U.S. DEPARTMENT OF AGRICULTURE

CLIMATE ADAPTATION PLAN

2024-2027

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A MESSAGE FROM USDA SECRETARY TOM VILSACK

Dear Reader,

Since the release of USDA's Action Plan for Climate Adaptation and Resilience in 2021, the risks posed by climate change, and its impacts to USDA's mission and those we serve, have only grown. This new USDA Climate Adaptation Plan reflects the progress we have made as a Department to address these risks and identifies areas where we can strengthen the integration of climate change information into our decision-making, operations, policies, and program delivery.

In August 2023, Hurricane Idalia cut across the southeastern United States, damaging croplands and orchards and destroying equipment and facilities in Florida, Georgia, South Carolina, and North Carolina. Earlier in 2023, after working directly with farmers to improve crop insurance coverage options, USDA's Risk Management Agency released a new Tropical Storm Option for its Hurricane Insurance Protection-Wind Index. With 60 percent of policies electing for this additional coverage, producers affected by Hurricane Idalia received $71 million in tropical storm indemnities and $85 million in hurricane indemnities, in addition to individual losses paid by multi-peril policies. This is but one example of how USDA is adapting its policies and programs to help our customers face a changing climate.

Of course, the scope of USDA's mission extends beyond agricultural production to also include natural resource and land management, rural development, food security and safety, and science and innovation. This broad mission increases our exposure to a range of climate change risks but also means we have great opportunities to build more resilient food systems and communities across the country. USDA's Rural Development agencies are helping communities build more resilient housing, energy infrastructure, and water utilities which will help them manage and recover from future extreme weather events. USDA's Research, Education, and Economics agencies are growing our understanding of climate change impacts on food systems and developing response options to both the acute shocks and long-term changes we anticipate.

Climate adaptation is one element of USDA's climate-smart approach and must be balanced with efforts to sustainably increase agricultural productivity and address climate mitigation goals through the agriculture and forestry sectors. At the same time, climate change poses a risk to these efforts, requiring a holistic approach that includes climate risk management. This new Climate Adaptation Plan brings together all eight USDA Mission Areas and truly reflects our whole-of-Department approach to helping communities across the country adapt and thrive in a changing climate.

Sincerely,

Thomas J. Vilsack

Secretary

INTRODUCTION

The U.S. Department of Agriculture (USDA), with its broad mission and diverse programs and operations, is vulnerable to the current and future effects of climate change. USDA has a stewardship responsibility for federally managed forests and grasslands, which provide a variety of critical ecosystem services. The Department also supports farmers, ranchers, and other land managers in the stewardship of their own lands and operations by promoting voluntary conservation programs and stewarding the expanding portfolio of conservation easements. These natural resources are vulnerable to a range of climate change impacts which will make them harder to manage and sustain for future generations. At the same time, the people and communities we serve across the country are exposed to the effects of extreme heat and increasingly severe storms, flooding, wildfire, and drought, many of which are intensified by climate change. This Climate Adaptation Plan describes the intentional steps that USDA is taking to adapt and build resilience Department-wide so that we are poised to serve and support our stakeholders in a changing climate.

The 2024-2027 USDA Climate Adaptation Plan builds on USDA's 2021 Action Plan for Climate Adaptation and Resilience and reflects how USDA agencies and offices have matured and advanced in their consideration of climate change in their programs, policies, and operations. The 2021 Plan identified the following priority actions:

1. Build resilience across landscapes with investments in soil and forest health.
2. Increase outreach and education to promote adoption of climate-smart adaptation strategies.
3. Broaden access to and availability of climate data at regional and local scales for USDA Mission Areas, producers, land managers, and other stakeholders.
4. Increase support for research and development of climate-smart practices and technologies to inform USDA and help producers and land managers adapt to a changing climate.
5. Leverage the USDA Climate Hubs to support USDA Mission Areas in delivering adaptation science, technology, and tools.

This new Plan does not supersede the vulnerabilities and cross-cutting action areas identified in the 2021 Plan but delves deeper into how USDA is assessing climate risks and integrating

climate adaptation into its mission delivery via policies, programs, funding, facilities management, and procurement.

This Plan was prepared in accordance with guidance for Federal climate adaptation planning from the White House Council on Environmental Quality (CEQ). The information presented here aligns with adaptation and resilience requirements in section 211 of Executive Order (E.O.) 14008 *Tackling the Climate Crisis at Home and Abroad,* section 5(d) of E.O. 14030 *Climate-Related Financial Risk*, and section 503 of E.O. 14057 *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability.* This work also describes how USDA is contributing to the objectives and opportunities for action identified in the Biden-Harris Administration's National Climate Resilience Framework.

Section 1 of this Plan provides an overview of USDA's approach to climate adaptation and resilience. Section 2 describes the risk climate change poses to USDA's mission, operations, services, and lands, and for the first time begins to leverage available data to assess climate risks to USDA's facilities and employees. Section 3 lays out USDA actions to address climate risks to the delivery of our mission and to our partners and stakeholders nationwide. Section 4 responds to governmentwide climate adaptation and resilience targets established by CEQ and highlights progress towards the cross-cutting action areas from the 2021 Adaptation Plan. Appendix 1 provides information on the climate data used in the Section 2 risk assessment. Appendix 2 summarizes the adaptation actions described throughout Section 3. Finally, Appendix 3 assesses options put forth by the U.S. Government Accountability Office (GAO) on how USDA can further enhance the climate resilience of agricultural producers through our work.

SECTION 1: AGENCY PROFILE

With this 2024-2027 Climate Adaptation Plan, USDA has broadened its work on adaptation and resilience to include 17 Agencies from all 8 Mission Areas and 6 Departmental or Staff Offices (Table 1). Climate adaptation is included in USDA's Strategic Plan for Fiscal Years 2022-2026 as Objective 1.2 "Lead Efforts to Adapt to the Consequences of Climate Change in Agriculture and Forestry," and is connected to other elements of the Strategic Plan related to natural resource management, economic resilience, science and innovation, and rural development. USDA Departmental Regulation 1070-001 Policy Statement on Climate Change Adaptation lays out the mission-wide approach to adaptation and describes how USDA will "develop, prioritize, implement, and evaluate actions to minimize climate risks, and exploit new opportunities climate change may bring" via adaptation planning. DR 1070-001 recognizes how climate adaptation complements USDA's climate mitigation efforts and must align with USDA's equity and environmental justice goals.

USDA's Office of Energy and Environmental Policy (OEEP), located within the Office of the Chief Economist (OCE), carries out duties identified in the Global Change Prevention Act of 1990, which include to "coordinate policy analysis, long range planning, research, and response strategies relating to climate change issues," and to "ensure that recognition of the potential for climate change is fully integrated into the research, planning, and decision-making processes of the Department." DR 1070-001 reinforces some of these responsibilities and directs OEEP to prepare a department-level Climate Adaptation Plan and coordinate agency-level adaptation planning efforts. The work of OEEP to coordinate and advance climate adaptation across Mission Areas, Agencies, and Offices is described further in Sections 3B(1) and 3C.

As detailed in Section 2A, the effects of climate change on USDA agencies and offices are uneven; agencies like USDA's Forest Service (USFS) are uniquely exposed to climate change impacts whereas agencies like the Agricultural Marketing Service (AMS) or the Food and Nutrition Service (FNS) have opportunities through their work to address climate risks to USDA's partners and stakeholders. USDA's Research, Education, and Economics agencies, USFS Research and Development, and USDA's Climate Hubs play a critical role in advancing science and delivering information via outreach, extension, and engagement to facilitate adoption of climate-smart practices and innovation. These research and science translation enterprises also support USDA internally to ensure use of the best-available science and to build the climate literacy and capacity of USDA personnel.

Agency-level adaptation planning is a critical step down from Departmental efforts, enabling agencies to develop adaptation actions within the scope of their mission and authorities and address their unique climate risks and opportunities. Through these planning efforts, agencies are best equipped to map out from headquarters to field offices how adaptation and resilience can be integrated into their work. This internal climate adaptation planning network provided the foundation for the development of this new 2024-2027 USDA Climate Adaptation Plan.

Table 1: USDA and Climate Adaptation at a Glance

Mission	To serve all Americans by providing effective, innovative, science-based public policy leadership in agriculture, food and nutrition, natural resource protection and management, rural development, and related issues with a commitment to deliverable, equitable, and climate-smart opportunities that inspire and help America thrive.
Adaptation Plan Scope	USDA's Climate Adaptation Plan is developed in collaboration with all 8 of USDA's mission areas, including 17 agencies and 6 Departmental and Staff Offices to reflect USDA's mission-wide approach to climate adaptation.
Agency Climate Adaptation Official	William Hohenstein, Director, Office of Energy and Environmental Policy, Office of the Chief Economist
Agency Risk Officer	John Rapp, Director of the Office of Budget and Program Analysis
Points of Public Contact for Environmental Justice	Dr. Dewayne Goldmon, Senior Advisor for Racial Equity to the Secretary Sean Babington, Senior Advisor for Climate, Office of the Secretary Justice40_USDA@usda.gov
Owned Facilities	40,298 facilities of 45,342,816 square feet (Corporate Property Automated Information System (CPAIS), 2023)
Leased Facilities	3,006 leases of 14,484,893 square feet (CPAIS, 2023)
Employees	93,974 USDA Federal (December 2023) 7,709 USDA Farm Service Agency Non-Federal (December 2023)
Federal Lands	193 million acres managed by USDA's Forest Service 405,783 acres managed by USDA's Agricultural Research Service
Budget	$221.2 billion FY22 Enacted, Public Law 117–103 $240.4 billion FY23 Enacted, Public Law 117–180 $215.1 billion FY24 Enacted, Public Law 118–42 $212.7 billion FY25 President's Budget
Key Areas of Climate Adaptation Effort	Key lines of climate adaptation effort center around the challenges that climate change poses to USDA and its stakeholders, including the risks to: 1. Agricultural productivity, 2. Water quantity and quality, 3. Rural communities and others disproportionately vulnerable to the impacts of climate change, 4. Resilience to extreme weather events, and 5. Federal lands and infrastructure.

SECTION 2: CLIMATE RISK ASSESSMENT

A. Climate Hazard Impacts on and Exposure to Mission, Operations, and Services

The current and anticipated impacts of climate change challenge USDA's ability to carry out its mission. Furthermore, climate change is threatening the lives and livelihoods of those we serve in the agriculture and forestry sectors and across rural America. These risks include the threat posed by extreme heat and precipitation, sea level rise, wildfire, and flooding and are imbedded in the climate vulnerabilities identified in USDA's 2021 Action Plan for Climate Adaptation and Resilience:

Decreased agricultural productivity

Threat to water quantity and quality

Disproportionate impacts on vulnerable communities

Shocks due to extreme climate events

Stress on infrastructure and public lands

USDA's mission is:

> "To serve all Americans by providing effective, innovative, science-based public policy leadership in agriculture, food and nutrition, natural resource protection and management, rural development, and related issues with a commitment to deliverable equitable and climate-smart opportunities that inspire and help America thrive."

Climate change has the potential to threaten USDA's leadership on the issues identified in its mission statement in diverse ways (Table 2):

- **Agriculture.** Climate change will challenge USDA's Farm Production and Conservation agencies by exacerbating demand for conservation technical and financial assistance, disaster assistance programs, risk management products, and other services. The Marketing and Regulatory Program agencies will be challenged to keep apace of climate-driven changes to pests and pathogens that pose a threat to agriculture and to maintain continuity of critical grading and inspection services.
- **Food and Nutrition.** Many of the communities that depend on programs administered by the Food and Nutrition Service (FNS) are disproportionately vulnerable to the impacts of climate change. The relative importance of FNS programs that are deployed in response to disasters or that target vulnerable populations, like children, will become increasingly important in a changing climate. Climate change poses a threat to livestock and poultry production and may alter the prevalence of foodborne illnesses, which may require the Food Safety and Inspection Service to adapt its policies and operations.
- **Natural Resources Protection and Management.** Climate change is challenging the Forest Service's (USFS) ability to maintain the health, diversity, and productivity of the Nation's forests and grasslands. Acute and chronic stressors are impacting the diverse services these ecosystems provide, including carbon uptake and storage, while posing a risk to the USDA employees who work on these lands. Increasingly frequent and severe wildfires, exacerbated by climate change, also pose a significant threat to communities across the United States, including those with environmental justice concerns.
- **Rural Development.** Ongoing climate change is testing the resilience of local governments and rural communities, making Rural Development's mission more difficult and threatening its investments in infrastructure, housing, and utilities. Disadvantaged communities will be the hardest hit. The work of RD and its partners can enhance the resilience of these communities, so they can recover more quickly when the next crisis occurs.
- **Science and Innovation.** The ability of the agriculture and forestry sectors to adapt in the long term depends on investment in and prioritization of science and innovation today. Scientific questions on the effects of and response to climate change are creating new demands on USDA's research and statistical agencies. At the same time, the effects of climate change will hinder USDA's ability to fund and conduct research and gather critical survey data in a timely manner, hampering progress and discovery.
- **Equity and Environmental Justice.** Considerations of equity and environmental justice are woven throughout USDA's climate adaptation efforts to ensure that the benefits of our actions reach those who are most vulnerable to the impacts of climate change, such as communities with environmental justice concerns. Maladaptation, when actions taken inadvertently increase climate vulnerability, must be considered during decision-making and other processes so that the actions USDA takes do not increase the exposure of communities with environmental justice concerns to further climate-related risks.

Table 2: Summary of climate change effects on USDA's mission, operations, and services

	Mission Impacts	Operational Impacts
DEPARTMENTAL ADMINISTRATION (DA)		
Office of Property & Environmental Management (OPEM), Office of Homeland Security (OHS), etc.	Impacts to continuity of operations planning, policy development, and emergency response and recovery.	Increased interagency coordination and workload of 24/7/365 OPSCENTER, demand for new staff expertise. Infrastructure and facilities damage, threat to continuity of operations
FARM PRODUCTION & CONSERVATION (FPAC, including the FPAC-Business Center)		
Natural Resources Conservation Service (NRCS)	Increased demand for technical and financial assistance from producers, increased training needs for field staff.	Impacts to local service center infrastructure and service delivery.
Farm Service Agency (FSA)	Increased demand for disaster assistance and other FSA programs.	Impacts to local service center infrastructure and service delivery.
Risk Management Agency (RMA)	Increased demand for risk management products.	
FOOD, NUTRITION, & CONSUMER SERVICES (FNCS)		
Food & Nutrition Service (FNS)	Increased demand for Supplemental Nutrition Assistance Program (SNAP), Disaster SNAP, and USDA Foods, challenges administering Child Nutrition Programs.	Threats to emergency response due to infrastructure and communication impacts.
FOOD SAFETY (FS)		
Food Safety and Inspection Service (FSIS)	Threats to animal welfare. Changes in levels of foodborne pathogens may impact food safety.	Risks to FSIS employee health and safety, changing workloads due to changing conditions.
MARKETING & REGULATORY PROGRAMS (MRP)		
Agricultural Marketing Service (AMS)	Difficulty procuring and distributing food and providing developmental assistance to local and regional food markets.	Disruptions to grading and inspection services.
Animal & Plant Health Inspection Service (APHIS)	Increased demands on agency capacity to monitor for, respond to, and manage pest, pathogen, and other threats.	Increased staff workload and deployments, exposure to extreme conditions.
NATURAL RESOURCES & ENVIRONMENT (NRE)		
Forest Service (USFS)	Increasingly challenging to manage the health, diversity, and productivity of Nation's forests and grasslands.	Employee exposure to extreme heat, wildfire, and other hazards; physical and mental strain; damage to infrastructure and recreation facilities.
RURAL DEVELOPMENT (RD)		
Rural Housing Service **Rural Utilities Service** **Rural Business Cooperative Service**	Threats to development efforts; property destruction; construction delays; revenue disruption for existing loans; stress on vulnerable communities.	Increased interagency recovery coordination, demand for new staff expertise.

	Mission Impacts	Operational Impacts
RESEARCH, EDUCATION, & ECONOMICS (REE)		
Agricultural Research Service (ARS)	Shifting demands on research priorities, increased need for innovation adoption.	Threat to research facilities and animals, continuity of field studies.
National Institute of Food and Agriculture (NIFA)	Shifting demands on research priorities, increased need for innovation adoption, disproportionate impacts to disadvantaged communities.	Delays in funding delivery, disruptions to funded research.
Economic Research Service (ERS)	Increased demand for staff and resources to provide decision-relevant analyses without diminishing other critical agency functions.	Ability to deliver timely, relevant analysis and information
National Agricultural Statistics Service (NASS)	Increased demand for climate-related data and analyses.	Ability to gather survey information impeded by climate-related hazards.
TRADE AND FOREIGN AGRICULTURAL AFFAIRS (TFAA)		
Foreign Agricultural Service (FAS)	Shifting global trade patterns, stress on trade infrastructure, and diminished food security globally.	Changing demands for international data and analyses

B. Climate Hazard Exposures and Impacts Affecting USDA Facilities

USDA has a total of 42,673 facilities reported in the Federal Real Property Profile Management System on which the Federal Mapping App draws (Figure 1). This inventory encompasses buildings, structures, and the land on which facilities are located, whose mission-critical uses include laboratories and field study sites, roads, housing, recreation, and communications systems, as well as office space. The analysis presented in this section includes all USDA facilities as they are all key components of USDA operations and non-building facilities represent almost half of all assets. USDA Forest Service facilities and structures account for 82 percent of USDA's asset portfolio, with the Agricultural Research Service managing another 12 percent of the assets. Facilities in California, Oregon, Idaho, Montana, Washington, Colorado, and Arizona make up 60 percent of the portfolio.

We present here a high-level summary of the exposure of these assets to climate-change related hazards including extreme heat, extreme precipitation, sea level rise, wildfire, and flooding, based on the data available in the Federal Mapping App (Box 1). Some hazards, like drought, are not yet able to be assessed with the available data at this time but may be addressed on a site-by-site basis. Efforts to address these hazards are presented in Section 3 of this Plan.

Extreme Heat

Under mid- and high-emissions scenarios, at mid- and late-century time horizons, all USDA facilities in the continental United States will experience an increase in the annual number of hottest days relative to the average of the four hottest days per year from 1976 to 2005 (days >99th percentile, Table 3). Under RCP 4.5, by 2050, 1 percent of USDA facilities would be expected to experience 30 or more extreme heat days and by 2080, 9 percent of facilities would experience 30 or more extreme heat days, with 0.5 percent of facilities experiencing 60 or more extreme heat days. Under RCP 8.5, by 2050, 8 percent of USDA facilities would have 30 or more extreme heat days, and 0.3 percent facilities could expect 60 or more extreme heat days. Under

this same scenario, by 2080, the vast majority of the continental United States would have over 30 days of extreme heat; 96 percent of USDA facilities would have at least 30 extreme heat days, and 24 percent would experience at least 60 extreme heat days. The impacts of extreme heat would be felt first and worst at facilities in Florida, followed by facilities throughout the Southwest, West, and Midwest. With prolonged severe heat, facility heating, ventilating, and air conditioning (HVAC) systems may be strained or inadequate.

Figure 1: Exposure of USDA facilities to climate change-related hazards, clockwise from top left, geographic distribution of USDA facilities and structures (n=42,673); projected increase in exposure to extreme heat; projected inundation due to sea level rise; current exposure to flood risk; current exposure to wildfire risk; and projected increase in extreme precipitation.

Table 3: Indicators of exposure of USDA facilities to climate-related hazards

	RCP 4.5 2050	RCP 4.5 2080	RCP 8.5 2050	RCP 8.5 2080
Heat: Percent of facilities projected to be exposed to more days with temperatures exceeding the 99th percentile of daily maximum temperatures (calculated annually) from 1976 to 2005	100%	100%	100%	100%
Precipitation: Percent of facilities projected to be exposed to more days with precipitation amounts exceeding the 99th percentile of daily maximum precipitation amount (calculated annually) from 1976-2005	99%	100%	100%	100%
Sea Level Rise: Percent of facilities projected to be inundated by sea level rise	0.7%	0.8%	0.7%	0.8%
	High Risk	**Very High Risk**	**Extreme Risk**	
Wildfire: Percent of facilities at highest risk to wildfire	22%	9%	11%	
	100- or 500-year floodplain			
Flooding: Percent of facilities located within floodplains	6%			

Extreme Precipitation

Under mid- and high-emissions scenarios, at mid- and late-century time horizons, the majority of USDA facilities in the United States will experience an increase in the annual number of wettest days relative to 1976-2005 (days >99th percentile, Table 3). By 2050, under RCP 4.5, most facilities would see an increase of ≤ 40% in the number of individual wettest days. By 2080 however, facilities experiencing a growing number of wettest days would increase, with those in areas of New England experiencing the most significant changes. Under RCP 8.5, these increases in extreme precipitation would occur more quickly and intensely and be more widespread. By 2050, facilities in Alaska, New Hampshire, Pennsylvania, and Vermont would be most affected, and by 2080, significant impacts would be felt across 32 States in the Northwest, West, Midwest, East, and Alaska. Extreme precipitation can cause localized flooding and subsequently damage property, buildings, dams, bridges, and roads.

While these data capture changes in precipitation, expected changes in the severity of drought are not quantifiable using the Federal Mapping App at this time. However, projected changes in drought intensity, per the Fifth National Climate Assessment (2023), are anticipated to impact USDA facilities across the Southwest and Great Plains.

Sea Level Rise

Sea level rise is expected to impact 0.7 to 0.8% of USDA facilities across both climate scenarios and time horizons. The areas with the most USDA facilities likely to be impacted are Humboldt County in California, Broward and Miami-Dade Counties in Florida, Terrebonne Parish in Louisiana, and Charleston County in South Carolina. Facilities in eight additional States and the District of Columbia are also vulnerable to sea level rise. Sea level rise can cause erosion around the foundations of buildings and disrupt operations and services.

Wildfire

Wildfire risk to USDA facilities is most significant across the western United States, but some facilities in the South, East, and Midwest also face wildfire risk. Overall, 42 percent of USDA facilities are in the high to extreme risk categories. The data available for this analysis only reflects wildfire risk based on historical information. Climate change, in combination with other stressors, is expected to alter natural fire regimes, creating increasingly frequent and severe wildfires, increasing the risk to USDA facilities. Wildfires can cause extensive damage to buildings and property and potentially lead to long-term disruption of operations. Campgrounds and other recreational facilities, as well as public safety, could be impacted.

Flooding

Based on FEMA's National Flood Hazard Layer, 6 percent of USDA facilities lie within the 100- or 500-year flood plain. Facilities vulnerable to flooding span 41 States and Puerto Rico, and while many are in coastal areas, many are also inland. With climate change-induced increases in precipitation, as described above, and changes in the intensity and behavior of severe storms, flooding risk is likely to further increase in many of these areas. As with sea level rise, flooding can cause damage to structure and contents of facilities and disrupt operations and services.

Data Sources for Climate Risk Assessment of Federal Facilities and Employees*

- USDA used the Federal Climate Mapping for Resilience and Adaptation Application (Federal Mapping App), developed for Federal agencies by CEQ and the National Oceanic and Atmospheric Administration (NOAA) to conduct a high-level screening of climate hazard exposure for Federal facilities and personnel.
- Asset data in this tool come from the Federal Real Property Profile Management System (FRPP MS), and employee data come from the Office of Personnel Management.
- Projected climate data is available for the heat, precipitation, and sea level rise indicators for two Representative Concentration Pathways (RCP), 4.5 (middle) and 8.5 (high) emissions scenarios, and for two time horizons, 2050 (mid-century) and 2080 (late-century).
- Heat and precipitation data come from high-resolution, downscaled climate model projections based on the Localized Constructed Analogs (LOCA) dataset as prepared by NOAA for the 4th National Climate Assessment.
- Sea level rise data comes from NOAA Coastal Digital Elevation Models and 2022 Interagency Sea Level Rise Technical Report Data Files.
- Wildfire and flood data are based on historical information and come from USDA Forest Service Fire Sciences Laboratory and Federal Emergency Management Agency (FEMA) data sources, respectively.
- All data sources cover the continental United States. Coverage for Alaska, Hawaii, and U.S. territories is more limited and shown when available.

**See Appendix 1 for more detail.*

C. Climate Hazard Exposures and Impacts Affecting USDA Employees

USDA has 93,974 Federal employees located in every State, some U.S. Territories, and at U.S. embassies and consulates around the world. A subset of this total, 70,537 employees, were provided by the Office of Personal Management for analysis within the Federal Mapping App, aggregated to the county-level for security and privacy reasons. Thus, the assessment below should be considered a high-level overview only and may not be representative of all climate-related risks to individual employees. Efforts to address climate-related risks to employee welfare and working environment are addressed in Section 3 of this Plan.

