



# CLIMATE ADAPTATION & RESILIENCE PLAN

PEOPLE ♦ SURVEYS ♦ DATA ♦ STATISTICS

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## Table of Contents

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Subject	Page
Section 1: Introduction.....	1
Section 2: NASS Strategic Goals and Objectives.....	3
Section 3: Climate Change Vulnerabilities and Data Gap Analysis Assessment.....	5
Section 4: Agency Climate Adaptation Actions .....	11
Section 5: Enhancement of Workforce Climate Literacy .....	16
Section 6: Environmental Justice.....	18
Section 7: USDA Climate Hubs .....	19
Section 8: Conclusion .....	20
Section 9: References and Resources .....	21

## Section 1: Introduction

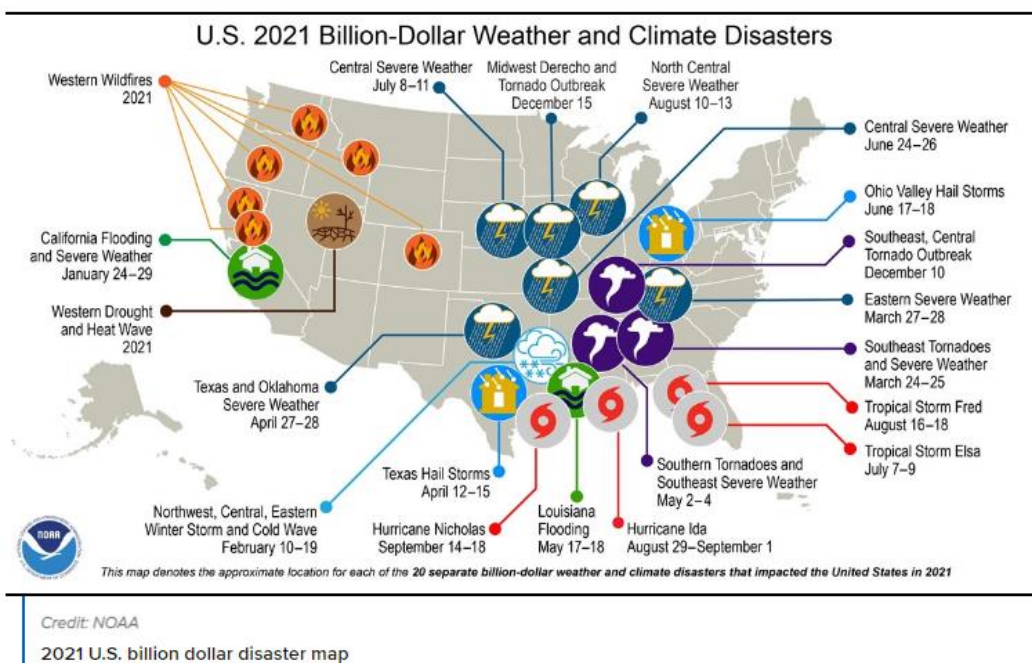
Climate change poses real and present risks to communities across the country. Its impacts are already being felt. The USDA's adaptation plan released in October 2021 describes USDA's climate vulnerabilities and steps the Department will take to bolster adaptation and increase resilience to the impacts of climate change. The USDA's Departmental Regulation 1070-001 directs USDA agencies to prepare detailed climate adaptation implementation plans that speak to how agencies will address risks to their mission and operations in the face of a changing climate.

### MISSION

To provide timely, accurate and useful statistics in service to United States agriculture.

The National Agriculture Statistics Service (NASS) supports the USDA's adaptation and resilience path forward according to these guiding principles:

- Protecting NASS's assets (i.e., employees, facilities, IT infrastructure, secured data, etc.) from climate change impacts by assessing vulnerabilities, taking action to adapt to the changing environment, and making resilience a cornerstone of operations to ensure NASS has climate-ready sites to maintain programs, perform data collection efforts, and produce products and services for the U.S. agriculture sector and industry.
- Building upon all USDA agencies' scientific expertise and the world class research and development capabilities of USDA National Laboratories to ensure promising adaptation technologies are included within our Climate Change Adaptation Resilience Strategy.
- Partnering with the National Association of State Departments of Agriculture (NASDA), local agriculture commodity groups, and industry leaders to share and corroborate the benefits and ideas of the NASS climate adaptation, resilience, and environmental initiatives; and
- Leveraging NASS's options through collaboration with other federal agencies to spur innovation, identify and reduce climate-related financial risk, and enhance resilience to better enhance data collection efforts, programs, products, and services.



NASS will continue to leverage its unique climate science expertise, modeling, data infrastructure, and capabilities in partnership with other agencies and institutions to continuously improve its adaptation and resilience strategies.

