

USDA National Institute of Food and Agriculture
Climate Change Adaptation Plan 2014

**USDA - National Institute of Food and Agriculture
Agency Climate Change Adaptation Plan**

I. Policy Framework

NIFA's mission is to advance knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations. NIFA doesn't perform actual research, education, and extension but rather helps fund it at the state and local level and provides program leadership in these areas.

NIFA's two key mechanisms for accomplishing its mission of "advancing knowledge" are:

National Program Leadership: NIFA identifies and supports research, extension, and education priorities in areas of public concern that affect agricultural producers, small business owners, youth and families, and others.

Federal Assistance: NIFA provides annual formula grants to land-grant universities and competitively granted funds to researchers in land-grant and other universities, and other eligible institutions identified by law.

NIFA's National Program Leaders and other program staff are empowered to carry out the mission of NIFA. To accomplish this mission, these senior staff members perform critical tasks under the authority of the NIFA Director and report to NIFA Assistant Directors and Division Directors. These tasks fall into four general categories:

- Network and collaborate with partners and stakeholders to identify mission-relevant problems, opportunities, and issues requiring federal attention and support;
- Conceive, formulate, and direct programs and activities to respond to existing or emerging problems, opportunities, and issues through the development and application of science-based knowledge;
- Administer and manage programs and activities to develop and apply science and knowledge; and,
- Evaluate and assess the quality, outcomes, and impacts of these programs.

NIFA supports the base programs of state Agricultural Experiment Stations and the Cooperative Extension System nationwide at land-grant universities. As USDA's primary extramural research agency, NIFA provides working funds to researchers at institutions of higher education all over the United States. These research programs benefit all Americans. NIFA helps ensure that a high-quality higher education infrastructure will be available at the nation's land-grant universities to address national needs, and it uses the infrastructure of scientific expertise from these and other colleges and universities, and also of public and private laboratories, to partner in addressing national priorities.

NIFA collaborates or has formal working partnerships with many institutions and individuals. NIFA's key partners are the institutions of higher learning making up the Land-Grant University System. However, NIFA also partners with other federal agencies, within and beyond USDA; non-profit associations; professional societies; commodity groups and grower associations; multistate research committees; private industry; citizen groups; foundations; regional centers; the military; task forces; and other groups.

NIFA and its partners focus on critical issues affecting people's daily lives and the nation's future. The advanced research and educational technologies supported by NIFA empower people and communities to solve problems and improve their lives on the local level.

II. Identification and assessment of climate change related impacts on and risks to NIFA's ability to accomplish its missions, operations, and programs.

NIFA will face both risks and opportunities associated with changing climate from an operational and mission perspective and impacts to its infrastructure and personnel. Physical factors associated with climate have the potential to disrupt the grant review and award process that is critical to the progress of agricultural science and the infrastructure of the land-grant system. NIFA's climate adaptation strategic plan will focus on two major areas of vulnerabilities, NIFA's Science Programs and NIFA's infrastructure and personnel. Both these areas will be impacted by extremes and wide variations in temperature, precipitation, and the secondary impacts of these events on transportation, communication, information technology systems and coordination with other federal, state, municipal, county and non-government partners, and industry.

Impacts to Science Programs

NIFA's mission is to support exemplary research, education, and extension. As USDA's primary extramural research agency, NIFA provides funds for research, education and extension activities through the AFRI Climate Challenge Area. NIFA will need to balance the increasing demand for scientific research, modeling, educational programs, and extension activities to address climate change issues with other research, education, and extension needs for agricultural. For example, investigations of climate stressors and tipping points will become more essential to climate adaptation science research and will need to be balanced with vulnerable areas of crop and livestock production research and formal and informal state educational programs. There will also be a need to establish more long-term collaborations with federal funding agencies to provide research support to understand complex climate issues and develop the models and decision-making products essential for the sustainability of economic and natural resource systems.

