloS One*, 11(5), e0154733. <https://doi.org/10.1371/journal.pone.0154733>
- Verbeke, W., Pérez-Cueto, F. J. A., de Barcellos, M. D., Krystallis, A., & Grunert, K. G. (2010). European citizen and consumer attitudes and preferences regarding beef and pork. *Meat Science*, 84(2), 284-292. <https://doi.org/10.1016/j.meatsci.2009.05.001>
- Viksten, S. M., Visser, E. K., & Blokhuis, H. J. (2016). A comparative study of the application of two horse welfare assessment protocols. *Acta Agriculturae Scandinavica. Section A, Animal Science*, 66(1), 56-65. <https://doi.org/10.1080/09064702.2016.1186726>
- Volk, J. O., Schimmack, U., Strand, E. B., Lord, L. K., & Siren, C. W. (2018). Executive summary of the Merck Animal Health Veterinary Wellbeing Study. *Journal of the American Veterinary Medical Association*, 252(10), 1231-1238. <https://doi.org/10.2460/javma.252.10.1231>
- Wahlberg, B. (2008). Produktions- och slaktdjurs rättsliga välbefinnande och skydd [Legal protection and welfare of farm and slaughter animals]. *Juridiska Föreningen i Finland*, 4, 369-416.
- Wahlberg, B. (2010). Djurskyddsövervakningen i Finland åren 1996–2006 gällande produktions- och slaktdjur [Animal welfare control relating to farm and slaughter animals in Finland 1996-2006]. *Juridiska Föreningen i Finland*, 4, 351-404.
- Weber, R., Keil, N. M., Fehr, M., & Horat, R. (2007). Piglet mortality on farms using farrowing systems with or without crates. *Animal Welfare*, 16(2), 277-279.
- Wilkins, D. B., Houseman, C., Allan, R., Appleby, M. C., Peeling, D., & Stevenson, P. (2005). Animal welfare: The role of non-governmental organisations. *Revue Scientifique Et Technique (International Office of Epizootics)*, 24(2), 625-638. <https://doi.org/10.20506/rst.24.2.1595>
- Winter, S. C., & May, P. J. (2001). Motivation for compliance with environmental regulations. *Journal of Policy Analysis and Management*, 20(4), 675-698. <https://doi.org/10.1002/pam.1023>

- Woods, A. (2012). From cruelty to welfare: The emergence of farm animal welfare in Britain, 1964–71. *Endeavour (New Series)*, 36(1), 14-22. <https://doi.org/10.1016/j.endeavour.2011.10.003>
- World Organisation for Animal Health. (2011). Terrestrial Animal Health Code (20<sup>th</sup> ed.). <https://www.oie.int/doc/ged/D10905.PDF>
- Wright, T. A. (2010). Much more than meets the eye: The role of psychological well-being in job performance, employee retention and cardiovascular health. *Organizational dynamic*, 39(1), 13-23. <https://doi.org/10.1016/j.orgdyn.2009.10.009>
- Wright, T. A., & Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *Journal of Occupational Health Psychology*, 5(1), 84-94. <https://doi.org/10.1037/1076-8998.5.1.84>
- Wright, T. A., & Cropanzano, R. (2004). The role of psychological well-being in job performance: A fresh look at an age-old quest. *Organizational Dynamics*, 33(4), 338-351. <https://doi.org/10.1016/j.orgdyn.2004.09.002>
- Yeates, J. W., & Main, D. C. J. (2008). Assessment of positive welfare: A review. *The Veterinary Journal*, 175(3), 293-300. <https://doi.org/10.1016/j.tvjl.2007.05.009>
- Yozgat, U., Yurtkoru, S., & Bilginoğlu, E. (2013). Job stress and job performance among employees in public sector in Istanbul: Examining the moderating role of emotional intelligence. *Procedia, Social and Behavioral Sciences*, 75, 518-524. <https://doi.org/10.1016/j.sbspro.2013.04.056>
- Yunes, M. C., von Keyserlingk, M. A. G., & Hötzel, M. J. (2017). Brazilian citizens' opinions and attitudes about farm animal production systems. *Animals*, 7(10), 75. <https://doi.org/10.3390/ani7100075>

# APPENDIX 1

## Main questions included in the questionnaire for official veterinarians

### Background information and work content

What does your job description include (you may choose more than one option)?

