A NATIONAL CALL TO ACTION FOR TRANSFORMATIVE INVESTMENT IN FOOD AND AGRICULTURE

THE PROBLEM

The future of food and agriculture in America is at a crossroads. Farm debt and bankruptcy rates are climbing as farmers and ranchers face ongoing economic uncertainty and growing threats from natural disasters, invasive pests, and labor shortages. Rural communities are shrinking. Food is getting more expensive and healthcare costs from diet-related diseases continue to rise. America has always relied on innovation to overcome challenges like these, but USDA data shows that public funding to advance food and agriculture has dropped by one-third[1] since the early 2000s, even as our international competitors continue to invest more.

The result? U.S. agricultural productivity growth is slowing[2] at a time when the stakes have never been higher. Current funding for research and development is not keeping up[3] with the global demand for food, and we are losing scientific expertise without enough graduates ready to step in. If we fail to act now, our food supply, public health, and economy are all at risk. The longer we wait, the further we fall behind other nations and the greater the cost to Americans.

THE CALL TO ACTION

It is not too late to change course. With renewed, transformational investment in food and agriculture, we envision a future where:

- **Americans can access safe, affordable, and nutritious food and live longer, healthier lives.**
- **Communities thrive through economic development and local leadership.**
- **U.S. farmers and ranchers are more resilient and profitable.**
- **A skilled workforce is ready to fill a wide range of in-demand careers across food and agriculture.**
- **Young people are empowered with the real-world skills they need to succeed in life.**

Together, we can ensure that American agriculture not only keeps pace but leads the world. By building more resilient supply chains, supporting rural prosperity, and protecting – and growing – the nearly 49 million jobs[4] in food and agriculture, we invest in our food and nutrition security, and with it, our national security.

THE OPPORTUNITY

Land-grant universities, located in every U.S. state and territory, are uniquely positioned and ready to make this future a reality by providing real-world solutions that support farmer profitability and communities. These solutions will rely on people leveraging cutting-edge technology to develop and deliver breakthrough discoveries that lead to new products and markets. It will also mean working closely with stakeholders across agriculture to ensure the right solutions reach farmers and communities.

The land-grant system has a proven track record of collaborative research, academic training, trusted local expertise through Cooperative Extension, youth development programs such as 4-H, and strong relationships with agriculture stakeholders and the private sector. This work provides a strong ROI[1]: according to USDA, every $1 invested in public agricultural research returns about $20 to the economy.

To keep pace with growing challenges in food and agriculture, increased federal funding for research and attracting, developing, and retaining top talent is essential to fully leverage the nationwide infrastructure and networks already in place. **With bold public investment in the land-grant university system and its partners, the U.S. can build a healthy, resilient future for families, farmers, and communities.**

Sources: [1] Amber Waves. USDA Economic Research Service. Retrieved from https://www.ers.usda.gov/amber-waves/2022/june/investment-in-u-s-public-agricultural-research-and-development-has-fallen-by-a-third-over-past-two-decades-lags-major-trade-competitors; [2] 2025 Global Agricultural Productivity Report. Virginia Tech. Retrieved from https://vtechworks.lib.vt.edu/server/api/core/bitstreams/a459e229-ecf0-44f2-b5ce-3459f72a561a/content; [3] Persistence Pays: US Agricultural Productivity Growth and the Benefits from Public R&D Spending Series. European Review of Agricultural Economics. Retrieved from https://academic.oup.com/erae/article-abstract/37/3/428/424098; [4] 2026 Feeding the Economy Report. John Dunham & Associates. Retrieved from https://feedingtheeconomy.com/wp-content/uploads/2026/03/Feeding-the-Economy-Report-2026.pdf.

BUILDING RESILIENT FOOD SYSTEMS FOR OUR NATIONAL SECURITY

U.S. agricultural productivity has stagnated over the past decade while other nations have surged ahead, putting national security, food security, and farm profitability at risk.

Now is the time for strategic investments in agricultural research, education, and Cooperative Extension to strengthen local and regional food systems nationwide. Transformative innovations across food production, processing, and distribution are essential to ensure Americans have affordable, nutritious, and safe food. By building more resilient food systems, we can address current economic uncertainty and high costs, helping farmers stay profitable amid extreme weather and biosecurity threats.

GOAL:

Strong supply chains, rural prosperity, and affordable, healthy food for all Americans.

IN TEN YEARS, WE WILL:

- ✓ Increase crop output per acre by ≥10% from 2020 levels.
- ✓ Reduce agricultural inputs–e.g. fertilizer, chemicals, water, and labor–by 10% without negatively impacting yields.
- ✓ Increase livestock feed use efficiency by 10%.
- ✓ Increase nitrogen use efficiency by 10%.

WHAT'S AT STAKE

Delaying investment increases the likelihood of **food supply disruptions, hunger, foodborne illness,** and **agricultural disease outbreaks** that threaten our national security. The longer we wait, the further we fall behind other nations and the greater the cost to Americans.

THE LAND-GRANT UNIVERSITY ROADMAP

Increased investment in agricultural research, education, and Extension can strengthen our food system and our national security by:

Increasing farm productivity through responsible management.

PROBLEM: U.S. agricultural productivity growth—producing more with the same inputs—has declined[1] in recent years, jeopardizing our ability to feed a growing population with healthy food. Innovations can help farmers participate more fully in the bioeconomy and access new markets with value-added crops.

LAND-GRANT SOLUTIONS:

- Improve crop and livestock genetics to increase yield efficiency.
- Help farmers optimize their land use through locally-adapted crops and livestock that are resilient to variable weather conditions.
- Conduct cost-benefit, life cycle, environmental impact, and social cost-benefit analyses to identify opportunities to improve efficiency and reduce inputs.
- Educate and train the future workforce through 4-H and university education to develop and utilize innovations that address agriculture's evolving needs.

Protecting food safety and agricultural biosecurity.

