

Fostering Wellness

Researchers explore rural health challenges.

Rural America. The phrase might evoke rolling hills, fertile farmlands and shaded country roads. While rural life can seem idyllic compared to the hustle and bustle of urban living, the reality is that residents of rural areas throughout the United States face their own unique set of challenges. And Pennsylvania is home to almost 50 rural counties.

According to the Center for Rural Pennsylvania's definition, the Keystone State has 48 rural counties and 19 urban counties. In 2020, nearly 3.4 million people, or about 26% of the state's 13 million residents, lived in rural counties, according to the U.S. Census Bureau.

Research has shown that rural populations are less healthy than urban populations. "Since the 1980s, the gap in health and mortality between rural and urban populations has been growing," said Leif Jensen, distinguished professor of rural sociology and demography.

In Pennsylvania, rural counties have fewer physicians than urban counties, per statistics from the Center for Rural Pennsylvania. In 2019, there was one rural primary care physician for every 523 residents, while urban counties had one primary care physician for every 216 residents. Eight of the state's rural counties have no hospitals.

Nationally, Jensen pointed out, residents of rural areas have lower life expectancies and higher rates of most chronic diseases, activity limitations, and chronic pain. Smoking, poor diets and physical inactivity are more likely among rural adults.

Another characteristic of rural areas is that rural populations tend to be older than the general population. "Population aging is an important trend in 21st century America, and it's happening more rapidly in rural areas than in urban areas," Jensen said.

This trend is evident in Pennsylvania: According to the U.S. Census Bureau, on average, rural Pennsylvania residents are older than urban Pennsylvania residents. In 2020, 20% of the rural population was 65 years old and older, compared to 18% of the urban population.

Marks of Chronic Stress

In one recent study, Jensen joined a team of social scientists to look at chronic stress experienced by rural residents compared to urban residents. He explained that while disparities in health and premature death between rural and urban residents are well documented, he and his colleagues wanted to examine allostatic load, which is a set of health biomarkers that capture wear and tear on the body as a result of aging. Biomarkers included in the study were blood pressure, pulse rate, total cholesterol, "good" cholesterol, body mass index, and measures to diagnose prediabetes or diabetes, kidney or liver problems, or

chronic inflammatory disease such as rheumatoid arthritis.

Led by Alexis Santos, an associate professor in Penn State's College of Health and Human Development, the study analyzed data on adults from the National Health and Nutrition Examination Survey to learn whether allostatic load differs between rural and urban residents. The researchers found that allostatic load is indeed higher among rural adults, except in those 80 and older.

These disparities in health biomarkers and broader health and aging challenges of rural populations may reflect more significant issues, such as economic inequality and unequal access to care in rural areas. Jensen emphasized the need for further insight into the severity of the disadvantages to rural populations, the causes and possible solutions.

Jensen has been the primary investigator for the Interdisciplinary Network on Rural Population Health and Aging, a national network aimed at supporting new research on rural populations and health and aging, through pilot research awards. "Through the network, we're trying to get to root causes," he said. "What is it about rural environments that gives rise to these health challenges?"

The project is addressing questions about how economic well-being and livelihood strategies interact with rural health and aging, the health implications of the physical and social isolation that characterizes many rural communities, and the health disparities not only between rural and urban areas but across rural America. Rural communities are not monolithic, Jensen pointed out, and vary significantly in terms of population characteristics, economic base and other factors.

To address critical health challenges facing rural Pennsylvania, Penn State's Rural Health and Wellbeing Initiative is a collaborative effort designed to leverage the collective expertise of Penn State researchers and educators. This initiative, led by Andrew Read, Penn State's senior vice president for research, harnesses the strengths and expertise of multiple colleges, institutes and outreach programs. The College of Agricultural Sciences plays a critical role in this initiative, aligning with Penn State's land-grant mission of solving real-world problems through research and education.

The initiative focuses on six areas: building strong relationships with rural communities to understand and address their unique health challenges, advocating for policies that support rural health and well-being, promoting preventive health measures and wellness programs, enhancing the delivery of health care services in rural areas, training and educating the health care workforce to meet rural health needs, and conducting and supporting research that addresses rural health issues.

"The rural health initiative underscores Penn State's commitment

By Krista Weidner

to serving the needs of Pennsylvania residents and exemplifies the power of collaboration in addressing complex health challenges,” said Katherine Cason, a professor who co-leads the initiative, representing the college and Penn State Extension. “This multidisciplinary, University-wide investment is crucial for making a substantial, lasting impact on the health and well-being of communities across the commonwealth.”

