

Essay

Animal Welfare Washing in Agriculture Supply Chains: Regulatory Gaps, Trade Incentives, and Ethical Risks

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Abstract

Animal welfare has become an increasingly prominent attribute in global food markets, embedded within sustainability narratives, quality claims, and ethical branding strategies. However, the proliferation of animal welfare claims has not always been matched by equivalent improvements in on-farm welfare outcomes. This paper conceptualises animal welfare washing (AWW) as a systemic phenomenon in animal-based supply chains, whereby welfare narratives, standards, and certifications create the appearance of ethical production without delivering measurable improvements in animal welfare. Drawing on the interdisciplinary literature from animal welfare science, sustainability studies, trade governance, and food policy, this conceptual essay examines how AWW emerges from the interaction of industrial farming systems, fragmented public and private regulations, trade incentives, and information asymmetries. The analysis shows that AWW undermines ethical commitments to animals, regulatory credibility, and food quality governance. Welfare claims frequently operate as credence-based quality signals, despite weak links to verifiable welfare outcomes. Together, these conditions enable symbolic compliance and regulatory arbitrage across global value chains. As a result, genuinely higher-welfare producers face distorted competition, while consumers encounter diminishing trust in sustainability labels. It is argued that addressing AWW requires a shift toward outcome-based measurable welfare standards, stronger enforcement, improved integration with food quality regulation, and trade-compatible governance frameworks that reward performance rather than symbolic claims. By situating AWW within broader sustainability and trade dynamics, this paper advances debates on ethical food governance.

Keywords: animal welfare certification; ethical claims; outcome-based welfare; regulatory gaps



Academic Editor: Manfred
Max Bergman

Received: 10 February 2026

Revised: 5 March 2026

Accepted: 9 March 2026

Published: 16 March 2026

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1. Introduction

The globalisation of animal agriculture has led to increasingly large-scale and intensive production systems, designed to satisfy global demand for meat, dairy, eggs, and other animal products, with profound implications for animal welfare [1]. Intensive livestock systems have expanded worldwide, driven by economies of scale and integration into global supply chains, contributing to higher animal densities and standardised housing practices that challenge animal welfare outcomes [2]. Industrial production models focus predominantly on efficiency and productivity, often at the expense of livestock's behavioural needs

and health outcomes. As animal welfare science has advanced, disparities between production realities and scientific welfare benchmarks have become more visible, revealing structural tensions in globalised food systems [3]. Despite growing attention to welfare labelling and sustainability communication, the existing literature has not systematically conceptualised animal welfare washing (AWW) as a governance phenomenon embedded in trade and regulatory dynamics.

As society's awareness of animal sentience has grown, animal welfare has emerged as a prominent attribute of credibility in food markets. As consumers cannot directly verify welfare outcomes, they must rely on external signals such as labels or certifications. Research on animal welfare labelling highlights that terminology like "free-range", "organic", or "higher welfare" is increasingly deployed in product marketing to link the required consumer information with the production practices; however, the proliferation of schemes generates substantial variability in standards and consumer comprehension [4]. Labels thus function as communication devices in a global food market where regulatory harmonisation is limited and voluntary schemes coexist with heterogeneous private standards. The growing number and diversity of claims can create confusion and scepticism among consumers regarding the welfare conditions associated with labelled products [5].

Animal welfare is recognised not only as an ethical concern but also as a factor influencing product quality, including physiological stress markers and meat characteristics (e.g., [6–8]). However, policy and trade analyses frequently treat welfare as separate from food quality regulation. Within global trade structures that incentivise export competitiveness and market differentiation, welfare claims may therefore promote symbolic compliance rather than substantive improvements that align welfare, trade, and quality objectives [9]. While animal welfare practices can plausibly affect food quality through physiological stress and handling effects, food labelling law generally limits welfare claims to verifiable practices rather than permitting implicit statements about product quality.

A growing body of critical literature on animal welfare communication reveals that not all welfare claims correspond to measurable improvements in on-farm conditions or downstream quality outcomes. Studies of voluntary labelling schemes in Europe [10] and the U.S. [11] reveal that inconsistencies across standards, voluntary frameworks, and a lack of harmonised criteria can allow animal welfare assertions to function more as marketing signals than verifiable welfare performance indicators. This divergence between label claims and actual animal welfare realities undermines regulatory credibility by eroding distinctions between substantive welfare compliance and symbolic claims [12]. When welfare labels fail to reflect actual welfare states, consumer trust and policy incentives for reform are weakened [4,13].

Animal welfare claims are increasingly embedded within broader sustainability labelling frameworks that combine environmental, social, and ethical attributes [14,15]. However, consumer understanding of multi-dimensional sustainability labels remains limited, and behavioural effects are modest outside controlled settings [16]. This fragmentation complicates efforts to integrate animal welfare meaningfully into sustainability governance.

The proliferation of claims without consistent standards thus risks reinforcing superficial interpretations of sustainability that detach ethical and animal welfare performance from production realities, decreasing the potential of sustainability governance to deliver holistic improvements across supply chains. This article conceptualises AWW as a multi-dimensional governance problem shaped by farming systems, regulatory fragmentation, and trade incentives within global value chains. Building on animal welfare science, food labelling research, and trade governance analysis, this conceptual essay:

- (1) Examines structural incentives in supply chains that facilitate AWW;
- (2) Analyses the ethical and regulatory implications of decoupled animal welfare claims;

- (3) Explores how animal welfare narratives relate to expectations about food quality.

By positioning AWW within broader trade and sustainability dynamics, the article advances a governance-oriented framework for understanding credibility gaps in animal welfare claims and identifies directions for policy reform.

2. Conceptualising Animal Welfare Washing

For this conceptual essay, a theoretical and analytical methodology was employed, integrating the literature from animal welfare science, sustainability governance, and trade law to develop the animal welfare washing framework, identifying mechanisms, typologies, and governance indicators, without original empirical data collection.