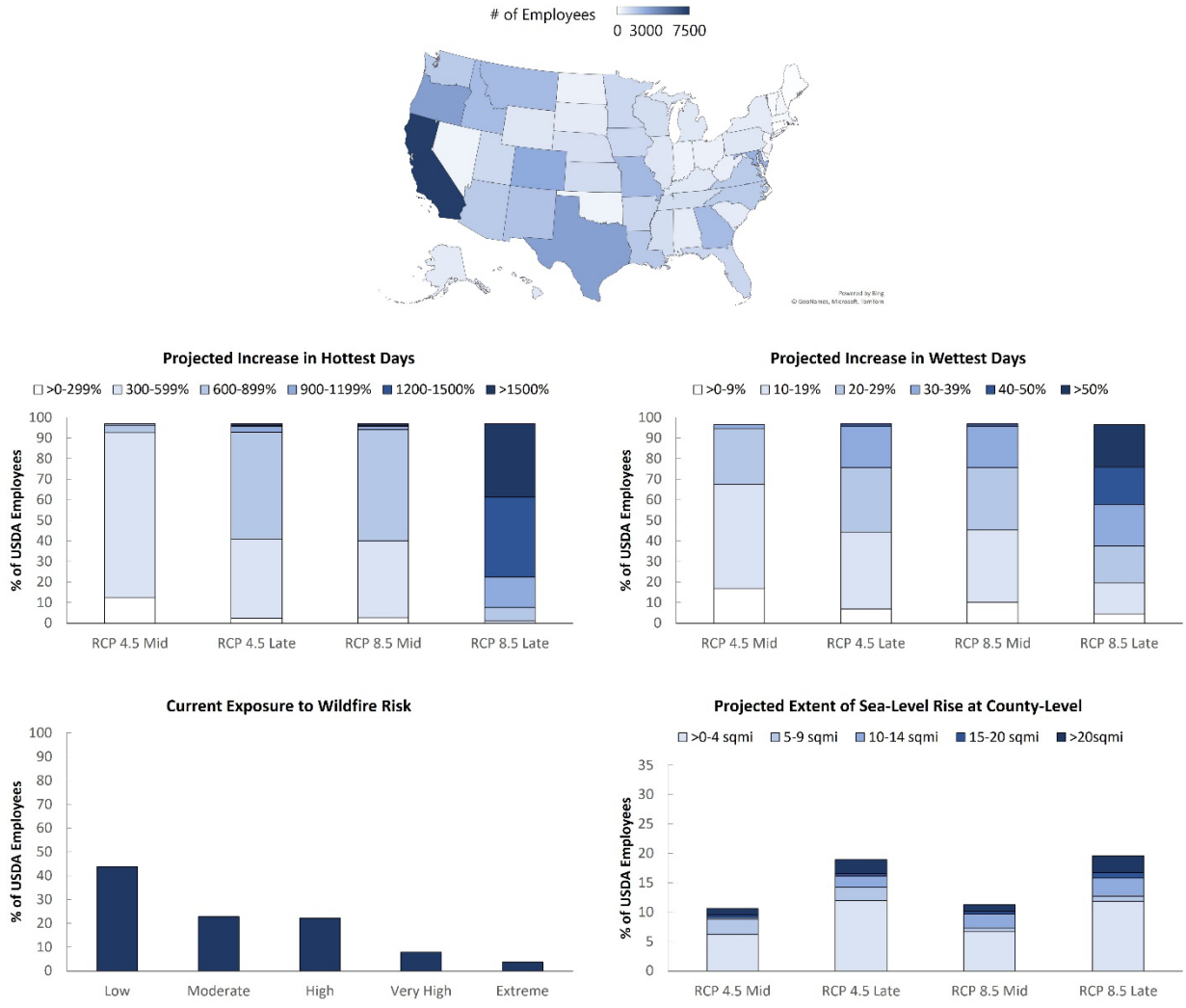


Figure 2: Exposure of USDA employees to climate change-related hazards, clockwise from top, geographic distribution of USDA employees (n=70,537); projected increase in extreme precipitation; projected inundation due to sea level rise; current exposure to wildfire risk; and projected increase in exposure to extreme heat.

Table 4: Indicators of exposure of USDA employees to climate-related hazards

	RCP 4.5 2050	RCP 4.5 2080	RCP 8.5 2050	RCP 8.5 2080
Heat: Percent of employees duty-stationed in counties projected to be exposed to more days with temperatures exceeding the 99th percentile of daily maximum temperatures (calculated annually), from 1976-2005	97%	97%	97%	97%
Precipitation: Percent of employees duty-stationed in counties projected to be exposed to more days with precipitation amounts exceeding the 99th percentile of daily maximum precipitation amount (calculated annually), from 1976-2005	97%	97%	97%	96%
Sea Level Rise: Percent of employees duty-stationed in counties projected to be inundated by sea level rise	11%	19%	11%	20%
	High Risk	**Very High Risk**		**Extreme Risk**
Wildfire: Percent of employees duty-stationed in counties at highest risk to wildfire	22%	8%		4%

Extreme Heat

Under mid- and high-emissions scenarios, at mid- and late-century time horizons, most USDA employees will be exposed to more hot days, respective to their given location (Table 4, Figure 2). Employees in Texas and Florida will likely be impacted first, but later in the century, this increase in hottest temperatures will be felt throughout the West and Midwest. USDA employees who are required to work outside or in poorly ventilated areas will be particularly vulnerable to the effects of rising temperatures, including heat-related fatigue, heat stroke, and exhaustion.

Extreme Precipitation

Similarly, under mid- and high-emissions scenarios, at mid- and late-century time horizons, the majority of USDA employees will experience an increase in the annual number of wettest days relative to 1976-2005 (days >99th percentile). The largest changes will occur in California, the Pacific Northwest, the Southeast, and the Northeast and will become more intense later in the century and under the high-emissions scenario. Increasingly intense rain events will make the work of employees who must work outside more challenging and, in instances of flooding, potentially more dangerous.

Sea Level Rise

Approximately 10 percent of USDA employees work in counties that will experience some degree of sea level rise by 2050 for both RCP 4.5 and 8.5. By 2080, under both scenarios, 19-20 percent of employees will be working in counties experiencing sea level rise that is increasing in its extent. USDA employs approximately 550 employees at the facilities most at risk for sea level rise, described above. Total vulnerability of USDA employees to sea level rise in other locations may be an overestimate due to the aggregation of employee data at the county level. Regardless, increased sea level rise as a result of climate change could make working and getting to work more challenging for many USDA employees.

Wildfire

Over a third of USDA employees work in counties most at risk of wildfire in the United States. Wildfire particularly affects the Forest Service workforce, especially the wildland firefighters, many of whom are hired on a seasonal basis. As of late July 2023, the Forest Service had 11,187 wildland firefighters onboarded, ahead of the typical wildfire season. With climate change, the active fire season is expected to become longer and more active, increasing the demands, stresses, and health impacts to wildland firefighters and other USDA employees.

D. Climate Hazard Exposures and Impacts Affecting Federal Lands, Waters, and Cultural Resources

Climate change threatens the ability of USDA to effectively manage the Federal lands, waters, and cultural resources it stewards. With the 193-million-acre National Forest System, the Forest Service is the primary land management agency within USDA. Climate change threatens the ability of the Forest Service to fulfill its mission, by undermining the health, diversity, and productivity of the Nation's forests and grasslands (Table 5).

The USDA Forest Service Climate Adaptation Plan, released in 2022, identifies six themes that encompass the physical and ecological risks to the Nation's forests, grasslands, and waters, as well as the social, economic, and organizational implications of those threats. The key risks include:

1. **Shifting fire regimes.**

   As fire regimes shift in a warmer and potentially drier climate, USDA will face challenges in reducing risks and realizing benefits from fire. Fire season length and area burned have increased in recent decades, and these trends will continue as the climate further warms. Potential future increases in both area burned and high severity fires, from changes in fire weather conditions and fuel loads, will present challenges to ecosystems and communities. In dry forest types that historically experienced frequent fires, over a century of fire exclusion and other land management practices have contributed to increased forest stand densities and higher fuel levels, making them vulnerable to larger and uncharacteristically severe fires. While fire is an important ecological process and management tool, warmer and drier conditions may hinder the ability of USDA to manage fire for its social and ecological benefits in some areas.

2. **Extreme events and disturbances.**

   Climate change will contribute to more frequent and intense extreme events and disturbances in addition to wildfire, including floods, drought, hurricanes, insect and disease outbreaks, and the spread of invasive species. These disturbances already affect the Nation's lands and waters but will likely increase in intensity and frequency because of climate change. Flooding may increase in many of the Nation's watersheds due to changes in precipitation patterns and hydrologic processes. Increased warming may result in more intense hurricanes and other storms and increase the likelihood of extreme droughts in many parts of the United States. Climate-induced changes to insects, pathogens, invasive plants, and other species will contribute to the loss of ecological integrity through increased mortality and competition with native species. These extreme events and disturbances, including increasingly frequent and severe wildfire, can interact and be compounded by one another.

3. Chronic stressors to watersheds and ecosystems.

The Nation's lands and waters are already experiencing long-term changes in mean annual temperature and precipitation, and these changes will likely accelerate in the coming decades. Long-term shifts in seasonal precipitation, growing season length, and annual minimum and maximum temperatures are creating chronic stress on watersheds and ecosystems. Atmospheric carbon dioxide also continues to rise, affecting forest and rangeland productivity and function. Chronic stressors will likely alter the diversity, structure, function, and productivity of ecosystems and watersheds, creating new challenges for land management.

4. Disruption in the delivery of ecosystem products and services.

Climate change will affect the ability of the Nation's forests and grasslands to furnish important services to the public, including clean water and air, carbon storage and uptake, timber and nontimber forest products, productive grazing land, and recreation opportunities. These benefits may be lost or altered due to changes in wildfire regimes, extreme events, and chronic stresses on watersheds and ecosystems. These impacts of climate change will interact with changes in demands for products and services resulting from shifts in human population and economic growth.

5. Disproportionate impacts on disadvantaged communities and Tribal Nations.

The adverse impacts of climate change on forests and grasslands disproportionately affect Tribal Nations and disadvantaged communities, undermining their ability to manage risks, respond to hazards, and minimize loss from disturbances. Climate change threatens ecosystem services important to human health, infrastructure, economic prosperity, and culture. Tribal Nations and other Indigenous peoples also face disproportionate impacts on their ancestral homelands, threatening cultural survival.

6. Threats to the agency mission, infrastructure, and operations.

The impacts of climate change affect the ability of the Forest Service to fulfill its mission, sometimes generating direct threats to its workforce and operations. Climate change may create new challenges for public engagement as well as place additional stress on an understaffed workforce. Extreme events may damage or destroy critical infrastructure, disrupting operations and elevating health and safety risks to the workforce.

Table 5: Exposure to and effects of climate change on the National Forest System

Hazard/Resource	Current Effects/Exposure	Future Effects/Consequences
Wildfire	Doubling of average annual area burned by large wildfires in the U.S. since 2000. Impacts public and employee health, natural fire regimes and ecosystem health, water quality, erosion, and infrastructure.	Increase in volume of trees killed by fire expected by 2070. Increases in annual area of moderate-severity fire in all Resource Planning Act Assessment regions. Variable changes in area of high severity fires.
Flooding	Increases in heavy rainfall apparent across most of the U.S. Impacts erosion, water quality, infrastructure. Burned areas are particularly vulnerable to landslides and other hazards.	Continued damage to Forest Service roads and infrastructure; impacts on watershed function, downstream communities, and ecosystems.
Severe Storms	More frequent or severe storms, particularly in Eastern U.S.	Continued change to the intensity and behavior of storms; increased needs for post-disaster support.
Drought	Decrease in water availability originating from forested lands. Harm to forest and rangeland health.	Increasing forest exposure to drought will decrease water storage and availability, harm forest and rangeland productivity, and increase severity and likelihood of wildfire.
Insects & Disease	Increased damage and mortality from insects, disease, and invasive species.	Future conditions increase potential for insect and disease outbreaks and expansion of invasive species distribution.
Habitat Shifts	Decrease in extent of certain forest types, caused in part by climate change, including commercially important trees.	Increased need for adapted forestry practices to manage pace of climate change.
Recreation	Increased demand for summer recreation activities and reduced opportunities for winter recreation. Impacts due to diminished air and water quality and on facilities and public safety.	Intersection of human population changes with climate change will alter recreation opportunities.
Sensitive & At-risk Species	Threat to biodiversity, migration patterns, and landscape connectivity.	Decreased ability of forests and grasslands to serve as climate refugia.
Ecosystem Services & Local Economies	Changes to forest product supply, exacerbation of changing use trends, and changes to wood products industry.	Challenges in simultaneously managing for ecosystem services and adapting management approaches.
Old Growth Forests	Increased risk from acute and chronic disturbances.	Climate-amplified damages continue to be the primary threat to these systems.
Cultural Resources	Direct (heat, precipitation) and indirect (wildfire, sea level rise, flooding, erosion) threats.	Increased risk depending on location and degree of future change.
Treaty Rights, Reserved Rights, Other Tribal Rights	Diminished ability to advance protection of Tribal rights.	Exacerbation of ability to advance protection of Tribal rights.
Sacred Sites	Threats to physical integrity, access, and protection of Sacred Sites	Exacerbation of threat to Sacred Sites.

SECTION 3: IMPLEMENTATION PLAN

Refer to Appendix 2 for a summary of key actions highlighted throughout Section 3.

A. Addressing Climate Hazard Impacts and Exposure

1. Addressing Climate Hazard Exposures and Impacts Affecting USDA Facilities

Summarizing Section 2B, the most widespread risk to USDA facilities is extreme heat, which will affect all facilities under all scenarios. This is followed by extreme precipitation, which will affect over 95 percent of USDA facilities in all scenarios, and wildfire, which poses a high to extreme degree of risk to 42 percent of USDA facilities.

Extreme temperatures can stress the U.S. energy system and place USDA facilities at risk, as cooling systems are overcome by the added burden, especially in the Southwest, Southeast, Puerto Rico, and the U.S. Virgin Islands. In Alaska, thawing permafrost associated with higher temperatures is expected to continue, leading to drier landscapes, more wildfires, and increased costs of maintaining infrastructure. Increased spread of invasive species such as termites will also pose a higher risk to USDA facilities.

In addition to buildings, other USDA facilities such as dams, bridges, and roads are at increased risk of flooding, washouts, and mudslides as the frequency and intensity of extreme weather events increase. Agency-owned dams are directly impacted by climate change. Dams are designed to withstand engineering average conditions but are not necessarily capable of handling the extreme events due to climate variations. Risks to the safety of dam assets are exacerbated by fire, drought, and flood conditions. Drought and flood conditions, along with wildland fire areas over dam assets, decrease safety and stability of structures, increasing the risk to land and communities downstream of the dams.

Forest Service buildings in the wildland-urban interface are at substantial risk for increased damage from wildfire, particularly in the West. Forest Service heritage sites, recreation facilities, and buildings throughout the National Forest System, such as visitor and welcome centers, comfort stations, offices, and warehouses are increasingly compromised by threats from climate change such as hurricanes, wildfire, flooding, and invasive species, which can threaten wood construction.

Department-level Priority Actions

USDA is committed to improving the climate resilience of sites, fleet, and facilities and implementing its Departmental Regulations and Directives for sustainable and climate adaptive operations of these assets (Table 6).

To increase understanding of climate vulnerabilities and better integrate climate considerations into project prioritization, USDA is re-launching the Sustainable Operations Council (SOC). The SOC will provide Department-wide senior management engagement in sustainable operations programs and real property management. The council will advise the Assistant Secretary for Administration (ASA) and develop and implement policies, procedures, processes, reporting mechanisms, and required actions related to USDA sustainable operations, including climate adaptation at USDA facilities. Within the framework of the SOC, subject matter experts and other stakeholders will work collaboratively to identify the Council's goals and objectives.

USDA is working with the Department of Transportation's Volpe Center to develop the Climate Hazard Exposure and Resilience (CHER) Tool for USDA property and infrastructure. The tool will be used to identify facility-level climate vulnerabilities and develop actions to address these risks, with the aim to increase USDA operational resilience. This effort will inform development of policy and guidance, as well as prioritization of project funding. This activity includes developing and deploying tools, guidance, and training to complete climate resilience assessments of 1,000 mission-critical USDA facilities, in accordance with the USDA 2021 Climate Action Plan. Climate risks to 2,000 of USDA's contaminated sites will also be assessed to inform decision making around project funding and environmental cleanup options to protect USDA managed lands. When possible, analyses will incorporate data, such as the Climate and Economic Justice Screening Tool (CEJST). The project includes the development of a template for presenting the business case for implementing resilience-building projects. Upon completion, USDA will have a dashboard to present the results of the completed resilience assessments.

The Federal Flood Risk Management Standard requires agencies to prepare for and protect federally funded buildings and projects from flood risks. USDA's real property leasing program will continue to ensure that floodplain impacts are identified for projects, and that alternatives that avoid the floodplain are identified and evaluated.

Agency-level Priority Actions

Office of Operations (OO). OO, which manages USDA facilities in the National Capital Region, is undertaking building modernization projects that include provisions to increase the resilience of real property. Examples include replacing roof components, adding storm windows and emergency generators, and installing air conditioning systems able to cope with changing temperatures. Future modernization projects will follow similar paths and add other appropriate provisions in response to future climate change.

Agricultural Marketing Service (AMS). To enhance resilience to climate impacts, AMS is building robust contingency operation (ConOps) plans by reviewing existing plans and assessing the need for new ConOps plans, ensuring that climate change vulnerabilities are assessed and incorporated. This action will be done in consultation with industry partners to identify plans that allow AMS to continue service delivery to their customers and to grant flexibilities during extreme weather events and other disasters. In coordination with the AMS real property plan,

Sustainability Plan, and related risk management factors, this process will inform AMS' future facility project prioritization.

Agricultural Research Service (ARS). ARS maintains continuity of operations plans (COOPs) to continue critical operations at ARS locations under a range of circumstances, including extreme weather impacts. ARS locations perform regular and preventative maintenance to keep buildings and equipment in optimal condition to resist severe weather. This is coordinated through the Environmental Management System (EMS), which is maintained by the ARS Facilities Division.

Farm Production & Conservation Mission Area (FPAC). FPAC employs a Climate Change Action Strategic Framework to underscore its commitment to a holistic approach to climate change. This approach explicitly addresses climate change risks to FPAC's owned real property assets: land, buildings, and structures. FPAC remains dedicated to consistently identifying and incorporating climate resilience criteria across its real property portfolio and other relevant initiatives, ensuring a proactive and adaptive stance against the evolving challenges of climate change.

Forest Service. The Forest Service Climate Adaptation Plan includes a priority action to reduce risks and improve capacity in agency operations and infrastructure. Risks from climate exposure and hazards to Forest Service buildings are addressed through the National Asset Management Program, which incorporates climate resilience criteria to inform infrastructure spending decisions.

Table 6: Prioritized actions to address climate hazard exposures and impacts affecting USDA facilities

Agency/ Office	Climate Risk	Priority Action	Implementation Timeline
OPEM	Need for additional high-level coordination	Re-launch USDA Sustainable Operations Council	2024 Q1 Ongoing, quarterly
OPEM	Need for facility-level assessments of climate-related hazards	Continue development of Climate Hazard Exposure and Resilience (CHER) Tool with DOT's Volpe Center to assess climate-related risks to facilities. Outputs to include a contaminated site report, final tool & guidance, completed facility assessments, and dashboard.	2024-2025
OPEM	Flood risk at leased facilities	Continue to ensure that floodplain impacts are identified for leases and identify and evaluate alternatives that avoid the floodplain.	2024, ongoing
OO	Hazards in the National Capital Region	Integrate resilience-building provisions into building modernization projects in the National Capital Region	2024, ongoing
AMS	Interruption to AMS mission critical services, including facilities.	As part of the contingency operations planning process, identify climate risks (Phase 1), implement targeted initiatives with metrics (Phase 2), and examine lessons learned and redesign as needed (Phase 3).	2025 (Phase 1)

Agency/ Office	Climate Risk	Priority Action	Implementation Timeline
ARS	Risk of extreme weather impacts to ARS facilities	Maintain COOPs and perform regular and preventative maintenance to buildings and equipment.	2024, ongoing
FPAC-BC	General facilities risk due to climate hazards	Develop a new space management policy to optimize workforce and operational footprint, integrate climate resilience and mitigation goals.	FY24
FPAC-BC	General facilities risk due to climate hazards	Develop a Facilities Program Manual to include planning guidance for environmental justice, climate adaptation, and resilience.	FY24
FPAC-BC	General facilities risk due to climate hazards	Conduct facility condition assessments to determine mission critical facility condition index and replacement value and identify retrofit opportunities to increase resilience.	FY24-27
USFS	Wildfire risk in wildland-urban interface	Continue to implement of 2021-2022 pilot program for USFS facilities at risk of wildfire to assesses fire resilience of structures and identifies changes to increase survivability.	2024-2027
USFS	Flooding	Quantify flooding risk, including due to climate change, using the USFS Flood Potential Portal (https://floodpotential.erams.com/).	Ongoing
USFS	Threats to historic building and facilities	Remotely train USFS recreation professionals and line officers using improved tools and strategies, embrace facility improvements when addressing deferred maintenance, and update web resources that help decision-makers assess a site or facility's climate vulnerability.	2024
USFS	Threat to dams due to extreme precipitation and flooding	Continue evaluation and analysis of high and significant hazard dam spillway capacities to understand how climate extremes may affect the safety of dam assets and communities and land downstream. Use results to inform prioritization of dam repairs, upgrades, and decommissioning.	Ongoing
USFS	Threat to dams due to wildfire	Work with the Burned Area Emergency Response (BAER) teams to identify assets affected by wildfire. Use results to inform prioritization of dam repairs and decommissioning.	Ongoing

2. Addressing Climate Hazard Exposures and Impacts Affecting USDA Employees

USDA employees are located throughout the United States, its Territories, and U.S. embassies and consulates around the world. Employees work in rural and urban areas, many in headquarters or field offices, some in laboratories, while many others spend significant amounts of time working outdoors or in privately owned facilities. The work environments of USDA employees are as diverse as the climate change risks that they face. As described in Section 2C, exposure to extreme heat will become an increasing concern for many USDA agencies. Physical disruptions and health risks will be an acute concern with more intense or impactful extreme weather events, including increased risk of flooding. Finally, firefighters in USDA's Forest Service are already feeling the burden of longer and more intense wildfire seasons that are associated in part with higher temperatures and intense drought.

Climate-related risks to employees should be identified through Enterprise Risk Management (ERM) activities conducted at the Mission Area- and Agency-level. The Office of Budget and Program Analysis (OBPA) leads ERM efforts for USDA and will continue to partner with the Office of Energy and Environmental Policy (OEEP) to strengthen connections between employees working on risk management and climate adaptation to ensure these risks are elevated, when appropriate.

The Emergency Programs Division and the Continuity Planning Division within USDA's Office of Homeland Security (OHS) are critical to preparing for and responding to natural disasters and other events that threaten USDA's mission or personnel. To account for longer seasons in which climate-related hazards are prevalent or increasingly frequent, OHS may have to adjust the staffing patterns of their 24/7 Operations Center. OHS aims to integrate GIS software into their workflows to allow for quicker analysis and response to disasters and extreme weather events. Finally, in continuity planning, OHS will ensure that agency alternative sites have appropriately accounted for potential climate change risks, especially those that may not have been prevalent when a site was originally chosen.

USDA Mission Areas and agencies are addressing climate-related risks to their employees in multiple ways, including (Table 7):

- Assessing workforce-specific climate vulnerabilities and reviewing personnel safety policies and guidance.
- Updating and maintaining Continuity of Operations Plans (COOPs) and leveraging telework flexibilities to enable critical work to continue.
- Building workforce capacity to address climate-related impacts and demands on employees.
- Bolstering critical communications infrastructure and enhancing lines of communication to employees.
- Recognizing the importance of fleet preparedness to employee resilience.
- Addressing the challenges to wildland firefighters.

New actions identified here will be integrated into future USDA agency-level climate adaptation planning, monitoring, and reporting efforts.