Availability of Healthy Food

When it comes to health, diet is a critical piece of the puzzle. Linlin Fan, associate professor of agricultural economics, is particularly interested in the connection between general health and the availability of healthy food options in rural locations. “Given the interrelation between the quality of the food environment and the healthfulness of diets and obesity rates, the food environment is an important public health concern in rural communities,” she said. “Limited availability of affordable and healthy foods can affect dietary quality and contribute to poor health, especially for residents of rural and low-income regions.”

Several years ago, Fan and her colleagues evaluated differences in prices and availability of healthy foods across food retail outlets in eight counties in the Mississippi Delta, a predominantly rural region that has one of the highest obesity rates in the U.S. The Delta region also has some of the most significant income inequality, the highest rates of poverty and the highest prevalence of preventable, nutrition-related chronic diseases in the country.

Because 24% of the population in the counties studied are low-income and about 10% receive Supplemental Nutrition Assistance Program, or SNAP, benefits, the team collected information from 71 SNAP-authorized stores in the region. These stores included four supermarkets, 17 medium-sized and small grocery stores, 14 dollar stores, and 36 convenience stores. Of the counties evaluated, three had a supermarket, one had only a convenience store, and the remainder

had only a small number of grocery stores. “The predominant food retail format in all counties was convenience stores,” Fan said.

To determine healthy food availability and quality scores across food outlets, the researchers documented the number of items available in six food groups — grains, fruit, vegetables, meat, dairy and eggs, and dried beans, seeds and nuts. They also evaluated food prices across store formats based on dollars per ounce.

Fan and her team found that, compared with the prices at supermarkets, the prices at convenience stores were 48% higher for grains, 35% higher for fruits and vegetables, 73% higher for meats, and 95% higher for beans, seeds and nuts.

The researchers also found that the prices of healthy foods are generally similar across counties, but prices of unhealthy foods are much lower in counties with high obesity rates compared to those with low obesity rates. Prices are much higher in convenience stores compared to supermarkets for the same item. Dollar store prices are similar to supermarket prices, but the healthfulness and availability of food are much lower in convenience stores and dollar stores compared to supermarkets.

Overall, supermarkets provided the healthiest assortment of foods, followed by grocery stores. The healthy foods availability and quality score for convenience stores, which comprise the highest proportion of store formats in the region, was 70% lower than for supermarkets.

For all food groups, the research team found a significant gap between scores for convenience stores and scores for supermarkets and grocery stores, and the difference was most striking for fruits and vegetables: None of the convenience stores carried frozen fruit, and only a few carried fresh fruits and vegetables. Many convenience stores and dollar stores generally sold small packages of eggs and milk, but low-fat cheese and yogurt were rarely available.

“Our finding that access and affordability of healthy foods were restricted in the counties studied have important implications because they affect a considerable segment of the population, specifically those who buy foods at retail outlets other than supermarkets and grocery stores,” Fan said. “These residents must resort to convenience or dollar stores to meet their food needs because of the limited access to supermarkets or full-service grocery stores.” She added that about 36% of residents in these counties live 1 to 10 miles away from a supermarket or a grocery store and often don’t have access to transportation.

The findings also have important implications for other regions of the country where convenience stores and dollar stores generally comprise the highest proportion of stores available.

“We suggest ways to promote healthy food environments, including marketing and educational efforts about the importance of healthy food choices,” Fan said. For example, she noted, in rural areas where fresh

Rural and Urban Pennsylvania Counties



Rural counties, in green, have fewer physicians than urban counties, per statistics from the Center for Rural Pennsylvania. In 2019, there was one rural primary care physician for every 523 residents, while urban counties had one primary care physician for every 216 residents. Eight of the state’s rural counties have no hospitals.

Rural areas have lower life expectancy and higher rates of most chronic diseases, activity limitations, and chronic pain.

fruits and vegetables are not readily available, residents could be encouraged to buy frozen and canned produce. “Frozen and canned options are more available in rural areas, and as long as they don’t have a lot of added salt or sugar, they are good choices for a healthy and balanced diet.”

Another option for encouraging SNAP recipients to buy more fruits and vegetables is introducing a price incentive. Policies that subsidize prices of fruits and vegetables for SNAP recipients could encourage them to eat more healthfully.

SNAP and Buying Habits

In a recent study focusing on SNAP recipients’ food-buying habits, Fan and her colleagues used survey data to study the effects of SNAP participation on diet quality. “Receiving SNAP benefits could lead families to increase their consumption of both healthy and unhealthy food,” Fan said. “Some households may increase their dietary quality while others may lower it.”