2.1. From Greenwashing and Human-Rights Washing to Animal Welfare Washing

The concept of AWW draws on established critiques of sustainability communication, particularly greenwashing and human-rights washing, while revealing its distinct dynamics in animal-based supply chains. Greenwashing is widely understood as the selective disclosure or exaggeration of environmental performance to create a misleading impression of sustainability without corresponding substantive change (e.g., [16–18]). More recent scholarship extends this critique to social and human-rights domains, showing how ethical narratives may be mobilised strategically to maintain legitimacy while avoiding deeper structural reform [19]. Within food systems, animal welfare increasingly occupies a similar symbolic position: it is invoked as an ethical pillar of sustainability, yet often detached from measurable outcomes [20,21]. This lineage situates AWW within a broader pattern of sustainability governance in which ethical claims substitute for verified performance [21]. Drawing on institutional theory, AWW is distinguished by its embedding in formally legitimate frameworks, where ethical claims can be decoupled from actual practice. This positions AWW as a specific form of governance decoupling, rather than a mere extension of greenwashing.

As such, AWW can be defined as the use of claims, labels, standards, or narratives that suggest high levels of animal welfare while masking minimal, uneven, or unverifiable animal welfare delivery along supply chains. Unlike traditional regulatory non-compliance, animal welfare washing often operates within formally legal frameworks, exploiting regulatory gaps, weak enforcement, and the voluntary nature of many private standards. Global supply chains amplify these dynamics by separating production from consumption and dispersing responsibility across multiple actors and jurisdictions. Scholars of animal welfare governance (e.g., [21–23]) emphasise that welfare outcomes are shaped not only by farm-level practices but also by upstream breeding choices and downstream market incentives, revealing the need for supply chain analysis. In sustainability terms, AWW reflects a variety of decoupling ranging from minor symbolic adjustments to uneven or partial welfare improvements, thereby challenging the integrative ambition of sustainable food systems.

AWW is distinct from general misleading advertising or ‘humane washing’ in that it operates within formal legal frameworks, and from simple non-compliance or ambiguous ‘welfare-friendly’ claims in that it strategically exploits gaps, enforcement weaknesses, or voluntary standards to create the appearance of high welfare without guaranteeing substantive outcomes.”

2.2. Differentiating Genuine Animal Welfare Delivery from Symbolic Compliance

Distinguishing genuine animal welfare delivery from symbolic compliance requires moving beyond formal adherence to standards and assessing whether claimed practices translate into improved animal experiences. Animal welfare science consistently demon-

states that welfare is an outcome-based concept, encompassing health, behaviour, and affective state, rather than mere compliance with inputs or housing specifications [22,23]. However, many animal welfare schemes prioritise easily auditable structural criteria, such as space allowances or housing type, which may not reliably predict welfare outcomes. Research on animal welfare labelling and certification shows substantial variation in stringency, with some schemes offering little improvement over baseline legal requirements [4,24]. Symbolic compliance emerges when welfare meets minimal market expectations without substantively improving animal outcomes, reflecting decoupling within institutional frameworks.

To identify AWW, we propose a formalised analytical framework consisting of three connected analytical indicators:

- (1) Governance structures—whether animal welfare standards are mandatory or voluntary, independently verified or self-reported, and embedded within coherent sustainability frameworks [25,26].
- (2) Animal welfare outcomes—whether claimed practices demonstrably improve animal health, behaviour, and stress indicators, drawing on welfare science rather than procedural compliance alone [27,28].
- (3) Information integrity—how animal welfare claims are communicated to consumers and trading partners, including clarity, comparability, and the avoidance of implicit quality or sustainability signals that are not empirically supported [29].

Assessing these dimensions allows AWW to be positioned along a spectrum, from minimal symbolic compliance to partial or uneven welfare improvements. Failures across the spectrum highlight broader governance weaknesses that prioritise reputational assurance over substantive change. This framework clarifies the conceptual boundaries of AWW, differentiates it from general greenwashing, and integrates insights from institutional decoupling theory, making it a distinct and analytically tractable phenomenon within animal welfare governance.

In practice, these indicators can be operationalised as evaluative tools: for example, governance structures can form a checklist to assess the independence and enforceability of standards; animal welfare outcomes can serve as coding domains for content analysis or performance audits; and information integrity can guide comparative case studies of labels, corporate reports, or consumer-facing claims, enabling systematic empirical assessment of AWW across contexts.

3. Farming Systems, Animal Welfare, and Production Realities

3.1. Industrial Farming Systems and Animal Welfare Constraints

Industrial livestock farming systems are characterised by high stocking densities, standardised housing, intensive genetic selection favouring productivity, and strong reliance on technological and pharmaceutical inputs. These are structural features that shape both production outcomes and animal welfare risks. A substantial body of animal welfare science shows that these features can constrain welfare by limiting natural behaviours, increasing disease risk, and imposing physiological stresses beyond animals' coping capacities. For example, high stocking densities and restrictive housing systems are associated with restricted movement, behavioural deprivation, and elevated risk of locomotory disorders in multiple species under intensive husbandry [30].

Empirical studies link intensive systems to elevated risks of lameness, metabolic disorders, behavioural restriction, and chronic stress across poultry, swine, and dairy cattle [30–36]. These welfare compromises reflect structural constraints rather than isolated management failures.

Rapid genetic selection for growth or yield traits has exacerbated welfare challenges by creating disproportionalities between production potential and animals' anatomical and physiological capacities [37]. Selection focused on high productivity often deprioritises health, longevity, fertility, and robustness traits, leading to trade-offs such as increased susceptibility to metabolic and reproductive disorders, lameness, and other welfare-related pathologies [37–39].

These constraints reflect structural trade, prioritising efficiency and yield over welfare, highlighting the systemic pressures that can drive symbolic compliance when welfare outcomes are secondary to production goals.

3.2. Structural Pressures Shaping Production Practices

Production practices within industrial systems are shaped by structural pressures arising from global competition, price volatility, and supply-chain consolidation [40,41]. Farmers operating within vertically integrated or contract-based systems often face limited autonomy over housing design, stocking density, breed choice, and input use, constraining their ability to implement welfare improvements even where willingness exists [40,42]. Cost pressures generated by globalised markets incentivise practices that minimise per-unit production costs, frequently prioritising efficiency over animal welfare outcomes [43]. These structural pressures are reinforced by trade liberalisation and market concentration, enabling corporations to externalise welfare risks while imposing compliance demands on producers. Such dynamics help explain why symbolic compliance, rather than substantive welfare improvements, can emerge in industrial supply chains [44–46].

