

Speciesism in Climate Change-Related Disasters: Billions of Animals are Excluded from the Continuum of Disaster Management

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Abstract: The warming climate and increasing rate and strength of disasters resulting from shifting weather patterns affect both humans and animals. As disaster management agencies globally are forced to become more effective at preparing and responding to climate-related disasters, the most populous farmed species are being left out of these plans. As the number of animals at risk of disaster events increases, it is mostly companion animal species that have been given more consideration for evacuation and sheltering. Species such as chickens, the most populous avian species on the planet, along with the rest of the eighty billion other farmed land animals that are killed every year for human consumption, have little to no protection in both intensive and extensive farming systems, whether in high or low-income countries. The speciesism prevalent in society is mirrored in disaster management to the detriment of public health, the environment, and animal rights.

Keywords: speciesism; disaster response; climate change; pastoralism; factory farming.

1 Introduction: Farmed Land Animals Face Increasing Threats from Climate Change-Related Disasters (CCRDs)

Within the current framework for international disaster management guidelines from government and nongovernmental agencies at the international and down to the community level (examples include the Sendai Framework¹ and LEGS²) the welfare and rights of farmed animal species used for human consumption such as cows, pigs, chickens, goats, ducks, sheep, and camelids are disregarded as sentient individuals. Their value in these frameworks is stated only instrumentally as economic tools and their status is relegated to just property.³ Species are divided into either those that are units of production or those to which humans have an emotional attachment. They are classified on a sociozoological scale that defines farmed animals as tools and in order to do so, deanthropomorphized.⁴ Farmed animals are seen as beings below humans,

¹ UNDRR, “Sendai Framework for Disaster Risk Reduction 2015-2030”, United Nations Office of Disaster Risk Reduction (2015) <<https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>> accessed 20 February, 2023.

² LEGS (2014). Livestock Emergency Guidelines and Standards, Second edition. Rugby, UK. Practical Action Publishing. <<https://www.livestock-emergency.net/wp-content/uploads/2021/09/LEGS-Handbook-2nd-edition-web-version-1.pdf>>.

³ Best, A. (2021). The legal status of animals: a source of their disaster vulnerability. *Australian Journal of Emergency Management*, 36(3), 63–68. <https://doi.org/10.47389/36.3.63>

⁴ Arluke, A., Sanders, C. R., & Irvine, L. (2022). The Sociozoologic Scale. In *Regarding Animals* (2nd ed., pp. 167–186). Retrieved from <<https://tupress.temple.edu/book/20000000010456>>.

below companion animals, below those species who fulfill the purpose of being near family status or, at the very least, entertaining such as captive wild animals in zoos and circuses. They are expected to have little understanding of the world, including the experience of pain.⁵ An animal species with the “companion” classification means they possess intrinsic value necessitating protection from natural and man-made hazards, something many countries are now developing better logistics, infrastructure, and regulations for. While companion animal species have in recent decades been added to disaster plans and now have national-level relief funds and logistical support in countries such as the US, the vast majority of domesticated animals killed during disasters have no similar protection while they are recognized as merely economic units with the sentience and rights equivalent to a piece of machinery in a factory. According to feminist and animal rights writer Carol Adams, farmed animals are story-less, “absent referents”, and are “‘meat’ when alive and ‘units’ when they die in any way other than the slaughterhouses”.⁶

The public health and environmental consequences of leaving farmed species to die in confinement are costs that go beyond individual animal suffering and affect the communities and ecosystems surrounding livestock-rearing facilities. The increasing number of intensified agricultural systems such as Concentrated Animal Feeding Operations (CAFOs)⁷ makes the logistics of evacuation and sheltering virtually impossible in most countries due to the high number of animals to transport and house safely.⁸ The individuals raised in small farms and pastoralist systems fare no better as property and profit, a status which ensures that owners have no legal obligation to provide for their care beyond what government or private insurance policy requires.⁹

Despite the inextricable link between public health, the environment, and animal welfare, the preservation of human life supersedes all other affected parties in disaster management often to the detriment of all non-human victims. The increased frequency of Climate Change Related Disasters (CCRDs) necessitates investigating how to more equally mitigate disasters for companion animals, wildlife, and farmed animals. During both slow and rapid onset CCRDs, animals exploited for human consumption, clothing, research, and entertainment are left behind in disaster planning and response and more government and private sector investment to move away from these systems would counteract that. While the elimination altogether of these systems of exploitation for human profit remains far off, acknowledging and acting on the inherent risk to farmed animals is necessary, as will be seen in the following examples.

Speciesism, defined here as prejudice or discrimination based on species, is deeply embedded in the field of disaster management. This discussion that follows will provide examples of several increasingly common CCRDs around the world. These examples will cover animals that are exploited for their meat, milk, coats, skins, and blood in both intensive and extensive farming and in sedentary as well as pastoralist systems among a variety of geographical, political, and economic situations.

⁵ Ibid (no. 3).

⁶ Carol Adams quoted in Irvine, L. (2021). *Filling the Ark: Animal Welfare in Disasters*. Temple University Press.

⁷ Doug Gurian-Sherman, “Production Costs of CAFOs and Alternative Systems”, *CAFOs Uncovered: The Untold Costs of Confined Animal Feeding Operations*, Union of Concerned Scientists (2008) pp. 13–28. *JSTOR*, <<http://www.jstor.org/stable/resrep00054.7>> accessed 11 Mar. 2023.

⁸ James Sawyer, and Gerardo Huertas. G. (2018). *Animal Management and Welfare in Natural Disasters* (1st ed). New York, N.Y.: Routledge.

⁹ Ibid.

Throughout the discussion that follows, the vein of speciesism inherent in cultures around the world as well as in prominent animal advocacy groups is shown to also be prevalent in disaster management. While the dominant rhetoric in the field of disaster management parrots the mantra that the only value in protecting farmed animals is in protecting community economic resilience, the lives of billions of sentient beings are not protected from suffering and death. Disaster management actors in the past decade have seen benefits to early intervention for animals in the wake of CCRDs, but have yet to seek to eliminate the systems that put these commodified animals in harm's way in the first place and realistically will not any time soon.¹⁰

As CCRDs have increased in strength and frequency in the past several decades, the most common are hydrometeorological (floods and storms) and climatological (droughts and heat waves).¹¹ From 1970-2019, the frequency of these events has increased by a factor of five globally with droughts causing the most human deaths followed by storms, floods, and extreme temperatures.¹² These disasters take significant public and private resources to respond to and countries with the least financial and logistical support, particularly in the Global South, are those for whom the effects can be catastrophic. Property loss in addition to the loss of life can take years of intense, expensive, multilateral relief to recover from.

Twenty-five percent of the world's population live in flood-prone regions, 4 out of 10 of them living in poverty, thus the impact of flood mitigation cannot be understated for both humans and non-human animals. Since nearly eighty billion land animals are killed for human consumption every year,¹³ many of whom are owned by the world's poorest populations in the most disaster-prone regions in South and East Asia, the risk for farmed animal species mortality is highest in these flood-prone regions.¹⁴ What is easy to forget, however, is that it is not the poorest countries in which the largest numbers of farmed animal species are confined and where the most significant policy shifts away from speciesism in disaster management need to take place to reduce morbidity and mortality. The first examples outlined below in British Columbia, Canada, and across Eastern North Carolina in the US show that it is the intensification of animal agriculture that proves the deadliest in wealthier countries which have the highest rates of animal product production and consumption. Regardless of location, type of disaster, or species affected, the following discussion will show that there is much work to be done on eliminating speciesist language and policy from the future of disaster management. The animals born into the food system fare the poorest as a result of speciesism and the livelihoods and economies that revolve around these farmed animals are at stake as well. As shown in the following

¹⁰ Ibid (no. 6).

¹¹ Vinod Thomas, Jose Albert, and Rosa Perez, "Climate-Related Disasters in Asia and the Pacific" (2013) ADB Economics Working Paper Series No. 358, Manila: Asian Development Bank.

<<https://www.adb.org/sites/default/files/publication/30323/ewp-358.pdf>> accessed 3 March, 2023.

¹² World Meteorological Organization, "Weather-related disaster increase over past 50 years, causing more damage but fewer deaths" (31 August, 2021) <<https://public.wmo.int/en/media/press-release/weather-related-disasters-increase-over-past-50-years-causing-more-damage-fewer#:~:text=The%20number%20of%20disasters%20has,deaths%20decreased%20almost%20three%2Dfold>> accessed 20 February 2023.

¹³ "Number of Animals Killed", Viva! UK (2022) <<https://viva.org.uk/animals/number-animals-killed/>>.

¹⁴ Jun Rentachler, Melda Salhab, and Bramka Jafino "Flood risk already affects 1.8 billion people: Climate change and unplanned urbanization could worsen exposure" (28 June, 2022) World Bank Blogs <<https://blogs.worldbank.org/climatechange/flood-risk-already-affects-181-billion-people-climate-change-and-unplanned>> accessed 28 February 2023.

examples, excluding farmed animals from disaster plans has far-reaching consequences.