SNAP is the nation’s largest domestic food and nutrition assistance program for low-income Americans, with more than 41.9 million Americans enrolled in the program in 2023, according to the U.S. Department of Agriculture. The goal of SNAP, Fan pointed out, is not just to make sure people have enough to eat but that they eat balanced and healthy diets.

For the study, researchers used data from the USDA’s Food Acquisition and Purchase Survey, a nationally representative dataset that captured detailed information about food purchases. Data were collected from about 4,800 households during a one-week survey period and included information on the prices, quantities and nutrient characteristics of foods. Diet quality was measured by the USDA’s Healthy Eating Index, which measures how well a set of foods aligns with the dietary guidelines as set by USDA and the Department of Health and Human Services.

For most households, the researchers found that SNAP participation had no significant impact on diet quality. But, somewhat surprisingly, SNAP participation had significant, negative impacts in households with low-to-intermediate diet quality scores before receiving SNAP benefits. “Among consumers who purchase low-quality food to begin with, SNAP actually decreased diet quality,” Fan said.

The negative impact of SNAP among households with lower diet quality scores is driven mainly by increased acquisition of empty calories, she explained. “One hypothesis is that SNAP benefits give people more money to buy sugary foods and beverages such as soda.”

Fan added that currently, SNAP imposes no restrictions on purchases of sugar-sweetened beverages or foods — a topic of debate among policymakers. One problem with restricting such foods and beverages — soda, for example — is that consumers easily can get around the restriction by buying substitutions such as candy and sweetened fruit drinks. Another argument against restrictions is that limiting peoples’ food choices can be seen as taking away their agency.

The research results highlight opportunities for education about making healthful nutritional choices and help identify the households that might benefit the most from such programs, Fan said.

“Our finding that SNAP has no average effect on overall dietary quality, and that it actually has a negative impact on dietary quality in some households, suggests a need for nutritional education in addition to monetary support to help improve diet quality,” she said. “A fundamental reason why a lot of people don’t eat healthy foods is that they don’t know much about healthy foods.”

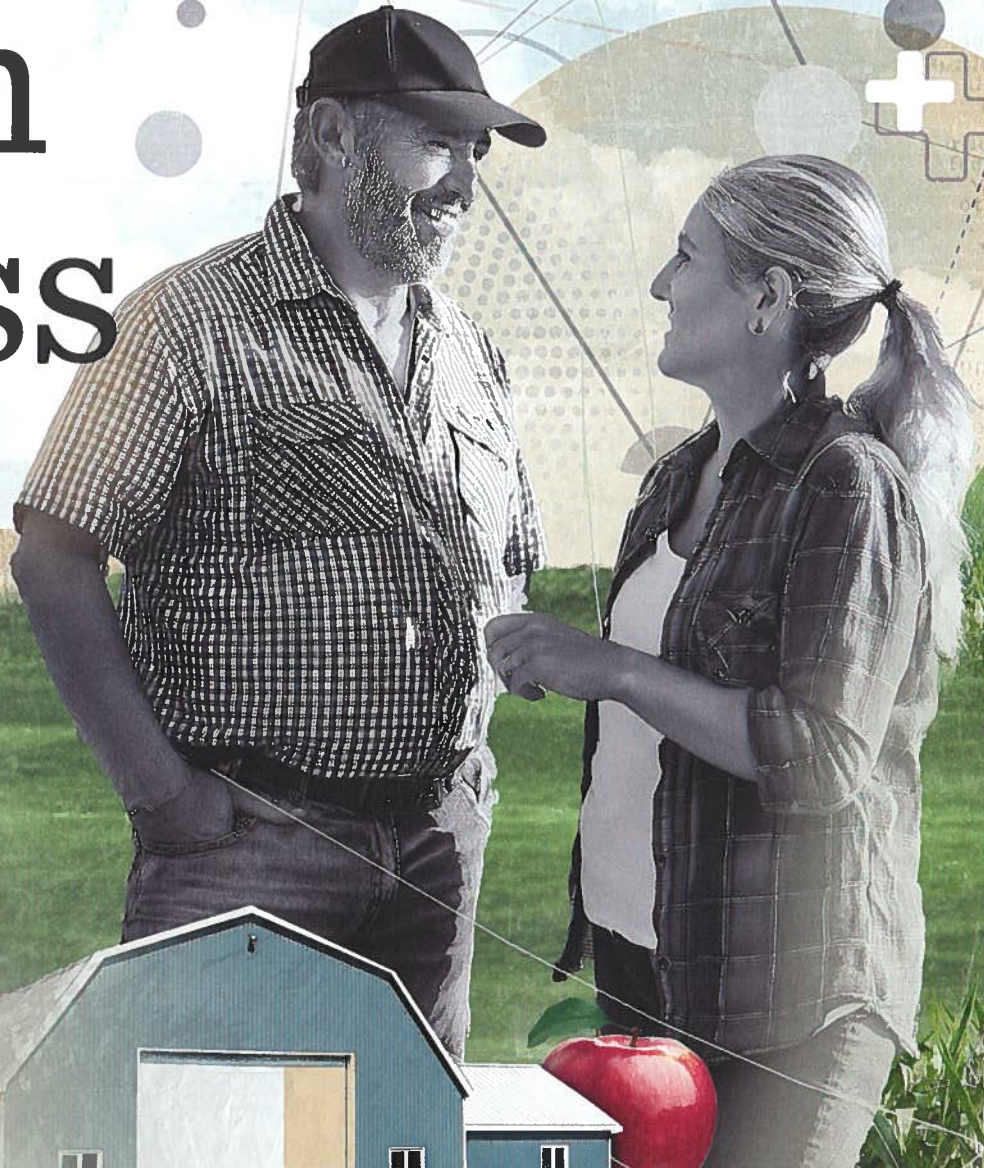
To teach SNAP recipients about healthy and balanced diets, educational programs could be aimed toward changing food preferences and habits and including information on which foods are healthy and which are unhealthy, enhancing cooking skills, and providing recipe ideas for making affordable and healthy foods appealing.