3.3. Animal Welfare Compromises and Their Invisibility Downstream

Animal welfare compromises at production are often invisible to downstream actors, including processors, retailers, and consumers. Modern food supply chains spatially and institutionally separate production from consumption, creating information asymmetries that limit transparency and weaken accountability [26]. Because welfare is a credence attribute, consumers must rely on labels, certifications, or corporate assurances, which may not capture actual conditions [44].

Consumers cannot directly observe welfare and must rely on labels and assurances, which are vulnerable to misinterpretation. Auditing and certification often emphasise structural compliance over outcome-based measures, allowing production realities to remain obscured. These information gaps facilitate AWW by enabling welfare claims to circulate independently of actual animal experiences [44–48].

3.4. Implications of Production Methods for Food Quality

Production methods that compromise animal welfare also affect food quality, challenging the implicit association between welfare claims and superior products. Animal stress, poor health, and inappropriate handling can reduce meat tenderness, water-holding capacity, colour, and shelf life through physiological stress mechanisms [49]. Chronic welfare deficits may also increase reliance on pharmaceuticals, affecting antimicrobial resistance and consumer perceptions of food safety [50]. These connections reveal that animal welfare is integral to food quality governance. When AWW obscures production realities, it can mislead consumers regarding both ethical and quality attributes of animal-based products.

4. Regulatory Gaps and Fragmented Governance

Public regulation of farm animal welfare remains uneven, fragmented, and limited in scope across jurisdictions. While many countries have enacted baseline animal welfare legislation, these laws often focus on preventing extreme suffering rather than promoting positive welfare states, and they frequently allow significant exemptions for industrial

farming practices [51,52]. In the EU, for example, animal welfare rules apply primarily to certain species and production stages, leaving substantial gaps in enforcement and coverage, particularly in relation to transport and slaughter [51]. Outside the EU, in the USA, for example, welfare regulation is often weaker or non-binding, relying on voluntary guidelines rather than enforceable standards [52]. These limitations constrain public law's capacity to deliver meaningful animal welfare improvements and create regulatory environments in which welfare claims can proliferate without a strong legal basis. Private standards and certification schemes have emerged to fill these regulatory gaps, yet their effectiveness is uneven [4]. Auditing softens and emphasises structural compliance rather than outcome-based welfare measures, which demonstrates a decoupling between formal governance structures and actual welfare outcomes.

Even where animal welfare rules exist, enforcement failures significantly undermine their effectiveness. Public enforcement agencies are often under-resourced, while inspection regimes may prioritise food safety or biosecurity over welfare outcomes [53]. In private governance systems, conflicts of interest may arise when audits are commissioned and paid for by the firms being assessed, weakening independence and rigour [54]. These enforcement weaknesses facilitate regulatory arbitrage, whereby producers and firms exploit differences in welfare requirements across jurisdictions or standards to minimise compliance costs while maintaining access to markets that reward animal welfare claims [40]. Regulatory arbitrage is particularly pronounced in global supply chains, where production may be relocated to jurisdictions with lower animal welfare requirements while downstream actors continue to market products under high-welfare or sustainable branding [55].

Regulatory gaps and enforcement weaknesses facilitate arbitrage across jurisdictions and standards, allowing producers to minimise costs while maintaining welfare claims. This mechanism illustrates the connection between governance structures and information integrity within the AWW framework.

A further governance challenge lies in the persistent disconnect between animal welfare regulation and food quality regulation. Food law frameworks traditionally prioritise safety, hygiene, and compositional standards, treating animal welfare as a separate ethical concern rather than an integral component of food quality [56,57]. Although animal welfare can influence quality attributes such as meat texture, shelf life, and residue risks, welfare considerations are rarely embedded in formal food quality or labelling regulations. This separation allows welfare claims to function as quasi-quality signals without being subject to the same evidentiary thresholds as safety or nutritional claims.

5. Trade Incentives and Global Supply Chain Dynamics

5.1. *Global Value Chains in Animal Agriculture*

Animal-based food production is deeply embedded in global value chains, in which production, processing, and consumption are geographically dispersed and coordinated through transnational firms and retailers. Research on agricultural global value chains emphasises that modern agrifood value chains involve complex networks of suppliers, processors, traders, and retailers that span multiple countries and stages of the production process, shaping how food systems function globally and how value is distributed across actors [58,59]. In the livestock sectors, welfare governance is primarily embedded in private standards and corporate codes rather than in public regulation. Third-party certification and retailer-driven requirements exemplify private governance mechanisms, consistent with global value chain governance theory, which stresses how lead firms shape supplier practices and standards across geographically dispersed production networks [60,61].

Sustainability and animal welfare claims thus become tools for coordination and differentiation within global value chains, enabling downstream actors to signal ethical attributes

to consumers and to segment markets based on credence qualities, despite upstream constraints related to cost, efficiency, and competitive pressures. The proliferation of private standards and labels illustrates how value chains integrate welfare claims for market differentiation, even when upstream practices vary, highlighting the causal pathway through which value chain governance incentivises symbolic compliance [60]. The concentration of power and the reliance on private certification mechanisms can permit downstream actors to benefit from animal welfare branding without fundamentally altering upstream production practices [59].

5.2. Trade Liberalisation, Competition, and Cost Pressures

Trade liberalisation has intensified competitive pressures in animal agriculture by facilitating cross-border sourcing and price competition. While liberalised trade can improve market access and efficiency, it also incentivises cost minimisation, often constraining investments in higher-welfare production systems that entail increased labour, space, or input costs [55]. Research in food systems shows that differences in regulatory stringency across countries influence export competitiveness in livestock sectors, such as pork: a recent panel analysis of pork trade between EU countries found that stricter national animal welfare regulations were associated with a reduction in pork exports, suggesting that higher compliance costs can affect producers' ability to compete in price-sensitive global markets [55].

