

# Addressing the Pig in the Room: How is animal welfare governance in EU intensive farming systems impacting public health?

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Thesis submitted for assessment with a view to obtaining the degree of Master of Arts in Transnational Governance of the European University Institute

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European University Institute  
**School of Transnational Governance**

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## **Acknowledgments**

I would like to thank my supervisor, Prof. Adam Kamradt-Scott for his valuable guidance and advice which has helped me carry out this master project.

## **Abstract**

European agriculture has drastically changed in the last forty years. As intensive farming systems have now become the norm in animal husbandry, the problems arising from the poor hygiene, intensive indoor confinement and chronic stress of animals have become hard to ignore. While public health implications of these high-output, low-cost production systems are becoming more apparent with the rise of Anti-Microbial Resistance, EU policy intervention remains lethargic. This paper explores the way in which EU animal welfare governance addresses the pressing problems of intensive farming systems by looking at European pig farming. By conducting a policy analysis on EU animal welfare policies and legislation on pig welfare, this paper finds that the EU's ambition to make its agricultural systems more sustainable are limited by its own governance strategies and its outdated Common Agricultural Policy.

Keywords: Animal welfare; governance; European agriculture; intensive farming systems; public health; Anti-Microbial Resistance

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## **Introduction**

As the global population grows, the environment deteriorates, and viruses emerge, decision makers need to think holistically when designing policies. Agricultural policymaking urgently requires a One Health approach that acknowledges the intrinsic relationship between animal, environmental, and human health. Given that the agricultural sector represents one of the most important global economic activities that provides food security, poverty alleviation and improved livelihoods, agricultural policy reforms and strategies need to consider the public health dynamics involved. This is because agriculture is also one of the sectors that is most damaging to the environment, animal health, and, as this paper discusses, human health. Although public awareness on the environmental harms caused by animal agriculture has gained much traction in recent years, the risks it poses on human health and welfare remain relatively obscured.

In the last few decades, the level of intensification reached within animal husbandry has brought the attention of academics, activists, and EU citizens, who have demanded action by the European Union. However, European livestock production has been, and still is, guided by economic and political forces rather than sustainability considerations (Jasiorowski, 1991). In Europe, currently 45,9% of all agricultural activity consists of livestock production where pigs represent the largest animal category (EUROSTAT, 2021). More specifically, 75% of these pigs are kept in large commercial holdings with 1,000 or more heads per farm, making the EU the world's second biggest producer of pork after China (Augère-Granier, 2020). Such level of intensive confinement has dramatically impaired the health and welfare of pigs. In conditions of poor hygiene, chronic stress, and inability to express natural behaviours, farm animals have lower immune systems and are therefore prone to infections and diseases (Horback, 2019). This causes farmers to heavily depend on antibiotics to avoid high mortality rates within their herds and propagate resistant strains of bacteria that no longer respond to antibiotic treatment (Marshall & Levy, 2011). What has been identified as one of the top threats to global health, Anti-Microbial Resistance (AMR) is developing at a fast rate and is spreading directly from livestock animals into food supply and human beings (Spellberg et al., 2016).

Based on these considerations, this paper explores how European animal husbandry practices have evolved over time, and how the European Union has contributed and intervened with policymaking. In doing so, this paper addresses the health problems that are arising from intensive farming systems, impacting both animal and human health, in the form of AMR. Without disregarding the moral and ethical motivations for animal welfare improvement, this paper takes a practical approach that considers animal welfare as a key component of sustainable development. This approach reveals that systematic disregard for animal welfare in livestock production has severe implications on animal and human health, and therefore, on sustainable development. Ultimately, this paper seeks to objectively answer the question “why does animal welfare matter?” Besides the assumption that animal welfare matters ‘in itself’, for ethical and moral reasons, it attempts to answer this question by exploring the extent to which animal welfare and health are intrinsic, and the extent to which animal health and welfare are consequential to human health. However, given the policy-oriented scope of this paper, the question then becomes “how does animal welfare governance impact public health?”

The answer to this question is explored in three chapters. The first chapter provides a literature review and a historical background on animal welfare as a field of research and controversial European policy. The literature review gives a chronological insight into how farm animal welfare has been studied and how the correlation between welfare and health has been identified. The second chapter investigates the current EU policies and regulations in place for the protection of pigs in intensive farming systems, and investigates several problems tied to the EU’s Common Agricultural Policy (CAP) and the European Commission’s animal welfare and health strategies. Finally, the third chapter explores the prevailing issues that shape the current state of play in animal welfare governance and addresses three areas of action that require effective policy intervention.

## **Research Design and Methodology**

This section outlines the research design and methodology used to answer the research question. It provides an overview of the qualitative nature of the research design, followed by an outline of the research process, including data collection and case study selection. Finally, it highlights the limitations of the selected methods and collected data.

The research design of this study is qualitative as it explores the dynamics of EU animal welfare governance through non-numerical observations. In order to obtain a thorough understanding of these dynamics, this paper conducts a policy analysis of EU animal welfare policy and legislation and uses intensive pig farming as its case study. Through secondary sources of knowledge, the paper identifies themes and motivations within European policy intervention that have shaped animal welfare governance as it is today. Furthermore, this study is not confined to the social sciences as it draws its insights on Anti-Microbial Resistance and animal welfare from secondary scientific literature.

### *Case study and policy analysis*

This paper uses intensive pig farming within the European Union as a case study, to gain a holistic understanding on how pig welfare has evolved in the context of farming intensification and EU animal welfare policymaking. The selection of this case study was guided by considerations on production size, data availability, and welfare characteristics of the species. On the one hand, pigs are a typical example of a farm animal whose wellbeing has long been impaired by the intensification of farming systems and whose exploitation causes severe behavioural and physical abnormalities (Van Putten, 1989). Further, pigs represent the largest category of European livestock production, most of whom are reared in intensive farming systems. On the other hand, at this level of intensification, pigs have been victims of, and have given rise to a discernible number of zoonotic diseases that have had serious impacts on animal and human health (Wang & Cramer, 2014). A case study on intensive pig farming therefore allows for a micro-level insight into EU animal welfare governance and the public health problems associated to intensive animal farming (Gerring, 2006).

