Abbotsford, B.C. Canada, 2021. Nick Schafer / We Animals Media

Canadian Producers and Farm Animals in a Changing Climate

The Abbotsford Flood of 2021

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In collaboration with:

WORLD ANIMAL PROTECTION

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Introduction

The relationship between animal agriculture and climate change stands out as one of the most urgent and pressing challenges before us. This assertion is grounded in the fact that the agri-food system functions as a major contributor to and a vulnerable victim of the climate crisis. The recent impact of climate change on global animal agricultural production has engendered an increased interest in how to respond to and mitigate future catastrophes. Our report focuses on the 2021 Abbotsford floods in the Fraser Valley Regional District in British Columbia (B.C.) to learn about what happens to farm animals during disasters in the Canadian context, with a focus on the province of B.C. This case study explores the dynamics between animal agriculture and climate-induced disasters, offering valuable insights into the challenges faced and puts forward recommendations on how to move forward.

In the past few years, especially in 2021 the province of B.C. faced a reckoning with the climate crisis, evident through devastating fires, floods, and extreme heat, raising alarming concerns for animal welfare. Between June 25th, and July 1st, a heat dome gripped the province, marked as the "most deadly weather event in Canadian history," with temperatures reaching as high as 49.6 C.[1] Next, a series of wildfires engulfed the region, making it the third-worst wildfire season on record, including the decimation of the town of Lytton[2]. Several months later, on November 17th, the lower mainland of B.C. was inundated with floodwaters and mudslides from an atmospheric flood. This catastrophe marked the "largest-ever agricultural disaster" an "animal welfare crisis" in the province's history.[3][4] We focus on the region of Abbotsford, B.C. due to the extensive global media coverage, subsequent public engagement, the magnitude of the damages and losses, and the ensuing conversations about climate change, animal agriculture, and disaster management in Canada following the 2021 Abbotsford floods.

It is crucial to keep at the forefront of reading this report that Abbotsford occupies the ancestral and unceded lands of the Stó:lō people, specifically the Semá:th and Matsqui First Nations. The agricultural history of this region is deeply rooted in settler-colonialism, emphasizing models of agriculture that prioritized expansion and growth rather than sustainability and stewardship. Our report focuses on this area as it continues to embrace expansion and growth despite the impacts of the climate crisis in the region.

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[1] Michelle Gomez, "June heat wave was the deadliest weather event in Canadian history, experts say," CBC, October 2, 2021, www.cbc.ca/news/canada/british-columbia/ubcm-heat-dome-panel

[2] Akshay Kulkarni, "A look back at the 2021 B.C. wildfire season," CBC, October 2, 2021, www.cbc.ca/news/canada/british-columbia/bc-wildfires-2021-timeline

[3] Maria Wesigarber & Meagan Gill, "B.C. floods: $228M announced in agriculture recovery efforts, officials say," *CTV News*, bc.ctvnews.ca/b-c-floods-228m-announced-in-agriculture-recovery-efforts-officials-say

[4] Greg Bankoff, "Learning about Disasters from Animals," in *Learning and Calamities: Practices, Interpretations, Patterns*, eds. Egner, Heike, Schorch, Maren, and Voss, Martin (New York: Routledge, 2015), 42-55.

The Risk Profile of the Fraser Valley Region and the 2021 Abbotsford Floods

Shortly after the centennial anniversary of the draining of Sumas Lake in the lowlands of B.C, on November 14th, 2021 the area experienced one of the largest flooding disasters in Canada's history.[5] When the dikes built to mitigate the chances for the floodplain to be inundated with water failed, over 37,066 acres of farmland hosting 1,000 farms accommodating over 2.5 million farm animals who were exposed to heavy precipitation, floods, mudslides, and secondary disasters such as power outages, road closures, and contaminated water. In an interview with a local animal hauler, Devon, he described it as the "perfect storm…It was the worst-case scenario. You had to get out. The system completely failed everyone. And the same was true in Abbotsford, in November. Everything that it was, it was kind of the Titanic of stories. You know, everything that could go wrong did so".

The Declaration of State of Local Emergency, declared from November 15th, 2021, until April 11th, 2022, enabled the authorities to use the emergency powers to regulate persons or property to protect the health, safety, or welfare of people or property. During the immediate disaster over 12,000 pigs, 458 cows, and 630,000 chickens and turkeys died in the immediate impact of the floods.[6] Additionally, an unknown number of animals had to be euthanized for reasons including injuries, exposure to contaminants, or from outgrowing their market-size.

The potential for this 100-year event to occur was made evident in reports on climate change and investigations into the region's flood management infrastructure. A 2015 study commissioned by the B.C. Ministry of Forests, Lands, and Natural Resource Operations, examining the flood management strategy of the Fraser Valley, highlighted multiple areas of concern. The investigation revealed that the province's dike standards were insufficient, with only 4% of the existing dikes meeting the provincial requirements. Moreover, considering the impacts of climate change the risk of dike failure and extreme flooding in the area was alarmingly high.[7]

Despite engineers rating the dikes as "unacceptable," funding did not flow into repairing the flood mitigation infrastructure. Instead, financial resources were directed toward expanding the agricultural capacity in the Fraser Valley, repeating a government pattern of development since the 1920s. Devon, reflecting on this situation in our interview said that "there is an element of irresponsibility when you are encouraging expansion in the area, yet unable to look after them".

Between 1920 and 1924 the Sumas Lake was drained and isolated from nearby rivers, leading to both the displacement of the water, and the Sumas First Nation. The area underwent rapid

[5] Elizabeth McSheffrey, "Sumas First Nation chief reflects on 'disaster' B.C. flooding where lake used to be," *Global News*, November 18, 2021, globalnews.ca/news/8385289/sumas-lake-reflection-first-nations
[6] Brian Hill, "1.3 million farm animals dead due to climate change: What can B.C. do to stop the next catastrophe?," *Global News*, December 7, 2021, globalnews.ca/news/8427762/b-c-flooding-kills-650000-farm-animals
[7] B.C. Ministry of Forests, Lands, and Natural Resource Operations, "*Simulating the effects of sea level rise and climate change on Fraser River Flood Scenarios*," Report, 2014, www.fraserbasin.bc.ca/_Library/Water_Flood_Strategy/Simulating_Effects_of_Sea_Level_Rise_and_Climate_Change_on_Fraser_Flood_Scenarios_Final_Report.pdf

development through government-driven programs that incentivized the development of what is today one of the most economically productive and efficient agricultural regions in Canada. The area is not unfamiliar with floods with flooding happening in the 1880s, 1930s, 1960s, and 1990s. Farm animals dying in the region due to flood date back to as early as 1876.8 However, what has changed is the scale of agriculture. Abbotsford ranks as Canada's largest agricultural town, generating over $1 billion annually in on-farm gate sales.[9]

Zooming into this area you will find 78.6% of B.C.'s total hog inventory, 61.7% of B.C.'s dairy cow, and two-thirds of all chickens and turkeys raised in the province concentrated in this area. Historian Chad Reimer, who has written extensively about the area, challenges the notion that religion is uniquely rich in agricultural land. He writes, "[t]here's a fallacy, an error in logic, that's being touted with almost every single news report…that the central Fraser Valley is a rich agricultural land". It is true that the Canadian government since the 1920s has encouraged producers to concentrate in this area because of the 'rich agricultural land,' however, as Reimer correctly points out the richness of the land is irrelevant to the contemporary animal agri-food system that houses the majority of the 2.5 million farm animals in confinement barns and depends on feed is grown elsewhere.

The Role of Climate Change in the Abbotsford Floods

Premier John Horgan expressed astonishment after the floods stating "[e]ven the experts were just completely surprised by it…I think all British Columbians fully understand that now we have to better prepare for events like this. But we couldn't have even imagined it six months ago."[10] In 2018, an auditor general report highlighted that while municipalities emphasized the need for climate change mitigation, there was a lack of support both politically and financially from the provincial government to implement climate change risk management.[11] There is a tension in Canadian climate politics that anticipates the impact to be "negligible overall but positive for North America, particularly for Canada".[12] The 2020-2021 disasters in B.C. shattered such beliefs, revealing that those who were expected to benefit from climate change, such as producers, are now "on the front lines of climate change".[13]

Prime Minister Justin Trudeau also acknowledged that the impacts of climate change have "arrived sooner than expected, and they are devastating".[14] Canada is warming twice as fast as global

[8] Nick Gandolfo-Lucia, "Infrastructures of vulnerability, or, how the Fraser Valley flooded twice," thesis submission, *The University of British Columbia*, 2022.
[9] Glenda Luymes & Lori Gilbert, "Repairing the Sumas Prairie will be expensive and require new thinking," *Vancouver Sun*, November 19, 2021, vancouversun.com/news/local-news/reporting-the-sumas-prairie-will-be-expensive-and-require-new-thinking
[10] Gordon Hoekstra, "'Couldn't have imaged it six months ago,' says Horgan, but scientists have been issuing climate warnings for decades," *Vancouver Sun*, November 18, 2021, vancouversun.com/news/local-news/number-of-flood-risk-assessments-in-past-decade-or-more-what-has-been-done-about-them
[11] Carol Bellringer, "Managing climate change risks: An independent audit," *Office of the Auditor General of British Columbia*, 2018.
[12] Marian Weber & Grant Hauer, "A Regional Analysis of Climate Change Impacts on Canadian Agriculture," Canadian *Public Policy*, *29*, No. 2 (2003): 164.
[13] Rachel Penner, "British Columbia farmers and researchers team up on climate change adaptation," *BC Gov News*, May 21, 2019, news.gov.bc.ca/stories/british-columbia-farmers-and-researchers-team-up-on-climate-change-adaptation
[14] Eric Stober & Sean Boynton, "Trudeau says B.C. flooding shows climate change impacts have arrived 'sooner than expected'," *Global News*, November 24, 2021, globalnews.ca/news/8399294/bc-flooding-canada-emergency-debate/

averages fueling extreme weather events like floods, heatwaves, and droughts.[15] Scientific research examining human influence on the 2021 floods indicated a significant anthropogenic influence, accounting for at least 60% of the increased intensity and frequency of flooding in the region.[16] Similar studies have shown that the heatwave and wildfires witnessed earlier in the year would have been "virtually impossible without human-caused climate change".[17] What this research underscores is a critical issue: most existing maps, models, and weather prediction resources are outdated. If we do not address these issues, our capacity to make accurate predictions is severely compromised.[18][19]

Building Back 'Better' in Abbotsford While Factoring in Climate Change

B.C. has been proactive in engaging with the threat of climate change funding studies, publishing reports, and making climate change a key topic discussed in public and governmental forums. Since 2008, the province has commissioned several reports on agriculture production and commodity-specific approaches to adaptation. These reports have highlighted the growing challenges faced by producers, who "are being called on to take on increasing risk, costs, and responsibility, with fewer resources at their disposal". There is a clear "disconnect between farmers' realities on the ground and decision-making in government".[20]

Despite initiatives like the 2013 Climate & Agriculture initiative, which developed regional adaptation plans and conducted farm-level research, gaps persist, leading to increased risks for the agricultural sector. Unfortunately, the efforts to address climate change have often been regarded as "paperwork exercises," lacking substantial commitment beyond acknowledgement and attempts to predict impacts.[21]

In response to the recent floods, the City of Abbotsford resumed discussions and plans to develop a long-term flood mitigation plan for the Sumas Prairie.[22] A public report was released in April 2022 followed by public consultation with residents, businesses, and multi-levels of governments.[23] The report outlines four potential flood mitigation plans. Each plan had to meet the three objectives: "avoid[] damage to buildings, barns and other infrastructure, preserving existing and for agriculture

[15] Environment and Climate Change Canada, "Canada's climate is warming twice as fast as global average," Government of Canada, April 2, 2019, www.canada.ca/en/environment-climate-change/news/2019/04/canadas-climate-is-warming-twice-as-fast-as-global-average
[16] Nathan Gillett et al., "Human influence on the 2021 British Columbia floods," *Weather and Climate Extremes*, 36, (2022): 100442.
[17] Philip, Sjoukje Y., et al., "Rapid attribution analysis of the extraordinary heat wave on the Pacific coast of the US and Canada in June 2021," *European Geosciences Union*, 13 no. 4 (2022): 1689 - 1713.
[18] Gillett et al., "Human influence," 100442.
[19] Danielle Celermajer, *Summertime: Reflections on a Vanishing Future* (Penguin Books, 2021).
[20] Erica Crawford & Rachelle Beveridge, "*Strengthening BC's Agricultural Sector in the Face of Climate Change*," *Pacific Institute for Climate Solutions: Knowledge, Insight, Action*, Report, 2013, 12, pics.uvic.ca/sites/default/files/uploads/publications/Strengthening%20BC%27s%20Agriculture%20Sector_0.pdf
[21] Ibid., 8
[22]Aletta Vanderheyden, "Sumas Prairie Flood mitigation options to be presented to council," *Abbotsford News*, April 1, 2022, www.abbotsford.ca/city-hall/news-media/sumas-prairie-flood-mitigation-options-be-presented-council
[23] City of Abbotsford, "City of Abbotsford long-term flood mitigation engagement program final report," *City of Abbotsford*, 2022, www.abbotsford.ca/sites/default/files/2022-06/City%20of%20Abbotsford%20Long-term%20Flood%20Mitigation%20Plan%20Engagement%20Program%20Final%20Report%20with%20APPENDIX.pdf

and food security and maximizing opportunities for agriculture".[24]

The four flood mitigation plans proposed ranged from $209 million to $2.8 billion, including upgrades to current pumping stations, building new stations, and other flood prevention infrastructure. On June 13th, the City of Abbotsford City Council unanimously approved a hybrid option that brings together options 2 and 4. This approach involves repairing and modifying existing dikes and pumps, constructing new dikes and pumps, and designing floodways to control overflow.[25] The estimated cost for the hybrid option is $497 million, with additional costs still being calculated.

An unpopular 5th option exists for flood mitigation in the Sumas area which is referred to as 'managed retreat'. The policy would relocate residents and businesses currently in the floodplain followed by returning the water to the lake. However, the City of Abbotsford is not willing to consider this 5th option, instead they will focus their attention on flood protection or again - or what Nick Gandolfo-Lucia refers to as "a society predicated on flood control".[26][27]

Structure of Report and Methodology

The report is structured around seven key questions or themes identified by World Animal Protection and the authors, followed by recommendations collaboratively developed with participants. The questions explored in this report include:

(1) Impacts of the Abbotsford floods on the welfare of farm animals;
(2) Describe the factors impacting vulnerability of animals in intensive farming systems in Canada;
(3) Compare vulnerability factors of animals in intensive and extensive farming systems in Canada;
(4) Describe the short, medium, and long-term impacts caused by the floods;
(5) Describe insurance and business risk policies available to producers;
(6) Describe the main government institutions and agencies that were involved in responding to the floods;
(7) Describe the current provincial and legal frameworks related to response and prevention of this type of event; and
(8) Describe the actions and initiatives taken at the time to minimize animal impact and losses, environmental contamination, and public health hazards.

To address these questions, we used primary and secondary data sources. In the initial research phase, we consulted secondary sources, including industry reports, government publications, and

[24] City of Abbotsford, "Long-term flood mitigation plan," *Let's Talk about Abbotsford*, April 2022, letstalkabbotsford.ca/abbotsfordfloodresponse
[25] City of Abbotsford, "City of Abbotsford long-term flood mitigation," 20.
[26] Gandolfo-Lucia, "Infrastructures of vulnerability," 76.
[27] Glenda Luymes & Gordon Hoekstr, "Fire & flood, facing two extremes: Why B.C. can't always build its way out of risks," *Vancouver Sun*, May 5, 2022, vancouversun.com/news/local-news/fire-flood-bc-facing-two-extremes-series-part-7

materials from non-governmental organizations. We also analyzed media coverage and press releases discussing recent extreme weather events, climate change, and agriculture in Canada, specifically B.C.

During this phase of research, we identified key actors and organizations to generate a list of potential stakeholders to interview. We reached out to 27 individuals, including experts in animal welfare and rescue, veterinarians, risk management advisors, insurance agents, government officials, academics, agricultural experts, producers, and community members. Of the 27, 15 agreed to be interviewed. Our interviews took place between June 25th and August 16th both in person and virtually. The interviews were recorded, transcribed and then qualitatively coded and analyzed.

