

Theme Overview: Farm Stress

Devon Mills and S. Aaron Smith

JEL Classifications: Q19

Keywords: Farm stress, mental health, rural health

Agricultural producers have to mitigate a variety of different stressors in their day-to-day operations, some in their control and some out of their control. Examples of these stressors include the weather, government regulations, price uncertainty, and labor shortages. These farm stressors have the potential to negatively impact not only the health of the agricultural business, but also the health of the producers themselves. Farm stress can also negatively affect the well-being of the general rural economy. These stressors have the potential to close agricultural operations that support rural communities. Stressors can also decrease agricultural operations' productivity. For example, a lack of on-farm labor can decrease a business's output.

The objective of this *Choices* theme package is to increase awareness surrounding farm stress, defined as the stress faced by agricultural producers related to their work. Those who work alongside agricultural producers (such as Extension professionals) can then begin to consider these stressors in their interactions with producers. Additionally, those who work in Extension should also be aware and up to date on any stressors that are specific to producers or area commodity groups in their region. With the articles in this theme package, we also want to provide exposure to these issues for those who are unaware about how prominent these issues are in agriculture. In addition to this theme package, there are available resources for agricultural and applied economists who are interested in learning more about farm stress. The USDA-NIFA Farm and Ranch Stress Assistance Network (FRSAN) has been established, whose goal is to support those working in agriculture with programs to mitigate farm stress (USDA NIFA, 2021). Farm Bureau has developed their 'Farm State of Mind' website, which includes mental health-related resources (Farm Bureau, 2021). Additionally, several University Extension programs now have materials on farm stress available on their websites.

Articles in this Theme:

- **Farm Stress Data Visualization**
Shelby Sledge and Brice Fortinberry
- **Risk-Induced Stressors for Row Crop Producers**
S. Aaron Smith and William E. Maples
- **Exploring the Specific Stressors Faced by Cattle Producers**
Charles C. Martinez, Rebekka M. Dudensing, and Joshua G. Maples
- **Stress and Resiliency among Confined Animal Producers**
Jada M. Thompson and Amy D. Hagerman
- **Addressing Farm Stress: Essential Insights for Agricultural Economists**
Mary Nelson Robertson, Devon Mills, Heather Sedges, and David R. Buys

The four articles in this *Choices* theme focus on farm stress, covering a variety of agricultural industries and associated stressors. Producers may experience negative health impacts as a result of physical and mental stresses. Three articles in this theme examine stressors specific to producers of three major U.S. agricultural sectors: row crops, cattle, and confined animals. A final article examines the link between producer health and farm stress, which—as the other articles show—is prevalent across agriculture, regardless of commodity or location.

Smith and Maples provide an overview of stressors encountered by row crop, including production, financial, and legal stresses.

Martinez, Dudensing, and Maples examine the particular stressors faced by cattle producers, such as ensuring that the livestock are healthy, adapting to the seasonal challenges of livestock production throughout the year, COVID-19-related issues, and government regulations.

The role of Extension economists in providing education and mental health programming for livestock producers is also given attention.

Thompson and Hagerman explain the stressors faced by confined animal producers and detail how modern confined animal production practices and policies have contributed to producer stress. The impact of catastrophic events, such as weather events or animal disease, on producer well-being is also described. Last, the article provides an overview of how confined animal

producers can build business, financial, and mental resilience.

Robertson, Mills, Wallace, and Buys explore the connection between farm stress and negative mental and physical health issues for producers. The article also describes how farm stress is currently being addressed through organizations like FRSAN and how preventative services can help alleviate negative health outcomes for producers.

For More Information

Farm Bureau. 2021, May 3. "Farm Bureau Launches Farm State of Mind Resource Directory to Support Mental Health Month." Available online: <https://www.fb.org/newsroom/farm-bureau-launches-farm-state-of-mind-resource-directory-to-support-menta>

National Institute of Food and Agriculture. 2021, October 27. "NIFA Invests Nearly \$25M in Farm and Ranch Assistance Network." U.S. Department of Agriculture. Available online: <https://nifa.usda.gov/press-release/nifa-invests-nearly-25m-farm-and-ranch-stress-assistance-network>

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Farm Stress Statistics and Resources


Shelby Sledge and Brice Fortenberry

JEL Classifications: N/A

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Background

Stressors such as financial issues, the weather, the economy, and social isolation can negatively impact agricultural producers. This infographic provides statistics surrounding the issue of farm stress which come from a national survey conducted by the American Farm Bureau Federation and Morning Consult. The infographic also lists resources that are available nationwide to assist farmers with their mental health and wellbeing.