2 Examples of Speciesism in Recent Global Disasters

2.1 The Triple Threat: Heat Dome, Wildfires, and Flooding in British Columbia, Canada

The summer of 2021 in British Columbia (BC) was the setting for a sequence of CCRDs that affected much of Western Canada and the Pacific Northwest of the US. It began with the summer heat dome at the end of June 2021 which was responsible for a 440% increase in excess mortality in BC as record temperatures reached a high of 49.6°C.¹⁵ Subsequently, over 100 wildfires broke out in the region and the town of Lytton, where the record-setting temperature was recorded, was almost entirely incinerated.¹⁶ Due to the lack of rain coupled with the extreme heat and additional lightning storms, 1610 wildfires over the summer of 2021 burned 868,000 hectares.¹⁷ The drought resulting from the heat dome that contributed to the rise in wildfire incidents was then responsible for the devastating effects of the floods that followed.¹⁸

During the heat dome alone, an estimated 400,000 chickens died. During that one summer alone, 1.3 million farmed animals were killed in these successive CCRDs. In November of 2021, after the land had been ravaged by drought and wildfires during the summer, an atmospheric river inundated the land and created the costliest disaster in the history of British Columbia.¹⁹ During these floods and landslides, most of the animal deaths occurred from drowning and/or hypothermia in their facilities housing hundreds of cows or thousands of pigs, and up to hundreds of thousands of poultry.²⁰ These staggering numbers of animals cannot be evacuated without having mass transport and sheltering available at a moment's notice for rapid-onset flash floods. Having species-appropriate shelters at the ready that are capable of taking in these high numbers of terrified animals is often just not possible without significant planning and the will to protect them. When factoring in infectious disease management, veterinary care, feed supplies, and having trained and experienced handlers available for such operations to limit animal injury and death, the logistics of evacuation and sheltering is an overwhelming, resource-intense challenge that many farmers either cannot or will not partake in.²¹

Due to the location of most of the farmed animal deaths in an area that was once a lake before being drained to create farmland, insurance companies and government officials were concerned about the rebuilding of farms in this flood-prone region in a

¹⁵ Sarah Henderson, Kathleen McLean, Michael Lee, and Tom Kosatsky "Analysis of community deaths during the catastrophic 2021 heat dome: Early evidence to inform the public health response during subsequent events in greater Vancouver, Canada" *Environ Epidemiol.* (19 Jan 2022) ;6(1):e189

¹⁶ Vjosa Isai, "Heat wave spread fire that erased Canadian town" *New York Times* (21 July, 2021). <<https://www.nytimes.com/2021/07/10/world/canada/canadian-wildfire-british-columbia.html>> accessed 7 March 2023.

¹⁷ Official website of the Government of British Columbia, BC Wildlife Service, Wildfire Season Summary (2021). <<https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary>> Accessed 7 March 2023.

¹⁸ Ibid.

¹⁹ Brian Hill, "1.3 million farm animals dead due to climate change: What can BC do to stop the next catastrophe?" *Global News* (7 December, 2021) <<https://globalnews.ca/news/8427762/b-c-flooding-kills-650000-farm-animals>> accessed 4 March, 2023.

²⁰ Ibid.

²¹ Ibid (no 8).

province in which seasonal CCRDs are becoming the norm. Animal welfare laws in BC in a country generally acclaimed for welfare standards did nothing to prevent these deaths because recommendations for farmers to include evacuation plans or contingency plans for power outages on CAFOs are merely suggested, not legally mandated.²² To require these farmers -a population working in a sector with already low-profit margins and high expenditures and loans- to have mandatory evacuation plans for 50,000-100,000 birds, hundreds of cows, or thousands of sheep or pigs (the evacuation of which would be required to be self-financed) would price most producers entirely out of the market. The director of the Canadian Coalition of Farm Animals in Hill's article²³ explains that governments are reluctant to make emergency evacuation plans mandatory due to the extra burden on farmers even though this greatly reduces protections for the individual animals in their care.

Mandatory evacuation and shelter plans for farmers is a potential disaster mitigation strategy, one not different from those that disaster managers recommend for places such as correctional facilities, hospitals, and care facilities in which living beings are confined, usually not mobile on their own, and under the constant watch of caretakers. This requirement, when coupled with zoning regulations limiting the density of animals per acre of land, would also effectively eliminate the economies of scale that make intensive animal agriculture a viable business model.²⁴ Ultimately, if the goal is to reduce animal mortality, or even to just protect livelihoods and local economies, the long-term mitigation strategy should include reducing the number of animals born into intensive animal agriculture and exposed to CCRDs with no chance of survival. To protect the artificially low prices of animal products by protecting CAFO farmers' bottom line with taxpayer-funded farm subsidies²⁵ is at the expense of the rights of billions of individual lives born into the food system. While the agricultural economy of BC was hit hard by this disaster and farmers were left with little more than fields of corpses, none fared worse than the animals themselves who were unable to escape their fate in this triple disaster.

Legally, the farmers in BC were not liable for the death of the animals in their care who died in the floods from drowning or hypothermia, and they faced no penalties due to the absence of mandatory evacuation for their herds or flocks. In addition to this lack of liability for their animals' deaths, the BC Prevention of Cruelty to Animals Act states that "farmers 'must not be found guilty of an offense if their actions are carried out 'in accordance with the prescribed standards of care' for the kind of farming they engage in".²⁶ The standards of care for animal agriculture globally, regardless of animal welfare laws in place, is that animals are property first and foremost, and as property and profit, their individual lives matter less than their economic value.²⁷

From this example in Canada, it is important to note that the primary focus of disaster management is not solely human protection. Protecting property and infrastructure, preventing environmental damage, safeguarding public health and safety, and ensuring business continuity are also among the goals of effective disaster

²² Ibid.

²³ Ibid.

²⁴ Gurian-Sherman (no 1).

²⁵ Christina Sewell, "Removing the Meat Subsidies: Our cognitive dissonance around animal agriculture" (11 February, 2020) <<https://jia.sipa.columbia.edu/removing-meat-subsidy-our-cognitive-dissonance-around-animal-agriculture#17>> accessed 3 March, 2023.

²⁶ Hill (no 8).

²⁷ Francione, Gary L. "Reflections on 'Animals, Property, and the Law' and 'Rain without Thunder.'" *Law and Contemporary Problems*, vol. 70, no. 1, 2007, pp. 9–57. *JSTOR*, <<http://www.jstor.org/stable/27592164>> accessed 9 March, 2023.

management in each phase: mitigation, preparedness, response, and recovery. However, within the existing system of animal welfare laws and guidelines regarding animals in disaster, the lack of protection for farmed animals only falls under business continuity and protecting property and that falls secondary to the protection of human victims. Farmed animals in BC were a side note even as protection for companion animal species increases globally. The words of the Abbotsford, BC mayor during the floods of November 2021 sum this up well: “I know it’s hard for farmers to leave their livestock, but people’s lives are more important to me right now than livestock or chickens.”²⁸ When given the opportunity to save a human or a chicken, most people would certainly help the human, but it is important that disaster plans get closer to eliminating people from having to make this choice at all by including farmed animals in preparedness or by preventing CAFOs being built in the first place.

Disaster mitigation in the Fraser Valley where the worst of the flooding and animal deaths took place would involve a shift in agriculture production entirely. If the suffering and deaths of the millions of animals that perished unnecessarily during the heat dome, wildfires, and floods of 2021 in BC were a consideration of the provincial government and disaster management agencies, subsidizing and committing to a transition to plant-based agriculture for the region would be the best chance for successful mitigation.²⁹ Given that climate change in BC has increased the probability of the atmospheric river event causing flooding by roughly 60%, and animal agriculture is the second highest source of anthropogenic greenhouse gases,³⁰ it is counterproductive to try to solve the problem of increased risk of flood disasters in Fraser Valley by continuing to support this main driver (and the largest number of victims) of climate change.

2.2 Stronger Storms: Hurricane Florence, North Carolina

The effects of Hurricane Florence of 2018 were felt most intensely in the hog and poultry-producing state of North Carolina. During Florence’s history through the Atlantic storm season, it was briefly a Category 4 hurricane offshore, but it made landfall in North Carolina on 14 September 2018 as a Category 1 hurricane with sustained winds of 150kmph.³¹ Despite the lower wind speed, the slow-moving storm dropped days of heavy rain in the floodplains of the state where the vast majority of CAFOs operate. With over 6500 CAFOs in NC, this flat Eastern side of the state contains the majority of factory farms.

Ten billion gallons of wet animal manure is generated in the state every single year from these farms along with 2 million tons of dry animal waste from chickens.³²

²⁸ Jordan Reichert, “BC flooding exposes the ongoing disposability of animals in agriculture”, Animal Protection Party of Canada (29 November, 2021) <<https://www.animalprotectionparty.ca/b-c-flooding-exposes-the-ongoing-disposability-of-animals-in-agriculture>> accessed 9 March, 2023.

²⁹ Ibid.

³⁰ Nathan P. Gillett, Alex J. Cannon, Elizaveta Malinina, Markus Schnorbus, Faron Anslow, Qiaohong Sun, Megan Kirchmeier-Young, Francis Zwieters, Christian Seiler, Xuebin Zhang, Greg Flato, Hui Wan, Guilong Li, Armel Castellan, “Human influence on the 2021 British Columbia floods”, *Weather and Climate Extremes*, vol. 36 (2022).

<<https://www.sciencedirect.com/science/article/pii/S2212094722000287>> accessed 2 March, 2023.

³¹ “Hurricane Florence: 14 September, 2018”, National Weather Service, National Oceanic and Atmospheric Administration (2022) <<https://www.weather.gov/ilm/HurricaneFlorence>>.

³² Christina Cooke, “North Carolina’s Factory Farms Produce 15,000 Olympic Pools Worth of Waste Each Year”, *Civil Eats* (28 June, 2016) <<https://civileats.com/2016/06/28/north-carolinas-cafos-produce-15000-olympic-size-pools-worth-of-waste/>> accessed 20 February, 2023.