Table 7: Prioritized actions to address climate hazard exposure and impacts affecting USDA employees

Action Areas	Priority Actions	Agency/ Office	Timeline
Enterprise Risk Management	Strengthen identification of climate-related risks, when appropriate, during enterprise-risk management.	OBPA	Ongoing
Continuity of Operations Plans (COOPs)	Adapt emergency planning, preparation, and operations.	OHS	Ongoing
	Follow-up on efforts identified in COOP update.	NRCS	Ongoing
	Maintain and adjust COOP as needed.	FSA	Ongoing
	Use telework/remote work flexibilities to enhance mission resilience when COOPs are activated.	All	Ongoing
Personnel safety policies and guidance	Develop new Disaster Preparedness Template.	FPAC-BC	Ongoing
	Develop plan to manage employee-related climate risks.	AMS	2025
	Review safety and hazard reporting (Directives 4791.12 & 4791.13) to ensure safe and healthy working conditions.	FSIS	Ongoing
	Continue to issue guidance to inspection program personnel on preventing heat-stress illness and acquire and distribute items to avert heat stress in IPP. Evaluate new products to make available as needed	FSIS	Ongoing
	Create data dashboard to evaluate employee-related climate risks to inform development of emergency guidance and communication system for RD duty stations.	RD	FY24-26
Workforce Capacity Building	Continue to operationalize 'jump teams' to add personnel and resources to county offices during disasters.	FSA	Ongoing
	Invest in training and support for employees to maintain mission-delivery through disasters.	FSA	Ongoing
	Implement agreement with AmeriCorps, The Corps Network (TCN), and the National Association of Conservation Districts (NACD), to establish a Working Lands Climate Corps.	NRCS	Ongoing
	Implement 5-year interagency agreement with AmeriCorps NCCC to establish the NCCC Forest Corps.	USFS	Through 2028
	Implement 5-year participating agreement with Student Conservation Association.	USFS	Through 2028
	Implement 3-year national participating agreement with Conservation Legacy Ancestral Lands Conservation Corps.	USFS	Ongoing
	Offer training sessions on disaster and emergency response	FNS	FY24
	Continue to provide Workplace Safety & Health Hazards training.	FSIS	Ongoing
Communications	Monitor emergency communications needs and consider embedding within COOP and disaster planning.	NRCS	Ongoing
	Review and identify alternatives and redundancies to ensure continuity of communications during disasters.	FSA	Ongoing
	Maintain emergency contact information and implement and review its emergency contact protocols.	NIFA	Ongoing

Action Areas	Priority Actions	Agency/ Office	Timeline
	Integrate health and safety information into employee newsletters, internal webpages, and other platforms.	All	Ongoing
Fleet preparedness	Consider transportation and fleet preparedness during disaster response. Identify at-risk vehicles and garages using decision-support layer in the Fleet Utilization Dashboard.	FPAC-BC	Ongoing
Wildfire	Continue implementing BIL-supported temporary pay increase for wildland firefighters. Continue work with Department of the Interior, through direction from BIL and FY23 National Defense Authorization Act (NDAA), within the Federal Firefighter Health and Wellbeing Program to develop an approach for measuring and managing hazardous exposures from the wildland fire environment with the potential for short- and long-term health effects.	USFS	Ongoing

3. Addressing Climate Hazard Exposures and Impacts Affecting Federal Lands, Waters, and Cultural Resources

Managing Climate Risks to the National Forest System

Climate change threatens USDA's ability to effectively manage its lands and waters, which primarily consist of the 193 million acres within the National Forest System, managed by USDA's Forest Service (USFS). The Forest Service is focusing on finding solutions to its climate challenges and greatly accelerating the integration of climate change considerations into all aspects of agency planning and operations. The Forest Service Climate Change Adaptation Plan (USFS CAP), released in July of 2022, provides an overarching vision for key actions that must be taken to reduce risks to lands and waters within the National Forest System, as well as state, private, and Tribal lands.

The Forest Service is seeking to reduce climate-driven wildfire risk through the implementation of the Wildfire Crisis Strategy (WCS) and support post-wildfire recovery through implementing climate-informed actions in its Reforestation Strategy. National programs are identifying key changes that need to be made to policy and guidance in response to USDA Secretarial Memorandum 1077-004 on Carbon Stewardship and Climate Resilience and based on input received from the recent Advance Notice on Proposed Rulemaking (ANPR) on Climate Resilient Forests and Grasslands. In addition, Regional Climate Action Plans, finalized in December 2023, identify key regional goals and climate challenges, and detail local programs, actions, and partners to address those challenges. These actions, investments, and policy reforms aim to sustainably manage and adapt our nation's lands and waters in ways that provide for ecological integrity and support social and economic sustainability in a changing climate.

Preparing for and responding to these changes will require clear performance and accountability measures that prioritize climate action. The Climate Action Tracker (CAT) is the primary tool used by the Forest Service for reporting and monitoring climate change actions, including those described in the USFS CAP, Secretarial Memorandum 1077-004, and Executive Orders 14008 and 14057. The CAT collects information about climate actions from 149 national forests and offices to quantitatively track progress on climate goals at all levels of the agency. In early 2024, the Forest Service plans to share a public progress report on the first two years of CAT reporting, including highlights of national and regional-level climate plans and actions.

Key action areas outlined in the USFS CAP to address the effects of climate change on Federal lands, waters, and cultural resources include (Table 8):

Implement the Wildfire Crisis Strategy through climate-informed actions. In early 2022, the Forest Service released its Wildfire Crisis Strategy (WCS), with the 10-year goal of treating an additional 20 million acres on the National Forest System and an additional 30 million acres on other lands to make landscapes more resilient to wildfire and other disturbances that are driven in large part by climate change. This strategy responds to the effects of climate change in degrading forest health and elevating wildfire risk, especially in the Western United States, by funding activities on 21 high-risk landscapes. Using funds from the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA), over a million acres were treated in FY 2022 and 2023. In February 2024, an additional $500 million from both BIL and IRA investment to further expand the WCS was announced, bringing the total investment in this comprehensive strategy to over $2.4 billion. The Forest Service is collaborating with the Intertribal Timber Council to support Tribal collaboration and workforce capacity in implementing the WCS. BIL funding is also being

used to support the Joint Chiefs' Landscape Restoration Partnership program that aims to improve forest health on public and private lands. FY 2023 investments built on the more than $48 million invested in FY 2022 to fund projects to mitigate wildfire risk, protect water quality, improve wildlife habitat, and enhance forest ecosystems, fostering resilience to climate stressors.

Help watersheds adapt to changing conditions, drought, and flooding. Climate adaptation efforts will target streams, rivers, lakes, and reservoirs to ensure that the Nation's forests and grasslands continue to provide clean and abundant water to downstream communities, even after extreme events. Functioning watersheds can absorb large pulses of water from heavy rain and rapid snowmelt while also weathering the effects of intense droughts. In 2023, the Forest Service signed a $33 million, IRA-funded agreement with Trout Unlimited (TU) as part of the National Watershed and Aquatic Restoration Initiative. This agreement will fund TU to collaborate with USFS personnel to implement approximately 130 projects that benefit USFS priority watersheds under the Watershed Condition Framework and Source Water Protection Areas through 2027. TU will also hire a Tribal projects coordinator to support Tribal Nations and communities in project development.

Help ecosystems adapt to intensifying disturbances and extreme events. Forest Service land managers are helping ecosystems resist the effects of and build resilience to disturbances. In some forests, this includes treatments to reduce tree densities, maintain species diversity, or create heterogeneous landscapes that can withstand droughts and insect outbreaks. In rangelands, managing for diverse native plant communities may help prepare ecosystems for drought and intensifying disturbances, like the spread of invasive species. In late 2023, American Forests and USFS announced a $20 million keystone agreement to help the agency organize and rapidly scale climate-adapted reforestation across millions of burned and degraded acres over the next five years.

Fully integrate climate considerations into guidance and directives. The Forest Service directive system serves as the primary basis for managing programs and the primary source of administrative direction for employees. The Forest Service is developing changes to its directives that better integrate climate resilience, carbon stewardship, and Indigenous Knowledge into planning and ecosystem management. For example, the Forest Service Silviculture Manual (FSM 2470) is undergoing revision to incorporate climate adaptation considerations. Language regarding the use of assisted migration is being added, providing explicit direction on when different forms of assisted migration may be appropriate, and the term "climate-informed reforestation" is being clearly defined. As part of the Secretary's Memo on Climate Resilience and Carbon Stewardship, the Forest Service prepared a set of 45 recommendations, including recommendations for 29 directives revisions. These recommendations were approved by the Secretary on February 29, 2024, for implementation in a phased approach from 2024 to 2026.

Plan for future conditions across boundaries. The pace and scale of climate change require the Forest Service to think at broader spatial scales and longer time horizons. Extending beyond jurisdictional and ecological boundaries, climate change will require planning to account for landscape-scale changes. Planning for desired future conditions that accounts only for past climatic conditions puts forests and grasslands at risk of being unable to sustain ecological integrity and provide multiple benefits to the public. The Forest Service is developing tools and information to help staff integrate climate vulnerability assessments and adaptation more effectively into the plan revision process, in accordance with the 2012 Planning Rule. State forest assessments and state wildlife action plans also are integrating climate change into strategic goals across ownership regimes. The agency is prioritizing investments in co-stewardship with Tribes to protect both Tribal lands and communities and National Forest System lands from climate risks.

Manage ecosystems for long-term change. On-the-ground management will require a range of actions to protect at-risk plant and animal species and ecosystems, improve ecosystem resilience, and in some cases facilitate transitions to more climate-adapted conditions. The Forest Service will employ evidence-based adaptation actions (derived from demonstration projects, the Adaptive Silviculture for Climate Change network, and other efforts) to maintain ecosystem function in balance with other social, economic, and cultural values; not all actions will be appropriate everywhere. Actions will ultimately depend on local goals and objectives and will be guided by local expertise, Indigenous Knowledge, and scientific research.

Table 8: Prioritized actions to address climate change hazard exposures and impacts affecting the National Forest System (see Appendix 2 for action timelines)

Hazard/Resource	Priority Actions
Wildfire	**Implement the Wildfire Crisis Strategy (WCS).** Project activities include fuel removal, including through thinning and prescribed fire, across 21 landscapes to reduce climate-related risks. Over a million acres treated in FY22 and 23, and with a plan to treat another half-million acres in FY24 within these high-risk landscapes. **Implement the National Prescribed Fire Resource Mobilization Strategy**. Aligns prescribed fire implementation, support, and coordination agency-wide to increase the pace and scale of prescribed fire use and successfully implement the Wildfire Crisis Strategy **Joint Chiefs' Landscape Restoration Partnership Program.** Three-year collaborative projects with agricultural producers, forest landowners, Tribes, and public land managers to enhance forest health and climate resilience. Implement FY 2023 and 2024 funding. **Implement the National Reforestation Strategy.** A framework to increase the pace and scale of reforestation to address existing needs, anticipate future events including climate change, and meet the provisions of the recently passed REPLANT Act (Public Law 117–58), with a 2030 target of reforesting 1.8 million acres.
Flooding	**Modernization of the Watershed Condition Framework.** Incorporation of climate change, drought, fire, and flood threats into prioritization of 6th level (HUC12) sub-watersheds and implementation of watershed restoration activities. **Updates to water resources directives.** Propose updates to the water resources directives to include climate adaptation considerations in Best Management Practices program policy, watershed planning, and watershed restoration prioritization. **Implementation of restoration programs to build resilience.** Leverage BIL and IRA investments towards the Collaborative Aquatic Landscape Restoration (CLAR) and Joint Chiefs' Landscape Restoration Partnership programs which will improve ecosystem health and wildlife habitat, making them better able to withstand climate stressors. **Avoid maladaptation in project implementation.** Continue to promote use of the categorical exclusions found in 36 CFR 220.6 (e) 18 and 19 for efficient project planning of hydrological restoration and post-disturbance remediation activities without potential for significant adverse impacts.
Severe Storms	**Forest Service National Post-Disaster Recovery (NPDR) Team.** Established in August 2023 to lead innovative approaches to post-disaster recovery to support the field, and coordinate efforts with Tribes, Federal and State agencies, and local partners. **Establish an Enterprise Emergency Management Council.** This cross-Forest Service senior-level team will facilitate timely information sharing on preparedness, response, recovery, and mitigation efforts in the event of large-scale emergencies or disasters affecting National Forest System lands. **Applying data and tools for preparedness and response.** Continue to use predictive technology and services to increase preparedness for major storm events and increase pre-emptive response to setup recovery efforts. **Center equity in recovery efforts.** Ensure guidance for recovery efforts thoroughly integrates Tribal and equity considerations.
Drought	**Apply geospatial analysis to assess drought impacts and vulnerability.** The Forest Service Climate Risk Viewer already includes drought-related geospatial layers to help land managers consider drought in strategic planning and other applications. In FY24, the USFS Geospatial Technology and Applications Steering Committee (GeoTASC) is funding design of a drought vulnerability assessment (DVA) that uses remotely sensed data and machine learning techniques and will be applied to inform forest and rangeland management in

Hazard/Resource	Priority Actions
	drought-stressed areas. Pilot DVAs and drought adaptation workshops will be conducted in Eldorado National Forest (R5) and the Ashley National Forest (R4).
Insects & Disease	**Address risk of invasive species across landscapes.** In FY23, the Forest Service announced investments in 60 projects totaling $18.7 million to address invasive species on Federal, State, private, and Tribal lands. In FY24, the Forest Service will allocate $7.7 million available from the BIL for invasive species prevention, detection, and eradication on National Forests and National Grasslands, which will help reduce the climate-driven impacts of invasive species.
Habitat Shifts	**Revise Silviculture Manual (FSM 2470).** This Manual is undergoing revision to incorporate climate adaptation into all aspects of silviculture and reforestation, including added language on assisted migration and climate-informed reforestation.
Recreation	**Reimagine Recreation.** Leverage Reimagine Recreation strategic planning initiative to enhance delivery of public benefits through recreation, including in the context of adapting to new environmental conditions. **Enhancing integration of climate adaptation into recreation planning.** Develop additional guidance, instruction, and procedural direction to integrate climate adaptation, wildfire risk reduction, and equity considerations into recreation planning; wilderness and wild and scenic river planning; facility improvement projects; special uses; and national level project prioritization and funding decisions.
Sensitive & At-risk Species	**Adapt policies and guidance for at-risk species.** Develop new data standards and data management policies for watershed conservation and wildlife connectivity. Develop informational guidance on incorporating climate risk and adaptation into the land management planning process. Prepare informational guidance for increased intra-agency, Tribal, State, and partner cooperation and coordination to promote biodiversity, habitat connectivity, and ecological integrity and resilience.
Ecosystem Services & Local Economies	**Integrate climate adaptation and mitigation into policies and guidance.** Prepare policy revisions, guidance, and additional research to encourage beneficial utilization of forest restoration byproducts as a result of adaptation-related activities while considering climate mitigation and carbon stewardship implications.
Old Growth Forests	**Climate-informed amendment of land management plans.** In amending all 128 land management plans to ensure consistent management strategies for old-growth forest conservation and management, integrate climate vulnerabilities and adaptation to enable flexibility in responding to rapid changes in wildfire behavior, drought, insects and disease.
Cultural Resources **Treaty Rights, Reserved Rights, Other Tribal Rights** **Sacred Sites**	**Strengthening Tribal Consultations and Nation-to-Nation Relationships.** Climate adaptation will be mainstreamed into elements of this Forest Service Action Plan, including into consultation, coordination, and collaboration on projects that affect Tribal interests and efforts to improve the protection of sacred sites. **Tribal Forest Protection Act workshops.** In FY24, the Tribal Climate Adaptation Menu team is leading a 'train the trainer' workshop to train facilitators to lead groups through using the menu, with the intent of promoting the consideration of Tribal perspectives in adaptation projects in multiple communities and locations.

Advancing the America the Beautiful Initiative

Launched in 2021, the Biden-Harris Administration's America the Beautiful Initiative seeks to support and advance locally led conservation and restoration efforts across the Nation. USDA contributes uniquely through its work to incentivize voluntary conservation on working lands and its partnerships with rural, urban, and Tribal communities across the country. Many of these conservation efforts simultaneously address climate change risks to soil health and agricultural production, biodiversity, recreation, and public health. We offer here recent examples of USDA activities at this intersection of conservation and climate adaptation that are elevating locally led conservation efforts and strengthening local economies (Table 9). Conservation and restoration efforts are inherent to many of the USDA programs highlighted below and integration of adaptation and resilience into these efforts will continue as these programs are implemented over the timeframe of this Adaptation Plan.

Table 9: Examples of USDA actions towards America the Beautiful focal areas

Incentivizing the voluntary conservation efforts of ranchers, farmers, and forest landowners
Voluntary and incentive-based conservation is key to USDA's approach to addressing climate change. NRCS works with producers and communities to achieve their individual conservation and business goals, while helping to ensure the long-term sustainability of U.S. agriculture. Through its Conservation Stewardship Program (CSP), NRCS helps producers build on existing conservation efforts, incentivizing them to further enhance their operation, building climate resilience and rewarding those efforts. In FY23, the CSP provided funding to 2,406 landowners for climate-focused contracts on 3,312,492 acres of land. Similarly, FSA conservation programs address conservation and climate goals on working lands. The Conservation Reserve Program (CRP) encourages farmers to remove environmentally sensitive land from agricultural production for 10- to 15-year periods. In FY23, FSA issued $1.77 billion in payments to 667,000 participants for conservation of more than 23 million acres of private land, 3.9 million of which was newly enrolled. FSA continues to adapt CRP to meet the needs of producers and the environment, including by adjusting payments to incentivize climate-smart farming practices as well as those that improve water quality. The Conservation Reserve Enhancement Program (CREP), a subset of CRP, has been adapted to incentivize additional conservation efforts, for example by allowing flexibility in how matching funds are provided. The Colorado Republican River CREP is one example where producers are incentivized to adopt dryland crop production practices which will help them work toward permanently retiring water rights and conserving the Ogallala Aquifer for future generations.
Creating jobs by investing in restoration and resilience
USDA's Rural Development (RD) supports efforts to bolster rural economies, including by working with partners to invest in restoration and resilience. In one example, joint support from RD and the U.S. Endowment for Forestry and Communities helped communities in Eastern Oregon and Northern California steward forest resources, create jobs, and plan for the future through organized community forestry. Using the funding, multiple regional and local organizations created and carried out plans to treat large swaths of public and private forests and implement policies to support sustainable forest stewardship. Supporting community investment in forest stewardship will help communities manage wildfire risk and foster forest health in a future changing climate.

Supporting Tribally led conservation and restoration priorities

Tribes are an important partner in conservation and contribute valuable traditional knowledge to conservation efforts. At the same time, Tribal livelihoods, health, nutrition, and cultural practices, as well as the ecological resilience of their territories, are vulnerable to the effects of climate change. USDA agencies partner with Tribal Nations to support them in addressing conservation and climate goals. NRCS's Regional Conservation Partnership Program (RCPP) promotes coordination of conservation activities with partners that offer value-added contributions, to expand the collective ability to address on-farm, watershed, and regional natural resource concerns. In 2023, three projects led by Tribes were funded, totaling more than $58 million: a project with the Gila River Indian Community to build drought resilience, the Headwaters Restoration project with the Penobscot Indian Nation and the US Fish and Wildlife Service to improve habitat and wildlife conditions, and the Tribal Stream and Michigan Fruitbelt Collaborative to preserve and restore the fragmented multi-tribal fisheries and wildlife populations in northwest Lower Michigan.

NRCS also uses authority granted in the 2018 Farm Bill to enter into Alternative Funding Arrangement Programmatic Agreements (PA) with Federally recognized Tribal Nations, giving NRCS greater program flexibility to work with Tribes to help them achieve their conservation goals.

FSA has worked to increase its engagement with a broader range of communities and expand access to its programs. In 2022, FSA entered into the first-ever Tribal Nations CREP agreements with the Cheyenne River, Rosebud and Oglala Sioux Tribes. FSA entered into the Big Sioux River Watershed CREP agreement with the South Dakota Department of Game, Fish & Parks to assist farmers, ranchers, and agricultural landowners to improve water quality, reduce soil erosion, enhance wildlife habitat, and create public hunting and fishing access. FSA's Safety Net Division (SND) worked extensively with Tribal Communities after the winter storms of 2022 to educate all members of available disaster recovery programs and requirements.

Expanding collaborative conservation of fish and wildlife habitats and corridors

In 2023, NRCS and FSA announced new coordinated conservation work through the Working Lands for Wildlife (WLFW) framework, which focuses on voluntary, locally led efforts that benefit wildlife and agricultural communities. This framework is actively being used in 48 states, helping guide 8 national and 14 state-identified initiatives that meet both the needs of the species as well as those of the agricultural operations. USDA is working with partners to develop four new frameworks to be released in 2024-25 for Western Migratory Big Game, Eastern Deciduous Forests, Eastern Aquatic Connectivity, and Southern Pine Ecosystems.

The Forest Service has recently established new keystone agreements using BIL and IRA funding that work to simultaneously address the wildfire crisis in the Western U.S. while enhancing fish and wildlife habitats and corridors. Examples include a $40 million agreement with Trout Unlimited to fund watershed restoration treatments, a $60 million agreement with the Mule Deer Foundation to carry out ecological restoration work, and a $50 million agreement with the National Wild Turkey Federation in support of the 20-year national master stewardship agreement.

Through the Collaborative Aquatic Landscape Restoration Program (CALR), the Forest Service has invested $25.5 million of BIL funding in 11 projects for fish passage and aquatic restoration in collaboration with the Department of the Interior, Tribes, and local partners. These projects enhance the resilience of aquatic systems to withstand increased visitation pressure and climate change effects. In FY24 $28 million will be allocated to fund 11 additional projects.

Creating jobs by investing in restoration and resilience

USDA's Rural Development (RD) supports efforts to bolster rural economies, including by working with partners to invest in restoration and resilience. In one example, joint support from RD and the U.S. Endowment for Forestry and Communities helped communities in Eastern Oregon and Northern California steward forest resources, create jobs, and plan for the future through organized community forestry. Using the funding, multiple regional and local organizations created and carried out plans to treat large swaths of public and private forests and implement policies to support sustainable forest stewardship. Supporting community investment in forest stewardship will help communities manage wildfire risk and foster forest health in a future changing climate.

Increasing access for outdoor recreation

USDA's RD recently supported work in Oakridge, Oregon to develop local trails into a hub for mountain biking recreation after this community lost 1,600 jobs to sawmill closures. With investments through its Water and Waste Disposal Loan Program, Business and Industry Guaranteed Loan Program, and Intermediary Relending Program, RD helped to support regional infrastructure and business development to aid this transition. The community was equipped with the resources to both steward the local environment, help small businesses, and transition its economy towards the outdoor recreation industry. Strengthening the recreation economy within this community will create more diverse job and income streams, increasing overall community resilience, while also fostering a renewed interest in conserving natural resources and ecosystem services for the future.

Creating more parks and safe outdoor opportunities

Through its Urban and Community Forestry (UCF) program, the Forest Service is delivering IRA investments that support disadvantaged communities experiencing low tree canopy through established partnerships with local organizations. Urban trees are a natural climate solution that help reduce the impacts of heat on urban communities while also directly storing carbon and reducing cooling energy use. In April 2023, USDA announced the availability of $1 billion in grants to increase equitable access to trees and green spaces in urban and community forests. Awards were announced in September 2023 and are being managed by the Washington Office, Regional Offices, and 12 National Pass-Through Partners. A significant number of these projects include climate resilience as a priority. In 2024, the UCF program will support 385 IRA awardees in their efforts to enhance access to tree canopy for communities in need, deliver an anticipated $40 million core program in collaboration with state forestry agencies, provide cost share grants to develop climate-resilient tree nurseries, and coordinate activities of the National Urban & Community Forestry Advisory Council.

B. Climate-Resilient Operations and Management

1. Accounting for Climate Risk in Planning and Decision Making

As described in Section 2A, climate change has the potential to impact many aspects of USDA's mission and operations. For this reason, climate change adaptation efforts are coordinated at the Department level, via the Office of the Chief Economist's (OCE) Office of Energy and Environmental Policy (OEEP). OEEP works closely with the Office of Budget and Program Analysis (OBPA), the office responsible for USDA's strategic planning; enterprise risk management; performance management and reporting; budget analysis, justification, and control; and legislative and regulatory actions. Section 3B(2) of this plan describes in greater detail how OBPA is working to integrate climate change into risk management processes which subsequently feed into strategic planning and budget formulation.

USDA Departmental Regulation (DR) 1070-001 reinforces the need "to integrate climate change adaptation planning, implementing actions, and performance metrics into USDA programs, policies, and operations." DR 1070-001 directs OEEP to issue guidance for USDA Mission Areas, Agencies, and Offices to prepare climate adaptation plans that identify how climate change may affect their ability to achieve their mission and policy, program, and operational objectives. The guidance prepared by OEEP follows the model of *The Adaptation Workbook*, a product of the Northern Institute of Applied Climate Science and USDA's Northern Forests Climate Hub. The guidance directs Mission Areas, Agencies, and Offices to (1) define their goals and objectives, (2) assess climate change impacts and vulnerabilities, (3) evaluate goals and objectives given the identified climate risks, (4) identify adaptation approaches and tactics for implementation, and (5) monitor and evaluate the effectiveness of implementation.