Producers in export-oriented systems face a tension between meeting welfare-related expectations in importing markets and remaining competitive in global markets, particularly where stringent animal welfare requirements raise production costs relative to competitors located in jurisdictions with less demanding standards. Trade liberalisation, by exposing producers to competition with lower-cost jurisdictions, creates structural incentives for symbolic compliance. Producers may adopt welfare claims sufficient to meet importing market expectations while avoiding costly, substantive improvements, illustrating a direct causal mechanism linking trade pressure to AWW [61,62].

Where animal welfare improvements are not adequately rewarded through price premiums or long-term contracts, producers lack robust financial motivation to adopt higher-welfare practices. Limited financial incentives and uneven consumer demand reinforce symbolic compliance, with welfare claims functioning strategically for reputation and market access rather than reflecting substantive welfare outcomes [63].

5.3. Welfare Claims as Market Access and Reputational Tools

Animal welfare claims increasingly serve as market-access tools in high-income regions, where consumer concern about ethical production is strong. Retailers and global food companies embed animal welfare criteria into purchasing and branding, using public commitments and benchmarks to shape supplier practices and signal ethical standards, reinforcing alignment with premium market expectations [64].

Retailers and importing countries often require suppliers to meet specific animal welfare standards, even if not legally mandated. Voluntary standards frequently become de facto prerequisites for supply, shaping competitive positioning [65]. While enhancing welfare expectations, market-driven standards can incentivise minimal compliance with visible criteria rather than substantive improvements, demonstrating a mechanism through which global supply chains translate competitive pressure into symbolic welfare claims [66].

Research shows welfare claims shape consumer perceptions and firm positioning, but when standards are weak or poorly enforced, these claims operate as symbolic signals, enhancing legitimacy without substantive welfare improvements, consistent with AWW dynamics [45,67].

5.4. *Equivalence, Mutual Recognition, and Regulatory Arbitrage*

International trade governance shapes animal welfare through principles like equivalence and mutual recognition under the World Trade Organization (WTO). The application of the Sanitary and Phytosanitary (SPS) Agreement requires countries to accept exporting nations' measures if they achieve comparable protection, facilitating trade, but potentially obscuring substantive differences in welfare outcomes across production systems [68]. Equivalence and mutual recognition emphasise procedural and risk-based alignment over substantive welfare outcomes, making process-based welfare measures difficult to enforce under WTO SPS rules. This creates structural opportunities for regulatory arbitrage, where producers may exploit lower-welfare jurisdictions while maintaining high-welfare claims downstream, a key mechanism facilitating AWW [69].

Producers may exploit lower-welfare jurisdictions while retaining access to markets valuing welfare claims, a form of regulatory arbitrage. Recognised equivalence across differing standards allows firms to minimise compliance costs, maintain high-welfare branding, and gain a competitive advantage, operating across fragmented regulatory landscapes to meet only minimal recognised benchmarks [70]. Equivalence-based arbitrage reinforces AWW by enabling welfare narratives to circulate independently of actual production practices, demonstrating how global trade governance interacts with value chain structures to sustain symbolic compliance [69].

5.5. *Implications for Food Quality and Sustainability Governance*

Trade-driven welfare claims often imply superior quality, safety, or integrity. Consumers increasingly expect relevant information as part of food quality, yet the link between welfare and legally defined quality attributes remains unclear [26]. Trade and food law generally separate animal welfare from quality and safety standards. In the EU, most welfare labels are voluntary, lacking harmonised criteria, creating regulatory gaps in consumer information, and limiting verification against legally defined food quality norms [26]. Welfare narratives can act as quasi-quality signals internationally, even without legal quality integration. Consumers may infer safety, taste, or nutrition from animal welfare claims, which experimental research shows can shape perceptions independently of verifiable or regulated food quality outcomes [45].

From a sustainability governance perspective, decoupling ethical, quality, and trade objectives weakens policy coherence. Animal welfare labels can evoke perceptions of higher quality and ethical production, yet regulatory heterogeneity limits their ability to ensure verifiable, meaningful sustainability improvements in practice [13]. Consequently, AWW emerges not only from weak animal welfare regulation but also from the interaction between trade incentives, fragmented governance, and the strategic use of ethical claims within competitive global markets, where welfare becomes a market signal with limited grounding in consistent quality governance.

6. Mechanisms and Typologies of Animal Welfare Washing

Animal welfare washing (AWW) builds on greenwashing by transferring its logic of symbolic misrepresentation into the domain of animal ethics and welfare science. Greenwashing generally refers to the practice of presenting an organisation's environmental performance as better than it is, often through selective disclosure or vague environmental messaging that lacks substantive practice change, creating a gap between communication and actual environmental outcomes. In contrast, AWW targets claims about the treatment and wellbeing of sentient animals, where welfare outcomes are objectively measurable yet often not realised in production despite ethical branding and marketing narratives. The welfare washing concept captures how advertising and product communication por-

tray producers as humane while obscuring underlying industrial practices, constituting a specific form of rhetorical decoupling rooted in welfare assertions rather than environmental attributes. This represents a conceptual advance by situating symbolic ethical claims about animal treatment within broader governance and marketing dynamics beyond generic greenwashing frameworks [12,67]. The mechanisms and typologies of AWW are summarised in Table 1.

Table 1. Summary of mechanisms and types of animal welfare washing (AWW).