## *Section 2: NASS Strategic Goals and Objectives*

NASS's FY 2020 – FY 2025 Strategic Plan speaks to the agility and capacity required for tackling the climate crisis. The strategic goals and initiatives align well with the development of the NASS Climate Adaptation and Resilience Plan by demonstrating an ongoing commitment to strategic and operational planning processes anchored around these three goals:

- Strategic Goal #1: Workforce Transformation – Foster a diverse workforce to meet current and emerging needs
- Strategic Goal #2: Exceptional Customer Service – Proactively strengthen relationships with data users, providers, and partners
- Strategic Goal #3: Organizational Excellence – Operate as a strategic, integrated, efficient organization built on sound management practices and methodological principals

To achieve a data program that is more agile, efficient, and responsive to the needs of data providers, data users, stakeholders, and policymakers, NASS created three strategic initiatives tightly integrated within our five-year strategic plan:

- Strategic Initiative #1: Data Collection Dashboard and Respondent Portal
- Strategic Initiative #2: NASS Operating Model Reimagined
- Strategic Initiative #3: Customer Experience: Improving the Ag Data User Experience

Under President Abraham Lincoln in 1862, USDA first provided U.S. agricultural information to the U.S. government and the public. The first official report regarding crop conditions was published in July 1863. NASS continues to fulfill its original mission through its release of USDA forecasts and estimates publications. NASS's responsibilities are authorized under the Agricultural Marketing Act of 1946 (7 U.S.C. 1621-1627), the Census of Agriculture Act of 1997, and Public Law 105-113 (7 U.S.C. 2204g). Public Law 105-113 transferred responsibility for the Census of Agriculture and other special studies from the Department of Commerce to USDA in November 1997; entrusting NASS to perform them going forward. Conducted every five years, the Census of Agriculture provides comprehensive information about the nation's agriculture at the national, state, and county levels. NASS maintains a current list of farms and ranches in the U.S., one of its unique federal roles. The Agency performs important reimbursable agricultural survey work for other federal agencies, state governments, and producer organizations. NASS also provides technical assistance for agricultural statistics programs in developing countries.

As the principal statistical agency for USDA, NASS maintains relationships with many partners, customers, and stakeholders whom the agency serves with data products and services, and who use and advocate for the data NASS produces. Among them are:

- State departments of agriculture and land grant universities. Through cooperative agreements and memoranda of understanding dating back to 1917, NASS field offices serve jointly as the federal field office and the state government agricultural statistical office. In this role, NASS provides data collection and statistical services to other agencies and provides statistics to the public through agreements with private producer organizations.
- The National Institute of Statistical Sciences, which brings together the best academic and NASS researchers to provide recommendations for emerging challenges and opportunities in the agricultural statistics program.

- More than 40 community-based organizations (CBOs), as well as countless local associations, facilitate USDA outreach to limited-resource and historically under-represented producers. These groups work with NASS staff to ensure their constituents are represented and that the census includes all farms and ranches, regardless of size, location, or type of operation. NASS also partners with these groups to provide hands-on assistance and support to local producers—including non-English speakers—to complete their census forms. NASS targets media outreach to small, minority, and non-English-speaking producers.

With a rich, growing portfolio of integrated surveys, the census, remote sensing, and other products and services, NASS is strategically positioned to support the data needs of the Department to better monitor and measure climate-related concerns of the U.S. agriculture sector.

### ***Section 3: Climate Change Vulnerabilities and Data Gap Analysis Assessment***

The August 2021 *USDA Action Plan for Climate Adaptation and Agriculture* recognizes climate change presents many challenges to USDA and its stakeholders and identifies five key climate vulnerabilities:

- Decreased agricultural productivity
- Threats to water quantity and quality
- Disproportionate impacts on vulnerable communities
- Shocks due to extreme climate events, and
- Stress on public lands and infrastructure

Vulnerability assessments are an important tool to guide USDA's understanding of risk, priorities, and options to form adaptation strategies. NASS will partner with the USDA Climate Hubs in assessing vulnerabilities to climate change across the wide array of agriculture subdomains and underserved producer groups.

#### **KEY CLIMATE VULNERABILITIES TO THE NASS MISSION, GOALS, AND OBJECTIVES**

NASS strategic initiatives are inherently responsive to adaptation and resilience capabilities necessary to carrying out its mission in light of climate change impacts.

##### **Vulnerability 1: Climate change impacts NASS's ability to gather survey information**

NASS Strategic Goal #1, transforming the NASS workforce, is essential to adapting to climate change. NASS relies on a decentralized data collection structure with mail, web, telephone, and in-person data collection capabilities. More than 2,700 telephone and field enumerators make up the NASS data collection workforce employed in partnership with the National Association of State Departments of Agriculture (NASDA). Extreme weather and other climate events will disrupt standard respondent contact processes and protocols, especially face-to-face enumeration.

##### **Response to Vulnerability 1: Further modernization of NASS data collection methods, strategies, and tools**

As seen with the COVID pandemic, NASS actions, in response to climate-related disruptions to its workforce, would include further decentralization of its data collection team and dynamic support strategies to ensure their success. In addition, increased reliance on machine editing, transition from print documents to digital imagery, and fuller use of new web portal tools will further reduce more labor-intensive clerical processes as previously conducted in a typical office setting.

##### **Vulnerability 2: Climate change impacts the effectiveness of NASS stakeholder engagement and its data portfolio**

Objectives under NASS Strategic Goal #2 seek to increase the effectiveness of stakeholder engagement, raising awareness and use of NASS products and services; incorporate new data sources and data collection techniques to reduce respondent burden; and increase sample representation while maintaining confidentiality and privacy. As seen with COVID, disruptions to normal levels and modes of interaction with stakeholders increases the importance of relationships with its data users and customers.



## Response to Vulnerability 2: Characterizing on-farm adaptation strategies and practices

NASS, as a routine business practice, evaluates the size, scope, and burden of its survey portfolio and how well that addresses data needs on agriculture. Climate change impacts will vary widely across the many types of farms and ranches in the United States. Vulnerability assessments, in which NASS data may play a key role, will help identify the why, where, when, and which agricultural resources are most at risk. Analyses informed by NASS data will help the agricultural sector understand climate exposure and sensitivity to change.