Simultaneously, for the purpose of understanding the evolution and causal links within EU policies and regulation of pig welfare in the last forty years, a policy analysis is conducted. The analysis explores the extent to which pig welfare policies and regulation have been informed by scientific and applied ethological research on the animal-human health intersection. As the paper also seeks to provide a post-implementation evaluation of EU animal welfare policies in their motivations, design, strategies, and implications, the method used is retrospective policy analysis (Patton & Sawicki, 1993). This method allows for a clearer understanding of the underlying mechanisms in EU health and agricultural policies that shape animal welfare governance. Together, retrospective policy analysis and the case study provide a lens through which important gaps and points for improvement can be identified.

### *Data sourcing*

As previously mentioned, the data collected for the case study and policy analysis consists of secondary sources. With the aim of acknowledging different perspectives within EU animal welfare policies, the study carries out data source triangulation through the convergence of information from different sources (Carter, 2014). The triangulated data collected consists of a mix of policy documents, including directives and regulations from the European Commission, European Parliament, and Council of the European Union, as well as audits and evaluations from the European Court of Auditors and the European Food Safety Agency. It also consists of institutional reports from the World Health Organisation (WHO) and Food and Agriculture Organisation of the United Nations (FAO). Furthermore, data related to the correlation between animal welfare, health, and AMR is sourced from scientific studies within veterinary and medical science.

In the literature review, secondary literature is used to provide a historical insight on the development animal welfare science, as well as European policy and legislation throughout the last forty years. On the one hand, EU policy and legislation analysis is used to track changes and developments in EU animal welfare governance. On the other hand, scientific papers on animal welfare are analysed to corroborate evidence and

convergence of information regarding the link between animal welfare and public health.

While using secondary data, the second chapter makes use of evidence-based medical and veterinary data on welfare themes and patterns of farmed pigs, from which animal welfare policy implications are drawn. The information and insights derived from scientific documents provide a valuable knowledge base, used to highlight welfare-related issues that have been neglected by policymakers. In turn, the third chapter uses position papers, policy evaluations and recommendations produced by policy analysts, animal welfare experts and other stakeholders to elucidate the road ahead in animal welfare governance.

#### *Limitations and scope*

The limitations of the methods used in this research paper are several. Firstly, due to the qualitative nature of this study, the research is not able to provide numerical insights into the causal links between intensive farming and public health degradation. Therefore, it cannot demonstrate causality nor gain independently confirmed insights on the animal welfare and public health correlation. However, by using data from peer-reviewed scientific literature providing evidence of this correlation, this limitation is mitigated. Secondly, the use of secondary sources risks the transmission of biases and misinterpretations from their authors to this study (Bryman, 2016). Thirdly, the use of a case study entails the risk of generalisation, as it is not to be assumed that the problems and implications of intensive pig farming apply to other farmed species (Gerring, 2016). Nonetheless, these limitations have been acknowledged throughout the research process and considerations on additional research methods will be given in further research.

Additionally, the scope of this paper also faces some limitations. On the one hand, the scope is limited in its space to address the numerous elements within the study of animal welfare. The various ethical and moral perspectives that have shaped animal welfare considerations will not be addressed in this paper. For instance, within the many issues that concern the use of animals by human beings, there are discussions on whether animals should be killed or not. Although this is an important ethical question,

it is not an animal welfare issue. This paper therefore only addresses the welfare of animals during their lifetime, in the context of animal husbandry. On the other hand, the scope of this paper is limited in its engagement with public health. Due to the extensive list of variables that affect public health, including zoonotic and non-zoonotic diseases, dietary habits, living conditions, genetics, and many more, this paper focuses on the development of Anti-Microbial Resistance (AMR) in humans as one of the numerous spill-over effects of intensive farming systems.

## **Chapter one.** Historical background of case study and literature review

This chapter will outline the changes of European pig farming throughout the second half of the 20th century, examining how the literature on animal welfare and pig farming has evolved and informed European Union policies. It will explore how ethical concerns over the treatment of animals in intensive farming systems, traditionally addressed by animal welfare scientists, applied ethologists, and activists, have become a public health concern increasingly addressed by decision makers. By exploring the reactive nature of EU animal welfare policymaking, this chapter identifies the main motivational drivers for policy change and development.

Prior to World War II, small subsistence and 'traditional' farming practices dominated European agriculture. This meant that farms were usually low-intensity and housed different types of crops and livestock, living most of their lives outdoors and feeding on pasture lands (Bignal & McCracken, 2000). These farms benefitted from synergies of diversification, where each farm would produce a variety of goods according to their climate, rotating crop production and animal species, and thus interrupting the life cycle of pests (Norwood, 2019). However, after World War II, a rapid modernisation of agriculture occurred, fuelling a shift from traditional to intensive farming where farms moved away from diversification towards specialisation and intensification (Hartung, 2013). From the 1950s onwards, large and expensive housing systems meant for all-year-round indoor animal raising and breeding were progressively used, and large-scale production of pre-mixed feed was introduced (Mench, 2019).

The industrialisation of agriculture meant that the number of animals raised in large-scale housing systems expanded considerably. To maintain low prices, producers increasingly looked to introduce cost-saving measures such as the automatization of feeding and maintenance systems aimed at maximising productivity while reducing labour costs (D'Silva, 2006). These measures were then regularly evaluated through the utilisation of cost-benefit analyses to identify new efficiency savings and improve production capacity (Norwood, 2019). With the development and commercialisation of modern fertilisers, pesticides, livestock health care technologies, and low transportation

costs, most farmers became specialised, producing the same type of crop or livestock each year (Ilea, 2009). This inevitably intensified their reliance on synthetic pesticides, fertilisers, and in the production of animals, the use of antibiotics, which allowed them to produce more intensely on the same amount of land (Mench, 2019)

In this new era of modernised agriculture, market forces compelled diversified farms to either specialise and expand production, or exit the industry (Sayer, 2013). In the context of porcine farming, specialised pig farms were observed to exhibit economies of scale given their unit cost of production decreased the more they produced (Donham, 2000). But to produce more, the installation of expensive machinery that would allow for increased efficiency demanded that the average fixed cost of production was minimised by placing as many pigs as possible inside the new expanded housing systems (Ilea, 2009). Such market forces gave rise to gestation crates for pregnant sows, in which pregnant pigs are confined in spaces so small that that there is not enough room to even turn around (Norwood, 2019). As the intensification of European farming systems was found to be increasingly cost-effective, in 1962 the European Union implemented the Common Agricultural Policy (CAP) to enhance modernisation and productivity with subsidies and direct payments to farmers (Bignal & McCracken, 2000). Although the early CAP facilitated food security and economic development, it also gave rise to systematic environmental and animal health problems, where indoor confinement, gestation crates, and other intensive production practices became the norm (Kuhmonen, 2018).