Typology	Core Mechanism	Primary AWW Indicator Affected	Governance Level	How It Operates	Key Risk
Label-based washing	Welfare labels shape perceptions without measurable welfare improvement	Information integrity; Outcome indicators	Market/Retail	Conflates welfare with quality, safety, or sustainability; Relies on weak harmonisation and unclear standards	Consumer deception; Symbolic differentiation
Certification & audit-based washing	Procedural compliance substitutes for outcome verification	Governance structures; Outcome indicators	Private governance	Checklist-based audits, input metrics, conflicts of interest in commissioned audits	Assurance-based legitimacy without substantive welfare gains
Regulatory & policy washing	Strong legal language with weak enforcement	Governance structures	Public governance	Under-enforcement, low sanctions, soft law commitments, aspirational rhetoric	Decoupling between law and practice
Corporate narrative/ESG washing	Symbolic disclosures without performance data	Information integrity; Outcome indicators	Corporate/Investor governance	ESG reports emphasise commitments over metrics; absence of standardised welfare indicators	Inflated legitimacy; Investor-oriented signalling
Information asymmetries	Structural opacity of welfare outcomes	Information integrity	Systemic/Market-wide	Consumers rely on labels, audits, narratives; Welfare states difficult to observe	Erosion of trust; Dilution of incentives for genuine welfare investment

6.1. Label-Based Washing and Welfare–Quality Conflation

Label-based washing occurs when animal welfare labels influence consumer perceptions of quality or ethics without corresponding improvements in animal outcomes, affects information integrity and outcome indicators within the AWW framework, and reflecting a conflation of welfare and product quality that can mislead consumers [8,71]. Label-based washing occurs when such labels influence perceptions of quality or ethics without corresponding improvements in animal welfare outcomes. This typology primarily affects information integrity and outcome indicators within AWW framework, reflecting a conflation of welfare and product quality that can mislead consumers.

Studies show that label-based washing amplifies perceived product quality without verifiable welfare improvements, exemplifying symbolic compliance and weak information integrity [5,45].

6.2. Certification and Audit-Based Washing

Audit-based washing reflects symbolic compliance where certification conveys legitimacy without verifying substantive welfare outcomes. This primarily engages governance structures and outcome indicators framework, showing how procedural compliance substitutes for genuine welfare improvements. Certification schemes and third-party audits aim to prevent misleading animal welfare claims; however, they have structural limitations. Analytically, it is important to distinguish between limitations in audit measurement (i.e., the difficulty of reliably assessing complex welfare states such as chronic stress or behavioural deprivation) and limitations in standard design (i.e., where standards themselves prioritise input-based resource criteria rather than outcome-based animal indicators). Reliant on pe-

riodic inspections and checklists, audits often prioritise visible management criteria, failing to capture chronic stress or behavioural deprivation. Many animal-based measures show limited reliability, revealing challenges in ensuring genuine welfare outcomes [72]. Governance auditors note that when audits are commissioned and paid for by the entities being assessed, conflicts of interest may weaken rigour and independence [25,73,74]. Official and private animal welfare inspectors report that private audits are sometimes perceived to overlook obvious animal welfare problems and that competitive pressures among private auditors can lead to lenient assessments, raising concerns about impartiality [73].

Comparative studies show animal welfare certifications often emphasise procedural compliance over outcome-based indicators, relying on input-focused checklists rather than validated animal-based measures (e.g., [75,76]). This approach, driven by the ease of assessing resources over complex welfare outcomes, reinforces a compliance logic, providing reassurance without guaranteeing substantive improvements in animals' lived experiences [76].

In sustainability terms, certification-based washing reflects a shift from substantive governance to assurance-based legitimacy, where the presence of a certificate substitutes for demonstrable welfare outcomes. Where audit systems emphasise checklists and procedural documentation, certificates can confer market legitimacy without corresponding evidence of improved animal welfare, facilitating strategic use of ethical claims in market contexts.

6.3. Regulatory and Policy Washing

Regulatory or policy washing occurs when laws exist but are weakly enforced, disconnecting stated policy from realised welfare outcomes. This primarily affects governance structures and enables AWW, illustrating a systemic decoupling between legal frameworks and measurable outcomes. The AWW can arise when governments use aspirational welfare language without strengthening enforcement. Weak inspections, exemptions, and low sanctions mean laws are often unenforced, undermining practical protection. Research shows many contraventions go undetected or unprosecuted, leaving welfare legislation largely "on paper" and disconnecting policy intent from real-world animal outcomes [77].

Policy washing fosters fragmented governance, where welfare rhetoric spreads but practical protection remains limited. Studies document an enduring enforcement gap, with statutory protections under-implemented, contraventions often unprosecuted, and authorities under-resourced, showing that strong legal language frequently fails to produce consistent regulatory action or the incentives necessary for effective compliance [77].

International welfare commitments are often framed as aspirational or soft law, emphasising principles rather than binding obligations. Symbolic regulation theory shows such language signals responsiveness to ethical concerns and stakeholder expectations, demonstrating commitment without changing underlying incentives, enforcement, or practical compliance, allowing policies to appear progressive despite weak implementation [78].

6.4. Corporate Narrative, Environmental, Social and Governance, and Disclosure Washing

Corporate narrative or ESG washing occurs when firms disclose welfare commitments without demonstrable performance, affecting information integrity and outcome indicators. Symbolic disclosures enhance perceived legitimacy while actual welfare outcomes remain limited. Corporate sustainability reporting represents another key site of AWW. Corporate sustainability reporting is the structured disclosure of environmental, social, and governance information, which increasingly incorporates topics beyond purely financial performance, including social issues such as animal welfare, but remains varied in quality and focus across firms and jurisdictions [79].

Animal welfare is increasingly incorporated into environmental, social, and governance (ESG) disclosures, supplier codes of conduct, and sustainability reports. Although

research on the integration of animal welfare in corporate disclosures is still emerging, studies demonstrate that many food companies and agricultural firms now include animal welfare considerations alongside other ESG dimensions such as labour practices, environmental impacts, and governance commitments [80].

While transparency can support accountability, critical ESG scholarship demonstrates that disclosures often emphasise commitments, policies, and intentions rather than measurable outcomes. Sustainability reporting research specifically identifies the distinction between symbolic vs. substantive disclosures, where symbolic language and broad commitments dominate even when tangible performance data are lacking, a pattern consistent with greenwashing dynamics in corporate reports [18].

In the absence of standardised animal welfare metrics or independent verification, narrative reporting allows firms to frame animal welfare as part of a broader sustainability identity without demonstrating substantive changes in sourcing or production practices. Empirical analyses of textual attributes in sustainability reports indicate that lengthy narratives with generic language can inflate perceived ESG engagement while often lacking robust, performance-oriented metrics that would enable stakeholders to assess real impacts [81].