NASS is well positioned to begin serving climate-related data, analyses, and adaptation needs that are specific, spatially, and temporally situated. Agencies with new data requirements would need additional resources to collaborate through NASS. New methods and tools may be necessary to support integration of enhanced surveys, non-survey data, and perform more powerful analytical tasks.

### **DATA NEEDS IDENTIFIED IN PLANNING PROCESS**

This next section describes new data needs where updating NASS goals and programs and filling data gaps would better inform climate adaptation strategies and actions across the sector. This role is central to NASS's mission to provide timely, accurate, and useful statistics in service to U.S. agriculture. As part of its own climate adaptation planning, NASS invited other USDA agencies to identify their climate data needs as a first step in understanding the climate data gaps. A description of those gaps follows below.

#### USDA Climate Hubs

- New Data Need – Renewable Energy On-Farm Capacity information on rates of adoption of practices and other innovations designed to advance sustainability in agriculture
  - Climate Hubs would like to know more about adoption rates for grass-fed/finished beef, and precision ranching technologies. The capacity to develop trustworthy models will depend in part on reliable data about rates of adoption.

#### Economic Research Service (ERS)

- New Data Need – Renewable Energy On-Farm Capacity for manure management practices in place, if no-farm crop application of manure exists, and if off-farm exporting of manure exists
  - The amount of manure produced, use of digester technology, amount of on-farm crop application of manure, amount of off-farm exporting of manure
  - Importing of manure for crop nutrient management
  - Further breakouts of the “other cattle” inventory to capture inventories such as veal cattle, beef and dairy calves, heifers, stockers, and beef breeding herds

#### Animal Plant Health Inspection Service (APHIS) Plant Protection and Quarantine

- Census of Agriculture – crop production data to support risk analysis
  - Specialty crop summaries, e.g., Citrus Fruits Summary
  - Agricultural economic data
  - New Data Need – Anticipated changes in crop production locations due to climate change could be useful
- Usual planting and harvesting dates
  - Specialty agriculture data, e.g., floriculture and honeybees
  - New Data Need – the ability to map NASS county level data by matching NASS Quick Stat American National Standards Institute codes with Economic Research Service (ERS)

county data tables would be nice. APHIS have manually created the 5-digit code using the State and County ANSI fields in the NASS quick Stat outputs to do this.

### Vulnerability 3: Climate change will impact the pace of modernization necessary for NASS to meet its organizational excellence goals

Objectives under NASS Strategic Goal #3, Organizational Excellence, speak to the agency's need to modernize business processes to produce quality data and products at a faster rate, enforce enterprise-level strategic processes and tools to guide data-driven decision-making, and to manage risk using proven internal controls for processes and systems. Legacy systems and tools are more likely to fail under the increased organizational demands under climate change.

### Response to Vulnerability 3: Further modernization of NASS data collection methods, strategies, and tools

NASS operational resilience during the COVID epidemic was achieved through innovation and leveraging internal expertise to devise effective, adaptive solutions. Further, ongoing decentralization of the workforce places new emphasis on all the attributes of organizational excellence under differing climate change scenarios.

## **NASS CONSIDERATIONS OF DEPARTMENT-LEVEL VULNERABILITIES FROM CLIMATE CHANGE**

In addition to assessing threats to its own mission, goals, and objectives, NASS also considered its role in responding to several Department-level vulnerabilities identified in the USDA Action Plan for Climate Adaptation and Resilience (2021).

### **DECREASED AGRICULTURAL PRODUCTIVITY**

NASS reports on agricultural productivity, released on a scheduled basis, are derived from hundreds of ongoing surveys and censuses. Timelier, more granular, and spatially based measures of agricultural productivity, while limiting burden on agricultural producers, is an ongoing part of the NASS mission. Among NASS data products are several spatially based, remote sensing assessments of crop condition, soil moisture, and land use on a variety of geospatial and temporal bases (on-demand, daily, weekly, or periodic). The strategies below align with NASS strategic goals.

- Develop new data products that leverage existing survey as well as non-survey sources of data.
- Expand remote sensing products that relate to the cropland data layer (CDL), especially those that characterize land use and productivity over time.<sup>1</sup>

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<sup>1</sup> NASS is collaborating with the Economic Research to release a new cropland data layer (CDL) derivative in summer 2022 that characterizes land use patterns over time.

## **THREATS TO WATER QUANTITY AND QUALITY**

Through collaborative agreements and partnerships with other agencies in the Department, NASS provides ongoing support in the form of annual, periodic, and topical datasets which are used in complex program and policy analyses on the environment and farm economy. These strategies, below, support NASS's ongoing ability to partner on products that cover water quantity and quality, while minimizing burden to producers.

- Prioritize data needs and new product opportunities from using multiple sources of data tied to NASS frames, census and survey data, administrative records, and economic, environmental, and remotely sensed data.
- Strengthen and expand collaborations on new sources of non-survey data with other USDA agencies, federal agencies, and through public-private partnerships.
- Identify new analyses, products, and reports from multiple sources of data, when taken together with the NASS data portfolio, would provide fresh insights on water quantity and quality.

## **DISPROPORTIONATE IMPACTS ON VULNERABLE COMMUNITIES**

The Census of Agriculture (COA) is designed to query every farm across the diversity of U.S. agriculture twice a decade. Data collection for the 2022 COA begins later this year and continues into 2023. Many agricultural operations represented on NASS's list frame master participate in farm programs. In addition, remote sensing data provides new opportunities to study land use's relationship to productivity and the farm economy over time. Engaging stakeholders through the methods below will help identify new reports that help characterize vulnerable communities more fully.