PROBLEM: The U.S. food system is vulnerable to disruptions from natural and intentional biosecurity threats. Crop and animal diseases, pathogens, and pests are natural threats to the food supply, costing billions of dollars[2] per year and driving up food prices for consumers. These threats can also be weaponized, resulting in potential disruptions regionally to globally.

LAND-GRANT SOLUTIONS:

- Develop and implement sensors for rapid identification of Highly Pathogenic Avian Influenza and similar diseases.
- Develop rapid detection techniques for major emerging pests and diseases, including New World Screwworm, Foot and Mouth Disease, African Swine Fever, and Wheat Stem Rust.
- Develop genetic resistance in crops to existing pathogens and diseases, such as fusarium head blight, citrus greening, and Soybean Sudden Death Syndrome.
- Develop improved controls for pests of major agronomic importance, including Spotted Lanternfly and Varroa Mites.

Supporting farm profitability.

PROBLEM: Farmers face societal, environmental, and economic challenges. Between 2017 and 2022, the U.S. lost 141,733 farms,[3] a 7% decline. Farm debt and bankruptcy rates climbed in 2025, exacerbating farmer stress at a time when production costs remain stubbornly high.

LAND-GRANT SOLUTIONS:

- Apply data-driven approaches to improve efficiency and achieve higher agricultural output using fewer resources.
- Connect farmers to local markets through Extension programs and technical assistance.
- Provide training and support to develop urban and community food systems, such as facilitating land access for farmers and providing communities with scalable, space-efficient production methods.

Building resilient food supply chains.

PROBLEM: Supply chain disruptions that limited product availability accounted for up to 48% of food price increases[4] from 2020 to 2024.

LAND-GRANT SOLUTIONS:

- Expand local fresh fruit and vegetable production, including using season-extending technologies.
- Develop crops resilient to drought, disease, and extreme weather by increasing crop diversity through research on emerging crops.
- Develop and deploy technologies that address extreme weather, water scarcity, and agricultural labor.

Reducing food waste.

PROBLEM: The U.S. wastes about 120 billion[5] meals' worth of food at an estimated cost of $382 billion.

LAND-GRANT SOLUTIONS:

- Develop models for reducing food waste through better supply chain planning and use of data.
- Develop and deploy new technologies for reducing postharvest losses, extending product shelf life, and implementing sustainable packaging.
- Develop new uses for agricultural byproducts.
- Educate stakeholders on practices that minimize waste from field to retailer to consumer.

A resilient food system will safeguard our national security, strengthen our economy, and secure America's food future for generations to come.

Sources: [1] Global Agricultural Productivity (GAP) Report. Virginia Tech. Retrieved from https://news.vt.edu/articles/2025/10/cals-2025-gap-report.html; [2] The Mean Sixteen. Farm Journal Foundation. Retrieved from https://www.farmjournalfoundation.org/post/new-report-analyzes-impact-of-pest-and-disease-outbreaks-in-agriculture; [3] 2022 Census of Agriculture. USDA Economic Research Service. Retrieved from https://www.ers.usda.gov/data-products/charts-of-note/chart-detail?chartId=108629; [4] Decomposing Food Price Inflation into Supply and Demand Shocks. University of Georgia. Retrieved from https://agecon.uga.edu/content/dam/caes-subsite/ag-econ/documents/cvs/cvs-fall-2024/Decomposing%20Food%20Price%20Inflation-September2024.pdf; [5] 2025 ReFED U.S. Food Waste Report. ReFED. Retrieved from https://refed.org/uploads/refed-us-food-waste-report-2025.pdf?_cchid=3f68e988d1f538626f8069df6771e1df.

Success Metric Citations: Thomson, Allison, et al. "National Indicators Report: Environmental Outcomes from On-Farm Agricultural Production in the United States." Field to Market. 4th ed. (2021). Tilman, David, et al. "Global food demand and the sustainable intensification of agriculture." Proceedings of the National Academy of Sciences 108.50 (2011): 20260-20264.

IMPROVING AMERICA'S HEALTH

Our nation is facing a public health crisis. Life expectancy in every U.S. state lags behind[1] the average for comparable countries despite spending more than $5 trillion yearly[2] on health care.

A healthy population is essential for the future of the country and our national security by maintaining a stable workforce. Research, education, and Cooperative Extension can improve the health of Americans and reduce healthcare costs by using data, technology, and community engagement to promote healthier diets, support well-being, and increase access to preventative care.

WHAT'S AT STAKE

Inaction will contribute to a **sicker population, declining life expectancy, growing healthcare costs, increased absenteeism at work and school,** and a **weakened national defense.**

GOAL:

Healthier Americans and reduced healthcare costs.

IN TEN YEARS, WE WILL:

- ✓ Achieve a 50% annual increase in improved diet quality and/or improved physical activity practices among adults and youth who participate in land-grant university nutrition and health programs.
- ✓ Provide foundational training and continuing education to 50,000 community health professionals annually.
- ✓ Achieve at least a $10 savings in healthcare costs for every $1 invested in land-grant university nutrition and health programs.

THE LAND-GRANT UNIVERSITY ROADMAP

Increased investment in research, education, and Extension can improve the health and well-being of Americans by:

Preventing chronic disease through nutrition.

PROBLEM: Poor diets contribute to rising rates of chronic diseases such as heart disease, type 2 diabetes, and obesity. Healthier diets could save $50 billion[3] in healthcare costs.

LAND-GRANT SOLUTIONS:

- Advance precision and personalized nutrition research to improve health outcomes, reduce diet-related disease, and support cognitive health across Americans' lifespans.
- Identify opportunities to leverage AI in food processing to increase access to safe, healthy foods.
- Use dietary patterns and evidence-based strategies to predict health outcomes and design interventions that promote healthy eating and prevent chronic disease.
- Expand education and community programs to help people put nutrition recommendations into practice and improve public health.
- Train the workforce through experiential learning in food as medicine and exercise science.

Increasing physical activity to support health.