One hundred and seventy of these waste lagoons are on 100-year flood plains³³ and during Hurricane Florence's torrential downpours lasting days, the flooding that followed caused multiple threats to public health and the surrounding land and waterways as a result of overflow from CAFO waste lagoons.

Public health concerns just from waste lagoons include the contamination of surface and groundwater and unmonitored and tested private wells with antibiotics; bacteria such as *E. coli*, salmonella, giardia, leptospirosis, brucella, and anthrax; viruses such as enteroviruses, caliciviruses, adenoviruses, coronaviruses, and rotaviruses to name just a few zoonotic pathogens.³⁴ While parasites, pharmaceutical metabolites, viruses, and bacteria are the greatest threat to humans and other animals in contact with the water, the heavy metals in animal feed as well as the nutrient load in the waste lagoon runoff have serious implications for aquatic ecosystems that this leakage ends up mixing with. Ammonia, nitrates, and phosphorus can cause eutrophication, or excessive algae growth, which then reduces the amount of oxygen in the water to the point that aquatic species can no longer live there and lakes, ponds, rivers, and even ocean dead zones occur.³⁵ Monitoring of the estuaries of the Albemarle-Pamlico Sound on the coast of North Carolina showed significant algae blooms and "unprecedented nutrient- and organic matter-laden freshwater discharges to nutrient-sensitive receiving coastal waters".³⁶

The waste lagoon runoff in North Carolina contained all these pathogens, heavy metals, and nutrients plus solid waste. In addition, carcass removal became necessary as the flood carried away the bodies of millions of deceased animals and added to their ranks the thousands of dead fish who floated on the top of flood waters infested with lagoon slurry. Very few of the farmed animal survivors were able to make it to sanctuaries to escape their fate of returning to the food system.³⁷

Even with plenty of warning that the hurricane was on its way, the potential to evacuate these millions of farmed animals and protect full waste lagoons from leakage was limited. While cat and dog shelters were evacuated and horse farms had plenty of places to move West out of the storm's path, pig and poultry farms simply cannot evacuate animals who have never even seen the light of day and are housed together by the thousands. There was also no incentive for farmers to do so while they were merely insured property like tractors or buildings.

The US Department of Agriculture (USDA) runs a livestock indemnity program to reimburse farmers for losses of livestock and crops due to a disaster. This reimbursement rate is 75% of the animal's market value on the day before they died from the disaster event.³⁸ The complaint from smaller farms is that this

³³ "Exposing Fields of Filth in North Carolina: landmark report maps feces-laden hog and chicken operations in North Carolina", Environmental Working Group, Washington, DC (21 June, 2016) <<https://www.ewg.org/research/exposing-fields-filth-north-carolina>> Accessed 2 March, 2023.

³⁴ M. D. Sobsey, L. A. Khatib, V. R. Hill, E. Alocilja, S. Pillai, Pp. 609-666 in *Animal Agriculture and the Environment: National Center for Manure and Animal Waste Management White Papers* (2006), J. M. Rice, D. F. Caldwell, F. J. Humenik, eds. 2006. St. Joseph, Michigan: ASABE. (doi:10.13031/2013.20268).

³⁵ Hans Pearl, Joseph Crosswell, Bryce Van Dam, *et al.*, "Two Decades of Tropical Cyclone Impacts on North Carolina's Estuarine Carbon, Nutrient and Phytoplankton Dynamics: Implications for Biogeochemical Cycling and Water Quality in a Stormier World", *Biogeochemistry* (2018) 141, 307–332. <<https://doi.org/10.1007/s10533-018-0438-x>>.

³⁶ *Ibid.*

³⁷ Ellyn Kail, "Stirring photos of animals in the aftermath of hurricane Florence (interview with Kelly Guerin)" Feature Shoot (14 November, 2018) <<https://www.featureshoot.com/2018/11/stirring-photos-of-animals-in-the-aftermath-of-hurricane-florence/>>.

³⁸ USDA, Livestock Indemnity Program (2022) <<https://www.disasterassistance.gov/get-assistance/forms-of-assistance/5800>> accessed 7 March, 2023.

reimbursement scheme favors the CAFOs whose economies of scale are far greater as they spend less per animal to raise them to market.³⁹ The American obsession with widely accessible and unnaturally cheap meat, dairy, and eggs has made it a world leader in factory farming with 99% of all farmed animals being raised in these conditions.⁴⁰ As a result, the rubric for compensation reflects the fact that the nature of the market is heavily weighted towards encouraging the growth of CAFOs, thus perpetuating the lowest-welfare production systems to proliferate throughout the US and especially in North Carolina's flood-prone regions.

For a farmer of either a CAFO or small farm, the task of protecting their flocks and herds by evacuation and sheltering is a financially and logistically impossible task in most parts of the world, even in countries like the US in which storm evacuation routes are well-defined for human residents. Many farms choose to send animals to slaughter before the storm to depopulate as the most humane and financially beneficial option.⁴¹ This prevents the need for carcass removal post-storm even if it means taking a little financial hit for slaughter at a lower-than-expected market weight. The reality of the food system these birds and pigs were born into is that they were set up from the start to die as infants. Their deaths at whatever age and by whatever means necessary are not regarded as paramount to either the producers or the consumers of these animals as long as the final product is safe by government regulations and profit is made. The food system relies on the ambivalence of consumers and producers for profit and production and as long as that is true, welfare laws are not going to reduce the growing number of animals ending up as rotting carcasses floating through flood waters.

Producer in NC had the choice of depopulation by early slaughter or insurance payouts rather than any incentive to evacuate and shelter their animals. Rather than encourage farmers to evacuate animals or even to allow the animals to escape to higher ground by leaving open barn doors before caretakers evacuate, insurance policies incentivize farmers to keep barns locked tight to facilitate an accurate head count of dead animals for reimbursement.⁴² The 3.4 million birds and 5500 pigs killed in Hurricane Florence never had a chance to survive because public policy favors cheap meat over individual animal lives whether during a disaster or between them.

As the evidence of increasing CCRDs along the Atlantic coastline becomes irrefutable, the North Carolina Department of Agriculture and Consumer Services (NCDACS) has managed a Swine Floodplain Buyout program since 2000 which seeks to close down CAFOs in the 100-year floodplain areas of NC; only forty-three out of

³⁹ Claire Kelloway, "After Florence, small farmers face major hurdles to federal relief." *Civil Eats* (5 October, 2018) <<https://civileats.com/2018/10/05/after-florence-small-farmers-face-major-hurdles-to-federal-relief/>> accessed 28 February, 2023.

⁴⁰ Kelly Anthis and Jacy Reece Anthis, "Global Farmed and Factory Farmed estimate", Sentience Institute <<https://www.sentienceinstitute.org/global-animal-farming-estimates>> accessed 28 February, 2023.

⁴¹ De Paula Vieira, A., Anthony, R., "Reimagining Human Responsibility Towards Animals for Disaster Management in the Anthropocene." Chapter in: Bovenkerk, B., Keulartz, J. (eds) *Animals in Our Midst: The Challenges of Co-existing with Animals in the Anthropocene*. The International Library of Environmental, Agricultural and Food Ethics (2021), vol 33. Springer, Cham. <https://doi.org/10.1007/978-3-030-63523-7_13>.

⁴² Alex Cerussi and Irina Anta, "Natural Disasters: considerations for animals in agriculture", American Bar Association (29 January, 2020) <https://www.animallawconference.org/wp-content/uploads/2020/10/Natural-Disasters_-_Considerations-for-Animals-in-Agriculture.pdf> accessed 28 February, 2023.

138 producers invited ended up participating.⁴³ This program would close down feedlot operations and set up easements on the properties to eliminate any agricultural production with the need for waste lagoon construction. However, it allows grass-fed cattle operations on the property which does little to reduce risk to animals in the floodplain and instead only eliminates the inevitable lagoon spillage.⁴⁴ Over a dozen named storms have made landfall since Florence's arrival in 2018 and none have had animal mortality rates as high thanks to some buyouts in the floodplain. However, the risk continues as CCRDs increase in frequency and strength while the policy to reduce CAFOs has barely budged. Just as Disaster Risk Reduction (DRR) and hazard mitigation for human populations include moving or at least incentivizing moving inhabitants out of regions that are most prone to disasters, the same could apply to animal populations. One must consider that continuing to put millions of sentient beings into harm's way by allowing CAFO permits to continue in this region is absurd, expensive, and dangerous to the environment and human population. A sustainable development strategy for North Carolina's agriculture industry must take into account the preservation of delicate aquatic ecosystems like wetlands and estuaries, the protection of public health, and the continuity of economic development while it protects animals' lives⁴⁵.

2.3 Climate Change in the Arctic and Reindeer Herding Pastoralism

The common association between global warming and CCRDs is with soaring summer temperatures and stronger storms in the middle latitudes. However, shifting arctic weather patterns, rapidly disappearing sea ice, and the melting of permafrost have affected millions of animals and pastoralists near and north of the Arctic Circle due to global warming. The Yamal peninsula of Russia is a region that lies mostly above the Arctic Circle and is home to the Nened indigenous group which is comprised of predominantly nomadic reindeer herders. The Nened use reindeer for meat, milk, bones, and hides and are dressed and housed in mostly reindeer products while still using reindeer-pulled sleds for transport for most of the year.⁴⁶ 80,000 reindeer died of starvation in 2016; 61,000 died in 2013; and 20,000 died in 2006- all years for unusual winter rains during warm days that penetrated the snow layer before freezing.⁴⁷ Reindeer in normal winter conditions dig through the snow with their hooves to eat the mossy lichens and pasture underneath, but the ice layer brought on by unusually high temperatures caused the ground to be unreachable and thus their food source was cut off entirely for most of the winter. In addition to the lack of access to food, extremely high summer temperatures dried up many water sources and reduced pasture quality as it also melted ancient permafrost and released anthrax from melting reindeer carcasses. The 2016 anthrax outbreak caused the death of 2350

⁴³ North Carolina Department of Agriculture and Consumer Services (NCDACS), "Swine Floodplain Buyout" (2018) <<https://www.ncagr.gov/SWC/easementprograms/SwineFloodplainBuyout.html>> accessed 27 February, 2023.

