



Multistate Research Fund

**IMPACTS**

# MITIGATING STRESS IN FARM ANIMALS

Some environmental conditions and management practices can stress farm animals and impair their health, welfare, and performance. For example, the U.S. dairy industry loses around \$1 billion each year as a result of heat stress that reduces milk production. Meat, dairy, and other animal products are popular, but consumer and producer concerns about animal welfare must be addressed.

Researchers at land-grant universities across the nation are working with the U.S. Department of Agriculture and other partners to measure stress in farm animals and find affordable, efficient ways to improve their welfare and performance.

The multistate framework brings together diverse expertise to work with various stressors, animals, and farm types. Working together also enables researchers to share facilities and other resources.





# RESEARCH HIGHLIGHTS

Collaborative research has led to behavioral, physiological, and immunological biomarkers for rapid detection of animals that are distressed, injured, or sick (Kansas State University, University of Minnesota, University of Nebraska, Texas Tech, Provimi-Cargill). Monitoring and quickly identifying stressed animals helps producers take action to improve animal well-being and minimize loss.

Research has led to new strategies to improve animal health and well-being. Multiple studies showed the importance of nutrition. For example, Colorado State University researchers measured how different feeds affect the digestion and absorption of trace minerals that influence beef cattle health and productivity. Scientists with the USDA's Agricultural Research Service found that replacing dietary antibiotics with a natural amino acid improves pig well-being and productivity, helps them cope with stressors, and reduces feed costs for producers by 18%. Other research helped reduce animal pain and fear. For example, new automated handling methods decrease stress when pigs are loaded for transport (USDA-ARS). Researchers also found less stressful ways to make sows stand up when they are crushing piglets (Kansas State University) and ways to prevent tail biting among pigs without docking the tail (University of Minnesota). Scientists also designed housing, flooring, bedding, and ventilation systems that reduce stress.

Through publications, workshops, and other outreach efforts, project members explained the impacts of stress on farm animals and demonstrated mitigation strategies to producers, veterinarians, policymakers, educators, and fellow scientists. Data on the costs of animal stress have helped convince producers and regulators to adopt stress-reducing tools and practices.

Working on this project, students gained experience that advanced their careers.

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## HELPING ANIMALS BEAT THE HEAT

Scientists at multiple universities identified indicators of heat stress, such as body temperature, respiration, and behavior, and used data to develop sensors, cameras, models, and other tools to predict and monitor heat stress (USDA-ARS, Cornell University, University of Georgia, University of Nebraska, University of Puerto Rico, University of Wisconsin, Ruakura Research Centre). Scientists also gained a better understanding of the biochemical and epigenetic processes by which heat stress affects animals (University of Arizona, Virginia Tech). Understanding and monitoring heat stress enables producers to take action sooner and see how well heat mitigation is working.

Genetic research identified animals that are very resilient or susceptible to heat stress, helping producers minimize deaths and economic losses (University of the Virgin Islands, University of Georgia).

New techniques are helping animals cool off. A conductive cooling system designed by Cornell University scientists decreases dairy cow temperature and respiration, resulting in 5% more milk. USDA-ARS scientists created cooling pads for lactating sows and modified hen perches to circulate cool water. Others improved cooling methods for race horses (University of Kentucky) and identified the most effective, resource-efficient methods for spraying dairy cattle with water (University of California).

University of Puerto Rico scientists identified feeding strategies that mitigate heat stress in tropical sheep and goats.