- Use existing stakeholder outreach mechanisms to identify potential new reports and analyses.
- Identify existing data collections and other sources that could meet those analysis needs.

## **SHOCKS DUE TO EXTREME CLIMATE EVENTS; STRESS ON PUBLIC LANDS AND INFRASTRUCTURE**

In the USDA-level vulnerability assessment, NASS identified areas that would benefit from increased use of satellite data for disaster assessments. NASS's research program utilizes satellite, NASS census and surveys, and other data to characterize the impact of extreme weather events and related disasters. This is a small program that provides ad hoc analysis, and after review, posts that analysis for public use. New satellite data and computing capacities are enabling fuller assessments of disaster impacts over wider areas. As well, broader measures of climate impacts on yields, shifting growing seasons, and crop failure and damage are now possible by combining a wider variety of data types and sources.

One impetus for using more non-survey data is to manage the burden on respondents from a survey-only approach for climate change data needs. New non-survey data sources being used in NASS programs include administrative records, and remote sensing, environmental, and economic data. Climate impacts can be studied on smaller areas, more broadly across regions, and over longer periods of time. When data are combined on a spatial-temporal basis, choices in land use can be measured against changes in soil quality, soil moisture, and other environmental attributes that interact with productivity. A modern data program, however, requires new staff skills, different tools, and modern IT and other infrastructure to transition from promising demonstrations, pilots, and research to a production scale that is secure, sustainable, and stable.

These two steps below improve NASS's ability to respond with authoritative data in a timely, specific manner to an increasing number and variety of extreme climate events.

- Assess and fill staff and resource needs to address the rising number and variety of climate events.
- Develop a climate data portfolio, vet with stakeholders, and raise its visibility.

### **NASS MISSION VULNERABILITIES**

Finally, the NASS team charged with developing this Adaptation Plan, representing all divisions in the organization and the full range of responsibilities, considered how the agency's vulnerabilities related to the Department's. The team identified five vulnerabilities that could impact the NASS mission, or its programs, operations, and stakeholders. These steps would mitigate these vulnerabilities.

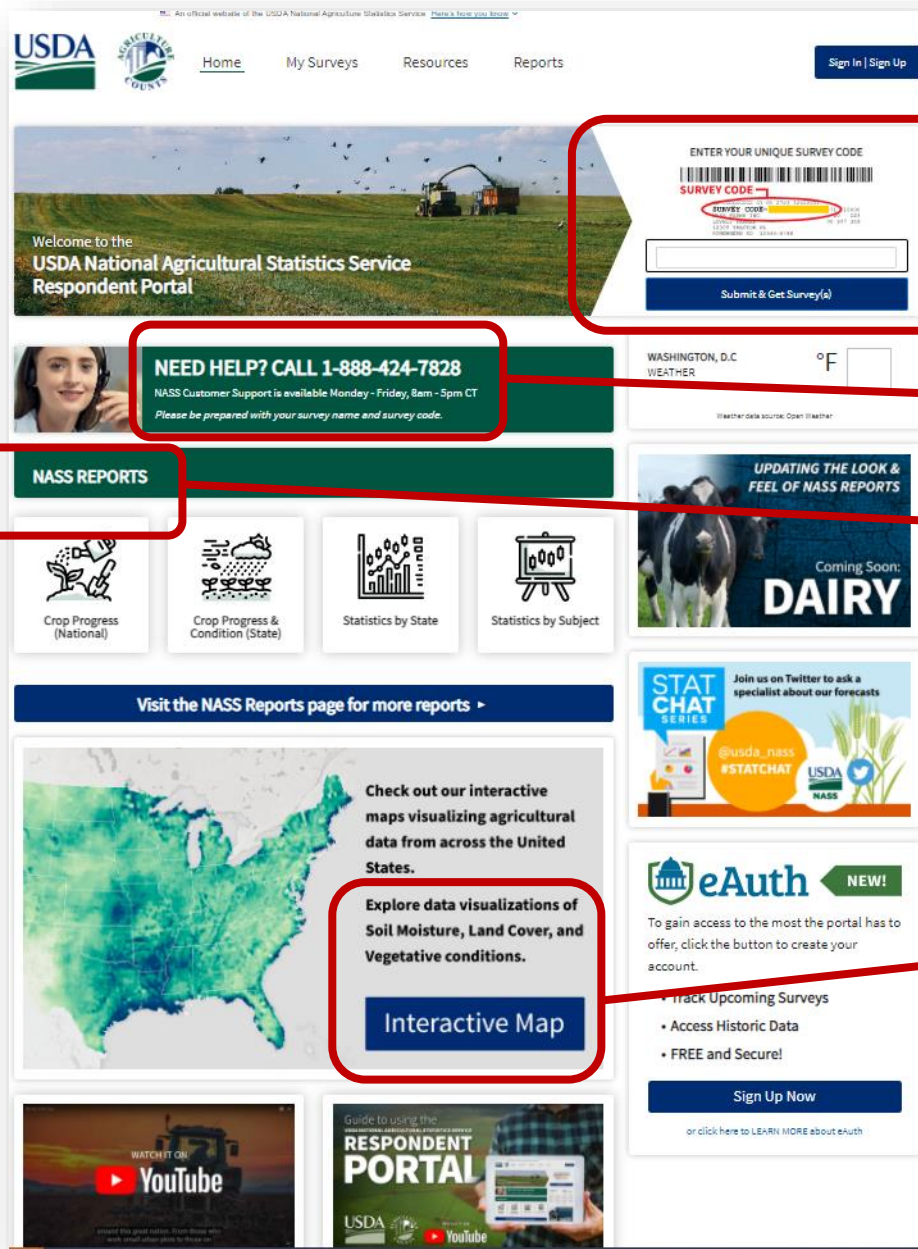
1. Achieving a higher level of agility in deploying an effective mix of modes/methods of data collection within budgeted costs
2. Ensuring high reliability IT infrastructure, tools, and processes
3. Minimizing dependence on external services and supply chains
4. Adopting modern management strategies to continue to meet rigid production schedules for products and services
5. Reducing reliance on brick & mortar facilities to secure confidential and/or market sensitive data