This report outlines the impacts of extreme weather events on farm animals and explores responses to these challenges. The report concludes with 15 recommendations informed by various stakeholders, an extensive literature review, and our previous projects in this area.[28] The recommendations put forward in this report challenge the "Build Back Better" narratives that follow each disaster. After decades of conventional approaches following disasters that have failed to ensure public safety, with the increased risks fueled by the climate crisis, communities need novel solutions and to rethink land-use patterns. Instead of 'Building Back Better,' there is a push to return to production as fast as possible leaving communities and farm animals vulnerable for the next extreme weather event. This leaves the same vulnerable systems and behaviors in-place, just now more fragile and exhausted. Instead, our recommendations emphasize the need to develop resilient strategies that include collaboration with producers and community members.

Research Gaps: Geographic Scale and Cumulative Impacts

In our report, our primarily focus was on the impacts of the flood in the Abbotsford region. However, we recognize a significant gap in the report is that it fails to capture the geographic scale of the disaster and its impacts. Apart from Abbotsford, the floods severely affected other areas, including the Squamish-Lillooet Regional district, B.C. Interior, and even parts of Vancouver, albeit indirectly due to transportation and supply-chain issues.

For example, consider Julia Smith, of Blue Sky Ranch in South Cariboo, located in the Interior of B.C. Julia, and her community experienced major flooding simultaneously as the floods in the Fraser Valley. Both flooding events were triggered by the same heavy rainfall, yet they occurred on different sides of the mountain range. However, media coverage predominately fixated on the Abbotsford region, neglecting the experiences of other impact communities.

[28] Stephanie Eccles & Elisabeth Stoddard, "Hurricane Florence's Impact: Policies on animals living in confined animal feeing operations in Eastern North Carolina," *World Animal Protection*, 2021, public/media/World_Animal_Protection-Impact_of_Hurricane_Florence_on_CAFOs_in_North_Carolina%28May2021%29_0.pdf

Before the flooding, Julia, and her community experienced six weeks of wildfires. When the rain arrived, the Coldwater River overflowed, leading to flooding that overwhelmed the eroded land's capacity to absorb water. This excess water triggered landslides and blocked natural channels, exacerbating the flooding situation. What's alarming is that communities outside of the Abbotsford area, equally impacted, received considerably less post-disaster support. This stark disparity raises crucial questions about the equitable distribution of disaster response resources. This further calls attention to the need to look at the disasters as interconnected, as each disaster's impacts create the conditions for the next.

Conclusion

Like the decisions made by the government in the 1920s, producers are currently being encouraged to establish or maintain farms in an active, unprotected, and unpredictable floodplain Despite the inherent risks associated with agriculture, the increasing impact of climate change is introducing new and frequent risks, requiring significant resources to manage. Given the commitment to preserve and expand agriculture in the Fraser Valley floodplain, this report explores what this decision means for the 2.5 million plus farm animals, as well as the agricultural community residing in the floodplain by looking at the Abbotsford floods of 2021.

A feed silo floats by a farm's irrigation system in the aftermath of the 2021 Abbotsford, B.C. floods.
Nick Schafer / We Animals Media

Factors Impacting the Vulnerability of Farm Animals

In *Filling the Ark: Animal Welfare in Disasters* (2009) Leslie Irvine encourages us to look at the experience of animals in disasters through the vulnerability paradigm. This approach shifts the focus from looking at disasters as events but "instead directs attention to the social mechanisms that create unequal risks".[29] In this section, we will elaborate on how agriculture is a "risky endeavor" by exploring under-emphasized hazards or risks that lead to disasters or emergencies.[30] In this section, we will briefly explore 3 types of factors that contribute to farm animals' vulnerability to disasters:

(1) the commodification and valuation status of animals,
(2) the infrastructure and housing systems used, and
(3) the neoliberal global food system.

These factors, as described below, are critical to keep in mind when reading our report and recommendations as we point to how to build a more climate-and-disaster resilient agricultural system.

Commodification and Valuation of Farm Animals

During disasters, the vulnerability of farm animals becomes evident as we witness the often-overlooked consequences of their commodification and varying degrees of valuation[31]. Animals farmed for food are transformed into standardized 'inputs' to generate commodities. Within this production system, farm animals undergo genetic, nutritional, physical, and reproductive interventions that render their "bodies more productive, more docile, and less resilient".[32] The commodification process renders animals less resilient; their immune systems are compromised, making them more susceptible to diseases, their bodies become hyper-sensitive to elements like sunlight, and they have limited exposure to novel experiences. It should be noted that although farm animals may lack resilience in confinement systems, when given opportunities, they can survive and thrive.[33]

Understanding the extent of farm animals' vulnerability requires recognizing their differential valuation. Not all species are valued equally, and within species, animals are valued differently based on factors like their age, breed, sex, reproductive status, or the producer-animal relationship.[34] These varying values influence rescue decisions. For example, media coverage primarily focused on cow rescues. It was explained to us in our interviews, that losing a flock of birds is negligible, whereas losing a herd of cows is significant. Consequently, more efforts were directed towards ensuring the safety of cows compared to other farm animals. However, within the category of cows, a dairy cow

[29] Leslie Irvine, *Filling the Ark: Animal Welfare in Disasters* (Temple University Press, 2009), 5-6.
[30] S. Ryan Isakson, "FFS-Small farmer vulnerability and climate risk: Index insurance as a financial fix," *Canadian Food Studies/La Revue canadienne des études sur l'alimentation*, 2 no. 2, (2015): 267-277.
[31] Ashleigh Best, "The Legal Status of Animals: A Source of Their Disaster Vulnerability," Australian *Journal of Emergency Management* 36, no. 3, (2021): 63-68.
[32] Katharyn Gillespie," Industrial slaughter," in *Macmillan Interdisciplinary Handbooks: Gender: Animals,* ed. Juno Salazar Parrenas (Macmillan US, 2015), 183.
[33] Elisabeth Stoddard & Alice Hovorka, "Animals, vulnerability and global environmental change: The case of farm pigs in concentrated animal feeding operations in North Carolina," *Geoforum*, 100 (2015):153-165.
[34] Ibid, 155.

would be rescued before a calf.[35] We will further explore the differential vulnerabilities between species within our report.

Intensive, Confinement Farming Systems

Farm animals are rendered vulnerable to disasters largely due to the intensive confinement systems they are raised in. Cows might be chained by their neck or loose in a barn or pasture, pigs may be kept in pens or individually confined to gestation crates, and chickens or turkeys may be caged or free-range within a barn. Cows' experience of vulnerability differs from other farm animals, as they have more spatial freedom, enabling them to escape or be released during a disaster. In contrast, animals in more spatially bounded housing units face infrastructural barriers to escape or be released (*See Recommendation - Reduce and/or Limit the Use of Confinement Housing*). It was explained to us that releasing pigs who are kept in gestation crates would be a logistical nightmare.

Our preliminary research engaged with questions of how farm infrastructure is regulated. To illustrate this, let's look at another case study in Canada involving disasters and farm animals. Between 2015 - 2019, at least 740,000 animals died in barn fires. Barn fires have historically been the leading disaster for farm animals in Canada. In 2020, the Humane Society International/Canada produced a report addressing this issue to educate the public and put forward recommendations.[36] Similar to what we saw in the context of our research, challenges persist in reporting animal deaths, concerns about rescue workers and producers developing PTSD and significant animal welfare implications.

For example, Twyla Francois, a former Canadian farm animal cruelty investigator, documented the aftermath of barn fires in the early 2010s. Her footage revealed the experience of pigs during a barn fire, showcasing how they piled on top of each other and those confined attempted to squeeze or bite themselves through the bars. To respond to barn fires, numerous campaigns have been started to raise awareness. Vicki Fecteau, a retired engineer, and volunteer at the Canadian Coalition for Farm Animals (CCFA) created the only known database of documenting barn fires and casualties. In her work with the CCFA she focuses on prevention and education, advocating for improvements in the National Farm Building Codes (NFBC) which until recently were the authoritative codes for on-farm infrastructure since 1995. In 2018 she petitioned the government and participated as a voluntary observer in the 5-year cycle of updating the 2020 National Model Codes (NMC).[37] She was ultimately successful, along with other groups such as the Canadian Farm Builders Association (CFBA) who lobbied the government to have the NFBC embedded in the NMC which means that the farm codes will be re-evaluated and updated every 5 years.

[35]Glenda Luymes, "Flooding leads to heartbreaking losses for some Abbotsford farm families," *Vancouver Sun*, November 21, 2021, vancouversun.com/news/local-news/flooding-leads-to-heartbreaking-losses-for-some-abbotsford-farm-families
[36] Humane Society International, "Untold suffering: The tragic impact of barn fires on animals," *Humane Society International Canada*, 2020 www.hsi.org/wp-content/uploads/assets/pdfs/reports/2020/200310-HSI-Canada-Barn-Fire-Report-Final.pdf
[37] See petition www.ourcommons.ca/Content/ePetitions/Responses/421/e-1452/421-02391_ISED_E.pdf

The new codes have renewed policymakers' ability to enforce them, as well as reflect the industrial changes to Canadian agricultural facilities since the 1990s.[38] Speaking to Fecteau she said despite efforts to improve protections for animals, ultimately the codes only consider human safety in their mandate. Farm buildings with the exception of a few such as a processing plants are categorized as 'low-human occupancy' meaning that general building protections such as sprinklers are not required. However, there have been improved standards for adjacent farm buildings such as an office, break room or laundry room which can lead to indirect protection for farm animals. She used the example of Classy Lane Stables which in 2016 had a barn fire, killing 43 racehorses. The fire began near the laundry room, so she was pleased to at least see a really bad event be mobilized to inform the codes. It is worth noting that this story received significant media attention because of the economic value of these animals, being prized racehorses whereas other barn fires fail to capture the attention of the media, demonstrating another example of differential vulnerability and value operating in animal disaster responses.

In our interview, Fecteau stressed that working with the provinces and territories individually is the best level of engagement to implement change. Her efforts alongside others have introduced effective prevention measures as witnessed in the decrease of barn fires across Canada, except for Quebec where barn fires continue to be a major issue.

During our interviews, many producers chose "shelter-in-place" due to limited feasible options. As this practice continues, the interventions in farm infrastructure are necessary. Following the floods and recognizing the significant mental and emotional toll on producers, B.C. Minister of Agriculture, Lana Popham, introduced a pilot program called *Extreme Weather Preparedness for Agriculture Program*. With a budget of $1.5 million, providing a maximum of $35,000 per applicant, this pilot project supports on-farm interventions.[39] The pilot includes 3 streams of funding: wildfire prevention, flooding preparedness, and extreme heat preparedness. Interventions the program supports include improving barn cooling systems, enhanced watering systems, improved on-farm fuel storage, and developing fill pads for buildings.

If each applicant receives the total maximum that means this pilot project minimally can support 42.8 projects. Despite being a cost-share program, many producers face barriers to apply such as already being in debt. Instead, what a project like this should entail is a mandate to install wildfire prevention and flooding and extreme heat preparedness on all farm infrastructure - including retrofitting existing infrastructure and requiring all new farm infrastructure to be built to code. This could be done by enlarging the funding available, as well as mandating it in B.C.'s farm building codes. Currently, without such mandates, the B.C.'s government supports the industry's self-governance, leaving the majority of producers, farm animals, and their broader communities vulnerable.

[38] Angela Gismondi, "Engineer reviews proposed farm building regulations in National Building Code 2020," *Daily Commercial News by ConstructConnect*, March 12, 2020, canada.constructconnect.com/dcn/news/associations/2020/03/engineer-reviews-proposed-farm-building-regulations-in-national-building-code-2020

[39] See program: www2.gov.bc.ca/gov/content/industry/agriculture-seafood/programs/extreme-weather-preparedness

The Neoliberal Global Food System

The Canadian food system is characterized by the logic of financializing food. This means that instead of valuing agriculture for its role in "protecting and preserving biodiversity, providing livelihoods, and provisioning food," it is now prioritized as a means to generate profit.[40] Under neoliberal policies, Canada's food system, according to Rod MacRae, is not a "food system, but an agriculture and agri-food industry".[41] Policies like *Growing Together*, introduced in the 1980s, limited government interventions and aimed to develop Canada's export status, shifting the focus on agriculture from nourishing communities and the environment to growing GDP.[42] In 1993, the Canadian government, through the Canadian Agri-Food Marketing Council, committed to doubling agricultural exports and increasing Canada's GDP through agricultural exports.

On the farm, this economic goal transformed what it meant to be a farmer. This transformation led to changes of farm infrastructure and management to better meet the industrialized food industry's needs, including introducing the widespread practice of gestation crates, and increasing the numbers of animals in limited space. These efforts have successfully positioned Canada as the 5th largest agri-food exporter globally, exporting over 50% beef, over 70% pork, and significant amounts of poultry and dairy products.[43] In 2021, Canada exported $1.1 billion in poultry and egg commodities, $4.9 billion in pork and pork products and $4.5 billion in beef and beef commodities. These numbers can be attributed to the installation of neoliberal policies.

However, under a neoliberal system growth is unevenly distributed. The growth in GDP "has been matched by the growth of a more troubling set of statistics: producers' debt, a growing mental health crisis, labor exploitation, rural brain-drain, and environmental degradation".[44] For example, on average, for every dollar in revenues, farms incur 83 cents in expenses, coupled with an increase in producers working off-farm. More than half of Canadian producers derive the bulk (64.4%) of their income from off-farm labor, with the highest off-farm incomes reported in B.C.[45]

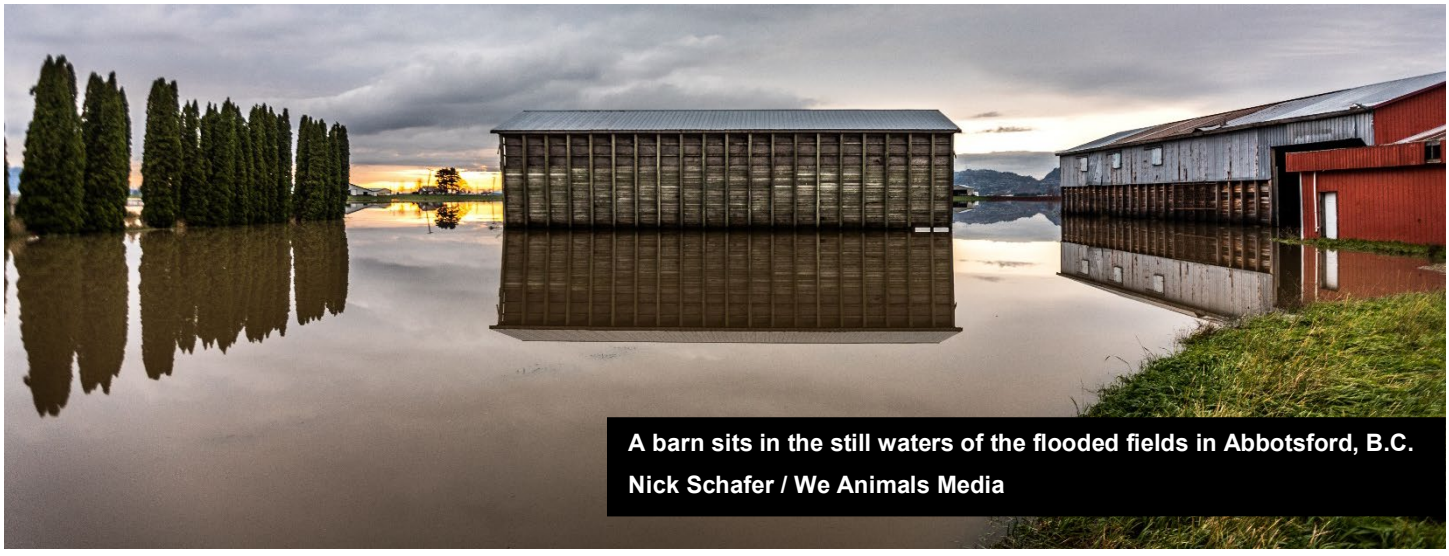
This trajectory contrasts with what Canadian policymakers envisioned in the 1970s when they introduced a supply management system for particular crops and animal agricultural commodities. The 'Supply Management Five,' comprising milk, eggs, turkey, chicken, and broiler hatching eggs, governed by the Farm Products Marketing Agencies Act, was introduced to safeguard Canadian

[40]Jennifer Clapp and S. Ryan Isakson, "Risky returns: The implications of financialization in the food system," *Development and Change*, 49 no.2 (2018): 437-460.
[41] Rod MacRae, "Policy failure in the Canadian food system. *For Hunger-Proof Cities: Sustainable Urban Food Systems," International Development Research Center*, (1999): 182.
[42]Naomi Robert & Kent Mullinix, "Beyond GDP: Lessons for Redefining Progress in Canadian Food System Policy," *Frontiers in Communication*, 6 (2022): 762482.
[43] Treena Hein, "Canada: World's 3rd largest exporter of pork and pigs," *Pig Progress,* January 20, 2022, www.pigprogress.net/world-of-pigs/country-focus/canada-worlds-3rd-largest-exporter-of-pork-and-pigs/
[44] Darrin Qualman, A. Haroon Akram-Lodhi, Annette Desmarais, & Sharada Srinivasan, "Forever young? The crisis of generational renewal on Canada's farms," *Canadian Food Studies/La Revue canadienne des études sur l'alimentation*, *5* no. 3 (2018): 100-127.
[45] Statistics Canada, "Total income of farm families, 2019," *Statistics Canada*, January 28, 2022, www150.statcan.gc.ca/n1/daily-quotidien/220128/dq220128c-eng.htm

consumers and producers.[4647] This system ensures domestic access and affordability to these commodities despite instability in global markets (or more localized disaster events) while providing producers with stable income and protecting them from corporate exploitation. The supply management system is based on production control, pricing mechanisms, and import control.[48] This system is not well-received in international trade, as it historically has protected Canadian producers by guaranteeing a 'farm gate price' for commodities.