In July 2022, USDA released 13 Agency-level Climate Adaptation Plans; these plans build off the themes identified in USDA's 2021 Climate Adaptation Plan and put them into practice via climate adaptation implementation at the agency-level. OEEP is currently working with additional agencies and staff offices to prepare and release their plans later in 2024. Through their Climate Adaptation Plans and development of this Plan, agencies are assessing the types of climate data and assessments their agencies already use in planning and decision making, and where are there gaps and opportunities to develop this capacity further (Table 10). In FY 2024, OEEP aims to organize a series of capacity-building sessions for USDA agencies that will support them in identifying and applying climate change data appropriate to their missions, climate vulnerabilities, and adaptation actions. Beginning in late FY 2025, OEEP will work with USDA agencies to update their agency-level plans to reflect progress to date and identify areas where climate data and assessments can be used more rigorously to inform planning and decision making.

As described in Action 5 of USDA's 2021 Climate Adaptation Plan, USDA's Climate Hubs play a role in supporting agencies in using climate change-related data and assessments and developing tools that are useful both internally and externally to USDA. Examples of such tools include the AgRisk Viewer, which provides an accessible platform for crop insurance loss data, the Climate Quick Reference Guides, which provides basic climatic information at the county level, Grass-Cast, a predictive tool that estimates how much grass will be available during a growing season, and the Soil Temperature Climatology and Freeze Date Tools. These tools look at historical data that provide producers and technical service providers with predictive information to support livestock and crop production.

Table 10: Integration of climate risk information into USDA planning and decision making

How climate data and risk assessments are already applied in planning and decision making:	
OBPA	Directs agencies to consider climate-related risks during enterprise risk management process.
OEEP	Encourages use of resources, like the Fifth National Climate Assessment and The Adaptation Workbook framework, during adaptation planning.
AMS	Incorporates climate risk assessments and risk-benefit analyses into annual budgets, strategic planning processes, and other efforts like USDA's Food & Agriculture Sector Risk Mitigation and Resiliency Plan for National Security Memorandum #16.
APHIS	Uses climate suitability maps, based on the Spatial Analytic Framework for Advanced Risk Information Systems (SAFARIS), for plant pests to inform operational and policy decisions like surveys and agricultural trade policy.
ERS	Annually considers adequacy of agency resources in response to anticipated demands for information and analyses. In recent years, facilitating climate adaptation to changing risks has emerged as an increasingly important priority. This is reflected in recent increases in investments in expanding data collection and development efforts and improving the capabilities of in-house models to better identify and evaluate climate hazards and their implications for agriculture, forestry, the environment, and rural communities.
FAS	Uses a Planning Quality Checklist for FAS Programs, Projects, and Activities, which includes best practices for risk management and evidence-based decision making. Administers the Global Agricultural and Disaster Assessment System (GADAS) which assists the agricultural community in monitoring global crop conditions and assessing extreme events. Manages the Global Agricultural Information Network (GAIN) which reports on climate-related issues and developments that impact international trade and U.S. export opportunities.
FNS	Maintains the FNS Disaster Resiliency and Recovery Tool to identify areas of highest need and determine communities that may contain underserved populations which could be adversely affected by climate change. Uses the tool and NOAA/NWS Prediction Center data to estimate how many households, schools, and SNAP retailers are in a disaster area. Works with Regional Disaster Coordinators to increase awareness of climate risks and educate stakeholders. Exploring the use of weather data to improve the disaster response waiver process.
FSA	Uses the National Drought Monitor to identify areas in need of relief for the Livestock Forage Disaster Program (LFP), the Emergency Assistance for Livestock, Honeybees, and Farm Raised Fish Program (ELAP), and CRP for emergency haying and grazing. Also uses the Drought Monitor to verify drought loss claims with the Emergency Conservation Program (ECP) and the Noninsured Crop Disaster Assistance Program (NAP). Applies weather station data, including the NOAA-supported Parameter-elevation Regressions on Independent Slopes Model (PRISM), to verify qualifying extreme weather events for NAP. Employs additional tools at State-level to update planting and harvest dates for the National Crop Table.
NASS	Use Google Earth Engine to estimate crops impacted by flooding, tornadoes, hurricanes, and wildfire. Use a climate information system to inform the Agricultural Statistics Board about climate anomalies and extreme weather that could impact agricultural production.
NRCS	Incorporates local observed and historical climate data into planning tools and databases like the Conservation Assessment Ranking Tool (CART), the Water Erosion Prediction Program (WEPP), the Wind Erosion Prediction System (WEPS), and others. Developed NRCS County Drought Dashboard.

How climate data and risk assessments are already applied in planning and decision making:	
RMA	Combines recent program information (20 years) with adjustments for longer-term climate data for insurance ratemaking. Some programs use rainfall and hurricane datasets that are 70 and 170 years long, respectively.
USFS	For project development, agency guidance encourages the use of (1) The Climate Risk Viewer for considering climate change risks in the development and analysis of a proposed action, (2) The Adaptation Workbook (and accompanying NEPA-specific guide) to assist with designing projects, and (3) forest carbon NEPA templates, carbon white papers, and other resources.
Future plans and/or needs to further incorporate climate data into planning and decision making:	
OPEM	Developing CHER tool for USDA facilities with DOT Volpe Center, to identify climate vulnerabilities, which will be used to inform prioritization of capital planning and space management projects.
FSA	Forward-looking data would help programs like ECP anticipate geographic areas in need of assistance along with budgetary and staff capacity needs. Programs relying on disaster declarations could incorporate analyses of impacts to commodities in long-term planning. FSA (and NRCS) could work with programmers to update climate years used in erosion models, (RUSLE2 and WEPS).
FSIS	Evaluating climate risks in development of forthcoming FSIS Climate Adaptation Plan. Could consider adapting sampling plans to increase sampling frequency or scope following extreme weather events.
NRCS	Conducted a survey of state and local climate data needs, which will be used to inform efforts to increase access to and use of climate change data. NRCS Science and Strategic Planning workgroup originating from the NRCS Adaptation Plan will finalize recommendations to integrate climate change into NRCS tools by the end of FY24.
RD	Continued development and implementation of tools, including a Loan Portfolio Disaster Dashboard and a Weather-Adjusted Economic Risk Dashboard, to inform decision making on underwriting and servicing by identifying areas with a history of and at risk of extreme weather events, including communities with environmental justice concerns.
USFS	In 2024 the agency will develop informational guidance and training to implement existing Planning policy and directives in the context of climate change. The guidance will clarify how to explicitly consider climate adaptation and carbon stewardship in each phase of land management planning and will be a framework for future Land Management Plan revisions. The guidance will discuss how to integrate climate risk data sources and tools such as the Forest Service Climate Risk Viewer, the Resources Planning Act Assessment (RPA), and existing climate change vulnerability assessments.

2. Incorporating Climate Risk Assessment into Budget Planning

As climate change-related economic damages grow, the climate-related financial risk to the Federal budget is also projected to increase. To address this risk, Executive Order 14030, *Climate-Related Financial Risk* (Section 6b) directs "[t]he Director of Office of Management and Budget (OMB) and the Chair of the Council of Economic Advisers, in consultation with the Director of the National Economic Council, the National Climate Advisor, and the heads of other agencies as appropriate, [to] develop and publish annually, within the President's Budget, an assessment of the Federal Government's climate risk exposure."

To support this directive, OMB is engaging with agencies annually to conduct assessments of federal climate risk exposure to specific programs, that are then compiled into a white paper that accompanies the President's Budget. The first of these analyses were published in 2022 and 2023 and, relevant to USDA, included assessments of the potential effects of climate change on crop insurance expenditures, federal wildland fire suppression expenditures, and federal facility flood risk. The assessments released with the FY 2025 President's Budget include an evaluation of the financial risk to USDA's Livestock Forage Disaster Program (LFP), based on recent work by the Economic Research Service (ERS), and an updated assessment of Wildland Fire Suppressions Costs.

These assessments of climate risk to USDA programs have been supported by the technical capacity of multiple USDA agencies. USDA's ERS has research capacity in both climate impacts and climate adaptation and resilience that is supported through statistical analysis as well as simulation models. The USDA Forest Service has extensive modeling capacity supporting its periodic Resources Planning Act (RPA) Assessment that provides snapshots of current agency forest and rangeland conditions and projected impacts 50 years into the future, incorporating drivers of socioeconomic and climatic change. These analyses and others rely heavily on data collection through efforts such as the Forest Inventory and Analysis (FIA) program, the Natural Resource Inventory (NRI), ERS's Agricultural Resource Management Survey (ARMS), and other National Agricultural Statistics Service (NASS) surveys of the agricultural sector.

Section 6c of E.O. 14030 directs that the Federal Government's long-term fiscal exposure to climate-related fiscal risk be addressed via the formulation of the President's budget and through oversight of budget execution. Moving towards this goal, USDA will be implementing a new process for FY 2026 budget development to include results of climate hazard risk exposure assessments in planning and decision-making processes. USDA systematically considers risk in planning and decision-making at the Departmental level via the Enterprise Risk Management (ERM) Program. Through the ERM process, Mission Areas, Agencies, and Staff Offices identify risks that may impede achievement of Agency objectives and Departmental strategic objectives. As part of the guidance, OBPA will direct Mission Areas/Agencies to explicitly consider the climate risk exposure assessments in their ERM risk assessment process. Then, during the budget planning and formulation process, Mission Areas, Agencies, and Staff Offices are required to identify their top enterprise risks and integrate discussion of these risks into their budget justifications.

3. Incorporating Climate Risk into Policy and Programs

Adaptation planning at multiple levels creates an enabling environment for agencies and offices to adapt policies and programs to current and anticipated effects of climate change. Adaptation can address climate impacts to programs and operations or can be a means to address the effects of climate change on the people, sectors, and communities that USDA serves. As documented in their Agency-level climate adaptation plans, and re-affirmed through the development of this Plan, USDA agencies are committed to reviewing policies and programs through a climate adaptation lens, when relevant and appropriate (Table 11).

Table 11: Adaptation of USDA policies and programs to climate change (see also Appendix 2)

Who across USDA is engaged in climate adaptation?
▪ Agency-level adaptation plans have been completed by 6 Mission Areas/14 Agencies, and 4 Offices. ▪ More than 18 Agencies and Offices provided input to and reviewed this Plan.
How is climate adaptation coordinated within USDA?
▪ OEEP coordinates across USDA and the Director of OEEP is USDA's Climate Adaptation Official (Table 1). ▪ OEEP engages with Agencies and offices via monthly meetings of USDA's Global Change Task Force and quarterly meetings of USDA's Climate Adaptation Community of Practice. ▪ OEEP manages development of USDA's Adaptation Plan, coordinates development of Agency-level plans, and solicits feedback on Agency-level adaptation implementation to inform Department-level reporting. ▪ OEEP works with OBPA to enhance integration of climate adaptation into planning and risk management.
How have policies and programs been adapted to account for the effects of climate change?
▪ Incentivizing climate-smart agricultural practices via conservation and risk management programs ▪ Integration of climate adaptation into USFS policies and programs ▪ Anticipating effects of extreme weather by offering new crop insurance products, streamlining access to post-disaster assistance, enhancing housing and energy resilience, and adapting nutrition policy and programs. ▪ Via regional efforts like NRCS State Technical Committees and USFS Regional Climate Adaptation Plans. ▪ Adapting USDA research, analytical capabilities, and survey priorities to reflect changing needs. ▪ Leveraging international diplomacy and engagement to advance climate adaptation. ▪ Prioritizing climate adaptation in strategic planning and enterprise risk management. ▪ Updating Departmental directives and guidance.

Planned policy changes or revisions to advance climate adaptation:		
1	Issue directions to consider climate risk exposure assessments in Enterprise Risk Management.	OBPA
2	Complete additional Agency/Staff Office Adaptation Plans.	OEEP
3	Include climate change effects and precautions in USDA Continuity of Operations Plan.	OHS
4	Include climate risks in USDA response to National Security Memorandum-16 on Strengthening the Security and Resilience of United States Food and Agriculture.	OHS
5	Incorporate real property resilience in USDA Departmental Manual on Sustainable Operations.	OPEM
6	Implement new predictive imputation methods for the June Area Survey, in part to help manage for climate-related disruptions.	NASS
7	Review and revise policy and guidance for stewardship of perpetual easements, including assessing potential for future ecological monitoring procedures to include climate change effects prior to and during habitat restoration.	NRCS
8	Revise the USDA Foods disaster response regulations (7 CFR 250.69 and 250.70) to better support the response to Presidentially declared disasters and emergencies.	FNS
9	Revise 7 CFR Part 1924 Subpart A to include climate resilient building practices.	RD
10	Update the USFS Silviculture Manual to ensure use of climate-informed silvicultural practices in the National Forest System.	USFS
11	Develop proposal for policy revisions, guidance, and additional research to encourage beneficial use of forest restoration byproducts.	USFS
12	Prepare additional procedural direction to integrate climate adaptation, wildfire risk reduction, and equity considerations into recreation, recreation facility, and designated areas planning.	USFS
13	Develop proposal to update Wildlife, Fish, and Sensitive Plant Habitat Management directives in context of current needs and future climactic conditions.	USFS
14	Include climate change in proposal to update the Water Resource Management directives (FSM 2532).	USFS

Agricultural production and conservation. The Farm Production and Conservation agencies are working to encourage adoption of climate-adapted farming practices and risk management strategies to enhance the climate resilience of farmers and land managers. NRCS's Easement Programs Division is reviewing and revising policy and guidance for stewardship of perpetual easements, including evaluating the potential for future monitoring procedures to assess climate impacts prior to and throughout habitat restoration. FSA's CREP for the Colorado Republican River has been revised to offer producers a dryland crop production practice to support producers in reducing consumptive water use and conserving the Ogallala Aquifer. This change enables producers to keep their land in production and continue earning income while implementing conservation practices. Finally, RMA continues to offer new products and adapt existing products to reflect changing farming practices as a result of changing conditions or new climate-smart approaches.

Natural resources management. As described in greater detail in Section 3A(3), the Forest Service is working to integrate climate adaptation into all aspects of its planning and operations. In 2023, USFS National Offices conducted a climate-oriented review of their directives and procedures to inform recommendations to the Secretary for adjustments to policy, guidance, training, and investment. At the same time, USFS issued the Forest and Grassland Climate Resilience Advanced Notice of Proposed Rulemaking (ANPR), which included public feedback

and Tribal consultation, on how USFS should adapt current policies to protect, conserve, and manage National Forests and Grasslands for climate resilience. Finally, in late 2023, USFS issued guidance for project-level consideration of climate change in NEPA. The establishment of a new Policy Office within the Forest Service has enhanced the agency's capacity for policy analysis and climate adaptive policy reforms. In 2024 and beyond, the USFS intends to update or propose climate-informed revisions to guidance and policies related to silviculture practices, beneficial uses of forest restoration byproducts, recreation and designated areas planning, habitat and water resource management, and forest-level land management planning. USFS will continue to use its Climate Action Tracker to collect agency-wide information to quantitatively track progress towards its climate goals.

Managing for extreme weather impacts. Adjustments to policies and programs are being made to account for changing intensity and severity of extreme weather events. Rural Development (RD) plans to revise 7 CFR Part 1924 Subpart A to include climate resilient building practices. Through its Rural Energy for America Program (REAP), RD is bolstering the energy resilience of farmers and rural small business owners. RMA has created new insurance products to help producers manage their risk from hurricanes, tropical storms, smoke, and excessively wet conditions that can prevent them from applying fertilizer. FSA has adjusted requirements for the 2023 Emergency Assistance for Livestock, Honeybees, and Farm-raised fish (ELAP) and the Livestock Indemnity (LIP) Programs to allow producers more time to apply for this disaster assistance. USDA's Food and Nutrition Service (FNS) is revising the USDA Foods disaster response regulations (7 CFR 250.69 and 250.70) to better support the response to Presidentially declared disasters and emergencies without impeding regular operations. FNS is also identifying opportunities through their Childhood Nutrition programs to minimize exposure to extreme heat during summertime and continue to get meals in the hands of children in spite of extreme weather events.

Science, research, and innovation. USDA's research and statistical agencies are adapting their programs to support the science and innovation needed to address the challenges climate change poses, while adjusting their operations to ensure reliability of the critical information they supply. The Economic Research Service has been expanding the resources it allocates to developing data products, enhancing modeling capabilities, and producing new research products that inform discussions of how to facilitate farm- and sector-level adaptation to changing climate conditions and risks. ERS has published three reports using 2019 Survey of Irrigation Organizations data to assess how irrigation organizations plan and respond to drought, how policies and new technologies have expanded lands under irrigation, and an assessment of the water infrastructure that irrigation organizations use. In recent years, ERS has also added new questions to the USDA Agricultural Resources Management Survey (ARMS) to improve understanding of the nature and extent of climate-smart farming practices, such as adoption of digital farming practices, cover crops, rotational grazing, and adoption of drought-tolerant corn. NASS is modernizing its data collection methods, strategies, and tools to minimize disruption to their operations. In FY 2024, NASS will implement new predictive imputation methods that use crop acreage forecasts, and geospatial and administrative data for NASS's largest annual survey, the June Area Survey. The Agricultural Research Service (ARS) is integrating climate change priorities into its programs via its 5-year Action Plan cycles that set research priorities and identify anticipated products. ARS scientists develop research projects to align with these Action Plans and ARS documents progress towards the objectives annually. At the end of each 5-year cycle, ARS conducts a retrospective analysis to see how well priorities are met. Section 3B(5)

discusses in greater detail how the National Institute of Food and Agriculture (NIFA) is elevating climate adaptation in the research and programs it funds.

At the intersection of USDA's science and program agencies, the USDA Climate Hubs provide climate change expertise to support USDA agencies in adapting their policies and programs. Activities can include dissemination of climate change information and resources, development of tools to support climate-informed decision-making, and capacity building and training for USDA employees to equip them with the knowledge and skills to make these decisions. NRCS has strengthened their connectivity to each of the 10 domestic Climate Hubs by establishing NRCS Climate Hub Co-Leads to work with each Hub, represent NRCS needs to the Hubs, and serve as a conduit of information between the Hubs and NRCS.

International activities. Internationally, USDA's Foreign Agricultural Service (FAS) is integrating climate adaptation into its programs and international engagements. In 2023, FAS launched a new International Climate Hub, growing USDA's network of Climate Hubs. This new Hub will share research and approaches developed domestically with our international partners and connect the other Climate Hubs to relevant research and approaches produced internationally. The Coalition on Sustainable Productivity Growth for Food Security and Resource Conservation, co-led by FAS and the Office of the Chief Economist, will work to highlight practices and approaches that help producers adapt and build resilience to the effects of climate change. FAS has already made climate-smart agriculture a key theme within the Food for Progress program, as well as its fellowship and exchange programs, and will work to expand the emphasis on climate adaptation into its activities on sanitary and phytosanitary systems. FAS is also leading USDA's engagement in the Global Framework on Water Scarcity in Agriculture, (WASAG), a multilateral initiative led by the Food and Agriculture Organization of the United Nations (FAO), to promote international cooperation on agricultural water conservation and sustainable food security in the context of climate change. Finally, FAS's efforts on climate adaptation align with many of the priorities identified in the President's Emergency Plan for Adaptation and Resilience (PREPARE), and FAS is working to align its metrics to track climate adaptation progress with PREPARE's Monitoring, Evaluation, and Learning framework.

In managing the effects of climate change, USDA strives to integrate and consider other related Departmental and Administration priorities, including addressing environmental justice, supporting and partnering with Tribal Nations, identifying areas of potential climate mitigation and adaptation co-benefits, and using nature-based solutions where possible. Planned actions to adapt policies or programs that also address these crosscutting priorities are included in Table 14.

Environmental justice. Through its Climate Adaptation Plan, USDA is able to advance environmental justice as part of its mission, consistent with Executive Order 14008 and with E.O. 14096 *Revitalizing Our Nation's Commitment to Environmental Justice for All*. In implementing this Climate Adaptation Plan, USDA will, as appropriate and consistent with applicable law, address disproportionate and adverse environmental and health effects and hazards, including those related to climate change. The Department will address cumulative impacts of environmental and other burdens on communities with environmental justice concerns and provide opportunities for the meaningful engagement of persons and communities with environmental justice concerns.

In addition, as a member of the White House Environmental Justice Interagency Council, USDA received recommendations on Climate Planning, Preparedness, Response, Recovery and Impacts

from the White House Environmental Justice Advisory Council (WHEJAC). The report includes many recommendations that are relevant to the work of USDA. The Department is reviewing the recommendations and, as appropriate, and to the maximum extent permitted by law, is taking steps to address the WHEJAC's recommendations.

OEEP collaborates closely with USDA's Environmental Justice Lead in OBPA, including in developing and reviewing this Plan. Together they work to ensure that communities with environmental justice concerns, and the effects of climate change on these communities, are considered in the work of the Department. Each Agency-level Adaptation Plan is directed to consider the unique vulnerabilities of communities with environmental justice concerns and how to ensure maladaptation is not perpetuated through USDA programs and operations. This work is continual, however recent examples of USDA actions to advance understanding and action on environmental justice include:

- Forest Service leveraging its Climate Action Tracker to track engagement with communities with environmental justice concerns to inform future strategies to reduce disproportionate, negative impacts and ensure equal distribution of the benefits of climate change activities.
- FSA's expansion of eligibility and access to Noninsured Crop Disaster Assistance (NAP) for underserved producers and investments in relief for distressed borrowers with certain direct and guaranteed loans.
- RMA's support for risk management education initiatives for underserved producers, a nationwide outreach effort to encourage enrollment in whole farm and micro-farm products, and engagement with specialty crop producers to address gaps in current crop insurance offerings.
- USDA Northeast Climate Hub's Climate Equity project, which seeks to identify and support stakeholders involved in agriculture, aquaculture, and forestry who are engaged with climate equity and social justice issues.
- NIFA's efforts to work with partner institutions who have relationships with disadvantaged communities, such as Hispanic-serving Institutions, Alaska Native-Serving and Native Hawaiian-Serving Institutions, 1890 Land-grant Institutions, and 1994 Land-grant Tribal Colleges and Universities. Within the Agriculture and Food Research Initiative's (AFRI) Foundational and Applied Sciences (FAS) program, there is a new program area priority on Environmental Justice (A1461), which in FY 2023 funded one award to an 1890 Land-grant institution to determine the impact of NIFA programs on underserved communities. This priority area is being expanded in FY 2024 to include work that will increase our understanding of community-level climate resilience and thresholds and will include a component on positive youth development.
- ERS's research on topics related to rural resilience, including improving understanding around broadband access and heirs' property rights.
- RD's development of priority scoring points for projects located in vulnerable areas and their incorporation into NOFAs for construction of new housing, buildings, and infrastructure. Ensuring that these investments are climate resilient will help decrease exposure of these communities to climate hazards, while reducing energy burden and carbon emissions.

Tribal Nations. USDA's Office of Tribal Relations (OTR) works across USDA to ensure that policies and programs are efficient, easy to understand, accessible, and developed in consultation with Tribal Nations. The Director of OTR represents USDA to the White House Council on Native American Affairs and co-leads the Committee on Climate Change, Tribal Homelands, and Treaties. OTR and OEEP are committed to working together on implementation of this Plan and will work to strengthen engagement with Tribes when developing policies and programs that address climate-related risks to Tribal communities.

Within USDA, for many of the initiatives described above, agencies are inviting consultations and engaging in collaborations with Tribal Nations to inform policy and program development. As part of the Advance Notice on Proposed Rulemaking (ANPR) on Climate Resilient Forests and Grasslands process, USFS held a collaborative national Tribal Forum in July 2023, issued invitations to Tribal leaders to consult on the ANPR in September 2023, for which one request has been received, and provided updates on the process at a December 2023 Tribal Forum. Feedback received in this Forum and from ongoing consultation will inform a range of policy decisions and programmatic actions to address climate resilience on national forests and grasslands. In another example, FSA's Safety Net Division worked extensively with Tribal communities following winter storms in 2022 to educate Tribal members of available disaster recovery programs and requirements to increase access to these programs.