Farm Stress

Potential Stressors

- Financial Issues
- Weather
- Economy
- Isolation

Farm stress can take many forms and have detrimental effects on agricultural producers. When surveyed, farmers cite financial issues (91%), the farm economy (75%), the weather (83%), and social isolation (52%) as having an impact on the mental health of their peers.¹

Available Resources

- Member Organizations
- Community Health Resources
- Call Centers and Hotlines

According to a national survey by Farm Bureau, farmers would feel comfortable discussing their mental health condition with their primary care doctor (78%), close friends (81%), and with a therapist or counselor (72%). Several types of resources are available for agricultural producers to alleviate farm stressors.¹

Help is HERE!

National Resources

- National Suicide and Crisis Hotline (988)
- Farm and Rural Stress Hotline (1-800-691-4336)
- FarmResponse Training
<https://www.agrisafe.org/courses/farm-response/>
- Farmer Resource Network
<https://farmerresourcenetwork.force.com>


¹ American Farm Bureau Federation and Morning Consult. (2019). "Rural Stress Polling Presentation". Available at: <https://www.fb.org/newsroom/>.

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Data Source: American Farm Bureau Federation and Morning Consult. (2019). "Rural Stress Polling Presentation." Available at: <https://fb.org/newsroom/>.

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Data Source

American Farm Bureau Federation and Morning Consult. (2019). "Rural Stress Polling Presentation." Available at: <https://fb.org/newsroom/>.

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Risk-Induced Stressors for Row Crop Producers

S. Aaron Smith and William E. Maples

JEL Classifications: Q19

Keywords: Mental health, Risk, Row crops, Stress

Mental health and managing stress are major concerns in rural communities and for agricultural producers. Peterson et al. (2016) indicated that agriculture was one of five major industry groups with suicide rates higher than the study population. Farm stress can often be traced to one of the five broad categories of risk that agricultural producers face: production risk, market risk, financial risk, legal risk, and human risk (Crane et al., 2013). Many stressors affect all agricultural producers regardless of the commodities produced on their farms; however, some stressors and mitigation strategies are more prevalent in certain agricultural sectors. We explore stressors readily encountered by row crop producers, including weather and climate, uncertain and volatile input and output prices, access to credit, social isolation, compliance with government regulations, succession planning, and labor shortages. We also discuss sources of stress by risk category for row crop producers.

Production Stress

A significant stressor in agricultural production is weather and climate. From preplanting to final sales, weather provides a substantial amount of uncertainty and consternation for crop producers. Crop yields are highly dependent on weather; inclement weather can severely impact production and, consequently, financial performance for crop producers. The 2012 drought, 2019 Midwest floods, and Hurricane Ida are examples of weather events that resulted in substantial production losses for row-crop producers, which increased uncertainty and producer stress (English et al., 2021). Natural events such as hurricanes and windstorms can eliminate a promising production year in just a few hours and devastate farm infrastructure, creating billions of dollars in losses (NOAA National Centers for Environmental Information, 2022). However, weather and climate are not the only sources of production stress.

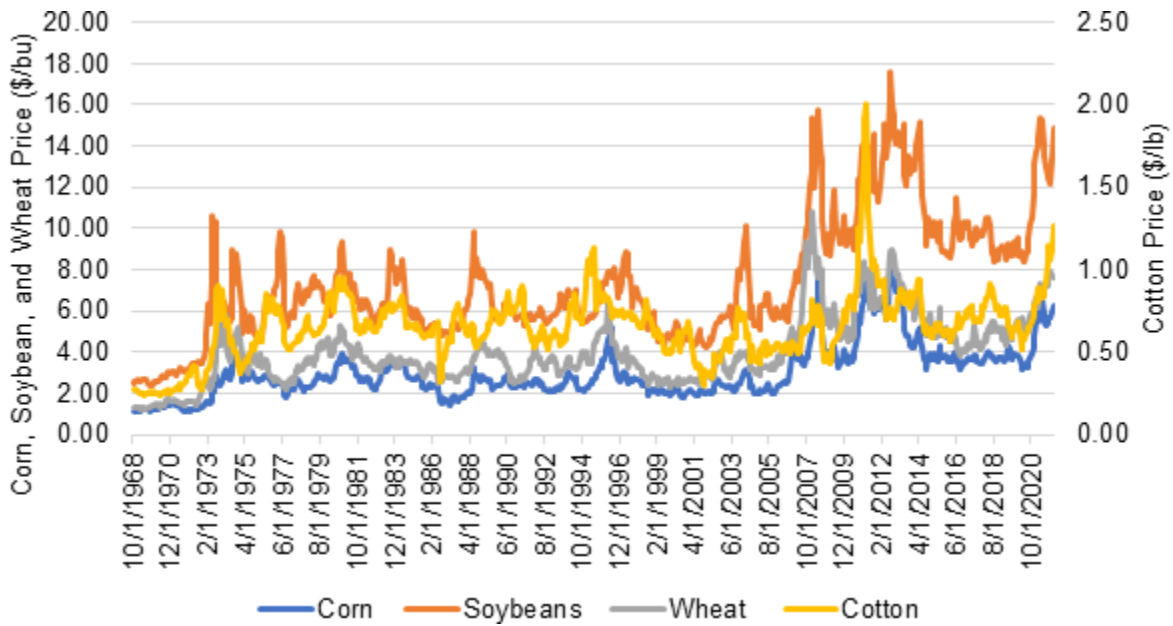
Production stress can occur through adoption of management practices and third-party actions. Herbicide