Beef and hog producers were excluded from the supply management system. It is predicted that if beef and hogs were to be under the supply management system there would have to be "considerable downsizing" for example, the hog industry would have to "contrast by 62.7%".[49] By excluding beef and hogs from the supply management system, these commodities are produced in an unstable marketplace and subject to corporate control.

The core principles of the supply management system have been disregarded in the contemporary food production model, centered on export-driven growth. Against the backdrop of climate change, the repercussions of this export-focused approach are becoming evident on farms and within communities. Specifically, the concentration of immunocompromised standardized animals, the accumulation of substantial farm waste, and an inherently fragile production model now confront challenges posed by floods, fires, and heat.



A barn sits in the still waters of the flooded fields in Abbotsford, B.C.
Nick Schafer / We Animals Media

[46] John Paul Tasker, "How Canada's supply management system works," *CBC*, June 16, 2018, www.cbc.ca/news/politics/canada-supply-management-explainer-1.4708341
[47] National Farmers Union, "Supply Management Campaign," *National Farmers Union*, n.d., www.nfu.ca/campaigns/supply-management/
[48] Khamla Chanthavong, "Canada's supply management system background paper," *House of Commons; Economics, Resources and International Affairs Division Publication,* No. 42, E. (2018): 1-13. lop.parl.ca/sites/PublicWebsite/default/en_CA/ResearchPublications/201842E
[49] The Pig Site, "Supply management and the Ontario pork industry," *The Pig Site*, September 29, 2009, www.thepigsite.com/articles/supply-management-and-the-ontario-pork-industry

The Impact of the Abbotsford Floods on Farm Animals and the Agricultural Community

The relationship between animal welfare and extreme weather events has been a focal point in disaster management since the 1990s. Although the significance of animal welfare during disasters has been acknowledged, it still stands as "one of the most unrealized issues in terms of its potential to help human welfare".[50] In this section, we will pay close attention to the links between animal, human, and environmental concerns. We will assess the welfare implications of the Abbotsford floods, laying the groundwork for a discussion that evaluates the initiatives taken before, during, and after the flood. This evaluation aims to consider potential interventions for future scenarios.

In this section, we will delineate both the direct and indirect welfare implications for farm animals during the Abbotsford floods, categorized by species to account for the differing experiences and vulnerabilities. Recent research in animal disaster studies has emphasized the significance of the post-disaster stage, highlighting welfare concerns that challenge the conventional depiction of disaster's impact on animals. Furthermore, the Food and Agricultural Organization (FAO) has issued a statement of concern for the lack of information about the impacts of natural disasters on farm animals.[51] The welfare implications may be under-studied, and complex but are essential to focus on to "determin[e] which recovery actions should be undertaken".[52] Below, we present a summary of the welfare impacts on farm animals in the Fraser Valley following the Abbotsford floods.

Calculating Animal Losses during the Abbotsford Floods

When assessing the impact of the Abbotsford floods on farm animals we can begin with the stated losses: 628,000 chickens and turkeys, 12,000 pigs, 428 cows, and other farm species. It is crucial to note that although these statistics feature prominently in reporting about the animal losses of the Abbotsford floods, it is critical to remember these statistics represent an estimate and have not been updated since December 2nd, 2021 when over 800 farms remained submerged under the floodwaters.[53] Furthermore, it is not clear if these estimates include animals that were to be euthanized upon producers gaining access to their barns once the water receded. Research indicates that floods can compromise farm animal health for at least a year, resulting in "frequent and sudden" death.[54] The 2021 Canada-British Columbia Flood Recovery Program for Food Security does anticipate post-disaster welfare implications as reflected in their decision to provide recovery losses until June 1st, 2022. Therefore, the losses, last updated on December 2nd, 2021, are likely much higher (*See Recommendation - Support a Mandatory Reporting Mechanism with Public Databases*).

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[50] James Sawyer & Gerardo Huertas, *Animal Management and Welfare in Natural Disasters* (New York: Routledge. 2018), 4.
[51] Food and Agriculture Organization of the United Nations, "The impact of disasters and crisis on agriculture and food security," *FAO*, 2021, www.fao.org/3/cb3673en/cb3673en.pdf
[52] Dick Green, *Animals in Disasters*, (Cambridge: Butterworth-Heinemann, 2019, 19.
[53] Grace Kennedy, "Thousands of animals died on Sumas Prairie. This is what happened to them," *Fraser Valley Current*, November 29, 2021, fvcurrent.com/article/dead-sumas-prairie-flood/
[54]Anna Gaviglio, Annafrancesca Corradini, Maria Elen Marescotti, Eugenio Demartini, & Rosalia Filippini, "A theoretical framework to assess the impact of flooding on dairy cattle farms: Identification of direct damage from an animal welfare perspective,". *Animals*, 11 no. 6, (2021): 1586.

In our interviews, it was revealed that the actual losses on the ground were significantly higher. For instance, a veterinarian disclosed a staggering loss of 13,750 pigs on one farm, citing the building's 1990 construction standards as a contributing factor. Additionally, a worker involved in mortality management stated that deadstock haulers were "a little busier as farms dried up". The method used for calculating losses as communicated by the provincial government remains opaque.

To achieve a more precise assessment there needs to be more rigorous and transparent reporting mechanisms such as a mandatory reporting requirement. This would enable a more accurate estimate and include losses accounted for in the subsequent weeks and months due to death or culling. The matter of reporting animal losses has been vocalized as an issue by Canadian Coalition for Farm Animals (CCFA) in the context of barn fires, and more recently, in response to the 2021 heat dome in B.C. by Animal Justice. Camile Labchuk from Animal Justice submitted a freedom-of-information (FOI) request to learn about the losses from the heatwave between June 24th-30th, 2021. According to the obtained data, the B.C. Chicken Marketing Board recorded 416,146 deaths and the B.C. Egg Marketing Board 145,000 deaths, the B.C. Turkey Marketing Board 61,000 and the B.C. Broiler Hatching Egg Commission reported a loss of 29,210 animals. At least 651,000 chicken and turkeys died during the heatwave surpassing the total reported losses during the floods. As for other farm animals that died during the heatwave, the B.C. Hog Marketing Commission, nor the B.C Milk Marketing board had to report numbers leaving a gap in our knowledge about the ongoing impact of climate disasters in the province.

The Animal Welfare Implications

Welfare concerns after a disaster are triaged and based on the availability of three essential resources: water, feed, and fuel or electricity maintaining the barn environment. Access to water and feed is vital to maintain the animal's productivity. Limited access to these resources can force producers into the difficult choice of prematurely euthanizing animals due to the severe impact on their ability to grow or reproduce.[55] Additionally, fuel or electricity is crucial for the animals' survival, especially in controlled environments like confinement barns.[56] Ensuring access to these three resources was a major concern during the Abbotsford floods.

On November 17th, 2021, Lana Popham, the B.C. Minister of Agriculture, candidly expressed, "[t]here are also animals who have survived that are going to be in a critical need for food… We knew we'd have a window of about three to four days in our poultry sector and dairy sector, but those stores are running out". In the following sections, we explore the disaster's impacts, providing species-specific snapshots of their experiences during the floods and secondary disasters.

[55]Adreia De Paulo Vieira & Raymond Anthony, "Reimagining Human Responsibility Towards Animals for Disaster Management in the Anthropocene," in *Animals in Our Midst: The Challenges of Co-existing with Animals in the Anthropocene* eds. Jozef Keulartz, (Springer, Cham: 2021): 223-254.
[56] Samantha Crist, Jameson Mori, & Rebecca Lee Smith, "Flooding on Beef and Swine Farms: A Scoping Review of Effects in the Midwestern United States," *Preventive Veterinary Medicine*, 184, 105158.

Pigs in the Abbotsford Floods

In B.C., according to 2021 Statistics Canada data, there are approximately 86,000 pigs, representing 0.61% of Canada's total herd. Of the 86,000 pigs spread across 770 farms with an average of 112 pigs/farm: 7,8000 are sows and breeding gilts, and the rest are classified as other. Although these numbers are significantly lower than other provinces, 72% of BC's hogs are now raised on just 16 commercial farms that are concentrated in the Fraser Valley accounting for 78.6% of B.C.'s total product.[57]

The hog industry in British Columbia faces challenges, including the cost of raising pigs is no longer profitable as feed costs are exorbitant, and the industry is market-driven, unlike the cattle and chicken and turkey industries which are supply-managed. During the floods, minimal media coverage was given to the pigs in the Fraser Valley, partly due to the region's history for being a hotspot for animal rights activities.[58]

Media reports stated that 12,000 pigs died without elaboration, and that there were significant challenges in handling carcasses. There was no mention of disaster mitigation or rescue with the exception of the failed rescue by John Guliker, a hog producer. He had recruited 14 workers to help evacuate hogs, however, the active floodwaters thwarted the rescue effort resulting in thousands of hogs drowning.[59]

During our interviews, we learned that pigs were left to shelter in place largely due to biosecurity concerns. Ultimately, this resulted in over 12,000 pigs dying from electrocution, drowning or euthanasia. Welfare implications included injuries sustained from attempts to escape, such as climbing on top of one another or struggling within confinement crates. Floodwater exposure caused skin lesions, open sores, and other infections leading to miscarriages, induced abortions, and overall reproductive loss. Additionally, the increased risk of disease post-flood influenced disaster response decisions. There is preliminary research that shows there are increased chances of flood-induced diseases on hog farms following a flood.[60] Veterinarians and producers assessed animal welfare, often opting to euthanize pigs based on factors such as market price, long-term health considerations, reproductive potential, and biosecurity threats. These decisions were made to balance immediate concerns with long-term welfare outcomes.

[57] Government of British Columbia, "BC hog industry snapshot," Government of British Columbia, 2017, www2.gov.bc.ca/assets/gov/british-columbians-our-governments/organizational-structure/boards-commissions-tribunals/bc-farm-industry-review-board/regulated-marketing/2017_hog_industry_snapshot_bcfirb.pdf
[58] Vicki Hopes, "Abbotsford farmer says 2019 protest at hog farm was 'hard to deal with'," The Abbotsford News, June 29, 2022, www.abbynews.com/news/abbotsford-farmer-says-2019-protest-at-hog-farm-was-hard-to-deal-with/
[59] Roberta Staley, "How livestock is getting caught in the climate change crossfire," Corporate Knights, May 9, 2022, www.corporateknights.com/food-beverage/climate-change-hits-livestock-farming/
[60] Crist, Mori & Smith, "Flooding on Beef and Swine Farms," 105158.

Cows in the Abbotsford Floods

In B.C., cows rank among the top-ten farm commodities, with dairy products leading the sales and beef ranking seventh.[61] For example, in the province, 71.3 million litres of milk are produced, with 43.5 million litres coming from the Fraser Valley. According to 2016 statistics, the Fraser Valley housed 103,034 cows, including 46,034 dairy cows (61.7% of BC's total, concentrated on less than half of the dairy farms), 2,826 beef cows (1.3% of BC's total), and 54,174 listed as other (such as calves).[62] During the floods, 65 dairy farms were under alert or evacuation orders, posing a significant welfare crisis for the 46,034 dairy cows, as farm labourers were prevented from accessing farms due to mudslides and floodwaters. It was estimated that a total of 7.5 million litres of raw milk was dumped into manure pits from lack of access to further processing and the market.

The experiences of beef and dairy cows differed from those of pigs, chickens, or turkeys. Cows could survive the floods due to their housing systems allowing for greater mobility and their stature enabling them to escape drowning, with human intervention playing a crucial role. However, the main impact on cows occurred in the long term, post-disaster from exposure to polluted water and other elements (e.g., cold weather), lack of access to food and water, and other injuries they may have incurred during the flood event. Since cows have longer production years than pigs, chickens, and turkeys, we are able to see the long-term impacts of disaster events.

Julia Smith, a producer, and rancher explained that after multiple climate events, the cows have been especially stressed. For generations, they have been moving up the mountain, and are now being moved down the mountain – doing the opposite of what they know and have taught each other over generations. During the fires, Julia and her team of other ranchers, horses, and dogs had to move the cows through the middle of an active logging operation with thick smoke and dust, load them on a trailer, transport them to safety, and then a month later, bring them back to a new pasture that they were not familiar with. Then came the flood. Julia explained that the cows got stressed, which caused them to be sick, and with the highway out, they could not get a veterinarian to come.

In dairy farms, it is estimated that it will take on average 3 years for the farm to return to the "pre-flood production level".[63] Studies indicate that the primary welfare concerns for cattle during a disaster are "displacement" and "disruption," which can lead to premature death due to interruptions of reproduction which can inform producers' decisions to euthanize the cow. Emerging studies on cows in disaster events suggest that the first year after a flood event results in increased and sometimes sudden death. Long-term health impacts emerge from changes in diet, dehydration, compromised immune system, lameness, miscarriages, undetected diseases, and injuries such as fractures, and

[61] Government of British Columbia, "British Columbia's Agriculture Food and Seafood Sector," Government of British Columbia, January 2022, www.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/industry-and-sector-profiles/fast-stats/fast_stats_2020.pdf
[62] Government of British Columbia, "Agriculture in Brief," Government of British Columbia, 2016, www.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/census/census-2016/aginbrief_2016_fraser_valley.pdf
[63] Gaviglio et al., "A theoretical framework to assess the impact of flooding," 1586.

stress.[64] In our interviews access to water was cited as a major concern. An animal rescue worker, Devon, noted that “dairy cows do not do well after 12 hours, which is when problems start to creep in. If a dairy cow is without water for 24 hours that is when the mortality rate goes through the roof”. It can be assumed that a survey of producers with pigs would see similar impacts. Another study found that sickly farm animals can even emit more methane.[65] There is an incentive to study the impacts of disasters such as floods on cows because of their longer production lives and the long-term impacts. In an interview, it was noted that over 6,000 cows were relocated during the floods, and how it would be valuable to producers to study the long-term impacts including their (re)productivity compared to non-flooded cows.

Multiple calf hutches piled up after being swept away by the Abbotsford, B.C. floods. Nick Schafer / We Animals Media

[64] Ibid, 1587.
[65] Vanessa Ezenwa et al., “Infectious diseases, livestock, and climate: a vicious cycle?,” *Trends in Ecology & Evolution*, 35 no. 11 (2020): 961.

Chickens and Turkeys in the Abbotsford Floods

B.C. is the third-largest chicken-producing province in Canada, with production steadily increasing to meet the demands of the export market. Between 2017 and 2018, production increased by 8%. As of 2016, Statistics Canada reported 13,773, 480 hens and chickens, 492,000 turkeys, representing respectively 66.8% and 57.1% of B.C.'s total herd primarily concentrated in Fraser Valley.[66] Notably, 80% of the province's eggs are concentrated in Abbotsford and Chilliwack.

