



# 2022 HIGHLIGHTS



## U.S. DEPARTMENT OF AGRICULTURE RESEARCH, EDUCATION, AND ECONOMICS 2022 USDA SCIENCE HIGHLIGHTS

The REE mission area is comprised of more than 8,500 employees across five component organizations including the Agricultural Research Service (ARS), Economic Research Service (ERS), National Agricultural Statistics Service (NASS), National Institute of Food and Agriculture (NIFA), and Office of the Chief Scientist (OCS), that work together to achieve USDA's science mission. This past year, the REE team made great strides in advancing USDA's priorities to better integrate equity in our research programs, tackle food and nutrition security, develop climate-smart solutions, and build more and better markets.

Key REE accomplishments during 2022 include: *(click to navigate)*

**EQUITY**



**FOOD AND NUTRITION SECURITY**



**CLIMATE SMART AGRICULTURE**



**MORE AND BETTER MARKETS**



Under Secretary Vilsack's leadership REE and USDA's Office of Partnerships and Public Engagements, convened a series of listening sessions with leaders from Hispanic-serving, 1890, 1994, and 1862 institutions. Conversations centered on how USDA can meaningfully enhance its partnerships with Minority-serving Institutions and Tribal partners to catalyze research to support historically underserved groups and improve access to USDA services.

For example, ARS launched a new collaboration with neighboring 1994 Tribal land-grant colleges, Nueta Hidatsa Sahnish College (NHSC) and United Tribes Technical College (UTTC), to expand the growth of heritage corn varieties and consolidate knowledge of culturally significant plants in the region. This research will ensure that native plants with cultural, historical, medicinal, and edible significance remain available for future generations. ARS and both Tribal colleges efforts to preserve these native plants and seed varieties so their legacy can continue will not only safeguard the heritage of Tribal communities in the Great Plains, but also the biodiversity of this region.

In August 2022, NIFA announced the availability of \$250 million in American Rescue Plan Act funding for Minority-serving Institutions to create career development opportunities for the next generation of agricultural leaders. The historic new program, "**From Learning to Leading: Cultivating the Next Generation of Diverse Food and Agriculture Professionals (NEXTGEN)**," will enable 1890, 1994, Alaska Native-serving, Native Hawaiian-serving, and Hispanic-serving Institutions to build and sustain the rising food, agriculture, natural resources and human sciences workforce through scholarship support, meaningful paid internships, fellows, and more.

Strengthening and growing the pipeline of future farmers and ranchers is also vital to the continued success of American agriculture. Beginning farmers and ranchers have unique needs for education, training, and technical assistance. Their success often hinges on access to reliable, science-based information and the latest educational resources so they can improve their operations' profitability and sustainability long-term. In November, NIFA announced a nearly \$24M investment to support 45 organizations across the country that teach and train beginning farmers and ranchers.

ERS awarded more than \$400K to the Agricultural and Applied Economics Association in support of a new five-year partnership to increase diversity in the field of agricultural economics. By expanding the number of students from underrepresented groups pursuing advanced degrees and careers in agricultural economics, both organizations aim to diversify, support and retain a new generation of skilled professionals more representative of today's society.

In November, **NASS launched the 2022 Census of Agriculture**, making it easier than ever for producers to make their voice heard by offering a secure, user-friendly, and time-saving online questionnaire option. Taken every five years, the ag census is the most comprehensive data collection for agriculture in the nation and tells the story of not only U.S. farms and ranches, but also the people who operate them. By completing the survey, producers across the nation can help generate impactful funding and program opportunities that better serve them and future generations of producers. Producers have until Feb. 6 to respond and ensure every voice is counted.

Early last year, NASS also launched a new **respondent portal** aimed at reducing the time needed for ag producers to complete surveys and otherwise make response more convenient. NASS will reach more producers and continue to provide data that reflect the broad diversity of America's farmers and ranchers. The new respondent portal will enable NASS to integrate new sources of data, better collect and use information, and create a more equitable, user-friendly interface for the public.

In March, NASS conducted its first-ever livestream of the Secretary's data report briefing. Now, **several briefings** are available for real-time viewing as data is being released. Livestreaming improves access for the public, increases transparency and understanding of NASS's data and processes. For anyone unable to attend a livestream, a recording is posted to **YouTube** later the same day.

To promote vaccine confidence and uptake, NIFA's Extension Collaborative on Immunization and Engagement (EXCITE) program reached more than 11 million people with vaccine education to hard-to-reach communities across the nation through a partnership with the Centers for Disease Control and Prevention (CDC) and the Cooperative Extension System (CES). The "Vaccinate with Confidence" campaign engaged Land-grant Universities and the CES to improve vaccination coverage in rural and other medically underserved communities. A second phase of the EXCITE program is scheduled to launch in 2023.