PROBLEM: As of 2020, only one-quarter[4] of adults aged 18 and over met recommended physical activity guidelines. Physical inactivity currently costs the U.S. $192 billion[5] in healthcare expenses.

LAND-GRANT SOLUTIONS:

- Help people be more active through environmental, community, and technology-based interventions–including Extension programs, community planning, fitness tools, and AI-driven analytics.
- Develop, implement, and assess individualized and community-based exercise programs to promote physical and mental health across the lifespan.
- Investigate how exercise may improve health outcomes and vaccine responses.

Increasing access to public health education and preventative medicine.

PROBLEM: Only 8% of Americans[6] undergo routine preventative screenings, and rural Americans are even less likely to have access to these services and other resources. Expanding the reach of health education will improve detection, management, and prevention of chronic diseases and reduce medical costs. For example, every $1 invested in vaccine programs averts around $20 in healthcare costs[7].

LAND-GRANT SOLUTIONS:

- Deliver and evaluate effective health and nutrition communication to counter misinformation and improve health literacy.
- Increase the use of screenings, preventative medicine, and ongoing health monitoring and expand Extension's immunization education efforts to reduce the prevalence or severity of diseases.
- Provide basic training and continuing education to health ambassadors, community health workers, volunteers, and community members.

Protecting the health and safety of farmers and agricultural workers.

PROBLEM: Agriculture is one of the most dangerous professions. Farmers and agricultural workers have unique health challenges, including mental health concerns, zoonotic disease transmission, pesticide exposure, and workplace safety risks.

LAND-GRANT SOLUTIONS:

- Conduct assessments to guide interventions that address health issues facing farmers and other agricultural workers, including mental health, zoonotic disease transmission, safe use of pesticides, and workplace safety.
- Provide health and safety education to those most at risk, including older farmers and migrant farm workers.
- Study how common stressors in the agricultural industry, including financial instability, isolation, and weather unpredictability, affect health outcomes, such as immune health, to identify effective interventions.

Supporting mental health in rural communities.

PROBLEM: Approximately one in five[8] rural adults experience mental illness, and suicide rates nearly doubled [9] during the past two decades. However, many rural communities lack access to mental health resources.

LAND-GRANT SOLUTIONS:

- Educate community members to spot early signs of stress, depression, mental illness, and suicide risk.
- Support farmers' and farmworkers' mental health through Extension's farm stress and suicide prevention trainings, support groups, and telehealth services.
- Assess the impact of exercise on mental health, with a goal to reduce the need for pharmacological intervention.

Strengthening local and regional food systems that provide access to healthy food.

PROBLEM: Failure to ensure access to safe, affordable, nutritious foods is a major threat to public health and will weaken our nation's economy. Establishing local food systems in both urban and rural communities can improve food access.

LAND-GRANT SOLUTIONS:

- Deliver technical assistance and foster connections between farmers and local markets in both rural and urban communities. This also helps strengthen farm viability and reduce farmer stress.
- Encourage the local production and distribution of healthy foods through on-site outreach at farmers markets and schools.
- Reformulate food products to improve nutrition for better health.
- Develop crop and livestock genetics for improved nutritional value and functionality using next-generation tools such as CRISPR and biofortification.

Strategic investment in agricultural research, education, and Extension will make America healthier by improving access to nutritious food, preventing disease, expanding physical and mental well-being, and reducing soaring healthcare costs.

Sources: [1] How does U.S. life expectancy compare to other countries? Peterson Center for Healthcare/KFF. Retrieved from https://www.healthsystemtracker.org/chart-collection/u-s-life-expectancy-compare-countries; [2] National Health Expenditure Accounts (NHEA). Centers for Medicare & Medicaid Services. Retrieved from https://www.ncei.noaa.gov/access/billions/summary-stats/US/1980-2020; [3] Poor diets linked to $50 billion in U.S. health care costs. Harvard T.H. Chan School of Public Health. Retrieved from https://hsph.harvard.edu/news/poor-diets-health-care-costs/; [4] National Center for Health Statistics Data Brief No. 443. U.S. Centers for Disease Control and Prevention. Retrieved from https://www.cdc.gov/nchs/products/databriefs/db443.htm; [5] Physical inactivity leads to $192B in American healthcare costs. University of Georgia College of Public Health. Retrieved from https://publichealth.uga.edu/physical-inactivity-leads-to-192b-in-american-healthcare-costs/; [6] Preventive healthcare policies in the US: Solutions for disease management using Big Data Analytics. J Big Data. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC7309216/; [7] The Value of Vaccines: Investments in Immunization Yield High Returns. International Vaccine Access Center. Retrieved from https://immunizationevidence.org/the-value-of-vaccines-investments-in-immunization-yield-high-returns; [8] Mental health & access to care in rural America. National Alliance on Mental Illness. Retrieved from https://www.nami.org/wp-content/uploads/2023/07/NAMI_MHinRuralAmerica.pdf; [9] National Center for Health Statistics Data Brief No. 373. U.S. Centers for Disease Control and Prevention. Retrieved from https://www.cdc.gov/nchs/products/databriefs/db373.htm.

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PROMOTING 4-H AND POSITIVE YOUTH DEVELOPMENT

Land-grant universities are uniquely positioned to help the next generation be ready for anything through youth development programming and partnerships such as 4-H—America's largest youth development organization. Delivered through the Cooperative Extension System, 4-H helps young people ages 5 to 19 in every state find their spark, build real-world skills, and grow into resilient, adaptable, lifelong learners.

GOAL:

Empower 10 million young people with essential life and work skills through 4-H.

IN TEN YEARS, WE WILL:

- ✓ Expand external partnerships in all communities 4-H serves.
- ✓ Offer dual-enrollment, industry-recognized credentials, certificates, microcredentials, or apprenticeships through every land-grant 4-H program.
- ✓ Engage 5 million 4-H alumni to support program success as mentors and community leaders.