⁴⁴ Ibid.

⁴⁵ David Godshalk, Timothy Beatley, Philip Berke, David Brower, Edward Kaiser, Charles Bohl, and MR. Matthew Goebel (1999) *Natural Hazard Mitigation: Recasting Disaster Policy and Planning*. p. 98. Island Press, Washington, DC.

⁴⁶ Florian Stammer, "Success at the Edge of the Land: Past and present Challenges for Reindeer Herders in the West Siberian Yamal-Nenetskii Autonomous Okrug" *Nomadic Peoples*, vol. 6, no. 2, 2002, pp. 51–71. *JSTOR*, <<http://www.jstor.org/stable/43123667>> accessed 1 March, 2023.

⁴⁷ Siberian Times, "Mass Reindeer Deaths if No Early Warning System for 'Climate Change' Freak freezes" (17 November 2016) <<https://siberiantimes.com/other/others/news/n0789-mass-reindeer-deaths-if-no-early-warning-system-for-climate-change-freak-freezes/>> accessed 8 March, 2023.

reindeer. One child died, hundreds of people were hospitalized and evacuated, and all property of the herders was burned to contain the outbreak.⁴⁸

While the Yamal is suffering life and livelihood-altering effects of climate change, the reindeer industry is also digging its own grave in other ways. In the current economy of the Yamal-Nenets Autonomous Region, the growth of profitability for reindeer antler sales has increased to the point that herders are growing their herds and not slaughtering them for meat to ensure that they can gather more antlers for sale year after year.⁴⁹ This means an already threatened set of resources for reindeer are further depleted as herds grow. All this has exacerbated the effects of the melting permafrost and the droughts from summer heat waves that deplete available grazing lands. Any winter rains that cause ice to cover the snow are catastrophic for tens of thousands of extra animals who slowly starve and then freeze to death.

Mitigation of the mass mortality of reindeer herds is being poorly regulated by the region's disaster management policymakers and by reindeer herding communities themselves while the warming of the region is only speeding up. The increased frequency of events such as these that take the lives of so many individuals requires that mitigation involves the drastic reduction in herd sizes and the rapid development of alternative livelihoods for Nenets herders. In addition, early warning systems for these weather events are possible if a close watch is kept on the retreat of sea ice in the Barents and Kara Seas.⁵⁰ This can give up to two days' warning before these winter rains which then can initiate the mobile slaughterhouses thus preventing mass starvation of herds. These teams depopulate herds and sell their meat before the animals face a prolonged death from starvation that results in herders receiving no government compensation for the loss of starved animals.⁵¹ The process of global warming leading to the irreversible decline in the levels of Arctic Sea ice-- and then increased winter temperatures and rain precipitation turning to ice-- is only going to get worse over the coming decades. Permafrost thaws and disease outbreaks are becoming the norm rather than exceptional events. It is safe to say that the reindeer populations and the Nenets -generations of which rely entirely on their herds for livelihoods- will no longer have any place in the Yamal region without drastically limiting herd sizes and preventing overgrazing at the very least.⁵²

The literature used in this section describing this example of an Arctic CCRD focused exclusively on the destruction of livelihoods over discussing the implications of this mass casualty event on the individual animals under the care of the herders. This rhetoric is commonplace when discussing animal mortality in disasters as the following sections will show. Around 40% of the Nenets population are still practicing

⁴⁸ Elena Liskova, Irina Egorova, Yuri Selyaninov, Irina Razheva, Nadezhda Gladkova, et al., "Reindeer Anthrax in the Russian Arctic 2016: Climatic Determinants of the Outbreak and Vaccination Effectiveness", *Frontiers in Veterinary Science* Vol. 8 (2021)

<<https://www.frontiersin.org/articles/10.3389/fvets.2021.668420>> accessed 8 March, 2023.

⁴⁹ Alexander Pilyasov, Valeriy Kibenko, "The Phenomenon of Entrepreneurship in Reindeer Husbandry in Yamal: Assessment of the Situation, Paradoxes, and Contradictions. In: Mathiesen, S.D., Eira, I.M.G., Turi, E.I., Oskal, A., Pogodaev, M., Tonkopeeva, M. (eds) *Reindeer Husbandry* (2023), Springer Polar Sciences. Springer, Cham.

⁵⁰ Bruce Forbes, Tina Kumpula, Nina Meschtyb, et al., "Coping with a Warming Winter Climate in Arctic Russia: Patterns of Extreme Weather Affecting Nenets Reindeer Nomadism" Chapter in: Marie Roue, Douglas Nakashima, and Igor Krupnik (eds.), *Resilience Through Knowledge, Science, and Global Environmental Change*, pp. 217-232, Cambridge, Cambridge University Press (2022).

⁵¹ *Ibid* (no. 47).

⁵² Ben Guarino, "Starvation Killed 80,000 Reindeer After Unusual Arctic Rains Cut Off the Animals' Food Supply", *Washington Post* <<https://www.washingtonpost.com/news/morning-mix/wp/2016/11/16/starvation-killed-80000-reindeer-after-unusual-arctic-rains-cut-off-the-animals-food-supply/>> accessed 27 February, 2023.

nomadic reindeer herding and seasonal fishing, this livelihood being nearly unchanged for thousands of years in the Yamal Peninsula where crop agriculture is limited. The number of herders from the 2010 census was nearly 25,000 with herds counted at around 700,000.⁵³ The deaths of the tens of thousands of individual animals should not be discounted at the same time as considering the culture-altering changes happening to the nomadic Nenets people affected by a CCRD. While the Yamal is also home to 90% of Russia's natural gas output and an increasing portion of oil which has created many problems for Nenets herders, it is vital to acknowledge that these animals starving and freezing to death from the effects of a warming climate is also caused in large part by animal agriculture's greenhouse gases (GHG). The loss of both animal lives and entire indigenous cultures in areas far from the CAFOs of countries like the US or China cannot be ignored. Global warming is indeed global after all.

Fossil fuel extraction in the Yamal Peninsula is now also a contributing factor to disrupted herd migration routes and is causing nomads to move to cities and face unemployment, alcoholism, and rising suicide rates.⁵⁴ The movement of farming families to cities due to livestock losses can be deeply traumatic, especially for those with no education or other skills to use in an urban environment. The region's increasing loss of pasture productivity means an inevitable migration of nomads to sedentary life in the permanent settlements of the region. While this may lead to a host of new problems including inadequate housing, the need for vocational training, and job market development, these will have to be addressed as part of the long-term mitigation of melting permafrost and the increased frequency of winter rains⁵⁵. As the end of reindeer herding as a viable livelihood comes near, these issues will need to be addressed.

2.4 Drought, Starvation, and Disease in the Horn of Africa

The Horn of Africa's (HOA) worst drought in 40 years began its fifth consecutive failed rainy season of March-May 2023.⁵⁶ This is the third drought in the region just in the past decade. Drought conditions have tripled in frequency between 1970-1979 and 2010-2019.⁵⁷ This prolonged drought is exacerbating the complex emergency that already exists across Kenya, Ethiopia, and Somalia which involves not only famine, but also civil conflict (particularly in Ethiopia), malnutrition-related disease outbreaks, political instability, internally displaced people (IDPs), and unstable food and fuel

⁵³ Atle Staalesen, "The Russian Arctic growth region", *The Barents Observer* (8 October, 2016) <<https://thebarentsobserver.com/en/life-and-public/2016/10/russian-arctic-growth-region>> Accessed 23 February, 2023; Minority Rights Group International, "Russian Federation: Nenets", *World Directory of Minorities and Indigenous Peoples* (2020) <<https://minorityrights.org/minorities/nenets/>> Accessed 8 March, 2023.

⁵⁴ *Ibid.*

⁵⁵ A M Ermakova (2021) *IOP Conference Series: Earth and Environmental Science*. 723 doi: 10.1088/1755-1315/723/4/042026.

⁵⁶ Office for the Coordination of Humanitarian Affairs (OCHA), "Horn of Africa: regional updates", OCHA (2023) <<https://www.unocha.org/horn>> accessed 2 March 2023.

⁵⁷ World Bank, "Climate Change Adaptation and Economic Transformation in Sub-Saharan Africa", *Africa's Pulse*, vol. 24 (Oct. 2021). <<https://openknowledge.worldbank.org/server/api/core/bitstreams/34f98cfe-b27b-58ad-a0cb-99568577e730/content>> accessed 1 March, 2023.

supplies and prices.⁵⁸ The resilience of the region to its frequent climate shocks is already low due to the Ukraine war commodity disruptions and the lingering effects of COVID-19 on the economy, but the pastoralist livestock farmers and millions of farmed animals are taking the brunt of these famine conditions. The UN World Meteorological Organization (WMO) reports that 11 million livestock have died from this drought up to February 2023 with many families losing entire herds.⁵⁹ The UN International Organization for Migration (IOM) reports that 16.3 million people are unable to access enough water for drinking, cleaning, and cooking; 2 million people are displaced; and 20 million people are facing severe food insecurity in this arid and semi-arid region.⁶⁰ Extreme poverty, political instability, an insufficient power grid, and poor healthcare infrastructure added to the lack of resources for animals such as accessible veterinary care and disease monitoring services make pastoralism and sedentary farming difficult even outside of drought periods. However, it is still among the few viable occupations for the rural poor in the HOA.