Identifying methods and measures to address these vulnerabilities will increase mission resilience and abilities to serve Department and external partner data needs. When incorporated into NASS's continuity of operations planning at the Regional Office and Headquarters levels, these actions would help maintain the NASS mission of providing uninterrupted timely, accurate, and useful statistics in service to U.S. agriculture.

### **IMPROVING ACCESS TO DATA AND TOOLS FOR AGRICULTURAL PRODUCERS**

#### NASS Strategic Initiative 1

Efforts to improve the NASS survey respondent/customer experience are well underway. This includes the February 3, 2022, launch of the Respondent Portal, which modernizes respondent access to survey requests and their ability to interact with and use their own data, NASS data products, and services [[Home | NASS \(usda.gov\)](#)]. Operation-specific data previously reported to NASS and other USDA agencies are accessible in one portal via eAuth.



Complete a survey

Get help with a survey

Look up NASS reports

Interact with data near you

Figure: NASS Respondent Portal (Web-based)



## ***Section 4: Agency Climate Adaptation Actions***

### **NASS ADAPTION TO CLIMATE VULNERABILITIES**

Adaptation to changes is both a strength and challenge for NASS due to the uniqueness of our efforts and responsibilities in service for and to U.S. Agriculture. Our responsiveness to the public and industry's data needs are routinely implemented when possible. Additionally, NASS frequently modifies programs in response to updated Congressional regulations, priorities, and Departmental guidance. The culture that NASS embodies and the authorities and regulations under which we adhere to in collecting and safeguarding the privacy and confidentiality of respondent and producer data are fundamental to the principals and practices of a federal statistical agency.

Our priorities are to publish essential reports of unbiased and official statistics on U.S. agriculture in a timely fashion, despite any challenges that may arise, which may include natural disasters, wildfires, lapse in funding, or any other difficulties that could affect the data collection, analysis, publication, and/or accuracy of data on a schedule established a year in advance.

In the production of official statistics, NASS also monitors local and/or national news sources, producer comments, and information from "boots on the ground" enumerators to ensure we obtain the most accurate, current, and up-to-date information to augment the accuracy of official estimates, reports, products, and publications. We take particular care to update both the crop and livestock estimates based on in-season environmental impacts. Many times, revisions due to these impacts are published in the next scheduled publication to ensure that the most current agricultural estimates are readily and consistently available. An example of NASS's responsiveness to natural disasters can be reflected in updates to estimates based on a mid-month fire that destroyed a statistically significant area of a cropland. In support of revisions, NASS studies impacted acres through ground reports and disaster assessments based on remote sensing and reviews administrative data. Revisions are published showing updated acreage and production values in the next monthly report.

In 2012, NASS underwent a reorganization that centralized several data collection processes and procedures, resulting in increased operational efficiency and a cost savings to the Agency. Operating in this manner enables NASS to quickly adapt to changes and continue operations should a natural disaster occur. The diversity in geography and experiences of our staff and NASDA enumerators is a strong asset to the Agency in navigating these special circumstances. NASS prioritizes maintaining the safety of staff while remaining operational in the face of floods, tornados, hurricanes, blizzards, fires, and other extreme weather events.

Remaining operationally resilient ensures that NASS can continue to collect, process, analyze, and publish official estimates for principal economic indicators on the agricultural economy as prescribed by law. This requires that our computer equipment (i.e., servers, iPads, computer) and systems are operating at an optimal level at all times. Additional investments and resources are necessary to prioritize operational resilience in the face of climate change and the growing number, variety, and cadence of data needs.

### **ACTIONS TO ENSURE CLIMATE-READY SITES AND FACILITIES**

Climate resiliency is integral to ensuring the operational continuity of NASS programs. In preparation for severe weather impacts on buildings, infrastructure, operations, and mission-critical activities, NASS has established an emergency response team at each of its facilities that follows a Continuation of Operations Plan (COOP). The team plans and tests readiness on a yearly basis. COOP exercises include a climate

event scenario that disrupts critical NASS activities. NASS’s physical infrastructure includes regional offices and a national operations center in leased spaces managed by the U.S. General Services Administration (GSA). NASS follows GSA’s recommendations for our facilities on climate resilience.