USDA agencies are advancing efforts to integrate Indigenous Knowledge (IK) into their activities, including those related to climate adaptation and resilience. Based on stakeholder engagement conducted in FY 2022, NIFA created an internal IK task force and has since integrated IK into Requests for Applications for AFRI FAS, AFRI Sustainable Agricultural Systems (SAS), From Learning to Leading: Cultivating the Next Generation of Diverse Food and Agriculture Professionals (NextGen), New Beginning for Tribal Students (NBTS), Tribal College Extension Program (TCEP), and Alaska Native-Serving and Native Hawaiian-Serving Institutions (ANNH) Education Competitive Grants programs. Incorporation of IK into NIFA funded projects will enhance climate resilience and nutrition security of communities through culturally relevant management of their natural resources and agricultural systems. NRCS is collaborating with Tribal subject matter experts on climate adaptation strategies already employed on Tribal Lands and has created an Indigenous Practices Team under the Science & Technology Deputy Area focused on the creation of interim practice standards. Finally, NRCS has established a new funding priority focused on strengthening conservation through IK within the National Classic Conservation Innovation Grants program. This effort will further expand the opportunities for NRCS to learn more about innovative climate adaptation and resilience strategies unique or applicable to Tribal and indigenous communities that may be appropriate for integrating into NRCS's own conservation planning and practices.

The USDA Climate Hubs have future activities planned that address Tribal concerns and aim to strengthen partnerships with Tribal Nations. One example is the planned re-establishment of a Memorandum of Understanding (MOU) between the Climate Hubs and the Cooperative Extension Section (CES) and Experiment Station Section (ESS) of the Association of Public and Land-grant Universities (APLU) Board on Agricultural Assembly. The new MOU places additional emphasis on working with Tribal Extension and developing greater understanding of IK. These activities will help USDA better understand the scope and scale of Tribal climate

equity issues in agriculture and forestry and enhance consideration of these issues in the work of the Climate Hubs.

Climate change poses a threat to Tribal subsistence practices and food security. Many USDA efforts to build the resilience of these systems will also enhance their resilience to the effects of climate change. RMA has worked with several Tribal Nations to target risk management products for Indigenous food sources, like wild rice. Investments through AMS's Indigenous Animals Harvesting and Meat Processing Grant Program (IAG) are working to boost supply chain resilience and expand local capacity to process and distribute culturally appropriate food sources to build food security in Tribal communities. Finally, in developing proposed changes to the USDA Foods disaster response regulations, FNS has considered input received via Tribal consultation during the development of the rule.

Climate mitigation and adaptation co-benefits. Climate adaptation and mitigation are often inextricably linked in agriculture because of the potential for many farming practices with carbon sequestration potential to also build resilience to the effects of drought, floods, and other hazards. The long term carbon sequestration potential of forests is threatened by climate change and other stressors, and larger, more severe wildfires have the potential to increase greenhouse gas emissions. Healthy soils and forests are essential to ensuring the sustainability of these resources for future generations, while also leveraging their full potential to be solutions to the climate crisis. For these reasons, USDA identified investments in soil and forest health as a critical need in its 2021 Climate Adaptation Plan.

The almost $19 billion provided by the IRA for NRCS conservation programs is targeted towards climate mitigating conservation practices. To the extent possible within the authorities of the IRA, NRCS is identifying opportunities for adaptation and mitigation co-benefits. The USDA Climate Hubs are supporting this work by helping to increase awareness and implementation of agriculture and agroforestry climate-smart practices. The Hubs will provide outreach and educational support for field planners and partners, address the near-term needs for relevant decision support tools and information, and address ongoing needs to evaluate practices, reduce uncertainty, and increase the connection of scientific knowledge to the implementation of climate change mitigation practices.

The USFS ANPR sought input on how National forests and grasslands should be managed for carbon stewardship as well as to foster climate resilience. The USFS is taking an intentional approach to carbon stewardship in ecosystem and watershed management on National Forest System lands, that considers carbon within the context of multiple uses, ecosystem integrity, and climate adaptation, not at the expense of forest health or habitat.

OPEM is weaving adaptation into its sustainability activities, prioritizing energy resilience in anticipation of utility disruptions, and integrating climate risk into building sustainability criteria. To increase the electric vehicle fleet and electric vehicle supply equipment (EVSE), USDA uses the Climate and Economic Justice Screening Tool to identify and prioritize sites for EVSE installation. Increased use of electric vehicles and implementation of onsite EVSE can provide continuity of fleet operations in the event extreme weather disrupts petroleum fuel supplies.

Nature-based solutions (NBS). NBS are woven into the fabric of many of USDA's existing farm conservation efforts and overlap with many of the activities described in Section 3A(3). An additional example from NRCS not already highlighted, is the Agricultural Conservation Easement Program (ACEP), which helps producers protect sensitive landscapes, including

wetlands, grasslands, and prime farmlands. In FY 2023, over 35,000 acres were enrolled in ACEP Wetland Reserve Easements and over 143,000 acres were enrolled in ACEP Agricultural Land Easements. The ACEP Wetland Reserve Easements program preserves, protects, and restores wetlands, which are key to floodwater containment in many areas and can be essential to climate resilience. Within FSA's work, the Conservation Reserve Program (CRP) is the most prominent example of NBS, where NBS and CRP support efforts to mitigate climate change, improve water quality, prevent soil erosion, and reduce the loss of wildlife habitat. Grassland CRP is one such example, which allows producers to continue haying and grazing practices, while protecting grasslands from conversion. In 2023, the Grassland CRP signup received a record 4.6 million acres in offers, of which nearly 2.7 million acres were enrolled. Similar to other cross-cutting priorities, NBS are woven into many of NIFA's funding opportunities as well. Finally, where possible and appropriate, RD building programs will incentivize the use of NBS via scoring points in future funding opportunities.

4. Climate-Smart Supply Chains and Procurement

USDA's Office of Contracting and Procurement (OCP) provides Department-wide leadership, management, and oversight in contracts and procurement. OCP is responsible for Department-wide procurement policy, Enterprise-wide procurement systems including purchase charge cards, and procurement operations servicing several USDA agencies and staff offices. Given the breadth of USDA's mission, procurements can range from software and routine supplies to scientific equipment or food commodities. With this diversity in procurement needs, the potential climate risks are diverse.

In developing this Plan, OCP worked with Mission Areas and Agencies to identify potential risks or increased demands to suppliers that could disrupt USDA mission delivery and operations (Table 12). These risks and others will be considered as OCP carries out risk management activities described below.

Table 12: Potential suppliers at risk of climate-related disruptions

At-risk supplies/services	Causes of risk	Future actions or progress towards addressing risks
HVAC (Acquisition, maintenance, and repair)	Extreme heat, flooding, wildfire	These long-term, risks, may require: • Adapting budgets to account for increased costs. • Increased coordination with other Federal agencies, e.g. FEMA • Adjustments to program demands (e.g., for aerial imagery) • Planning for and anticipating delays • Alternate sourcing with longer lead-times
Supplies and services required after natural disasters (food, construction materials, etc.)	All hazards	
Geospatial aerial imagery acquisition	Longer growing seasons, more storm events	
Construction contracts	Flooding, wildfire	
Information technology (IT) materials, including silicon chips	Any hazards that may impact international trade	

To better understand overall and climate-related risks to mission critical acquisitions, OCP has the following activities planned for 2024-2027:

- Inclusion of climate hazard risk in Acquisition Mission Area Annual Reviews in FY24, which will promote collaborative identification of supply chain risks and best practices for risk management.
- Planned research (and potential acquisition) of supply chain risk management software.
- Process mapping and policy infrastructure creation to support readiness of Agriculture Priorities & Allocation Systems (APAS) ratings. APAS is a USDA program that supports national defense and emergency preparedness initiatives by addressing essential civilian needs (food and food resources) through the placement of priorities or allocations on contracts for items and services.
- Expanded use of the USDA's Procurement Forecasting Tool to identify mission critical procurement requirements and expand the vendor visibility and assist in market research.

- Include identification of climate-smart sourcing items/providers when the acquisition workforce uses Government Purchase Card (GPC) platforms and develop goals for climate-smart sourcing using the GPC.
- Explore use of the NIST Manufacturing Extension Partnership (MEP). The MEP partners with Federal agencies to assist potential vendors to reduce costs, improve efficiencies, develop the next generation workforce, create new products, and find new markets. The manufacturing innovations could be used to assist USDA in addressing climate hazard and supply chain vulnerabilities.

In addition to leveraging the risk assessment actions, described above, OCP plans to integrate climate hazards and vulnerabilities into its under-development Program Management Deskbook. The Deskbook will serve as policy, guidance, and instruction to Mission Area Program and Project Managers across USDA. Specifically, the Deskbook will have a subsection devoted to drafting climate exposure management considerations during the requirement formation and market research steps of USDA acquisitions. In addition, OCP plans to require that Mission Area Senior Contracting Officers submit action plans to address identified climate hazards within the supply chain. These submissions are planned in FY 2025 based on the FY 2024 AMRs.

To implement efforts to address potential supply chain disruptions due to climate hazards, OCP will leverage its existing Pillars of Sustainable and Innovative Acquisition program. Initiated in FY 2022, this program is delivering sustainable Federal acquisition solutions in four focal areas: procurement equity, worker well-being, climate-smart acquisition, and supply chain resilience. Annually, the program lead works with stakeholders across the Department to establish projects, set goals, and track accomplishments associated with each of the Pillars' focal areas. The goals and accomplishments related to acquisition within this Plan will be tracked accordingly, including the identification of key milestones.

To build capacity for this work within USDA, in FY 2024 OCP is establishing and staffing the Acquisition Project Management Office (APMO). The APMO will assist USDA Mission Areas with all aspects of acquisition program and project management including the appropriate inclusion of climate hazard risk management aspects. Finally, as described in Section 3C, OCP is working in partnership with OPEM to build employee climate literacy and engagement on climate risk to supply chains and procurement.

5. Climate Informed Funding to External Parties

USDA agencies provide funding to diverse stakeholders in the form of grants, loans, and other mechanisms to support their respective missions. Improved integration of climate adaptation into many of these programs was considered during adaptation planning efforts at the agency-level in 2022. Examples of USDA programs where climate adaptation is a funding consideration or priority include:

Agricultural Marketing Service. AMS works to improve domestic and international opportunities for U.S. growers and producers and build more resilient food systems by offering Federal funding opportunities to organizations across rural America and the Nation's agricultural sector. In FY 2023, AMS published 12 funding opportunities for grants and cooperative agreements totaling over $1 billion to support market development for U.S. agricultural producers. The following language was included in each of those funding opportunities and will continue to be used for relevant opportunities in the future:

> "USDA promotes climate-resilient landscapes and rural economic systems, including tools to support agriculture, forests, grazing lands, and rural communities. AMS encourages applicants to consider including goals and activities related to reducing and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere or adapting to the already occurring climate change in their project's design and implementation."

Farm Service Agency. FSA administers programs to agricultural producers, many of which enable producers to be more financially resilient and as a consequence, more climate resilient.

- FSA offers:
    - Emergency loans to help producers recover from production and physical losses due to drought, flooding, and other natural disasters or quarantines,
    - Low-interest financing to build or upgrade on-farm storage facilities and purchase handling equipment, and
    - Loans to provide interim financing that helps producers meet cash flow needs, without having to sell their commodities when market prices are low.
- Using IRA funds, FSA has so far provided $1.7 billion of disaster relief to more than 30,000 distressed borrowers with certain FSA loans to expedite assistance to agricultural operations at financial risk.
- FSA's Farm Loan Programs recently developed a climate-smart toolkit and factsheet to help producers implement climate-smart agriculture practices or to purchase related equipment for their operations.
- The Farm Storage Facility Loan (FSFL) Program loan application has been updated to ask the applicant if the project will use clean energy or energy efficient equipment, which as a co-benefit, can make the facility more energy resilient.
- FSFL launched the Emergency Grain Storage Facility Assistance Program to deliver assistance to producers who lost critical facilities during the devastating tornadoes and derechos of 2021, to which USDA committed $120 million to meet the large demand for assistance.
- Through its Monitoring, Assessment, and Evaluation program, FSA is working to evaluate the effects of land enrollment in the Conservation Reserve Program (CRP) on soil health, wildlife habitat, water quality, and carbon sequestration. Data collected from these projects will improve understanding of the links between these outcomes and direct future practices offered under CRP.

Foreign Agricultural Service. FAS's Food for Progress Program donates U.S. agricultural commodities to recipient countries to be sold on the local market and then uses the proceeds to support agricultural, economic, or infrastructure development programs in-country. FAS includes climate-smart agriculture as a programmatic theme in its annual Notice of Funding Opportunity (NOFO) and is currently funding projects in Colombia, Cote d'Ivoire, Malawi, Mauritania, and Thailand that will have adaptation and resilience benefits for the farmers.

In FY 2023, FAS included the following adaptation-related language in its NOFO for the McGovern-Dole International Food for Education and Child Nutrition program:

> "Applicants must include information on climate change's current impacts on food security and food systems in the country, especially its impact on school-age children…Climate: FAS encourages Applicants to include information on how proposed activities will account for climate change vulnerabilities. FAS encourages Applicants to propose climate informed interventions, such as fuel-efficient stoves, climate-smart agriculture adaptations to school gardens, adapted WASH infrastructure, and climate resilience committees."

Funded projects are encouraging adaptation through their work by training producers to use climate smart growing techniques, planting trees to reduce soil erosion, installing solar powered water pump systems and stoves, and considering resilience in construction of school kitchens.

Forest Service. At least 38 internal and external competitive funding programs in the Forest Service include criteria related to climate resilience in their guidance. The Forest Legacy Program, a program administered in partnership with State agencies, aims to protect privately owned forest lands from the threat of conversion to non-forest uses. The Scoring Guidance for the National grant funding component of the process prioritizes climate resilient landscapes based on attributes that enhance resilience and support adaptation, including landscape connectivity, forest health, ecosystem diversity, soil productivity, species presence and range, wildlife habitat, and water resources. Another program, the IRA-Forest Landowner Support (FLS) program, incorporates IRA provisions that support the participation of underserved and small-acreage forest landowners in emerging private markets for climate mitigation or forest resilience and establish cost share for climate mitigation or forest resilience practices through competitive grant programs. IRA-FLS released a NOFO in August 2023 related to market participation, with guiding principles and evaluation criteria emphasizing adaptation and resilience. A NOFO related to cost share programs will be released in FY 2024. Finally, in FY 2023, the Forest Service began accepting applications for a second round of investments in wildfire protection for communities through the Community Wildfire Defense Grants program. Individual grants fund up to $250,000 to update community wildfire protection plans and up to $10 million for associated wildfire resilience projects, with total number funded determined by available funding, which is up to $250 million.

National Institute of Food and Agriculture. NIFA, USDA's extramural research funding body, applies an integrated approach to ensure that the outcomes of agriculture-related science and innovation reach the people who can put them into practice. NIFA is integrating climate change-related research, extension, and education into its funding programs, when appropriate, and creating new opportunities to support agriculture, forestry, and rural communities in tackling climate change. In FY 2022, NIFA awarded a total of $35 million across the agency to support climate adaptation; this level increased to $105 million in FY 2023.

- NIFA includes an emphasis on proposals that address climate smart agriculture and forestry in the Request for Applications (RFAs) for all three AFRI programs: FAS, SAS, and Education and Workforce Development (EWD).
- NIFA created a new program area priority, Rapid Response to Extreme Weather Events across Food and Agricultural Systems in its AFRI FAS program for FY 2022 and 2023. The new rapid response program allows for rolling submission of applications and awards funding in response to climate change-relevant natural disasters. This program supports Extension and research on three themes, (1) agroecosystem resilience, (2) food safety, food and nutrition security, and agricultural commodity security, and (3) health, well-being, and safety. FY2022 and 2023 funding totaling $5.7 million supported 20 projects in response to extreme events including drought, flooding, wildfire, and hurricanes.
- Beyond AFRI, there are over 30 programs at NIFA such as the 1890 Capacity Building Grants Program, Beginning Farmer and Rancher Development Program, Community Food Projects, Sustainable Agriculture Research and Education, etc. that support projects that address climate-smart agriculture and forestry.
- In FY 2023, new language was added to the USDA-wide Small Business Innovation Research (SBIR) Phase I RFA to emphasize projects that address climate adaptation to build resilient systems and communities.

Natural Resources Conservation Service. NRCS delivers financial assistance via grants and cooperative agreements to address conservation and environmental challenges. Examples where climate adaptation and resilience are being considered, include:

- Conservation Innovation Grants (CIG) are competitive grants to support partners in addressing water quality, water quantity air quality, soil health, and wildlife habitat challenges, all while improving agricultural operations. Climate adaptation-relevant priorities for CIG's On-Farm trials in FY 2024 include irrigation water management technologies, nutrient management, grazing lands, and soil health demonstration trials. For CIG Classic, adaptation-relevant priorities include forestry, habitat conservation and restoration for wildlife and invertebrates, managing agricultural lands to improve local water quality, energy conservation, economics, and strengthening conservation through Indigenous Knowledge.
- As described in prior sections, the Regional Conservation Partnership Program (RCPP) is a partner-driven approach to conservation that funds solutions to natural resource challenges on agricultural land. In 2023, out of 81 projects and $1.1 billion of investment, 22 projects are focused on water quantity and conservation, 3 are led by Tribes, 16 support protection and restoration of wildlife corridors, and 10 focus on urban agriculture.
- NRCS supports dam and flood prevention projects and repairing existing watershed infrastructure through the Watershed and Flood Prevention Operations (WFPO) Program, Watershed Rehabilitation Program (REHAB), and Emergency Watershed Protection (EWP) Program, which can help project sponsors rehabilitate aging dams that are reaching the end of their design lives or no longer meet Federal or state standards.
- Equity Conservation Agreements support outreach activities that encourage diverse and inclusive participation in NRCS programs. Working in conjunction with non-governmental organizations (NGOs), projects introduce conservation planning and climate smart practices to protect farmland ecosystems, watersheds, and wildlife habitat in areas of disadvantaged communities. In FY23, NRCS selected 139 projects, investing $70 million to expand access to conservation assistance and career opportunities.

Rural Development. Where appropriate and possible, RD integrates climate and energy resilience into its programs, for example:

- The Rural Energy for America Program (REAP) enhances climate resilience through investment in energy efficiency improvement projects.
- The Powering Affordable Clean Energy (PACE) program asks applicants to demonstrate that a proposed project is reliable and resilient.
- Rural Housing Service disaster response programs incorporate resilience into Single-Family Housing and Community Facilities programs. The Community Facilities Technical Assistance and Training Program and the Rural Community Development Initiative support resilience-building through technical assistance.
- Electric programs within the Rural Utilities Service fund energy efficiency improvements and conservation measures that can enhance resilience.

USDA agencies will continue to create and review funding opportunities through the lens of climate adaptation and resilience to ensure that, as applicable, these programs have the maximum opportunity to provide these benefits directly or as a co-benefit. Additional planned changes to funding opportunities include:

- FSA is reviewing FSFL policies to determine whether certain flexibilities can be made, or waivers granted, to further reduce FSFL financial obligations for producers in immediate need of grain storage following extreme weather events.
- FSA is undertaking a major initiative to streamline and automate Farm Loan Program processes, which will improve customer service and expand credit access. Though not climate-specific, these changes will reduce the burden for producers seeking financing and make them more economically resilient to the effects of climate change on their farms.
- USFS is broadly seeking to integrate climate adaptation and resilience into all relevant competitive funding, in accordance with recommendations prepared in response to the USDA Secretary's Memo on Climate Resilience and Carbon Stewardship, including continuing efforts related to the Forest Legacy Program and IRA-FLS, described above.
- NIFA is continuing to review RFAs and programs to identify additional opportunities to integrate climate adaptation into funding streams. NIFA will continue to offer webinars to highlight funding opportunities relevant to climate adaptation and resilience.
- FAS is drafting an update to the climate-related language in the FY24 McGovern-Dole NOFO.

Ensuring that all applicants, whether they are individuals, communities, or organizations, have equitable access to these fundings streams is a priority for USDA. NRCS is prioritizing projects focused on underserved producers and climate smart agriculture and forestry, offering enhanced payment rates to program participants, and revising the minimum annual payment for FY24 CSP to recognize operational size and efficiency differences. FSA's Increasing Land, Capital, and Market Access Program is working to increase access to farm ownership opportunities, improve results for those with heirs' property or fractionated land, increase access to markets and capital that affect the ability to access land, and improve land ownership, land succession, and agricultural business planning. Rural Development and the Forest Service use the Climate and Economic Justice Screening tool (CEJST) to identify disadvantaged communities and incorporate this information into scoring criteria for funding opportunities. The Forest Service is expanding its Community Navigator Initiative in 2024 to support disadvantaged communities in accessing Forest Service programs, services, and competitive funding opportunities. These populations include Tribes, rural communities at high risk of wildfire and/or climate extremes, small acreage landowners, and new partners that have not previously worked with the agency. Finally, many of the programs described in this section are part of the Biden-Harris Administration's Justice40 Initiative, which set the goal of 40 percent of overall benefits of certain Federal investments in climate, clean energy, affordable and sustainable housing, clean water, and other areas flow to disadvantaged communities that are marginalized by underinvestment and overburdened by pollution.

C. Climate Training and Capacity Building for a Climate Informed Workforce

Enhancing the climate literacy and capacity of USDA's workforce is critical to ensuring that the Department can best serve our stakeholders in a changing climate. A common understanding of what climate change is and its effects on agriculture, forestry, and rural communities is a useful foundation. However, the diversity of USDA's mission requires also educational resources and engagement that is unique to the work of specific agencies and job series.

The most significant Department-level climate literacy effort since USDA's 2021 Climate Adaptation Plan was a monthly, year-long Climate Science Seminar Series. The series looked across agricultural, forested, grassland, food-, and forest-product systems, and included the biophysical and social sciences to understand the impacts of climate change, options for adaptation and mitigation, the variable impacts on communities of people, and interactions with economic and social systems. Each hour-long seminar featured a 40-minute presentation by scientists from USDA, other Federal agencies, universities, non-governmental organizations, and private industry followed by 15-20 minutes for questions. Live participation was limited to USDA staff and a few Extension professionals, to create an environment where a range of questions could be asked, and afterwards the recordings were made widely available. Personnel from 24 of 29 USDA agencies and offices attended at least one seminar and attendance ranged from 246 to 1339 attendees (average 738/seminar, Table 13). Attendance was broad across position types and job descriptions, including scientific, technical, and administrative staff as well as some senior executives. This series has provided a strong scientific foundation upon which agencies are building more specialized training.

Table 13: USDA Climate Employee Climate Training and Capacity

Climate Training Efforts	~ 3% of USDA employees viewed Climate Science Seminar Series (2973 unique participants)
	~ 130 Senior Leadership individuals (primarily within NRCS and FSA) have received training that included climate change effects and adaptation responses
	~ 65% of certified USDA contracting professionals completed a climate training course
Agency Capacity	25 – 12,000 number of full- time USDA employees (FTE) with climate adaptation-related duties (range includes employees for whom climate change is integrated into at least 20% of their work, representing somewhere between 0.03 to 13% of the total USDA workforce)
	≥ 228 contractors, interns, fellows, and other non-FTEs with climate adaptation-related duties

Within agencies, an array of climate literacy and capacity building efforts are taking place, a few examples of which include:

- NRCS is engaging employees through a range of formats including regional NRCS Climate Town Halls, 1-hour basic climate and conservation sessions for State office and technical specialists, and thematic webinars hosted by the Office of the Regional Conservationists. USDA's Climate Hubs have provided Climate Conversation sessions to over 3,000 NRCS staff in 24 States and 4 above-State/regional groups. These 1-2 hour sessions are tailored to each location to describe climate change impacts and how climate-smart agriculture and forestry-related practices can support adaptation.

- During disaster program training for all employees in 2023, FSA provided a climate 101 presentation, which included FSA's Adaptation Plan and what it means for the FSA workforce. The Midwest Climate Hub has established a collaboration with Iowa FSA leadership to provide climate training to their staff.
- From August to November 2023, FAS hosted a 13-part, agency-wide Climate Change Literacy Series with subject-matter experts speaking on different climate change topics, while tying them to FAS' overall mission. Each session had a weekly average of 80 attendees from FAS Washington and Overseas posts, with the most popular session reaching a capacity of 168 live attendees.
- RD has developed training to support their field staff in implementing and ensuring compliance with the new Federal Flood Risk Management Standard (FFRMS).
- Approximately 200 members of USDA's acquisition workforce received training on Climate Risk and Procurement as part of its regular training series.

Intra-agency coordination and engagement occurs via regular meetings with different levels of leadership from the Office of the Secretary, Mission Area, Agencies, and staff and Departmental offices. OEEP hosts a monthly meeting of USDA's Global Change Task Force, providing Department-level updates and hearing updates from Agencies and offices on recent accomplishments and upcoming activities. In late 2022, OEEP began convening quarterly meetings with climate adaptation leads from across the Department as a platform for sharing lessons learned, building intra-agency partnerships, and identifying data and other climate adaptation-related needs.

