ENVIRONMENTAL ENRICHMENT FOR FARMED ANIMALS

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Environmental enrichment standards are set in many animal welfare laws, but such protections are generally withheld from farmed animals. Instead, farmed animals are subject to substandard enclosures that are under-stimulating and inappropriate for their species-specific behavioral needs. Scientific studies have shown that the inclusion of environmental enrichment in an animal's enclosure balances their production of stress hormones, which has beneficial implications for the overall health and well-being of the animal. Establishing enclosure standards for farmed animals that include provisions relating to environmental enrichment would improve farmed animal well-being and, subsequently, the health of the humans who consume products deriving from farmed animals.

I. INTRODUCTION

A recent trend on 'farm tok,' a subsection of content on the entertainment application TikTok that features content about agriculture and farmed animals made by farmers and ranchers, includes people

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raising backyard chickens installing disco balls in their coops.[1] The home farmers talk about their chickens needing more stimulating activities and interactions than what they can generally provide in a small backyard area, and the benefits that they have observed for their animals from something as simple as rotating reflections of light.[2] Though enrichment for captive animals is commonly discussed, these TikToks were the first time I had seen environmental enrichment discussed in the farmed animal context.

Before continuing, it is important to define "farmed animals" as it will be used in this Article. The definition of "animal" is controversial and defined differently in every law employing the term.[3] "Livestock" and "poultry" are equally debated and circumstantially defined.[4] Without a definitive and consistent definition, this Article will draw on the definition of livestock in *United States v. Park*: "livestock" is understood as animals generally raised on a farm for food or fiber in the United States.[5] These include, but are not limited to, cows, pigs, rabbits, sheep, goats, fowl and gallinaceous birds.[6]

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1 *See, e.g.*, Lindsey Brown (@brownsfamilyhomestead), TIKTOK (Sept. 18, 2022), https://www.tiktok.com/t/ZTRm8c7on/ (accessed Oct. 18, 2023) (implying that she saw an increase in her chickens' egg production after adding a disco ball to their coop); Epic Gardening (@epicgardening), TIKTOK (Sept. 17, 2022), https://www.tiktok.com/t/ZTRm8gt4d/ (accessed Oct. 18, 2023) (showing his chickens' reactions to a disco ball in their coop at night); Mona aka The Prickly Pear (@thepricklypear), TIKTOK (Sept. 12, 2022), https://www.tiktok.com/t/ZTRm8pjMo/ (accessed Oct. 18, 2023) [hereinafter The Prickly Pear] (showing her chickens' and geese's reactions to a disco ball added to their coop as enrichment).

2 Brown, *supra* note 1; Epic Gardening, *supra* note 1; The Prickly Pear, *supra* note 1.

3 *See, e.g.*, Animal Welfare Act, 7 U.S.C. § 2132(g) (defining animal as "any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, or such other warm-blooded animals, as the Secretary may determine is being used . . . for research, testing, experimentation, or exhibition purposes, or as a pet; . . . exclud[ing] birds, rats . . . , and mice . . . bred for research, horses not intended for research purposes, and other farm animals, such as, but not limited to livestock or poultry, used or intended for use as food or fiber, or . . . used or intended for use for improving animal nutrition, breeding, management, or production efficiency, or . . . improving the quality of food or fiber."); Knox v. Massachusetts Soc. for the Prevention of Cruelty to Animals, 425 N.E.2d 393, 396 (Mass. App. Ct. 1981) (stating that the definition of "animal" does not require "deliberating on where the line should be drawn on any taxonomic scale," but rather, within the context of the animal cruelty law at question in the case, includes "animals subject to possible neglect"); 7 U.S.C. § 136(d) (defining animal as "all vertebrate and invertebrate species, including but not limited to man and other mammals, birds, fish, and shellfish").

4 *See, e.g.*, United States v. Park, 536 F.3d 1058, 1062–63 (9th Cir. 2008) (recognizing "livestock" as colloquially understood as "farm animals" but unworkably ambiguous without further definition in a statute); Levine v. Vilsack, 587 F.3d 986, 994 (9th Cir. 2009) (reiterating that the Secretary of the U.S. Department of Agriculture has the discretion to define "livestock" under the Animal Welfare Act, and deciding that that the definition at the time of the case, which excluded poultry from the definition, was not arbitrary).

5 Park, 536 F.3d at 1062–63.

6 This list intends to represent which animals are thought of when asked what the term "farm animals" invokes. *See, e.g.*, *Farm Animals*, ANIMAL WELFARE INST., https://

Environmental enrichment refers to the addition of stimulus-inducing items or situations within captive animals' enclosures that serve to keep the animals entertained and socially connected.[7] Environmental enrichment includes increasing the "physical, social[,] and temporal complexity" within an animal's enclosure, which entails having "structural, visual, auditory, olfactory[,] and gustatory stimuli" introduced for varying periods of time and in consideration of which social settings are most appropriate for that species.[8] No matter what manner of environmental enrichment is implemented, the goal is to make changes within an animal enclosure "for the benefit of the inhabitants,"[9] allowing for animals to engage in "non-injurious[,] species-typical activities."[10]

As animals on display to the entertainment-seeking public[11] or needing to be well enough for effectively comparable medical results,[12] providing for the mental and social well-being of zoo and laboratory animals through environmental enrichment is a prominent concern. Federal legislation requiring minimum standards of environmental enrichment for animals in laboratories in the United States has been passed and updated several times since 1966.[13] Similarly, the Association of Zoos and Aquariums (AZA), the leading accreditation

awionline.org/content/farm-animals (accessed Oct. 8, 2023) (describing the "chickens, pigs, cattle, turkeys, sheep, goats, ducks, and geese . . . raised for food . . . in America").