GSA follows the *Facilities Standards for the Public Buildings Service, PBS-P100*, which describes design standards and criteria for climate-ready sites and facilities. Studies during the project formulation phase include identifying and developing adaptations to climate risk factors. NASS will work with GSA to improve processes that protect vulnerable, mission-critical sites, develop portfolio-wide data to better understand climate sensitivity and exposure to flooding risks, and continue piloting occupancy sensors to improve safety from climate-driven hazards. NASS will work with GSA to accomplish the following:

- Strategically relocate mechanical equipment, IT infrastructure, and other mission-critical equipment that could be disrupted by heavy wind, rain, floods, or fires.
- Review site drainage and landscaping to prevent flooding issues from intense storms.
- Commission new buildings and review existing buildings envelope systems for compliance with updated codes on water and wind resistance.
- Develop resiliency strategies for water reuse and reduction in drought-prone areas.
- Consider creating “clear zones” around facilities in areas with wildfire risks.
- Assess and address employee thermal comfort during extreme temperature shifts through design, while also addressing additional burdens on energy and water use during peak utility-use periods.
- Harness the power of procurement to ensure that the mechanical and operational equipment for its facilities, as well as materials, furnishings, and fixtures, are resilient to and adapt against the impacts of climate change (*e.g.*, windows, roofing, and cladding materials used in coastal areas will be both energy efficient and able to withstand high-level hurricane winds and floods).

USDA plans to develop a Departmental Manual to guide staff to align sustainable and resilient facility operations with the USDA *Departmental Regulations on Climate Change Adaptation and Sustainable Operations*. NASS will follow the guidelines set forth in that manual.

## **ENSURING CLIMATE-READY SUPPLY OF PRODUCTS & SERVICES**

In addition to ensuring NASS’s ability to carry out its mission should a climate-driven event impact its facilities, NASS has also been tested many times in delivering its products and services after major climate events that impact the data. For example, NASS has conducted re-interviews of the damaged population from the quarterly Acreage, Production, and Stocks Survey to validate previous published reports. A special section of the following month’s Crops Production report summarizes the findings of the Re-Interview survey. NASS will continue to adapt to climate events by accounting for damages to agricultural production of many commodities.

Not only is NASS striving to provide up-to-date data that has been impacted by climate-related events, but it also conducts several surveys that serve climate data needs. The following table lists ten surveys and programs with a climate-nexus that can be used to identify agricultural trends and emerging actions that the farming community is undertaking to support U.S. agricultural production.

- Agricultural Resource Management Survey (ARMS)
- Agroforestry Survey (2022)
- Census of Agriculture
- National Resource Inventory - Conservation Effects Assessment Project (NRI - CEAP)

- Conservation Practices Adoption and Motivation Survey (2022 CPAMS)
- Crop-CASMA (online remote sensing data product)
- Cropland Data Layer
- Survey of Irrigation Organizations
- Irrigation and Water Management Survey
- Impacts of Agricultural Disasters



Table 1: NASS adaptation actions to address climate change effects and vulnerabilities

Climate Vulnerability	Action Title/Description	Type of Activity	Lead Office	Timeframe	Coordination	Progress Metrics	Accomplishments to Date
ARMS aligns with Identified Climate Vulnerabilities	Agricultural Resource Management Survey (ARMS) is the U.S. Department of Agriculture’s primary source of information on the production practices, chemical use, fertilizer use, pesticide use, other resource use, and economic well-being of America’s farms and ranches.	Data Collection, Data Analysis, Data Summary and Data Lab work	NASS	June - April	ERS	NASS Survey Dashboard	The results of this survey are the only source of information available for objective evaluation of many critical issues related to agriculture and the rural economy.
The Agroforestry Survey aligns with Identified Climate Vulnerabilities	United States Department of Agriculture’s National Agroforestry Center (USDA-NAC) is “to advance the health, diversity, and productivity of working lands, waters, and communities through agroforestry.	Data Collection, Data Analysis, Data Summary and Data Lab work	NASS	Every 5-years	Forest Service Agroforestry Center	NASS Survey Dashboard and Forest Service will publish summary statistics available at the national and state level	Data Collection completed April 2022 and Forest Service Data Lab works begins soon
The Census of Agriculture aligns with Identified Climate Vulnerabilities	The Census of Agriculture is a complete count of U.S. farms and ranches and the people who operate them. Even small plots of land - whether rural or urban - growing fruit, vegetables or some food animals count if \$1,000 or more of such products were raised and sold, or normally would have been sold, during the Census year.	The Census of Agriculture, taken only once every five years, looks at land use and ownership, producer characteristics, production practices, income, and expenditures. For America’s farmers and ranchers, the Census of Agriculture is their voice, their future, and their opportunity.	NASS	Every 5 years	All USDA Agencies and the US Public	NASS Survey Dashboard	Currently identifying and building the Census Mail List preparing for the December 2022 mail out
The Conservation Practices Adoptions Motivation Survey aligns with Identified Climate Vulnerabilities	The 2022 Conservation Practice Adoption Motivations Survey (CPAMS) collects data on conservation practices in the United States. The resulting State/Regional-level data will be used by the National Resource Conservation Service (NRCS) to educate producers in NRCS programs about conservation practices and to promote adoption of those practices.	The goal is to ascertain farmers’ and ranchers’ behaviors, as well as reasons for those behaviors, associated with adoption of conservation practices on cropland, grazing land, forest land and concentrated livestock feeding operations. In addition, the NRCS will use the data for a variety of policy analyses.	NASS	Annual, 2022 CPAMS for Cropland and Livestock, 2024 CPAMS for Grazing Land and Forestry	NRCS	NASS Survey Dashboard	Two Versions of CPAMS (Crop and Livestock) will be mailed out May 2022

Table 1: NASS adaptation actions to address climate change effects and vulnerabilities (Continued)