- Animal welfare control
- Animal health and disease control
- Food control
- Fish plant control
- Milk hygiene control
- By-product control
- Other, what?

How many years have you worked as a veterinarian?

- < 3 years
- 3–5 years
- 6–15 years
- 15+ years

How many years have you worked as an official veterinarian in the field of animal welfare?

- < 1 year
- 1–3 years
- 4–6 years
- 7+ years

What is your current position?

- Municipal
- Regional State Administrative Agency

How many animal welfare inspections do you perform on average per week?

- 1–5
- 6–10
- 10

How many times have you participated in animal welfare cases outside office hours in the past 12 months?

- None
- Once
- 2–4 times
- 4 times
- I don't know

How do you perceive your work commitment?

- Too little
- Suitable
- Too much

How often do you work overtime?

- Daily
- Weekly
- Few times per month
- More rarely

How big a proportion of animal welfare inspections do you perform alone?

- < 10%
- 10–30%
- 31–50%
- 51–80%
- 80%+

Are you able to get somebody to come with you to perform an inspection?

- Never
- Sometimes
- Often
- Always
- Only when prearranged
- I don't know

Who do you get to come with you?

- Practitioner
- Another official veterinarian
- Police
- Health inspector
- Animal welfare counsellor
- Some other, who?

### **Positive features and challenges of the work**

What are the best elements of your work?

What are the most challenging elements of your work (please select from the list) and why?

- Fieldwork
- Paperwork
- Interpretation of legislation
- Reporting
- Other, what?

Do you perceive working alone as inconvenient?

- Never
- Sometimes
- Often
- Always

Why do you perceive working alone as inconvenient?

Do you feel lonely at work?

- Never
- Sometimes
- Often
- Always
- I don't know

What kind of threatening situations have you encountered at work?

- I have been threatened with death
- I have been threatened in another way
- I have been assaulted
- My phone has been interfered with
- My home has been targeted
- Other, what?

How have you managed in a threatening situation (you may choose more than one option)?

- By discussing it
- By defending myself
- By using a weapon
- By using something that I had in my hands or could reach
- By calling the police
- By fleeing from the situation
- Other, what?

#### **Job satisfaction and negative side effects of work**

How do you perceive your job satisfaction?

- Very good
- Good
- Variable
- Bad
- Very bad

How meaningful do you consider your work?

- Very meaningful
- Somewhat meaningful
- Somewhat unmeaningful
- Very unmeaningful
- Neither meaningful nor unmeaningful

Does the work affect your sleep?

- Never
- Sometimes
- Often
- Always

Does the work negatively affect your private life?

- No
- Only a little
- Somewhat
- A lot



Do you experience work-related stress or fatigue?

- Never
- Seldom
- Sometimes
- Weekly
- Daily
- I don't know

### **Support and cooperation**

Do you get support from your superior and work community?

- Never
- Sometimes
- Often
- Always
- Yes, if I ask for it

What kind of support do you receive?

What kind of support do you want to have?

How well (very well – well – neither well nor badly – badly – very badly – I don't know) does the cooperation with your superior, the Regional State Administrative Agency, the Food Safety Authority, the police, the prosecutor, social workers and child protection workers work?

### **Use of enforcement measures and educational needs**

How do you perceive the use of enforcement measures?

- Challenging
- I can use enforcement measures well
- I need more training to use them correctly
- I don't perceive their use as difficult
- I don't know

How would you like to use the enforcement measures?

- By myself
- The Regional Administrative Agency should use them on behalf of local veterinarians
- Together with a veterinarian working as a practitioner
- Together with another official veterinarian
- Other, what?

What kind of training would you like to have (more than one option can be chosen)?

- Training in interaction skills
- Education in animal welfare and husbandry
- Education in animal diseases
- Education in legislation
- Other, what?

## APPENDIX 2

Main questions included in the questionnaire for farmers

### Background information

Gender

- Female
- Male

Year of birth

What was the main area of production at your farm in 2010–2014?

- Dairy cattle
- Beef cattle
- Calf raising
- Suckler cow herd
- Other cattle farm
- Farrowing unit
- Fattening unit
- Farrow-to-fattening unit

What is the average number of animals on your farm?

Where is your farm located (area of Regional State Administrative Agency)?