Over time, this level of intensified animal production triggered responses by activists, politicians, and the public, giving rise to a growing societal concern about “factory farming” (Sayer, 2013). The publication of Ruth Harrison’s *Animal Machines* (1964) pioneered the public’s engagement in animal welfare activism and inspired the British government to set up a commission to investigate livestock husbandry production (Broom, 2011). The committee, chaired by Professor F. Rogers Brambell produced the *Five Freedoms* report, which outlined five aspects of animal welfare under human control where animals should have the freedom to stand up, lie down, turn around, groom themselves and stretch their limbs (Brambell, 1965). The Five Freedoms have had an important impact on animal welfare governance as they became the basis for



European governments to establish regulations and criteria for animal welfare assessments (McCulloch, 2013). Nevertheless, the Five Freedoms report only provided general guidelines that governments were encouraged to adopt, meaning that definitive regulation of animal welfare practices remained ad hoc across the European Union.

Indeed, it was only in the 1970s that earnest discussion around pig welfare problems began to take place within the European Commission (Van Putten, 1989; Simonin & Gavinelli, 2019). This came after the 1950s saw the intensification of farm animal husbandry, which was also accompanied by pig cannibalism, impaired locomotion, transport death due to stress, bar biting, crushing of piglets and respiratory problems by pigs and farmers (Van Putten, 1989). As these problems increased alongside a discernible number of pig-related diseases, farmers resorted to tail-docking and teeth-clipping as countermeasures. In turn, the Council of Europe established the convention for the Protection of Animals kept for Farming Purposes (1976) in which discussions focused on space allowance, balanced diet, enriched environment, and limitation of harmful procedures (Veissier et al., 2008). The European Union's initiative to protect farm animals with legislation was motivated by the fact that disparities between national laws protecting animals could compromise fair competition within the common market (Council Directive 78/923/EEC). In fact, the introduction of first Directive produced in 1978 clearly states that "the protection of animals is not in itself one of the objectives of the Community" (Ibid, p. 1). Legislation on animal protection was then placed under the responsibility of the European Commission's General Directorate for the Health and Consumer Protection (DG-SANCO). It could be therefore argued that legislative changes on farming practices at the European Union were largely driven by economic considerations, in which animal health and welfare featured as a secondary concern to productivity and consumption.

Eventually, in the 1980s scholars of animal ethics and applied ethology began to address the problems posed by intensive farming practices, focusing on the behaviour of animals under human management and examining the moral consideration of human-animal relationships (Schouten, 1985; Regan, 1985; Langford, 1989; Van Putten, 1989). More specifically, veterinarians began to recognise that animals and their immune response systems are subject to challenges from their environment (Jensen,

1986; Hughes & Duncan, 1988; Broom, 1988). In fact, many important contributors to animal welfare science, including Mench (1998, 2019), Jensen (1986), Schouten (1985), Van Putten (1989) and Broom (1986,1988, 2006, 2011) have used observations on swine behaviour to highlight the importance of understanding animal behaviour when designing housing environments for farm animals. Collectively, this research contributed to the development of animal welfare science, which is principally concerned with the biological and psychological state of an animal under human care, whether in zoos, laboratories, or farms, as it attempts to cope with its environment (Broom, 1986). As this research continued throughout the 1990s, concern over the incrementing intensification of animal husbandry drew the attention of scholars from other fields, including ethics, economics, health and political science, who began to contribute further to the animal welfare base and gave rise contemporary literature on animal welfare (D'Silva, 2006; Grethe, 2017; Horback, 2019; Fernandes, 2021)

### *Contemporary Literature on Animal Welfare*

From the 1990s and onto the new century, the study of animal welfare expanded into different disciplines as public interest in the protection of farm animals continued to rise and policy intervention was increasingly demanded (Donham, 2000; D'Silva, 2006; Ilea, 2009, Veissier et al., 2008; Stathopoulos, 2010). During this period, scholars began to contemplate the practicalities of animal welfare application and enforcement (Webster, 2005). Within these practicalities, several questions on the definition, science and assessment methods of animal welfare emerged. The literature that sought to answer these questions combined applied ethology with animal ethics.

Subsequently, in the attempt to reach consensus over the very definition of 'animal welfare', many scholars have adhered to Broom's definition (1986) which sees it as a status within a continuum between poor welfare (i.e.: suffering) and good welfare (i.e.: thriving) encompassing the experiences of the animal from birth to death. Nonetheless, Cohen et al. (2009) have argued that ethical perceptions of animal welfare differ between cultures, religions, and time. But since the European Union established its own animal welfare standards, which have been adopted and accepted by its Member States, attention has been drawn to the various definitions of welfare assessment methods. For

instance, Horback (2019) reveals that the predominant method used by regulators and farmers focused on physical ailments, such as illness and body condition while ignoring psychological and emotional state of the animal. Animal science scholars, including Mench (1998), Hughes and Duncan (1988) have subsequently drawn attention to behavioural approaches to understanding and assessing animal welfare. Mench (1998) explains that the performance of certain behaviours can lead to improvements in physical health, as she shows that animals use behavioural mechanisms to reduce illness, pain, fear, stress, and tension. In the same vein, Boissy et al. (2005), while exploring the harmful effects of restrictive environments in which farmed animals live, found that chronic negative affective states such as distress, frustration, or boredom can trigger physiological and psychological changes in an animal. Such changes include locomotor activity, feeding behaviours, body temperature, body weight, sexual and maternal behaviours, and circadian rhythm (Ibid.).

As research dedicated to animal welfare science continued to expand throughout the end of the 20th century, social and political interest in animal welfare in the context of human management began to substantially increase (Ohl & van der Staay, 2012). In response, the European Union produced a series of legislative measures for the protection of farm animals in all different steps of production, including farming, transport, and slaughter (Veissier et al., 2008). Since then, legislation addressing farming activities progressed into more specific provisions that consider age, species, and different transport and slaughter operations, which are all covered by EU directives and regulations (Mul, Vermeij et al. 2010). As the first EU legislation specific to pigs came in 2001, with directives that formulated requirements for floor design, housing, and environmental enrichment for pigs at every stage of production, more literature on the psychological and physiological needs of pigs emerged (Donham, 2000). Later, the EU proposal to reform the CAP and implement the 'EU Animal Welfare Strategy 2012-2015', proposing several actions to enhance of farm animal welfare, including voluntary animal welfare payments to farmers, was well received by animal welfare advocates and scholars (Simonin & Gavinelli, 2019).