“Policymakers have become motivated in recent years to improve the quality of diets among SNAP participants, given the increasing nationwide prevalence of diet-related chronic disease, obesity and diabetes,” Fan said. “SNAP education programs are promising in helping people combat the obesity epidemic and improve people’s well-being and health. I hope our research findings can help secure more support for policies that work toward curbing the rising trend of obesity and nutrition-related diseases.”

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The Penn State Rural Health and Wellbeing Initiative includes the College of Health and Human Development, College of Medicine, College of Agricultural Sciences, the Pennsylvania Office of Rural Health, Penn State Health, Social Science Research Institute, Penn State Outreach, Penn State Clinical and Translational Science Institute, College of Nursing, Commonwealth Campuses, and Penn State’s Office of Government and Community Relations.

Breaking the Silence on Farm Stress



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“You're not alone”



When the manager of a Pennsylvania poultry farm lost her entire flock, job and housing all in one day, she fell into a crisis. Fortunately, Gregory Martin, poultry extension educator, was there to offer crucial support. “You’re the first person to actually talk to me about this,” she told him.

Farming has always been a demanding profession, but today’s farmers face unprecedented pressures that can severely impact their mental health. From unpredictable weather and fluctuating markets to disease outbreaks and evolving consumer preferences, farmers navigate a complex landscape that often feels beyond their control. In response, Penn State Extension offers an array of mental health resources and support.

Unique challenges of farming

Agriculture differs from other jobs where “clocking out” is as simple as shutting a laptop.

“In animal production, every day is a workday,” Martin said. “Christmas is just another day on the farm. And they’re long days. You’re milking every 12 hours. We plan our weddings and funerals between milkings.”

Ginger Fenton, dairy extension educator, pointed out two main sources of stress for farmers: weather and financial pressures.

“We can’t control the weather,” she said.

Martin echoed this. “We put a seed in the ground and hope for rain to make it grow,” he said. “It’s a big risk. Sometimes it happens, and sometimes it doesn’t.”

Adding to these concerns are financial burdens, including high input costs, low commodity prices and debt. Although there are risk management tools, much depends on luck, Fenton said.

Farming is also among the most dangerous work environments in the U.S., with higher fatality rates than emergency responders, according to the National Education Center for Agricultural Safety. With physically demanding work, farmers are at elevated risk of injuries, pesticide exposure and overwork.

Disease outbreaks add further stress. Highly pathogenic avian influenza threatens Pennsylvania’s poultry industry. Fruit and vegetable growers face threats from invasive species and diseases that jeopardize plant health. And farmers constantly must adapt to new regulations.

Beyond external factors, family dynamics create unique pressures on the farm.

“The semiretired father who is still hands-on can make it tough for everyone below him,” Martin said.