In June 2022, USDA released its "**2022 Pollinator Priorities Report**," featuring a new section on equity and inclusivity. The report outlines federally-led efforts to address factors impacting pollinator health. In partnership with the Environmental Protection Agency, OCS worked closely with Tribal organizations to gather input on unique pollinator and habitat research needs of Indigenous communities. USDA strives to promote the voices and needs of diverse, marginalized, and disenfranchised communities in our pollinator research and programmatic activities. In 2023, USDA is expanding its outreach to Hispanic and Latinx communities, with continued input being garnered from Indigenous communities.

ARS converted 67% of its **1890s graduating scholars** into permanent scientific positions. Permanent conversion of scholars is the primary objective of both the 1890 and 1994 USDA National Scholars Program. ARS's conversion rate is one of the highest in the Department. Hiring the scholars establishes return on investment (ROI) and reinforces the training of the next generation of agricultural leaders. Further, such programmatic success demonstrates the department's fulfillment of its agreement with the 1890 institutions and commitment to the community.

NIFA provided more than \$4 million in funds through the New Beginning for Tribal Students program. The New Beginnings program support 1994 Institutions and Tribal students in diverse ways including dual credit programs; tuition and related fees; experiential learning; and student services, including tutoring; counseling; academic advising. The program's overarching goal is to increase the retention and graduation rate of Tribal students.

NIFA allocated about \$7.5 million in funds to the Tribal Colleges Research Grant Program. The Tribal College Research Grant Program helps 1994 Land-Grants become centers of scientific inquiry and learning for remote and rural reservation communities. This funding helps them address important questions impacting their communities. Additionally, the program emphasizes training students in science and enhancing both students' career opportunities and economic vitality in their communities.

NIFA made available about \$12 million through the Hispanic-Serving Institutions Education Grants Program. These monies funded projects at institutions in multiple states to deliver education and training in agricultural disciplines ranging from food and nutrition to climate-smart technologies.

# FOOD AND NUTRITION SECURITY

In December 2022, REE announced the new **Agricultural Science Center of Excellence for Nutrition and Diet for Better Health** (ASCEND for Better Health) in support of President Biden's Cancer Moonshot effort. This virtual center will accelerate research on diet-related chronic diseases. A long-term goal of the center is to translate research into impactful solutions that improve public health and well-being. On January 31, 2023, USDA will host the first community engagement session in partnership with Southern University that focuses on diet-related health disparities faced by African Americans. Additional community engagement sessions will be announced soon.

NIFA leveraged American Rescue Plan funding to expand the impact of the Gus Schumacher Nutrition Incentive Program (GusNIP) to increase consumption of fresh produce and improve health and nutrition in low-resource communities. In November, USDA announced an investment of \$59.4 million to support the GusNIP Produce Prescription and Nutrition Incentive programs designed to encourage families and individuals to eat more healthfully by increasing access to fresh fruits and vegetables. The funding allowed NIFA to expand its reach to many first-time program applicants from underrepresented communities nationwide with projects that allow participants the opportunity to double their fruit and vegetable purchases at no additional cost.

ERS played a key role in helping USDA and our stakeholders understand the impact of the infant formula shortage by providing timely, high-quality and objective research. ERS analysis provided context for disruptions to the infant formula market due to a voluntary recall by a U.S. manufacturer. In 2018, about 56 percent of U.S. infant formula was consumed by infants 0-12 months that were participants in USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The 2022 recall strained U.S. supplies of infant formula, causing reduced availability in grocery stores. The reduction of the domestic infant formula supply in retail channels corresponded with surging imports of infant formula manufactured abroad.

ERS forged a partnership with the Robert Wood Johnson Foundation (RWJF) to support research that will help to overcome structural barriers to equitable access to healthy food. RWJF and ERS announced a call for proposals in April to support research on relevant and timely evidence that informs the USDA, Congress, and the public about the food sector and about key national issues regarding food and health—such as food insecurity, obesity, diet quality, and nutrition assistance programs.

ERS, in collaboration with FNS, also encourages new and innovative research on food and nutrition assistance issues through the Research Innovation and Development Grants in Economics Program (RIDGE). In 2022, a new RIDGE partnership was awarded to Tufts University, the University of Connecticut, and the University of Missouri, and a request for research proposals was released in December.