Nevertheless, these actions and advancements in the EU's legislative framework for the protection of farm animals did not come without critiques on how decision makers

determine the level and necessity of intervention. While the EU Animal Welfare strategy proposed several actions to improve housing conditions for pregnant pigs, transport arrangements to reduce injury and exhaustion and minimise pain and suffering at slaughter, critics raised several shortcomings in its level of intervention and clarity (Rojek-Podgórska, 2016). Critics also argued that EU intervention to improve animal welfare standards across the EU prioritises minimal market disruption and generally lacks a holistic approach to animal welfare considerations (Buller et al., 2018). This then triggered scholarly discussion on the various policy and economic tools that could improve animal welfare enhancement and intervention. One of these tools proposed, was the quantification of disease burden brought by poor animal welfare in intensive farming systems (Persad, 2019). While this type of utility indicator is used by national health systems to maximise quality of human life with the least amount of costs, it is not yet used in animal health and welfare policymaking.

Nevertheless, as more attention has been drawn on the adverse health effects that intensive farming systems have on the animals, concern over emerging zoonotic diseases and their cross-sector economic impact came to be increasingly discussed among scientific scholars (Narrod et al., 2012). Among these discussions, came an incrementing awareness on the correlation between the intensification of animal husbandry and the rise of Anti-Microbial resistance (AMR) (McEwen & Fedorka-Cray, 2002). As the dangers of extensive antibiotic use on farm animals became more apparent with the increased awareness on AMR, further criticism of the insufficient policy intervention by the EU emerged (Ferreira & Staerk, 2017; Serwecinska, 2020). More recently, international public health organisations, veterinarian, and medical scientists have also drawn attention to the adverse human health effects of antibiotic usage in livestock (WHO, 2014; FAO, 2006; Holmer et al., 2019; Spellberg et al., 2016; McEwen & Fedorka-Cray, 2002). Increasingly, while addressing the costs of poor animal health and welfare in intensive farming, emphasis is being placed on the rise of AMR (Spellberg et al. 2016). Indeed, it has been found that animals living in the crowded and stressful conditions of intensive farming systems are prone to contract infections, and therefore rely on antibiotics to be cured of these infections (Anomaly 2019). Further, this correlation has been observed through the environmental constraints that prevent captive animals from expressing adaptive behaviours, such as escape or shelter, which

have been found to elicit harmful side effects, including a decreased immune system (Horback, 2019).

Although the EU has recognised AMR as a rising threat to public health, its intervention in the sectors involved has been limited despite extensive warnings by scholars and organisations (Ferreira & Staerk, 2017; WHO, 2022). The devastating health effects and economic costs brought by AMR have been discussed extensively by public health scholars (Shallcross et al., 2015) and medical scientists (Monger, Gilbert et al., 2021). The general consensus is the problem of AMR is so serious that it threatens the achievements of modern medicine (Monger, Gilbert et al. 2021). The World Health Organisation (WHO), for example, has estimated that 700,000 people around the world die every year of diseases that have become difficult to cure due to antibiotic resistance, and that if the problem continues, the number could reach 10 million by 2050 (WHO, 2020). However, while non-governmental organisations and scholars of political science, economics and public health have addressed the negative externalities brought by intensive farming practices, their focus has mostly been on the environmental and public health pressures brought by manure waste, zoonotic diseases, water and soil pollution and greenhouse gas emissions (Osterberg and Wallinga, 2004; Donham, 2000; FAO, 2006; Ilea, 2009). Much of the literature concerned with the animal and human health correlation at policy level bring forward the “One Health” concept as a public health policy framework (Narro et al., 2012; Nabarro & Wannous, 2014). This concept calls for integrated policies that factor in the circulation of zoonotic agents between animals, humans, and the environment as a public health risk that has severe economic impacts.

As this chapter has explored, there has been an increasing awareness that simply focusing on the physical health of pigs without giving due consideration to animal welfare is insufficient.

EU animal welfare policies have evolved in reaction to the expansion of animal welfare science and applied ethology research, as well as societal concern. The chapter has also discussed how the development of animal welfare science has been essential to the improvement of livestock husbandry practices as it has shown that the health and welfare of animals is subject to their housing environments and has made animal

welfare a measurable scientific subject. Animal welfare science has thus become the scientific basis upon which European policies are made and informed. Nonetheless, the integration of animal welfare standards and guidelines into agricultural policies has not been a priority for decision makers nor producers.

**Chapter two.** State of play: What are the current EU policy mechanisms in place to tackle AMR and enhance pig welfare?

As chapter one examined, EU policies that address animal welfare in the agriculture sector have been often driven by a combination of basic ethical considerations and societal pressure. While improvements have been made, intensive farming systems driven by market-based policies still dominate animal welfare considerations. As the previous chapter explored, however, there is increasing recognition that environmental, animal, and human health is intimately interconnected, and poor animal welfare practices are being recognised as contributing to adverse health phenomenon such as AMR.

This chapter outlines the current state of play in EU animal welfare governance in the pig sector. Specifically, the chapter explores the problems in recent decision-making that prevent farmers from substantially improving the physiological and psychological wellbeing of farmed pigs. The chapter commences with an overview of the public health concerns associated with Europe's current pig farming practices with a particular focus on AMR. The chapter then surveys relevant EU directives and regulations that seek to address AMR while protecting pig welfare including the EU Animal Welfare Strategy 2012-15, the reformed Common Agricultural Policy (CAP) and the EU Green Deal's Farm to Fork Strategy and highlights practical problems that fail to make EU policy intervention effective.