- Southern Finland
- Western and Inland Finland
- Southwestern Finland
- Eastern Finland
- Northern Finland
- Lapland
- Åland Islands
- I don't know

### Requirements of national animal welfare legislation

How sufficient is the degree of information regarding the requirements of animal welfare legislation?

- Completely sufficient
- Almost sufficient
- Neither sufficient nor insufficient
- Slightly insufficient
- Completely insufficient
- I don't know

Do you consider that your knowledge of animal welfare requirements is sufficient?

- Yes
- No

If you answered no, what are the main reasons for this?

- I am not interested in the subject
- The degree of information is insufficient

- Legislation is difficult to understand
- I have no time to study the legislation
- Some other reason, please specify
- I don't know

Is there something you would like to change, add or remove from the current animal welfare legislation?

**Animal welfare control and inspections**

How sufficient is animal welfare control in Finland?

- Completely sufficient
- Somewhat sufficient
- Neither sufficient nor insufficient
- Somewhat insufficient
- Completely insufficient
- I don't know

Why?

How necessary are animal welfare inspections in Finland?

- Completely necessary
- Somewhat necessary
- Neither necessary nor unnecessary
- Somewhat unnecessary
- Completely unnecessary
- I don't know

Why?

Would you like comment on anything else related to animal welfare control?

The Finnish animal welfare control system was updated at the end of 2009 when new official veterinarian posts were created for animal welfare control. The update was justified because of existing conflicts of interest; the same official veterinarians who were responsible for the veterinary care of the animals also carried out inspections on the same premises, i.e., on those of their clients. Have you noticed the update of the Finnish animal welfare control and if yes, how?

Has your farm been inspected during 2010-2014?

- Yes
- No

**Your experiences of the inspections**

Was the inspection / were the inspections announced before hand?

- Yes, each time
- Yes, most of them
- No, most of them were not
- No, never
- I don't know

Did you understand why the inspection was performed?

- Yes
- No

If non-compliance was detected during the inspection, what enforcement measures were applied?

- I was prohibited from repeating a procedure that violates the welfare rules or I was given an order to meet my obligations
- A prohibition or order was intensified by the conditional imposition of a fine or threat of having the neglected action taken at my expense
- The inspector took immediate action to ensure the welfare of an animal (e.g., euthanased an animal)
- The inspector seized an instrument, piece of equipment or substance and destroyed it
- An animal or an implement was seized by the inspector
- The inspector gave me guidance
- No measures were applied
- I don't know

The following statements concern the inspection situation. Choose the option (completely agree – somewhat agree - neither agree nor disagree - somewhat disagree – completely disagree) that best matches your opinion and if necessary, specify.

- Communication with the inspector was easy
- The inspection was made in mutual understanding
- My opinion was heard during the inspection
- The inspection was carried out professionally
- The inspector acted professionally
- The atmosphere was open
- The inspectors' ability to communicate was insufficient
- The inspector's actions were appropriate
- The inspection was insulting
- The inspection was beneficial
- The inspector's actions were questionable
- The inspector's observations were appropriate
- Non-compliances were explained during the inspection
- I felt that my legal protection was violated
- It is clear to me where to complain
- The inspection report was clear
- The inspection promoted my knowledge of keeping animals
- The inspection promoted the welfare of the animals
- The inspection was unnecessary
- The inspection did not disturb the routines of farm

Was a repeat inspection carried out at your farm after enforcement measures?

- Yes, each time
- Yes, in most cases
- Most of cases, no
- No
- I don't know
- Not applicable

## APPENDIX 3

**Appendix 1.** *Inspected items concerning adult cattle, calves and pigs applied during sampling-based animal welfare inspections in Finland.*