In May, the Vietnamese Ministry of Agriculture and Rural Development moved forward to further evaluate the ARS-developed African Swine Fever Virus (ASF) vaccine under field conditions within the country. In June, Vietnam announced the licensing of the USDA-ARS ASF vaccine, NAVET-ASFVAC and outlined a two-phased approach for integrating the use of the vaccine in their national ASF control program.

ARS scientists are working on new tests and ways to track COVID in animals. Two of the projects call for developing easy-to-use field tests to quickly identify COVID infection in wildlife and domestic animals. In two other projects, field and laboratory studies will determine how long the virus persists in deer and whether deer or elk can serve as intermediate animal hosts in which the COVID virus can survive in the wild and potentially mutate into new variants. The fifth project calls for developing a cell line model that will let researchers better predict which animal species may act as hosts or reservoirs for COVID virus.

ARS scientists, in a joint analysis completed with scientists from ARS' Swiss counterpart Agroscope, confirmed that genetically modified Bt corn has little impact on nontarget insects and other organisms, especially compared to growing conventional corn. Bt corn is corn that has been genetically modified so that it produces proteins from the bacterium *Bacillus thuringiensis* to control corn borers, corn rootworms and other major pests of corn. This is the largest, highest quality analysis of data ever conducted on Bt corn.

Researchers at ARS's Children's Nutrition Research Center and Baylor College of Medicine in Houston, Texas, examined the relationship between obesity, insulin resistance, cardiorespiratory fitness, and bone mass in Hispanic youth. Findings show that a higher fitness level was positively related to bone health, but obesity and higher body fat had a negative effect on this relationship. This suggests that a higher level of cardiorespiratory fitness and higher lean mass may reduce the adverse effects of obesity and insulin resistance on bone health in children. These findings support the importance of promoting an increase in physical activity to prevent the negative impact of obesity on bone health in children.

NASS has a significant responsibility to count America's food and agricultural products. To achieve this important mission, NASS works with partners like the National Association of State Departments of Agriculture (NASDA). Last year, NASS celebrated its **50th anniversary of partnership** with NASDA to help tell the story of America's farmers and ranchers. NASDA enumerators are the boots on the ground that help reach local communities and collect data. High-quality, impartial data, increases the ability to produce safe and nutritious food for everyone.

An ARS research study showed that adding cooked black beans to a high-fat diet improved sensitivity to insulin and other measures often related to diabetes and restored gut bacteria balance in obese mice.

# CLIMATE SMART AGRICULTURE

The Agriculture Innovation Mission for Climate (AIM for Climate), co-led by the U.S. and United Arab Emirates, seeks to drive climate action by increasing investment and worldwide support for climate-smart agriculture and food systems innovation. Since its launch at COP26, AIM for Climate partners have increased investments to more than \$8 billion, launched 30 innovation sprints, and expanded to 275 partners worldwide. USDA is hosting the **AIM for Climate Summit** on May 8-10 in Washington, D.C.

Drought can have a major impact on irrigated agricultural production. The 2022 ERS report, *Irrigation Organizations: Drought Planning and Response* summarizes information from USDA's 2019 Survey of Irrigation Organizations, the first nationally representative survey of irrigation districts, ditch companies, and groundwater districts in over forty years. The report examines the extent of drought planning by these organizations as well as the most common types of strategies used to improve drought resilience for irrigated agriculture. It also looks at the prevalence of investment in water conservation practices such as improved flow-rate metering, canal lining and piping, and managed aquifer recharge as additional tools for improving drought resilience.

Last year, NASS and NRCS teamed up to conduct the first-ever Conservation Practice Adoption Motivations Survey (CPAMS) aimed at assessing a producer's adoption rates of different conservation practices. There are four different conservation categories which were surveyed: crop practices, grazing practices, confined livestock practices, and forestry practices. Survey data will be used to guide the implementation of NRCS programs in the future.

ARS researchers in Auburn, Alabama, developed a unique mobile system that assesses and maps out soil carbon in real time. The mobile system, when paired with a GPS device, can accurately acquire information about soil carbon content and generate corresponding maps in a rapid, inexpensive, and efficient manner. The data obtained from this new tool helps farmers and other stakeholders better understand how their land management practices impact environmental processes like carbon sequestration, a method of mitigating climate change by storing CO<sub>2</sub> in the soil, rather than releasing it into the atmosphere.

NIFA implemented a Bioproduct Pilot Program to support research studying the benefits of using materials derived from covered agricultural commodities to manufacture construction and consumer products. Increasing production, distribution and sale of biobased products will spur growth in rural economies while reducing the risks of bringing biobased products to the market. Additionally, it will help foster a circular economy where resources can be extracted, consumed and reused in a sustainable manner.

