AGRICULTURAL EXPERIMENT STATIONS

A System to Address Challenges in Food and Agriculture

Our food and agricultural systems face complex challenges as the physical environment and human societies change. Public investment in research and development is key to increasing agricultural productivity, food safety and security, community resilience, environmental stewardship, and economic growth. As part of the Land-grant University system, and with the support of USDA funding, Agricultural Experiment Stations (AES) and agricultural research programs at universities and historically black and tribal colleges are uniquely positioned to improve natural resources, food and agricultural systems.

WHAT MAKES AES UNIQUE?

Institutions in all 50 states and many U.S. territories with research sites representing diverse ecosystems, communities, and food production systems

A family of land-grant universities directs research that reflects a diverse U.S. population and varied needs

Laboratories, greenhouses, computational centers, equipment, and tools focused on improving the food supply and protecting the environment

Skilled scientists, educators, students, and staff working in fundamental and applied research fields
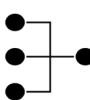
Impartial, verified science, technology, and recommendations

THE POWER OF PARTNERSHIPS

Federal and state funding allows AES to mobilize scientists to respond quickly to local issues

Multistate projects bring together scientists from AES across the country to tackle regional and national issues, creating state synergy, reducing duplication, and leveraging funds, facilities, and other resources

A close relationship with Extension and educators creates a feedback loop from research to application

Strong relationships with government agencies, farm and commodity groups, and the private sector transform innovations into economic development and business opportunities
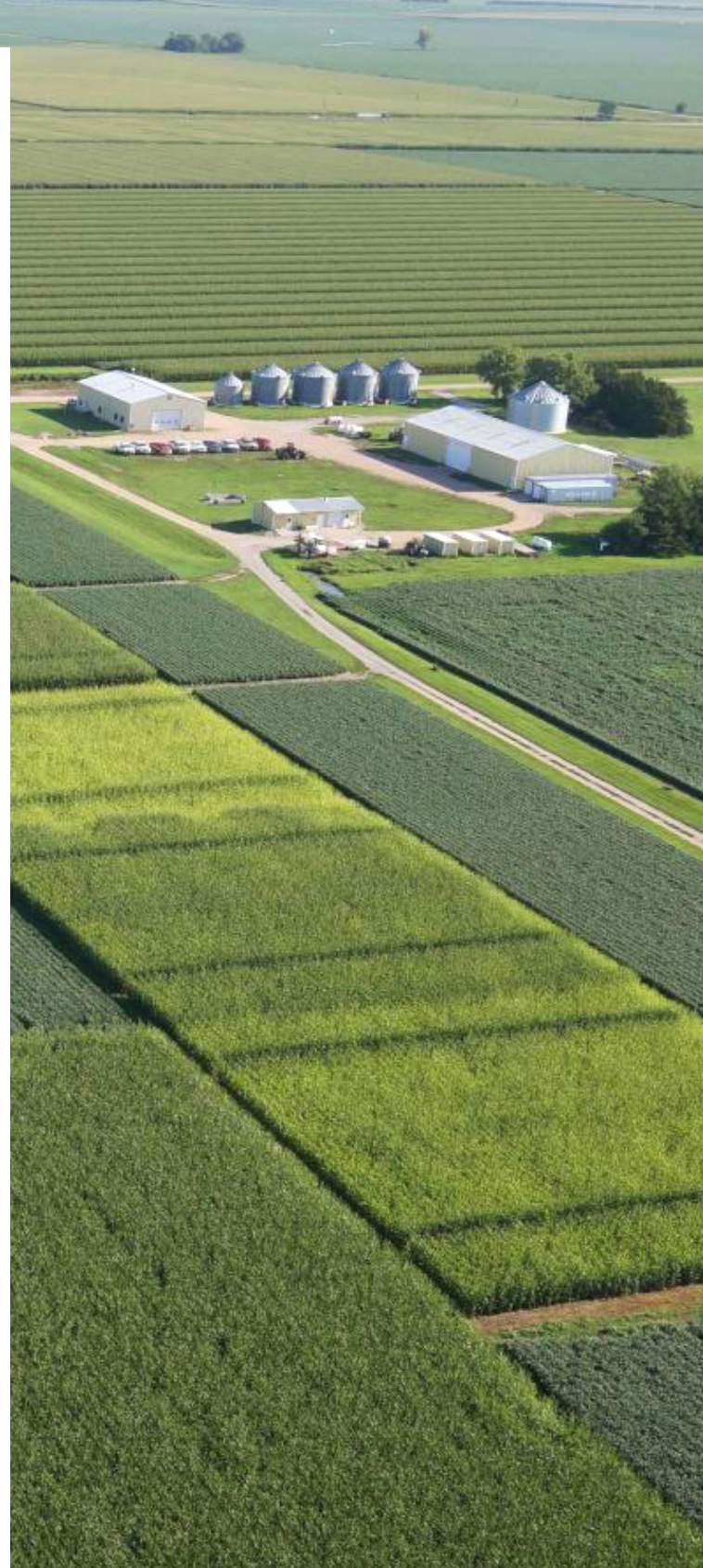
South Central Agricultural Laboratory. Photo by University of Nebraska-Lincoln.