*The EU pig sector and its ramifications on global health degradation*

The EU's sizeable livestock population has long been dominated by pigs, with approximately 146 million heads reared in the EU every year, producing 23 million tonnes of pig meat in 2020 (EUROSTAT, 2022). Most EU pigs are farmed in just a few EU Member States, including Spain (22%), Germany (17.8%), France (9.4%), and Denmark (9.2%) (EUROSTAT, 2021). While the quantity of pig meat production has risen by 3% during the period 2010-2020 (EUROSTAT, 2020), the number of pig farms across Europe have decreased by more than two thirds and the number of pigs per farm have quadrupled (Augère-Granier, 2020). These density changes can in part be explained by

the occurrence of the African Swine Fever (ASF) epidemic in eastern EU countries which affected mainly small sized pig holdings (Bellini et al., 2016). Lacking the infrastructure for the implementation of biosecurity measures, small-scale pig producers were more vulnerable to pathogen circulation among herds. The ASF epidemic therefore triggered a change in production systems, where biosecurity measures became stricter, outdoor pig farming in territories affected by ASF was prohibited, and mass culling of pigs exposed to the virus became compulsory (Bellini, 2021). These measures inevitably led to the disappearance of most small pig farms. As a result, ASF containment measures solely intended to eliminate the virus have systematically impaired pig welfare and brought to light the extent to which disease control costs are aggravated by the absence of pre-crisis prevention.

As the ASF outbreak has demonstrated, the implications of disease control are costly. Not only are animal disease outbreaks economically costly to farmers and governments, but they also contribute to animal suffering and morbidity. Further, the technical and reactive nature of disease management has severe impact on animal welfare (Heath, 2012). Although the European Commission designed a new EU 'Animal Health Strategy' in 2007 stipulating "prevention is better than cure", its recommendations failed to address the intensity of farming practices that contribute to disease emergence. Outlining four pillars, the strategy's action plan focuses on EU intervention to prevent distortion of competition for farmers, compensation mechanisms in the event of disease outbreaks, and biosecurity guidelines for different types of production systems. In terms of threat prevention, the strategy calls for better veterinary surveillance, risk analysis, and research innovation (European Commission, 2008). At no point does the action plan refer to the fact that animal welfare is a key component of good animal health and disease prevention. It does not mention, for example, the harmful and constraining farming practices that keep animals in conditions of discomfort, fear, and distress - conditions which lower animal immunity and makes them more susceptible to infection (Horback, 2019). Nor does the plan address the fundamental problems with pre-existing husbandry conditions that foster pathogen interactions, including the high-density indoor housing that propagate airborne concentrations of infectious dust and manure waste (Otte et al., 2007).



Moreover, the failure to address some of the root causes of disease outbreaks in pigs is contributing to another larger problem in the form of AMR. Described as one of the top health challenges of the 21<sup>st</sup> century, AMR jeopardizes advances in modern medicine (WHO, 2022). Loss of antibiotic efficacy threatens the effectiveness of life-saving interventions, from simple skin infections to surgery, cancer chemotherapy, and organ transplantation (Spellberg et al., 2016). As a public good, the use and misuse of antibiotics creates negative externalities and collective consequences that affect everyone (Anomaly, 2019). Said another way, the irresponsible use of antibiotics on animals, either to treat infections that could be prevented by allowing them better living conditions, or to promote growth, is affecting the ability to use antibiotics in life-saving interventions for humans. Although the EU has been progressively regulating sales of antibiotics for livestock, it is estimated that, worldwide, 66% of all antibiotics are used in farm animals (Tiseo et al., 2020). Nevertheless, as this chapter explores, EU policy remains insufficient as it does not address the underlying factors contributing animal ill-health and extensive antibiotic use related to intensive farming practices.

### *EU policy intervention*

Firstly, current EU Directives and regulations insufficiently regulate antibiotic use by farmers. They are limited by their short-term outlook on agriculture and public health. These limitations can be observed in two ways. On the one hand, the directives, regulations, and policies that cover antibiotic usage address AMR as an issue that solely concerns the sale, manufacture, import, export, supply, distribution, control, and use of veterinary medicinal products, rather than a structural problem within livestock production. This leads to disaggregated policies when tackling AMR requires coordination across multiple sectors as well as more attention to addressing the root causes, i.e., preventive efforts. For instance, the first Directive that addressed AMR, released in 2003, set out goals for EU Member States to monitor and report zoonoses and zoonotic agents (Directive 2003/99/EC). The Commission Decisions and regulations that followed only added further reporting instructions according to different types of bacteria and placed bans on the use of medicated feed and unsupervised use of medicinal products (Commission Decision 2007/407/EC; Commission Implementing Decision 2020/1729/EU; Regulation 2019/4/EU). On the

other hand, directives that protect pigs during farming processes fail to address antibiotic usage entirely. While they set minimum standards for the protection of pigs and address the need to limit painful operations such as castration without pain relief or tail-docking, they do not mention antibiotic usage (Council Directive 98/58/EC; Council Directive 2008/120/EC). Although the Directive tailored to pigs does mention that to prevent tail biting and fighting farmers need to change “inadequate environmental conditions and management systems” (Council Directive 2008/120/EC, Annex I, Chapter 1.8), it fails to specify what constitutes ‘inadequate conditions’. Further, minimum requirements on space allowance, health, feed, and other basic needs, do not include specifications designed to meet basic psychological need for play, social interaction, exercise, and other natural behaviours, which are equally essential to pig health (D’Silva, 2006). Therefore, although regulation on AMR surveillance and monitoring is undoubtedly valuable, the approach currently taken remains reactive in nature and fails to lower the risks of initial infection by neglecting the animals’ psychological needs. On these grounds, farmers are not incentivised to change their ways into more sustainable practices that enhance animal welfare which, as this chapter argues, would curtail AMR emergence.

Secondly, the EU strategies for animal welfare and action plans for AMR intervention that have been announced by the European Commission in the last decade still treat public health and animal welfare as two separate issues that are only superficially interconnected. For instance, although the ‘EU Action plan against rising threats from AMR, 2011-2016’ came almost at the same time as the ‘EU Animal Welfare Strategy, 2012-2015’, they make no reference to each other nor intersect in any of their proposed precautionary measures. While the five-year action plan does state the necessity to address the threat of AMR with a holistic approach, through the involvement of different sectors such as animal husbandry, agriculture, and veterinary medicine, almost none of its twelve actions go beyond surveillance, prudent use, and innovation of antibiotics. Only one of its actions alludes to prevention, as it presents a plan to enhance prevention and control of infections in animals through a new Animal Health Law, as well as to promote “good farming practices” (European Commission, 2011, p.8). Yet it remains vague on what these practices generally involve other than basic healthcare. Likewise, the three-year Animal Welfare strategy does not provide recommendations

on farming practices that could reduce the need for antibiotics. Although it presents actions to improve compliance with Member States, optimise synergies with the Common Agricultural Policy, and increase transparency of animal welfare information to consumers, among others, it provides no information on how farmers could improve animal welfare to reduce infection risks and antibiotic use (European Commission, 2012). The more comprehensive 'EU One Health Action Plan against Antimicrobial Resistance (AMR)' and 'EU4Health, 2021-2027' programme that followed go beyond crisis response by focusing on healthcare resilience but once again fail to address the structural issues in animal farming that interlink animal welfare and AMR. Other than augmenting the amount of funding for action implementation by €5.3 billion, addressing the role of the environment, and proposing therapeutics and alternative treatments (European Commission, 2017; Regulation 2021/522/EU), these initiatives do not diverge substantively from the 2011 EU Action Plan for AMR intervention. So, while these plans and strategies call for the adoption of a holistic approach to AMR intervention and animal welfare enhancement, their proposed actions do not reflect it.