Additionally, NIFA added a new program area priority to the Agriculture and Food Research Initiative's (AFRI) Foundational and Applied Science RFA to spur development and implementation of climate-smart agricultural or forestry practices that will reduce greenhouse gas emissions and create positive economic, environmental and social impacts and released an updated Climate Adaptation and Resilience Plan, outlining how NIFA will combat climate change and its threat to U.S. food and agriculture. Implementation is currently underway and includes program changes and attention to environmental justice.

In December, NIFA **announced an investment of \$9.5 million** to support the scale-up of sustainable bioproduct manufacturing in the United States. Three successful projects are funded through the Bioproduct Pilot Program, which funds research and development of value-added products from agricultural commodities. This program seeks to study the benefits of using materials derived from covered agricultural commodities for manufacturing construction and consumer products. This program is authorized under the Infrastructure Investment and Jobs Act.

In October, USDA Secretary of Agriculture Tom Vilsack and USAID Administrator Samantha Power released the U.S. government's **Global Food Security Research Strategy, FY22-26**, underscoring the U.S. government's commitment to ending hunger and malnutrition and building medium to long-term sustainable resilient food systems. OCS led coordination and delivery of the USDA-approved Global Food Security Research Strategy. The new strategy builds on an exceptional record of achievement from past U.S. investments across agriculture and food systems research.

On February 24, 2022, ERS launched the ERS Charts of Note mobile app. The app provides users a new way to access the popular ERS Charts of Note series, which highlights economic research and analysis on agriculture, food, the environment and rural communities. Featuring 24/7 access to thousands of high-resolution charts, features include the ability to filter charts by topic, links to related ERS research and the option to tailor notifications according to user preference.

ARS developed Yorizane, a new self-pollinating almond variety with superb consumer traits such as size, color, and flavor. Yorizane can produce an abundant harvest of nuts without needing to be pollinated by insects or having another almond variety planted in the same orchard—unlike almost all other commercial trees—that makes it so important to California's \$6-billion-a-year almond industry.

NIFA invested \$25 million through new and existing workforce development programs to provide a pipeline of well-trained workers to meet the demand increased independent processing capacity via ARPA's Meat & Poultry Agriculture Workforce Training program. These investments enhanced equity and capacity across the food supply chain by supporting meat and poultry research, education and training at the local level. Workforce training will increase the resiliency and competitiveness of local and regional supply chains and support the industry's urgent need for highly skilled talent to meet labor demands across the country.

NIFA provided \$5 million for Extension Risk Management Education and Sustainable Agriculture Research Education. These programs will support development of meat and poultry processing training and educational materials for place-based needs, particularly relevant to small- or medium-sized farmers and ranchers.

NIFA established funding for Centers of Excellence at 1890 Land-grant Universities and educational programs at 1994 Land-grant Colleges, Alaska Native and Hawaiian Native Institutions, Resident and Insular Areas, and Hispanic-serving Institutions to develop or enhance existing meat and poultry processing training programs. This funding is critical to our and our partners' efforts to prepare students for careers in the food, agriculture and natural resources sciences.

ERS provided quality, timely and objective research on emerging market and trade events such as retaliatory tariffs, and higher labor costs for producers, as well as global food security and other issues related to the invasion of Ukraine. ERS publications aided in understanding situations including:

- o The economic impact of retaliatory tariffs
- o How fruit & vegetable producers are adjusting to higher labor costs
- o How unstable fertilizer markets created uncertainty, altering 2022 planting intentions

In November, OCS and the Oregon State University Global Hemp Innovation Center organized the **Hemp Research Needs Workshop** focused on all aspects of hemp value chains from production to product manufacturing and for grain, fiber, and chemical market classes of hemp. The workshop brought together leading industry and government experts to help determine what are the research approaches, and effective private-public partnerships required to establish a sustainable, globally competitive hemp industry. In February, the inaugural NASS **Hemp Acreage and Production Survey** reported the value of all U.S. hemp production totaled \$824 million in 2021.

OCS led USDA's development of the **Sustainable Aviation Fuel Grand Challenge Roadmap** (published September 23, 2022) in partnership with the Department of Energy and Department of Transportation. The *Roadmap* outlines a strategy to achieve Sustainable Aviation Fuel supply with a minimum of a 50% reduction in life cycle greenhouse gas emissions to meet 100% of domestic aviation fuel demand by 2050. The goal, set in a **Memorandum of Understanding** by the three Departments, can create opportunities for American farmers, business owners, and rural communities.