7 Yang Feng et al., *Environmental Enrichment Changes Rabbits' Behavior, Serum Hormone Level and Further Affects Cecal Microbiota*, PEERJ 1, 1–2 (2022); A. B. Riber et al., *Review of Environmental Enrichment for Broiler Chickens*, 97 POULTRY 378, 378 (2018); K. Carlstead & D. Shepherdson, *Alleviating Stress in Zoo Animals with Environmental Enrichment*, *in* METHODS IN BEHAVIORAL PHARMACOLOGY 337, 337 (Frans van Haaren ed., 1993).

8 Carlstead & Shepherdson, *supra* note 7, at 337.

9 ROBERT J. YOUNG, ENVIRONMENTAL ENRICHMENT FOR CAPTIVE ANIMALS 1 (James K. Kirkwood et al. eds., 2003).

10 MAKING LIVES EASIER FOR ANIMALS IN RESEARCH LABS 47 (Vera Baumans et al. eds., 2007) [hereinafter MAKING LIVES EASIER].

11 *See* Marina Salas et al., *Zoo Visitor Attitudes are More Influenced by Animal Behaviour than Environmental Enrichment Appearance*, 11 ANIMALS 1, 11 (2021) (concluding that effective environmental enrichment that "stimulate[s] certain species-specific behaviours . . . enhance[s] the experience of visitors").

12 *See* Garet Lahvis, *The Inescapable Problem of Lab Animal Restraint* at 1:10, TED TALK (Nov. 2019), https://www.ted.com/talks/garet_lahvis_the_inescapable_problem_of_lab_animal_restraint (accessed Sept. 30, 2023) (discussing the analytical issues stemming from comparisons of the health and abilities of lab animals kept in low-stimulation housing with the health and abilities of the average human).

13 *See* 7 U.S.C. § 2131 (describing the congressional statement of policy under the Animal Welfare Act to "insure that animals intended for use in research facilities or for exhibition purposes or for use as pets are provided humane care and treatment"); Animal Welfare Regulations, 9 C.F.R. § 1.1 (2023) (stipulating the conditions facilities must maintain when housing animals). *See also* National Research Council (U.S.) Committee to Update Science, Medicine, and Animals, *Regulation of Animal Research*, NAT'L LIBR OF MED (2004), https://www.ncbi.nlm.nih.gov/books/NBK24650/ (accessed Sept. 30, 2023) [hereinafter *Regulation of Animal Research*] (providing a background and overview of the AWA); *Animal Welfare Act*, ANIMAL & PLANT HEALTH INSPECTION SERV, U.S. DEPT OF AGRIC (Jan. 12, 2022), https://www.aphis.usda.gov/aphis/ourfocus/animalwelfare/awa

organization for zoos in the United States, has published and updated guidelines for minimum standards of environmental enrichment at zoos since 1974.[14]

However, farmed animals are generally outside the scope of such legislation and guidelines. The Animal Welfare Act's (AWA) definition of "animal" explicitly "excludes . . . farm animals, such as, but not limited to livestock or poultry, used or intended for use as food or fiber, or . . . used or intended for use for improving animal nutrition, breeding, management, or production efficiency, or . . . the quality of food or fiber."[15] Unlike this categorical approach, the AZA's accreditation process applies to public exhibitors like zoos and aquaria, rather than to specific species.[16] Animals that are typical of those on a farm may receive coverage within the AZA's standards, but only if they are housed and displayed at or being transported to or from a zoo or aquarium.[17] Even state anti-cruelty laws tend to expressly exclude "animals raised for consumption" from the scope of their applications.[18] As such, the only regulations in the United States applying to farmed animals are those pertaining to their transportation and slaughter.[19]

This lack of welfare standards for farmed animals in the United States has detrimental effects on both the farmed animals themselves and the consumers of products derived from farmed animals. Farmed animals are subjected to significant long-term stressors from the living conditions at large and factory farms.[20] These conditions increase the stress hormones that the farmed animals produce,[21] which can have health impacts including slowed growth and reproductive rates,

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(accessed Oct. 1, 2023) [hereinafter *APHIS: Animal Welfare Act*] (describing the AWA and giving additional resources for information about its implementation).

14 *About AZA Accreditation*, Ass'n of Zoos & Aquariums, https://www.aza.org/what-is-accreditation (accessed Dec. 12, 2022).

15 7 U.S.C. § 2132(g).

16 2023 Accreditation Standards & Related Policies, Ass'n of Zoos & Aquariums 5, 5–12 (2022), https://assets.speakcdn.com/assets/2332/aza-accreditation-standards.pdf (accessed Sept. 29, 2023).

17 *See id*. at 12, 98–99, 101 (suggesting that domesticated animals are covered in some situations by the AZA standards). But *see id*. at 99 (specifying that "[d]omestic animals should be transferred in accordance with locally acceptable humane farming practices . . . subject to all relevant laws and regulations.").

18 Bruce Wagman et al., Animal Law: Cases and Materials, 487 (6th ed. 2019).

19 *See, e.g.*, Twenty-Eight Hour Law, 49 U.S.C. § 80502 (regulating the minimum standards of care that must be provided for animals during long-distance transport); Humane Methods of Slaughter Act, 7 U.S.C. §§ 1901–07 (regulating the process of slaughtering livestock for consumption).

20 *See Factory Farming: What It Is and Why It's a Problem*, The Humane League (Nov. 30, 2020), https://thehumaneleague.org/article/what-is-factory-farming (accessed Sept. 25, 2023) [hereinafter *Factory Farming*] (describing the poor living conditions and inhumane treatment of farmed animals at factory farms).