drift is an example of a production technology or a third-party action that has added significant stress to row crop producers and rural communities. The use of dicamba has been a polarizing technology for rural communities, pitting neighbors against each other and creating production losses due to drift and volatilization (Gunsolus, 2021). Management practices can also create stress for crop producers. Insect, weed, and disease control provide tremendous sources of growing-season production stress. Controlling herbicide-resistant weeds, managing sugarcane aphid infestations, and controlling southern rust are all costly management practices that can reduce production and create stress. In many cases, production stress will also create financial and legal stress for the crop producer. Producers can use tools such as crop insurance, irrigation systems, and production technologies to help alleviate some of the production stress during the growing season.

Market Stress

Economic theory states that producers are price takers. The large number of commodity sellers makes it difficult for one producer to have the market power to influence supply sufficient to change prices. As such, crop producers are subject to market/price changes due to supply and demand, government policies, and other economic influences. The 2020, 2021, and 2022 production years provide prime examples of the volatility and rapid changes in price that row crop producers face. Nearby corn futures swung from a low of \$3.09 per bushel on April 20, 2020, to \$8.13 ½ per bushel on April 25, 2022, a 163% change in price. Markets are uncertain and provide a constant source of stress for crop producers. The dilemma between action and inaction in selling commodities over the course of a marketing year is incredibly stressful for most crop producers. From 1968 to 2022, the greatest month-to-month changes in futures closing prices for corn, soybean, wheat, and cotton were 46%, 58%, 37%, and 53%. For context, imagine a hypothetical salary move of 37%–58% from one month to the next. Even with a well-developed risk management strategy, stress experienced by farmers

Figure 1. Monthly Nearby Commodity Futures Prices, October 1968—January 2022



due to price movements outside their control is substantial.

Price uncertainty can lead to stress over whether operations will be profitable for that year or not. Crop prices are determined through global, national, and local forces, which are outside of producers' control.

Additionally, supply and demand are affected by macro-economic influences (exchange rates, global economic activity, inflation, and interest rates) and government policies (domestic, foreign, and trade policy). Periods of low prices or significant price volatility (Figure 1) can be a major contributor to stress. Extended periods of low commodity prices, such as 1999–2002 and 2015–2020, can provide long-term market-based stress due to financial hardship and equity erosion. Some market stress can be partially mitigated through producer adoption of risk management tools such as crop insurance or futures and options to protect against adverse movements in price and production disruptions. However, crop insurance indemnity payments and safety net program payments will not always cover losses or be realized during periods of low price.

Financial Stress

Financial performance can be a major stressor for all agricultural producers. High input costs, access to credit, and cyclical profitability all contribute to stress for row crop producers. Recent global events have amplified the risk and stress associated with input prices and availability. In 2022, COVID-19 induced supply chain shortages, and geopolitical conflict caused fertilizer prices to increase by 100%–200% compared to levels a year ago. Additionally, due to supply chain disruptions, producers' ability to procure chemicals, fertilizers, and

machinery parts was also uncertain. This uncertainty and elevated input price environment have substantially increased financial stress. The increased cost of production for principal row crops has created an environment in 2022 with the potential for large losses should commodity prices fall.

Changes in input prices can compress margins or eliminate profits even with high prices and good yields. Conditions in 2021 and at the start of the 2022 crop season demonstrate how input prices and availability can create stress. Crop producers are facing a lot of input price stress in 2022. Increased production costs mean that producers are risking substantially more in 2022 than ever before. This increased amount of money invested in a crop will increase concerns over financial losses even if prices and yields remain strong. Since 2013, annual cash receipts from crop production have varied between \$187.9 billion and \$248.6 billion (USDA, 2022). Additional financial stressors for crop producers are access to credit, land acquisition, and negotiation of rental agreements.

Farm Bill programs form the core of the farm financial safety net through Commodity Programs (Title I), Conservation (Title II), and Crop Insurance (Title XI). These programs help producers manage in-season and cyclic changes in the agricultural economy. Understanding and effectively implementing Farm Bill programs can mitigate financial risk and reduce financial stress.