WHAT'S AT STAKE

Six million young people currently benefit from 4-H, but millions are missing out due to limited program resources. This has a ripple effect: every $1 invested in a 4-Her results in a $40 return in economic benefit[1] to youth, their families, and communities.

We have the opportunity to create a Ready Generation. Research[2] shows that 4-Hers are:

- **2x more likely to live life with purpose**
- **2x more likely to be a leader**
- **4x more likely to give back to the community**
- **4x more likely to feel competent**

THE LAND-GRANT UNIVERSITY ROADMAP

Investment in agricultural research, education, and Extension can increase the impact of 4-H by:

Serving all youth.

PROBLEM: Many youth in both rural and urban areas lack access to consistent mentoring and hands-on learning opportunities.

LAND-GRANT SOLUTIONS:

- Expand 4-H's partnerships with schools, employers, and local organizations.
- Increase awareness and understanding of agriculture through interactive STEM activities and hands-on learning opportunities.
- Increase the number of trained staff, volunteers, and partners, strengthening community leadership.

Developing the next generation of innovators, entrepreneurs, and scientists.

PROBLEM: Many employers report difficulty finding workers with verified technical and workplace competencies. As of 2023, less than one-third[3] of high school graduates reached college readiness benchmarks in STEM subjects. Furthermore, youth need more support[4] to develop essential career, life, and technical skills that will help them succeed in the future.

LAND-GRANT SOLUTIONS:

- Increase reach of science-based programming that improves STEM literacy and helps young people understand how to use technology, like AI, responsibly.
- Expand industry-aligned credentialing, certification, apprenticeship, and microcredential pathways that help youth and adults gain verified skills in agriculture, technology, natural resources, health, entrepreneurship, and skilled trades.

Strengthening youth leadership, critical thinking, and engagement in their communities.

PROBLEM: Employers say recent graduates lack real-world skills such as adaptability and creative thinking.

LAND-GRANT SOLUTIONS:

- Expand 4-H programs that teach real-world problem-solving, communication, and teamwork.
- Increase teen 4-H retention by connecting them to leadership development pathways and college credit opportunities.
- Expand 4-H teen and alumni engagement as mentors to younger members.
- Engage 4-Hers in community-level volunteer activities, building their capacity and motivation to remain involved as adults, employers, and local organizations.

Supporting the physical and mental well-being of young people and helping them grow into healthy, confident, and capable adults.

PROBLEM: 7 in 10 teens[5] have experienced struggles with mental health.

LAND-GRANT SOLUTIONS:

- Increase the number of places where youth can belong, develop confidence, and contribute to their communities. 4-H serves as a "third space" besides home and school.
- Enhance education for 4-Hers about healthy lifestyle habits like nutrition, exercise, and screen time.
- Advance research on positive youth development principles and youth engagement that result in long-term outcomes like happiness, a sense of purpose, and life satisfaction.

Connecting youth to higher education and careers in food, agriculture, and natural resources.

PROBLEM: Over 104,00 job openings[6] in the food, agriculture, renewable natural resources, and environmental sectors are expected annually between 2025 and 2030 for individuals with college degrees, but there won't be enough graduates in these fields to fill them. Many youth and adults face barriers to accessing affordable pathways that lead to industry-recognized credentials, certifications, and employment opportunities.

LAND-GRANT SOLUTIONS:

- Increase youth engagement in career immersion experiences such as job shadowing, internships, and mentoring.
- Develop and expand dual enrollment and college credit opportunities for 4-Hers in programs such as digital and precision agriculture, food safety, and conservation.
- Expand 4-H curriculum and experiences in emerging STEM fields that apply to agriculture, environmental sciences, and nutrition, such as AI, robotics, and the bioeconomy.

Expanded investment in agricultural research, education, and Extension will prepare 10 million ready, young people who are healthy, productive, and engaged.

Sources:
[1] Finster, M., et al. (2023). Exploratory Cost-Benefit Study of 4-H; [2] 4-H Impact. National 4-H Council. Retrieved from https://4-h.org/about/research/4-h-impact; [3] Elementary and Secondary STEM Education. Science & Engineering Indicators. Retrieved from https://ncses.nsf.gov/pubs/nsb202331/executive-summary; [4] Youth Voice Survey. National 4-H Council. Retrieved from https://4-h.org/about/blog/new-4-h-survey/; [5] 4-H Youth Mental Health Survey. National 4-H Council. Retrieved from https://4-h.org/about/research/teen-perspectives/4%E2%80%91h-youth-mental-health-survey/; [6] Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources and the Environment, United States, 2025-2030. USDA National Institute of Food and Agriculture/Purdue University. Retrieved from https://ag.purdue.edu/news/2025/11/employment-outlook-remains-strong-for-agriculture-graduates.html.

PROMOTING ECONOMIC DEVELOPMENT FOR THRIVING COMMUNITIES

Rural areas face growing uncertainty. Where will the next generation choose to raise their families? How can communities bring back jobs? How can farmers stay in business and support their local communities? How should communities best prepare before the next natural disaster strikes?

Community economic development programs from land-grant universities develop and use science-based recommendations to address these significant challenges but they are currently underfunded and understaffed. Investment is needed in research, education, and Cooperative Extension to help rural communities take control of their own futures by supporting small businesses, empowering community leaders, and preparing the future workforce.

GOAL:

Thriving economies and a better quality of life in rural communities across America.

IN TEN YEARS, WE WILL:

- ✓ Increase small business formation and 5-year retention rates by 10% in sectors aligned with land-grant university programming.
- ✓ Increase rural employment growth rates by 10% in sectors aligned with land-grant university programming.
- ✓ Increase community disaster resilience by 10%* in communities developing plans and policies with direct land-grant engagement.

** A 10% increase in disaster resilience as determined by the composite total resilience score of the BRIC index, cited at end of document.*

WHAT'S AT STAKE

Without increased investment in personnel, programming, educators, and technology, rural America will continue to **lose population, farmers, businesses, workers,** and **farmland**.

