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Stress and Resiliency among Confined Animal Producers

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Livestock producers manage several challenges, including business risks, financial risks, strategic risks, responsibility for animal welfare, and environmental stewardship (Purdue University Center for Commercial Agriculture, 2022). Business risks include adverse weather events, disease, price and market risks, and legal risks. Financial risks include costs of production, operating capital, and loan conditions. Strategic risks are external risks that include macroeconomic factors such as inflation and consumer confidence, changing trends among consumers, and policy changes. Producers face stressors every day as they navigate these risks for their operation. In addition to the business, financial, and strategic risks listed, livestock producers also face financial, physical, emotional, and multifactor stresses relating to production professionally and personally. Each time a person is placed under stress, they need time to process and recover from that stressor. The ability to effectively recover from an adverse event or stressor is referred to as resiliency.

While all livestock producers face many stressors and can take actions to enhance resiliency, confined animal feeding operation (CAFO) producers face additional stressors relative to extensive or smallholder livestock producers. CAFO producers often work in intensive and complex production systems that require precision and exact timing. Legal actions, new policy, and catastrophic events can result in large damages to the operation and domino quickly. Policy changes affecting animal housing—such as California's Proposition 12 rule prohibiting the sale of meat from animals housed in facilities not meeting California's requirements—can place stress on a producer to replace facilities and equipment earlier than they might have anticipated or face losing their contract. Such pressures are not only policy related. Table egg layers may increasingly convert to cage-free or enhanced environment housing due to consumer demand for products with those specific characteristics. Extreme disruptions to the supply chain like the Holden, Kansas packing plant fire and the COVID-19 packing plant closures created disruptions throughout their respective supply chains. Due to the nature of production, market disruptions and events can have catastrophic effects. In this paper, we outline the major stressors on producers of confined animals, including impacts of catastrophic events and the resiliency to these stressors.

Confined Animal Production

The face of livestock production has changed in the last century, driven by the consolidation of industries and farms and changes in production efficiencies, scale economies, farm size and number, and relationships between stages of production (MacDonald and McBride, 2009; Ollinger, MacDonald and Madison, 2005). CAFOs produce meat, eggs, and dairy animals in a confined area and bring feed and water to the animal rather than the animal moving to water or feed, which can increase production efficiency but also increase risks for whole-farm impacts compared to extensive producers. CAFOs are common in the poultry, swine, dairy, beef feeding, and small ruminant feeding sectors. The concentration of production into larger, confined houses, barns, or pens has led to increased output but has also introduced additional stresses for producers.

Stressors in Technology Adoption

The nature of CAFO production includes a combination of stressors associated with all three risk areas (business, financial, and strategic) as producers attempt to keep on the cutting edge of technology and genetics while still complying with changing regulations. CAFO production requires innovation and technology adoption, which often add to the producer's financial burden. In addition to the economic forces driving technology adoption, contracts used in integrated production systems can force technology adoption to remain under contract. Contract systems have been shown to increase productivity, but this can come at the cost of innovation, which adds to producers' debt load (Key and McBride, 2003). Much of U.S. broiler production (99%) and swine production (up to 63%) operates under some kind of contract system (USDA-NAHMS, 2014; 2015). These

contracts stipulate the conditions of raising or marketing animals for a specific company.

Policy Stressors

While there are benefits to a contract system—such as guaranteed market and prices for animals—there have been some criticism of CAFOs. The concentration of animals leads to management concerns about mortality disposal and waste, air, and water quality. Due to changes in regulation of water and waste, producers must manage manure and waste under strict best management practices to comply with local, state, and federal regulations. This can be stressful for producers when these rules change or when large-scale litigation causes business disruptions. Failure to comply can lead to losses of contracts or being dropped from a processor, such as in dairy production.

Marketing and Business Continuity Stressors

During a large market disruption, integrated contract farmers face uncertainty in production. The contracts typically guarantee continued placement but not the number of animals placed or the amount of downtime between animals placed. This was one of the producer stresses related to the impact of COVID-19 for CAFOs under contract systems (Maples et al., 2021; Weersink et al., 2021). Changes in placements and extension of downtime can place additional financial strain on producers during a charged situation. CAFOs are based on moving animals at uniform sizes to processing facilities. Due to COVID-19, limitations and shortages in labor led to reduced processing capacity and additional feed-out times to growers led to reduced feed efficiency or to humane euthanasia (Luckstead and Devadoss, 2021; Weersink et al., 2021). One benefit of a contract system is the priority in processing during that time. Anecdotally, there were situations where processers did not have the capacity to support animals that were not under contract, leading to producers maintaining animals that could not be processed (Weersink et al., 2021). These multilayered stresses exemplify the no-win feelings that producers sometimes experience.