Financial Impact in Rural Communities

Row crop producers, particularly large operations, are highly visible members of rural communities. Production

has become concentrated on large farms for major field crops. For field crops in every census year from 1982 to 2002, the share of land harvested by farms harvesting more than 1,000 acres increased. In 1982, 59.9% of the land was operated by farms exceeding 1,000 acres. This has increased with each Census of Agriculture—61.56% in 1987, 64.27% in 1992, 65.34% in 1997, and 66.83% in 2002 (Key and Roberts, 2007). Producers that farm many acres are well known in their local communities. The land they farm and the machinery required to produce crops are highly visible. In addition to being highly visible members of their communities, they are also often major contributors to the local rural economy. In general, the more rural the county, the more important the economic contribution of row crop agriculture to the community. Farms are a source of direct employment but also indirect and induced economic activity within their communities. Declines in farm profitability can have an adverse economic effect on entire communities. This can result in a perceived obligation, by the producer, to contribute to economic stability, which can increase producer stress.

Legal Stress

Row crop producers must navigate a complex framework of interrelated local, state, national, and international policies and regulations. Legal stress can be associated with trade wars, environmental concerns, counter-party risks, and changing government regulations. The trade war between China and the United States had dramatic implications for U.S. soybean producers. Concerns over environmental regulations such as the Environmental Protection Agency's definition of Waters of the U.S. or restrictions to pesticide use create stress for farmers by complicating production decisions and increasing uncertainty. Loss of weed, insect, and disease technologies due to regulatory actions can limit producer options to mitigate production losses and increase producer stress. Additionally, class action lawsuits to seek compensation for production losses or counterparty defaults are challenging and time consuming for producers to navigate.

Human Stress

Row crop producers often work long hours and are isolated from their family, friends, and communities for extended periods of time, particularly at planting and harvest. For some, this isolation is one of the major benefits of being a row crop farmer. However, isolation can also amplify mental health issues. Many farmers are reluctant to reach out for mental health help when faced with adversity.

Approximately 70% of family farm operators expect their operation to continue past their death, but fewer than 25% have a formal succession plan. Succession planning can be one of the more stressful management decisions for crop producers. Allocating resources to on- and off-farm heirs can be complex, especially while maintaining the financial viability of the farm operation. Determining an allocation of assets between siblings and other beneficiaries often creates confrontational situations with family members with high degrees of stress, particularly for the older generation.

Balancing labor supply has become increasingly stressful post-pandemic. Labor to produce and move the crop to market has become difficult to obtain for many farms. Lack of labor supply can lead to production disruptions—due to failure to apply chemicals/fertilizer in the optimal window) or transporting a crop to market. Managing farm labor is a continual source of stress for many row crop operations.

Discussion and Conclusions

Risks row crop producers face are often sources of stress that can affect mental health for producers and farm families. Mental health and dealing with stress have been part of Extension programming for decades with the roots for many land grant institutions tracing back to the financial crisis of the 1980s. Recent efforts, while still focusing on financial stress, have been expanded to include programming specific to other areas of stress. Removing all stress in agriculture is not possible, but the farm community should continue to strengthen programs that assist farmers and rural communities with mitigating or managing stress based on the needs for the specific agricultural enterprises in the community.

Resources

American Psychological Association: <https://www.apa.org/events/farmer>
Farm Bureau: <https://www.fb.org/related/Rural+Stress>
USDA: <https://www.usda.gov/sites/default/files/documents/farm-stress-resources.pdf>
Succession Planning: <https://farmlandlegacy.tennessee.edu/>
National Agriculture Law Center: <https://nationalaglawcenter.org/>

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Exploring the Specific Stressors Faced by Cattle Producers

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JEL Classifications: Q10, Q16

Keywords: Cattle producers, Extension programming, Farm stress

Cattle producers and ranchers experience many situations that can lead to stress, anxiety, depression, and substance misuse. They tend to experience work-home imbalances, social and geographic isolation, and potential for financial losses, often due to factors outside their control such as weather, changes in input and commodity prices, media and social criticism, and bureaucracy (Dudensing, Towne, and McCord, 2017; Booth and Lloyd, 2000).

In addition to these stressors, cattle producers face unique challenges in caring for and maintaining the well-being and productivity of animals. Sick or injured animals can result in financial losses, increased labor, and emotional stress. When an individual has a primary responsibility for livestock care and experiences financial outcomes tied to livestock health, repetitive interactions with livestock can reinforce negative feelings during hardships. Still, stress associated with caring for sick or distressed animals often exceeds concerns for financial loss. Research documents “compassion fatigue,” stress, and related mental health concerns among animal caregivers, including veterinary professionals and livestock producers (Shearer, 2018).

Animal welfare has been shown to affect livestock caretakers’ well-being, which in turn affects producers’ motivation and ability to care for their cattle (Kauppinen et al., 2010). Some studies have found a link between animal care and positive mental health outcomes, but these studies focus on interaction with animals rather than herd management (Pederson et al., 2011). Decreased care of livestock or farmstead is often an outward sign of depression (Williams and Fetsch, 2012; Dudensing, Towne, and McCord, 2017). However, changes in management and upkeep can also reflect labor shortages, aging, and other concerns.