This narrative-based washing is particularly effective in global supply chains, where complexity and distance limit external scrutiny and where sustainability communication is increasingly oriented toward investors rather than regulators or civil society. Content analysis of multinational sustainability reporting shows that many firms maintain a “business-as-usual” mindset in their disclosures, focusing on compliance and policy commitments with limited evidence of embedded welfare improvements or standardised metrics [82].

6.5. Information Asymmetries and Consumer Trust

Information asymmetry functions as an enabling condition for AWW: it allows symbolic claims, through labels, audits, policy rhetoric, or corporate narratives, to influence consumer perceptions while substantive welfare outcomes remain opaque. This links to information integrity indicators and explains how other typologies operate effectively within market and governance systems. Underlying all forms of animal welfare washing are persistent information asymmetries between producers, firms, regulators, and consumers [83,84]. Animal welfare outcomes are inherently difficult to observe, and consumers rely heavily on labels, certifications, and corporate claims to guide ethical purchasing decisions [85].

The proliferation of voluntary welfare labels and ambiguous ethical product differentiation can weaken the credibility of these governance tools and reduce incentives for producers to invest in genuinely higher-welfare systems, as the expected quality differential between high-welfare and conventional products becomes diluted, and consumer trust diminishes [4]. As such, AWW represents both a cause and a consequence of weak information integrity in sustainable food systems.

7. Animal Welfare Washing Implications

7.1. Ethical Harms to Animals and Moral Legitimacy

The practice of AWW poses direct ethical risks by normalising production systems that fail to meet accepted welfare standards while simultaneously claiming moral legitimacy. It also misleads consumers and obscures actual animal conditions. Bjørkdahl & Syse’s [12] AWW framework analyses how meat advertising disseminates disinformation about animal welfare, portraying producers as humane and caring while deflecting attention from routine harm and systemic confinement in intensive systems.

Practices that restrict movement, frustrate natural behaviours, or expose animals to chronic stress undermine animal protection, reflecting failures of the animal welfare outcome indicator. When animal welfare narratives mask routine practices that restrict movement, frustrate natural behaviours, or expose animals to chronic stress, they undermine the ethical foundations of animal protection itself. Scientific analyses highlight that intensive animal agriculture systems often impose behavioural restrictions and physiological stressors that compromise animal welfare, even when marketed with humane attributes [86]. This misrepresentation is ethically significant because it allows harm to persist under the guise of responsible or sustainable production. Empirical research on USA consumer responses to welfare labels demonstrates that many shoppers interpret terms such as “free-range”, “cage-free” or “humanely raised” as indicating substantively improved animal welfare, despite evidence that such terms are poorly regulated and can correspond to minimal real improvements in animal experience [87,88]. Such misleading labelling can stabilise low-welfare practices by dampening consumer pressure for genuine reform and normalising the continued use of systems that fail to meaningfully reduce suffering. This dynamic also has competitive implications, as genuinely higher-welfare systems typically entail increased costs, including greater space allowances, enriched housing, lower stocking densities, higher labour inputs, slower growth rates, and in some cases reduced output per animal.

From a moral perspective, welfare washing exploits ethical concerns, weakening trust between producers, regulators, and consumers. Current frameworks allow deceptive claims prioritising market advantage over substantive welfare, raising justice, transparency, and accountability concerns in food systems [89].

Such practices risk emptying animal welfare as a meaningful normative commitment within sustainability frameworks by turning animal welfare into an instrument of branding rather than an ethical imperative. When ethical commitments are commodified and disconnected from measurable welfare outcomes, the normative force of welfare concerns weakens [88]. By commodifying welfare and disconnecting it from measurable outcomes, AWW erodes ethical legitimacy, reduces trust, and diminishes political will for genuine welfare improvement.

7.2. Consumer Deception and Erosion of Trust

A second ethical risk arises from consumer deception. Animal welfare is a classic credence attribute, meaning that consumers cannot independently verify welfare conditions at the point of purchase and must rely on external claims, labels, and institutional assurances [83]. Because animal welfare outcomes are largely invisible to consumers, trust in labels and governance systems plays a central role in shaping ethical food choices [90]. Animal welfare is a credence attribute, making trust in labels, certification, and governance crucial. This links to the information integrity indicator.

Empirical studies consistently show that when ethical or quality claims are perceived as misleading, vague, or inconsistent, consumer trust declines, not only in specific labels but also in food governance institutions more broadly [13]. Experimental and survey-based research demonstrates that exposure to misleading welfare claims reduces perceived credibility of certification schemes and lowers general trust in agri-food regulation and assurance systems [91]. In the context of animal welfare labelling, such distrust has been shown to persist beyond individual products, leading to scepticism towards welfare claims as a category [67].

This erosion of trust has wider sustainability implications, as it undermines the effectiveness of ethical consumption as a governance mechanism and reduces consumers' willingness to pay for genuinely higher-welfare products. Evidence from behavioural and

economic studies indicates that trust is a key mediator of willingness to pay for animal welfare improvements; when trust in labels or claims is weakened, stated and revealed preferences for higher-welfare products decline [83,92]. As such, AWW creates a negative feedback loop in which deceptive claims diminish the market incentives needed to support meaningful welfare improvements, weakening both consumer-driven governance and broader sustainability transitions in food systems [91].

7.3. Distortion of Competition and Impacts on Higher-Welfare Producers

AWW distorts competition by disadvantaging producers who invest in genuine welfare improvements. Higher-welfare systems typically contain increased costs, including for space allowances for animal, labour, slower growth rates, and sometimes reduced output per animal [90,91]. These structural cost differences mean that higher-welfare producers often rely on price premiums and sustain consumer trust in welfare claims to remain economically viable.

When symbolic or weakly regulated animal welfare claims allow lower-cost producers to access the same markets and price premiums as genuinely higher-welfare producers, competitive advantages shift towards superficial compliance rather than substantive change. Research on animal welfare labelling and market signalling (e.g., [68,91]) demonstrates that unclear or poorly differentiated welfare claims reduce consumers' ability to distinguish between levels of welfare performance, thereby weakening market rewards for producers who deliver measurable welfare improvements.

Weak or symbolic claims allow lower-cost producers to access the same markets and price premiums, reducing differentiation and weakening governance and outcome indicators related.