During the floods, Lisa Bishop-Spencer, the communications director with Chicken Farmers of Canada, reported that 61 farms were evacuated, including 22 of broiler farms, where chickens are raised for their meat and the remaining were turkey or egg-laying farms. On December 3rd, 2021, it was reported that 97% of egg-laying chickens survived. However, in a previous disaster, the heatwave, Joe Falk of Fraser Valley Specialty Poultry in Chilliwack reported a significant loss in his duck-breeding flocks. He reported a 20% drop in production following the heatwave.[67] Therefore, despite birds surviving the initial disaster it is important to monitor for secondary disasters as birds are very sensitive to stress; it can be expected that welfare concerns would emerge over time.

There remain many gaps in the literature regarding the welfare impacts of birds during a flood event. The industry and associated organizations dominated the response, resulting in insulated communications about the events. In our discussions, all participants agreed that, given the nature of the industry – short production lives, confinement, disease risk, and the relatively low individual value of a bird – birds are left to shelter in place during disasters.[68] For instance, if a producer expects a new flock in approximately 36 days, investing resources in the current flock is not economically viable. Instead, it is more cost-effective, and often the norm, to let the birds die, manage their mortality, and prepare the barn for the next flock.[69] Any environmental contaminant or disturbance that occurs would result in depopulation, a sentiment reiterated by producers in our interviews and the media. It was reported in the media that 90% of chicken and turkey production resumed 26-days after the initial flooding, however, what exactly does that mean for the animals who survived the initial flooding?

Multiple broiler sheds sit partially submerged.
Nick Schafer / We Animals Media

[66] Government of British Columbia, "Agriculture in Brief," 2016.
[67] CBC News, "'It weighs very heavily': B.C. livestock farmers on adapting to the challenges of rising temperatures," *CBC News*, August 4, 2021, www.cbc.ca/news/canada/british-columbia/bc-livestock-farmers-heat-wave
[68] Thomas Van Boeckel, Weerapong Thanapongtharm, Timothy Robinson, Chandrashekhar Biradar, Xiangming Xiao, & Marius Gilbert, "Improving risk models for avian influenza: the role of intensive poultry farming and flooded land during the 2004 Thailand epidemic," *PloS one,* 7 no.11 (2012): e49528.
[69] Irvine, "*Filling the Ark*," 2009.

The Economic Impacts and Role of Insurance during the Abbotsford Floods

The B.C. government, in consultation with insurance companies, estimated that the flood-related damages suffered by producers to be approximately $285 million. Apart from these immediate costs, it was estimated that supply chain disruptions resulted in economic losses estimated at 5 to 6 billion.[70] Despite these estimated costs, researchers say that the economic impacts of the floods were not well documented, a common issue with climate-related disasters. Addressing this gap, Dr. Zafar Adeel and his team conducted a comprehensive study aiming to propose a systematic methodology for gathering and analyzing economic impacts of climate-related disasters in Canada and North America.[71]

Their investigation looked at different sources for data on the economic impacts of the Abbotsford floods. In their quest for accurate and up-to-date information, they engaged commercial insurance companies. However, to access insurance records, the team had to sign a non-disclosure agreement. This process revealed that insurance records are not accessible to the public or government, raising concerns about the transparency of cost estimates associated with disasters. It also highlighted the significant but often overlooked role that insurance companies play in post-disaster economics.

Despite the uncertainty regarding the economic impacts of the floods, $228 million dollars have been allocated to AgriRecovery, a provincial-territorial-federal disaster relief framework. Within AgriRecovery, the 2021 *Flood Recovery Program for Food Security* was established to support producers in their recovery efforts. The program covers costs in three main areas that are not addressed by existing government programs or private insurance. These areas included: (1) clean-up, repair and restoration of land, barns, and animal shelters, as well as water and waste systems; (2) repair of uninsurable essential farm infrastructure and on-farm structures such as containment fences; and (3) animal welfare, replacement feed, transportation, and veterinary care; and loss of perennial plants not raised for resale, such as blueberry plants.[72]

The program primarily reimburses producers for costs associated with uninsurable damages during the floods. The program stipulated, under clause 6.12.5, that “payments, where insurance was deemed available, will be denied by the program,” meaning producers without insurance, would not be eligible.[73] Additionally, eligible producers excluded smaller producers whose off-farm income is more than 50% or producers that have more than $1 million in revenue. Payouts for the Abbotsford

[70] Communication with Dr. Zafar Adeel, Simon Fraser University.
[71] Zafar Adeel et al., “Developing a comprehensive methodology for evaluating economic impacts of floods in Canada, Mexico, and the United States,” *International Journal of Disaster Risk Reduction,* 50, (2020): 101861.
[72] Maria Weisgarber & Meagan Gill, “B.C. floods: $228m announced in agricultural recovery efforts, officials say,” *CTV News Vancouver*, February 7, 2022, www.bc.ctvnews.ca/b-c-floods-228m-announced-in-agriculture-recovery-efforts-officials-say
[73] Government of British Columbia, “2021 Flood Recovery Program for Food Security,” Government of British Columbia, February 8, 203. www.gov.bc.ca/gov/content/industry/agriculture-seafood/programs/agriculture-insurance-and-income-protection-programs/flood-recovery

flood were set to be a maximum of $300,000/operation, whereas losses were often $1 million or more on each farm. This left many producers struggling financially after the disaster, despite the federal and provincial governments' promises to support them financially in their recovery. Considering the conditions for eligibility, we wanted to understand if and what programs producers had to manage risk and insurance.

The Accessibility and Relevance of Insurance and Risk Management Options

According to the B.C. producers Emergency Management Guide,[74] there are five avenues for producers to obtain insurance or sign up for risk management programs: (1) commercial or private insurance; (2) The Insurance Bureau of Canada; (3) AgriStability; (4) AgriRecovery; or (5) AgriInvest.

In our research, we found that the existing insurance options fail to cover expenses associated with farm animals. For example, animal welfare, transportation and veterinary care are not covered by existing government programs or private insurance. An insurance broker with over thirty-years of experience explained to us that farm animals constitute a "class of business" that is increasingly uninsured. Partly because insurance markets are unwilling to participate due to prohibitively high costs. Consequently, with limited animal-centered insurance policies available, fewer producers are participating. The issue is further complicated because insurance is increasingly limited in what it will cover such as restrictions on applying for flood insurance if located in a flood zone. This has led some to feel that insurance brokers are abandoning animal producers.

Certain producers are unable to obtain flood insurance due to their location like many of the producers in the floodplain. In an interview with a veterinarian, he explained, "many farmers are underinsured. It's a hateful thing to pay when you don't see the benefit and then when we want to collect it's difficult. Insurance companies are a bit predatory in my mind". This sentiment captures producers' experiences during the floods. For example, Ed Mulder, a chicken producer residing in Flood Plain since 1994, recounted, "we're basically in the drain of this prairie". Their chickens drowned. They are trying to raise $100,000 through a GoFundMe[75] campaign to cover their losses and rebuild. He laments, "sadly, we are not covered by insurance. Sumas Prairie lies upon a floodplain, so insurance companies do not sell flood insurance for this area. This means that the reconstruction of every barn, every piece of equipment inside, the house that my parents just excitedly renovated this past summer, and everything inside is to be solely paid out of pocket. This expense is achingly and wildly huge". Dairy producers Phil and Trina Graham faced a similar experience. They explain, "as farmland on the flood plans, there is no flood insurance".[76] They are also trying to raise $100,000 to cover recovery costs.

We discovered that producers are exploring alternative risk management options beyond purchasing

[74] BC Pork Producers' Association, "Emergency Management Guide for BC Pork Producers," Government of British Columbia, n.d., www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/farm-management/emergency-management/bc_pork_emergency_management_guide.pdf
[75] See www.gofundme.com/f/edhestermulder
[76] See www.gofundme.com/f/help-phil-trina-grahams-dairy-farm-from-flood

insurance policies. Every producer we interviewed mentioned investing significant time and money into projects to mitigate the risk and vulnerability of their animals and farm. However, when it comes to purchasing insurance policies, they are not differentiated from producers whose practices do not contribute to reducing risk, vulnerability or enhancing animal welfare and resilience.

Brett Israel, an extensive producer at 3Gen Organics in Wallerstein, Ontario, grows and rotates small grains, which store more carbon, nurture healthy soil, and enhance crop resilience during drought. Growing his own feed has allowed him to better care for his animals during disease and climate-related disasters, as he can provide food for his animals when roads and plants are shut down. Feeding small grains and hay to his pigs has resulted in a reduction in mastitis in sows and increased welfare among his pigs by meeting their enrichment needs. Israel provides outdoor access for his pigs, which research has shown makes them more resilient to extreme weather, such as heat, increases their rate of weight gain, and reduces mortality. Yet, Israel spends $46,000 per year on insurance.

As for Julia Smith, of Blue Sky Ranch in South Cariboo in the Interior of B.C., she invests thousands of dollars to manage fire risk. This includes purchasing tubs to hold water, pumps, reservoirs, and a firefighting system. She irrigates her land, and as a result, her farm and the houses and farms around her have survived fires, when others in the area have been devastated. Smith uses high welfare and more resilient production practices. She moves her pigs around her land, allowing them to clear brush and create natural fire breaks, which reduces the risk for her and others. However, her insurance company does not acknowledge or financially reward her for this proactive work. Smith reported that she spends more on insurance policies than she makes in profit each year.

Blaine Hajertaas, a regenerative producer in Redvers, Southeast Saskatchewan, uses rotational grazing and silvopasture, promoting healthy soil, tree cover, stores carbon in trees and soil, reduces erosion, increases biodiversity, and creates shade. He restored wetlands on his land, expanding watering locations for his cows and enhancing grass and forage production These practices support his cows and business during drought, and reduce the risk of fire. As risks increase each year from the climate crisis, insurance premiums rise each year. Despite the proven benefits of his practice, his insurance company does not recognize their effectiveness.

When discussing possible solutions to insurance coverage with producers, they expressed interest in collaborating to develop policies that rewarded producers who integrate resiliency into their production systems (*See Recommendation - Form a Canada Multistakeholder Alliance Working Group*). Many emphasized the need for the government to create a government-run insurance program specifically for animal agricultural producers, expanding AgriInsurance beyond crops. Speaking about business interruption insurance, a pig veterinarian described it as such:

> Business interruption insurance, which, you know, really comes down to what was the impact on your business, whether or not it's an animal heartbeat,

> infrastructure damage, but interruption to business. And that's, I think, ultimately where insurance needs to go as opposed to putting a value on an animal and saying is she alive or dead? Or what's your marginal value? It really comes down to what your business looked like before this disaster happened and what it looks like now. So insurance companies are funny critters because they're in the risk business, but they don't want to take the risk. So, their whole point says, you're in a floodplain. Why would we cover you for flooding?

Producers, and other agricultural workers suggest creating government-supported programs where producers demonstrating investments of time and money in management practices that enhance resilience to climate threats receive reductions on risk management and insurance policies (*See Recommendation - Develop Insurance Policies to Incentive or Reward Risk Mitigation)*. One approach is to connect producers with Living Lab projects, where practices proven beneficial by both producers and researchers through evidence are identified, and standards established. These standards could be utilized to obtain tax breaks or reduce insurance premiums. Implementing such standardization and reward systems could encourage widespread producer participation. These suggestions are practical, producer-centered, and can effectively reduce the vulnerability of farm animals to hazards while enhancing their welfare.

The Future of Business Risk Management in Canadian Agriculture

An October 2022 report published by the B.C. government titled “Treading Water: The Impact of and Response to the 2021 British Columbia Floods,” provided an updated briefing on the impacts and unresolved issues.[77] The report quoted an expert witness who stated that financial assistance was “awfully slow in coming”. Another expert witness mentioned that even after 6 months following the floods, “a lot of people still [had not received] some of the financial resources that they were promised,” delaying producers’ efforts to rebuild and resume production, exasperating the immediate impacts of the floods.

During our research, the Next Agricultural Policy Framework (NPF) was drafted for review and consultation. The NPF policy framework is a five-year (2023–2028) investment plan between federal, provincial, and territorial (FPT) governments focusing on strengthening and expanding Canada’s agriculture and agri-food sector. The program replaces the previous Canadian Agricultural Partnership (CAP), which expired March 31, 2023. In particular, this policy framework outlines the foundation for government and private agricultural programming for the next 5-years.[78] Insurance was highlighted as a key policy issue to consider. At the time of writing, the National Farmers Union (NFU) issued a stakeholder letter addressing many points, including insurance. They noted that CAP policy

[77] See sencanada.ca/en/committees/AGFO/Reports/44-1
[78] Canadian Federation of Agriculture, “Standing Policy: The Canadian Federation of Agriculture,” *Canadian Federation of Agriculture*, 2023, www.cfa-fca.ca/wp-content/uploads/2023/03/Policy-Manual_E_2023.pdf

included AgriRisk funding to research private insurance mechanisms that may replace some business risk management tools, such as AgriInsurance. The main concern the NFU raised is that private insurance is primarily profit-oriented, which could "accelerate the exit of today's farmers". Instead, the NFU advocated for an alternative, publicly funded business risk management system. The FPT is yet to be released, and the future of business risk management programs in Canada remains uncertain.

Establishing Responsibility during the Abbotsford Floods

Following a disaster event, questions of accountability and responsibility arise. Despite numerous handbooks and workshops commissioned by the government and associations outlining disaster protocols, it is important to note that these efforts remain *voluntary* and directed at the individual producers. The legal responsibility lies with the producers, as stated clearly in a government handbook: "individual producers are ultimately responsible for their animals, farm property, and equipment during a flood".[79] However, what has been criticized following recent climate-induced disasters is the lack of enforcement of this legal responsibility. Furthermore, there is no legal mechanism that mandates producers to prepare for or rescue animals under their ownership or care (if contracting for a company), nor are there legal consequences for losses (*See Recommendation - Challenge the Canadian Legal Context Governing Farm Animals)*.

For example, following the 2021 heat dome, which resulted in a significant loss of animals, the B.C. Farm Industry Review Board (BCFIRB), an independent administrative tribunal that operates at arm's length from the government, refused to investigate the heat-dome-related deaths stating, "...despite proactive and ongoing animal-care practices by producers, the excessive heat was so extreme that it resulted in a number of unfortunate bird fatalities".[80]

Animal Justice, a national animal law organization in Canada, has highlighted the absence of regulations governing animal welfare standards generally and in the context of more frequent extreme weather events. There are no legal requirements for farms to have emergency or evacuation plans in place. The National Farm Animal Council (NFACC) creates Codes of Practice for producers in the event of emergencies; however, it is difficult to determine if producers comply, and if not, what repercussions there are. As it stands farm emergency plans are considered best practices – encouraged but not required. Animal Justice writes, "[a]lthough there have been some evacuation attempts of larger animals like dairy cows, private insurance and government disaster subsidy programs often cover financial losses that producers incur from leaving the animals to die".[81]

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[79] Investment Agriculture Foundation, "Climate Change Adaptation Program: Farm Flood Readiness Toolkit," *Government of British Columbia*, 2022, bcclimatechangeadaptation.ca/wp-content/uploads/2022/Resources/SP05-Toolkit-Farm-Flood-Readiness-2022-fillable.pdf

[80] Denise Ryam, "Massive B.C. livestock losses from heat dome, documents show," *Post Media,* September 27, 2021, www.pressreader.com/canada/the-province/20210927/281552294011070

[81] Animal Justice, "Limit farm sizes to protect animals from disasters, says Animal Justice," *Animal Justice*, November 24, 2021, animaljustice.ca/media-releases/limit-farm-sizes-to-protect-animals-from-disasters-says-animal-justice

Together, the reluctance to investigate producers' actions, encouraging rather than mandating emergency preparation, and the promise of post-disaster relief funding result in individual producers ultimately deciding, based on their own risk assessments and resources, what happens to the animals.

On December 3rd, just 19-days after the initial flooding, Minister Popham stated that the “boots-on-the-ground” approach resulted in the following survival rates: 98% of turkeys, 97% of other birds, and 98% of cows. Absent was a remark about the survival rate of pigs or further discussion about long-term welfare impacts that could lead to on-farm euthanasia.[82] Popham’s comments framed the efforts as successful; however, those we interviewed worried that relying on a similar response plan during future disasters will compound debt, trauma, death, and more.