21 G.P. Moberg, *Biological Response to Stress: Implications for Animal Welfare*, *in* The Biology of Animal Stress: Basic Principles and Implications for Animal Welfare 1, 17 (G.P. Moberg & J.A. Mench eds., 2000); Balvinder Kumar et al., *Stress and its Impacts on Farm Animals*, Frontiers in Bioscience E4, 1759–1767, 1760–63 (2012).

increased emotional dysregulation and social capability issues, and increased vulnerability to diseases.[22] Environmental enrichment can provide relief for farmed animals, giving them means to alleviate their stress or boredom and subsequently improving their overall health.[23] For consumers of products derived from farmed animals, this health improvement may lead to higher quality products.[24]

Several options exist for improving the environmental enrichment of farmed animals in the United States. The AWA could be amended to include farmed animals in its scope or to include a section specifically about humane standards for the keeping of farmed animals. Alternatively, a separate piece of federal legislation could be passed to establish humane standards for the keeping and care of farmed animals. This legislation could draw from the only existing law regulating humane standards for farmed animals in the United States—the New Jersey Humane Treatment of Domestic Livestock Act[25]—as well as from similar laws in the European Union.[26]

However, due to the lobbying strength of the industrial animal agriculture and agribusiness industries,[27] such federal or even state legislation is unlikely to pass. Instead of a government-driven approach to change, a consumer-led approach may be more successful. Such a path for change would need to include a mass media consumer education campaign focusing on the current living conditions of farmed animals, the improvements that could be made, and the impacts of environmental enrichment improvements on both farmed animals and their derivative products. Like the movement on reducing the consumption of

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22 Moberg, *supra* note 21, at 18; Carlstead & Shepherdson, *supra* note 7, at 338; MAKING LIVES EASIER, *supra* note 10, at 36; David Fraser & Daniel M. Weary, *Quality of Life for Farm Animals: Linking Science, Ethics, and Animal Welfare*, *in* THE WELL-BEING OF FARM ANIMALS: CHALLENGES AND SOLUTIONS 39, 40 (G. John Benson & Bernard E. Rollin eds., 2004).

23 *See infra* Part V (concluding that data shows environmental enrichment improves the health of farmed animals and, accordingly, leads to higher quality products).

24 *See infra* Part III (discussing the effects of environmental enrichment on the health of farmed animals and applying evidence from various studies to the conclusion that it also leads to higher quality meat products); *cf.,* YOUNG, *supra* note 9, at 43 (discussing anecdotal evidence regarding physical health improvements for animals who receive environmental enrichment but suggesting that the lack of evidence for physical health improvements may be attributed to missing data).

25 *See* Humane Treatment of Domestic Livestock, N.J. STAT. ANN. § 2:8-1.1–8.7 (2004) (establishing minimum humane standards for domestic livestock).

26 *See, e.g.*, Council Directive 98/58, 1998 O.J. (L 221) 23–27 (EC) (setting minimum standards for the keeping of farm animals to ensure their welfare).

27 *See, e.g.*, Christina M. Russo, *How Industrial Agriculture Has Thwarted Factory Farm Reforms*, YALE ENV'T 360 (Nov. 19, 2013), https://e360.yale.edu/features/interview_robert_martin_how_big_agriculture_has_thwarted_factory_farm_reforms (accessed Oct. 4, 2023) (characterizing "Industrial Agriculture" as having "more money than Big Tobacco did in efforts to regulate cigarettes and the personality of the National Rifle Association").

products made with palm oil,[28] consumer education may lead to changes in consumption habits, which can, in turn, persuade industrial animal agriculture and agribusiness producers to change their current farming conditions.

Part II of this Article dives further into the AWA, Humane Methods of Slaughter Act (HMSA), and Twenty-Eight Hour Law and the prominence of environmental enrichment in the contexts to which they pertain. Part III summarizes many scientific studies that have found environmental enrichment to substantially improve farmed animals' health, as well as the quality of products made from farmed animals. Part III draws on the New Jersey Humane Treatment of Domestic Livestock Act and laws from the European Union to lay out potential courses of action for improving environmental enrichment for farmed animals in the United States. Finally, this Article concludes that environmental enrichment is necessary for the welfare of farmed animals and, for audiences where animal welfare alone is an insufficient motivating factor, will improve the quality of products derived from farmed animals.

II. CURRENT LEGISLATION AND GUIDELINES

Though the AWA is essential in understanding the federal regulation of the humane caretaking of captive animals, only the Twenty-Eight Hour Law and the HMSA apply to farmed animals.[29] Even though the AWA is intended to protect animals through the setting of standards for humane handling and care,[30] the regulations promulgated under the AWA provide standards for environmental enrichment only for non-human primates.[31] Despite this, a review of the environmental enrichment standards for non-human primates and the conditions standards for all the species covered by the statute could provide context and guidance for how such standards could be extended to farmed animals. As the Twenty-Eight Hour Law and the HMSA only apply in very specific situations and include little to no mention of the living conditions of farmed animals, they lack any federal standards of environmental enrichment for farmed animals.[32]

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28 *See, e.g.*, Molly Fleming, *How Greenpeace's Campaign Helped Make Palm Oil as Toxic as Plastic*, MARKETING WEEK (Jan. 10, 2020), https://www.marketingweek.com/how-greenpeaces-campaign-helped-make-palm-oil-as-toxic-as-plastic/ (accessed Oct. 4, 2023) (describing the success of Greenpeace's YouTube and social media campaign in getting many stores to advertise and sell palm oil-free products).

29 49 U.S.C.A. § 80502; 7 U.S.C.A. §§ 1901–1907.

30 7 U.S.C.A. § 2131.

31 9 C.F.R. § 1(A)(3)(D)(3.81)(b).

32 49 U.S.C. § 80502; 7 U.S.C.A. §§ 1901–1907.

A. THE ANIMAL WELFARE ACT

The AWA authorizes the Secretary of the Department of Agriculture to set, implement, and enforce standards for the "humane handling, care, treatment, and transportation of animals."[33] These standards must address and include "minimum requirements" for "handling, housing, feeding, watering, sanitation, ventilation, shelter from extremes of weather and temperatures, adequate veterinary care, and separation of species" in enclosures.[34] Though this list does not include environmental enrichment, they represent the "minimum requirements"[35] intended to ensure the provision of "humane care and treatment,"[36] and thus should not be read as an exhaustive list. Additionally, standards must be set to require research facilities to reduce the "pain and distress" experienced by the animals kept and experimented on.[37] Within the context of the AWA as a whole, it is not unreasonable to read in that some minimal level of environmental enrichment may be required in the standards set by the Secretary.