Finally, the scale of the EU's failure to effectively intervene in proscribing AMR emergence and animal welfare deterioration can be observed in its funding schemes. It should be noted that, increasingly, the correlation between intensive farming practices and the transmission of antibiotic-resistant bacteria from animals to humans has been strongly advocated by microbiologists and veterinarians (Marshall & Levy, 2011; Neill, 2015; Burow et al., 2019; Holmer et al., 2019). Despite this, the CAP and European Agriculture Fund for Rural Development (EAFRD) continue to support business models that hold animals in crowded and unsanitary conditions. The CAP is a key European policy that is dedicated to support farmers and improve agricultural productivity, accounting for 33.1% of the total EU-27 budget (European Parliament, 2022), and through the EAFRD funding programme, it is the most important source of funding for animal welfare activities, including animal welfare payments. However, despite the various reforms that have attempted to modernize the CAP, the very structure of CAP payments maintains intensive farming systems that are detrimental to animal welfare. For instance, subsidies to farms are still distributed according to production size and output rather than to contribution towards animal and environment friendly production (Leone, 2020). Furthermore, the engagement in animal welfare-friendly

practices is not mandatory for all European farmers (Eurogroup for Animals, 2018). In terms of AMR intervention on the other hand, the new Farm to Fork Strategy within the EU Green Deal recommends the reduction of antibiotics in livestock by 50% and the increase in the share of agricultural land used for organic farming by 25% by 2030 (Fondation Robert Schuman, 2021). Yet, in terms of funding, €270 billion (72%) of the total €387 billion are allocated for direct payments to farmers, 45,9% of which are livestock farmers, mostly producing with intensive farming systems (EUROSTAT, 2021). Direct payments are therefore a systematic income support for all European farmers, regardless of the nature of their activities. This does not leave much room to fund expensive structural changes required for organic transitions and the dis-intensification of livestock farms needed to reduce antibiotic usage.

As this chapter has argued, it can be seen that EU policies have thus far been insufficient and narrow in their scope to address the underlying factors contributing to AMR emergence. The directives, regulations, strategies, action plans and CAP reforms meant to improve animal welfare and address the global health threats that stem from intensive farming practices illustrate a prevailing lack of awareness of the environmental-animal-human health relationship. The state of play of EU animal welfare and public health governance shows that the excessive harms to which pigs have long been submitted remain practically untouched either by superficial welfare regulations, or by One Health EU ambitions. The treatment of animal welfare and AMR as stand-alone issues, intervention through restriction rather than incentivization, and the adherence to the old business model of productive agriculture impede real and long-term change. The changes necessary to achieve this need to occur in all the different sectors and levels that contribute to global health degradation, in order to address the structural and root causes.

### **Chapter three.** The road ahead: Animal welfare-maximising approaches for better policy and production practices

As chapter two has illustrated, several problems in EU policy are impeding farmers from implementing changes in their farms that would improve animal welfare and reduce antibiotic use. The failure to effectively address and mitigate AMR stems from the treatment of public health and animal welfare governance as two separate fields. But as chapter one highlighted, the profound changes in production that took place in the 21<sup>st</sup> century have created systemic problems that are now integral to Europe's agriculture. The perpetual intensification of animal husbandry and systematised use of antibiotics in farm animals are sustained by market forces and 'wicked' policy problems (Kuhmonen, 2018). As a result, poor animal welfare and AMR have become deeply rooted problems that require structural changes across the healthcare and livestock sector. Focusing on three areas of action, this chapter discusses the implications of the problems mentioned in chapter two and highlights policy-relevant approaches that can help mitigate them. The first area of action discussed is awareness-raising, as a means to address root-level problems of systemic animal welfare degradation and irresponsible use of antibiotics. The second area of action considers decision-makers, producers, and consumers as key actors within the transition to sustainability and focuses on policy and strategic planning for animal welfare and public health. The third area of action discusses the importance of incentives for farmers and decision makers in the agricultural sector to reform farming practices that are detrimental to public health.

#### *Awareness*

As previously mentioned, although the environmental-animal-human health intersection has been widely recognised and the scientific community has been warning on the misuse of antibiotic for years, effective action by the EU is lacking. As discussed throughout this paper, animal welfare is now recognised not only as an element contributing to the development of antimicrobial resistance, but also to climate change, environmental pollution, water depletion, and poor labour conditions for farmers (Eurogroup for Animals, 2020). Yet one of the overarching problems that impedes policymakers from taking effective action is lack of awareness across all sectors

involved in the use and misuse of antibiotics, including among consumers. In a field where the end justifies the means - where compensation is based purely on production output rather than sustainability performance and welfare output, reforms and structural changes need to be driven by a change of mindset. On the one hand, stakeholders need to become more aware of the negative consequences associated to their aversive animal farming practices that are contributing to public health deterioration. On the other hand, stakeholders should also be made aware of the multiple benefits that good animal welfare has on public health, environmental protection, rural development, and global competitiveness.

Stronger awareness on the implications of animal welfare can allow farmers, policymakers, and consumers to make more informed decisions on issues that affect all citizens. As the European Commission's evaluation of the 'EU Animal Welfare Strategy 2012-2015' highlighted, there is a need to optimise synergies with the CAP to increase beneficiaries' awareness of animal welfare requirements (European Commission, 2021). This was also raised by the Council of the European Union, which presented the need for better awareness-raising about EU standards given that the lack of understanding of the rules impedes enforcement and legislation remains open to different interpretations (Council of European Union, 2019). Additionally, an issue that deters enforcement is the perception that good animal welfare and less antibiotic use do not go hand in hand with economic interest, even though business profitability can be enhanced by reduced mortality, improved resistance to disease and higher quality meat, which can then generate a competitive advantage for the business (Fernandes et al., 2021). The significance of these knowledge gaps has been made apparent by low Member State engagement with CAP tools and funds to address animal welfare objectives (European Court of Auditors, 2018).