This complex emergency --one in which no mitigation strategy has yet prevented the necessity for protracted relief operations-- is getting worse for both humans and animals. While the arguments for defending pastoralism as a vital livelihood and food source have many facets, these need to take into account the unstoppable climate shocks in the HOA. The common arguments for pastoralist systems are that they effectively sequester carbon through grazing and that livestock make use of arid and semi-arid lands (ASAL) not viable for crop production.⁶¹ Some defenders of pastoralism advocate for adaptations to livestock rearing such as developing concurrent agroforestry systems, mixing crop and livestock rearing, utilizing more drought-resilient breeds, and restoring grazing lands,⁶² but none of these consider a replacement of this system for the humans and animals trapped in this farming method. The deeply speciesist policy of pastoralist livelihood protection at all costs to the farmed animals is problematic because providing jobs is not necessarily the same as poverty reduction. This can be seen from the extreme poverty, poor health care, and low literacy rates of pastoralists. This fact tends to be passed over when pastoralism is defended.⁶³ Protecting pastoralists does not need to mean protecting the system of pastoralist farming itself. To ensure that the way things have always been done (which has served neither herders nor animals well) continues is to perpetuate the cycle of suffering and death the animals in this food system experience during CCRDs. International organizations and governments can acknowledge that

⁵⁸ USAID (13 December 2022) Horn of Africa- Complex Emergency

<https://www.usaid.gov/sites/default/files/2022-12/2022-12-13_USG_Horn_of_Africa_Complex_Emergency_Fact_Sheet_3.pdf> accessed 10 March, 2023.

⁵⁹ UN World Meteorological Organization (22 February, 2023). Another poor rainy season forecast drought hit Horn of Africa. < <https://public.wmo.int/en/media/news/another-poor-rainy-season-forecast-drought-hit-horn-of-africa>> accessed 9 March 2023.

⁶⁰ UN International Organization for Migration, “East and Horn of Africa Regional Drought Response 2023” IOM (2023) <<https://crisisresponse.iom.int/response/east-and-horn-africa-regional-drought-response-2023>> accessed 1 March 2023.

⁶¹ Uddin Md E., Kebreab Ermias, Review: Impact of Food and Climate Change on Pastoral Industries, *Frontiers in Sustainable Food Systems*, vol. 4, 2020 <<https://www.frontiersin.org/articles/10.3389/fsufs.2020.543403>>.

⁶² World Bank, “Climate change adaptation and economic transformation in Sub-Saharan Africa”, *Africa’s Pulse* (Oct. 2021), vol. 24 <<https://openknowledge.worldbank.org/server/api/core/bitstreams/34f98cfe-b27b-58ad-a0cb-99568577e730/content>>; Dawson, I., Carsan, S., Franzel, S., et al., “Agroforestry, Livestock, Fodder Production and Climate Change Adaptation and Mitigation in East Africa: Issues and Options”, ICRAF Working Paper No. 178. (2014) Nairobi, World Agroforestry Centre.

⁶³ Steinfeld (no. 46).

herders have few other viable employment options and work towards changing that specifically.

As seen in the previous examples, due to deeply engrained speciesism, none of these arguments or mitigation options address the individual animals who are not only drivers of climate change⁶⁴ but also are vulnerable and unprotected from CCRDs, have poor veterinary care if any at all, and are still victims of the food system from which there is no escape. The herds are discussed only as economic units and as factors of a traditional culture that is dying as the climate changes and animal farming becomes a less viable livelihood. The FAO, the UN's main animal agriculture oversight agency, has multiple reports detailing the environmental and public health disasters from both intensive and extensive livestock rearing in addition to disaster management guidelines for animals in disaster.⁶⁵ However, at no point in these reports are the animals discussed as individuals who are being exploited and killed while given little to no veterinary care. The eleven million animals who have died up to Spring of 2023 in the HOA since the beginning of the recent drought are not considered living beings in the literature. To discuss drought or other CCRD mitigation for animals without acknowledging their pain and suffering as individuals with an interest in survival is in stark contrast to the way most societies view cruelty to dogs and cats negatively. If eleven million puppies were killed in a drought, the public response would most certainly be different than it is when goats, cattle, and camels are dying of thirst and starvation.

While it is the animals that are suffering and dying in the highest numbers in this current drought, to ignore the plight of the farmers themselves is not the intention of this discussion. The mental health of pastoralists and sedentary farmers alike suffers greatly when faced with loss of livelihood from livestock losses.⁶⁶ ⁶⁷ Job loss in any context can bring on stress, anxiety, depression, and even suicidal ideation. In regions like the HOA, the Yamal Peninsula, and most of the Global South, access to mental health services is extremely limited, even more so in such remote regions where pastoralists live. To balance the needs of both humans whose livelihoods are destroyed and the animals whose lives are taken by disease and starvation means that pastoralists' struggles – as well as those of other farmers throughout the world- have to be prioritized. Neither farmed animals nor their human caretakers fare well in CCRDs. Generations of people working as herders are currently and, more so in the future, losing their livelihoods while their livestock fail to survive the effects of CCRDs throughout the world. These people lack sufficient support to find alternative livelihoods in remote regions with few other options. In the HOA, there is simply no

⁶⁴ Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., et al., "Tackling Climate Change through Livestock: A Global Assessment of Emissions and Mitigation Opportunities", Food and Agriculture Organization of the United Nations (2013)

<<http://www.fao.org/3/i3437e/i3437e.pdf>> accessed 4 March, 2023.

⁶⁵ Ibid; Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M. and de Haan, C., "Livestock's Long Shadow: Environmental Issues and Options", Food and Agriculture Organization of the United Nations (FAO) (2006) Rome; Food and Agriculture Organization, "Livestock-Related Interventions During Emergencies: A How-to-Do-it Manual", Edited by Philippe Ankers, Suzan Bishop, Simon Mack and Klaas Dietze. FAO Animal Production and Health Manual No. 18. (2016), Rome.

⁶⁶ Nuvey, F. S., Kreppel, K., Nortey, P. A., Addo-Lartey, A., Sarfo, B., Fokou, G., Ameme, D. K et al. (2020). Poor mental health of livestock farmers in Africa: a mixed methods case study from Ghana. *BMC Public Health*, 20(1), 825. <<https://doi.org/10.1186/s12889-020-08949-2>>.

⁶⁷ Sarah Cooper, Paul Hutchings, John Butterworth, Solome Joseph, Abinet Kebede, Alison Parker, Bethel Terefe, Barbara Van Koppen (2019) "Environmental associated emotional distress and the dangers of climate change for pastoralist mental health" *Global Environmental Change*, Volume 59 <<https://doi.org/10.1016/j.gloenvcha.2019.101994>> accessed 7 September, 2023.

turning back in terms of providing herds with a survivable environment- regardless of relief aid provided- thanks to the worsening climate crisis⁶⁸. As a result, the farmers are facing the inability to provide their families with basic needs while consumers are being faced with food shortages. Without significant diversification of the livelihoods available in this region that are not livestock dependent, increased poverty and food insecurity, declining mental health, and high unemployment are all inevitable for those caught up in a food system they were born into. As the population of the African continent doubles by 2050⁶⁹, the reliance on an animal-based food system so sensitive to increasing drought conditions in the HOA needs to be called into question.

There are other options to be explored in the HOA that would save livelihoods, protect animals, and increase food security. Agroforestry, an agricultural method combining native tree planting with other agricultural production, is one excellent option for disaster resilience because not only does it diversify plant-based food production and the regeneration of soil quality of ASALs, but also because it has excellent potential for CCRD mitigation and is an alternative to livestock-based livelihoods. Trees break wind sheers, provide shade for crops, and prevent soil erosion. In the savannas of the HOA, this would be a step in the right direction away from fodder production and grazing land restoration. In drought and flood-prone regions, agroforestry and even rewilding savannas are opportunities to mitigate future climate shocks and increase food security while not wasting scarce resources on animal-based farming which the future climate cannot support.⁷⁰ While international organizations discuss water-intensive livestock fodder farming and increasing access to watering holes that are fast disappearing, agroforestry is a more sensible option.⁷¹ This is not only due to drought, but also in part due to the difficulties of doing business under the conditions of competing water and fodder resources of sedentary ranchers, depleted market access due to veterinary restrictions and disease outbreaks, changing demand from urban markets, cattle raids, and political instability.⁷²

As farmed animals face starvation from depleted grazing lands and their communal water sources dry up, their hungry and thirsty bodies also become less resistant to disease and pests. As mentioned, most animals in the HOA in the best of times lack access to veterinary treatment of any kind.⁷³ Pastoralists and their herds have difficulty accessing veterinary and laboratory services, and herders similarly lack healthcare access. With poor transport infrastructure in pastureland and only small

⁶⁸ Haile, G. G., Tang, Q., Hosseini-Moghari, S.-M., Liu, X., Gebremicael, T. G., Leng, G., et al. (2020). Projected impacts of climate change on drought patterns over East Africa. *Earth's Future*, 8, e2020EF001502. <<https://doi.org/10.1029/2020EF001502>>.

⁶⁹ Ibid; Africa's population will double by 2050 (28 March, 2020). In *Africa: Special Report*. The Economist.