The Secretary has used AWA's authorization to pass the Animal Welfare Regulations (AWR),[38] which include species-specific standards for handling and care,[39] but notably do not touch on environmental enrichment or conditions within the enclosure.[40] For example, requirements for cat and dog enclosures must be large enough for the animals to "express species-typical behavior," hinging on the size of the enclosures, not the conditions inside them.[41] The same enclosure-size provision exists in the regulations for guinea pigs and hamsters,[42] rabbits,[43] and non-human primates,[44] while standards for the expression of species-typical behaviors are found in the regulations for cats, dogs, guinea pigs, hamsters, and rabbits.[45]

Despite having the authority to impose standards for all species, the Secretary has only expressly included environmental enrichment standards in the regulations for non-human primates.[46] Non-human

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33 7 U.S.C. § 2143(a)(1).

34 7 U.S.C. § 2143(a)(2)(A).

35 7 U.S.C. § 2143(a)(2).

36 7 U.S.C. § 2131.

37 7 U.S.C. § 2143(a)(3)(A).

38 Animal Welfare Act, U.S. DEP'T AGRIC. NAT'L AGRIC. LIBR., https://www.nal.usda.gov/animal-health-and-welfare/animal-welfare-act#:~:text=Animal%20Welfare%20Act%20%2D%20Current%20statute,the%20law%20by%20issuing%20regulations (accessed Oct. 1, 2023); 9 C.F.R. § 1.

39 9 C.F.R. § 3.1–3.6.

40 *Id*. § 3.6(d).

41 *Id.*

42 *Id*. § 3.28(c)(3) (1990).

43 *Id*. § 3.53(c)(3) (1990).

44 9 C.F.R. § 1 Parts 1, 2, 3.

45 *Id.*

46 *Id*. § 3.81(b).

primate enclosures must "be enriched by providing means of expressing non-injurious species-typical activities," which may include "providing perches, swings, mirrors, and other increased cage complexities[,] . . . objects to manipulate[, and] varied food items; using foraging or task-oriented feeding methods; and providing interaction with the care giver."[47] This requirement only existing in the regulations for non-human primates may be due to sympathies arising from the similarities between humans and non-human primates, and thus lawmakers wanting some similar enrichment for non-human primates.[48] Alternatively, the requirement may be prompted by the need for primates in research to reach neurological development comparable to the humans on which the results of primate research will be applied.[49] Whatever the motivation, these are the only environmental enrichment standards for captive animals at the federal level.

B. THE TWENTY-EIGHT HOUR LAW AND THE HUMANE METHODS OF SLAUGHTER ACT

If farmed animals were within the scope of the AWA's definition of animal, the regulations would apply to each farmed animal species, but this is not the case. Only two federal laws address the humane care of farmed animals: the Twenty-Eight Hour Law and the HMSA.[50] The Twenty-Eight Hour Law is brief, requiring that animals being transported for "more than 28 consecutive hours" are unloaded after that twenty-eight-hour mark for "feeding, water, and rest."[51] The only mention of the animals' enclosures comes from the exception to the unloading rule: unloading is not required if the "vehicle or vessel [of transit is one] in which the animals have food, water, space, and an opportunity for rest."[52] There are no requirements pertaining to environmental enrichment on the vehicle or vessel of transit or at the point where the

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47 *Id*.

48 *See generally*, Robert Sanders, *Speciesism, Like Racism, Imperils Humanity and the Planet*, BERKELEY NEWS (2023), https://news.berkeley.edu/2023/01/09/speciesism-like-racism-imperils-humanity-and-the-planet/ (accessed Jan. 31, 2023) (explaining how speciesism has allowed for humans to think of ourselves as superior from other species, and thus feel justified in treating them as inferiors); R.D. Ryder, *Speciesism in the Laboratory*, IN DEFENSE OF ANIMALS: THE SECOND WAVE 87 (Peter Singer ed., 2006) (describing how nonhuman animals used as scientific models in research must be treated in a sufficiently similar way to humans for both ethical and scientific reasons). *Cf*. Marla K. Conley, *Caring for Dolphins, Otters, and Octopuses: Speciesism in the Regulation of Zoos and Aquariums*, 15 ANIMAL L. 237 (2009) (comparing the federal facilities standards for land animals with the reduced standards for aquatic animals, and attributing these differences to speciesism and degrees of perceived separation between humans and aquatic animals).

49 *See* Lahvis, *supra* note 12 (explaining that results from animal testing are only applicable and effective in testing the effects of medical treatments on humans if the research animal subjects are similarly neurologically developed).

50 49 U.S.C. § 80502; 7 U.S.C. §§ 1901–1907.

51 49 U.S.C. § 80502(a).

52 49 U.S.C. § 80502(c).

animals are unloaded. On the other hand, the HMSA was passed to "prevent[] needless suffering" of livestock during the slaughtering process, and only addresses how to incapacitate livestock before slaughter so that they are not aware of the process.[53] Despite the fact that both the transportation and slaughtering processes are extremely stressful for farmed animals,[54] these statutes lack any conditions standards for basic humane keeping—likely because it is assumed that requiring such would be a waste of resources for animals headed to slaughter.

III. SCIENCE OF ENVIRONMENTAL ENRICHMENT

'Farms' today are generally overcrowded industrial facilities, with little for farmed animals to do beyond eating and sleeping.[55] The animals in these conditions experience extreme stress and boredom, manifesting in poor overall health which many farmers use to justify the use of growth stimulants and other antibiotics.[56] Addressing the overcrowding issues by requiring adequate living space and the removal of cages and crates is a necessary step in improving farmed animal welfare,[57] but should not be the sole solution. The negative consequences resulting from ignoring the conditions of animal enclosures beyond size can be avoided, or at least reduced, through the addition of environmental enrichment at farming facilities.