The Insulated Abbotsford Response: The Strained ‘Resiliency’ of Producers and Community Members

The immediate response to the Abbotsford flood event was highly localized. The reasons for this will be explored below, including the government's responsibility in organizing the people who were on the ground. The community-centered response makes sense in a place like Abbotsford, where residents who are not producers live in what is an Agricultural Land Zone (ALZ). Here, 1-in-5 jobs are in the agricultural sector, reinforcing a deep sense of community.[83] It was this strong community bond that materialized in what has been celebrated as a ‘boots-on-the-ground’ demonstration of resiliency and community. However, because the response was so localized, they did not have access to a sophisticated Incident Command System (ICS). Consequently, most of their organizing and communication occurred through phone calls or social media posts. In an interview, it was explained to us that “it’s whoever jumps on social media,” creating challenges because “seven people can respond to one call, while 4 more are getting ignored because they didn’t have access to social media”. This highlights the need for a more localized version of the ICS to support effective communication and coordination.

Julia Smith, a volunteer first responder, played a vital role during the floods. She went door-to-door, warning people about the imminent danger from the floods and the need for producers to move their animals. Among those affected were close friends who lost 15 acres of land, barns, and essential infrastructure. Additionally, they suffered a devastating loss of 20% of their herd and all their grazing land. Julia described the challenges they faced. Highways were closed, forcing producers to navigate back country roads where previous fires had eroded the landscape. It was devastating and stressful for the people and the animals.

[82] Fraser Valley Current, “Abbotsford flood update: Final evacuation order lifted in Sumas Prairie,” *Fraser Valley Current*, December 9, 2021, fvcurrent.com/article/breaking-catastrophic-damage-predicted-in-abbotsford/
[83]Abbotsford, “AgRefresh: Background research report,” *Abbotsford*, 2016, www.abbotsford.ca/sites/default/files/2021-02/AgRefresh%20Stage%201%20Background%20Research%20Report%20Presentation.pdf

While the community took pride in their ability to support each other and achieve significant accomplishments with limited resources, there was lingering frustration and distrust in the government's response. Interviews revealed that those on the ground experienced post-traumatic stress disorder in the aftermath of the disaster. Although communities came together during the floods, the immediate and long-term impacts should prompt serious discussions about why they were left stranded in their responses without immediate external support. In our interviews, producers and other agricultural workers discussed the value of a community-first response that should be extended and empowered (*See Recommendation - Support a Community First Responder Model in Agricultural Communities*). There needs to be a local response led by community members who know the backroads, where the water accumulates, and alternative routes to start the work to save animals' lives, land, and farms.

The Government's Responsibility

The primary responsibilities of the government in a disaster event include mass communication such as through issuing alarms and emergency orders, coordinating the movement of people and resources through the Emergency Operation Center (EOC), and intervening during the post-disaster phase (e.g., clean-up, disaster relief packages, etc.,). A veterinarian pointed out, "…sometimes provincial agencies are not the most agile in the world and ours is no exception. In fact, we had some people in key positions who were MIA, unfortunately. So, our ministry was very background and not in the forefront as they should have been". Government responders were missing in action, surprising many, but they were still tasked with doing more 'behind-the-scenes' work. However, our research found that there was a general lack of government-coordination communication, a fundamental aspect of an effective emergency response plan.

In the following sections, we will outline how the government mishandled issuing alarms and emergency orders, and how, through the EOC, they may have delayed or prevented other groups from accessing communities in need.

The Challenges of the Alert System

> "*Abbotsford didn't actually, didn't even come up with a flood alert until like, two days after the Nooksack River was breached. So, you know, that's like waiting until the barn is just about burned down to say, Oh, hey, there's a fire over there*." (Devon, an animal hauler, and community resident)

Following the Abbotsford flood emergency, numerous complaints surfaced regarding the way emergency warnings were communicated, which ultimately led to slower response times, resulting in delayed actions and greater losses. The primary alert systems that producers rely on are alarms issued by the government, which, upon issuing an emergency warning, activate other resources and policies. During the disaster across the Sumas Prairie, no official warnings were issued. For example,

the City of Abbotsford did not issue an alert but instead knocked on doors to not "panic," as stated by Mayor Henry Braun,[84] in contrast to the sirens used across the border in Sumas, Washington. A civil lawsuit was filed on December 31st, 2021, against the City of Abbotsford, Fraser Valley Regional District, and the province of B.C., alleging failure to warn the community in a "timely manner".[85] The plaintiffs claim that with a reasonable warning, they could have "reduced their damages by transferring their equipment, inventory, chattels, and other movables". The lawsuit was initiated by Caroline Mosterman, Ted Dykman, and other unnamed "class members". Dykman is a dairy producer in Abbotsford who has experienced flooding three times in the last decade.[86] The lawsuit aims to demonstrate gross negligence.

In building a case for gross negligence, an investigation by the Canadian Centre for Policy Alternatives suggests that the River Forecast Centre, responsible for providing information to the government on flood risk and coordinating with the equivalent organization across the border, the National Oceanic and Atmospheric Administration, may have been delayed in issuing warnings due to being significantly understaffed. For example, in Alberta, there are 25 staff members, whereas in B.C there were only 5.5 staff members.[87]

In addition to these alert systems, there is also the Premises ID program that links farm animals to a specific geographic location, providing up-to-date information that can be mobilized during an emergency. This includes sending alerts to farms at-risk. During the time of the floods, registering for the Premises ID program was optional. Yet, producers who were registered during the Abbotsford flood did not receive alerts from Premises ID. In an interview on CBC news, Chelsea Meier of U&D Meier Dairy in Abbotsford explained that despite her 100-acre farm being registered with the federal Premises ID program, yet she did not receive a warning. She is left wondering had she been informed of the risk to her farm if her animals would not have drowned. She and other producers are skeptical about the program's effectiveness in the future.[88]

Looking ahead, the federal government has mandated producers register to the Premises ID program and recalibrated AlertReady, a nationwide program that can broadcast emergency alerts through TV, radio, and wireless devices. Previously, this program was exclusively used for tsunamis, amber alerts, and civil emergencies but will now include, as of June 2022, threats from extreme weather events.[89] AlertReady works in concert with provincial emergency operation centers (EOCs). Although

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[84] Yvette Brend, "'Somebody needs to be accountable': Sumas Prairie farmers angry over lack of flood warnings," *CBC News*, December 3, 2021, www.cbc.ca/news/canada/british-columbia/meier-farm-sumas-prairie-recover-floods-abbotsford-warning-system-failure-1.6268183

[85] See www.slatervecchio.com/wp-content/uploads/2022/01/2021-12-23-Filed-Notice-of-Civil-Claim-Mostertman-v-City-of-Abbotsford....pdf

[86] Dan Fumano & Gordon Hoesktra, "Proposed class-action suit filed to recoup damages from Sumas Prairie flooding," *Vancouver Sun*, December 24, 2021, vancouversun.com/news/local-news/proposed-class-action-suit-filed-to-recoup-damages-from-sumas-prairie-flooding

[87] Mattison Enterprises, "River Forecast Centre Review," report, November 30, 2010, www.policynote.ca/wp-content/uploads/202/11/MattisonReportNov2010.pdf

[88] Brend, "'Somebody needs to be accountable," 2021.

[89] Government of British Columbia, "BC Emergency Alerts," *Government of British Columbia*, n.d., www2.gov.bc.ca/gov/content/safety/emergency-management/preparedbc/evacuation-recovery/emergency-alerts

this opens up new pathways for communicating emergency alerts, this resource does not address issues of understaffing, mistrust, or guarantee that the government will use these channels in a timely manner, which ultimately determines whether resources will be made available to producers.

Lack of Coordination between Response Levels

> *"You know, like the farmers that we met last year, it's like we're not leaving 400 head of animals to fend for themselves. So, they're really annoying, kind of harping on this at this point, but there really needs to be a far more effective effort. Both the provincial and the federal level. Really, that's where their leadership needs to come from, but they need to listen to the farmers. They need to do what the farmers tell them they need. None of this high-end from the government, I'm here to help you crap*." (Devon, animal hauler and community resident)

Regarding the response coordination, there was a notable disconnect between different levels of response groups - local community, municipalities, and the provincial government. Dick Green, an expert in animal disaster management, stressed the importance of an integrated and coordinated response across all levels of response.[90] This usually is organized by what is called an Emergency Operations Center (EOC), which is tasked with coordination, including facilitating the incident-command system (ICS), communication, resource distribution, and more. In B.C., there is some degree of integration between animal agriculture and the government. However, as explained to us, whatever coordination was established over the past decade dissolved during the floods.

For example, in an interview, it was recounted to us that the Ministry of Agriculture commissioned trucks full of supplies, but upon arrival, the trucks were stopped and delayed by police barricades. Essentially, there are four roads leading to the region, which were either inundated by flood waters, damaged, or inaccessible due to police blockades. Furthermore, once the trucks were granted access, they were again stranded due to lack of coordination with people on the ground. In the same interview, Devon said he "finally got a call from the ministry, now day nine, asking me for my opinion as to how their efforts were going...she hung up on me because I wasn't polite". He continued, stating, "...you know, they literally put helicopters into the air without knowing where they were going. They had no destination. They just have to fly around. See if you can find somebody you need to and so again, it was you know, it was very spectacular. It was all over the news and everyone it was, it was a good show. And you know, at ground level, it was not just a joke, it was an insult".

Who wasn't there: Activists and the Canadian Veterinarian Reserves (CVR)

During our interviews, we also learned about who was not there. Producers expressed frustration multiple times about the absence of animal rights activists. One participant raised the question that "if animal rights activists care so much, why weren't they there helping us?". In an interview with Nick

[90] Michael Appleby & Tonya Stokes, "Why should we care about nonhuman animals during times of crisis?, *Journal of Applied Animal Welfare Science*, 11 no. 2 (2008): 95.

Shafer, a photojournalist associated with WeAnimals it became clear that these individuals were not absent by choice; rather, they were denied access to the region. Shafer stated, “We’re here, but they’re not letting us in”. In disaster responses, it is not uncommon in disaster responses for what are called “spontaneous uninvited volunteers” (SUVs) to be denied access. SUVs are animal-centered groups that are not formally invited, are not integrated into the Incident Command System (ICS) and can potentially tarnish the reputation of invited animal welfare groups. This restriction extends to journalists as well. This practice has faced criticism for favoring the agricultural industry and safeguarding its image. Consequently, the images and narratives that are shared are filtered through agricultural communities, which have a vested interest in controlling how the story is presented in the public sphere, aiming to evoke empathy rather than ridicule.

Another group that was absent, again, whose absence was denied, was the Canadian Veterinarian Reserves (CVR). The CVR was a result of the 2005 CVMA Emergency Plan, which established a pool of emergency-trained Canadian veterinarians willing to respond to domestic and international large-scale animal disasters. During the early 2000s, a series of domestic and international animal disasters, including avian influenza and Hurricane Katrina, highlighted the necessity for government responses to large-scale disasters involving animals. The CVR was formalized in 2006 and has since been funded by the CFIA due to its recognition as a “public good”. In its inaugural year, the CVR recruited 364 veterinarians. The ultimate goal is to establish a national Animal Health Emergency Response Team, like that of the Public Health Agency of Canada’s Health Emergency Response Team.[91]

The CVR provides “surge capacity” or a “second wave” of support to the local veterinarian response during a disaster event. It serves as the emergency team of the Canadian Veterinary Medical Association (CVMA) and is funded by the Canadian Food Inspection Agency (CFIA). The CVR is activated when the CVMA receives a request from an authorized requester, which includes provincial, territorial, or federal levels of government. The CVR then issues a “Call Up Notice,”[92]” detailing the disaster event and duties.[93]

The CVR is at the forefront in Canada, advocating for more inclusive disaster management efforts, as “animals are a part of every emergency. Human safety and welfare are directly affected by the plight of animals”.[94] The CVR responds to disasters, including biological, weather-related, geophysical, and accidents, which are categorized into two taskforces: (1) foreign animal diseases and (2) natural and man-made disasters. The CVR membership is exclusive to Canadian veterinarians who agree to complete annual emergency training.

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[91] Canadian Veterinary Medical Association, “Canadian Veterinary Reserve (CVR),” Presentation, /animalhealthcanada.ca/pdfs/forum-2015-presentations/3%20-%2015%2010%2029%20-%20CVR%20presentation%20to%20NFAHW%20Nov_%2023%202015_Jost%20am%20Rhyn.pdf

[92] See example here: www.canadianveterinarians.net/about-cvma/canadian-veterinary-reserve/cvr-member-training/faqs/

[93] Carin Wittnich & Michael Belanger, “How is animal welfare addressed in Canada's emergency response plans?,” *Journal of Applied Animal Welfare Science*, 11 no. 2 (2008): 125-132.

[94] John Drake, “The Canadian Veterinary Reserve: The CVMA’s Animal Emergency Response Team,” *Canadian Veterinary Journal*, 49 no. 5 (2008): 433-436.

The CVR recognizes the vital role of veterinarians who play a major role in supporting producers during normal times and in disasters. A veterinarian described his profession as essentially “trusted advisors on the farm,” providing care to both the animals and producers. With this comes a lot of responsibility, especially in a changing climate and threats of emerging diseases. Therefore, veterinarians have a major role in disaster management on a farm, including assisting in pre-disaster planning, and responding to disasters providing care and if necessary, euthanasia.

During the Abbotsford floods, the CVR was ready for deployment, as confirmed in an interview. However, the B.C. government did not request their assistance.[95] Similarly, during the 2021 fires, the CVR was on standby but was not requested. Ultimately, it is the provincial government's decision to request the CVR’s assistance but without transparency, people are left wondering why they were not mobilized (*See Recommendation - Support, Promote, and Institutionalize Animal Emergency Task Forces*). This highlights a gap in communication between primary responders and the government. We learned in our interviews that the additional support from the CVR would have been well received. Reflecting on how the CVR is activated, the organization is exploring alternative pathways for the reservists to be deployed, such as by collaborating with producer groups.

A tractor and chicken barn sit partially submerged in floodwaters in Abbotsford, B.C.
Nick Schafer / We Animals Media

[95] Canadian Veterinarians of British Columbia, “Quick Convos: Dr. Megan Berman and Ms. Covey Van’t Haaff re. Emergency Flood Response,” *CVBC*, November 23, 2021, www.cbc.ca/quick-convos/#elementor-action%3Aaction%3Dpopup%3Aopen%26settings%3DeyJpZCI6IjIyNjYyIiwidG9nZ2xlIjpmYWxzZX0%3D

Provincial and Federal Government Disaster Frameworks and Resources

Canadian provinces and territories are required to establish detailed structures and processes to respond to climate disasters and emergencies, rooted in provincial statutes and legal requirements. The Emergency Management Framework for Agriculture in Canada serves as the guiding document for provinces and territories to draft their own frameworks.[96] The primary legislation in the province is called the British Columbia Emergency Program Act that was last updated in 1993. In 2018, the Province adopted the United Nation's Sendai Framework for Disaster Risk Reduction to modernize emergency management. Following this, the Province organized public and community consultations to discuss the future of emergency management. The working paper, Modernizing BC's Emergency Management Legislation provided a framework for consultation. From this extensive consultation process, the theme of animal welfare came up. In their consultation summary report, the BCEMC acknowledges there is a need for the legislation to address animals including companion animals, captive animals, and farm animals.

B.C. introduced Bill 31, the Emergency and Disaster Management Act, in October 2023 to replace the existing Emergency Program Act. The proposed law seeks to address gaps, and shift from focusing on emergency response to emergency management and introduces key concepts such as co-management and institutionalizes the role of volunteers which aligns with the needs identified in our research project.

Some highlights from the act that consider animals include:[97]

- 52 Emergency management plans:
    - 52 (2) (f) measures to mitigate any adverse effects of an emergency; (ii) vulnerable individuals, animals, places, or things;
    - 52 (3) Local authority must (a) include a plan for the evacuation and care of individuals and animals in the area within the jurisdiction of the local authority,
- 68 Minister may make an action under this section:
    - 68 (3) (d) providing emergency resources or the use of land, including respect to individuals and animals evacuated from another jurisdiction and personal property removed from another jurisdiction;
- 77 Evacuations and removals:

[96] Government of Canada, "Emergency Management Framework for Agriculture in Canada," *Government of Canada*, 2016, agriculture.canada.ca/en/sector/animal-industry/emergency-management/framework
[97] Government of British Columbia, "Modernized Emergency Management Legislation, *Government of British Columbia*, October 3. 2023, www.gov.bc.ca/gov/content/safety/emergency-management/emergency-management/legislation-and-regulations/modernizing-epa

- 77 (1) the minister, may, by order, do one or more of the following in relation to any area to which a declaration of a state of provincial emergency applies: (b) authorize the evacuation of individuals or animals, from the area
- 77 (2) if the minister makes an order under subsection (1), the minister may arrange for (a) the adequate care and protection of evacuated individuals, or animals

The Act has passed first, and second reading and at time of writing, is undergoing committee review. It is important to follow this bill's progress in parliament.