Many USDA agencies (e.g., APHIS, NIFA, NRCS, and ERS) have formed internal climate teams to coordinate within their agencies on issues related to climate change and ensure they are responsive to climate-related demands from both the top-down and bottom-up. Internal SharePoint platforms have become a common means of sharing climate change information with a wider number of agency staff. NRCS and FSA have been particularly effective at engaging leadership within their agencies in climate literacy activities. For example, climate change sessions at each of the NRCS National Leadership Team Meetings in FY 2023 and 2024 have engaged 97-104 national and State-level leaders each meeting.

One means of building the climate capacity of USDA's staff has been the establishment of USDA's Climate Change Fellows Program (CCFP), through which Fellows are hired to time-limited appointments in the Excepted Service under "Schedule A" hiring authority, as specified in 5 CFR 213.3102(r). NRCS has used workforce analysis and planning to identify key disciplines needed to support climate adaptation and mitigation activities and is using the CCFP to fill some of this need. The Forest Service is also increasing climate change workforce capacity through climate-focused cohorts of the Resource Assistants Program, using BIL funding. Beginning in February 2023, a new cohort of approximately 20 recent graduates has been onboarded every 6 months. These individuals are placed in 8-12 month internships where they work on climate change adaptation, carbon analysis, and sustainability before converting into permanent positions. NIFA has recently filled permanent positions, including a new division director to lead the Global Climate Change Division and a National Program Leader focused on climate data systems and analysis, and is also using the CCFP to support climate-related programs and reporting.

In the immediate future, agencies and offices plan to advance climate literacy and engagement in the following ways:

- NRCS will continue to inventory existing training and identify modules where climate information could be easily integrated to meet training needs as well as encourage the use of Climate Quick Reference Guides, developed by the Southwest Climate Hub, to support the work of NRCS field staff.
- OCP and OPEM will survey USDA's acquisition workforce in FY 2024 to assess existing knowledge and skills related to climate smart acquisition and identify areas of focus for future communications and training.
- FSA will continue to broaden collaborations with the Climate Hubs to provide training to FSA staff when feasible. FSA is also considering developing materials and training to help staff understand climate issues and how program and loan products can be used to achieve a customer's environmental and conservation goals.
- The Forest Service will continue its work with the American Society of Adaptation Professionals (ASAP) to identify and address gaps in workforce climate literacy. Existing resources have already been catalogued, a gap analysis has been completed, and learning programs for certain job categories have been outlined. The next step is to develop full learning programs for line officers, climate change coordinators, and resource specialists that will consist of existing and to-be-developed resources.

Over the lifespan of this Adaptation Plan, USDA will continue to identify new ways to enhance climate literacy to ensure the Department is equipped to meet its climate goals and respond to the effects of climate change.

SECTION 4: DEMONSTRATING PROGRESS

A. Measuring Progress

To better capture adaptation and resilience outcomes across the Federal Government CEQ has developed process metrics that aim to demonstrate progress towards these outcomes. Below are USDA's responses for 6 process metrics which will serve as a benchmark to grow from as we advance our efforts on climate adaptation and resilience.

Outcome	**Climate adaptation and resilience objectives and performance measures are incorporated in planning and budgeting of USDA programs by 2027.**
Process Metric	**Step 1: USDA has an implementation plan for 2024 that connects climate hazard impacts and exposures to discrete actions that must be taken.** Yes **Step 2: USDA has a list of discrete actions that will be taken through 2027 as part of our implementation plan.** Yes
USDA Response	This updated USDA Climate Adaptation Plan, in combination with Agency and Office Climate Adaptation Plans, will direct implementation of climate adaptation actions for 2024 and beyond. In late 2025, OEEP will initiate a process to update the Agency and Office Adaptation Plans, which will include folding in the actions described here, if not already included in prior Plans. Climate adaptation is a stated objective (1.2) in USDA's 2022-2026 Strategic Plan and has been incorporated into several Agency Strategic Plans, also.
Process Metric	**USDA has an established method of including results of climate hazard risk exposure assessments into planning and decision-- making processes.** Partially
USDA Response	Due to the diversity of USDA's mission across its 29 Agencies and Departmental offices, there is no single type or method for using climate risk assessments that would be suitable across these many organizations. At the Department-level, the Office of Budget and Program Analysis is working to better integrate climate change risks into the Enterprise Risk Management process and the Office of Energy and Environmental Policy is supporting Agencies and offices in developing and implementing agency-level Climate Adaptation Plans. Both of these efforts will position agencies and offices to make more climate-informed decisions.

Process Metric	**USDA has an agency-wide process and/or tools that incorporate climate risk into planning and budget decisions.** Partially, ongoing
USDA Response	As described in Section 3B(2), in developing the FY 2026 budget, OBPA will direct USDA Mission Areas and Agencies to consider results of climate risk exposure assessments during Enterprise Risk Management. Then during budget planning and formulation, these entities will be required to identify their top enterprise risks and integrate discussion of these risks into their budget justification. Assessments of climate-related financial risk to USDA programs is supported by technical capacity across multiple USDA agencies, including the ERS, RMA, and USFS.
Process Metric	**Step 1: By July 2025, USDA will identify grants that can include consideration and/or evaluation of climate risk.** Complete, ongoing **Step 2: USDA modernizes all applicable funding announcements/grants to include a requirement for grantees to consider climate hazard exposures.** Partially, ongoing
USDA Response	Per Section 3B(5), grant programs across USDA have been identified where climate adaptation language can and has been incorporated. As part of ongoing and iterative climate adaptation, USDA will continue to identify opportunities to address climate risks and support adaptation through funding opportunities, where appropriate.

Outcome	**Data management systems and analytical tools are updated to incorporate relevant climate change information by 2027.**
Process Metric	**Agency has identified the information systems that need to incorporate climate change data and information and will incorporate climate change information into those systems by 2027.** Partially, ongoing
USDA Response	Through adaptation planning and coordination efforts, USDA Agencies and offices have identified systems that already use climate-related information and other areas where climate information and data could be used to enable climate-informed decision-making. As described in Section 3B(1), USDA Agencies and offices are committed to improving USDA's capacity to use climate information and data and apply it, where appropriate, to support delivery of USDA's mission.

Outcome	**Agency Climate Adaptation Plans address multiple climate hazard impacts and other stressors and demonstrate nature-based solutions, equitable approaches, and mitigation co-benefits to adaptation and resilience objectives.**
Process Metric	**By July 2025, 100% of climate adaptation and resilience policies have been reviewed and revised to, as relevant, incorporate nature-based solutions, mitigation co-benefits, and equity principles.** Yes, ongoing
USDA Response	Adaptation planning at the Agency and office level has provided the framework for assessment of policies and programs relevant to climate adaptation. Where relevant, these policies and programs are considering climate adaptation as well as other cross-cutting themes and priorities, including equity, environmental justice, nature-based solutions and climate mitigation. USDA will continue this work to mainstream climate adaptation so that it is an integral consideration, when relevant, in the early phases of policy and program development.

Outcome	**Federal assets and supply chains are evaluated for risk to climate hazards and other stressors through existing protocols and/or the development of new protocols; response protocols for extreme events are updated by 2027.**
Process Metric	**Step 1: Agency has assessed climate exposure to its top 5 most mission-critical supply chains.** Yes **Step 2: By July 2026, agency has assessed services and established a plan for addressing/overcoming disruption from climate hazards.** Partially, ongoing
USDA Response	In preparing this Plan, OCP has taken strides to identify mission critical acquisitions, and the general and climate-related vulnerabilities to their supply chain. This effort will serve as a foundation to develop and implement plans to minimize climate-related supply chain disruptions.
Process Metric	**Agency has identified priorities, developed strategies, and established goals based on the assessment of climate hazard risks to critical supplies and services.** Partially
USDA Response	OCP will include a subsection devoted to managing climate change vulnerabilities and exposure within the acquisition process into the USDA Program Management Deskbook that is currently under development. OCP also plans to require that Mission Area Senior Contracting Officers submit action plans to address identified climate hazards within the supply chain.

Outcome	**By 2027, USDA staff are trained in climate adaptation and resilience and related agency protocols and procedures.**
Process Metric	**Step 1: By December 2024, 100% of USDA leadership has been briefed on current climate adaptation efforts and actions outlined in this Plan.** Planned **Step 2: Does the agency have a Climate 101 training for your workforce?** Yes, ≥ 3% USDA staff have completed **Step 3: By July 2025, 100% of employees have completed climate 101 trainings.** Partially
USDA Response	As appropriate, USDA leadership will be briefed on the current state of climate adaptation efforts and the actions outlined in this Plan. The USDA Climate Science Seminar Series currently serves as the most comprehensive, foundational, and accessible resource for climate literacy across USDA. Agencies and Offices are building off this work and developing their own mission- and workforce-specific trainings. USDA employees will complete climate training as relevant and needed for their individual roles. Given the diversity of USDA's mission, basic climate literacy, and the format in which it is delivered, varies widely between agencies.

B. Adaptation in Action

USDA's 2021 Climate Adaptation Plan identified five Adaptation Actions that articulate how USDA can help the agriculture and forestry sectors, and rural communities, build resilience and adapt to the effects of climate change. These Actions are still relevant and provide a context for this 2024-2027 Climate Adaptation Plan. Below we highlight a selection of USDA efforts in support of these Actions to demonstrate our progress.

Action 1: Build resilience across landscapes with investments in soil and forest health.

USDA's Natural Resources Conservation Service (NRCS) is leveraging the Regional Conservation Partnership Program (RCPP) to collaborate with partners to support innovative projects that address climate change, enhance water quality, and address other critical challenges on agricultural land. In 2023, NRCS announced $1.1 billion for 81 RCPP projects, made possible by the Inflation Reduction Act. Either as a direct benefit or co-benefit, many of these projects will enhance soil health and increase the climate resilience of the agricultural producers. Examples of such projects in 2023 include:

- A project in California to implement high-efficiency irrigation systems that will reduce water consumption, manage erosion, improve soil health, foster enriched habitats, and reduce greenhouse gas emissions.
- A project in Scott County, Iowa to implement climate-smart conservation practices that will help manage for flood and drought risk, water quality, soil health and wildlife habitat.
- A project in the northern Great Plains to increase adoption of soil health practices, including no-till and cover crops, which will include outreach to underserved producers and partner with Tribal communities.

Action 2: Increase outreach and education to promote adoption of climate-smart adaptation strategies.

The National Institute of Food and Agriculture (NIFA) established a program area priority within one of its flagship funding programs to forge stronger regional partnerships between USDA's Climate Hubs and the Cooperative Extension Service. These projects leverage the combined capacity of Extension and the Hubs to reach agricultural producers, land managers, and diverse communities across the country. Through the A1721 Extension, Education and USDA Climate Hubs Partnership program area priority of the Agriculture and Food Research Initiative's Foundational and Applied Science Program, NIFA invested $18 million in 12 projects in FY22 and FY23. Examples of these projects that aim to enhance climate adaptation and resilience, include:

- A project with the Northern and Southern Plains Climate Hubs to develop and implement educational and outreach resources that promote the adoption of climate-smart practices to reduce the risk of drought, wildfire, and woody encroachment on livestock production.
- A project with the Southeast Climate Hub to develop and deliver science-based climate-smart forestry Extension education to landowners, professionals, and natural resource managers.
- A collaboration with the Northwest and California Climate Hubs to build stronger regional networks of agricultural organizations and peer-to-peer producer communities of practice to advance resilience to drought and other climate risks, particularly for small and mid-scale underserved producers.
- A partnership with the Caribbean Climate Hub to build the capacity of community health centers in Puerto Rico and the U.S. Virgin Islands to prepare for and manage climate change impacts to agricultural workers.

Action 3: Broaden access to and availability of climate data at regional and local scales for USDA Mission Areas, producers, land managers, and other stakeholders.

USDA's Forest Service (USFS) developed the Climate Risk Viewer, a new tool to assess climate risks and vulnerabilities and identify gaps between management plans and climate pressures. The Climate Risk Viewer brings together spatial information from 131 high-quality datasets about wildfire and firesheds, ecological trends, climate risks, and Forest Service management intention. USFS continues to develop, improve, and provide guidance for the application of the Climate Risk Viewer to National Forest System management. To build on this work, USFS is supporting a collaborative effort with a range of stakeholders and technology service providers to advance innovation and technology to support climate-informed forest management for the broader land management community, that encompasses landscapes beyond the National Forest System.

Action 4: Increase support for research and development of climate-smart practices and technologies to inform USDA and help producers and land managers adapt to a changing climate.

Science to understand the effects of climate change and advance climate adaptation and resilience cuts across many priority areas of USDA's Agricultural Research Service (ARS), from plant genetics and diseases to human nutrition and sustainable agricultural systems. In one example of adaptation-related research, ARS scientists in North Dakota are collaborating with partners at the University of Alaska Fairbanks to explore the impacts of climate change on Alaskan

agriculture and develop effective adaptation strategies. This includes identification of crops that may be better suited to the changing conditions and considering growing areas within Alaska. In the long run, this work hopes to foster a sustainable approach to agriculture in Alaska that minimizes soil degradation and other negative impacts, while fostering more economically resilient and food secure local communities.

Action 5: Leverage the USDA Climate Hubs to support USDA Mission Areas in delivering adaptation science, technology, and tools.

USDA's Climate Hubs and Agencies are working together to build workforce climate literacy, improve access to and use of climate change-related information, and translate science for application in USDA conservation and land management activities. Recent examples of supporting activities include:

- The Northwest Climate Hub co-hosted two workshops to build peer-to-peer learning and share information on drought, the U.S. Drought Monitor, and climate adaptation options for producers and staff from NRCS, FSA, and Extension.
- NRCS has established 10 NRCS Climate Hub Co-Leads to work with each of the 10 regional Hubs, to represent NRCS needs to the Hubs, oversee collaborative activities, and serve as a conduit of information.
- The Forest Service Rocky Mountain Research Station, in collaboration with the Northern Plains Climate Hub and other USFS staff, is developing templates and guidance to incorporate climate and related data into rangeland National Environmental Policy Act (NEPA) analysis.
- The Caribbean Climate Hub is building on its ADAPTA project and working with NRCS, USFS, and Extension to create bilingual, sector-specific adaptation guides for tropical forestry and agriculture.

ABBREVIATIONS

AMS	Agricultural Marketing Service
APHIS	Animal and Plant Health Inspection Service
ARS	Agricultural Research Service
AFRI	Agriculture and Food Research Initiative
BIL	Bipartisan Infrastructure Law
CEJST	Climate & Economic Justice Screening Tool
CEQ	White House Council on Environmental Quality
COOP	Continuity of Operations Plan
CRP	Conservation Reserve Program
EO	Executive Order
ERM	Enterprise Risk Management
ERS	Economic Research Service
FAS	Foreign Agricultural Service
FNS	Food and Nutrition Service
FPAC	Farm Production & Conservation
FSA	Farm Service Agency
FSIS	Food Safety and Inspection Service
FTE	Full-time equivalent
FY	Fiscal year
GAO	U.S. Government Accountability Office
IRA	Inflation Reduction Act
NASS	National Agricultural Statistics Service
NBS	Nature-based solutions
NCA	National Climate Assessment
NIFA	National Institute of Food and Agriculture
NRCS	Natural Resources Conservation Service
OBPA	Office of Budget & Program Analysis
OCE	Office of the Chief Economist
OCP	Office of Contracting & Procurement
OEEP	Office of Energy and Environmental Policy
OHS	Office of Homeland Security
OMB	White House Office of Management and Budget
OPEM	Office of Property and Environmental Management
OTR	Office of Tribal Relations
RD	Rural Development
RCP	Representative concentration pathway
RCPP	Regional Conservation Partnership Program
REE	Research, Education, & Economics
RMA	Risk Management Agency
USDA	United States Department of Agriculture
USFS	United States Forest Service
WCS	Wildfire Crisis Strategy

APPENDIX 1: DATA SOURCES FOR CLIMATE RISK ASSESSMENT

USDA used the Federal Climate Mapping for Resilience and Adaptation Application (Federal Mapping App), which was developed for Federal agencies by the White House Council on Environmental Quality (CEQ) and the National Oceanic and Atmospheric Administration (NOAA) to conduct a high-level screening of climate hazard exposure for Federal facilities and personnel.

Facilities

Facility data comes from the publicly available Federal Real Property Profile (FRPP). The General Services Administration (GSA) maintains FRPP data and Federal agencies are responsible for submitting detailed asset-level data to GSA on an annual basis. Although FRPP data is limited—for example, not all agencies submit complete asset-level data to GSA, facility locations are denoted by a single point and do not represent the entirety of a structure or could represent multiple structures, and properties may be excluded on the basis of national security determinations— it is the best available public dataset for Federal real property. Despite these limitations, this data is sufficient for screening-level exposure assessments to provide a sense of potential exposure of Federal facilities to climate hazards.

Personnel

Personnel data comes from the Office of Personnel Management's (OPM) non-public dataset of all personnel employed by the Federal Government that was provided in 2023. The data contains a number of adjustments, including exclusion of military or intelligence agency personnel, aggregation of personnel data to the county level, and suppression of personnel data for duty stations of less than 5 personnel. Despite these adjustments, this data is still useful for screening-level exposure assessments to provide a sense of key areas of climate hazard exposure for agency personnel.

Climate Hazards (Tables 1 and 2)

The climate data used in the risk assessment comes from the data in Climate Mapping for Resilience and Adaptation (CMRA) Assessment Tool. When agency climate adaptation plans were initiated in 2023, CMRA data included climate data prepared for the Fourth National Climate Assessment (NCA4). Additional details on this data can be found on the CMRA Assessment Tool Data Sources page. Due to limited data availability, exposure analyses using the Federal Mapping App are largely limited to the contiguous United States (CONUS). Additional information regarding Alaska, Hawai'i, U.S. Territories, and marine environments has been included as available.

Table 1: Climate data used in USDA risk assessment

Hazard	Description	Scenario	Geographic Coverage
Extreme Heat	Measured as whether an asset is projected to be exposed to an increased number of days with temperatures exceeding the 99th percentile of daily maximum temperatures (calculated annually), with reference to 1976-2005. Data are from high-resolution, downscaled climate model projections based on the Localized Constructed Analogs (LOCA) dataset prepared for NCA4.	RCP 4.5	CONUS
		RCP 8.5	CONUS
Extreme Precipitation	Measured as whether an asset is projected to be exposed to an increased number of days with precipitation amounts exceeding the 99th percentile of daily maximum precipitation amounts (calculated annually), with reference to 1976-2005. Data are from high-resolution, downscaled climate model projections based on the LOCA dataset prepared for NCA4.	RCP 4.5	CONUS
		RCP 8.5	CONUS and AK
Sea Level Rise	Measured as whether an asset is within the inundation extents from NOAA Coastal Digital Elevation Models and the 2022 Interagency Sea Level Rise Technical Report. Intermediate and Intermediate-High sea level rise scenarios used as proxies for RCP 4.5 and 8.5, respectively.	RCP 4.5	CONUS and PR
		RCP 8.5	CONUS and PR
Wildfire Risk	Measured as whether an asset is in a location that is rated as high, very high, or extreme risk based on the U.S. Forest Service Wildfire Risk to Potential Structures (a data product of Wildfire Risk to Communities), which estimates the likelihood of structures being lost to wildfire based on the probability of a fire occurring in a location and likely fire intensity. Data reflects wildfires and other major disturbances as of 2014.	Historical	All 50 States
Flooding	Measured as whether an asset is located within a 100-year floodplain (1% annual chance of flooding) or 500-year floodplain (0.2% annual chance of flooding), as mapped by the Federal Emergency Management Agency National Flood Hazard Layer.	Historical	All 50 States and PR

Table 2: Climate scenarios considered in USDA risk assessment

Scenario Descriptor		Summary Description (taken from 5th National Climate Assessment)
RCP 8.5	Very High Scenario	RCP 8.5 reflects the highest range of carbon dioxide (CO_2) emissions and no mitigation. Total annual global CO_2 emissions in 2100 are quadruple emissions in 2000. Population growth in 2100 doubles from 2000. This scenario includes fossil fuel development.
RCP 4.5	Intermediate Scenario	This scenario reflects reductions in CO_2 emissions from current levels. Total annual CO_2 emissions in 2100 are 46% less than the year 2000. Mitigation efforts include expanded renewable energy compared to 2000.

APPENDIX 2: SUMMARY OF MAJOR MILESTONES

The following is a summary of ongoing and new actions described throughout Section 3. Effort has been made to avoid duplication, however where there is crossover between purposes or aims, actions may be repeated.

Agency/ Office	Hazard	Action	Timing	Indicators of success
3A(1) Addressing Climate Hazard Impacts on and Exposures to Federal Buildings				
OPEM	All	Re-launch USDA Sustainable Operations Council	Ongoing	Regular meetings
OPEM	All	Develop CHER Tool	2024-2025	Application of tool
OPEM	Flooding	Identify flood risks and evaluate alternatives in leasing processes	Ongoing	Fewer flood incidences
OO	All	Integrate resilience provisions into building modernization projects	Ongoing	Provisions into project plans
AMS	All	Integrate climate risks into COOP development	2025	Completed COOP
ARS	All	Maintain COOPs. Building and equipment maintenance for extreme weather resilience.	Ongoing	Updated COOPs Fewer post-disaster expenses
FPAC-BC	All	Integrate climate goals into space management policy	FY24	Completed policy
FPAC-BC	All	Integrate climate goals into Facilities Program Manual	FY24	Completed manual
FPAC-BC	All	Conduct facility condition assessments	FY24-27	Resilience in assessments
USFS	Wildfire	USFS facilities assessment for wildfire risk	2024-2027	# facilities assessed
USFS	Flooding	Quantify facility flooding risk	Ongoing	# facilities assessed
USFS	All	Train USFS recreation professionals and line officers	2024	# employees trained
USFS	Precip. Flooding	Evaluate at-risk dam spillway capacities	Ongoing	# dams evaluated
USFS	Wildfire	Work with BAER team to identify damaged assets	Ongoing	# assets assessed
3A(2) Addressing Climate Hazard Impacts on and Exposures to Federal Employees				
OBPA	All	Integrate climate risk into enterprise risk management	Ongoing	Climate risk in ERM
OHS	All	Adapt emergency planning, preparation, & operations	Ongoing	Future risk considered
Multiple	All	Review communication needs and redundancies	Ongoing	Resilient comms plan
Multiple	All	Communicate climate-related risks to employees	Ongoing	# of articles/items
AMS	All	Develop plan to manage climate risks to employees	2025	Plan complete
FNS	All	Staff disaster and emergency response training	FY24	# employees trained
FPAC-BC	All	Complete development of Disaster Preparedness Template	Ongoing	Deliver to agencies
FPAC-BC	All	Consideration of fleet preparedness for disaster response	Ongoing	Resilient fleet plan
FSA	All	Continue to operationalize ‘jump teams’	Ongoing	# events responded to
FSA	All	Train and support employees to maintain mission-delivery	Ongoing	# employees trained

Agency/ Office	Hazard	Action	Timing	Indicators of success
FSIS	All	Review safety and hazard reporting	Ongoing	Data submitted and review complete
FSIS	Heat	Maintain heat-stress guidance and products for IPP	Ongoing	# heat stress illness prevention items distributed
FSIS	All	Continue annual Workplace Safety & Health Hazards training	Ongoing	% employees trained
NRCS	All	Follow through on efforts originating from COOP update	Ongoing	COOP tasks complete
NRCS	All	Interagency agreement to establish Working Lands Climate Corps	Ongoing	# of people employed
RD	All	Create and use dashboard for climate risks to employees	FY24-26	Dashboard complete
USFS	All	Interagency agreement to establish the NCCC Forest Corps	2023-2028	# of people employed
USFS	All	Implement agreement with Student Conservation Association	2023-2028	# of people employed
USFS	All	Implement agreement with Conservation Legacy Ancestral Lands Conservation Corps	2023-2026	# of people employed
USFS	Fire	Implement BIL-supported temporary pay increase for wildland firefighters	Ongoing	# employees w/higher pay
3A(3) Addressing Climate Hazard Impacts/Exposures to Federal Lands, Waters, and Cultural Resources				
USFS	Wildfire	Implement Wildfire Crisis Strategy	Ongoing	Meet FY24 goal
USFS	Wildfire	Implement the National Prescribed Fire Resource Mobilization Strategy	Ongoing	Prescribed fire usage by USFS
USFS	All	Implement Joint Chiefs' Landscape Restoration Partnership Program projects with adaptation benefits	Ongoing	$ invested
USFS	All	Implement National Reforestation Strategy	2022-2030	Meet 2030 target
USFS	All	Modernization of Watershed Condition Framework	Ongoing	Climate risks incorporated
USFS	All	Update water resources directives	2024-2027	Update complete
USFS	All	Allocate $28 million to fund 11 additional Collaborative Aquatic Landscape Restoration (CALR) projects	FY24	$ invested
USFS	All	Forest Service National Post-Disaster Recovery Team	Ongoing	Regular meetings
USFS	All	Establish an Enterprise Emergency Management Council	2024	# events responded to
USFS	Drought	Design & deploy a drought vulnerability assessment	FY24	# workshops held
USFS	All	Allocate $7.7 million available FY24 invasive species prevention, detection, and eradication in NFS	FY24	Acres treated
USFS	All	Revise Silviculture Manual (FSM 2470)	Ongoing	Revision complete
USFS	All	Continue to integrate adaptation into recreation planning	Ongoing	# Facilities assessed
USFS	All	Integrate adaptation into land management plan amendments	Ongoing	# plans revised/128