THE LAND-GRANT UNIVERSITY ROADMAP

Increased investment in agricultural research, education, and Extension can advance community economic development by:

Fostering economic growth across agriculture and other rural industries.

PROBLEM: In 2025, U.S. farm bankruptcies rose 46%[1] compared to 2024 and 45% of small business owners experienced a drop in net profit[2].

LAND-GRANT SOLUTIONS:

- Provide science-based technical assistance to promote the adoption of production practices that support farm success and profitability.
- Support tourism–including agritourism–and outdoor recreation's role in responsible rural economic development through capacity building in planning, destination promotion, and resource management.
- Train the next generation of rural business leaders in decision tools and market-based approaches that improve farm and non-farm commercial profitability.

Developing the future rural workforce and creating pathways to sustain careers for rural populations of all ages.

PROBLEM: Rural Gen Zers are less likely[3] than their urban peers to say good jobs are available in their communities, and technological and economic changes are bringing increased employment risks for the current workforce. A younger and more adaptively-skilled workforce is essential to the future of rural economies.

LAND-GRANT SOLUTIONS:

- Ensure communities can sustain and grow businesses by developing a labor force with the 21st-century skills needed to meet evolving industry demands.
- Provide rural youth with opportunities through 4-H and university programs for middle and high schoolers to discover future occupations in agriculture, veterinary science, technology, and entrepreneurship that allow them to remain in rural America.
- Develop science-based tools to better anticipate current and future employment skill needs and expand community-based partnerships and Extension programming to provide forward-looking skills training to meet projected workforce needs.

Preparing communities for natural disasters.

PROBLEM: Rural communities often struggle with weather-related disaster response and recovery and have access to fewer disaster and emergency resources. Every $1 invested in disaster preparedness saves an estimated $13[4] in damages, cleanup, and economic losses.

LAND-GRANT SOLUTIONS:

- Educate property owners about property protection and emergency preparedness.
- Participate and contribute to municipal, county, regional, and state policy development related to community-level disaster preparedness and resources.
- Develop and increase adoption of community and regional disaster preparedness indices to enable communities to understand risk and progress toward reducing risk.

Adapting to shifting demographics and land use.

PROBLEM: Rural America's population declined[5] from 2010 to 2020, but rural counties grew post-pandemic, mainly without an increase in working-age residents. Additionally, the number of U.S. farms in 2024 was down 8% since the previous Census of Agriculture[6].

LAND-GRANT SOLUTIONS:

- Use economic data to identify land use trends and develop strategies, including land use planning, to preserve farmland from competing uses.
- Develop tools that identify local factors contributing to rural population losses, stagnation, or growth, and aid community and regional planning to identify data-informed strategic pathways forward.
- Develop evidence-based strategies to create communities where people want to live, work, visit, and learn.

Supporting entrepreneurship.

PROBLEM: Nearly half of all new businesses fail by their fifth year[7] due to challenges with costs, marketing, and competition, and rural areas are expected to face substantial losses in existing businesses as the "silver tsunami" of Baby Boomer generation retirements leads to closures[8].

LAND-GRANT SOLUTIONS:

- Provide local business leaders training and counseling, including support for business succession and entrepreneurship through acquisition, to build and retain "Main Street" businesses.
- Develop entrepreneurship incubation and acceleration programs to help grow and scale businesses.
- Partner with Small Business Development Centers and other local resources to create a collaborative, systems approach in support of entrepreneurship.

Improving access to essential services, infrastructure, and technology.

PROBLEM: Rural America faces severe infrastructure challenges due to low population density, high per-household costs, and historical underinvestment. 30%[9] of U.S. households currently have no or limited access to the internet. One-third of all rural hospitals are currently at risk of closure[10].

LAND-GRANT SOLUTIONS:

- Develop evidence-based strategies that improve transportation, housing, energy, healthcare, and other physical infrastructure to enable community growth and resiliency.
- Collaborate with the public and private sector to expand coverage to help rural residents access and use broadband effectively.
- Invest in updated technology to facilitate training and learning opportunities in the community.

Empowering local leaders with data and skill development.

PROBLEM: Rural leaders often struggle to access reliable and complete data essential for effective policy making.

LAND-GRANT SOLUTIONS:

- Provide access to and understanding of how to use research-based data sets to support community livability and resilience.
- Teach skill development in public decision making, civic engagement, leadership, conflict resolution, and media and digital literacy.
- Develop state-of-the-art data science tools that help rural policy makers and leaders plan and assess investments, enabling communities to better address their unique challenges and opportunities.
- Promote coordination and collaboration across land-grant universities and their partners to address region-specific issues.
- Increase the number of students trained as community and economic development policy practitioners.

Improving energy efficiency and renewable energy production.

PROBLEM: Rural Americans spend a disproportionately high share of their income on energy bills. Renewable energy production can provide an economic boost to rural communities.

LAND-GRANT SOLUTIONS:

- Advance research on renewable energy sources, such as biomass, and innovations that boost energy efficiency.
- Develop outreach strategies to help landowners adapt to diversifying land use opportunities, such as using land for both solar power and agriculture.
- Prepare a workforce of experts trained in engineering, robotics, systems management, and environmental science.

Strategic investment in agricultural research, education, and Extension will expand opportunity, strengthen local economies, and ensure every community can thrive in a changing world.

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Success Metric Citations: U.S. Census Business Formation Statistics (https://www.census.gov/econ/bfs/index.html) overlaid with North American Industry Classification System - NAICS (https://www.census.gov/naics/) codes associated with programs administered by extension and land-grants. Baseline Resilience Indicators for Communities (BRIC) Index: https://sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/bric/. U.S. Census Bureau - Center for Economic Studies - Business Dynamics Statistics (2023): https://bds.explorer.ces.census.gov. Occupational Employment and Wage Statistics (OEWS) Tables: https://www.bls.gov/oes/tables.htm

PROTECTING AMERICA'S WATER SUPPLY

Communities across the nation are experiencing the consequences of too much water, too little water, and water that is unsafe to use. Reliable access to safe water is fundamental to agriculture, public health, ecosystems, and the economy.