⁷⁰ Shem Juya, GW Sileshi, Eike Leudeling, FK Akinnifesi, Cory Whitney, et al., "Potential of Agroforestry to Enhance Livelihood Security in Africa", Chapter in: J. C. Dagar et al. (eds.), *Agroforestry for Degraded Landscapes: Recent Advances and Emerging Challenges - Vol. 1* (2020), <https://doi.org/10.1007/978-981-15-4136-0_4>.

⁷¹ Mesfin Mekonnen, Arjen Hoekstra, "A Global Assessment of the Water Footprint of Farm Animal Products. *Ecosystems* (2012). 15, <https://doi.org/10.1007/s10021-011-9517-8>; Arjen Hoekstra, "Water for Animal Products: A Blind Spot in Water Policy", *Environmental Research Letters* (2014), 9. Doi: 10.1088/1748-9326/9/9/091003.

⁷² Kate Dyer, "Pastoralism in the Horn of Africa: Diverse Livelihood pathways". Future Agricultures Consortium Policy Brief, <<https://www.future-agricultures.org/wp-content/uploads/pdf-archive/CAADP%20Policy%20Brief%2006.pdf>> accessed 20 August, 2023.

⁷³ Kula Jilo, Nejash Abdela, and Jemal Adem, "Insufficient Veterinary Service as a Major Constraint in Pastoral Area of Ethiopia: A Review", *Journal of Biology, Agriculture and Healthcare*, vol. 6:9 (2016) <https://www.law.ox.ac.uk/sites/default/files/migrated/oscola_4th_edn_hart_2012quickreferenceguide.pdf> accessed 2 March, 2023.

communities scattered over the savanna, veterinary surgeons, community animal health workers, and government animal health department staff simply do not have regular access to animals. There is no economically viable model for private or even public veterinary care when clients are so scattered. Herders are left to provide treatment without training, often using unregulated pharmaceuticals they aren't familiar with which can lead to antimicrobial resistance, overdoses, and more pain and suffering for the animals.⁷⁴ This makes monitoring the health of herds and providing vaccines and treatments to animals suffering in drought conditions extremely challenging.

Early intervention to reduce animal mortality in combined disease outbreaks and famine conditions is logistically impossible without fully mobile veterinary services and an increase of at least para-professional community animal health workers, if not large animal veterinarians. Regular vaccinations outside of emergency conditions are the best prevention for disease outbreaks but this requires an existing cold chain network and the disease surveillance systems and veterinary staff in place to execute regular herd vaccinations before the animals are starving and more vulnerable to disease.⁷⁵ Access to regular veterinary care is vital for disaster relief for animals and for protecting public health.

When famine conditions put pressure on food and water supplies, using those scarce resources for growing fodder for livestock rather than crops for human consumption in a drought-prone, food-insecure region wastes precious water resources and land while not increasing long-term food security for the human population. While currently 21 million people in the Horn of Africa are highly food insecure and the population lacks access to potable water and suffers from cholera and diarrhea,⁷⁶ using scarce water for land and water resource-intensive herds that are not climate change-resilient is shortsighted in the face of the need for more effective water management and food production in frequent drought conditions. In this acute famine situation in which the preservation of human life is the highest priority, relief agencies focus on destocking prior to livestock starvation and for nutrition support.⁷⁷ As in the case of reindeer in the Yamal, herd destocking before mass starvation is more humane and saves more animal and human lives and relief funds than any program to attempt to increase the sustainability of a fundamentally unsustainable livelihood in the wake of increasing CCRDs. However, due to the lack of veterinary support and difficulty in getting starved and sick animals to slaughterhouses, this may not be an option.⁷⁸ In the case of the World Society for the Protection of Animals (WSPA- now World Animal Protection) relief in the state of Assam, India after floods in 2012, the early intervention of vaccinations, vitamin injections, and feed for the animals prevented the loss of tens of thousands of animals and thus the farmers' livelihoods, but that

⁷⁴ Immaculate Omondi, Isabelle Baltenweck, Emmanuel Kinuthia, Leonard Kirui, et al., "Mobile Veterinary Clinics in the Drylands of Kenya: Securing Pastoralists' Livelihoods by Bringing Services Close", *Development in Practice* (2021), 31:5, 561-579, doi: 10.1080/09614524.2020.1863917.

⁷⁵ Trish Silken, "Veterinary Services in the Horn of Africa: Where Are We Now?" *Development in Practice* (2002), vol. 15:1, pp. 40-48. *JSTOR*, <<http://www.jstor.org/stable/4030163>> accessed 11 March, 2023.

⁷⁶ Fall, M., Dunford, M. Phiri, C. and Mbago-Bhunu, S. "The world cannot afford to ignore drought in horn of Africa", FAO Regional Office for Africa (14 November, 2022) <<https://www.fao.org/africa/news/detail-news/en/c/1618945/>>.

⁷⁷ FAO (18 August, 2011). FAO's preparedness and response to the Horn of Africa drought. <https://www.fao.org/fileadmin/templates/tc/tce/pdf/FAO_ongoing_response_to_the_drought_in_the_Horn_of_Africa.pdf> accessed 1 September 2023.

⁷⁸ LEGS 2014 (no. 54).

required effective access to the animals in question which is not as logistically simple as in a more densely populated area⁷⁹.

When/if the current drought conditions end in the HOA (and after millions more animals are expected to die in 2023), due to the lack of veterinary services available, the poor infrastructure for disease monitoring, and the lack of capacity of private and public investment in the veterinary industry in the region, it is important to address the problems associated with restocking herds in relief efforts. The process of disposing of millions of starved animal carcasses should be a wake-up call and an opportunity to expand livelihood diversification and address decreasing- rather than working to meet- the demand for animal-based food systems. This protracted drought is not a moment for governments and relief agencies to invest in restocking herds to return to yet another mass casualty incident for farmed animals in the next inevitable drought or other CCRD. Just as it is nonsensical to rebuild communities in severely disaster-prone areas, the same logic of avoiding imminent and repeated suffering for farmed animals in the HOA should apply. Restocking, however, remains the knee-jerk reaction recovery strategy to protect pastoralist livelihoods over the lives of millions of animals who are dying slowly and painfully in the HOA.⁸⁰ Restocking, as opposed to early intervention for existing herds, has been proven to be a less efficient use of relief funds in several disasters, but also perpetuates the poor welfare situation of the animals.⁸¹ Animals that are restocked while conditions remain the same with poor vet care, lack of fodder/forage, and water scarcity will be returning to the same fate as those animals who had previously perished.

Shifting food systems, diversifying crop production, and ending the unsustainable reliance on farmed animals in the economy could have the most impact and be the most cost-effective mitigation strategy for both humans and animals. As the climate changes and extremes in temperatures and precipitation alter the landscape of the HOA, plant-based agriculture and agroforestry will need to play a bigger role in regional food security and livelihood development. Plant proteins from legumes and grains that tolerate drought better than livestock fodder/forage would increase food security without risking the lives of millions of farmed animals in CCRDs. Government and relief agency resources could be better utilized to assist in the transition of livelihoods from pastoralism to livelihoods that increase, rather than deplete, food security.

3 Mitigation and Recovery: Speciesism as a Hindrance to Long-Term Disaster Resilience

From a disaster management perspective, it is no longer logical to support animal agriculture in any system in the face of increasingly common CCRDs. The definition for mitigation, “the lessening or limitation of the adverse impacts of hazards and related disasters”⁸² cannot be taken seriously without addressing the fact that the

⁷⁹ Economists at Large. (2014). *A benefit-cost analysis of WSPA’s 2012 Intervention in the Dhemaji district of Assam India*.

⁸⁰ LEGS (no. 54); FAO 2016 (no. 46).

⁸¹ Ibid (no. 8).

⁸² “Guidelines on Disaster Management and Risk Reduction in Relation to Animal Health and Welfare and Public Veterinary Health: Guidelines for National Veterinary Services”, World Organization for Animal Health (OIE) May 2016, <<https://www.woah.org/app/uploads/2021/03/disastermanagement-ang.pdf>> accessed March 6, 2023.

greatest impact in terms of mortality is always the farmed animal deaths- both in terms of lives lost and economic losses. These victims have the least ability to escape confinement and protect themselves. To truly mitigate the effects of CCRDs on animals, the community of disaster management along with animal health and agriculture agencies need to reconsider supporting policies and production systems that are responsible for animal mass casualty incidents. Support for a food system resilient to CCRD shocks and safe for farmed animals in any part of the world will not include animal agriculture. Mitigation policy in the future will need to include reducing animal farming on flood plains like Eastern North Carolina, drought-prone regions such as the HOA, and on unsustainable, defrosting permafrost pasturelands such as in the Yamal. It is difficult to justify putting thousands of lives unnecessarily in harm's way regardless of whether they are human or animal.⁸³

While demand for animal products continues to rise globally, so, too, does the accessibility of plant-based products and nutritional information regarding shifting to a diet that does not support the exploitation of animals in systems contributing to CCRDs while not being resilient to them. The WHO backs a shift to decrease animal products in diets to reduce health impacts from non-communicable diseases like cardiovascular disease, cancers, and diabetes which cause 71% of premature deaths globally.⁸⁴ While other UN agencies like the FAO continually support animal farming despite their reports about its devastating effects on animals, the environment, and public health, the WHO acknowledges that there has to be a global reduction in animal consumption to eliminate the environmental impact of animal agriculture's destruction of biodiversity and the climate.⁸⁵

Recovery operations teach disaster managers so much about disaster risk reduction, but the lessons are not being heeded in animal protection. The definition of recovery is "the restoration and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors".⁸⁶ One cannot talk about DRR and recovery while ensuring that animals remain trapped in growing numbers in the same food system with all the same limitations for potential evacuation and shelter, with all the same risks to community public health, and with all the same ways that animals in animal agriculture contribute to and are affected by CCRD environmental destruction. Increased investment in the diversification of livelihoods, away from both extensive and intensive animal farming models and towards more sustainable and profitable plant-based agriculture would eliminate the loss of life and billions of dollars in recovery relief funds going towards managing the ever-more frequent animal mass casualty incidents. It is better policy to eliminate the problem than to respond and recover from it.