Livestock production is seasonal, and each season is a part of the specific operation’s production system, which brings new annual challenges and unique stressors for producers. For example, during calving, producers often experience a lack of sleep and irregular sleep routines,

both of which can be associated with depression (Hawes et al., 2019). Further, sleep disruption is often worst during extreme weather, increasing newborn calf morbidity and mortality, another source of stress. Hay season is another stressful period for many livestock producers and requires many long days and co-operation from weather. Cattle marketing often leads to concern, or anxiety, about whether the hard work, time, and effort put into raising the animals will be rewarded or thwarted by constantly fluctuating market prices.

The past couple of years have introduced unique stressors such as the Tyson beef-packing facility fire (Holcomb, KS) in August 2019 and COVID-19. The worst was felt during the external event of the COVID-19 pandemic, when cattle producers saw a drop in cattle prices driven by COVID-19 related plant shutdowns and changes in meat demand related to shifts from restaurant dining to at-home cooking (Martinez, Maples, and Benavidez, 2020). During that time, cattle producers that raised a live animal and fed it out in a feedyard incurred substantial feeding costs. Additionally, the price per pound for fed cattle declined, which induced financial stress for feeders and retained ownership producers in terms of when to sell. Thus, during the pandemic, cattle producers throughout the supply chain endured much stress.

Additionally, various established and proposed government policies can require significant effort to understand or access. There has been particular attention in the policy arena on cattle and the beef industry in recent years. The beef processing sector of the supply chain is highly concentrated and high beef prices at the time of low cattle prices during recent disruptions have caused consternation among producers and policy makers. Multiple pieces of proposed legislation have led to significant discussion and disagreement among producers about impacts on the future of the industry (Chase, 2022).

Role for Extension Economists

Many ranch stressors (i.e., weather, disease, market disruptions, farm/family relationships, and policy) are almost impossible to eliminate and are not controllable by cattle producers. However, resilience can be learned and encouraged (Greenhill et al., 2009; Pedersen et al., 2017). Extension plays a crucial role in resilience education among livestock producers.

A number of scholars have advocated for further research into the connection between human well-being and animal welfare (Jones-Britton et al., 2020). Applied research and related Extension/outreach efforts may be able to address such concerns simultaneously. In fact, Greenhill et al. (2009) insist that resilience “needs to be understood in the context of wider social and economic systems” (p. 324) and tie resilience to general farm profitability concerns. Several of these concerns—including business planning, income security, and risk management—are firmly in the purview of Extension economists. Helping producers understand policies that impact their operations is another area well within traditional Extension goals.

Including topics on mindfulness and more social aspects can be done in traditional livestock Extension programming. In some cases, agricultural professionals may be trained to deliver mental health programming, and they may also partner with other disciplines and organizations. Texas Extension has successfully addressed mental health and mindfulness topics with farmers and ranchers through regular farm and ranch programming. Incorporating mental health topics into Extension and other educational programming may normalize discussing mental health among farmers and

provide information to producers before crises (Kilpatrick et al., 2012; Naik, 2017; Holt et al., 2021).

Integrated programming does not preclude programming with a specific mental health focus. Mental Health First Aid, an international program employed by many Extension agencies, has a rural certification for trainers to focus on mental health within rural communities with limited mental health resources and long distances to such services. Other institutions offer different programs: Mississippi State University Extension hosts the Preventing Opioid Misuse in the Southeast (PROMISE) initiative as well as “R is for Rural and Resilient” webinars addressing mental health education within agricultural and rural contexts.

While awareness and educational opportunities continue to evolve, it is important for educators and policy makers to realize that attitudes about mental health change over time and, usually, in the context of long-term, trust-based relationships. Including mental health information in a variety of programs and formats may help familiarize livestock producers with mental health resources and remove barriers to talking about stress and depression. For farmers and ranchers looking to access mental health resources now, resources include:

- SAMHSA National Suicide Prevention Lifeline. 1-800-273-TALK (8255) Available online: <https://www.samhsa.gov/find-help/national-helpline>
- Farm Aid. 1-800-FARMAID (-327-6243) Available online: <https://www.farmaid.org/our-work/family-farmers/help-for-farmers/>

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Stress and Resiliency among Confined Animal Producers

Jada M. Thompson and Amy D. Hagerman

JEL Classifications: Q19

Keywords: Confined animal feeding operations, Mental health, Stress

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 processors 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