Though some level of stress is inherent in life, the level of cortisol produced during periods of distress can have detrimental effects on an animal's health.[58] Cortisol is the "main stress hormone" that triggers the body to change blood pressure levels, digestive functions, and

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53 7 U.S.C. §§ 1901–1902.

54 *See, e.g.*, N.G. Gregory, *Animal Welfare at Markets and During Transport and Slaughter*, 80 MEAT SCI. 2, 2–9 (2008), https://www-sciencedirect-com.library.lcproxy.org/science/article/pii/S0309174008001654 (accessed Sept. 28, 2023) (describing physically observable manifestations of extreme stress exhibited by pigs, cattle, and poultry during transport and slaughter); Luigi Faucitano, *Preslaughter Handling Practices and Their Effects on Animal Welfare and Pork Quality*, 96 J. ANIMAL SCI. 728, 728–34 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6140870/pdf/skx064.pdf) (accessed Sept. 28, 2023) (describing the devaluation of pork caused by extreme stress during the transport and slaughter of pigs).

55 *See Factory Farming*, *supra* note 20 (describing the living conditions of farmed animals at factory farms).

56 Tom Laskawy, *FDA Takes Steps to Limit Use of Antibiotics in Livestock*, GRIST (Nov. 18, 2010), https://grist.org/article/food-fda-takes-steps-to-limit-use-of-antibiotics-in-livest/ (accessed June 16, 2023) ("Animals in concentrated animal feeding operations, or CAFOs, are routinely given antibiotics to help them tolerate the stressful, crowded conditions they are raised in . . . [and] the drugs generally help them grow bigger, faster.").

57 *See, e.g.*, Paul B. Thompson, *Philosophical Ethics and the Improvement of Farmed Animal Lives*, 10 ANIMAL FRONTIERS 21, 23, 25 (2020) (explaining that increasing living space for farmed animals has a substantial impact on the animals' health and welfare).

58 Moberg, *supra* note 21, at 17.

emotional capabilities in response to stress.[59] Elevated cortisol production in farmed animals can lead to slower growth, reduced reproduction rates, reduced immune function (and consequentially higher rates of disease and infection), increased emotional disturbances, and decreased social capabilities and behavior.[60] Further, sustained high cortisol levels can manifest in stereotypies,[61] which are repetitive, non-adaptive, and atypical behaviors.[62] Stereotypies tend to appear or increase where there are "absence[s] of variation in the environment" or "insufficient amount[s] of stimulation" provided.[63] Additionally, stereotypies can be the result of enclosures that are too small or only provide for solitary living.[64] The less stimuli or opportunity to engage with stimulus that animals have in their enclosures, the more stressed, bored, frustrated, and consequently, unhealthy, the animals are.

Introducing changes to an animal's environment which allow for different and curiosity-driven behavior can break the patterns of stereotypy, leading to better regulation of the animal's stress hormones.[65] This is where environmental enrichment becomes important. As defined previously,[66] environmental enrichment includes altering or introducing items into an animal's enclosure to provide the animal with a stimulus-inducing setting appropriate for that animal.[67] The goals of environmental enrichment include "increas[ing] behavioral diversity; . . . reduc[ing] the frequencies of abnormal behavior patterns; . . . increas[ing] the range or number of normal behavior patterns; . . . increas[ing] positive utilization of the environment; . . . [and] increas[ing] the ability to cope with challenges in a more normal way."[68] Though these goals may be difficult to achieve, or even conceptualize in the setting of a modern or factory farm, the guiding concern should be providing for the farmed animals' "physical . . . [and] psychological health."[69] Environmental enrichment may come in many forms, and

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59 WebMD Editorial Contributors, *What Is Cortisol?*, WEBMD (Nov. 18, 2020), https://www.webmd.com/a-to-z-guides/what-is-cortisol (accessed Dec. 15, 2022).

60 Moberg, *supra* note 21, at 18; Carlstead & Shepherdson, *supra* note 7, at 338; MAKING LIVES EASIER, *supra* note 10, at 36; Fraser & Weary, *supra* note 22, at 40.

61 Toates, *supra* note 60, at 210–11.

62 B.A. Ellenbroek & A.R. Cools, *Stereotyped Behaviour*, *in* METHODS IN BEHAVIORAL PHARMACOLOGY 519, 519 (Frans van Haaren ed., 1993); F. Toates, *Multiple Factors Controlling Behavior: Implications for Stress*, *in* BIOLOGY OF ANIMAL STRESS: BASIC PRINCIPLES AND IMPLICATIONS FOR ANIMAL WELFARE 199, 210 (G.P. Moberg & J.A. Mench eds., 2000).

63 *Id*. at 210.

64 COMPASSION MAKES A DIFFERENCE: DISCUSSION BY THE LABORATORY ANIMAL REFINEMENT & ENRICHMENT FORUM 147, 147 (Viktor Reinhardt ed., 2013) [hereinafter COMPASSION MAKES A DIFFERENCE] (discussing the impacts of small enclosures on macaques).

65 Toates, *supra* note 60, at 210, 216; Moberg, *supra* note 21, at 17; Carlstead & Shepherdson, *supra* note 7, at 348.

66 *See infra* Part I.

67 Feng et al., *supra* note 7, at 2; Riber et al., *supra* note 7, at 379; Carlstead & Shepherdson, *supra* note 7, at 337.