NIFA collaborates or has formal working partnerships with many institutions and individuals. NIFA's key partners are the institutions of higher learning making up the Land-Grant University System, however, NIFA also partners with other federal agencies, within and beyond USDA; non-profit associations; professional societies; commodity groups and grower associations; multistate research committees; private industry; citizen groups; foundations; regional centers; the military; task forces; and other groups. NIFA and its partners focus on critical issues such as climate change that affects people's daily lives and the nation's future. NIFA will need to advance research and educational technologies that empower people and communities to solve problems and improve climate adaptation and mitigation efforts at the local level. NIFA also supports the base programs of state Agricultural Experiment Stations and the Cooperative Extension System nationwide at land-grant universities with support from formula funds. NIFA needs to foster a high-quality higher education infrastructure will continue to be available at the nation's land-grant universities to address national needs, and uses the infrastructure of scientific expertise from these and other colleges and universities, and also of public and private laboratories, to partner in addressing national priorities, such as climate change.

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Impacts to Infrastructure and Personnel

A changing climate can result in more frequent, severe and longer term weather related disasters in the national capital region. There will be a future need to increase the agency's resiliency to short and medium term weather events. NIFA should strive toward improvements in employee notification, increased productivity of unscheduled telecommute workdays, as well as decreased panel impacts of weather related travel delays.

All of the approximately 350 employees of NIFA report to the Waterfront Centre, the Whitten and South Buildings in Washington DC and reside in the metro DC area (DC, Maryland, Virginia). Impacts of a variable and changing climate will require an adaption plan assessment that focuses on the ability to maintain primary operations when personnel are unable to report to the primary duty station. This also includes impacts to panels who are invited to DC to conduct reviews of proposals. Transportation and building infrastructure will also be impacted by climate and the safety of personnel travelling to and from the primary work site will need to be addressed. Climate will also impact the technological infrastructure at the Waterfront Centre where information systems are housed and require a controlled temperature and humidity environment. This also applies to NIFA's back-up systems located outside Washington D.C. Heating and cooling systems will also impact the performance of personnel in the building.

III. Programs, policies, and plans NIFA has in place to manage climate risks in the near term and build resilience in the short and long term;

NIFA implemented a set of enabling activities that will generate novel Ideas, Partnerships, and Tool for Discovery, Learning, and Outreach that will address climate change issues in multiple sectors. This includes plans to integrate climate change adaptation science and resiliency into relevant NIFA policies, programs, and operations. Accomplishments include:

- Preparation and implementation of a comprehensive Climate Change Portfolio Plan for NIFA: A NIFA Climate Change Science Plan is an essential document for establishing the Institute's goals and outcomes for research, education and extension activities addressing global change and climate. The plan includes adaptation, mitigation, and decision support as the primary components and would identify human, financial, and infrastructure resources to achieve goals. The plan is complementary to the USDA Climate Change Science Plan, and the REE Action Plan developed by the REE mission area. It would also support the goals of the USDA Strategic Plan and the U.S. Global Change Research Program.
- Maintaining a well-funded competitive challenge area in AFRI focused on Agriculture and Natural Resources Science for Climate Variability and Change: AFRI provides competitive grants for fundamental and applied research, education and extension projects. AFRI will support climate projects of various scales that promote collaboration, open communication, and the exchange of information; reduces duplication of effort; and coordinates activities among individuals, institutions, states, and regions.
- Collaboration with NOAA Sea-Grant for Climate Extension: NIFA has facilitated interactions with Cooperative Extension and NOAA's Sea Grant program to establish a joint climate extension service, to identify and agree upon common focused goals, outcomes, and targeted audiences. Significant new resources are being identified to support a coordinated national effort providing climate information and decision support tools to clientele and stakeholders. This collaboration would contribute to federal government efforts with the National Climate Assessment and the US Global Research Program.

- Collaboration with other federal funding agencies: NIFA continues to foster and advance NIFA climate science work through partnerships with other science agencies (e.g., NOAA, NSF, DOE) in order to capitalize on the resources available to support multidisciplinary work and bring climate science expertise to agricultural and natural resource subject matter.