3.1 Speciesism and Logistical Limitations in Rescue Operations

Rescuing humans from disaster will always take precedence over animal rescue of any species, but in the US, the Pets Evacuation and Transportation Standards Act amendment to the Stafford Act (PETS Act), which was enacted after Hurricane Katrina

⁸³ Ibid (no. 6).

⁸⁴ "Plant-Based Diets and Their Impact on Health, Sustainability and the Environment: A Review of the Evidence", WHO European Office for the Prevention and Control of Noncommunicable Diseases (2021). Copenhagen: WHO Regional Office for Europe.

⁸⁵ Ibid 2021.

⁸⁶ OIE (no 59).

hit in August 2005, was a small step towards relief efforts for nonhuman animals.⁸⁷ The PETS Act provides federal relief coverage for FEMA and the municipalities, NGOs, and private companies involved in disaster relief to ensure emergency evacuation and sheltering for certain companion animals and service animals. Under this scheme, the costs to the state and local governments for companion animal disaster relief operations are reimbursed by federal disaster relief funds. In the US, these federal relief programs are engaged as the size of the disaster grows, however, meaning that if a disaster is smaller and managed only by local government or even state government without the need for federal intervention, it does not necessarily mean companion animals must be provided shelter. Each state varies in its capacity to evacuate and shelter animals along with the amount of integration of the PETS Act into local disaster management planning, and often this falls short of the initial intention of the act.⁸⁸

The PETS Act was a step that resulted primarily from the fact that 44% of residents in Hurricane Katrina's path chose not to evacuate because they were not allowed to bring their companion animals.⁸⁹ Many companion animals had to be left behind to starve, drown in the floods, and fend for themselves due to the lack of facilities to shelter them and the fact that human shelters were turning them away. PETS was first and foremost a human protection measure, not a way to protect animals, and even if the effect of PETS did aid in protecting more animals in subsequent disasters, it completely ignored animals in animal agriculture, aquaculture, and labs as well as companion animals that are farmed animal species or exotics.⁹⁰

Disaster response for animals can involve different equipment, different needs for sheltering facilities, and teams of veterinary and caretaking staff with training for the species they are working with. All of these are big asks for most disaster-affected communities around the world, even in industrialized countries with a higher level of veterinary capacity and first responders. Most small animal vets and vet staff in the US, for example, have little to no experience with avian medicine and rarely interact at all with farmed birds like chickens and ducks whether in backyard settings or CAFOs. Large animal medicine for cows and pigs is limited to reproduction, milk production, and slaughter rather than providing lifesaving care for these species that governments around the world categorize as "food animals". Large animal vets are trained to ensure food safety more so than alleviating animal pain and suffering, so in disasters, they are often available just for euthanasia for injuries rather than treatment or rescue. Without vets and experienced handlers of farmed animals, rescue operations including evacuation, sheltering, or post-disaster event rescue are impossible. Additionally, the PETS Act has excluded all reptiles, fish, amphibians, farmed animals, horses, and other non-traditional companion animals so there is no impetus for widescale training in the US for including these species in disaster

⁸⁷ H.R.3858 - 109th Congress (2005-2006): Pets Evacuation and Transportation Standards Act of 2006 (October 6) <<https://www.congress.gov/bill/109th-congress/house-bill/3858>> accessed 10 March, 2023.

⁸⁸ Glassey, S. (2018). "Did Harvey learn from Katrina? Initial observations of the response to companion animals during Hurricane Harvey". *Animals*, (47), 1–9.

⁸⁹ Fritz Institute (2006). Hurricane Katrina: Perceptions of the Affected; Fritz Institute: San Francisco, CA.

⁹⁰ "The PETS Act: Companion Animals Affected by Natural Disasters", Animal Legal Defense Fund <<https://aldf.org/article/the-pets-act-companion-animals-affected-by-natural-disasters/#:~:text=The%20PETS%20Act%20only%20provides,rabbits%2C%20rodents%2C%20and%20turtles>> accessed 20 February, 2023.

management.⁹¹ There are online and in-person courses for training for disaster relief for animals (FEMA has many options for training through their website), but as mentioned in the examples, farmed animals don't often get as many opportunities for evacuation as companion animal species so the focus tends to be on small animal handling (and sometimes equine victims) during rescue and relief operations.

Stressed large animals can be terrifying and often very dangerous, especially animals that are used for food and have no positive interaction with humans on a daily basis. Rescuing a 300-kilogram CAFO sow who has never seen the light of day from rushing flood waters is not the same process as rescuing a Golden Retriever from a flood. Driving a truck and trailer or lorry for large animal rescue transport is a less common skill than being able to drive a minivan full of kennels or even a boat with rescued small animals. Chickens are easily stressed birds with fragile bones, and while most of the planet eats them, relatively few people- even trained rescuers and vets- have ever even been in the room with one, much less had to catch, transport, shelter, feed, and medically treat hundreds of thousands of them while maintaining the vital biosecurity that housing large numbers of "food animals" requires.⁹² As a result of these difficulties in disaster rescue response for farmed animals, often these animals are left to die or must fend for themselves rather than be rescued. While culturally in the US, the PETS Act may have initiated the inclusion of companion animals in disaster management, farmed animals remain far from the concern of the public.⁹³

3.2 The Economics of Farmed Animal Disaster Response

In the US where 49% of family-run pig and poultry farms are under production contracts with large livestock companies, while the loss of individual animals may be insured, often the cost of culling and cleanup is covered by the property managers rather than the companies.⁹⁴ Family farms comprise most of the world's animal agriculture production, whether on contract with larger producers or privately owned, so the economic losses in livestock farming to these people can be devastating. Whether a family raises twenty goats per year for slaughter in Mongolia or a family has a CAFO with 200,000 chickens slaughtered every couple of months in North Carolina, farming animals is not a disaster-resilient occupation anywhere in the world and no subsidies or insurance policies have yet changed that.

The owners of CAFOs -whether contract farmers or actual animal owners- are above all concerned with protecting profit rather than saving the lives of animals whom they have bred to kill at a fraction of their natural lifespan. This is just the business of farming animals, even if farmers may have some emotional connection to their animals. The investment in disaster planning and the execution of disaster plans often cuts deeply into profits and saving animals costs more than the value of the

⁹¹ LaVoy, E. (2019). The PETS Act and Beyond: A Critical Examination of the PETS Act and What the Future of Disaster Planning and Response for Animals Should Be. *Mitchell Hamline Law Journal of Public Policy and Practice*, 40.

⁹² Leslie Irvine. (2021). *Filling the Ark: Animal Welfare in Disasters*. Temple University Press.

⁹³ *Ibid* (no. 88).

⁹⁴ James MacDonald and Christopher Burns, "Marketing and Production Contracts are Widely used in US Agriculture", US Department of Agriculture (1 July, 2019) <<https://www.ers.usda.gov/amber-waves/2019/july/marketing-and-production-contracts-are-widely-used-in-us-agriculture/#:~:text=Only%208.1%20percent%20of%20U.S.,percent%20of%20farms%20with%20contracts>> accessed 20 February, 2023.

animal at market.⁹⁵ As long as farmers are compensated through private and public insurance, there is little incentive to save lives that will be quickly cut short. Destocking is just the option that makes more financial sense in both intensive and extensive farming. Culling a herd or flock before a disaster is the least resource-intensive option for protecting profits while eliminating the drowning, starvation, freezing, etc. of the animals that they were going to eventually kill for profit.

Farmed animals are predominantly seen as just commodities by governments and farmers alike⁹⁶, an inevitable economic loss, none with any stake in the preservation of their own lives. This mentality is echoed in guidelines throughout disaster relief agencies, animal health institutions, farming organizations, and even most of society. Millions of chickens were killed along with 10,000 cattle (an estimated \$30 million in losses) in Hurricane Katrina and the only legislation for animals to come out of that event protected only companion animals⁹⁷. At the same time that Congress was working to rectify the loss of companion animals and their caretakers who did not evacuate, farmers in Louisiana and Mississippi were still busy loading trucks full of carcasses. The PETS Act clearly missed the point.

4 A Problem of Rhetoric: The Shift from Economic Units to Sentient Beings

Before disaster management guidelines can improve the fate of millions of animals caught in CCRDs, the language used to discuss farmed species has to change. Among the most detrimental aspects of disaster management to these animals is the dominant rhetoric in international and national level disaster management guides, legislation, and academic papers speaking of farmed animals in a way that reduces them to nothing more than units of production. Farmed animals are rarely addressed with the inclusion of their individual needs based on each sentient being's inherent interest in preserving their own life and avoiding suffering. While companion animal species and wildlife have the status of being worthy of protection at all levels of disaster management in much of the world, through a review of the literature and legislation, there are few voices in disaster management that acknowledge not only the suffering inherent in farmed animals caught in disasters but also the evidence that animal agriculture's contribution to climate change is second only to that of fossil fuels. Farmed animals are the drivers of CCRDs at the same time as they are victims of them. The dominant discourse centers on how relief agencies can continue to protect the ever-increasing supply of farmed animals in disaster zones in the same breath as listing the casualty statistics for animals in CCRDs.

