

Resilient Lands



Overview:

As a global leader in agricultural production, the United States must strengthen the resilience of its agriculture and natural resources to better withstand the growing challenges of variable weather and extreme events. This requires production practices that regenerate soil, conserve water, and support biodiversity and community resilience. By adopting soil health principles, innovative technologies, and climate-resilient practices driven and delivered by Land-grant University research and Extension, we can safeguard natural resources and advance U.S. agriculture, enhancing resilience and bolstering national food and nutrition security.

Outcome Goals and Impacts:

- Enhance yield stability, improve soil health, boost energy efficiency, and increase soil carbon sequestration, while integrating renewable energy—together driving a 40% reduction in agriculture’s carbon footprint through innovation and best practices.
- Drive innovation in nitrogen fertilizer use efficiency, minimizing nutrient runoff reduction, and optimizing crop nitrogen utilization while supporting producers in adopting sustainable management practices that collectively lower production costs and reduce greenhouse gas emissions by 35%.
- Foster new forestry land management, land cover, and harvesting approaches that promote healthy forests resilient to fire and extreme weather events, while increasing by 20% annually the number of forest owners with management plans to support healthy forests capable of absorbing 30% of economy-wide carbon dioxide emissions each year.
- Improve the adoption of practices to enhance the resilience of agriculture, rangeland, and forest ecosystems by developing adaptive land management plans to optimize production amid variable and extreme weather, reducing federal crop insurance costs by 25% (\$3.5 billion).
- Improve infrastructure and emergency planning to reduce the devastating financial impact of extreme weather events on communities.

Opportunities:

- **Identify innovative agronomic practices** that enhance nitrogen use efficiency, soil fertility, structure, and resilience, while deepening our understanding of soil composition and processes.
- **Reduce barriers to collaboration** among farmers, land managers, communities, researchers, and policymakers to increase engagement and accelerate the adoption of grassroots innovations for adaptation and resilience.
- **Develop infrastructure and response plans** to improve the resiliency of rural and urban communities.
- **Develop accurate metrics** to quantify greenhouse gas emissions, carbon sequestration, water usage, and biodiversity, integrating long-term weather modeling and scenario simulations to strengthen the resilience of agriculture and natural resource systems.
- **Apply gene-editing techniques** to create climate-resilient crops and livestock (e.g., improved water use efficiency, drought tolerance, heat tolerance), and develop feeds to reduce methane emissions from livestock.

Risks of Inaction:

From escalating wildfires to droughts and floods, agriculture and our communities are already grappling with the effects of variable weather and extreme events. Without adaptation, these challenges will intensify, resulting in lower crop yields and greater harm to livestock, forests, fisheries, and communities. Biodiversity will decline as resistant weeds, pests, diseases, and wildfires become more widespread, disrupting ecosystems and agricultural productivity. The degradation of water, air, and soil quality will worsen, leading to severe consequences for food security, human and animal health, and environmental sustainability.

Crosscutting Education Outcome Goal:

Workforce Development: Annually train an additional XX college students and XX 4-H members in food, agriculture, and renewable natural resources to meet the increasing demand for a skilled workforce. Recruitment efforts will focus on engaging youth and adult learners from diverse backgrounds and experiences.



Funding Requirement:

America’s future prosperity relies on Land-grant Universities delivering groundbreaking discoveries for a resilient, sustainable tomorrow. Achieving this requires bold investments in USDA capacity and competitive funding and aligned federal programs.