NIFA continues to develop plans to manage climate risks in the near term and build resilience in the short and long term through professional development. Plans include:

- Expanding National Program Leadership Areas to Address Climate Change Issues: Current expertise within NIFA national program leadership has gaps in areas relevant to climate change science, especially in economics, social sciences, and behavioral sciences. The complexity of climate change impacts on the environment and society requires a well-coordinated, multidisciplinary approach in arriving at system science methods to address specific climate-related issues. Examples of expertise identified as important for implementing climate change research, education and extension activities include science writing, climate modeling and behavioral science. Social scientists, economists and educators with climate change science backgrounds would complement the current subject matter expertise at NIFA. There is also a need to maintain a standing division level unit within NIFA to address the larger climate portfolio.
- Developing a Plan for Workforce Development and Education: Educational programs at all levels need to address the critical skills and professions needed to meet the future demands for climate change research, education and extension in agriculture. Non-formal education programs, such as 4-H, and formal higher education curricula need to adopt a specific climate change component. Program developers need to be aware of the impacts of climate change on agricultural production and societal behavior so these can be incorporated into teaching and accompanying materials. Research and teaching capacity also needs to be built with minority serving institutions so they can advance their contributions to climate change science and workforce development.

IV. Climate change related risks that impair NIFA's statutory mission or operation and how they will be addressed.

A changing climate can result in more frequent, severe and longer term weather related disasters in the national capital region. There will be a future need to increase the agency's resiliency to short and medium term weather events. NIFA should strive toward improvements in employee notification, increased productivity of unscheduled telecommute workdays, as well as decreased panel impacts of weather related travel delays. The following are NIFA approaches to climate adaptation at its Headquarters.

- NIFA uses the MIR3 system to increase its ability to notify employees and gather status information in the event of a disaster in the national capital region. Over 90% of NIFA employees are MIR3 registrants. Users self-register with the following contact information: Work e-mail, work phone, home e-mail, home phone, mobile phone, pager, and/or emergency contact phone. The system can contact any or all of these devices, for any or all employees, and track message retrieval and responses. The agency plans to conduct four limited and two agency-wide MIR3 drills annually.

- The agency will continue to increase the telework capacity and capability of the NIFA workforce and IT system. Capacity is reflected by the number or percentage of employees that have a core or situational telework agreement in place, as well as the capacity of agency information technology resources to support simultaneous users. Capability reflects the ability of individual employees and the organization to be productive in a telework environment, which could include the variety of systems that employees can access and the types of tasks that can be conducted remotely. Regardless of whether conditions require a long term continuity of operations (COOP) plan deployment or a single unscheduled telework day, the ability of the workforce to productively telework will increase the agency's resiliency. Continuity plans will be adjusted to incorporate scenarios for devolution to a majority telework environment.
- Gathering together panels of experts to review funding applications is a significant function of the agency. Historically, these panels have gathered face-to-face in Washington, DC area, which makes them dependent on nationwide travel reliability and the operability of a central facility. NIFA plans to increase the employment of "virtual panels" as a method to decrease the process's dependence on live meetings based in the national capital region.

V. NIFA considerations to improve climate adaptation and resilience with respect to agency suppliers, supply chain, real property investments, and capital equipment

NIFA plans and implementation in this area are limited because of the small number of personnel allocated in the DC Headquarters. NIFA does not run any laboratories or operate any facilities. It does not own or operate any vehicles nor own buildings. Efforts have been made, however, to address real property issues in the following areas.

- Increased temperature extremes have the potential to increase stress on the Heating, Ventilation, and Air Conditioning (HVAC) systems. As a result of this planning process, NIFA has solicited competitive bids to increase preventative maintenance on these systems in order to decrease future breakdown and repair costs.
- Increased weather extremes can lead to a greater variety of safety hazards for the agency's lease facility and the employees it houses. NIFA will increase its all hazards education and safety programming in coordination with the USDA Office of Homeland Security and Emergency Coordination, Office of Operations, and the General Services Administration.
- Current online information technology asset backup on the east coast, coupled with planned server consolidation, will further distribute key data resources.
- Hotter days in summer are likely to lead to increases in air quality warnings and the severity of those warnings. NIFA will continue to promote use of public transportation resources and telework.