Experiment Station
Committee on Organization
and Policy (ESCOP)

http://escop.info

HOW ARE AES ADDRESSING CHALLENGES IN FOOD AND AGRICULTURE?

Improving sustainability, competitiveness, and profitability

Onion growers applied **75%** less insecticide and saved **$300 per acre** using pest management programs developed by researchers.

Researchers **quadrupled** the length of the strawberry growing season, increasing production **80%**.

Research-based recommendations saved **10,500** honey bee colonies, enough to provide crop pollination worth **$6 million each year**.

Cutting-edge research has minimized the impacts of cattle diseases, which cause **billions of dollars** in losses.

In just one generation, soybean yields have **doubled** and corn yields have **quadrupled.**

Adapting to and mitigating climate change impacts

Researchers have developed crop varieties that grow well on marginal land and bred animals that can tolerate heat.

Researchers found that changes in temperature and precipitation caused soybean yields to be **30%** lower over the last 20 years, resulting in losses of **$11 billion.**

Supporting energy security and the bioeconomy

Growers using recommended lighting and heating sensors and strategies have reduced energy use **up to 30%**.

Researchers increased the oil content of sugarcane tissues **80-fold** and genetically modified cell walls, improving ethanol production efficiency by **more than 60%.**

Scientists developed bio-based textiles that add value to agricultural byproducts, reduce waste, and provide alternatives to synthetic, petroleum-based textiles.

Ensuring a safe, secure, and abundant food supply

Researchers designed antimicrobial sprays, high pressure processing, and other technology that ensures food safety without damaging quality.

24 peanut varieties worth **$200 million per year** were bred from a single peanut sample collected by researchers in 1952.

Improving human health, nutrition, and wellness

Pioneering research on bioactive compounds is guiding diet-based interventions, new food products, and accurate food labels, helping people make healthy choices, stave off illness, and reduce healthcare costs.

85 colleges are using a research-based program to create healthier campuses and encourage healthy diet, exercise, and stress management choices among their students.

Heightening environmental stewardship

Information about the economic value of ecosystem services has helped land managers and policymakers weigh the costs and benefits of management options, estimate losses under certain land use and climate scenarios, and predict how mitigation strategies might reduce losses.

Researchers helped install prairie strips on **35 farms** in **9 states**, reducing soil, nitrogen, and phosphorus runoff from these farms by **up to 95%**.

80% of commercial egg producers have adopted new feeding strategies that reduce ammonia emissions.

Building personal, family, and community resilience

Research on rural areas is guiding programs and policies, increasing the likelihood they successfully meet needs.

Nationwide, residents, businesses, and government agencies use research to guide disaster preparedness and recovery and to adapt to climate change impacts.

Research has shown that diversity and tolerance can lead to richer stores of social capital and economic prosperity.

WHAT DO AES NEED NOW?

With enhanced support, AES and agricultural research programs at universities and historically black and tribal colleges can continue to address challenges in food and agriculture more efficiently than any other system in the world. Filling current gaps and needs will require:

- Enhanced funding to support diverse research, enable exploratory and early-career projects, and give AES the flexibility to respond to emerging local issues

- Resources to improve campus infrastructure and facilities for cutting-edge research

- Interdisciplinary, systems-level research

- Broader focus on sustainability and wellness

- Models and decision-making tools that account for interlinked variables and uncertainty

- Harnessing advances in big data, genetics, nanotechnology, and other emerging fields

- Strategies for communicating information and sharing technology