68 YOUNG, *supra* note 9, at 2.

69 *Id*. at 11.

whatever means are implemented should allow for and encourage the animal's interaction or engagement—their enrichment.[70] Environmental enrichment which is "biologically relevant," meaning that it encourages species-typical behavior like foraging, gnawing, or perching, is generally more effective, as animals do not get 'bored' with the enrichment.[71]

There are many ways to provide effective environmental enrichment for farmed animals. Perhaps the most readily apparent of these are more additive means, including the use of toys and music. Several farmed animal species—including pigs, goats, and rabbits—engage with cloth ropes or basic toys like cardboard boxes filled with rocks, hay, or food morsels, which provide acute environmental enrichment that can encourage play-like behavior.[72] Giving pigs access to "chains suspended into their pens from the ceiling" for them to pull and play with between feedings substantially reduces the pigs' cortisol secretion.[73] Playing music in an enclosure or farming facility can also provide effective enrichment. For example, pigs exhibit more relaxed and less aggressive behavior when music is played in their pens.[74] Dairy cows exposed to "'easy listening' music" similarly exhibit more relaxed behavior, though this may be a result of the music masking jolting sounds at the facility and thus creating a more audibly stable environment.[75]

Alternatively, more alteration-based means of environmental enrichment include changes to the farm animals' enclosures. Changing the floor coverings in enclosures from the typical metal grates to substrates like dirt, hay, grass, or mulch creates an enclosure more biologically appropriate, encouraging the "foraging and investigatory behavior" typical of pigs, rabbits, and other farmed animals.[76] Such floor coverings are especially impactful for animals who typically perform some "nesting" behavior while in the reproductive process; for example, pregnant and nursing sow pigs showed reduced cortisol levels when provided with straw or other substrate in their pens.[77] Similarly, providing various

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70 Susan D. Healy & Martin J. Tovee, *Environmental Enrichment and Impoverishment: Neurophysiological Effects*, *in* ATTITUDES TO ANIMALS 63 (Francine L. Dolins ed., 1999).

71 CARING HANDS: DISCUSSION BY THE LABORATORY ANIMAL REFINEMENT & ENRICHMENT FORUM 13 (Viktor Reinhardt ed., 2010), https://awionline.org/sites/default/files/products/Pub-CaringHands-Part1-032912.pdf (accessed Sept. 29, 2023) [hereinafter CARING HANDS].

72 COMPASSION MAKES A DIFFERENCE, *supra* note 63, at 17–18, 27, 57.

73 MOBERG, *supra* note 21, at 17 (citing R. Dantzer & P. Mormede, *Pituitary-Adrenal Consequences of Adjunctive Activities in Pigs*, 15 HORMONES & BEHAV. 386 (1981)).

74 COMPASSION MAKES A DIFFERENCE, *supra* note 63, at 150.

75 Ted H. Friend, *Meeting Physical Needs: Environmental Management for Well-Being*, *in* THE WELL-BEING OF FARM ANIMALS: CHALLENGES AND SOLUTIONS 112–13 (G. John Benson & Bernard E. Rollin eds., 2004).

76 Carlstead & Shepherdson, *supra* note 7, at 343; P. SMITH & H. CRABTREE, PIG ENVIRONMENT PROBLEMS 59–60 (2005).

77 Carlstead & Shepherdson, *supra* note 7, at 348.

levels of flooring for farmed animals to move between and rest on allows for their movement in enclosures with limited space.[78] Adding mirrors or reflective surfaces to the enclosures is another option; for example, sheep seem to find comfort in their reflections, especially when they are kept alone in an enclosure.[79] Rabbits also interact with mirrors in their enclosures, but in a way more similar to a toy on which they can pull and make noise.[80]

Environmental enrichment standards have been in place at zoos in the United States for almost half a century.[81] As such, many studies have tracked the impact of environmental enrichment on the health and behavior of animals in zoos, finding that animals with access to environmental enrichment show "decreasing abnormal behavior" and "improved reproduction and health."[82] Similarly, environmental enrichment has been regulated and extensively studied at research laboratories.[83] Numerous studies show that the provision of environmental enrichment for laboratory animals "changes brain biochemistry to augment learning or cognition," which includes increased brain plasticity, function, and density; improved memory and visual perception; and enhanced social capabilities and emotional regulation.[84] Studies have also shown reduced cortisol levels, improved immune system function, and increased body weight without a change in diet as a result of environmental enrichment.[85] Less direct health impacts may also be prompted by the provision of environmental enrichment. For example, using wood chips as flooring in chicken coops creates a micro-environment of fungi which begin decomposing manure between cleanings, rather than manure simply accruing on metal grating, improving the air quality within and cleanliness of the enclosure.[86]

Environmental enrichment studies have been predominantly focused on behavioral impacts. A limited number of studies have been conducted to evaluate the impact of enrichment on meat quality,[87] so

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78 COMPASSION MAKES A DIFFERENCE, *supra* note 63, at 18; FRANK HYMAN, HENTOPIA: CREATE A HASSLE-FREE HABITAT FOR HAPPY CHICKENS 76 (Deborah Burns ed., 2018).

79 COMPASSION MAKES A DIFFERENCE, *supra* note 63, at 26.

80 *Id*. at 59.

81 *See supra* Part I. (It is prudent to note that the studies at both zoos and laboratories are on animals in captive environments that often have their own inhumanities. These studies also beg the question about what constitutes "normal" in inherently abnormal environments for once-wild individuals. However, as farmed animals and animals held in zoos and laboratories are all captive, studies on the effectiveness of enrichment for one can be used in advancing enrichment for all.)

82 Carlstead & Shepherdson, *supra* note 7, at 337.

83 YOUNG, *supra* note 9, at 41–42.

84 *Id*.

85 *Id*. at 40.