Financial Stressors

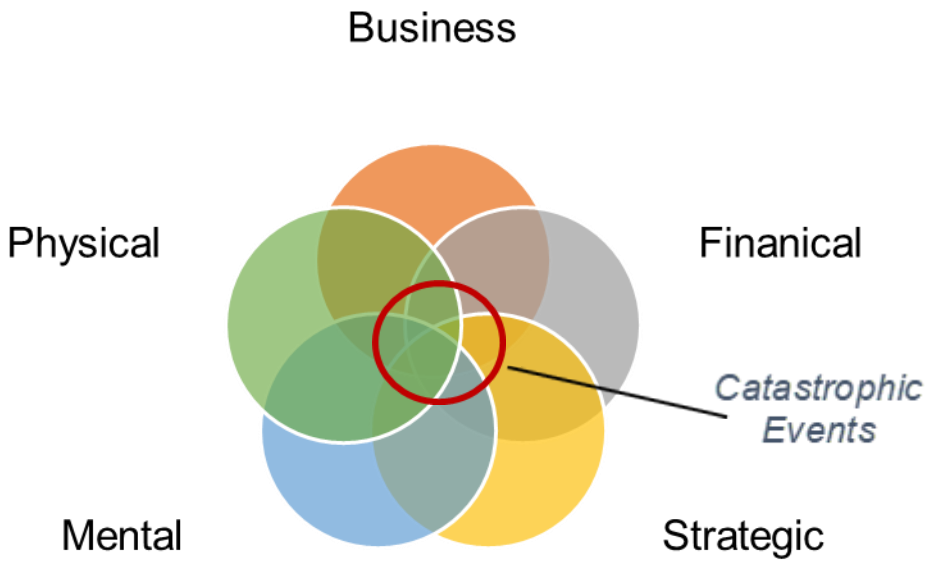
Financial stress is among the top mental health risk factors among producers (Yazd, Wheeler and Zuo, 2019) and has been listed among producers' top worries (Gregoire, 2003). While all producers face financial stresses due to the inherent risk associated with agricultural production, CAFOs often require additional capital expenditures related to production practices to remain competitive and follow best animal practices.

Finally, confined animal production has come to the forefront of social discourse in livestock production due to the concentrated production practices and their public perceptions. Long-term trends in consumer demand, domestically and internationally, create additional stressors as CAFO producers are subject to intense scrutiny in social media and public opinion.

Catastrophic Losses

When a producer is placed in an intensely stressful situation, such as a catastrophic loss of facilities or animals, the mental health burden is extremely high. These stressors overlap with a CAFO producer's day-to-day stressors (see Figure 1). Catastrophic losses include

Figure 1: Stressors Associated with Confined Animal Feeding Operations and Catastrophic Events



isolated incidents, such as a tornado or hurricane destroying barns and killing livestock, or widespread events like highly pathogenic avian influenza killing the entire population of a poultry barn within a few days. These events can have a lasting toll on the producer due to large-scale mortality, cleanup, disposal, and the collective mental health effects. How diseases or natural disasters affect producers varies greatly from person to person and has geographical differences (Sims and Baumann, 1972; Morrissey and Reser, 2007). The ability to recover from the event—to be resilient to the event—also varies greatly from person to person.

Emotional Impacts of Catastrophic Losses

Catastrophic events may have different effects on CAFOs and on extensive or smallholder livestock operations because CAFOs house higher numbers of animals in each location, so the effect is more intense. CAFOs are vulnerable to catastrophic risks, in part because of the capital risks associated with high-cost barns and specialized equipment. These capital assets often are built with large loans, and large operating loans are often maintained with payments due even when catastrophic events occur. This is compounded by the specialized nature of the facilities. Damage to a facility may make it unusable for a period, severely disrupting that operation's income stream.