To combat the growing threats of floods, droughts, and water pollution, strategic investment in research, education, and Cooperative Extension is needed to boost productivity, enhance water efficiency, protect water quality, and support watersheds.

Land-grant universities are uniquely equipped to address these challenges with community-led solutions. Interdisciplinary research and Extension teams can effectively implement innovations throughout the entire food system at individual, community, state, and national scales.

GOAL:

Clean, safe water for agriculture and communities.

IN TEN YEARS, WE WILL:

- ✓ Reduce the waterways polluted with high levels of nutrients, pathogens, bacteria, sediment, and pesticides by 10%.
- ✓ Increase water use efficiency by 50% across food and agricultural systems, including production and processing.
- ✓ Strengthen agricultural system resilience, such as by reducing production losses from waterlogging, flooding, and drought by 50%.

WHAT'S AT STAKE

Today's water challenges are far reaching and growing. **Droughts** cost the U.S. more than $6 billion[1] per year and floods cost approximately $5 billion[2] per year. **Strained drinking water systems** drive up costs for both households and agriculture. Low water levels cause **economic disruption** by slowing barge traffic on rivers, reducing U.S. farmers' competitiveness, hurting ecosystems, threatening hydropower production, and reducing local recreation and tourism opportunities. **Unsafe water** due to contaminants poses a serious risk to public health. If we don't address these issues now, they will just become more difficult and costly later.

THE LAND-GRANT UNIVERSITY ROADMAP

Increased investment in agricultural research, education, and Extension can protect our water supply and improve the lives of all Americans by:

Protecting and improving water quality.

PROBLEM: Agricultural runoff impairs water quality in rivers and streams, lakes, and wetlands. About 46% of U.S. rivers and streams have excess nutrients, and only 28% are assessed[3] as healthy. By adopting water conservation practices, farmers and ranchers can reduce the runoff of contaminants and pollutants, prevent soil erosion, and maintain productivity.

LAND-GRANT SOLUTIONS:

- Develop new technologies to improve pesticide and herbicide management and improve precision irrigation, including using AI.
- Prepare a workforce of experts trained in water resource management.
- Advance best practices, tools, Extension programs, and policies that improve and protect water quality.
- Coordinate multi-state collaborations with communities, public officials, and neighboring educational institutions to address water quality challenges.

Facilitating wise water use and resource management.

PROBLEM: Agriculture accounts for nearly half[4] of all freshwater withdrawals. To conserve water and maintain productivity, agriculture needs improved technologies and management strategies.

LAND-GRANT SOLUTIONS:

- Develop technologies and promote practices that increase water use efficiency across food and agricultural systems, including production and processing.
- Develop drought and flood tolerant crops through research and provide outreach and education to farmers as they decide the best varieties to grow.
- Advance best practices, tools, and policies to improve crop and livestock production efficiency through research and Extension programs.
- Advance decision support tools and related products to improve the usefulness and usability of weather forecasting data so that farmers and ranchers can make well-informed decisions.
- Manage water as a connected system across agriculture, ecosystems including healthy forests, and communities, aligning use with basin-scale priorities.
- Manage water to increase wise water use at multiple scales: farm-, watershed-, and basin-levels as well as the field level.

Enhancing agricultural and community resilience.

PROBLEM: Nearly 30 million[5] Americans live in areas with a limited water supply. Communities need support with data-driven decision-making and policy development to build resilient water systems and improve local watershed management. This can help farmers and ranchers reduce production losses from too much or not enough water.

LAND-GRANT SOLUTIONS:

- Advance research on how best to align private incentives with public goals around water protection, management, and use.
- Create a multi-year strategy that integrates innovative practices, Extension programs, and water monitoring to inform policy interventions that increase resilience to floods and droughts.
- Collaborate with communities and public officials to develop strategies to improve water accessibility, resource use, and forest and watershed management.
- Create policy tools that empower farmers and ranchers to increase the economic resilience of their operations while maintaining the ecosystems on which their operations and communities depend.
- Increase water literacy across the agricultural and natural resources disciplines to ensure land-grant university graduates are prepared to address water issues in their communities.

Strategic investment in agricultural research, education, and Extension is a cost-effective way to protect America's water supply while strengthening national security, supporting economic growth, and ensuring a resilient food system for future generations.

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SUPPORTING RESILIENT WORKING LANDS

America's working lands increasingly face threats from weather-related disasters that cause growing instability and market disruptions.

A strong food system starts with the land and healthy soils. Investing in land-grant universities will provide farmers and landowners with tools and resources to adapt more effectively to the growing challenges of variable and extreme weather. Adopting regenerative and other resilient production practices will also protect the soil, conserve water, and support biodiversity over the long-term.

GOAL:

Productive lands, healthy soils, and reduced costs from natural disasters.

IN TEN YEARS, WE WILL:

- ✓ Reduce catastrophic wildfire losses by 15%.
- ✓ Increase adoption of integrated management practices by 30% among landowners and agencies engaged with the land-grant universities.
- ✓ Achieve a 10% increase in soil organic matter and 5% reduction in soil erosion on farms adopting best practices.

WHAT'S AT STAKE

Agriculture and communities are grappling with dangerous and costly **wildfires**, **droughts**, and **floods**. Without adaptation, these challenges will intensify, bringing **lower crop yields**, **loss of biodiversity**, and r**educed water, air, and soil quality**. These problems result in more expensive federal disaster assistance and crop insurance costs, and a greater risk of food price inflation.

THE LAND-GRANT UNIVERSITY ROADMAP

Increased investment in agricultural research, education, and Extension can support resilient working lands by:

Improving soil health.

PROBLEM: A 2022 USDA survey of farmers of major crops found that 49%[1] reported at least one soil concern in their fields. Maintaining and improving soil health is critical to ensuring long-term productivity.