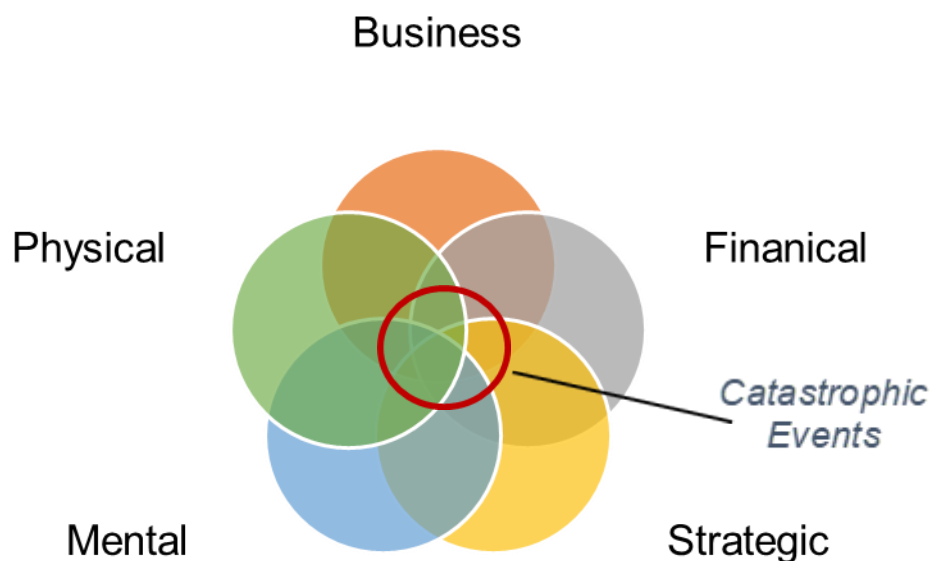
Financial stress is among the top mental health risk factors among producers (Yazd, Wheeler and Zuo, 2019) and has been listed among producers' top worries (Gregoire, 2003). While all producers face financial stresses due to the inherent risk associated with agricultural production, CAFOs often require 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 effects¹. 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 through 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

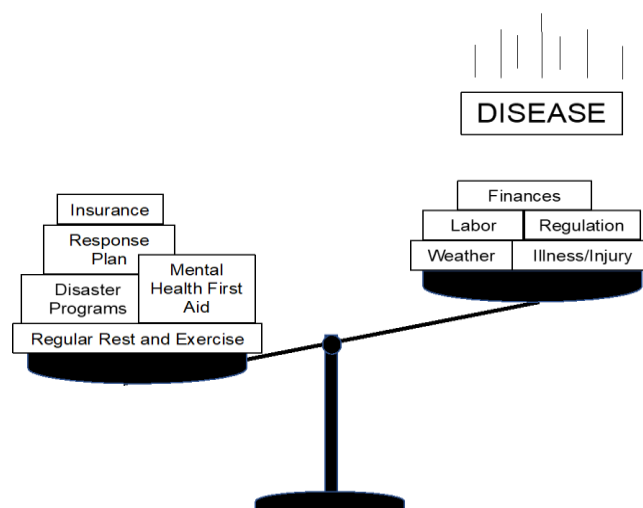
the initial moment of intense stress (flight, fight, or flee) and instead move into a period of action.

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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Addressing Farm Stress: Essential Insights for Agricultural Economists

Mary Nelson Robertson, Devon Mills, Heather Sedges, and David R. Buys

JEL Classifications: I10, I15, I31

Keywords: General welfare, Health, Health and economic development, Well-being

Farmers are uniquely experiencing the mental health crisis in the United States. Of all the occupations and industries in the United States, farming has the fourth highest rate of suicide among males (Peterson, et al., 2020). Although not necessarily the direct cause of suicide, risk factors like mental health challenges, social isolation, financial problems, substance misuse, physical injuries or illnesses, and job problems increase the risk of suicide (CDC, 2021). In addition, previous literature suggests that farmers who do not produce a profitable harvest are at greater risk of dying by suicide (Rosmann, 2010). Therefore, suicide risk among farmers is greater than in other occupations (Milner et al., 2013). This paper focuses on the stressors unique to farming, the connection between those stressors and negative health outcomes, and the need for a systems-change approach to address farmer stress and well-being. Figure 1 demonstrates the relationships between farm stressors, economic impacts, societal impacts, and farmer stress and well-being. While not all the responsibility of agricultural economists, understanding these relationships may help those in this profession better serve farmers.

Farm Stress

Stressors Out of Farmers' Control

Farmers experience some of the same stressors experienced by the general population, such as family and health issues. However, farmers also experience stressors specific to their field such as changing weather patterns, labor shortages, supply shortages, volatile markets, livestock illnesses, and specific concerns about family issues such as succession planning (Raine, 1999; Thelin and Donham, 2016; Yazd, Wheeler, and Zuo, 2019). These additional stressors may increase the risk of negative health outcomes and extend beyond farmers' locus of control, which has been validated as a moderating factor for reported stress symptoms and physical health and safety concerns (Elkind, 2008). For example, farmers cannot control when or how much it rains, nor can they control the market fluctuations that

impact their operating expenses and potential profits. The latter issue is of particular salience given that financial matters are among the most prevalent and commonly reported stressors among farmers (Dinterman, Katchova, and Harris, 2018; American Farm Bureau Federation, 2019).