Consumer preferences introduce new challenges as the public increasingly seeks transparency and a connection to the story behind their food, Fenton noted. But not all farmers are comfortable with public relations.

Reluctance to seek help

Despite a clear need for support, many farmers hesitate to seek help due to embarrassment and high health care costs. A 2022 survey of Pennsylvania livestock producers revealed that farmers often feel tired, nervous or anxious but are reluctant to seek mental health care. The survey was part of a collaborative initiative by state agricultural organizations and educational institutions, funded by the

*By Alexandra McLaughlin
Illustrations by Nadia Radic*

Pennsylvania Department of Agriculture and the U.S. Department of Agriculture Farm and Ranch Stress Assistance Network.

Knowing where to get help and taking that initial step can be daunting, Fenton noted.

"We're working to get the word out," she said. "The collective effort in the ag industry is lessening the stigma. More people are willing to seek help now, and resources are easier to find than before."

One effective resource is a simple yet powerful tool: wallet cards that say, "Farming is stressful; you're not alone." These cards list the Penn

State Extension website and AgriStress HelpLine for Pennsylvania, available 24/7 to help farmers in crisis.

"We give out a huge amount of them," Fenton said. "I encourage people to take these, and they disappear quickly. I tell people they can call and help someone else too. They might take it for themselves without realizing it."

Another free, anonymous resource is extension's "Farm Stress Real Talk" podcast, which supports farmers, farm families and workers in the agriculture industry experiencing stress. The podcast addresses challenges in farming, offers suggestions and raises awareness about stressful conditions affecting farmers.

"Our thought was farmers could listen to the podcasts in the cab of their tractor or truck while hauling grain or livestock, and nobody else needs to know," Fenton said. "It's anonymous."

Unequal Burden

Research indicates that COVID-19 exacerbated stress for veterans of color and female veterans

The COVID-19 pandemic caused widespread illness and death, economic and employment issues, severe social restrictions, and significant changes to family life. Researchers at the Clearinghouse for Military Family Readiness at Penn State recently published a study in *Stress and Health* examining stress levels of post-9/11 veterans during the pandemic across employment, financial, social and health domains.

"In 2020, at the height of the pandemic, we surveyed more than 3,100 post-9/11 veterans about their stress in various life domains," said Keith Aronson, co-director of the clearinghouse. "In virtually every domain, veterans of color and female veterans reported significantly higher levels of stress than their white male counterparts."

White male veterans reported considerably less stress about job stability than female, Black, Hispanic and "other" racial group male veterans.

Female veterans and veterans of color reported more concern about contracting COVID-19 while at work than white males.

"In terms of financial stress, post-9/11 veterans reported being slightly stressed about paying for essentials, such as food and rent," said co-author Daniel Perkins, co-director at the clearinghouse and professor of family and youth resiliency and policy. "Black male veterans were 13% and female Hispanic veterans 21% more likely than white males to feel stress about paying for essentials."

Social isolation caused slight to moderate stress, with white and Hispanic female veterans feeling more isolated than males of all race/ethnicity groups.

In terms of mental/emotional health, veterans of color reported significantly higher stress than white male peers, with white female veterans also more stressed than Hispanic males. Black females reported significantly higher mental/emotional stress compared to Black, Hispanic and "other" race males. Veterans of color reported higher physical health-related stress than white males.

These findings align with other U.S. studies showing that females and people of color were impacted more negatively by the pandemic than white males. The researchers theorized that COVID-19 exacerbated existing health and social disparities.

"Closing these disparities and reducing barriers to care would likely enhance the health and well-being of veterans of color and females in the event of future health shocks such as the COVID-19 pandemic," Aronson said. —Kristie Auman-Gooding

Recognizing the signs of stress

Martin had a friend in college who died by suicide.

"I missed the signs," he said. "I wasn't trained to recognize them. I wish I had been."

Signs of stress in farmers include irritability, lack of focus and motivation, desperation, chronic illness, loss of interest in hobbies, low energy, and anger.

"Someone who usually cares deeply about their animals might suddenly say, 'I don't care about anything. Let the farm fall apart,'" Martin said.

Changes in a farmer's habits also can be telling

"If every Wednesday morning they joined lunch in the cafe and then stopped, that could be a warning sign," Fenton said.

For anyone interested in learning an emergency mental health intervention for individuals at risk of suicide, extension offers the "Question, Persuade and Refer: Gatekeeper Suicide Prevention Training." This evidence-based training helps individuals recognize warning signs of suicidal thoughts and behaviors, ask questions about how someone is feeling, practice active listening, persuade people to seek help, and refer them to appropriate resources.