<b>Requirement</b>	<b>Adult cattle</b>	<b>Calves</b>	<b>Pigs</b>
<b>General requirements for premises</b>			
Facilities and equipment are			
safe for animals	x	x	x
easily cleanable	x	x	x
suitable for disinfection	x	x	x
Cleanliness of facilities and equipment is adequately taken care of	x	x	x
Floors do not cause damage to animals	x	x	x
Liquid secretions are properly removed or absorbed into bedding	x	x	x
Pest control is taken care of	x	x	x
Animals are easily removed from shelter	x	x	N/A <sup>a</sup>
There is equipment for fire and rescue	N/A	N/A	x
<b>Space requirements</b>			
Calves are not tied up	N/A	x	N/A
Each animal has a clean and suitable lying area	x	x	x
Calves less than 2 weeks of age have a well-littered lying area	N/A	x	N/A
Individual pens for calves are large enough	N/A	x	N/A
There is a medical reason if calves are kept in a closed-wall pen	N/A	x	N/A
Calves over 8 weeks are kept in a group box	N/A	x	N/A
There is a medical reason if calves are kept alone	N/A	x	N/A
Stalls are appropriate	x	N/A	N/A
Equipment for stalls is appropriate	x	N/A	N/A
Pigs kept in groups have enough space	N/A	N/A	x
There is enough space for a boar	N/A	N/A	x
There is enough space behind the sow in the farrowing crate	N/A	N/A	x
Piglets have a dry and appropriate lying area where they can lie down at the same time	N/A	N/A	x
In the case of free-farrowing, piglets are protected	N/A	N/A	x
<b>Environment</b>			
Temperature is good for animals	x	x	x
Lighting is suitable for animals and adequate for proper inspection and care of animals	x	x	x
Air quality and moisture are good for animals	x	x	x
In the case of mechanical ventilation, the system is checked daily and there is an alarm system which is also tested regularly	x	x	x
The noise is low enough	x	x	x

## Management

There is enough staff to take care of the animals	x	x	x
Calves are checked at least twice daily	N/A	x	N/A
Pigs are checked at least daily	N/A	N/A	x
Hooves are checked often enough and treated when necessary	x	N/A	N/A
Social hierarchy is considered	x	N/A	N/A
There are no electronic stalls and tails are not kept tied all the time	x	N/A	N/A
Pigs can see other pigs	N/A	N/A	x
Pigs have straw or other suitable enrichment material	N/A	N/A	x
Sows are given suitable material for construction of the farrowing nest	N/A	N/A	x
Mixing groups is avoided	N/A	N/A	x
In case of fighting, appropriate measures have been taken	N/A	N/A	x
There is proper care for diseased and injured animals	x	x	x
Sick and injured animals are placed, where appropriate, in separate compartments	x	x	x
Record of medical treatment is kept	x	x	x
Record of dead animals is kept	x	x	x
Killing animals is done appropriately	x	x	x
Dehorning is done when calves are under 4 weeks	N/A	x	N/A
Piglets have appropriate heating when needed	N/A	N/A	x
Sows are treated for parasites	N/A	N/A	x
Teeth of the piglets are routinely cut off / ground only if there are injuries to the sow's nipples and is done on under 8-day-old piglets	N/A	N/A	x
Piglets are castrated before the age of 8 days	N/A	N/A	x
Piglets are weaned over 4 weeks of age	N/A	N/A	x
Tails are not cut	N/A	N/A	x

## Feeding and drinking

Animals have enough adequate feed	x	x	x
Calves are fed at least twice a day	N/A	x	N/A
Feeding systems are available for all animals	x	x	x
In the case of a mechanical feeding system, the system is checked daily and there is a back-up system	x	x	x
Pigs kept in groups can eat at the same time unless feed is not ad libitum	N/A	N/A	x
Pigs are fed at least daily	N/A	N/A	x
Feed and drinking water remain clean	x	x	x
There is enough pure water available for animals	x	x	x
Calves are given something to drink at least twice daily	N/A	x	N/A
In hot weather clean water is always available for calves	N/A	x	N/A
In case of sick calves there is water available all the time	N/A	x	N/A
There are enough watering places for animals	x	N/A	N/A
In the case of a mechanical drinking system, the system is checked daily and there is a back-up system	x	x	x
There is water available all the time after age 2 weeks	N/A	N/A	x
In the case of an automatic drinking or feeding system, animals have become accustomed to it	x	x	x

**Outdoor raising and pasture**

Tie-stalled dairy cows and heifers have access to pasture or exercise area outdoors	x	N/A	N/A
Ground of outdoor area remains properly dry	x	N/A	N/A
Animals (excluding animals reared outside year-round) have adequate weather protection	x	N/A	N/A
There are appropriate facilities for isolating and treating animals	x	N/A	N/A
Fences are suitable, safe and in good condition	x	N/A	N/A
Animals outside year-round have adequate weather protection	x	N/A	N/A
Animals are acclimatized to cold gradually	x	N/A	N/A

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<sup>a</sup> Not applicable.