4.1 Pastoralist Protections

Emergency relief on its own will not reduce pastoral vulnerability. A different approach is needed to build capacity for drought preparedness

⁹⁵ Leslie Irvine, "Animals in Disasters: Issues for Animal Liberation Activism and Policy." *Animal Liberation Philosophy and Policy Journal* (2006), 4(1)

⁹⁶ Ibid, 42 (Kindle)

⁹⁷ Allison Clark (15 October, 2005) "Loss of Livestock Reaches Millions: Gulf Coast states assess damage to livestock caused by Hurricane Katrina. *American Veterinary Medical Association*. <<https://www.avma.org/javma-news/2005-11-01/loss-livestock-reaches-millions>> accessed 25 August, 2023

in pastoral areas, which focuses on wealth and opportunity creation by investing in and promoting the development of pastoral areas.⁹⁸

This quote is from the Humanitarian Policy Group speaking of threats to pastoralism in the HOA. As mentioned above in the discussion of the HOA drought, as of March 2023, over 11 million farmed animals are already dead from the multi-year drought currently plaguing the region. Yet this report is still promoting the development of pastoralism as a wealth-generating opportunity. The animals who died of thirst and starvation in a region prone to increasing CCRD risk are not even considered a factor in this paper. Animals are property, commodities, supposed wealth generation, and food security for the world's poorest farmers. Twenty million people in the HOA are dependent on pastoralist livestock farming for their livelihoods, people living at the most extreme end of the poverty scale who increasingly face water scarcity and food insecurity.⁹⁹ Rather than the preservation of human life, animal life, and the ecosystems that no longer can support this system, preserving a farming system that is unsustainable in this region and has never been an opportunity for escaping extreme poverty remains the goal of development organizations.

4.2 Animals as Assets

Only twice in the twenty-six pages of text of the UN Office for Disaster Risk Reduction's (UNDRR) Sendai Framework for Disaster Risk Reduction 2015-2030 does the word "animal" show up and it is only in this context:

Priority 3: investing in disaster risk reduction for resilience, national and local levels. To achieve this, it is important: p.) to strengthen the protection of livelihoods and productive assets, including livestock, working animals, tools, and seeds.... Global and regional levels: To strengthen and promote collaboration and capacity-building for the protection of productive assets, including livestock, working animals, tools, and seeds.¹⁰⁰

In both examples, animals are reduced to "productive assets". The fact that they, too, are sentient beings in need of protection from disaster no different than a human and are not, as they infer, merely units of production, has been disregarded in this document from one of the most renowned international agencies working in disaster mitigation. Animals, like a piece of machinery, a car, or a plant, are described as things to be used as inanimate objects that provide human owners with products to consume or profit from.

⁹⁸ Humanitarian Policy Group, "Pastoralism, Policies, and Practice, in the Horn and East Africa: A Review of Current Trends", Overseas Development Institute (April 2019), London <<https://cdn.odi.org/media/documents/4315.pdf>>.

⁹⁹ The World Bank, "World Bank Boosts Support for Pastoralists in Horn of Africa", World Bank Press Release (18 March, 2018) <<https://www.worldbank.org/en/news/press-release/2014/03/18/world-bank-pastoralists-horn-africa>>.

¹⁰⁰ UNDDR (no 1).

4.3 Animal Advocacy Organizations Advocating Against Animals

World Society for the Protection of Animals (now World Animal Protection) wrote in their 2013 pamphlet, “Animals: Helping us Achieve the World We Want” and said this about livelihoods:

The loss of animals in disasters can devastate livelihoods. The FAO recognizes that, “The loss of livestock not only represents a loss of income for families, but also family savings and investment over many years. Livestock represents a safety net for many families and the loss of such productive assets will impact significantly on lives and livelihoods.” Animal-related income streams are critical to the economic and social well-being in the world’s poorest regions, in both rural and urban settings.¹⁰¹

Farmed animals have been living investments, insurance, collateral, and dowries for most of human history. They have been an asset that can be traded and used like currency and commodities. Despite this quote coming from an animal welfare organization, they have missed the fact that animals are living beings who suffer and have a vested interest in their well-being that is not related to human income. This prominent international animal advocacy organization -one that is heavily involved in disaster relief- failed to mention that when flood waters are rising, animals, like the humans that profit from their exploitation, have an innate desire to not drown just as any other living being would. This does not matter if they are of the “food animal” species.

The FAO, quoted above, was among the first UN organizations to put out a document (“Livestock’s Long Shadow”) detailing the detrimental effects of livestock on land degradation, biodiversity loss, water and air pollution, and the diversion of plant agriculture to fodder crops rather than crops for human consumption.¹⁰² Even after detailing these effects and acknowledging the animal agriculture sector to not be disaster resilient or safe for the environment, public health, or the warming climate, the report only recommends focusing on technological advances to mitigate the effects of the increasing demand for meat rather than considering the individual lives that will be lost if society does not begin to reduce demand for animal products.

World Animal Protection’s early intervention in the Assam, India flooding of July 2012 preserved the existing livestock trading market in the region in which over 1.7 million animals were affected. It was evaluated only by the economic value of the intervention rather than the benefit to the animals themselves.¹⁰³ The cost of the intervention with supplemental feeding and veterinary care was \$49,324 with an estimated economic benefit from saving the lives and productivity of the animals treated by World Animal Protection at nearly \$5 million USD¹⁰⁴. This not only proves that treating and supplementing existing animals is better for the animals in the short term, but that in the end, they remain commodities that are traded for their flesh and secretions which are economically very valuable. This economic report never

¹⁰¹ World Society for the Protection of Animals, (2013) “Animals: Helping Us Achieve the World We Want”, WSPA (now called World Animal Protection)

<<https://sustainabledevelopment.un.org/getWSDoc.php?id=2748>>.

¹⁰² Steinfeld (no 46).

¹⁰³ Ibid (no. 79).

¹⁰⁴ Ibid.

acknowledges the animals as living beings, no differently than World Animal Protection itself. This on its own is problematic.

5 Conclusion

The lack of protection for farmed animal species during this unstoppable increase in CCRDs is a form of speciesism we see present in all aspects of society, even in animal protection movements, particularly welfarism rather than rights-based advocacy. Ignoring the rights of animals of any species to not be confined, repeatedly bred, and exploited for human use as property threatens the human population in the form of destruction of fragile ecosystems and by threatening public health through zoonoses; this is true in emergencies and non-emergency scenarios. Humans are intensifying animal agriculture and its associated greenhouse emissions globally and then fail to put in place ways to protect those animals from the CCRDs these activities are causing.

There are relatively few inhabited parts of the world in which humans have no access to arable land for the cultivation of food crops as human population centers tend to be the largest near access to reliable water sources and land suitable for growing food rather than just raising livestock.¹⁰⁵ As the climate changes, locations where crops can be produced and where food is accessible will inevitably change. The WHO said this in their most recent report on plant-based diets: “Considerable evidence supports shifting populations towards healthful plant-based diets that reduce or eliminate intake of animal products and maximize favorable ‘One Health’ impacts on human, animal, and environmental health”.¹⁰⁶ While some UN organizations are putting everything on the line to support animal agriculture-based livelihoods despite their lack of disaster resilience,¹⁰⁷ the WHO acknowledges that this food system shift is the future. DRR strategies in all development sectors must take into account the larger picture that the expansion and intensification of animal agriculture are too costly to both humanity and animals to stand behind anymore as we watch CCRDs intensify in strength and increase in number.

In the human context of DDR looking at the drivers of disaster vulnerability, a recent example is the impoverished neighborhoods of people with no means to evacuate such as the 9th ward in New Orleans prior to Katrina. Like farmed animals, humans living in extreme poverty and living in housing that cannot survive the shocks of floods, wind damage, or seismic damage are just as vulnerable. Broiler chickens stuffed into farms by the tens of thousands that are living on flood plains such as in eastern North Carolina, trapped in buildings unable to withstand hurricane-force winds and raging flood waters, and for whom there is no escape other than the slaughterhouse truck are vulnerable in a way that can only be rectified by the elimination of that system of production in the first place. The reason they die in such high numbers is because the food system as it stands today requires them to live under those conditions to ensure the population has access to cheap meat above all considerations for the welfare of the animals and their vulnerability in the face of CCRDs. These animals are exposed to significant risk and then we collectively fail to acknowledge that the millions of lives lost in disasters are our fault.

While not discounting fossil fuels’ contribution to climate change in the Arctic and around the world even in countries without fossil fuel extraction at the level of the

¹⁰⁵ Barry Klinger and Sadie Ryan, “Population Density Within the Human Climate Niche”, *PLOS Climate* (October 2022), vol. 1:11.

¹⁰⁶ WHO (no. 60).

¹⁰⁷ *Ibid* (no. 98).

Yamal Peninsula, global meat demand continues to rise, and animal agriculture and its carbon footprint has only intensified over the past fifty years. From the literature review, it is clear that disaster mitigation strategies for CCRDs typically avoid addressing the contribution of animal agriculture to GHG and climate change while simultaneously avoiding the topic of transitioning to more climate-friendly and disaster-resilient occupations and food systems. When the rhetoric and policy changes in the world's largest organizations to reflect a warming world and protect all its inhabitants, we will see a drastic reduction in farmed animal mortality.

Conflict of Interest Statement: The author is the founder and director of Vietnam's only farmed animal sanctuary and rescue and a vegan for over a decade. In addition to studying animals in disaster for her Master's of Emergency and Disaster Management, she worked extensively with horses in the hurricane-prone US Gulf Coast. These experiences plus the overwhelming evidence have shaped her views on the plight of farmed animals in disasters.