In the next section we will highlight three key policy tools and evaluate their relevance to producers, and effectiveness during disasters. We will look at (1) the Livestock Relocation Policy; (2) AgriRecovery; and (3) B.C. Industry-Specific Guidelines and Handbooks.

The Livestock Relocation Policy

The Livestock Relocation Policy is a provincial policy triggered during an evacuation alert stage[98]. The policy once activated allows farm businesses or local governments that relocate farm animals during an evacuation alert to receive financial support for expenses incurred related to transport, feeding, housing, and managing mortality if applicable. Producers are prompted to address a series of questions before relocating their animals, including:

- What is the status of your insurance?
- What are the pros and cons of relocating or sheltering in place?
- Is it possible to send animals to processing early?
- Have you consulted your veterinarian on relocation risks for animal health?
- Where would you relocate your names too?
- Identify and map out the access and egress routes.

Underscoring each of these questions is concerned about animal welfare. The policy states, "[a]ny relocation plans and actions during an emergency must also include consideration of the welfare of animals at risk, i.e., suffering that would be incurred by abandoned animals". However, in our research we learned that this policy is best understood as a fund rather than a policy as it lacks teeth to require producers to relocate animals.

We submitted a Freedom of Information (FOI) request to the B.C. government to learn more about the policy and its relevance during the floods and fires during July to August 2021 to compare.[99] The main takeaways from the report were that:

(1) Dairy and beef producers were the primary beneficiaries of this policy with less than 50 pigs and birds being subject to this policy;

[98] Emergency Management BC, "Policy 2.01 Provincial support for Livestock Relocation during an emergency, "Emergency *Management BC*, 2016, www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/policies/201_provincial_support_for_livestock_relocation_policy.pdf

[99] See FOI Request - AGR-2022-21591 or www2.gov.bc.ca/gov/search?id=9199E7BC9682482EB9EA0B6D6B8D386C&tab=1&q=livestock+relocation+program

(2) Many producers opted to permanently relocate their animals to an auction yard or processing plant due to the loss of rangeland and/or housing infrastructure;
(3) At times, animals were temporary relocated to transport vehicles as it removed them from floodwaters, however, as transit routes were limited, they remained in-place, but elevated in the liner;
(4) The Emergency Management BC will consider extending this policy to support animals sheltering-in-place;
(5) Many of the requests were submitted by local emergency management representatives for multiple farms at once as well as individual producers.

The policy seems to be most often applicable to cows, sheep, and horses and not pigs or birds (*See Recommendation - Mandate Relocation Planning and Implementation for Farm Animals*). This tracks on our other research findings that highlight how species are differentially valued during disaster situations. Another concern reflected in the notes found in the request forms is how the policy is triggered. Currently, it is only active once an evacuation alert or order is issued. This may de-incentivize producers to relocate animals in anticipation of an evacuation alert or order as the reimbursement is only triggered once the evacuation is declared.[100]

AgriRecovery

AgriRecovery is the disaster relief framework for rapid response, filling gaps not covered by existing programs, and addressing animal welfare concerns. This framework involves a coordinated effort between federal, provincial, and territorial governments to respond quickly to disasters. In the aftermath of the 2021 floods, a $228 million recovery package, the 2021 Flood Recovery Program for Food Security, was announced. The program includes four main areas that are not covered by existing government programs or private insurance: (1) Clean-up, repair and restoration of land, barns and animal shelters, as well as water and waste systems; (2) Repair of uninsurable essential farm infrastructure and on-farm structures such as containment fences; (3) Animal welfare, replacement feed, transportation and veterinary care; and (4) Loss of perennial plants not raised for resale, such as blueberry plants. The recovery program's deadline was pushed to June 1st, 2022, for primary disaster costs, and a second deadline of August 31, 2022, for secondary disasters. For example, if a cow did not reproduce in the Spring following the flood, and you sent her to market, you could claim that loss of income.

B.C. Emergency Management Industry-Specific Guides

As part of the Growing Forward federal-provincial-territorial initiative, the province of B.C., in collaboration with industry associations, developed industry-specific guides to assist producers in

[100] See for more information emergency.rdos.bc.ca/

preparing for and mitigating the impact of emergencies on farms".[101] These guides provide valuable insights into various farm emergencies, offering strategies in risk management, business management, and general preparedness, including creating and posting emergency maps.

Despite these guidebooks posted online, most producers do not consult them. The primary reason is because they are not that helpful, and too generic. Most guides we have seen in the US and Canada are applicable to small-scale extensive producers, yet they are written to and directed toward large-scale intensive producers. However, based on our interviews with producers and other agricultural workers, many, if not all, mentioned that these guidebooks are not read by producers. Additionally, these recommendations primarily address management within the existing system, overlooking the evolving emergency management needs in a changing climate.

A dairy farm sits just above the floodwaters in Abbotsford, B.C.
Nick Schafer / We Animals Media

[101] Government of British Columbia, "Emergency response plans and roles," *Government of British Columbi*a, n.d., www2.gov.bc.ca/gov/content/industry/agriculture-seafood/business-market-development/emergency-management/emergency-response-planning

Responses during the Abbotsford Floods and Secondary-Disasters

According to the British Columbia Local Authority Emergency Plans produced by the BC Ministry of Agriculture producers have four options: (1) shelter-in-place; (2) move animals to a safe place on-farm; (3) relocate animals off-farm; or (4) release animals.[102][103]

In our interviews, we explored these four options and discovered that there were built-in limitations. For example, more often than not shelter-in-place (option 1) often remains the only feasible option for pigs, chickens, and turkeys, even though barns might not offer 'sufficient protection'.[104] It was explained to us that pigs, chickens, and turkeys were not eligible for option 2, 3, or 4 because of concerns related to *biosecurity* and *confinement*. A veterinarian explained that the dairy and beef industries do not consider biosecurity as a "primary pillar of their management strategy" which enables movement between spaces and other herds, making options 1,2,3 or 4 possible - including options to relocate them to other sites or to market early. In contrast, for pigs, chickens, and turkeys, biosecurity is a primary concern, leaving very few viable options besides keeping the specific flocks or herds in their confinement barns. In fact, a pig veterinarian said that "moving animals off-site to another hog farm, then bringing them back is worse than not at all".

Further, the prevalence of confinement farms present a significant spatial challenge. It was described to us by an Abbotsford veterinarian:

> Confinement barns, they're groups of rooms and pens and animals are very difficult to move in mass and to trailer them and load them and know, unfortunately, do things happen. Number one is logistically it's just a challenge as an individual animal. You know, they're just tough to move. We still have a large number of sows in stalls. Unfortunately, moving animals to a large extent is not possible.

In the context of B.C., evacuation is synonymous with 'relocation'. It is estimated that around 6,000 cows were eventually relocated during the emergency; however, it is not clear at which phase of the emergency the relocations occurred. Worth noting that according to the literature, cow producers experience fewer losses from drowning during floods because they tend to take immediate action to save animals compared to other farm animals.[105] This was confirmed in the media with numerous news stories reporting the heroic undertakings by the agricultural community as well as those who

[102] BC Ministry of Agriculture, "Template Agriculture Appendix for BC Local Authority Emergency Plans," *Government of British Columbia*, 2017, /www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/farm-management/emergency-management/relocation/900600-5_local_gov_em_plan__ag_appedix_template.pdf

[103] Image 2: From the B.C. Emergency Handbook

[104] Chaidate Inchaisri et al., "The effect of a catastrophic flood disaster on livestock farming in Nakhon Sawan province, Thailand," *Tropical animal health and production*, 45 no.4, (2012): 917-922.
[105] Gaviglio et al., "A theoretical framework to assess the impact of flooding," 1586.

were in support roles such as the Canadian Armed Forces, local sports teams, and other community members who moved cows by boat and other aquatic vehicles.[106]

Relocation efforts are supported by a policy called the Livestock Relocation Policy (LRP), one of the few policies that consider farm animals during a disaster. However, the LRP should be thought of as a fund rather than a policy. Once an evacuation alert or order is issued, the policy is triggered, and any producer relocating farm animals can apply for reimbursement for costs associated with relocation, temporary housing, feed, and if applicable, mortality management if the animal dies. For example, a farm with 420 cows consolidated them into a single barn that meant for at most 120 cows, creating conditions for poor welfare.

The relocation efforts also highlight the differing valuation systems between and within species. For example, Abbotsford mayor Henry Braun stated: "[m]any of those calves, like this [motions height with hand] with three to five feet of water, those calves drowned. They couldn't get them out".[107] When it comes to relocating pigs, we discovered there was a single attempt to move them. However, after recruiting 14 workers, the waters encroached and the effort had to be abandoned leaving thousands of pigs to drown.[108] Regarding relocation of chickens and turkeys, it is generally discouraged due to biosecurity measures. Nevertheless, there were a few efforts to relocate birds when possible. The Canadian Armed Forces,[109] for example, assisted in relocating birds on a single farm. The birds were on the second story, having avoided the immediate flood unlike the birds on the lower story who had drowned. However, it remains unclear where these birds were being relocated; it is likely that they were sent to a processing plant.

Having explored the feasibility of these options, we gained a better understanding of the Abbotsford response. For example, it was the beef and dairy industries who were able to make interventions, such as relocation, during the disaster. Based on our research, we can assert that pigs and birds were left to shelter-in-place due to the zoonotic risks, logistical challenges associated with moving thousands of animals, many of which live in crates (e.g., gestation crates), as well as how they are economically valued, leading to a vulnerable state where it is "cheaper to let them drown".[110]

Efforts to Reduce Secondary Disasters for Farm Animals

After the disaster event, there are days and weeks in which secondary disasters could occur, making getting food, fuel, and water to animals vital. Following the flood event, much of the feed and water

[106] CBC News, "Canadian Armed Forces help rescue thousands of chickens from flooded B.C. farm," *CBC News*, November 20, 2021, www.cbc.ca/news/canada/british-columbia/canadian-armed-forces-forces-help-rescue-thousands-of-chickens-from-flooded-b-c-farm-1.6257242
[107] Megan Devlim, "Thousands of animals dead at flooded BC farms, more expected to perish, *Daily Hive Vancouver,* November 17, 2021, dailyhive.com/Vancouver/bc-flooding-farm-animal-deaths?auto=true
[108] Staley, "How livestock is getting caught in the climate change crossfire," 2022.
[109] CBC News, "Canadian Armed Forces," 2021.
[110] Thomas Walkom, "Smaller farms could help animals survive climate emergencies," *Toronto Star,* November 25, 2021, www.thestar.com/opinion/contributors/2021/11/25/smaller-farms-could-help-animals-survive-climate-emergencies.html

became contaminated, leaving animals in a fragile position.[111] Multiple efforts from community members and industry associations worked together to source, secure, and transport available water and feed to animals. For example, it was explained to us by an animal rescue worker that dairy cows do not "do well after 12 hours…and that if a dairy cow is without water for 24 hours…you know, the mortality rate shows through the roof". Devon shared his experience of being a water hauler and animal transport worker during the floods, working at times over 40 consecutive hours. He recounted a story of a cow producer who was preparing to shoot his cows, however, upon seeing Devon with a water tank, he instead embraced him and started crying. There were also numerous stories of producers and community members hand-feeding cows as they stood in contaminated flood waters. There was another story of four tons of feed being airdropped to a farm in Abbotsford housing 4,000 pigs.[112]

As for the chicken and turkey industry, despite being less vocal in the media compared to the dairy and beef associations, the 5 boards collaborated in the Emergency Operations Centre (EOC) that made internal decisions on how to move water, feed, birds, and eggs.[113] Previously established to respond to disease outbreaks such as avian influenza, the EOC was able to mobilize quickly. Within their mandate, they could distribute resources such as water easily as the ECO had pre-existing distribution lists. In an interview, an organic producer and retired disaster response specialist who served on the ECO shared that the greatest challenges were related to how information was shared between different levels of the EOC teams. She said that. "[i]t was a challenge not having all the information and it became more complicated as more layers of government became involved in the response…Decisions were being made and it was a top-down structure. By the time we were informed of the decision, we didn't have any input into the decision-making process. We weren't able to point out ways the decision could be altered to be more of a win-win for the government and industry."

Mortality Management

Acknowledging loss of life involving at least 628,000 birds, 12,000 pigs, and 428 cows raises critical questions about how their mortality was managed. Proper mortality management is important; if mishandled, it can contaminate groundwater, emit methane, or even spread pathogens.[114][115] Following the floods, mortality management was discussed in the media positioned as a success story of different companies coming together to tackle the mass mortality event. These networks and

[111] These same challenges are faced by farm animal sanctuaries, See Recommendation - *Support Farm Animal Sanctuaries in Canada During Disasters*
[112] Michele Brunoro, "Military joins efforts to rescue animals in Abbotsford flood zone," *CTV News*, November 20, 2021, bc.ctvnews.ca/military-joins-efforts-to-rescue-animals-in-abbotsford-flood-zone-1.5674984
[113] Kate Ayers, "Farmers step up in emergency operations," *Country Life in BC*, February 1, 2022, www.countrylifeinbc.com/farmers-step-up-in-emergency-operations/
[114] Important to note is the argument of biosecurity was used as to why pigs and poultry were not relocated yet the problem persists with mortality management. It could be argued that there is more confidence in biosecurity in mortality management strategies than there are with relocation strategies based on the number of resources and research invested in mortality management.
[115] Food and Agriculture Organization of the United Nations, "Carcass management for small and medium scale livestock farms," *FAO*, 2018, www.fao.org/documents/card/en/c/CA2073EN

relationships pre-date the floods as concerns raised in the 2000s with avian influenza, and most recently the COVID-19 pandemic necessitated mortality management strategies.

However, several problems arose during the floods in responding to mass mortality. For example, bovine losses present a unique challenge due to mad cow disease. The Canadian Food Inspection Agency (CFIA) requires the specific risk material including brains, eyes, and parts of the small intestine of a cow, to be separated from the rest of the carcass and permanently destroyed. The first problem during the floods was that there were no permitted rendering facilities in B.C. In a normal situation, B.C.'s bovine carcasses are sent to the West Coast Reduction facility in Calgary in the neighboring province of Alberta. However, due to road closures, the 428 cows reported to have died during the floods were sent to an undisclosed landfill in B.C.[116]

Turning to the chicken, turkey, and pig losses, despite pre-existing relationships, the challenge of navigating active emergency companies made it impossible to access the carcasses for sometimes 2-3 weeks, removing the option to render them as "even inedible meat has an expiry date".[117] In B.C., rendering is handled by one company, West Coast Reduction. West Coast Reduction has two plants: one in the lower mainland Vancouver that handles chickens, turkeys, pigs, and fish and the Calgary facility handles bovine.

Upon assessing the carcasses, it was determined that the majority of carcasses were too decomposed, so they were sent to a transfer station in Sumas Way before being diverted to nearby stockyards for composting. Chicken mortality was predominately managed by the British Columbia Chicken Association and West Coast Reduction stepped in to organize the management of pig carcasses. Although West Coast Rendering was not able to salvage more than 175 tons of dead pigs for their own facility, they were able to offer their transportation vehicles and help transport carcasses to landfills, and compost sites.

The clean-up logistics were challenging beyond timely pick-up. Producers and others tasked with clean-up floated animals out of farms while the flood waters remained. One participant told us that "hogs looked just like footballs," and birds similarly floating and swollen in the water. In another clean-up story at a hog farm, after the floodwaters receded, workers had to move all 14,000 pigs to trucks to be hauled away, which took over ten days. In situations where animals were outside of confinement barns, he said that they used similar techniques used during an oil spill to contain and collect the bodies.

There was a particular mortality management story that made it into the media. Net Zero Waste Eastgate Facility was one of the companies contracted by West Coast Reduction to compost a "huge amount" of carcasses estimated at over 10,000 pigs weighing over 700 tons filling 17 water-tight

[116] Winston Szeto, "Thousands of carcasses of pigs drowned in B.C. floods pose no threat to environment, composting plant says," *CBC News,* January 26, 2022, www.cbc.ca/news/canada/british-columbia/net-zero-waste-pig-carcass-princeton-1.6329158
[117] Grace Kennedy, "Thousands of animals died on Sumas Prairie," 2021.

trucks.[118] The facility is located along the Similkameen River.[119] The timeline of processing 10,000 carcasses is roughly a year, and will produce soil additives, oils, and proteins. The Similkameen Indian band was concerned and sent a letter of complaint[120] to the town of Princeton upon finding piles of uncovered carcasses[121] adjacent to the river on December 10th.[122][123]

In the letter they wrote, "[i]n addition to the massive number of dead animals, we also found that leachate and contaminated water was flowing directly from the facility into the receiving environment near the Similkameen River. Materials on site appeared to be in excess of the 5,000 tones of compost per year authorized, and much of the material was located on bare ground, off the cement pads that are the required deposit location for the processing of compost material".[124] The Ministry of Environment investigated the facility and found that the company was out of compliance with 12 regulations of the Environment Management Act. In the report, they detailed how of the 17 truckloads of pig carcasses, 3 truckloads were dumped on gravel instead of the required cement pads.