Climate Vulnerability	Action Title/Description	Type of Activity	Lead Office	Timeframe	Coordination	Progress Metrics	Accomplishments to Date
Survey of Irrigation Organizations aligns with Identified Climate Vulnerabilities	The survey provides a national representative assessment of irrigation water-delivery entities and groundwater management of districts serving the U.S. irrigated sector.	The dataset includes information on organization structure, irrigation infrastructure, system management practices, and water use by source. The special emphasis is on institutional measures and conservation initiatives that enhance drought resilience and long-term water supply management practices.	NASS	Not Defined	NRCS	Summary statistics available at national and state levels.	<a href="https://www.nass.usda.gov/Surveys/irrigation/">USDA - National Agricultural Statistics Service - Surveys - Irrigation Organizations</a>
Irrigation and Water Management Survey aligns with Identified Climate Vulnerabilities	The NASS Irrigation and Survey (IWMS), last conducted in 2018, was sent to producers who indicated in the 2017 Census of Agriculture that they had irrigated sometime during the past five years. It is the successor to the Farm and Ranch Irrigation Survey Water Management.	Data Collection, Data Analysis, and Data Summary that provides statistical estimates on many aspects of irrigation of agricultural land and operations who irrigate.	NASS	Every 5 years	Summary statistics available at national and state levels	NA	NA
Impacts to agricultural productivity, drought, extreme weather events, etc.	Crop-CASMA (Crop Condition Soil Moisture Analytics) provides soil moisture measurements from NASA Soil Moisture Active Passive mission and vegetation condition measurements from the NASA MODIS (Moderate Resolution Images Spectroradiometer) sensor on a weekly cadence Monday - Sunday. Crop-CASMA provides both top and sub-soil volumetric, categorical and anomaly measurements that inform on water surplus or shortage issues.	Impacts of Agricultural Disasters	NASS	After each disaster (This program began in 2017 for agricultural flood monitoring from Hurricane Harvey and proved to be accurate, affordable, and efficient for operational use. This provides decision makers with an accurate and timely assessment of disasters on agricultural lands)	NASA	NA	<a href="https://modis.gsfc.nasa.gov/">https://modis.gsfc.nasa.gov/</a>

## *Section 5: Enhancement of Workforce Climate Literacy*

Climate science is a rapidly changing and challenging topic as new studies are released and more people become familiar with the science.

Action: NASS will build staff climate literacy through formal and informal training opportunities.

As climate literacy improves in the agency, staff can incorporate climate science into the decision-making process of daily operations and climate adaptation activities. NASS will research, develop, and implement a learning agenda for all staff with the goal of developing broad general knowledge of climate science. Current training assets such as AgLearn do not have climate science courses, but NASS will leverage available external resources to develop the initial curriculum for staff. Webinars, videos, and presentations from many experts are readily available. The USDA Office of the Chief Economist is building a webinar series that can be used as a foundation to build climate literacy for NASS staff.

Action: NASS will competently demonstrate how its data programs inform and support adaptation.

NASS will conduct more outreach to external groups to not only improve its understanding of climate science but to share with these same groups how NASS data can support climate adaptation initiatives. From this outreach, NASS can gather feedback to improve its current operational response and climate data programs, as well as to support other adaptation efforts. As resources permit, the NASS training plan will include internal training and external partnerships to achieve climate literacy goals.

### Internal Curriculum, NASS

1. Course: Climate Science, Adaptation, and NASS
  - a. Format: instructor-led or self-paced online course
  - b. Learning objectives: knowledge and skills needed to develop mission resilience to climate impacts, responsive stature to data needs for adaptation assessments and actions, and responsible reporting strategies to the public on climate and agriculture.
  - c. Suggested content: introduction to adaptation, scenario planning, and facilities management.
2. Informal Training and Information Exchange: identify channels that provide continued learning and discussion opportunities on climate adaptation, e.g., seminars, AgLearn courses (currently not available); newsletters, and webinars. Below are readily available resources for NASS staff to begin to build climate literacy.
  - a. USDA Office of the Chief Economist Climate Change Office
    - i. [Climate Change | USDA](#)
    - ii. [Climate Change Science Seminar Series | USDA](#)
  - b. USDA Economic Research Service Climate Change Resources
    - i. [USDA ERS - Climate Change](#)
  - c. USDA Agricultural Research Service Climate Change Impacts Report
    - i. [Optimizing Agricultural Management to Mitigate Climate Change Impacts: USDA ARS](#)

### External Partnerships:

1. NASS will conduct outreach with external groups.
  - d. Targeted groups: USDA partner agencies, non-USDA federal agencies; universities; and non-profit organizations.
  - e. Objectives: to further develop, expand, and share training to achieve mission resilience.

2. NASS will assess perceptions about the following:
  - a. Likelihood and severity of climate events that impact NASS mission, programs, operations, and stakeholders.
  - b. Areas of vulnerability and priorities for adaptation actions; and
  - c. Stakeholder expectations and data needs given increasing, disruptive weather events.

## *Section 6: Environmental Justice*

The Justice40 Initiative was established by Executive Order 14008, which states that “40 percent of all overall benefits” of federal investments from covered programs should flow to underserved communities. To respond to this directive, each agency should establish a methodology for calculating the benefits that:

- a) Flow from each applicable covered program, and
- b) Accrue in underserved communities from each covered program.