86 HYMAN, *supra* note 77, at 74–75.

87 *See, e.g.*, I.C. de Jong et al., *Effects of Rearing Conditions on Behavioral and Physiological Responses of Pigs to Preslaughter Handling and Mixing at Transport*, 80 CAN. J. ANIMAL SCI. 451, 456–57 (2000) (discussing the behavioral differences in "barren-housed"

the evidence is considered less persuasive for providing farmed animals with environmental enrichment than the other studies.[88] However, the effects like increased body weight, improved immune health, and improved social capabilities should be of interest to farmers, as these impacts may lead to less of a need for expensive growth hormones and other antibiotics or invasive surgeries which remove parts of animals which may cause harm to other animals during conflict.[89] On the consumer side, this would mean more ethically raised meat and less exposure to bioaccumulated antibiotics.

IV. SUGGESTIONS FOR IMPROVEMENT

Considering the animal welfare concerns at issue with the lack of environmental enrichment at farming facilities, it would be reasonable to ask the government to craft legislation to address the problem and implement minimum standards. This could come from modifying the AWA's definition of animals to include farmed animals, and subsequently prompting the Secretary to promulgate humane care and handling regulations for farmed animal species or drafting a new law solely targeting the welfare of farmed animals. However, considering the lobbying might of the industrial animal agriculture and agribusiness industries, it would be difficult to raise enough support from Congress to pass such an amendment or bill. A consumer campaign may be the only route potentially sufficient at this time to persuade either Congress or the industries themselves to implement changes to environmental enrichment at farming facilities.

A. NEW JERSEY'S HUMANE TREATMENT OF DOMESTIC LIVESTOCK ACT

The New Jersey Humane Treatment of Domestic Livestock Act could serve as a model for Congress to pass a bill separate from the AWA to further protect the welfare of farmed animals.[90] The New Jersey law's regulations apply to "domestic livestock"[91] and include

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versus "enriched-housed" pigs and how these enclosure differences impacted physiological stress indicators); and Faucitano, *supra* note 53, at 728–29 (explaining how the results of studies like the one cited prior here show that pigs raised in enriched environments present less stress indicators than those raised in barren environments, and concluding that this is an element that can make a difference in the quality of pork products); YOUNG, *supra* note 9, at 43.

88 YOUNG, *supra* note 9, at 43.

89 *Id*. at 40, 43. *See Inhumane Practices on Factory Farms*, ANIMAL WELFARE INST., https://awionline.org/content/inhumane-practices-factory-farms (accessed Sept. 30, 2023) (describing the common practices of tail docking, dehorning, castration, and debeaking used at factory farms to avoid the animals injuring each other from being kept in large numbers in inadequately spaced areas).

90 N.J. STAT. ANN. § 4:22-16.1 (1995).

91 N.J. ADMIN. CODE §§ 2:8-1.1 (2017).

sections specifically about the care and handling of cattle, horses, poultry, rabbits, small ruminants, and swine.[92] The regulations imply environmental enrichment is included in its definition of "environmental conditions," which is defined as "the sum of all physical (housing, temperature, humidity, photoperiod, etc.) and social (presence of other animals) factors affecting an animal."[93] Further, the sections addressing the enclosures of each of these farmed animals calls for farmers to provide the animals with "environment[s] that support[] [their] health" and explicitly suggests providing species-appropriate flooring.[94]

B. ANIMAL WELFARE IN EUROPEAN UNION LAW

Additionally, Congress may find inspiration in the laws of the European Union. The European Union centers on the "Five Freedoms" when creating animal welfare laws.[95] These freedoms include:

> (1) Freedom from thirst, hunger[,] and malnutrition [] by ready access to fresh water and a diet to maintain full health and vigor[;] (2) Freedom from discomfort [] by providing a suitable environment including shelter and a comfortable resting area[;] (3) Freedom from pain, injury[,] and disease [] by prevention or rapid diagnosis and treatment[;] (4) Freedom from fear and distress [] by ensuring conditions that avoid mental suffering[; and] (5) Freedom to express normal behavior [] by providing sufficient space, proper facilities[,] and company of the animal's own kind.[96]

Notably, most of these freedoms are freedom *from* negative stimuli. The fifth freedom, however, is about proper provisions that cater to an animal's "normal behavior[al]" needs.[97] As such, the fifth freedom arguably includes and demands environmental enrichment for comprehensive animal welfare.

The most wide-reaching legislation that involves environmental enrichment and the living conditions of farmed animals following these Five Freedoms is Council Directive 98/58/EC.[98] This Directive simply defines "animal" as "any animal bred or kept for the production of food, wool, skin or fur or for other farming purposes," expressly including any and every farmed animal.[99] Farmers and caretakers of such animals must take all reasonable steps to avoid causing farmed animals "unnecessary pain, suffering or injury," including providing the animals

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92 N.J. ADMIN. CODE §§ 2:8-2.1 to 2:8-7.7 (2017).

93 N.J. ADMIN. CODE §§ 2:8-1.2 (2017).

94 N.J. ADMIN. CODE §§ 2:8-2.4, 2:8-3.4, 2:8-4.4, 2:8-5.4, 2:8-6.4, 2:8-7.4 (2017).

95 SMITH & CRABTREE, *supra* note 74, at 7.

96 JOHN WEBSTER, ANIMAL WELFARE: LIMPING TOWARDS EDEN, A PRACTICAL APPROACH TO REDRESSING THE PROBLEM OF OUR DOMINION OVER THE ANIMALS 12 (James K. Kirkwood et al. eds., 2005).

97 *Id.*

98 Council Directive 98/58(EC), 1998 O.J. (L 221) 23–27.

99 *Id.* at art. 2(1).

with living conditions that meet the farmed animals' "physiological and ethological needs in accordance with established . . . scientific knowledge."[100] As multitudes of scientific studies now stress the importance of environmental enrichment for animals generally,[101] these base farm conditions and suffering reductions thus implicitly include means of environmental enrichment.