Another issue that indirectly lowers producer and Member State compliance with EU animal welfare objectives is lack of awareness and information among consumers. Although recent surveys have shown that EU citizens list animal welfare as the second most important responsibility that farmers should have, EU consumers lack the information to choose their products accordingly (European Commission, 2020a). One of the reasons why lack of consumer awareness indirectly lowers producer compliance

is because it creates a lost opportunity to create consumer demand for meat that has been produced with high-welfare standards, and therefore a missed chance to incentivise animal welfare enhancement (Fernandes et al., 2021). An initiative that has been brought forward by scholars and citizens to bridge the knowledge gap between producers and consumers is the implementation of labelling schemes (Leone, 2020; Eurogroup for Animals, 2018).

On the one hand, labelling can help consumers make informed choices on what they consume and stimulate a stronger market for animal welfare-friendly production. Indeed, animal welfare labelling has already been demanded by European consumers who have voiced their dissatisfaction about the low level of awareness regarding the conditions in which farmed animals are kept and treated (European Commission, 2022). Despite this, there is only one EU-wide compulsory system of animal welfare labelling, which applies exclusively to table eggs (Simonin & Gavinelli, 2019). On the other hand, labelling schemes could also be used to inform consumers about antibiotic use while indirectly enhancing awareness on AMR. While studies have shown that EU consumers have strong concerns about the use of antibiotics in the products they consume, the idea of antibiotic labelling at EU-level has not yet gained much traction (European Commission 2022). At present, although it has been concluded by the European Commission itself that a labelling intervention would provide added value to producers and consumers, the Farm to Fork strategy proposes to still ‘consider options’ for animal welfare labelling (European Commission, 2020). Arguably, the obstacles to effective awareness-raising among decision-makers, producers, and consumers can be found in current policies constrained by wicked problems and limited strategic planning.

### *Policy and strategic planning*

The EU’s failure to take a preventive approach when it comes to animal and human health, as demonstrated by the African Swine Fever outbreak, stems from its weaknesses and limitations in strategic planning. As previously mentioned, none of its AMR mitigation and animal welfare EU-level strategies put forward actions that enhance resilience through structural change. The proposed changes have rather been restrictive in the way antibiotic sale is being limited and regulated, as well as superficial,

as the intensity of animal husbandry systems has been left untouched. Although the EU's leniency to adopt the One Health approach has been praised as a step towards the right direction, its One Health approach has not yet gained traction in agri-food systems (Garcia et al., 2020). Among many of the difficulties that the EU faces in its attempt to adopt the One Health approach at a multisectoral level is strong stakeholder resistance to policy reform. In the case of agriculture, the Common Agricultural Policy has been a controversial topic of discussion that has proven to be difficult to reform since its creation in 1962 (Germond, 2013). Nonetheless, since the European Green Deal was adopted and set to implement transformational change across all economic sectors to achieve climate neutrality, strategic planning has been directed at making the CAP more compatible with its ambitious goals (European Commission, 2020b).

As the CAP reform processes that have taken place in the last few decades have demonstrated, multi-stakeholder engagement is key. Historically, the CAP reform process has not been easy (Germond, 2013). The problems that the policy had originally been set to address, including productivity growth promotion and food affordability have now become wicked problems, bringing collateral concerns on market imbalance and the environment that have amplified the complexity of the CAP (Kuhmonen, 2018). The CAP has therefore triggered a two-camp division among the main actors in the agricultural policy field where some have advocated reform and others have lobbied against it (Germond, 2013). Among these main actors concerned, powerful farm interest groups have played a decisive role in resisting reform. For this reason, strategic planning for structural reforms in the European agriculture sector requires thorough stakeholder engagement, particularly with livestock farmers who have to make significant changes in their production methods.

Therefore, if the EU is to strictly reduce and regulate the sale of antibiotics, it is important that it also supports the transition with the development of sustainable alternatives (European Court of Auditors, 2018). In the absence of immediate antibiotic availability and alternative tools to antibiotics, current farming practices present a serious risk to animal health. This has triggered stakeholder demand for a dual transition where a reduction of antibiotic use, which increases the risk of infection in the immediate term, needs to be mitigated by financial support and innovative research



on animal health protection (Copa Cogeca, 2022). Accordingly, while antibiotic use is regulated and gradually reduced, simultaneous investment in farm infrastructure would help improve animal health and ease the costs that farmers would face. More investment in housing and bedding, for instance, could help mitigate the infection risks posed by limited space and crowding and give animals more space to express natural behaviours, strengthening their immune systems in the long term (D’Silva, 2006).

Furthermore, when it comes to directives and regulations that are addressed to farmers, a strategic approach that facilitates effective implementation is lacking. As previously mentioned, the current legislation on welfare is both complicated and limited. It is complicated in that it lacks clarity and detail in its requirements, remaining vague in many parts and failing to specify on important terms such as ‘inadequate environmental conditions’ (Council Directive 2008/120/EC). Further, it is limited in that there is no information on responsible antibiotic use and AMR prevention. If farmers are expected to change their farming practices, they should also be given the tools with legislation that provides preventive measures against antibiotic dependency. For instance, rather than addressing AMR as a sector-specific issue that concerns only the sale, supply, and distribution of antibiotics, a multi-sectorial regulatory framework providing information on responsible use of antibiotics could be more consequential. Nonetheless, as much as clearer and more complete legislation can facilitate implementation, willingness to implement cannot come without incentives.

### *Incentives*

When it comes to implementation and compliance incentivisation for farmers to enhance animal welfare and diminish antibiotic use, the EU has been relatively passive. As for any policy or measure that requires structural and costly changes, incentives are key. For instance, measures that promote higher standards of animal welfare need to be accompanied by synergies that can lower the costs of implementing them (Grethe, 2017). These synergies can be generated by existing governance instruments, such as regulation and conditional payments, as well as by further research and innovation that creates value in animal welfare enhancement and incentivises compliance.

