ARS RESEARCH IN A CHANGING CLIMATE

ARS climate change research addresses the interactions between agricultural production systems, weather variability, and changing climate. ARS is finding ways to **mitigate greenhouse gas (GHG) emissions**, **reduce the effects of climate change on production**, and help **create adaptive and resilient production systems**. ARS supports the **USDA Climate Hubs,** an interagency program that provides region-specific climate science and technology to producers and partners. Finally, ARS climate research data is strategic to U.S. international agreements; it supports ongoing improvements to the accuracy of the National GHG Inventory.

PROVIDING SOLUTIONS

ARS research explores how environmental changes at various scales affect agricultural production systems and develops strategies to protect, adapt, and enhance agricultural production in the face of challenges from weather variability and climate change.

MITIGATING GHG EMISSIONS

ARS researchers in Auburn, Alabama, developed a rapid assessment method for measuring and mapping soil carbon. This can be used by scientists to identify best management practices that maintain soil productivity and help mitigate climate change.

REDUCING THE EFFECTS ON PRODUCTION

ARS scientists and their partners developed Grass-Cast, a grassland productivity forecasting tool that ranchers can use to make adaptive, seasonal grazing management decisions to help maintain the health of their livestock and rangelands.

CREATING ADAPTIVE AND RESILIENT SYSTEMS

ARS researcher in Stillwater, Oklahoma, developed a systematic, step-by-step spillway design guideline to rehabilitate aging embankment dams. The Natural Resources Conservation Service (NRCS) expects the guidelines to be implemented on approximately 1,200 aging USDA-assisted dams.

SUPPORTING THE USDA CLIMATE HUBS

ARS supports five of the 10 USDA Climate Hubs, a program that enables The Climate Hubs provide science-based, region-specific climate information and technologies to agricultural and natural resource managers.

OPPORTUNITIES

- Create a new national climate data and model integration project that will coalesce climate-related information into new models and tools for researchers and producers.
- Expand the Long-Term Agriculture Research (LTAR) Network focus on climate adaptation and resilience.
- Establish regional climate change research teams aligned with each ARS Climate Hub location.
- Develop new animal feeds and strategies that reduce methane emissions.
- Mitigate climate-driven food safety risks caused by food and waterborne pathogens.
- Find new sources of climate resilience in ARS gene banks through leading-edge genetic and genomic studies and breed new climate resilient crops.
- Mitigate climate change in crop production by developing strategies to increase carbon storage and achieve near net zero greenhouse gas emissions.
- Improve management of emerging invasive pests brought about by climate change—developing effective tools to mitigate pests, pathogens, and weeds in crops, livestock and aquaculture systems.
- Carbon storage technologies: improving our ability to capture, measure, model and verify carbon in the agricultural landscape and soils.
- Expand Climate Hub reach and impact, including increased focus on Alaska and Hawaii, establishing a region-focused fellowship program, and building strong ties between the Hubs and the Civilian Climate Corps.

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