Contribution of Agriculture to Family Income

The size of one's farm can impact a producer's positive income from farming. While farmers from operations of all sizes can experience financial stress, small and intermediate farmers are most dependent on off-farm income (Whitt, MacDonald, and Todd, 2019; USDA, 2021a). As demonstrated in Table 1, reported positive income from farming in 2020 increases by farm size, as does the portion of total household income at the median in 2020 coming from farming (USDA, 2021a). Therefore, smaller-scale operations may function with tighter financial margins, leaving less room to remain resilient in the face of external farming strains beyond farmers' control. Financial stress can put a strain on families, relationships, and parenting (Lee, Lee, and August, 2011), leading to an iterative loop of persistent concern. While many Americans experience some type of personal financial stress, it is important to note that when experienced by farmers, financial strain impacts the viability of their occupation and personal well-being in a unique way.

The Agrarian Imperative

In addition to common business owner stressors, farmers typically have a deep connection to the land. Therefore, it can be extremely difficult for a farmer to sell their land. To an outsider, selling the land makes sense if the farmer is in a difficult financial situation. However, losing the land to which their identity is so closely tied can feel like the ultimate loss for a farmer, a concept referred to as the agrarian imperative (Rosmann, 2010). Land is meaningful across generations—from first generation to tenth generation—and to farmers from both large and small operations. Although the literature suggests that succession plans can prevent land loss

Figure 1



Table 1. Contribution of Agriculture to Family Income by Farm Size

Farm Size	USDA ERS Definition	Reported Positive Income from Farming in 2020	Reported Portion of Total Household Income from Farming at the Median in 2020
Residence	“Farms with less than \$350,000 in gross cash farm income and where the principal operator is either retired from farming or has a primary occupation other than farming.”	36%	10%
Intermediate	“Farms with less than \$350,000 in gross cash farm income and a principal operator whose primary occupation is farming.”	47%	28%
Commercial	“Farms with \$350,000 or more gross cash farm income and nonfamily farms.”	87%	82%

Note: Definitions are from USDA (2021a).

and family disagreements, this deep connection to the land can make it even more difficult to discuss plans with family (Suess-Reyes and Fuetsch, 2016). The future of the land is always on the farmer’s mind, further exacerbating stress associated with farming.

Health Problems

While few, if any, studies have examined the connections between stress and health in farming populations, many studies have examined the connections between stress and health in the general population. Previous literature suggests that stressors can accrue and lead to bigger problems—specifically health problems—for individuals. Stress is strongly associated with poor mental and physical health among those in this sector (Schneiderman, Ironson, and Siegel,

2005; Cohen, Janicki-Deverts, and Miller, 2007; Toussaint et al., 2016). In fact, stress has a greater influence on one’s health than tobacco use and physical inactivity (Holt-Lunstad, Smith, and Layton, 2010).

Stress and Physical Health Outcomes

Previous studies have found connections between stress and multiple health problems, including heart disease, Alzheimer’s disease, skin conditions, diabetes, and depression (Mariotti, 2015; Ouanes and Popp, 2019; Chengane et al., 2021). More intense, longer-term (i.e., chronic) stressors have a greater impact on one’s health. Chronic stress contributes to physiological changes like increased plaque buildup, high blood sugar levels, hyperlipidemia, and hypertension, all of which can lead

to heart disease (Yao et al., 2019). Further complicating the issue is that farming sometimes requires high-intensity physical activity, like climbing up and down machinery and working in extreme heat conditions. This high-intensity physical activity can be extremely dangerous for someone with heart disease. Farmers who are not physically healthy cannot properly tend to their farms, further compounding their stress and increasing the likelihood of mental health concerns.

Stress and Mental Health Outcomes

Stress can contribute to poor mental health outcomes and behaviors such as depression, substance misuse, anxiety, and suicidal tendency (Mariotti, 2015; U.S. Department of Health and Human Services, n.d.). Generally, stress is a response to an external cause, while anxiety is typically an internal response to stress (U.S. Department of Health and Human Services, n.d.). There is a positive correlation between stress and the presence of mental health symptoms, meaning that the risk of developing a mental health challenge increases with increased stress. With farming being one of the most hazardous and stressful occupations, farmers are more likely to self-medicate by using alcohol or opioids as a “quick fix” for getting back to their crops or herd (National Institute for Occupational Safety and Health, 2021). For example, if a farmer breaks their arm while working, the farmer may be prescribed an opioid medicine (painkiller) so they can return to work as quickly as possible. After the farmer’s physical injury heals, the farmer might develop a reliance or even a long-term opioid addiction because the medicine also reduces the farmer’s stress. Results from a national survey administered by the American Farm Bureau Federation (2017) suggest that three out of four farmers or farmworkers are directly impacted by the opioid epidemic. The misuse of opioids, along with the documented misuse of alcohol as a coping tool, further place farmers—and thereby our economy—at risk. It is critical for farmers to have quality mental and physical health.