In addition to legislation to implement the Directive, which must include standards imposed on farmers and farming facilities to meet its requirements,[102] some governments also have initiatives to encourage humane farming. For example, the UK has a "deregulated legislation" model, wherein the "Department of Environment, Food and Rural Affairs produces a series of leaflets on the welfare of farm animal species."[103] While these leaflets do not explicitly address environmental enrichment, they discuss living conditions for farmed animals at length and give farmers suggestions about improving their farming facilities.[104]

C. POTENTIAL APPROACHES TO CHANGE

As discussed previously, the AWA expressly excludes farmed animals from the scope of its protections.[105] Allowing for these protections to apply to farmed animals could be accomplished by simply changing the AWA's definition of "animal" so that it reads:

> The term "animal" means any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, *livestock*, *poultry*, or such other warm-blooded animals, as the Secretary may determine is being used, or is intended for use, for research, testing, experimentation, or exhibition purposes, *for use, or intended for use, for food or fiber, improving animal nutrition, breeding, management, or production efficiency, or for improving the quality of food or fiber*, or as a pet. . . .[106]

Farmed animals would then be privy to regulations promulgated by the Secretary, who would set minimum standards for facility conditions that would ideally be akin to those standards set for non-human primates at laboratory facilities—with environmental enrichment included.[107]

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100 *Id.* at art. 3–4.

101 *See infra* Part II (discussing how the lack of environmental enrichment negatively impacts animals' health and welfare).

102 Council Directive 98/58/EC, Concerning the Protection of Animals Kept for Farming Purposes, art. 10, 1998, O.J. (L 221) 23, 25.

103 YOUNG, *supra* note 9, at 25.

104 *Id.*

105 *See* discussion *infra* Part II (stating that the AWA does not apply to farmed animals); 7 U.S.C. § 2132(g).

106 7 U.S.C. § 2132(g) (proposed changes in italics).

107 7 U.S.C. § 2143; 9 C.F.R. § 3.81(b).

Alternatively, U.S. Congress or state lawmakers could follow New Jersey and the European Union's leads and pass a bill that sets standards for farmed animal welfare, including minimum standards for environmental enrichment at farming facilities. There would undoubtedly be pushback from the industrial animal agriculture and agribusiness industries if such a bill were presented. The industries would argue that environmental enrichment "increases the costs of maintaining animals[,] . . . creates additional work for animal caregivers[, and] . . . creates a more risky environment for animals."[108] These would increase the costs of labor needed to run a farm. Additionally, rule makers and legislators may find difficulty in agreeing on a workable definition of "environmental enrichment" in the context of farmed animals, as the language used for animals in zoos and laboratories relates to the animals' behavior in the wild, and farmed animals have been domesticated for centuries.[109]

A non-legislative, consumer-led approach via a mass media education campaign may be more successful than modifying or creating animal welfare laws. Such a campaign could include television and social media ads about the current living conditions of farmed animals at factory farms in the United States compared with the current living conditions of farmed animals within the European Union. The ads could then posit what changes could be made and the resulting impact of those changes on the health and well-being of farmed animals. As two-thirds of Americans "frequently" eat meat from farmed animals,[110] it would be prudent for the ads to include both the negative impacts to human health from that consumption, as well as the potential to alleviate those impacts by providing farmed animals with environmental enrichment. Such a consumer education campaign could lead to reduced consumption of farmed animal products or to an outcry strong enough to persuade the industrial animal agriculture and agribusiness industries to self-implement environmental enrichment and other farmed animal welfare-centered standards.

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108 YOUNG, *supra* note 9, at 20.

109 *See* Robert J. Young, *The Behavioural Requirements of Farm Animals for Psychological Well-Being and Survival*, *in* ATTITUDES TO ANIMALS: VIEWS IN ANIMAL WELFARE 77, 86–88 (Francine L. Dolins ed., 1999) (exploring the difficulties of assessing animals' behavioral needs given the differences between wild and "intensively farmed" animals). "Domesticated," though, is different than industrially farmed. Domesticated farmed animals in fields and pastures lived much differently than those in the intensive production facilities that dominate the farmed animal industry today. *See* Andrea Prisco, *The Rise of Concentrated Animal Feeding Operations, Their Effects, and How We Can Stop Their Growth*, 126 DICK. L. REV. 883, 885–89 (2022) (describing the differences between traditional farms and CAFOs); Jessica Lear, *Our Furry Friends: The History of Animal Domestication*, J. OF YOUNG INVESTIGATORS (Feb. 17, 2012) https://www.jyi.org/2012-february/2017/9/17/our-furry-friends-the-history-of-animal-domestication (accessed Oct. 6, 2023) (explaining that animals have been domesticated for millennia).

110 Justin McCarthy & Scott Dekoster, *Nearly One in Four in U.S. Have Cut Back on Eating Meat*, GALLUP (Jan. 27, 2020), https://news.gallup.com/poll/282779/nearly-one-four-cut-back-eating-meat.aspx (accessed Sept. 26, 2023).

V. CONCLUSION

The animal welfare movement has advocated for animal rights for decades. Studies on the impacts of improving the living conditions of captive animals have been conducted in zoos, laboratories, and farms and show beneficial effects on animal behavior. However, there tends to be a disconnect between these studies and their actual implementation, whether on caretaking at farming facilities or by using the conclusions of these studies to craft laws to protect farmed animals.[111] There is empirical data showing that providing farmed animals with environmental enrichment improves their health and well-being.[112] In addition to this animal welfare benefit, these health and well-being improvements may increase the quality of the products derived from farmed animals,[113] and thus may also be in the best interests of consumers of such products. Following the tenets of animal welfare,[114] farmed animals deserve the quality of life that comes from the simple inclusion of environmental enrichment in farming facilities.

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111 YOUNG, *supra* note 9, at 76, 79.

112 *See infra* Part III (sharing scientific research on how environmental enrichment benefits animals).

113 YOUNG, *supra* note 9, at 43.

114 *See* WEBSTER, *supra* note 95, at 12 (defining the Five Freedoms).