VI. NIFA interagency efforts to support climate preparedness and resilience at all levels of government

NIFA has established new opportunities and interagency partnerships to better understand risks and opportunities. NIFA will continue to promote strategic partnerships which will advance community preparedness for climate impacts and events. These partnerships have helped develop science-based

methods to assess vulnerability, to monitor climate impacts, and to project impacts based on scenarios. Current accomplishments include:

- **Interagency collaborations for funding basic and applied climate science:** Multiple interagency collaborations have been established to fund fundamental and interdisciplinary research that better understands the impacts and feedbacks of global and climate change on agricultural systems (including farm, crop, forest, and range lands) and provide potential adaptation and mitigation strategies, as well as discovery and demonstration of decision support tools for land, ecosystem and water resource managers to mitigate carbon and greenhouse gas emissions (i.e., increase carbon sequestration and storage). These projects will develop the science base and infrastructure to support a new generation of coupled agriculture and climate system models to improve attribution and prediction of high-impact regional weather and climate, to initialize seasonal-to-decadal climate forecasting, and to provide predictions of impacts affecting adaptive capacities and vulnerabilities of environmental and human systems.
- **Effective Communication and Marketing Strategies for NIFA Activities on Climate Change:** In order to engage stakeholders and elevate the science, a marketing strategy focused on climate change is needed. Marketing strategies would include web site development and other communication mechanisms that reach out to all public sectors for educational and service purposes. A well-developed marketing process would also improve post-award management and the quality of reporting to NIFA from funded projects.
- **Consultation with the USDA Office of the Chief Scientist, the REE and NRE mission area agencies, the OCE Climate Change Program Office, and APLU for stakeholder input.**
- **Cascade compliance related to the USDA Strategic Plan, NIFA Strategic Plan, USDA Research, Education and Economics Mission Area Action Plan, and the US Global Change Research Program Strategic Plan,**
- **Organizing and producing syntheses products in Agroclimate Science:** Syntheses products will be produced from, a series of project director workshops and symposiums on climate change to address the needs of the portfolio and provide a benchmark for the status of scientific knowledge, technological advances, and producer needs in agriculture and forestry. The syntheses activities would be led by NIFA funded scientists with possible support from NIFA and the USDA Global Change Program Office. The syntheses would include the science needed to implement a carbon trading system and for natural resource management to adapt to and mitigate climate change. The syntheses could also be the starting point for a sustained stakeholder input process.

VI. Sustained Adaptation Process

A. Agency steps for sustained planning

Climate Portfolio Review: NIFA conducts a portfolio review of its projects and programs to evaluate the program success in achieving goals for the environment and natural resources. The portfolio review makes use of NIFA's established knowledge areas of which Weather and Climate is one. In addition, a *National Institute of Food and Agriculture* based on climate change. A new portfolio review is a portfolio planning, assessment, and quality improvement plan.

Continuous Assessment through Post-Award Management of Climate Change Research, Education and Extension Projects to Identify Gaps: An inventory and assessment of climate change research, education and extension projects funded by NIFA is needed for advancing climate science and its delivery to intended users. The assessment would also include programs conducted by other USDA agencies to identify gaps and how NIFA's unique mission can fill those gaps. A reporting system designed to fit the needs of the inventory and stakeholder groups will need to be created.

Expand Climate Change Communities of Practice within eXtension: Climate change education and outreach has not yet been part of eXtension which has the capacity to reach a broad audience through its communities of practice. Resources related to consumer knowledge, carbon footprints and environmental markets are needed and should be developed. Significant efforts need to be made to soliciting these and other eXtension communities of practice for specific areas such as forest management, climate impacts on health, understanding carbon markets(such as cap and trade), and implementation of a National Climate Service.

B. Process for Prioritization

NIFA will establish a Core Set of Climate Change Priorities as a Component of multiple NIFA Portfolios: The portfolio management and competitive grants planning processes have been evolving to improve trans-disciplinary approaches to research, education and extension. The portfolio document, in particular, is becoming important for thematic planning purposes, in addition to its very important accountability function. Aligning portfolio outcomes to climate change will identify NIFA's investments in climate change research, education, and extension and facilitate the planning of future competitive and non-competitive grants. The quality of reporting would also improve as expected outcomes will be clearly defined in the solicitation planning process.