Responding to how mortality management was handled following the floods, Doug Davidson, the operation manager of West Coast Reduction, sees the need for more attention and resources to be made available so issues like what happened at Net Zero Waste Eastgate Facility do not happen again. From his perspective, with the increase in frequency and intensity of extreme weather events due to climate change, B.C. has to invest in and develop the capacity to handle mass mortality events.

Agricultural Waste

In Fraser Valley, millions of farm animals are kept in confinement barns with waste stored directly below or adjacent to the barn in an open-pit lagoon. During disasters, there is an elevated risk for waste to overflow or breach into the surrounding communities, raising environmental and public health risks. It was explained to us that before the floods, producers had just finished spreading manure on their land. Devon, a community member described the situation as "shit timing… the whole prairie was covered in a layer of shit. It could not possibly have happened at a worse time". We learned that producers, in a desperate attempt to mitigate the damage began filling their waste tanks with flood water during the early stages of flooding.

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[118] CBC News, "B.C. First Nation worried about environmental impact of livestock killed in floods," *CBC News video*, www.youtube.com/watch?v=33W0YXoJQmE
[119] Szeto, "Thousands of carcasses," 2022.
[120] Town of Princeton, "Agenda," January 17, 2022, princeton.civicweb.net/document/49872/ (see 35-36)
[121] Imagine 3,4. Pig carcasses from the Abbotsford Flood exposed near the Similkameen River were captured by an anonymous photographer, who submitted the graphic photo to community media outlet Castanet.
[122] Casey Richardson, "'Like a horror movie': Thousands of dead pigs left dumped and decomposing at Princeton-area compost facility spark environmental concerns," *Castanet*, January 18, 2022, www.castanet.net/news/Penticton/357266/-Like-a-horror-movie-Thousands-of-dead-pigs-left-dumped-and-decomposing-at-Princeton-area-compost-facility-spark-environmental-concerns
[123] It is worth it to note that this community has had ongoing issues with this facility, and in the letter asked for the town of Princeton to remove the permit entirely for Net Zero Waste.
[124] Town of Princeton, "Agenda," 2022.

The concern extends beyond animal waste. Farms also store fertilizer, gasoline, and other chemical products that are vulnerable and can seep into the floodwaters.[125] There was a general lack of discussion about the consequences of agricultural waste or on-farm pollution following the disaster.[126] However, on December 4, 2021, the Ministry of Environment and Climate Change Strategy issued an order requiring producers to report liquid manure overflows, disposal of milk or if the farm was temporarily housing relocated animals, leading to increased manure production, in an attempt to document the extent of such practices and impacts[127]. Reflecting on how waste and potential pollution sources were handled, our participants emphasized the need for environmental research to be conducted following the floods, a gap that continues to exist today (*See Recommendation - Support Research that Examines Environmental and Animal-related Secondary Disasters*).

Comparing Vulnerability between Production Systems: Intensive vs. Extensive

Within our report we have drawn attention to the impacts of the floods and resiliency of intensive and extensive production systems. In this section, we will compare intensive and extensive production systems highlighting the strengths and challenges of each.

Evacuating such vast numbers of animals become nearly impossible due to logistical constraints, including the need for extensive transport, supplies, and personnel. In the intensive production industry, where barns are kept at maximum capacity for just-in-time production (discussed in detail below), there is little room to move animals, as barns are kept full and at capacity to maximize profit. This makes it difficult to address their welfare when faced with immediate threats like flooding. Moreover, the rapid growth of the animals means that within 3-5 days, they outgrow the barns, creating a time-sensitive crisis in the event of road closures resulting in secondary-disasters.

Intensive operations also pose secondary disasters such as mortality management and waste management. For example, large-scale losses of farm animals can overwhelm existing disposal methods, leading to environmental hazards and public health concerns. In cases of significant loss in intensive production, mortality management can also become a major issue, with buried animals threatening groundwater, incineration threatening air quality, and rendering not an option for non-fresh carcasses. This has weighed heavily on producers' minds leading to mental health issues for producers and their families. In an interview with a producer, they said, “intensive farms should have a way to euthanize these poor animals, such as a CO_2 switch in the barn. You can’t evacuate that

[125] Cloe Logan, “After floods, oil slicks, human and animal waste,” *National Observer*, November 19, 2021, /www.nationalobserver.com/2021/11/19/latest-news/after-floods-oil-slicks-human-and-animal-waste
[126] Elizabeth McSheffrey, “Liquid manure from B.C. floods may have contaminated some lower Mainland wells,” *Global News*, December 5, 2021, globalnews.ca/news/8426870/liquid-manure-warning-bc-floods/#:~:text=The%20B.C.%20government%20is%20warning,the%20Health%20Department%20on%20Saturday.
[127] Government of British Columbia, “Email: Order to provide information related to risk of liquid manure overflows,” Government of British Columbia, December 4, 2021, www2.gov.bc.ca/assets/gov/environment/air-land-water/spills-and-environmental-emergencies/docs/forms/2021-12-04_aem_code_section_80_information_order.pdf

many animals that quickly. Don't encourage or allow people to build massive hog and poultry confinement operations in a lakebed, or if you do, provide them with a way to euthanize them. The loss of that many animals is heartbreaking and unethical".

Finally, the size and concentration of animals can create a waste management issue on a daily basis, which is exacerbated during a flood. For instance, with 214,000 pigs in B.C., you are looking at over a million gallons of waste produced each year, which is then flooded into local communities creating public health issues, threatening soil and water health, and negatively impacting local wildlife. These harms disproportionately impact Indigenous communities in the region (*See Recommendation* Campaign on the Link Between Farm Animals, Humans, and the Environment).

In contrast, extensive farm production offers flexibility and resilience in the face of disasters. These producers can move animals to safer locations on their properties and adapt their housing and infrastructure more easily to mitigate risks. Operating on a smaller scale allows for more manageable evacuations, and their animals, accustomed to outdoor conditions, handle novel environments better. In addition, where intensive housing is fixed, extensive systems have the ability to move, shift, and fortify housing to help farm animals be resilient in the face of flooding, fires, and extreme heat. For example, huts can be moved to higher ground; they can be shifted to create more shade or to better protect from wind and rain. While intensive systems are dependent upon electricity for ventilation and some feeding systems, extensive systems are not.

Finally, with extensive management, the animals themselves can help create more resilient systems. For example, the hogs at Blue Sky Ranch in B.C. are moved to areas where brush has accumulated. They not only remove the combustible brush but also create firebreaks in the landscape - a gap in vegetation that acts as a barrier to slow or stop the progress of a wildfire. Extensive production is adaptable and resilient which is increasingly becoming important in disaster-prone regions like B.C.

Just-in-time Production

A just-in-time production system is standard in intensive production systems. It creates a vulnerable and less resilient system or group of animals because of the lack of flexibility when stoppages occur. In a just-in-time system, for example, intensive hog producers have a 3–5-day window before the animals in the system literally outgrow the space, they are in. Therefore, if a climate disaster closes roads for one week, you have animals that can no longer physically or humanely live in the space for 4-6 days. If a processing plant closes due to Covid-19, another infectious disease, or due to a climate-related event, such as a flood or fire, you may have animals that can no longer physically or humanely live in the space for several weeks. As a result, producers have to manage animals who are suffering, regularly remove deceased animals, or euthanize them in less-than-ideal conditions, where they may not have the most humane methods for euthanasia available. This results in unnecessary animal suffering and may result in poor mental health outcomes for producers.

Flexibility with space and time is key for resilience in farm animal production, particularly in a changing climate, changing political landscape, and the threat of disease-related shutdowns. In extensive production with outdoor access, the additional space provided by the required outdoor paddock can double the square footage of a production system. This additional space makes farms and farm animals more resilient during disaster-related stoppages, such as road or processing closures due to Covid-19 and climate events. Animals can continue to grow and live in place humanely, for up to two weeks in the case of 3Gen Organics in Wallenstein, ON, though reduced space will result in welfare issues the longer the stoppage is.

Resiliency of Extensive Production Systems

An organic producer, Brett Israel of 3Gen Organics in Wallenstein, ON, has a long history of farming pigs with his family, and they have done so with small herds outdoors, then intensive production, and now organic production in Ontario. Israel met the outdoor requirement but did not think it would impact his hogs, but he was proven wrong. Quantitative data he has collected over time has shown that his pigs' rate of gain has improved, and his rates of death and disease have reduced significantly. Once his piglets are weaned, his mortality rate is zero, which is impossible in conventional intensive production.

Daily observational data has shown his pigs to be less stressed, with fewer instances of fighting and with increased displays of natural behavior, such as wallowing and engaging in positive social interactions. A reduction in stress enables animals to be more resilient in the face of extreme weather and disease. In Israel's case, in the extreme heat of the last two summers and with the Porcine Reproductive and Respiratory Syndrome (PRRS) outbreak, he has experienced zero deaths, which his vet says is not the case with his conventional counterparts. With regular outdoor access, not only has stress been reduced, but respiratory health has improved due to a decrease in exposure to ammonia and other aerosolized particles. Israel has seen a push for barn scrubbers to improve indoor air quality and reduce ammonia while keeping hogs confined entirely indoors. Alternatively, he aims to build his animals' immune systems through daily outdoor exposure and by reducing stress through increased space, outdoor access, and the ability to engage in species-specific natural behaviours.

In some organic, extensive, and other farms, producers grow their own feed. This has several benefits:

a) The nutrient cycle can be a closed loop, with animal manure providing nutrients to crops, and those nutrients being removed through animal consumption of those crops. Feed shipped in can create nutrient imbalances and associated water pollution that negatively impacts humans, animals, and the environment.

b) Farming techniques can store carbon in the ground and reduce or eliminate pesticides for growing animal feed. These efforts and initiatives are growing in Canada, and if welfare actions can be linked, initiatives that reduce GHGs, store carbon, and support animal welfare can be funded.

c) Quantitative and observational data from Israel's farm has shown improved health outcomes from his feeding of hay and small gains, including reducing the need for a dewormer, reduction in cases of mastitis, and improved enrichment with the pigs enjoying the diversity of food.

d) During climate and disease-based disruptions (e.g., road closures), pigs have regular access to feed. Rotating the crops on site has made the land and crops more resilient to extreme weather, such as drought, which has been documented both by Israel and by other producers.[128]

Israel's pigs have the ability to choose to be outside or inside. The inside of the barn has concrete slabs covered with hay instead of slatted floors. Their waste mixed with hay creates a cooling effect. In hot weather, the pigs stay outside in the early morning, evening, and overnight. The empty barn keeps it cooler when the pigs do use it during the hottest part of the day. Israel located the outdoor pen to get morning sun and afternoon shade to better manage extreme heat. The extra space and outdoor environment are key to managing extreme heat and to animal wellbeing. The barn shades the outdoor pen in summer, and in the winter, they create a wall with bales of hay to keep the wind-down.

Israel located the barn on their property where the natural infrastructure offers protection against flooding. In addition, they have added catch basins, drainage, and invested money into drainage around the farm. They have a generator that can run for 10 days. It was all expensive, but it was effective and worth it to address flooding concerns. He likes the idea of critter pads where the animals could be moved to the elevated ground, and it would work with his pigs who are used to being outside but might stress pigs raised in indoor confinement.

Processing Capacity: A Barrier to Extensive Production

A significant increase in local processing plants will enable extensive and organic production to thrive, enabling welfare-centered and climate-resilient producers to continue and grow. According to several producers and an agricultural economist in B.C., meat processing, like production, has become centralized and concentrated in ownership. Brett Israel, an organic hog producer in Wallenstein, ON, explains that there used to be 7-8 processors in his area, and now there are two. The limited number and scale of operation impede the business success of smaller-scale extensive and organic farms (*See Recommendation - Support the Development of Small-scale Processors*).

[128] See the case study www.google.com/url?q=https://understandingag.com/case_studies/dark-branch-farms

Demand for humane and sustainable meat and co-producers is significant, but each producer we spoke to said they couldn't meet demand due to the lack of small-scale processors. Organic and extensive producers most often have smaller herds and flocks of animals because of management practices that ensure and enable positive animal welfare, environmental sustainability, and climate resilience. Producers like Israel are looking to process 30-50 pigs at a time, but the two major processing plants will only accept producers with around 30,000 animals. With the limited number of small-scale producers and a lack of access to industrial ones, producers like Julia Smith of Blue Sky Ranch in South Cariboo in the Interior of B.C., have to book the processing of her animals 18 months in advance, and she has to keep her numbers small.

This means that her business cannot grow, and she lacks the flexibility she needs to be resilient in the face of changing climate and other conditions. In an interview, Julia Smith explained, "If we want to see a significant increase in farm animal welfare, reduce greenhouse gas emissions, store more carbon in the soil, reduce pollution, and have more resilient food systems, then we need to see structural support for extensive, welfare-centered production. Increasing the number of small-scale processors is one way to do this. Without these, we (extensive producers) cannot continue to farm". The producers we spoke with, as well as associated farm organizations, want the opportunity to grow to be able to compete in a market where intensive production systems currently dominate. They want to be able to create a model that can scale up to serve as a real and regular alternative to intensive production. They cannot do this without the ability to process their animals regularly, at a scale that meets their needs, at an appropriate regulatory scale, and at a price that is reasonable. It is important to note that in order for this system to make an impact, there has to be a significant reduction in meat and dairy consumption (*See Recommendation - Support Plant-based Production*). Otherwise, as these systems develop and multiply, they will be an addition to industrial farming, rather than a substitution.

In preparation for an extreme climate event, such as flooding, producers may choose to process their animals early so that they better manage the safety and welfare of fewer remaining animals and their staff during a disaster. Having more processors also helps address welfare issues post-climate events. During the B.C. floods, the roads were closed for weeks, preventing producers from accessing processors. Having more local, small-scale processors would mean that producers, extensive and intensive, would have options to process their animals in the event of a climate disaster or disease outbreak. With intensive operations using just-in-time production, they literally run out of space for their animals within 3-5 days. This created significant welfare issues that were well-documented during the pandemic and during the B.C. floods. Having more processors could make production systems more welfare-friendly and climate resilient by enabling the success and growth of extensive production systems and by increasing producers' access to processors during and after a climate disaster or outbreak.

Recommendations for World Animal Protection

In this concluding section of the report, we present 15 recommendations based on our extensive research and consultations with participants. Each recommendation addresses specific issues identified during our research and elucidates how its implementation could enhance the welfare of farm animals. Recommendations are organized by four themes: (1) support efforts to reduce the impact of climate-related disasters on farm animals; (2) support efforts to build disaster resiliency and capacity on farms; (3) support extensive and climate resilient agricultural systems; and (4) support efforts to document the impacts of disasters.

Please note that recommendations are not ranked in terms of priority; rather we envision each recommendation serving an integral part of a comprehensive intervention aimed at protecting farm animals in disaster contexts.

Support Efforts to Reduce the Impact of Climate-related Disasters on Farm Animals

- *Mandate Relocation Planning and Implementation for Farm Animals*

In Canada, there is no legal framework mandating producers to establish plans for relocating or rescuing farm animals during disaster. Nor, is there a legal mechanism to ensure that the plan is implemented. However, if producers do choose to relocate their farm animals, financial support is provided through the Livestock Relocation Policy. We also learned that producers follow decision-making processes that omit pigs, birds, and at times lesser-valued cows from being relocated that was reflected in the data obtained in our FOI request. These omissions present many challenges.

We recommend a revision of the Livestock Relocation Policy to address these gaps. Alternatively, efforts should be made to overcome the obstacles preventing the relocation of certain farm animals (e.g., pigs). Ensuring the safety and well-being of all animals during disasters is paramount, and comprehensive policies and actions are essential to achieving this goal.