"I always say suicide is a long-term solution to a short-term problem," Martin said.

Given the close-knit nature of farming communities, Cynthia Pollich, an extension educator in the food, families and communities unit, advocated for "neighbors helping neighbors" to address mental health concerns.



“The ag community cares about each other and is willing to help those who are struggling.”

“Outsiders can’t always do that,” she said. “When a neighbor notices a friend missed social gatherings, they might knock on the farmer’s door to make sure they’re okay.”

Pollich explained that neighbors can support each other by “letting them know you miss them, you’re concerned and you’re here to listen.”

Martin experienced his own mental health struggles during the avian influenza crisis in 2022. Lancaster County, where he is based, ranks among the top counties nationally in poultry and egg sales. Martin, due to his proximity to the affected premises, was often in the field helping to direct depopulation and disposal efforts.

“I literally saw millions of dead birds for over a year,” Martin said. The fatigue wore on him. His colleagues in extension noticed — and spoke up.

“I have the best people working with me here in Lancaster County,” he said. “They notice things I might miss. Despite looking in the mirror every day, I didn’t see how tired I was.”

A colleague told Martin he looked exhausted and suggested he take a break. Martin took a week off to catch up on much-needed sleep.

“Taking proper care of yourself, getting plenty of rest and taking breaks helps,” he said.

Responding to someone in need

When speaking with the poultry farm manager who lost her flock, job and housing, Martin used his “Mental Health First Aid” training from extension.

Using an evidence-based curriculum from the National Council for Mental Wellbeing, this webinar teaches action steps for helping others and emphasizes the importance of mental wellness and reducing stigma. Participants learn skills for providing initial emotional support, offering practical assistance and connecting individuals to appropriate services.

The farm manager lived in a house on the farm property. When avian influenza hit, the entire farm shut down. Millions of birds were lost, and the farm would be out of production for a long time. The manager was scrambling to find work and a place to stay. She had lived there for more than 25 years.

“Mental health first aid training helps us recognize stress in people and empathize with them,” Martin said. “We’re not psychiatrists, but a resource to connect people with the right help.”

Active listening is crucial to show empathy and fully understand concerns.

“For her, it was about finding shelter and work,” he said. After Martin talked with the manager for about an hour and a half, she calmed down, and everything turned out okay. Concerned individuals who became aware of her plight found her a job.

“She landed on her feet,” Martin said. “But I was worried because

we’ve had suicides after major disasters within the farming community. It takes the farmer to a different point, and they don’t see a way out.”

Extension offers workshops, such as “Communicating with Farmers Under Stress” and “Mending the Stress Fence,” to help community members and agricultural professionals recognize stressors, signs of anxiety and suicide warning signs. These courses, developed by Michigan State University Extension, teach participants to approach and assist farmers who show changes in their mental health and steer them toward resources. Training is available on request by contacting a member of the farm stress team.

The farm stress team comprises educators from multiple disciplines who understand and support the farming community. Their goal is to improve communication with farmers under stress and reduce mental health stigma. While they don’t provide counseling, they offer webinars and workshops on available tools and helplines.

Fenton compares these workshops to insurance: information that’s great to have but you hope you don’t need.

“Some people come to our workshops to be prepared,” she said. “Especially ag industry folks who might encounter difficult situations on farm visits or when talking to farmers — they want to be ready.”

Martin recommends this training for anyone in agriculture’s support structure.

“The bank loan officer, the equipment supplier — they need this training,” he said. “The more people know, the better our community can support agriculture. We’re always one disaster away from collapse, so it’s important to be sturdy, prepared and able to handle whatever comes.”

Avenues for help

Pollich pointed out that farm stress is more than an occupational hazard.

“Being a farmer is your job, but it’s also your identity,” she said. “It might be where your family has lived for 100 years.”

This deep-rooted identity and sense of pride among farmers can contribute to the stigma of seeking help.

“They are strong and have been doing this for generations,” Pollich added. “But they might need a little help.”

Penn State Extension tailors mental health resources to the agricultural community. Martin compares these resources to a seatbelt in a car: “You never know when you’ll need them,” he said. “But when you do, you need them immediately.”

Fenton is encouraged by the sense of camaraderie she sees in the agricultural community.

“The ag community cares about each other and is willing to help those who are struggling,” she said. “Farmers are so resourceful. You see the word ‘resilient’ a lot, but I’d say resourceful. I hope they continue to realize that these avenues for help are out there.”