Agency/ Office	Hazard	Action	Timing	Indicators of success
USFS	All	Integrate adaptation into "Strengthening Tribal Consultations and Nation to Nation Relationships" implementation	Ongoing	Climate in consultations
USFS	All	Hold Tribal Forest Protection Act workshop	FY24	# trainers trained
3B(1) Accounting for Climate Risk in Planning and Decision Making				
OEEP	All	Finalize additional agency & office adaptation plans	2023-2024	Plans complete
OEEP	All	Develop and hold briefing sessions on application of climate data in agency processes	2024	# attendees & sessions held
OEEP	All	Update agency-level climate adaptation plans	FY25-26	Plans revised
OPEM	All	Use CHER tool to prioritize capital planning and space management projects	2026	Tool applied to planning
APHIS	All	Apply climate suitability maps in decisions on survey design and trade policy development	Ongoing	Maps used in planning
NASS	All	Use Google Earth Engine to estimate crops impacted by climate-related extreme weather events	Ongoing	Methods implemented
NASS	All	Use climate information system to inform NASS Agricultural Statistics Board about climate change-related impacts to agricultural production	Ongoing	Methods implemented
NRCS	All	Finalize recommendations on integration of climate change into NRCS tools	FY24	Rec's delivered
RD	All	Development of Loan Portfolio Disaster Dashboard	Ongoing	Dashboard applied
RD	All	Development of Weather-Adjusted Economic Risk Dashboard	Ongoing	Dashboard used
USFS	All	Adapt informational guidance and training on Planning policy for climate change	2024	# resources w/ climate
3B(2) Incorporating Climate Risk Assessment into Budget Planning				
OBPA	All	Implement new process for FY26 budget development to include results of climate hazard risk exposure assessments	FY24	ERM guidance updated
ERS/All	All	As needed, support development of financial-related climate risk assessments	Ongoing	Analyses complete
3B(3) Incorporating Climate Risk into Policy and Programs				
OBPA	All	Integrate adaptation considerations into the development of USDA's Environmental Justice Strategic Plan	2024	Adaptation language included
OPEM	All	Real property resilience incorporated into Departmental Manual on Sustainable Operations	2024-2027	DM complete
OHS	All	Include language on climate effects and precautions in USDA COOP	Ongoing	COOP complete
OHS	All	Include climate risks in USDA response to National Security Memorandum-16	Ongoing	USDA response submitted
OTR/OEEP	All	Incorporate climate adaptation into planned Tribal Consultations when appropriate	FY24	Include climate adaptation in framing papers when applicable

Agency/ Office	Hazard	Action	Timing	Indicators of success
ARS	All	Use internal ARSx and Grand Challenges Synergies programs to promote innovative and cross-disciplinary climate research	Ongoing	# projects advancing climate adaptation science
ARS	All	Use LTAR and GRACEnet science networks to conduct cutting edge climate research	Ongoing	# projects advancing climate adaptation science
FAS/OCE	All	Highlight climate adaptation and resilience practices within the SPG Coalition	2024-2027	Inclusion of adaptation
FAS	All	Grow the work of the new International Climate Hub	2024-2027	# international partners engaged
FAS	All	Implement climate-smart agriculture fellowship and exchange programs	2024-2027	# participants
FAS	All	Integrate adaptation into sanitary and phytosanitary systems activities	2024-2027	Climate effects on SPS considered
FNS	All	Revise USDA Foods disaster response regulations (7 CFR 250.69 and 250.70)	Ongoing	Regulations revised
NASS	All	Implement new methods for June Area Survey	FY24	Methods implemented
NIFA	All	Expansion of AFRI FAS A1461 to support research and Extension focused on environmental justice	FY24	Projects funded
NRCS	All	Review and revise policy and guidance for stewardship of perpetual easements	Ongoing	Climate included in revisions
NRCS	All	Include environmental justice in equity training	2024-2027	# employees receiving training
RD	All	Revise 7 CFR Part 1924 Subpart A to include climate resilient building practices	2024-2027	Revision complete
RMA	All	Develop new risk management products for specialty crop producers	Ongoing	# new products offered
USFS	All	Integrate climate change into guidance for forest-level management planning, consistent with 2012 Planning Rule	2024	Guidance issued
USFS	All	Update USFS Silviculture Manual	2024-2027	Update complete
USFS	All	Develop policy and guidance to encourage beneficial use of forest restoration byproducts	2024-2027	Policy/guidance finalized
USFS	All	Prepare additional direction to integrate adaptation into recreation and designated areas planning	2024-2027	Guidance finalized
USFS	All	Develop proposal to update Wildlife, Fish, and Sensitive Plant Habitat Management directives	2024-2027	Proposal completed/adopted
USFS	All	Develop proposal to update the Water Resource Management Directives	2024-2027	Proposal completed/adopted
3B(4) Climate-Smart Supply Chains and Procurement				
OCP	All	Include climate risks in Acquisition MASCO Reviews (AMR)	FY24	AMRs complete
OCP	All	Research (and potentially acquire) supply chain risk management software	2024-2027	Software acquired

Agency/ Office	Hazard	Action	Timing	Indicators of success
OCP	All	Conduct process mapping and policy creation to support Agriculture Priorities & Allocation Systems ratings	2024-2027	Ratings adapted
OCP	All	Expand use of Procurement Forecasting Tool	2024-2027	# of tool uses
OCP	All	Integrate climate goals into Government Purchase Card (GPC) use and platforms	2024-2027	GPC policies updated
OCP	All	Integrate climate vulnerabilities into Project Management Deskbook	Ongoing	Deskbook complete
OCP	All	Require Senior Contracting Officers to submit action plans that account for supply chain climate risks	FY25	Plans submitted
OCP	All	Establish and staff Acquisition Project Management Office	FY24	Staff onboarded
3B(5) Climate Informed Funding to External Parties				
AMS	All	Include climate resilience language in RFAs, when appropriate	Continuous	# NOFOs with adaptation
FAS	All	Update language in McGovern-Dole NOFO	FY24	# projects received with adaptation
FSA	Storms	Review Farm Storage Facility Loan policies for flexibilities to speed up assistance	Ongoing	Policies changed
FSA	All	Streamline and automate Farm Loan Program processes	Ongoing	# loans/time period
NIFA	All	Review RFAs and programs for climate adaptation opportunities	Continuous	# RFAs with adaptation
NIFA	All	Webinar to share agency-wide climate adaptation funding opportunities	FY24	Annual climate adaptation funding level
NRCS	All	Review funding opportunities for adaptation and resilience	Continuous	# of NOFOs with adaptation
USFS	All	Integrate climate adaptation and resilience into all relevant competitive funding	Continuous	# programs with adaptation criteria
USFS	All	Update National Forest Carbon Monitoring dataset to support Forest Legacy project development	Ongoing	Dataset updated
USFS	All	Issue NOFO for Forest Landowner Support cost-share programs	FY24	NOFO issued
USFS	All	Invest additional $44 million in Community Navigators	FY24	# individuals served
3C Climate Training and Capacity Building for a Climate Informed Workforce				
OCP/OPEM	All	Survey USDA acquisition personal for knowledge and skill gaps	FY24	Training plan developed
FSA/ Climate Hubs	All	Expand work with USDA Climate Hubs to support FSA training	2024-2027	# employees trained
NRCS	All	Identify and adapt training materials to meet needs	Ongoing	# employees trained
USFS	All	Develop and deploy learning programs with ASAP	Ongoing	Learning programs ready

APPENDIX 3: ASSESSMENT OF OPTIONS TO ENHANCE THE RESILIENCE OF AGRICULTURAL PRODUCERS TO THE IMPACTS OF CLIMATE CHANGE (RESPONSE TO GAO 23-104557)

A. Introduction

This Appendix to USDA's 2024-2027 Climate Adaptation Plan addresses the Recommendation for Executive Action from the January 2023 U.S. Government Accountability Office (GAO) report titled "CLIMATE CHANGE: Options to Enhance the Resilience of Agricultural Producers and Reduce Federal Fiscal Exposure (GAO-23-104557)." Within the context of increasing climate change impacts and growing Federal fiscal exposure, the aims of this report were to (1) examine USDA efforts to enhance the climate resilience of agricultural producers and (2) identify potential options to further enhance these activities (Table 1).

GAO's Recommendation for Executive Action for USDA was to further analyze the options identified within the report and integrate them into ongoing climate adaptation and resilience planning, as appropriate. In response to GAO's recommendation, USDA committed to integrating consideration of these options into its departmental adaptation planning process. This appendix to USDA's 2024-2027 Climate Adaptation Plan represents that consideration, with input from USDA's Office of Energy and Environmental Policy (OEEP), the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), the Risk Management Agency (RMA), and USDA's Climate Hubs. In addition to the discussion of each option below, these agencies and programs will continue to consider these options in future adaptation and strategic planning processes.

GAO used their *Disaster Resilience Framework* to structure the study, sorting the thirteen identified options among the Information, Integration, and Incentive principles of the Framework. The recommendations primarily focus on policies and programs within NRCS, FSA, and RMA, as well as USDA's Climate Hubs, a multiagency program. USDA engaged with GAO during the development of the study and some of the feedback provided during that process is available in Appendix IV of the report. This appendix, a supplement to USDA's 2024-2027 Climate Adaptation Plan, expands on that initial feedback and reflects the most up-to-date thinking on the relative strengths and weaknesses of each of the GAO options. For each option, we discuss the extent to which USDA is already advancing certain measures and if not, the barriers or limitations that may make an option challenging to implement. Many of the options are complementary so there may be some overlap in how USDA is addressing multiple options. As noted by GAO, USDA's work is likely strengthened by pursuing a selection of the options presented here.

Table 1: Potential policy options identified by GAO for USDA to enhance the climate resilience of agricultural producers, using the principles of GAO's *Disaster Resilience Framework*

Information	Options to help producers further enhance their climate resilience by improving producer access to information that is authoritative and understandable.
1.	Collect data on practices that enhance climate resilience.
2.	Expand technical assistance to prioritize and promote practices that enhance climate resilience.
3.	Prioritize climate resilience in whole-farm conservation planning.
4.	Expand the capacity and expertise of USDA's Climate Hubs.
Integration	Options to help producers enhance their climate resilience through integration of agency planning to help decision makers take coherent and coordinated resilience actions.
5.	Develop an agricultural climate resilience plan that addresses regionally specific needs.
Incentives	Options to help producers enhance their climate resilience by providing additional incentives through the Department's agricultural risk management and conservation programs.
6.	Establish standards for climate-resilient agricultural operations.
7.	Revise the Natural Resources Conservation Service's Conservation Practice Standards to include practices that enhance climate resilience.
8.	Expand conservation program eligibility to include and prioritize practices that enhance climate resilience.
9.	Expand the capacity of USDA's conservation programs to help producers enhance their climate resilience.
10.	Research the feasibility of incorporating climate resilience into crop insurance rates.
11.	Require the adoption of relevant climate-resilient practices to receive premium subsidies.
12.	Offer crop insurance premium subsidies for agricultural producers who use practices that enhance their climate resilience.
13.	Require that producers adopt practices that enhance climate resilience to be eligible for certain Farm Bill Title I programs.

B. Assessment of GAO Options to Help Enhance Producers' Climate Resilience

Option 1: Collect data on practices that enhance climate resilience to demonstrate the benefits of those practices and ensure that data are accessible to a variety of stakeholders.

GAO Option 1 encourages USDA to leverage data about conservation practice outcomes to demonstrate and communicate the climate resilience benefits of those practices to producers. This Option aligns with USDA and Agency-level Climate Adaptation Plan actions that aim to help farmers and land managers manage their unique climate risks by providing decision support tools and information.

NRCS's Conservation Effects Assessment Project (CEAP) is one way in which USDA is already working to quantify the effects of conservation practices across the Nation's working lands. CEAP uses natural resource and farmer survey data and physical process modeling to estimate the environmental effects of conservation practices on five different focus areas: cropland, grazing land, wetland, wildlife, and watersheds. These assessments include practices that span many land uses and resource concerns and of which climate adaptation and resilience is a direct or co-benefit (e.g. wetland assessments to contain floodwaters, ecosystem services from key rangeland practices – brush management, herbaceous weed treatment, and prescribed grazing,

and the impact of cover crops and reduced tillage practices on nitrogen and phosphorus dynamics on cropland).

NRCS shares data on conservation practice implementation via NRCS programs publicly using the Soil and Water Resources Conservation Act (RCA) Data Viewer. This information alone however is not sufficient to communicate to producers the benefits of risk-reducing practices. In the context of NRCS's Climate Adaptation Plan, NRCS has established a working group dedicated to improving data management and outcomes for climate adaptation. This group also aims to produce useful data and tools to support climate change adaptation decision-making by the agency. Equipping NRCS staff with resources and data about climate risks and adaptation responses will strengthen the technical assistance they are able to provide to producers. As part of ongoing climate adaptation, NRCS will consider actions such as:

- Improving practice implementation data collection and reporting with greater detail and more results.
- Expanding CEAP to include assessment of practices for climate change benefits.
- Strengthening internal and external collaborations with research organizations to support evaluation of conservation practice benefits.

Like NRCS, FSA is also taking steps to better quantify the benefits of conservation practices delivered through their programs. Many of the Monitoring, Assessment, and Evaluation (MAE) projects that work to address soil and forest health of land enrolled in Conservation Reserve Program (CRP) have climate resilience benefits in addition to the climate mitigation benefits they primarily target. MAE could be further leveraged to determine if sufficient climate resilient practices exist within the current suit of conservation practices or if new practices need to be added in response to a wider range of climate stressors across diverse farming operations.

Both FSA and NRCS identified the critical need for continued partnership with USDA's Research, Education, and Economics (REE) agencies to leverage the research they conduct and support to better understand the climate resilience benefits of different agricultural practices. Also essential is an understanding of the co-benefits or tradeoffs with these practices and the need to balance adaptation and resilience with sustainably increasing agricultural production and achieving climate mitigation goals. The Agricultural Research Service (ARS) supports this work through its National Programs (NP), including NP 305: Crop Production, NP 211: Water Availability & Watershed Management, NP 212: Soil and Air, and NP 216: Sustainable Agricultural Systems. ARS also manages the Long-Term Agroecosystem Research (LTAR) Network, a series of 18 research locations across the United States that develop strategies to sustainably intensify agricultural production, which includes managing for the effects of climate change. The National Institute of Food and Agriculture (NIFA) supports proposals that address the need to better understand conservation practices through efforts like the Agriculture and Food Research Initiative's (AFRI) Foundational and Applied Sciences (FAS) and Sustainable Agricultural Systems (SAS) programs. The Economic Research Service (ERS) and National Agricultural Statistics Service are working to improve the timeliness of data collection and release, including developing a national-level conservation data platform. While much of this work is being undertaken to improve quantification of greenhouse gas benefits, with support from the Inflation Reduction Act, many of these practices have climate adaptation co-benefits and will contribute to the goals of Option 1. Finally, USDA's Climate Hubs can play a key role in translating scientific outcomes into useable information and tools for USDA field staff delivering conservation technical assistance.

Option 2: Expand the technical assistance provided by USDA and other key partners to prioritize and promote practices that enhance climate resilience.

Option 2 identifies the important role that conservation technical assistance, through USDA's NRCS, can play in helping producers adapt and be more resilient to the impacts of climate change. NRCS's Climate Adaptation Plan recognizes the need to not only expand technical assistance, but to also strengthen NRCS's consideration of climate change effects and responses in its existing business practices and programs.

To advance implementation of their Climate Adaptation Plan, NRCS stood up a short-term Climate Change Adaptation Technical Team (CCATT). The CCATT provided foundational recommendations for how NRCS should integrate information on climate impacts and adaptation into the NRCS conservation planning process. Some of these recommendations are still being considered by agency leadership, while others have already been incorporated (see Option 7).

NRCS is dedicating significant effort to improve the climate literacy of its professional conservation planners to enhance technical assistance for climate-smart agriculture, which includes climate adaptation. Examples of recent and ongoing efforts include:

- Developing a Climate-Smart Agriculture and Forestry Toolkit for use by staff at the State and county level.
- Integrating climate science and resource impacts into NRCS State Technical Committees.
- Enhancing cross-agency coordination by identifying State- and national-level climate points of contact.
- Enhancing cross-agency communication by establishing an internal, online climate change resource center, publishing a monthly internal climate newsletter, and initiating bimonthly virtual meetings on issues related to climate change.
- Collaborating with USDA's Climate Hubs to develop tools, curricula, webinars, and other resources.

NRCS is also leveraging programs and initiatives like the Regional Conservation Partnership Program and the NRCS Plant Materials Centers (PMCs) to support innovative projects to address climate change and other critical challenges to agricultural producers. A recent progress report on climate-smart agriculture activities from the Plant Materials Program describes how the PMCs are helping conservation planners choose appropriate plant species and varieties for a changing climate.

Looking ahead, depending on capacity and resources, NRCS will continue to partner in new ways with USDA's Climate Hubs, particularly on workforce climate literacy, to ensure that NRCS's field staff is equipped to help producers manage climate change-related challenges. NRCS could also potentially expand the work of the PMCs on climate adaptation and resilience. Looking beyond NRCS conservation technical assistance, the National Cooperative Extension Service will be a critical partner in helping producers assess and manage for climate change effects on their lands. Through AFRI FAS funding, NIFA is currently supporting the development of a climate action plan for Extension that will direct efforts to help producers, land managers, and rural communities address the causes and consequences of climate change.

Option 3: Prioritize climate resilience in whole-farm conservation planning and incentivize it through USDA's conservation programs to enhance producers' climate resilience.

Option 3 suggests that USDA prioritize climate resilience in "whole-farm conservation planning" and incentivize "whole-farm planning" through its conservation programs. Taking a whole-farm view aligns with a climate-smart agricultural approach that prioritizes and balances sustainably increasing agricultural production, adapting to climate impacts, and opportunities to reduce greenhouse gas emission and increase carbon sequestration.

As described in response to Option 2, NRCS stood up a Climate Change Adaptation Technical Team (CCATT) to develop recommendations for how NRCS should integrate information on climate impacts and adaptation into the NRCS conservation planning process. The initial steps of this process take a holistic view of a producer's operation and include:

1. *Identify problems and opportunities.* Initial opportunities and problems are first identified while working with the customer.
2. *Determine objectives.* The customer identifies their objectives, while the planner guides the process so that it includes the customer's needs and values, the resource uses, and on-site and off-site ecological protection
3. *Inventory resources.* Natural resource, economic, and social information for the planning area is collected to further define problems and opportunities, develop alternatives, and evaluate the plan.
4. *Analyze resource data.* The planner studies the resource data and defines existing conditions for all the identified natural resources, including limitations and potentials for desired use.

NRCS conservation planners will help producers define the scope of their conservation planning efforts, but at their core, NRCS's conservation programs are voluntary and locally led. Prioritizing whole-farm planning may dissuade participation by producers who want to initially address a specific resource concern or test a single conservation practice on one part of their operation.

As described in Option 2, NRCS is taking significant steps to increase the capacity of its field staff to understand climate change risks and identify response options, in particular during conservation planning. NRCS is curating data and developing tools to support NRCS decision-making at the State and local level; a drought dashboard has already been developed and deployed, a wildfire dashboard is in development, and flood risk data have been collected and evaluated. Through its Resource Inventory Assessment Division (RIAD), NRCS has updated its Priority Data Layers Project to visualize past treatment and future opportunities for (1) mitigating climate change, (2) advancing equity in program delivery, and (3) promoting conservation in urban and peri-urban areas. Dependent on capacity and resources, future updates could consider how to overlay climate change-related risks with these existing indicators.

Option 4: Expand capacity and expertise of USDA's Climate Hubs to help producers make informed decisions on climate resilience.

GAO Option 4 proposes to grow the technical capacity and expertise of the Climate Hubs to expand their reach and impact. This option is consistent with the prominent role of the Climate Hubs identified in USDA's 2021 Action Plan for Climate Adaptation and Resilience and Climate-Smart Agriculture and Forestry Strategy: 90-Day Progress Report (2021).

USDA's Climate Hubs develop and deliver science-based information and technologies to farmers and other natural resource managers to enable climate-informed decision-making, reduce agricultural risk, and build resilience to the effects of climate change. The ten regional domestic Hubs and one international Hub achieve this through assessment and synthesis of scientific information, development of tools and technology paired with technical assistance, and stakeholder education, outreach, and engagement. While a significant portion of the Hubs' work is outward-facing, working with external partners, the Hubs also play a crucial inward-facing role, strengthening the capacity of USDA agencies to mitigate and adapt to climate change.

Established in 2014, the Hubs are hosted and funded by USDA's Agricultural Research Service (ARS), Forest Service (USFS), Natural Resources Conservation Service (NRCS), and Foreign Agricultural Service (FAS), with contributions from other USDA research and program agencies. At the national level, the Hubs are overseen by an Executive Committee comprised of senior program leaders from across USDA, led by a National Lead that rotates biennially between ARS, FS, and NRCS, and supported by a National Coordinator, a permanent position located within USDA's Office of Energy and Environmental Policy.

Each Hub is led by a director, who oversees the regional implementation of the Hub's mission, including regional program priorities, staffing, budgeting, and evaluation. Each Hub is supported by a Coordinator, who manages and supports science synthesis, tool development, communication, and education efforts, and provides connection and cohesion within each Hub and with external partners. Climate Hubs Co-Leads from ARS, NRCS, and FS ensure collaboration between the Hubs and their home agencies at the regional level and provide advisory support to the Director. Additional staffing levels are dependent on the priorities of each Hub and can include fellows, early-career individuals that assist in implementing Hub strategies and projects, and liaisons, temporary detailees who work with Hubs to develop and deliver projects that are beneficial to their host agency and act as subject matter experts.

In the past 2-3 years, there has been a significant increase in funds, including through the Inflation Reduction Act, for the Climate Hubs to carry out additional projects and activities. This is enabling the Climate Hubs to hire term Climate Fellows and other staff that can support specific networking and training for field and leadership staff within USDA and for external partners, as well as climate-related tool development and science synthesis. Despite the influx of funds, the limited number of full-time equivalent (FTE) staff for the Climate Hubs has remained relatively static over its 10-year lifespan. Additional resources had been dedicated to contractors or fellows in temporary positions to carry out focused projects. The lack of growth in FTE positions has made it challenging to build expertise and foster lasting stakeholder relationships at the regional and national level. One challenge is that funding from the USDA agencies that contribute to the Climate Hubs can be variable and uneven depending upon the prioritization of the Hubs by each agency. This limits the ability for the Hubs to hire permanent staff necessary for program continuity. Another challenge is that as funding and term positions have grown at the regional level, national support has remained limited to two positions, one permanent and one term. These, and other concerns will be identified during this year's Hub 5-year review process, beginning in 2024, and may be addressed in the next Hub Strategic Plan.

In the future, expanded support of the Climate Hubs could allow the program to broaden its reach, diversify projects, and ensure stability and consistent expertise. In the context of this Adaptation Plan, increased capacity and expertise of the Hubs would strengthen the Hubs' ability to help USDA agencies aid producers in preparing and responding to the effects of climate

change. Challenges arise when funding is transient and inconsistent, making it difficult to build permanent capacity and sustain long-term projects and engagements.

Option 5: Develop an agricultural climate resilience plan that addresses regionally specific needs by coordinating within USDA, across relevant Federal agencies, with producers, and with other key stakeholders.

Option 5 proposes that USDA develop and implement a strategic plan focused on adapting and building resilience of agricultural production and producers to the impacts of climate change. This plan would place an emphasis on regional climate risks and opportunities and be informed by engagement and input from Federal agencies and diverse agricultural stakeholders.