This dynamic discourages long-term investment in welfare-enhancing systems and reinforces industrial production models that externalise ethical and sustainability costs. Economic studies indicate that where trust in welfare claims is undermined, or labels fail to credibly signal higher standards, producers face reduced incentives to adopt more costly welfare practices, even when consumer concern for animal welfare is high [90]. From a policy perspective, such distortions weaken the capacity of markets to reward sustainability performance and undermine fairness within agri-food systems, highlighting the need for robust governance and credible differentiation of welfare standards [67].

7.4. Impacts on Food Quality, Safety, and Integrity

Animal welfare practices play a significant role in determining food quality and product integrity. Prolonged stress, disease, and inadequate handling can adversely affect meat characteristics, including tenderness, colour, water-holding capacity, and storage stability. Stressors such as handling procedures, transportation, and regrouping can modify muscle physiology and biochemical processes, leading to changes in pH levels, protein structure, oxidative stability, and overall sensory and physicochemical properties [49].

Poor animal welfare, including crowding, stress, and disease pressure, can increase reliance on veterinary drugs, raising antimicrobial resistance risks and undermining consumer confidence, food safety, and the long-term sustainability of animal-derived products in intensive production systems [93].

When animal welfare labels imply superior quality without reflecting actual production conditions, they weaken the informational value of quality signals and blur the boundary between ethical and technical food standards. Labelling research shows that consumers often interpret welfare-related verbiage as indicators of enhanced intrinsic quality and safety, even though such claims may not correspond to measurable differences in

product characteristics or verified animal welfare outcomes, thereby reducing the reliability of labelling as a quality governance mechanism [7].

This disconnect weakens food quality governance, allowing ethical claims to circulate without verification, reducing transparency, accountability, and consumer confidence, while complicating oversight of safety, nutritional, and welfare standards in animal-derived food systems.

8. Policy, Trade, and Governance Responses

Table 2 presents a stepwise roadmap for implementing outcome-based animal welfare standards, linking regulatory, governance, and market measures to improve compliance and transparency.

Table 2. Step-by-step policy roadmap for implementing outcome-based standards.

Step	Action	Description/Details	Analytical Indicators
1	Define measurable welfare outcomes	Establish species-specific, animal-based indicators (e.g., lameness, body condition, behavioural expression)	Outcome measures, governance structures, information integrity
2	Integrate into regulation & certification	Embed outcome-based standards in public law and private schemes; update inspection and audit criteria	Governance structures, compliance indicators
3	Strengthen enforcement & verification	Risk-based inspections, unannounced audits, independent verification, penalties, and corrective pathways	Governance, outcome indicators
4	Transparency & reporting	Mandatory reporting of welfare outcomes to regulators, auditors, and consumers; reduce information asymmetry	Information integrity, transparency measures
5	International coordination	Align standards with OIE recommendations; adopt WTO-compatible equivalence frameworks; integrate welfare outcomes in trade agreements	Governance, market access, regulatory alignment
6	Continuous evaluation & adaptation	Regularly review indicators, enforcement, and compliance; adjust based on scientific evidence, stakeholder feedback, and market dynamics	Outcome measures, adaptive governance

8.1. Strengthening Public Regulation and Enforcement

Tackling AWW demands stronger, clearer, and better-enforced regulation. Despite baseline standards, enforcement and inspections are often limited, especially in intensive systems, with research showing farmers and inspectors perceive official regimes as having minimal impact on improving compliance with welfare legislation [94]. This as a primary intervention within the AWW framework, directly addressing the ‘governance’ indicator. Strengthening enforcement through risk-based inspections, higher penalties, and improved training can narrow gaps between standards and practice. Risk-based official controls prioritise high-risk operations, improving welfare compliance under limited inspection resources [95]. From a sustainability perspective, public regulation sets non-negotiable welfare floors. Scholars argue that systematic under-enforcement undermines the rule of law, weakens animal protection, and creates animal welfare deficits that private standards alone cannot remedy [96].

Without credible enforcement, welfare standards risk becoming symbolic, enabling superficial compliance and welfare washing rather than substantive improvements. Empirical studies of welfare control systems emphasise that effective official control systems, including adequate resourcing, standardised training and robust sanctioning mechanisms,

are necessary to ensure that legal animal welfare protections translate into meaningful outcomes on farms [73]. We also note political economy constraints, including resource limitations for enforcement and potential industry resistance, to situate reforms realistically.

8.2. Outcome-Based Welfare Standards and Metrics

Addressing AWW requires shifting from input- or process-based standards to outcome-based assessment. Animal-based indicators, such as lameness prevalence, mortality rates, integument lesions or injuries, body condition scores, and observable behaviour indicators (e.g., social interaction, fear responses), offer more reliable and valid measures of welfare, correlating more closely with animals' actual state than resource- or management-focused criteria [22,97]. Several of these measures, particularly lameness prevalence, mortality, and lesion scoring, are already widely used in welfare assessment protocols and could plausibly be standardised across supply chains. Outcome-based metrics align more closely with sustainability governance by focusing on real-world impacts rather than formal adherence to prescriptive inputs. Standardised welfare outcome assessments allow comparison of production systems based on actual animal wellbeing rather than solely on infrastructure or procedural checklists, thereby supporting more meaningful certification and policy instruments that reflect animal welfare performance [98].

Incorporating outcome-based indicators into regulation and certification enhances transparency and limits symbolic compliance. Initiatives like Welfare Quality® and AWIN use animal-based measures, body condition, lameness, behaviour, and health to detect welfare issues and guide corrective action [28,99].

Outcome-based metrics also align more closely with sustainability governance, as they focus on real-world impacts rather than formal adherence to prescriptive inputs. Standardised welfare outcome assessments allow for the comparison of production systems based on actual animal wellbeing rather than solely on infrastructure or procedural checklists, thereby supporting more meaningful certification and policy instruments that reflect animal welfare performance [22]. Implementing outcome-based systems demands investment in data, training, and harmonisation. Despite scientific robustness, standardising measures across species and markets is challenging but essential to avoid fragmented metrics, trade distortions, and inequitable certification outcomes [28,99].