When determining the benefits of a covered program, as specified in section IV(A) of this Executive Order, agencies are to consult with stakeholders, including state, local, and Tribal governments, as well as Native communities, to ensure public participation and that community stakeholders are meaningfully involved in what constitutes the “benefits” of a program. In addition, if the calculation of a benefit to a disadvantaged community includes investments outside of that community, the disadvantaged community is to be consulted. In engaging with stakeholders, agencies are to consider their obligation under Title VI of the Civil Rights Act of 1964 to ensure meaningful access for individuals with Limited English Proficiency (LEP), as well as their obligation pursuant to Section 504 of the Rehabilitation Act to take appropriate steps to ensure effective communication for individuals with disabilities. Where applicable, agencies are to also comply with the Paperwork Reduction Act, Federal Advisory Committee Act, or other relevant law, regulation, or guidance. Agencies are to review and incorporate, where appropriate, recommendations from the White House Environmental Justice Advisory Council (WHEJAC) and the IAC when developing metrics. (Examples of Stakeholder Engagement Plans will be available to agencies on the MAX Justice40 page.)

Forthcoming guidance will provide additional information on the tool agencies should use to report the above information discussed in sections IV and V, and specific instructions for submitting the data into that tool. The Administration’s overall progress towards the Justice40 Initiative’s goal will be tracked by the categories of covered projects (climate change, clean energy and energy efficiency, clean transportation, affordable and sustainable housing, training and workforce development, the remediation and reduction of legacy pollution, and the development of critical clean water infrastructure). NASS is prepared to play an important role in the Justice 40 Initiative as USDA receives this guidance.

To ensure the unique vulnerabilities of these communities are visible in the data, NASS can work with partners across government and stakeholders to bring new data to bear on them. Results of the 2022 Census of Agriculture (COA) can be combined with non-NASS data to provide a fuller understanding of the vulnerabilities, then aggregated in manner that protects privacy and ensures confidentiality of respondents. This approach would provide a stronger framework to study the interaction of contributing factors.

NASS will identify strategies to develop informative reports on vulnerabilities in Justice40 communities through the following steps:

- Use existing stakeholder outreach mechanisms to identify potential new reports and analyses.
- Identify existing data collections and non-survey data that could meet those analysis needs.
- Conduct outreach specific to stakeholders and researchers in this area and identify analyses and reports that would be responsive.

## *Section 7: USDA Climate Hubs*

USDA's Climate Hubs are a unique collaboration across the Department's agencies. They are hosted by the [Agricultural Research Service](#) and [Forest Service](#) at ten regional locations, with contributions from many agencies, including the [Natural Resources Conservation Service](#), [Farm Service Agency](#), [Animal and Plant Health Inspection Service](#), and the [Risk Management Agency](#). The Climate Hubs link USDA research and program agencies in their regional delivery of timely and authoritative tools and information to agricultural producers and professionals.

The NASS web portal, CropCASMA (Crop – Crop Condition and Soil Moisture Analytics), serves daily and weekly soil moisture and vegetative condition information. A recent enhancement to CropCASMA is the addition of the ten Climate Hub regional boundaries as new areas of interest for analysis. This Climate Hub specific enhancement provide users with the ability to quantify assessments for early identification of climate induced anomalies or monitor long-term ecological stress events for the ten Climate Hub regions. The Climate Hub boundaries can now be used to calculate soil moisture or vegetation condition statistics, create maps, and download soil moisture and vegetation condition data for the specific Climate Hub regions.

## *Section 8: Conclusion*

The Climate Adaptation and Resilience Plan provides a pathway for NASS to adapt to current and projected impacts of climate change, while also leveraging the co-benefits of partnering with other USDA partners. The actions identified in this plan will assist NASS in better understanding current and future risks and in assisting the Department with fulfilling the climate change mission and operations. These actions will also help to characterize areas of the USDA climate vulnerabilities where NASS can be of service, as well as inform the development of the climate science and resilience tools needed to adapt and respond to climate hazards. By assessing vulnerabilities, developing adaptation tools, and institutionalizing climate requirements and literacy throughout the workforce ensures NASS is adapting and becoming resilient to climate change. This plan will provide guidance for NASS to improve the current COOP mission plans and improve tools to deploy climate resilient technologies and practices throughout its complex methods of sampling, frame maintenance, data collection, data analysis, and data dissemination during future climate change events.

## ***Section 9: References and Resources***

[USDA NASS - Research and Science: Disaster Analysis](#)

[Climate Change 101: The Foundational Science](#)

[USDA Climate, Agriculture, and Forestry Seminar Series](#)

[Home | National Climate Assessment](#)

[USDA - National Agricultural Statistics Service - Research and Science - Disaster Analysis](#)

[Memorandum - Guidance for Providing and Using Administrative Data for Statistical Purposes](#)

Foden, W. B., Young, H. R. Akcakava, R. A. Garcia, A. A. Hoffman, B. A. Stein, C. D. Thomas, C. J. Wheatley, D. Bickford, J. A. Carr, and D. G. Hole. 2019. Climate change vulnerability assessment of species, Wiley Interdisciplinary Reviews: *Climate Change*, 10:e551

[Vulnerability Assessment | USDA Climate Hubs](#)

Workforce Climate Change Literacy: Needs Assessment and Strategy

U.S. Department of Agriculture. (2021). [U.S. Department of Agriculture 2021 Climate Adaptation Plan](#). Washington, DC.

U.S. Department of Agriculture. (2014). [USDA Climate Change Adaptation Plan](#). Washington, DC.

U.S. General Services Administration. (2021). [P100 Facilities Standards for the Public Buildings Service](#), Washington, DC.