Addressing Farm Stress

Farm stress is a serious problem in the United States that is increasingly being addressed at local, state, and national levels. Some local farming communities across the United States are engaging professionals to discuss farm stress and offer stress reduction resources at commodity, civic club, and community meetings. The Minnesota Department of Agriculture (MDA) offers one example of how states are addressing the issue of farmer stress. MDA has a full-time mental health professional who specifically works with farmers experiencing challenges, which allows farmers and their family members to talk to someone who understands farming in addition to having the knowledge and access to resources to mitigate concerns. Engaging with this resource permits farmers to regain a sense of their locus of control during times when it may feel as though there is none.

The federal government is also taking farm stress seriously by investing in strategies to remediate farmers’ stress in the short, medium, and long term. For instance, the U.S. Department of Agriculture National Institute of Food and Agriculture (USDA/NIFA) implemented four regional Farm and Ranch Stress Assistance Networks (FRSAN). Each regional network brings together key agricultural contributors (e.g., land-grant institutions, government agencies, commodity and lending groups, and nonprofits) in each state to collaboratively address farm stress (U.S. Department of Agriculture, 2020). Each network is tasked with coordinating regional efforts such as the creation of a farmer stress hotline, support groups, and education for those in and proximal to agriculture. Key to these efforts is the curation and dissemination of resources through interactive and dynamic online repositories. Coordination on this scale requires a holistic view of agriculture that respects the interconnectedness of agricultural issues.

A Systems-Change Approach

Taking a systems-change approach may be effective in addressing farm stress. A systems approach will increase resource leveraging. For example, 13 states partner with the Farm and Ranch Stress Assistance Network: Southern Region (FRSAN:SR) based at the University of Tennessee Institute of Agriculture (Sedges, 2020). FRSAN:SR allows for more collaboration and leveraging of resources across state lines. Diversified teams comprised of representatives from multiple states ensures the engagement of multiple perspectives needed to address the chronic nature of farmers’ stress.

In all fields, it is easy to adopt a zero-sum game mentality of winners and losers. Nevertheless, it is critical to contextualize data beyond red-and-black ledger sheets. Consideration for the emotional strain farming takes may be a measure not previously calculated by agricultural economists. Given that financial stress is common among farmers, perhaps it is time that economists become allies in addressing the issue.

Agricultural economists, like most professionals who work in and around agriculture, are not trained as mental health interventionists; nor should they be. Instead, in addition to considering systemic change, these professionals can be equipped to recognize the signs and symptoms of mental health challenges and connect individuals to appropriate professional help, a role often called gatekeeping. Increasing the number of mental health gatekeepers can expand the safety net for farmers and their families, help destigmatize those seeking appropriate professional help, and prevent negative outcomes of serious mental health challenges, such as suicide (Hossain et al., 2009, 2010; Mendenhall, Jackson, and Hase, 2013).

One program dedicated to equipping people with the skills needed to intervene and address mental health issues is Mental Health First Aid (MHFA). MHFA is an evidence-based mental health gatekeeper training program that teaches adults how to better understand, recognize, and respond to signs of mental health challenges. In other words, MHFA teaches adults how to be “expert noticers” and serve as a bridge to care for mental health challenges. Mississippi State University Extension Service has had great success in training all Extension agents as MHFAs in Mississippi. The training can positively change the way that organizations approach mental health and well-being situations, such as farm stress or mental health crises. Most of the Extension agents who participate in the MHFA training reported using the skills learned from the training (60%), and nearly a sixth of agents reported having an encounter with someone in crisis after completing the training (15%) (Robertson et al., 2021).

A systems-change approach allows for farmers to be met where they are, sparking connections along the way. Providing preventative services can help farmers

cope with stress using a healthier approach, in turn improving their physical and mental health. Healthy farmers lead to more productive workdays, bountiful harvests, and, ultimately, may boost rural community morale and economies. All of these systems influence the others in some way. Taking a systems-change approach allows for more leveraging and better use of resources.

To conclude, stress impacts the physical and mental health of farmers across America. Without healthy farmers, productivity decreases, and America is without many resources to sustain the economy and health and well-being of Americans. Agricultural economists can help reduce farm stress through contextualizing the data in light of the humans (farmers) who are connected to each number. Awareness and knowledge of mental health challenges among farmers has a lot of power. It is important that agricultural economists have the toolset necessary to understand, recognize, and respond to signs of mental health challenges and crises both through their traditional economic work and in newfound ways like MHFA.

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