Often with mass casualties, producers are left with the financial burden of the event as well as the emotional impact. Producers can mitigate the cost of a catastrophic event using catastrophic insurance on top of property insurance required by lenders, increasing financial resiliency to the events, but to date these policies are expensive and a low perceived risk of catastrophic events has led to low uptake (Boyd, Pai and Porth, 2013; Pai and Ravishanker, 2020). Mental resilience is harder to define, and it is more difficult to prepare for the emotional and mental damage of a catastrophic event. Producers create animal-human bonds, even collectively with herds or flocks, and mass animal loss has a mental health cost that can go untreated (Hall et al., 2004). When managing the emotional toll of those losses, negative mental health effects can manifest directly or have a delayed trauma response (Hood and Seedsman, 2004; Mort et al., 2008; Taylor et al., 2008; Wasson and Wieman, 2018). The effects of large-scale losses and first response to the event have been linked to post traumatic stress disorder and acute stress disorder (Hibi et al., 2015; Wasson and Wieman, 2018). These effects can lead to anxiety, guilt, depression, relationship disruptions, avoidance behavior, and suicide (Wasson and Wieman, 2018; Park, Chun and Joo, 2020). Producers are intrinsically linked with their farm and large losses affect the producer's identity and self-value (Gregoire, 2003).

We have discussed livestock mortality related to disease or natural disaster, but situations requiring humane euthanasia or depopulation can also have mental health effects[1]. An animal disease outbreak has three sources of death loss: first, many foreign animal diseases, like highly pathogenic avian influenza, have very high death rates as a result of the disease itself. Second, some diseases result in severe impacts to animal mobility or quality of life, to the point that humane euthanasia is necessary for welfare reasons. Third, when a flock or herd is infected or when financial or processing limitations would result in welfare distress to animals, depopulation may be employed on the whole herd or flock level. For instance, in the 1990s in the UK, 4.4 million cows were affected with bovine spongiform encephalopathy (BSE, commonly called mad cow disease); in 2015 in the US, 49.6 million birds were infected with avian influenza. Both of these zoonotic (diseases with the potential to infect both humans and animals) disease events led to high mortality rates and large-scale depopulation to protect the food supply and human health (Webster, Douglas and Sato, 2009; Hagerman and Marsh, 2016). These events have been studied for their economic impacts, but the effect of mental stress on producers and first responders themselves largely goes unreported in economic analyses because they are difficult to quantify. We know that large-scale depopulation comes with an emotional burden on top of the economic costs. Such burdens are so great they have been addressed in both the scientific literature and in fictionalized books and movies. Producers take on the responsibility for the care for their animals, but large-scale euthanasia is a hard emotional burden to carry (Hood and Seedsman, 2004; Whiting and Marion, 2011; Hibi et al., 2015; Shearer, Griffin and Cotton, 2018; Park, Chun, and Joo, 2020).

Mass Carcass Disposal

On top of animals lost either thorough sickness, natural disaster, or euthanasia, producers are also required to manage carcass disposal, which can come with its own regulatory stressors even when a mortality disposal plan or on-site disposal exists (CAST, 2008; Costa and Akdeniz, 2019; Campbell et al., 2021). Catastrophic events can limit the ability to transport carcasses to off-site locations. Some municipalities may not accept whole farm mortality, and traditional burial may be limited by biosecurity or environmental regulations (Glanville et al., 2009; Yuan, Snow and Bartelt-Hunt, 2013).

[1] Sometimes humane euthanasia and depopulation are used interchangeably, however a specific sequence of events is required for an animal to be euthanized. Specifically, the animal has to be unconscious before death occurs. This is true in packing plants or when a veterinarian euthanizes an animal. In mass animal depopulation in infected herds and flocks, unconsciousness is not always possible to guarantee. Therefore, the term "depopulation" is used separately from "euthanasia" in this paper.