NIFA will establish a NIFA Science Priority-making Process for Climate Change: A climate science priority-making team with an established management structure and guidance from the NIFA science leadership council is needed to identify and manage a set of core climate change activities that cuts across agency programs and portfolios and would function as the central source of management for climate change research, education and extension activities. The collaborative team would be able to address portfolio goals as well as the planning of all competitive and non-competitive funding lines related to climate change managed by NIFA. A collaborative issue team would be composed of national program leaders, program specialists and support staff representing disciplinary and mission area expertise from across the agency and would be accountable to the senior leadership within NIFA. The team would be responsible for the development of criteria for competitive solicitations to achieve long-term outcomes. The collaborative issues team would be advised by the advisory group.

C. Sources of information for plan development

- External Advisory Group on Agriculture and Climate Change
- Diversified Stakeholder Base for New and Emerging Partners from industry and professional organizations
- Open Public Stakeholder Listening Sessions
- NIFA Project Directors Meetings
- NIFA Interagency Collaborations

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- State Plans of Work and Annual Reports under the Hatch, and Evans-Allen Acts
- State Plans of Work and Annual Reports under the McIntire-Stennis Act

- State Plans of Work and Annual Reports under the Renewable Resources Extension Act
- State Plans of Work and Annual Reports under the Smith-Lever Act
- Consultation with the USDA Office of the Chief Scientist, the REE and NRE mission area agencies, the OCE Climate Change Program Office, and APLU
- 2013 President Climate Action Plan

D. Performance Metrics

- Climate Portfolio Review: The NIFA portfolio review process includes gap analysis and performance metrics to evaluate progress and improvement of climate projects funded by NIFA.
- External Advisory Group on Agriculture and Climate Change: The external advisory group will be part of an evaluation process of the science program planning.
- NIFA responses to the REE Action Plan on Climate Change progress through a scorecard method that tracks quarterly progress of projected accomplishments.
- NIFA responses to the annual call of agency accomplishments that is published in the
- Annual Report to Congress of the US Global Change Research Program
- NIFA contributions to the National Climate Assessment which is now a sustained assessment process.
- Federal Agency Climate Adaptation Plan elements outlined here.

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Action Description	Action Goal	Agency Lead	Risk or Opportunity	Scale	Timeframe	Implementation Methods	Performance Metrics	Inter-governmental 1 Coordination	Resource Implications	Challenges / Further Implications	Highlights of Accomplishments
Maintain and expand Climate Change as a grand societal challenge for NIFA	Increase accessibility to funding opportunities	NIFA	Opportunity to advance the development of basic and applied science in agriculture to address climate issues	National	Ongoing	Agriculture and Food Research Initiative	Breadth and depth of portfolio of projects covering areas of need.	Not applicable	Existing and new resources	Farm Bill Resources	NIFA Climate Change Portfolio Strategic Plan completed
Maintain and expand priority areas in the Climate Change Challenge Area in AFRI	Increase areas of climate adaptation in agriculture	NIFA	Opportunity to develop regional based research to address regional climate impacts in agriculture and natural resources	National	Ongoing	Agriculture and Food Research Initiative	Amount of funds invested for climate change research, education and extension	Not applicable	Existing and new resources	Farm Bill Resources	Other AFRI Challenge Areas now include Climate Change priorities
Develop Climate Change programs at land-grant institutions	Increased capacity for climate science	NIFA	Opportunity to develop research, education and extension activities to address state-identified issues	National	Ongoing	Formula funds, Specials grants	Amount of funds invested for climate change research, education and extension	Association of Public and Land-grant Universities	Existing and new resources	Farm Bill Resources	Seven Climate Coordinated Agriculture Projects are supported by NIFA
Host and expand stakeholder listening sessions	Increased stakeholder input for priority making	NIFA	Opportunity to receive input to programs from stakeholders	National	Ongoing	NIFA Outreach	Number of participants reached through stakeholder sessions	Not applicable	Existing and new resources	NIFA Resources	Webinars for funding opportunities are held annually
Maintain Climate as a standing portfolio in NIFA	Increased opportunity for climate science	NIFA	Opportunity to evaluate progress, identify gaps and plan for climate activities funded by NIFA	National	Ongoing	NIFA Planning, Accountability and Reporting Process	Increased of Portfolio Implementation	Not applicable	Existing and new resources	Farm Bill Resources	NIFA Climate Portfolio Strategic Plan in 2 nd year of implementation
Establish Collaborative funding opportunities with other federal agencies	Increased funding capacity for climate science	NIFA	Opportunity to leverage funding for agriculture research in climate change	National	Ongoing	Memorandums of Understanding	Increased funds leveraged from other federal agencies	US Global Change Research Program	Existing and new resources	NIFA Resources	Memorandums of Understanding with NSF and DOE are currently in force
Conduct annual Project Director	Increased coordination of scientific investigation	NIFA	Opportunity to network and advance science for climate	National	Ongoing	Agriculture and Food Research Initiative	Increased number of publications and	Not applicable	Existing and new resources	NIFA Resources	Annual Project Directors Meeting have been held on schedule