8.3. Reforming Private Standards, Certification, and Audits

Private standards and certification will continue to play a central role in welfare governance, but require reform to enhance credibility and effectiveness. Although some schemes can surpass minimum legal requirements, transparency, credibility, and consistency are often limited. Evaluations of dairy welfare programmes, for example, reveal substantial variation in criteria, monitoring intensity, and publicly available information, limiting comparability and accountability [53]. In private governance systems, conflicts of interest may arise when audits are commissioned and paid for by the firms being assessed, creating risks of lenient evaluation and reduced independence [73]. Comparative research indicates that when auditors are closely linked to certified entities, whether through second-party arrangements or financial incentives, the credibility of audit outcomes may be compromised. Mechanisms such as unannounced inspections, rotation of auditors, and the unfiltered publication of audit summaries are identified as measures that can deter superficial compliance, improve oversight, and strengthen confidence in certification systems [100].

Private standards remain central to welfare governance but need reform. Schemes may exceed legal minima, yet transparency, credibility, and consumer scrutiny are limited, with dairy programme evaluations showing wide variation and highlighting the need for accountability [101].

From a sustainability perspective, private governance should complement public regulation and align with scientific welfare outcomes. Systems with accountability and independent verification sustain trust, whereas those lacking these features risk being perceived as mere marketing signals [102].

8.4. Trade Policy and International Coordination

Trade policy poses challenges and opportunities for addressing AWW. The WTO rules require animal welfare measures to avoid arbitrary discrimination or disguised trade barriers. Legal analyses emphasise that such measures must be scientifically grounded and consistent with the General Agreement on Tariffs and Trade (GATT) and the SPS Agreement when protecting public morals or other legitimate objectives [103]. Legal scholarship recognises that welfare measures grounded in legitimate public morals can be permissible. WTO rulings show such measures may be justified under GATT Article XX(a) if proportionate and non-discriminatory, allowing welfare regulation within defined trade law boundaries [103].

Enhanced international coordination using equivalence frameworks focused on outcome-based animal welfare could limit regulatory arbitrage and improve policy coherence. WTO SPS rules encourage members to align measures with the World Organisation for Animal Health (OIE) standards [104], facilitating trade while safeguarding animal health and welfare [105]. Including animal welfare in trade agreement sustainability chapters could incentivise genuine improvements. Though few agreements currently do so, conditional market access based on welfare equivalence and sustainability criteria may better align trade rules with societal and ethical expectations [106].

8.5. Aligning Welfare Governance with Food Quality and Sustainability

Reducing AWW requires integrating welfare governance with food quality and sustainability policy. Animal welfare claims often run parallel to safety regimes, and mainstream sustainability tools, like Life Cycle Assessment, typically neglect welfare, highlighting the need to embed welfare metrics for coherent, policy-relevant assessments [107]. These measures map to the information integrity of the outcome indicators framework, linking ethical claims to measurable animal welfare improvements.

Aligning animal welfare claims with verifiable standards, traceability, antimicrobial reporting, and health metrics enhances their policy relevance. Research shows robust traceability improves supply-chain transparency and consumer confidence in authenticity, safety, and quality, supporting animal welfare and ethical credibility [50,108]. Connecting animal welfare governance with food quality and sustainability is supported by evidence that better welfare reduces antimicrobial use, while poor welfare increases it, demonstrating that animal welfare improvements align with public health, food safety, and sustainable food system goals [50].

From a sustainability perspective, integrating animal welfare links ethical animal treatment to environmental, health, and social outcomes. Researchers advocate including animal welfare alongside environmental and socio-economic indicators to fully assess food system impacts and strengthen policy and governance [107]. Aligning welfare with traceable, validated quality systems can enhance consumer trust and incentivise producers to invest in genuinely higher-welfare, higher-quality production, supporting the credibility of animal welfare claims and ethical food choices [10,88].

9. Final Considerations and Conclusions

This study is conceptual, focusing on the development of the animal welfare washing (AWW) framework without generating original empirical data. Consequently, its applica-

bility is limited to theoretical and analytical insights, and the relationships proposed require future empirical validation across diverse production systems and governance contexts. This limitation should be considered when interpreting the generalisability of findings and the practical implementation of the proposed analytical indicators. Future research should empirically test the conceptual framework of animal welfare washing across different production systems, supply chains, and regulatory contexts. Comparative studies could assess the effectiveness of outcome-based standards, certification reforms, and corporate disclosures in reducing symbolic compliance. Investigating consumer perceptions, trust, and willingness to pay for verified welfare improvements will clarify market incentives. Additionally, interdisciplinary work integrating governance, trade law, and animal welfare science can inform policy design, regulatory alignment, and global coordination to strengthen accountability and ethical food systems.

This analysis has prioritised and evaluated governance responses, linking reforms explicitly to the analytical framework introduced. Beyond summarising findings, the study contributes theoretically by integrating governance mechanisms with trade and welfare considerations, highlighting how institutional design shapes policy effectiveness. Positioned within the greenwashing literature, our results clarify how regulatory reforms can mitigate superficial compliance and strengthen accountability. Recognising political economy constraints and trade-offs, including WTO rules and international coordination, reveals the practical limits and opportunities for policy implementation. Looking forward, research could explore the dynamics of cross-border regulatory harmonisation, the effectiveness of incentive-based governance tools, and the interactions between public and private actors in sustaining genuine environmental commitments. Collectively, these insights suggest that robust governance, aligned trade policies, and welfare-oriented design are mutually reinforcing pillars for credible and effective climate and sustainability interventions.

Author Contributions: Conceptualisation, F.M.; methodology, F.M.; investigation, F.M. and M.R.M.; writing—original draft preparation, F.M. and M.R.M.; writing—review and editing, F.M. and M.R.M.; supervision, F.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analysed in this study. Data sharing does not apply to this article.

Acknowledgments: To the Foundation for Science and Technology (FCT, Portugal) for financial support to CISAS UIDB/05937/2020 and UIDP/05937/2020.

Conflicts of Interest: The authors declare no conflicts of interest.

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