LAND-GRANT SOLUTIONS:

- Develop long- and short-term experiments to increase understanding and drive innovation in soil health, input efficiency, carbon sequestration, and nutrient runoff reduction, coordinated across research stations.
- Identify innovative agronomic practices that enhance nutrient use efficiency.
- Develop regional tools that help producers evaluate soil health practices, estimate ROI, and track soil fertility, structure, and input-use reductions.
- Prepare a workforce skilled in agricultural sciences and natural resource management.

Optimizing food production.

PROBLEM: In 2024 alone, extreme weather resulted in crop and rangeland losses estimated at more than $20 billion[2]. Farmers also face costly, volatile markets for inputs like nitrogen fertilizer.

LAND-GRANT SOLUTIONS:

- Create locally-adapted crops and livestock with increased yield, water use efficiency, and improved tolerance to drought, heat, and pests.
- Develop, demonstrate, and deploy best practices to improve crop and livestock production.
- Prepare the future agriculture workforce through 4-H, undergraduate programs, and graduate programs.

Managing working lands to support productivity and manage risk.

PROBLEM: Agricultural, forest, and rangeland managers face complex, interconnected challenges due to extreme weather and environmental degradation. Wildfire costs the U.S. $424 billion annually[3].

LAND-GRANT SOLUTIONS:

- Identify management systems that stabilize productivity and reduce risk across regions.
- Increase collaboration among farmers, land managers, communities, universities, researchers, and policymakers across states and regions to improve agricultural, forest, and rangeland management.
- Integrate adaptive grazing, cropping, and forest management into certification programs that help producers improve resilience and reduce insurance claims.
- Provide producers and land managers with management plans that promote resiliency to wildfire and extreme weather and improve recovery efforts after disasters occur.
- Prepare a skilled workforce in forest fuel management and ecological restoration.

Reducing threats–and related costs–from natural disasters.

PROBLEM: Federal agricultural disaster assistance approached $24 billion in 2025[4]. Every $1 invested in disaster preparedness saves an estimated $13[5] in damages, cleanup, and economic losses.

LAND-GRANT SOLUTIONS:

- Establish regional testbeds and producer networks that test, improve, and scale practices that make lands more resilient.
- Link land system resilience with rural infrastructure, emergency planning including early warning systems, and workforce development to reduce the cascading impacts of extreme weather on communities.
- Build data infrastructure, modeling, and forecasting tools that translate climate, soil, and biological data into actionable guidance for producers, insurers, and policymakers to prevent losses.
- Promote data science literacy so community leaders can utilize large data sets for planning.
- Expand community preparedness trainings to emergency planners and local responders annually.

Strategic investment in agricultural research, education, and Extension will strengthen the resilience of America's lands—helping farmers, foresters, and local leaders adapt to extreme weather, protect natural resources, and secure a sustainable future.

Sources: [1] Amber Waves. USDA Economic Research Service. Retrieved from https://www.ers.usda.gov/amber-waves/2022/may/farmers-report-soil-related-resource-concerns-on-about-half-of-soybean-wheat-cotton-and-oat-fields; [2] Hurricanes, Heat and Hardship: Counting 2024's Crop Losses. American Farm Bureau Federation. Retrieved from https://www.fb.org/market-intel/hurricanes-heat-and-hardship-counting-2024s-crop-losses; [3] Annual Cost of Wildfires in the U.S. U.S. Geological Survey. Retrieved from https://www.usgs.gov/media/images/annual-cost-wildfires-us; [4] Farm Income and Wealth Statistics - Government payments by program. USDA Economic Research Service. Retrieved from https://data.ers.usda.gov/reports.aspx?ID=4050; [5] Unpacking the ROI of Disaster Preparedness. U.S. Chamber of Commerce Foundation. Retrieved from https://www.uschamberfoundation.org/disasters/unpacking-the-roi-of-disaster-preparedness.

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LAND-GRANT UNIVERSITIES: FUELING AMERICA'S INNOVATION ECONOMY

What are land-grant universities?

America's land-grant universities are uniquely equipped to tackle today and tomorrow's challenges and deliver solutions for our food system and communities through their powerful integrated mission of research, education, and Cooperative Extension. Together, they transform scientific discoveries into real-world solutions that improve lives, strengthen communities, and drive economic growth.

Located in every state and territory and rooted in a legacy that spans over 150 years, land-grant universities have built trusted partnerships with other educational institutions, federal agencies, state and local governments, and stakeholders across food, agriculture, nutrition, and natural resources. Through these partnerships, they drive regional, national, and global impact by advancing innovation, fostering scientific collaboration, leveraging resources, and developing solutions to society's most pressing challenges.

An integrated mission: research, education, and Cooperative Extension

RESEARCH

agInnovation is the nationwide collaborative network of Agricultural Experiment and Research Stations dedicated to advancing the science that feeds, fuels, and sustains America and the world. Through stakeholder-driven research, agInnovation scientists develop innovations and practical solutions that increase agricultural productivity, strengthen food and national security, support rural economies, enhance environmental stewardship, and improve quality of life. The return on investment is extraordinary: every $1 invested in agricultural research generates an estimated $20 in economic and societal benefits, delivering lasting value to taxpayers, producers, businesses, and communities. As the primary performers of publicly funded agricultural research—conducting approximately 70%[1] of this work along with other non-federal institutions—land-grant universities play a critical role in driving innovation, economic growth, and global competitiveness.