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meetings of NIFA funded and interagency projects			adaptation and mitigation				presentations of research projects.				
Work with extension for the translation and delivery of science to communities and decision makers	Increased delivery of science products	NIFA	Opportunity to deliver credible science and decision making tools to users	National	Ongoing	Agriculture and Food Research Initiative	Increased number of publications and presentations of research projects.	Association of Public and Land-grant Universities	Existing and new resources	Farm Bill Resources	Funding for extension projects is increasing.
Work with other USDA agencies and offices like the US Forest Service and the Climate Change Program Office on climate change science.	Increased coordination of scientific objectives	NIFA	Opportunity to better coordinate climate science research within USDA	USDA	Ongoing	Agriculture and Food Research Initiative	Increased number of coordinated research activities and opportunities within USDA	USDA Global Change Task Force	Existing and new resources	NIFA Resources	The USDA Climate Hubs is a coordinated effort at USDA.
Participation in the US National Climate Assessment	Increased assessment of knowledge gaps	NIFA	Opportunity to assess impacts of agriculture science on climate	National	Ongoing	USDA Global Change Task Force activity	Reduction in gaps of science and science delivery for agriculture	USDA Global Change Task Force	Existing and new resources	NIFA Resources	NIFA funded scientists contributed to the assessment
Support a robust Extension Disaster Education Network (EDEN) to increase Cooperative Extension's ability to decrease the impact of disasters through education.	Increased preparedness of communities for disaster management	NIFA	Opportunity for advancing climate science for risk management	National	Ongoing	Formula Funds	Increased number of communities trained in disaster preparedness	Cooperative Extension	Existing and new resources	Farm Bill Resources	EDEN network remains strong and is looking at potential collaboration with NOAA Sea Grant
Increase the agency's	Increased work	NIFA	Ability to notify employees of	NIFA HQ	Ongoing	NIFA supported activity	Increased number of	USDA HQ	Existing and new	USDA HQ Resources	Emergency notification system at NIFA is in place and annually tested.

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ability to notify employees and gather status information in the event of a disaster in the national capital region.	capacity at HQ		hazards associated with workplace impacts of climate change				employees working under adverse conditions		resources		
Continue to increase the telework capacity and capability of the NIFA workforce and IT system.	Increased work capacity at HQ	NIFA	Ability to support continuation of NIFA's activities under extreme weather	NIFA HQ	Ongoing	NIFA supported activity	Increased number of employees working under adverse conditions.	USDA HQ	Existing and new resources	USDA HQ Resources	All employees have telework agreements.
Refine continuity plans by incorporating scenarios for devolution to a majority telework environment.	Increased work capacity at HQ	NIFA	Ability to support continuation of NIFA's activities under extreme weather	NIFA HQ	Ongoing	NIFA supported activity	Increased number of employees working under adverse conditions	USDA HQ	Existing and new resources	USDA HQ Resources	Increased training for supervisors for telework implementation.
Increase the employment of "virtual panels" as a method to decrease the process's dependence on live meetings based in the national capital region.	Increased work capacity at HQ	NIFA	Ability to support continuation of NIFA's activities under extreme weather	NIFA HQ	Ongoing	NIFA supported activity	Increased number of review panels working under adverse conditions	USDA HQ	Existing and new resources	USDA HQ Resources	Virtual panels now account for 50% of all review panels at NIFA.