- *Mandate Animal Welfare Protection in Disaster Risk Reduction Strategies and Funding Conditions*

Following a disaster, funding is allocated to help producers return to production as quickly as possible. However, this approach limits opportunities for conducting risk assessments, reflecting on valuable lessons, and establishing new standards that could reduce the vulnerability of both infrastructure and animals. Relief funds remove the cost burden on producers regardless of whether producers took measures to mitigate risks. Disaster funds should come with conditions, such as adherence to new codes or standards designed to enhance farm resilience.

Instead, what you see in the aftermath of the floods is an emphasis on getting producers back to production, facilitated by the B.C. Flood Recovery Program for Food Security, a $228 million cost-share program that reimburses producers without interventions to improve food security such as by implementing mitigation measures on the farm.

It is not that the government lacks interest in enhancing farm resilience. In July 2022, the provincial government introduced a new pilot project called the Extreme Weather Preparedness for Agriculture program. The pilot project invites producers to apply for provincial cost-share funding to enhance farm-level resilience to extreme weather. The fund is divided into three streams: (1) wildlife preparedness, (2) flooding preparedness, and (3) extreme heat preparedness. The pilot project will fund up to $35,000 per project, covering activities like installing fill pads to elevate farm buildings, or installing additional watering systems or barn cooling systems for extreme heat.

While these efforts are commendable, the pilot project falls short in a few areas. Firstly, it's only accessible to a select few producers who can afford to invest or access loans, potentially deepening their debt. Secondly, it treats risk management and resilient farm infrastructure as optional. Mark Siemens, a chicken producer in British Columba who had previously installed a cooling system in his barns, applied for the program stating, "in the past, we didn't need cooling in those barns at all…it's kind of this new reality. The odds are nine years out of 10, I won't need it. But I definitely want that cool air when I need it". Consequently, building resilience in one barn leaves hundreds of others vulnerable (*See Recommendation - Mandate Animal Welfare Protection in Disaster Risk Reduction Strategies and Funding Conditions*).

Extreme weather events are unavoidable, but the events of 2021 have provided a baseline for what can be expected in the future. Therefore, there is an urgent need to reduce these impacts and create more resilient infrastructure. This includes building codes and introducing legislation at the provincial, territorial, and federal. Upgraded infrastructure should be mandated, not optional if producers chose to continue farming in a flood zone, or in the changing climate.

- *Campaign on the Link Between Farm Animals, Humans, and the Environment*

In our research, we found that the government and other important actors failed to see the connection between producers, agricultural communities, and the well-being of farm animals. Literature focusing on farm animals in disaster situations emphasizes the critical importance of understanding the link between producers, agricultural communities, and the vulnerability of farm animals. These shared vulnerabilities are conceptualized through a 'One Health Perspective,' which integrates animals, humans, and the environment. For example, solutions to address environmental concerns following a disaster, such as mortality management and manure disposal can and should also address animal and human health and welfare. This includes the impact of disasters on mental health and injuries sustained during relocation efforts and the elevated risk of diseases spreading during a disaster. All of these issues point to the need to reduce farm animals' vulnerability which is directly connected to the well-being of humans and the environment.

- *Challenge the Canadian Legal Context Governing Farm Animals*

In Canada, federal regulations concerning farm animals focus on two distinct phases of their life: transportation and once at the abattoir. For matters of their day-to-day lives provinces and territories are responsible for producing and enforcing their own legislation. However, these regulations typically rely on “generally accepted activities," allowing the industry to set its own standards. Unfortunately, as the animal agricultural industry continues to grow and is at the whim of the marketplace, decisions are made more often than not for the economic interests rather than the animals' interests.

Legal scholars have found that current agricultural regulations primarily aim to preserve the value of animal-derived products and safeguard consumer health, with animal well-being an incidental concern, if considered at all. Therefore, there is a critical need for comprehensive legislation that prioritizes the well-being of farm animals throughout all stages of their lives. An essential intervention in Canadian law is necessary to curb industries’ ability to set their own standards. Instead, legislation must be implemented that genuinely serves the best interests of farm animals at every stage of their life. This change is imperative to ensure the ethical treatment and welfare of farm animals in Canada with consideration of climate change and increased risks to their lives.

- *Support Farm Animal Sanctuaries in Canada During Disasters*

Farm animal sanctuaries in Canada are exposed to the same climate and disease threats as production farms. Additionally, sanctuaries source their materials, such as feed from the same supply chains as producers. The recent 2021 floods highlighted the interconnectedness of sanctuaries and production farms. For example, during the 2021 floods, as supply chain disruption occurred, creating challenges for both farms and sanctuaries to access feed. Happy Herd Sanctuary reported a drastic increase in hay prices, soaring from $5 to as much as $25 per bale. Sanctuaries faced additional challenges as they were given lower priority compared to production farms. Faced with these obstacles, the four sanctuaries in B.C. made the decision to halt intake, agreeing that “with the future so uncertain, they dare not overburden themselves”.[129]

Recognizing these ongoing challenges, P.E.A.C.E, a registered charity formed to provide resources and education for Canadian sanctuaries, has taken proactive steps. This mission-based charity has initiated a public dialogue about sanctuaries and disasters. One major concern is the lack of resources and funding options available to sanctuaries following a disaster. P.E.A.C.E has initiated the conversation and is actively pooling together resources for sanctuaries but they will need more support in a changing climate.

[129] Nicholas Read, “How 2021’s climate catastrophes are still hurting B.C. farm animal sanctuaries,” *Vancouver Sun*, April 6, 2022, vancouversun.com/news/local-news/how-2021s-climate-catastrophes-are-still-hurting-b-c-farm-animal-sanctuaries

Support Efforts to Build Disaster Resiliency and Capacity on Farms

- *Form a Canadian Multistakeholder Alliance Working Group*

This report serves as a foundational step in collecting and synthesizing knowledge while also fostering relationships to address farm animals in extreme-weather disasters in Canada. We recommend forming a Canadian Multistakeholder Alliance Working Group. To do this, World Animal Protection is funding and hosting a multi-day, multi-stakeholder workshop in late 2023. This workshop will elaborate on two areas: (1) How to shift funding towards humane and climate-resilient farming practices; and (2) How to support a community first responder model in agriculture communities. The findings of this workshop will be shared with relevant policy makers to inform change and will be formally submitted as part of the B.C. government's consultation on its new disaster assistance regulations.

- *Develop Insurance Policies to Incentive or Reward Risk Mitigation*

The producers we spoke to were using high-welfare and climate resilient practices that reduced their risk of flooding, fires, and drought yet were paying similar rates as producers who were not. In discussing possible solutions to this issue, producers were interested in the following insurance interventions:

> (1) Receive tax breaks on property taxes if producers provide data to show they are using practices that reduce their animals, land, business, and property's risk to climate-related disasters;
> 2) Working with an insurance company to reward climate resilient practices; and
> 3) Working with the government to create a government-run insurance program for animal producers, with financial rewards for using climate resilient practices.

Producers suggested using the current Living Lab model (*See Recommendation - Collaborate on Climate Resilient Agricultural Initiatives*), where practices are deemed beneficial by producers and researchers through field trials, and the collection of data. Collaboration could lead to the development of standards that could be used by insurance companies to offer tax breaks or to reduce premiums. This type of standardization and reward could result in producers participating, which would reduce the vulnerability of farm animals to hazards and increase welfare overall.

- *Support a Community First Responder Model in Agricultural Communities*

Based on our interviews highlighting the challenges to first responders and communities during disasters, we recommend an extended model for disaster response. Producers and others working or living near agricultural production are most often the first line of care during a disaster. This model

recognizes this reality and pro-actively works to support and secure resource access for them. For example, the team could have an equipment library for use during disasters. Currently, they have to wait for the government to use such equipment, which can cause delays in crucial response efforts. While the government has a system in place, if you are not registered in their system, then you are not called. A local response is more efficient and effective as it is led by community members who know the backroads, where the water accumulates, and alternative routes. If these people were trained and enabled legally, they would make a difference in saving animals' lives. Farm communities and first responders explain that they have knowledge and resources that are being dismissed and not utilized effectively.

- *Support, Promote, and Institutionalize Animal Emergency Task Forces*

The Canadian Veterinary Reserve (CVR) was developed by the Canadian Veterinary Medical Association in cooperation with the Canadian federal government as a national response system for emergencies that involve animals. The CVR can provide animal medical diagnoses and treatment and help with associated issues concerning human health. They have technicians who will provide animal medical care and support. They will support non-governmental organizations with rescue, sheltering, daily care, and the associated logistics. The CVR has a system that is in place prior to any disaster to assist in the rapid assessment, deployment, and communication of diagnosis, treatment, medical care and support, rescue, sheltering, daily care, and logistics. We found, through interviews, that the CVR is not being called on. While it is financially supported and prepared to operate, it is not included in emergency response plans. We recommend that the CVR be included in emergency response plans at all levels to buttress the capacity for animal disaster response when needed.

Support Extensive and Climate Resilient Agricultural Systems

- *Support the Development of Small-scale Processors*

Promote the development of local processing plants or expand processing on-farm to enable extensive and organic producers to thrive. This supports the growth and continuation of welfare-centered and climate-resilient producers. Organic and extensive producers most often have smaller herds and flocks of animals as a result of management practices that ensure and enable positive animal welfare, environmental sustainability, and climate resilience. The limited number and scale of operations impede the business success of smaller-scale extensive and organic farms. Demand for humane and sustainable meat is significant, but each producer we spoke to said they could not meet demand due to the lack of small-scale processors. The Small-Scale Meat Producers Association of British Columbia is spearheading this initiative in the province.

One of the primary policy issues is that small-scale processors are held to the same regulatory standards as industrial processors. This means they have to build to the same standards. As such, to build a small processing plant in B.C., for example, it will cost 3 million dollars and, in the case of Julie Smith, it will only cover 4% of the processing needs of extensive producers in her area. Producers

need support and advocates to help match regulations with the scale and type of operations that it is serving.

Additionally, having more processors helps address welfare issues during all phases of a disaster. During the floods, roads were closed for weeks, preventing producers from accessing processors. This can lead to welfare issues such as what happens when a barn becomes over-capacitated. In animal disaster literature, a key strategy to minimizing harms to animals is to send them to market early if possible. Having more local, small-scale processors would mean that producers, extensive and intensive, would have options to quickly process their animals in the event of a climate disaster or disease outbreak.

- *Support Plant-based Production*

Numerous challenges face animal agriculture, including climate-related issues, disasters, and zoonotic diseases. In 2020, the British Columbia Food Security Task Force published a report emphasizing the need to transition to plant-based production. This shift is crucial for supporting a sustainable, climate-resilient food system that aligns with emerging market demands in the province to support a sustainable, climate-resilient food system that aligns with emerging market demand.

More support and policy incentives are needed to transition animal-based producers to plant-based producers. Similar programs have been implemented in the past, albeit aimed at mitigating disease risks. For example, the Hog Farm Transition Program (HFTP) was developed by the Canadian Pork Council (CPC) and Agriculture and Agri-Food Canada (AAFC) in 2009. The program was mandated to permanently reduce Canada's hog production capacity while supporting producers to exit the sector. Between 2009 and 2011 over 455 producers participated in this program showcasing the positive response from producers in such programs.

- *Reduce and/or Limit the Use of Confinement Housing*

One of the factors we identified in impacting the vulnerability of farm animals is the intensive confinement farming system. Confining a large number of animals inside these large-scale operations leads to several welfare issues during disaster events. For example, keeping sows in gestation crates makes it logistically challenging to release them, as well as severely limiting their mobility (e.g., sometimes sows cannot stand up). As animal agriculture continues to expand in the Fraser Valley region coupled with the updated building codes that have removed farm size restrictions, there is an urgent need to support limitations on farm sizes.

Another option would be to advocate for barns to remain empty for periods of time. For instance, chicken and turkey farms situated in the floodplains could skip the arrival of new flocks or significantly reduce their bird populations during identified flood periods.

- *Collaborate on Climate Resilient Agricultural Initiatives*

There is a significant amount of governmental, non-profit, and for-profit programming, and attention committed to farm mitigation and promoting adaptation, and resilience practices. While most of these programs do not specifically focus on farm animals, they could indirectly benefit farm animals through the management and resilience practices they promote. We have identified four key programs to consider:

The British Columbia Land Matching Program connects producers looking to retire with individuals aspiring to start a farm. Funding is administered by Young Agrarians B.C to facilitate the transfer of the land and business. Currently, there are no conditions in place to ensure the new business follows sustainable and resilient practices. Research indicates that producers are leaving the industry due to disease or climate risks. Without factoring into why a producer is retiring may prolong the vulnerability of that farmland. It would be beneficial to advocate for programs like these to factor in the retiring producer's reasons. This could lead to a re-evaluation of their participation in the program, or at least be factored into the next business operations.

Agricultural Climate Solutions (ACS) program is a $185 million, 10-year initiative aimed at developing and implementing farming practices to tackle climate change. To be eligible for the ACS program, producers are required to develop a network of partnerships within a province, including with agricultural non-profits, Indigenous organizations, and environmental groups. Launched in April 2021, the program focuses on regional collaboration hubs, also known as 'Living Labs', and offers grants of up to $100,000.

The goal is for every province and territory in Canada to have at least one collaboration hub. Each hub is set up on a farm, enabling producers and researchers to co-develop best practices. Brett Israel of 3Gen Organics, an interview participant and program participant, developed associated management practices that enhance animal welfare and climate resilience. Despite these programs not being explicitly about animal welfare, his practices are explicit goals within the program. Producers like him often lack the capacity to apply for these types of grants and could use more support from the not-for-profit sector or extention agents in their application processes.

The **On Farm Climate Action Fund,** active from August 2021-2024, emphasizes the agricultural sector's adaptation to climate change through sustainable on-farm practices, emphasizing improved environmental health and the development of a climate-resilient economy. Animal welfare should be integrated into these goals.

In March 2022 **Seed Change Initiative** received an $750,000 investment from the Minister of Agriculture and Agri-Food. This funding aims to enhance the Canadian seed system, supporting the development and long-term competitiveness of producer-bred grain and vegetable varieties for organic and climate-resilient farming. This is focused on grain and crop production. Currently, there are no programs explicitly focused on farm animals, even though this is a significant portion of the

economy. We recommend similar funding from the minister and Agri-food to support improvements to farm animal welfare and climate resilience.

Support Efforts to Document the Impacts of Disasters

- *Support a Mandatory Reporting Mechanism with Public Databases*

In our research, we encountered challenges to identify accurate numbers regarding how many animals died during the Abbotsford floods. With the mandate of a mandatory reporting mechanism this challenge could be addressed. This issue echoes concerns raised in other disaster events, such as the 2021 heatwave, and the ongoing issue of barn fires. In particular, the Humane Society International (Canada) addressed this concern in their report *Untold Suffering: The Tragic Impact of Barn Fires on Animals* (2020), recommending that fire departments should be required to report animal deaths to a centralized database. This step is crucial for understanding the full scope and impact of such incidents.

In addition, the literature on animal disasters emphasizes that welfare concerns persist in the aftermath of the disaster. Animals may need to be euthanized due to reasons such as reproductive losses, sustained injuries, compromised immune systems, and diseases among other issues. Therefore, it is imperative that the reporting mechanisms encompasses not only initial losses but also poster-disaster fatalities. This recommendation addresses a gap identified by the Food and Agricultural Organization (FAO), which pointed out the lack of comprehensive global information regarding the impacts of disasters on farm animals. By mandating a reporting mechanism that includes initial and post-disaster losses, a national and public database can be established. This will support a more transparent, and accurate representation of the extent of the impact of disasters on farm animals. It will also help Canada meet its commitment to the UN Sendai Framework for Disaster Risk Reduction in terms of monitoring progress in reducing the loss of livelihoods and productive assets, including ‘livestock, working animals, tools and seeds’.

- *Support Research that Examines Environmental and Animal-related Secondary Disasters*

During our research, we found it challenging to understand the environmental impacts of the flood for example, the British Columbia Health Department issued warnings that the 300 or more private wells were likely contaminated with human and animal fecal matter, disposed milk, or other chemicals. Further, there were concerns about the impact on soil and future croplands. A study completed in 2018 found that flooding negatively impacts ecosystem services underscoring the urgent need for environmental impact research to follow disaster-events. Supporting required research will yield the necessary data to generate knowledge crucial for shaping policies at protecting wildlife and the environment in the aftermath of a disaster. These policies, in turn, can have indirect positive impacts on farm animals.

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