EDUCATION

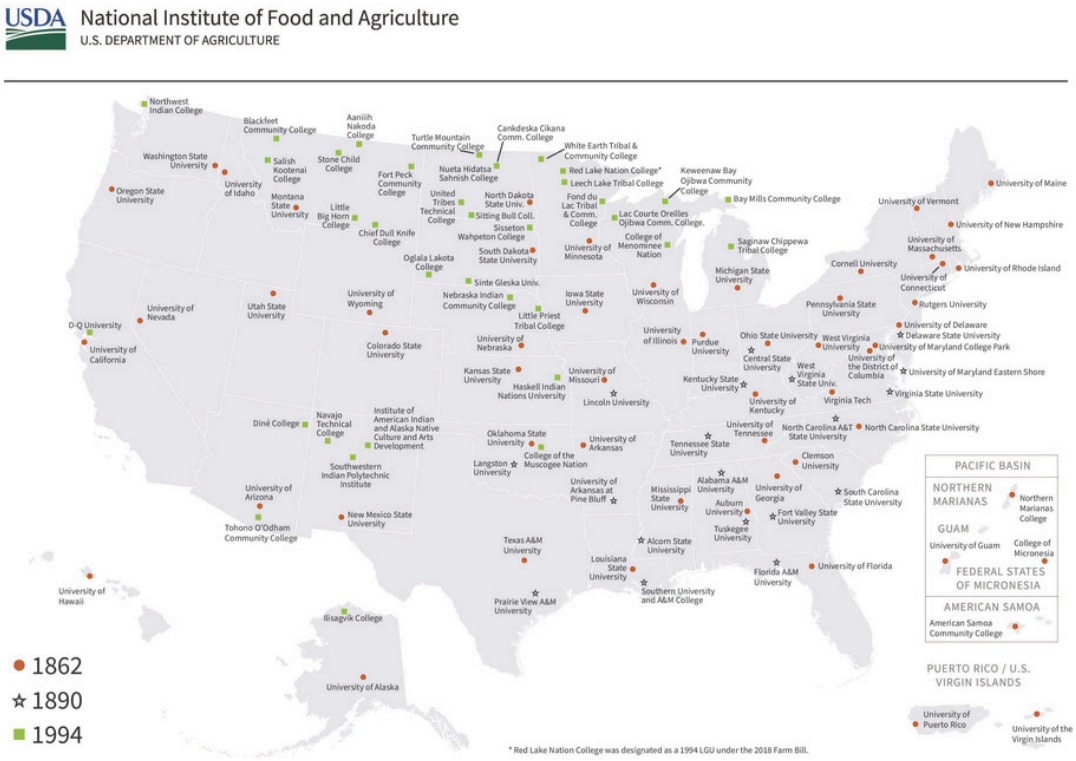
Academic programs at the land-grant universities are dedicated to preparing society-ready graduates of all levels with the knowledge and skills necessary to sustain and enhance the food, agriculture and natural resource and life science systems. Faculty at the land-grant universities play an important role in cultivating future agricultural leaders, innovators, and entrepreneurs. Students gain the knowledge and skills needed to succeed across industry, academia, and all levels of government. Today, employers' demand for graduates with degrees in agriculture and related fields far exceeds[2] the number of students entering the workforce.

EXTENSION

The Cooperative Extension System translates university research directly within rural, suburban, and urban communities across the nation's 3,300 counties, boroughs, and parishes. These professionals live where they work and have direct ties to thousands of campus-based specialists to address locally-identified, statewide, and national needs by leveraging community-based knowledge with resources from land-grant universities and USDA. Extension also provides leadership for 4-H, the country's largest youth development program that empowers 5- to 19-year-olds across our nation. The Extension System engages with farmers, ranchers, families, youth, business owners, and community members, regardless of their locations. Extension professionals set annual priorities, report progress toward those goals, and document impacts of their work.

Sources: [1] Charts of Note. USDA Economic Research Service. Retrieved from https://www.ers.usda.gov/data-products/charts-of-note/104153; [2] USDA Employment Outlook Report. Purdue University/USDA National Institute of Food and Agriculture (NIFA). Retrieved from https://ag.purdue.edu/news/2025/11/employment-outlook-remains-strong-for-agriculture-graduates.html.

Where are land-grant universities located?



What is "capacity" and "competitive" funding?

"Capacity" funding[3] from USDA is foundational to the effectiveness of the land-grant university system, providing the stable, long-term investment needed to sustain scientific expertise, train the next generation of researchers and Extension professionals, maintain equipment and infrastructure, and address critical state, regional, and national challenges. These funds enable institutions to respond rapidly to stakeholder needs, pursue long-term and multi-state or regional research priorities, and deliver science-based solutions that strengthen agriculture, communities, economies, and natural resources.

The capacity funding allocated to each institution is determined by law. Guided by stakeholder input and external peer review, university leaders invest these resources in high priority programs that are further leveraged through matching state funds. Institutions are accountable for the effective use of these investments through regular reporting to USDA's National Institute of Food and Agriculture on outcomes, stakeholder engagement, and progress toward scientific and public-benefit goals.

"Competitive" funding programs are also vital because they spark innovation through another rigorous, peer-reviewed grant process that attracts a broad range of applicants to address specific national agricultural priorities over short periods (typically, up to five years). These programs often leverage capacity-supported research into bold and integrated efforts across multiple institutions and regions.

Adjusted for inflation, federal capacity funding has seen a significant decline since its peak in the 1970s despite showing a strong ROI[4]. Inadequate funding has caused a loss of personnel that negatively impacts the reach of Extension and the ability to serve communities[5]. Additionally, key competitive programs have not been funded at their fully-authorized levels.

Sources: [3] Types of Federal Assistance. USDA National Institute of Food and Agriculture (NIFA). Retrieved from https://www.nifa.usda.gov/about-nifa/what-we-do/types-federal-assistance; [4] Funding and Resource Utilization for Cooperative Extension in the United States. Agricultural and Applied Economics Association 2024 Annual Meeting. Retrieved from https://ideas.repec.org/p/ags/aaea24/343699.html; [5] FY 2026 Appropriations Requests. Association of Public and Land-grant Universities. Retrieved from https://www.aplu.org/wp-content/uploads/FY26-Agriculture-Priorities.pdf. Map Image Source: USDA National Institute of Food and Agriculture (NIFA). Retrieved from https://www.nifa.usda.gov/sites/default/files/2023-04/NIFALGUs_MapREV_AI0522_508.pdf.