Resiliency

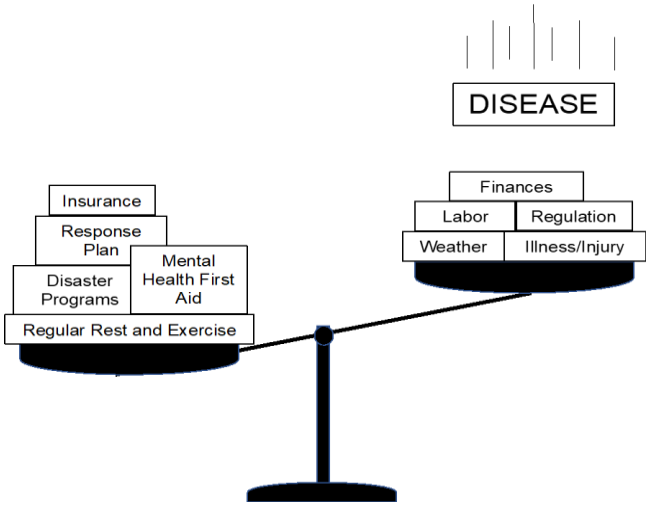
Producer resilience has many aspects. Business resilience is the ability to quickly rebuild a building or repopulate a herd. Property insurance protects buildings and machinery from eligible loss events such as hurricanes, tornados, and floods. Cattle price risk protection through federal insurance products, like the Livestock Risk Protection program, has been growing in popularity as a complement to more traditional risk protection through futures and options or contracts. Catastrophic livestock insurance that protects against animal death and health disruptions has historically had a low adoption rate in the United States, but there are some options available. Along with production integration, these insurance options help CAFO producers recover their physical operations relatively quickly. The exception is, perhaps, for highly specialized breeding facilities that hold the genetic lines such as grandparent poultry flocks or primary breeding herds. Another aspect of business resilience is having an emergency plan, which would include immediate contacts: the integrator company, insurance provider, and emergency management. It would include contact information for all employees to check that they are safe and to inform them of next steps. Managers may have specialized responsibilities for key employees. For example, one person might be responsible for corresponding with emergency management to find out when it is safe to go on site again, and another might be responsible for all contacts with insurance providers. Having a plan in place and discussing it with employees before an incident happens creates “muscle memory” and can help the producer and employees move from the initial moment of intense stress (flight, fight, or flee) and instead move into a period of action.

Financial Resiliency

Financial resilience is the ability to quickly recover from the losses and costs associated with a catastrophic event. State and federal programs can help producers recover from large-scale natural disasters and animal disease events. These programs will pay a market value for the excess mortality associated with the event. In a natural disaster, like a hurricane or tornado, commercial livestock are eligible for the Livestock Indemnity Program (LIP). LIP pays 75% of the fair market value for mortality above normal mortality on commercial livestock operations. Insurance for buildings should be regularly reviewed, and producers should keep a list of contact numbers and a copy of their insurance policy at an off-site location. As with insurance, a notice of loss needs to be filed with the USDA Farm Service Agency within 30 days of the incident. In certain types of events, like hurricanes, producers may also be eligible for emergency financial assistance from the Federal Emergency Management Agency (FEMA).

In the event of an animal disease, the producer and integrator would be eligible to jointly receive indemnity for depopulated livestock, provided the farm had a herd disease management plan in place at the time of depopulation. Indemnity may be up to 100% of the fair market value of animals for transboundary diseases like foot-and-mouth disease, highly pathogenic avian influenza, or African swine fever. This indemnity program is administered by the USDA Animal and Plant Health

Figure 2: Tools to Enhance Resilience to Catastrophic Events



Inspection Service-Veterinary Services (USDA APHIS-VS). In addition, producers and their employees may be eligible to receive compensation for cleaning and disinfecting facilities prior to repopulation. This program can help offset the burden on employees who would not receive a paycheck otherwise during the recovery time for the facility.

Mental Resiliency

Mental resilience is the ability to process a stressor and move forward in a healthy way. A producer may never be the same; they will always carry the effect of that event on their lives. However, by having the tools and taking the time to process what they have been through, producers can move forward from the stressful event. Programs on agricultural producer mental health and mental health first aid are available in many agricultural communities through faith-based organization, the land grant Extension system, and private counseling. Attending programs to enhance personal resilience before an event can help producers recognize the warning signs of extreme mental fatigue and mental illness in themselves, their workers, and their neighbors. Simply taking time to develop good sleep and exercise habits can go a long way toward building resilience to common and uncommon stressors.

Producers can be empowered with tools to process stress during and after catastrophic events, enhancing resilience (Figure 2). These same tools can be practiced daily as producers deal with business, financial, and strategic risks to their operation. As a final note, if you or someone you know has a mental illness, is struggling emotionally, or has concerns about their mental health, there are ways to get help. The National Suicide and Crisis Lifeline provides free and confidential support anytime at 988 by call or text.

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