Yet, as the EU sets itself to make agriculture more sustainable, it faces resistance from stakeholders whose willingness to comply remains low. Since the EU Green Deal was launched in 2020, animal welfare enhancement actions have been set to be implemented under sustainable rural development, for which it seeks to broaden the scope of animal welfare legislation and ensure a higher level of animal welfare across the EU (European Commission, 2020). However, the European Commission's ambitions seem to conflict with the CAP's rural development policy around animal welfare payments, which, as a voluntary measure for Member States, has led countries to devote insufficient budget allocation for it (Leone, 2020). Although analysts have found that voluntary support measures are not suitable for preventing violations of animal welfare laws, CAP funding is still provided on a voluntary basis when Member States are willing to support animal welfare enhancement (European Court of Auditors, 2018). Furthermore, when funding is allocated to animal welfare, payments are received by farmers as input support for animal welfare housing systems and management, but the actual animal welfare output is not considered (Bergschmidt et al., 2021). This leads to transparency issues where farmers are not given accountability in how the animals are kept and treated from the start to the end of their lives. This has resulted in increasing demand for a CAP reform that adds conditionality to payments based on animal welfare output, rather than input on minimum standards for animal welfare-friendly infrastructure (Council of the European Union, 2019).

However, it has become clear that for a results-based conditionality to be implemented within CAP animal welfare payments in the first place, decision makers require more science-based incentives (European Commission, 2021). Further research on the costs and benefits of farm animal welfare could therefore provide further empirical evidence for decision-making improvement. Conducting impact assessments and cost-benefit analyses on animal welfare enhancement could shed more light onto the effects it could have on the workforce, competitive advantage for businesses, risk mitigation and social consequences (Fernandes et al., 2021). For instance, by conducting further investigation on the interconnectivity between sectors that affect human, environmental, and animal health, the evidence base for policymakers can be increased. A quantitative evidence base that delineates the "true" burden of AMR, for example, could uncover needs for further action and guide EU policymakers in their priority-setting efforts (Persad,

2019). In the same vein, further research on the costs of animal disease and mortality stemming from animal welfare issues can help develop incentives for producers. By investigating and articulating animal welfare as an element of risk to food safety and consumer health, producer responsibility to comply with welfare standards becomes more serious (Buller et al., 2018).

As this chapter has explored, agricultural reform is not an easy task. Currently, farmers see investment in animal welfare enhancement as a cost and a disruption to cost-effective production and lack the information to be aware of the subsequent implications. As long as awareness on AMR and public health consequences of poor animal welfare remain low, willingness to implement necessary structural changes remains low as well. Yet this depends on the strategic planning of agricultural policies in how they implement the One Health approach and prioritise prevention to combat AMR. Although the correlation between animal welfare and health has been established by the scientific community for some time now, the structure of the CAP prevents effective change from taking place. In the absence of results-based animal welfare payments to farmers, labelling schemes and quantitative research on the “true” burden of poor animal welfare, policy intervention remains toothless and market forces continue to favour intensive farming systems. For this reason, awareness, strategic planning, and incentives are important elements that should be considered by decision makers in agricultural policymaking.

## Conclusion

This paper has examined how animal welfare governance has evolved in the EU in the last few decades and how its past and current policies are impacting public health. With a particular focus on pig intensive farming, the purpose of this study was to demonstrate the relevance of EU policy intervention to mitigate the public health threats arising from livestock intensification. To this end, this paper has looked at the problems and limitations within the EU's agricultural policies, legislative framework and policy strategies that shape current animal welfare.

Having explored the evolution of animal welfare both in academia and in European policy that has taken place in the last 40 years, an epistemological shift was identified, where ethical and moral considerations of animal welfare gradually turned into scientific and practical considerations. The literature review has shown that while practical problems within intensive farming have long been identified, other rooted problems in European agricultural policy are becoming increasingly apparent. On the one hand, the EU's Common Agricultural Policy, with its well-guarded direct payments system and low prioritisation of animal welfare, impedes systematic change from happening in the favour of sustainable animal husbandry. On the other hand, even though much of the literature demonstrates a clear correlation between poor animal welfare conditions and the development of AMR due to extensive antibiotic use, the EU has intervened little and ineffectively.

These root-level problems were explored by looking at the extent to which the EU Animal Health Strategy, Farm to Fork Strategy, One Health Action Plan against AMR, animal welfare legislation and the reformed CAP sufficiently address the interconnection between animal welfare, animal health, and human health. It was found that these measures meant to increase public health resilience and agricultural sustainability fail to propose substantial changes that target the business model of intensive farming that substantially contributes to AMR. The analysis of these measures found that the problems are multifactorial and therefore require several types of

intervention at different levels of governance. As these different levels of governance were investigated, three areas of intervention and reform were identified. These areas concern EU policy and strategic planning, lack of awareness among stakeholders, and low incentivisation to reform detrimental farming practices and agricultural policies. An important takeaway from the literature was that the post-war changes that have profoundly shaped Europe's agricultural systems are difficult to reform and adapt to today's environmental and health crises. These difficulties stem from a range of obstacles including stakeholder resistance, political and market forces that favour farm intensification, and wicked problems within the CAP, as a policy that promotes agricultural economic development but conflicts with environmental conservation and public health.

Nonetheless, it was also found that the EU's progressive adoption of the One Health approach favours the transition towards more sustainable agriculture. By enhancing public and stakeholder awareness on the animal-human-environmental health intersection, Member State compliance can be incentivised and consumer demand for better animal welfare can be stimulated. Furthermore, the study found certain financial and governance tools such as conditional payments for animal welfare, labelling schemes, and innovative research to be viable options for more effective animal welfare governance.

While addressing questions surrounding the impacts of intensive farming systems, this study has raised several issues that require further research. The most prominent one concerns the way in which the CAP can be reformed and optimised to fit the EU's sustainability agenda. If the EU is to address and mitigate the pressing health problems that threaten the wellbeing of society as a whole, it needs to be diligent in its policy intervention strategy. Furthermore, a thorough quantitative analysis of the "true" burden of poor animal welfare on human and environmental health would help elucidate the severity of the problem and provide further incentives for decision makers to implement significant changes. Although animal welfare has now reached a normative status in EU policy and legislation, discussions around the topic still depend on the benevolence of policy makers rather than serious commitment to a more sustainable and resilient Europe.

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