USDA regularly prepares a department-wide Climate Adaptation Plan and carries out annual progress reporting based on the White House Council on Environmental Quality's guidance for Federal climate adaptation planning. USDA's Office of Energy and Environmental Policy (OEEP) leads these activities, in accordance with USDA Departmental Regulation 1070-001: USDA Policy Statement on Climate Change Adaptation, to integrate climate change adaptation into USDA's mission, operations, and assets. To account for the diverse risks and opportunities that climate change poses to USDA's 28 agencies and offices, USDA released agency-level climate adaptation plans in 2022 that build on the Department-level plan and further integrate adaptation into agency-level management. Through these efforts, USDA is working to manage the effects of climate change on its mission delivery and support the Nation's agricultural producers, forest land managers, rural communities, and food systems in adapting and building resilience to climate change.

Overlaying a separate adaptation planning process on this existing framework would likely be duplicative. However, the underlying principles of Option 5, a regional emphasis on addressing climate risks to producers, have merit and in some ways are already integrated into USDA's climate adaptation efforts. USDA's Farm Production and Conservation agencies (NRCS, FSA, and RMA), Research, Education, and Economics agencies (ARS, NIFA, ERS, and NASS), and Marketing and Regulatory Program agencies (APHIS and AMS) are all already working to manage the diverse threats climate change poses to agricultural production across the United States. NRCS is supporting practices and projects that enhance the adoption of climate-smart farming practices through its conservation programs, while USDA's research agencies are supporting development of crop and livestock varieties that are adapted to changing climate conditions. USDA's Climate Hubs address regional climate change challenges to agriculture, both by working with external partners and with USDA agencies. Individual Hubs work with USDA agency staff in their region to train them on regional climate risks, adaptation options, and ways to use tools and data to manage those risks and assess options.

In terms of elevating regional climate risks and opportunities, much of this is borne out at the agency-level when acute or chronic climate hazards are addressed through existing programs. Taking NRCS as an example, many of the projects funded by the Regional Conservation Partnership Program address regional climate challenges via Critical Conservation Areas designated by the Secretary of Agriculture. NRCS maximizes local flexibility for using conservation practice standards to address natural resource issues by sharing examples, integrating new technologies, and prioritizing national review of practices that will have the most impact helping producers adapt to climate changes. NRCS has taken initial steps to review and provide updates to policy where needed to maximize local flexibility. NRCS has provided

guidance to States on how to create geographically specific payment scenarios. This new guidance addresses, among other issues, the inability to add or change scenarios in response to emergency needs such as droughts, flooding, fire, and industry supply disruptions.

Moving forward, as the challenges climate change poses to agriculture grow, USDA will strive to maintain momentum its mainstreaming of climate adaptation throughout its mission. This will include enhancing the use of climate change data and information in planning and decision-making and bolstering the capacity of customer-facing programs to provide support to producers dealing with climate impacts. This will be underpinned by the critical work of USDA research agencies to develop regionally appropriate technologies and approaches to ensure farmers can keep farming well into the future.

Option 6: Establish standards for climate-resilient agricultural operations to help create incentives for practices that enhance climate resilience and improve marketability.

With Option 6, GAO proposes that USDA establish standards for climate resilient farming operations, potentially akin to USDA's National Organic Program, with the intent to incentivize adoption of practices that enhance producers' climate resilience and product marketability.

Creation of standards for climate-resilient agriculture operations has the potential to be duplicative of ongoing government programs and private industry efforts to incentivize the adoption of agricultural practices with climate mitigation benefits. For example, USDA is investing $3.1 billion in its Partnerships for Climate-Smart Commodities Program to expand markets for climate-smart commodities. The 141 projects through this effort are pilots, meant to inform approaches related to implementing climate-smart practices, measuring their climate benefits, and creating markets for the associated commodities. Many of the approaches and practices that are being tested by Partnerships projects have adaptation and resilience co-benefits. It will be important to learn from these approaches before developing a "climate-smart" standard, which could include both mitigation and adaptation benefits.

GAO notes that developing agricultural climate resilience standards would require significant stakeholder coordination and collaboration. USDA agrees that coordination with stakeholders would be essential and offers anecdotal evidence to suggest that stakeholders are not yet interested in USDA climate-resilient standards. To understand and share the most successful climate mitigation and marketing strategies arising from Partnerships for Climate-Smart Commodities projects, USDA is engaging Partnership grant recipients in a Learning Network. Through frequent engagement with grant recipients, USDA is learning that recipients do not have consensus on whether USDA standards for climate mitigation would advance climate-smart market development. Some grant recipients have expressed an interest in USDA standards, while many others are not interested in standards-based incentives. Further, there are divergent opinions on what such standards should reflect, how they could be measured or verified, and whether it is possible to generate one set of standards applicable to a wide range of agricultural products. Therefore, reaching consensus to generate such standards for climate resilient practices is unlikely, especially given the outstanding need to quantify their benefits (Option 1), and presents a high barrier to pursuing this strategy.

Lack of Congressional authority is another barrier to implementing Option 6. The USDA National Organic Program (NOP) offers an example of a successful federally regulated labeling program. It is important to note however that establishment of NOP and organic farming

standards was authorized via passage of the Organic Foods Production Act of 1990. No such authority yet exists to support USDA establishment of climate-resilient farming standards.

Beyond USDA, there already several certification schemes for ecological or regenerative agriculture, for example Savory Institute's Land to Market Initiative, A Greener World's "Certified Regenerative" label, and others. These initiatives typically include a focus on soil health, holistic management, and natural resource conservation that may already fill the niche for climate-resilient agricultural standards. Regenerative labels already appear in retail markets, and many standards developers are spearheading initiatives with consumer packaged goods companies that have broad supply chains and market influence. An additional challenge that standard setting creates is determining whether to make the standards outcome-based or practice-based. Existing regenerative agriculture standards are split on if they require the adoption of practices (practice-based) or are focused on measurable outcomes (outcome-based), and there is no consensus on which approach is better.

USDA can incentivize adoption of climate resilient practices without creating accompanying standards which would likely be costly to develop and potentially outweigh the marketing benefits. As described in other options, NRCS is working to integrate climate resilient agricultural practices through their conservation planning process and existing conservation programs.

Option 7: Revise the Natural Resources Conservation Service's Conservation Practice Standards to include the identification and evaluation of existing and new conservation practices that enhance producers' climate resilience.

With Option 7, GAO suggests that NRCS revise its Conservation Practice Standards to better identify and evaluate existing and new practices that can enhance the climate resilience of producers. In the NRCS Climate Adaptation Plan, Action Area 4 proposes to address this need through maximizing "local flexibility for using Conservation Practices to address natural resource issues by sharing examples, integrating new technologies, and prioritizing national review of practices that will have the most impact helping producers adapt to climate changes."

The NRCS Climate Change Adaptation Technical Team (CCATT), introduced in the discussion of prior Options, was staffed by 7 full-time NRCS technical staff on a 120-day detail with the goal to provide recommendations to NRCS on how to integrate climate impact and adaptation information into NRCS conservation planning. Recommendations made by the CCATT included those related to:

- Natural resource concerns that may be associated with climate change stressors.
- Conservation planning criteria, assessment procedures, tools, and considerations that can be adjusted to better address climate change-related resource concerns.
- Conservation practices and activities that may support adaptation or can be updated to better address adaptation needs.

Some of these recommendations included, for example, proposed revisions to the existing natural resource concern framework used to assess and identify conservation opportunities, the integration of additional climate data layers and information into agency conservation planning tools, and the development of draft fact sheets that can help conservation planners understand and plan for projected resource concerns caused by climate change. While these

recommendations are currently under review, NRCS is working to implement them, as appropriate.

As NRCS continues to implement this and other priority actions identified in its Adaptation Plan, NRCS will continue to look for opportunities to improve the Conservation Practice Standards with available resources. Option 7 is closely linked with Options 1-3 and will be dependent on many of the enabling conditions previously raised, including climate literacy of the NRCS workforce, sufficient technical expertise within NRCS, and collaboration with USDA's research agencies and Climate Hubs.

Option 8: Expand eligibility to include and prioritize climate-resilient practices in the administration of USDA's conservation programs.

With Option 8, GAO suggests that USDA could expand conservation program eligibility by prioritizing applications from:

- Producers' seeking to apply climate resilience-building practices,
- Regions at higher risk of climate change-related impacts, or
- Lands with climate adaptive and resilient qualities at risk for conversion to non-agricultural uses.

Both NRCS and FSA have taken actions in the past or have ongoing efforts to expand eligibility and prioritize climate-resilient practices through USDA conservation programs.

NRCS's approach has been to expand eligibility at the funding or allocation level by having focus areas within programs and program rankings, such as special initiatives or funding pools. A prior example is the Environmental Quality Incentives Program (EQIP) Cover Crop Initiative, where NRCS made $38 million in additional assistance available in 11 States to help producers mitigate climate change through widespread adoption of cover crops. While the focus was on the potential of this natural and inexpensive solution in increase carbon sequestration in soils, the soil health benefits from cover crops can improve resilience of the soils to climate impacts. Climate change factors continue to be a consideration within NRCS allocation processes; however, additional work is needed to further integrate climate adaptation needs and priorities.

FSA has been working to update its programs to integrate climate-resilience co-benefits within existing conservation programs. For example, FSA has expanded Conservation Reserve Program (CRP) eligibility by:

- Moving State Acres for Wildfire (SAFE) back into Continuous CRP to allow for year-round sign-up.
- Making the Highly Erodible Land Initiative (HELI) eligible for both General CRP and Continuous CRP.
- Expanding the Clean Lakes, Estuaries, and River 30 (CLEAR30) pilot program nationwide.

FSA is always considering improvements to its programs and will continue to look for ways to include climate-resilient practices. One action FSA is considering taking is updating the environmental benefits index (EBI), which is used to rank general CRP offers. The EBI could be updated to increase the weight of the climate ranking factor. FSA would need to determine how that would affect the other ranking factors that make up the EBI score. FSA will continue to

partner with NRCS to ensure that conservation practice standards that meet the definition of climate resilient can be reviewed and considered for FSA conservation programs.

Option 9: Expand the capacity of USDA's conservation programs to prioritize enrollment of acreage that helps producers enhance their resilience to climate change.

Option 9 encourages USDA to expand the capacity of its conservation programs administered by NRCS and FSA to prioritize enrollment of acreage that helps producers enhance their climate resilience. Helping producers adapt to the effects of climate change and build resilience on their farms is important but must be balanced with other economic and environmental interests, including but not limited to, sustainably enhancing agricultural productivity. While this Option appears to focus on financial assistance from USDA's conservation programs, technical assistance, as discussed in Option 2, is a critical component to ensure appropriate and effective conservation decision-making. This Option is also closely linked to Option 1 in that the benefits of climate resilient farming practices need to be better understood to appropriately match farm acreage to potential climate risks and conservation options.

FSA has already created a Climate-Smart Incentive within CRP that provides additional payments for CRP practices "that will increase carbon sequestration, reduce greenhouse gas emissions, and otherwise are climate-smart practices," many which have climate adaptation co-benefits. The payments support establishment of trees, grasses, wildfire habitat, and wetland restoration. FSA could review the Climate-Smart Incentive and the environmental benefits index (EBI) to ensure they adequately incentivize climate-smart practices, which would help FSA prioritize enrollment of CRP acres that enhance producers' climate resilience. Congressional action would be required to increase the total acres enrolled in CRP programs beyond those authorized in the Farm Bill. Another potential action FSA could take is to explore expanding pilot programs like the Soil Health and Income Protection Program (SHIPP). The program allows producers up to 5 years to develop a systems approach with multiple practices as part of a production crop rotation, which could increase conservation program capacity for climate resilient practice implementation.

NRCS has ongoing work dedicated to increasing the acreage on which climate adaptive and resilience-building practices are implemented, including by improving data management and quantification of conservation outcomes (Option 1). NRCS has collected and evaluated data for priority climate stressors (drought, wildfire, and flooding) and has developed or initiated development of decision-support tools to support decision-making and prioritization. Conservation easements are an important part of NRCS's portfolio of conservation programs. Easements can be used to protect critical landscapes such as wetlands, helping to maintain ecosystems services like water regulation and retention that can buffer the impacts of extreme weather events and other climate change effects. The Agricultural Conservation Easements Program (ACEP) aids landowners and eligible entities with conserving, restoring, and protecting wetlands, productive agricultural lands, and grasslands at risk of conversion to non-grassland uses. Landowners voluntarily offer to sell an easement to NRCS that provides the agency with the full authority to restore and enhance the floodplain's functions and values through the Emergency Watershed Protections Programs Floodplain Easement Option.

Finally, with resources from the Inflation Reduction Act, NRCS will be investing $19.5 billion over 5 years in conservation practices, activities, and projects that support climate change

mitigation. While this funding is directed toward climate change mitigation, several of the supported Climate-Smart Mitigation Activities may also provide adaptation and resilience co-benefits. For example, while cover crops help to increase carbon sequestration in soils, the increased soil cover and organic matter can also help increase soil moisture-holding capacity and prevent soil erosion, which may increase resilience to climate change impacts such as increased drought and changing precipitation patterns.

Option 10: Research the feasibility of incorporating data on the projected impacts of climate change on agriculture and data on the effects of climate-resilient practices into crop insurance rates.

Option 10 suggests that USDA's Risk Management Agency, RMA, which manages the Federal Crop Insurance Corporation (FCIC) consider how to incorporate projections of climate impacts on agriculture and adaptation response into crop insurance rates. As required by law, Federal crop insurance is an actuarially sound insurance program, meaning that the premium charged should be equal to expected indemnities, plus a reasonable reserve. This means that, to the extent that climate change affects the risk profile of a given commodity, and thus the expected indemnities, the premium charged should change accordingly. Option 10 suggests that RMA should consider integrating additional data on climate impacts or implementation of climate-resilient farming practices into the insurance rating methodology to improve the accuracy of premium rates.

USDA regularly reviews its rating methodology and incorporates historical loss data into updating premium rates. For example, RMA shortened the historical time horizon used to establish premium rates from around 45 years down to a rolling 20-year period, which makes premium rates more responsive to changes in risk. These regular and timely updates incorporate recent climate change-related impacts and adoption of existing climate-resilient practices by producers. Furthermore, RMA's premium rating methodology includes a self-adjusting mechanism whereby yield guarantee changes with a producer's productivity. Considerations of future climate change projections would likely impact the overall risk assessment and would have to be considered alongside potential changes in technology and improvements in farming practices that may mitigate risk.

Nonetheless, inquiry into the impacts of climate change on crop insurance is vital, as increasing climatic variability will place demands on RMA's programs. RMA's Climate Adaptation Plan highlights the need for this research on an ongoing basis. RMA also encourages private individuals and the private sector to engage with the FCIC by proposing specific insurance products or other revisions. The Post Application Coverage Endorsement is a recent example of a programmatic change that was developed via stakeholder contributions.

Option 11: Require the adoption of relevant climate-resilient practices to receive crop insurance premium subsidies.

Option 11 suggests that RMA should require farmers to implement climate risk-reducing agricultural practices to receive Federal crop insurance premium subsidies. USDA's approach to agricultural conservation and risk management is voluntary and incentive-based, however, the approach this option proposes is more prescriptive. Implementing requirements such as this would likely require Congressional authorization. Putting in place this option would require a strong response to Option 1 to ensure that conservation practice requirements were applied in the right contexts and had clear climate resilience benefits. Furthermore, there is a mismatch

between the annual timescale on which farmers purchase crop insurance and the multiple years it often takes to realize climate resilience benefits of ongoing conservation practice implementation.

Crop insurance is a key pillar of farm support within USDA's safety net programs. Its adoption is extremely high, with well over 90 percent of principle crops covered in the United States. Already, requirements exist for participants in the program to follow good farming practices (GFPs) to maintain their crop insurance coverage. The Highly Erodible Land Conservation (HELC) and Wetland Conservation (WC) provisions are examples of a more prescriptive incentive structure already in place. These provisions require certain conservation actions be taken by farmers to receive financial support from Federal farm programs. The 2014 Farm Bill made certification of and adherence to HELC and WC a condition for receiving crop insurance premium subsidies. As a result, 99.9 percent of crop insurance customers are compliant (those out of compliance must pay the full premium cost without subsidy or do not purchase insurance at all). Program participation has continued to grow since passage of 2014 Farm Bill; thus, it does not appear that the HELC and WC provisions are significant barriers to wider adoption of crop insurance by farmers and ranchers.

Option 12: Offer crop insurance premium subsidies for agricultural producers who use practices that enhance their climate resilience.

Option 12 is similar in its aim to Option 11, but less prescriptive in its approach to encourage adoption of climate-smart practices by increasing the amount of crop insurance subsidies. This Option aligns well with part of USDA's approach, described in RMA's Climate Adaptation Plan, to incentivize climate-smart practices like cover crops. There is an existing authority that allows States to provide additional subsidy to producers with crop insurance policies. Iowa, Illinois, Indiana, and Wisconsin have used this authority to provide an additional premium subsidy to producers who used cover crops prior to their insured crops. The aforementioned States identified eligible producers and land and provided this information to USDA to administer the additional subsidy. USDA used this early effort as a model for its national Pandemic Cover Crop Program. These programs have been successful in promoting the link between cover crops and crop insurance and demonstrating the compatibility of cover crops and crop insurance coverage.

Beyond the State authority and the temporary authority during the pandemic, USDA cannot continue to implement incentive programs structured this way, as subsidy levels are determined legislatively. If addressed legislatively, Congress would need to provide authority, funding, and a mechanism for identifying eligible producers and land. Also, whereas cover crops have an existing reporting infrastructure for identification, most climate-resilient practices are not reported uniformly or in a way that is conducive to integrating with crop insurance operations. RMA's Climate Adaptation Plan does address the possibility of continuing these State and national programs in the future, should such authorities exist, especially in regard to cover crops and climate-smart water use.

Option 13: Expand conservation compliance requirements to include the adoption of certain climate-resilient practices for producers to be eligible for certain Farm Bill Title I programs.

Option 13 suggests that USDA consider expanding conservation compliance requirements to include the adoption of climate-resilient practices for producers to be eligible for certain Farm Bill Title I programs. As described in Option 11, the HELC and WC provisions are examples of

where conservation compliance is already a requirement. These provisions require producers participating in most programs administered by FSA and NRCS to abide by certain conditions on any land owned or farmed that is highly erodible or that is considered a wetland. Producers must certify that they will not:

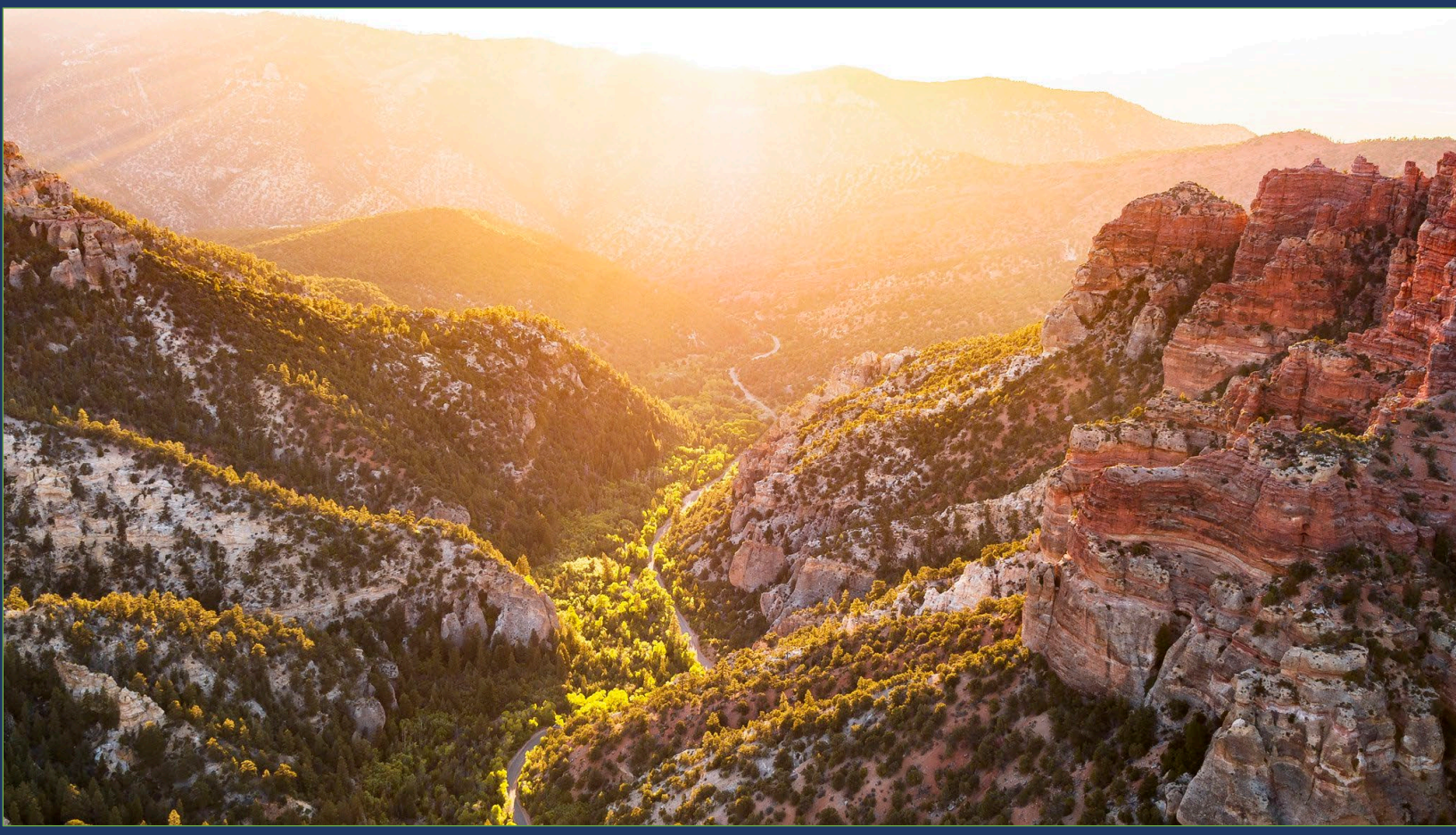
- Plant or produce any agricultural commodity on highly erodible land without following an NRCS-approved conservation plan or system.
- Plant or produce an agricultural commodity on a converted wetland.
- Convert a wetland to make possible the production of an agricultural commodity.

Commodity programs have historically been an essential part of U.S. farm policy by virtue of their history of providing various forms of revenue support. Provisions of Title I, the "Commodity Title," of the 2018 Farm Bill, Agricultural Improvement Act of 2018, Pub. L. No. 115-334, 132 Stat. 4490, authorize current commodity revenue support programs for crop years 2019 to 2023. These programs include marketing assistance loans (MALs), Price Loss Coverage (PLC), and Agricultural Risk Coverage (ARC). MALs provide both a floor price and interim financing for certain commodities. The PLC and the ARC programs provide income support at levels above the price protection offered by MALs. Title I also authorizes four programs that provide Federal assistance to help farmers recover financially from natural disasters, including drought and floods. These programs are (1) the Livestock Indemnity Program; (2) the Livestock Forage Disaster Program; (3) the Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program; and (4) the Tree Assistance Program.

Adding additional eligibility requirements for these programs may impede access for the producers most in need of them. They might also disincentivize producers from participating in voluntary conservation programs due to concerns about the cost or difficulty of implementing climate resilient practices as a prerequisite. Cost effective implementation of climate-resilient practices such as no-till residue management, cover crops, conservation crop rotation, and nutrient and pest management can take years to establish and produce climate-resilient benefits. Producers may not have the equipment and labor necessary to readily transition to and implement these practices if new requirements were put in place. Similar to many of the other options discussed here and as acknowledged in Option 1, there is not yet sufficient data to determine when a return on investment is reached for a range of agricultural operations and regions. These requirements would likely place disproportionate stress on underserved and limited resource producers trying to comply with eligibility requirements to receive USDA benefits.

Requiring adoption of climate smart practices for Farm Bill Title 1 programs might improve climate resilience; however, it is likely not feasible without additional resources to enhance financial and technical assistance to producers to assist in the transition.

C. Conclusion

USDA welcomed this GAO report which identified key policies and programs that USDA can leverage to help farmers adapt and build resilience to the effects of climate change on their operations. In developing the responses presented here, Option 1 stands out as particularly important, that if not addressed could undermine other efforts to enhance the climate resilience of producers. Improving understanding of the costs and benefits of conservation practices that provide adaptation and resilience benefits or co-benefits will enhance conservation planning and

help producers make more informed decisions in a changing climate. Many of the identified options align with ongoing efforts, however some may require additional authorities or resources to implement to the extent envisioned by GAO. The GAO report and the assessment presented here will be useful resources to USDA as it continues to engage in the iterative process of climate adaptation planning and implementation at various levels of the Department.