United States Department of Agriculture
USDA Climate Hubs
1400 Independence Avenue, SW
Washington, D.C. 20250

INFORMATIONAL MEMORANDUM
SUBJECT: **USDA Climate Hubs Annual Report for FY 2022**

THROUGH: **Linda Heath**, Executive Committee Chair, USDA Climate Hubs
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Director, Office of Energy and Environmental Policy

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Summary. This report summarizes key FY22 accomplishments of the USDA Climate Hubs network. Regional staff addressed important national priorities supporting implementation of best practices for climate adaptation and resilience, climate literacy, climate-smart agriculture and forestry, environmental justice, and climate-smart wildland fire and forest restoration. Activities include significant expansion of the Adaptation Workbook, strengthening peer-to-peer learning networks, increasing climate literacy and workforce development through outreach and educational materials, and tool development and deployment. These highlights demonstrate important strengths of the Climate Hubs in listening and learning from our partners and stakeholders, effectively working across USDA agencies and the federal government, and delivering actionable, decision-relevant information and resources to those affected by extreme weather and climate impacts.

FY22 Overview

	Hub staff hosted or participated in **286** workshops and webinars with an estimated **25,905 participants**. Hub staff gave **216** presentations at meetings, reached **957** youth participants, and had **69** engagements with Tribes.
	The Hubs published **384** products in FY22, including **44** peer reviewed publications, and **340** white papers or grey literature.
	**Synergy.** The Climate Hub National Office shared information, co-developed strategies, and synthesized accomplishments on climate adaptation, resilience, equity, literacy, reforestation, and mitigation in over **100** engagements with **14** USDA Agencies and Departmental Offices, **20** Federal partner agencies, **12** State and nongovernmental partners, and **10** countries.
	The Hubs website had **48,473 users** for **63,523 non-bounced sessions** (meaning that users interacted with webpage elements and/or spent measurable time on the site). Our Twitter account gained **824 new followers with 50,630 profile visits, and over 282,000 impressions**.
	**Adaptation in Action.** The Climate Hubs figure prominently in the USDA Action Plan for Adaptation and Resilience and subsequent Agency Adaptation Plans. Among five Departmental actions, one focuses on leveraging the Climate Hubs to support adaptation science, tools, and technologies. Moreover, the Climate Hubs serve as one of the four foundations for climate adaptation in the US Forest Service Climate Adaptation Plan.

Appendices A and B include FY22 peer-reviewed publications and grey literature, respectively. Appendix C includes FY22 budget information. Appendix D provides contact information.

USDA Climate Hub Accomplishments – FY22

Enhancing Climate Adaptation and Resilience to Extreme Weather Events and Chronic Change

Responding to drought

- In response to more intense, frequent, and longer droughts, the Climate Hubs have developed peer-to-peer drought learning networks that provide a framework for researchers, service providers, and communities to connect and better forecast drought, monitor conditions and impacts, and communicate practices to reduce risk. Working with Southwest Drought Learning Network partners, the **Southwest Climate Hub** shared drought information via webinars and podcasts throughout FY22 and reaching over 500 people. The **Caribbean Climate Hub** stood up the Caribbean Drought Learning Network to increase drought communication by collaborating on the Puerto Rico/US Virgin Islands bimonthly drought updates. This work also supported drought monitoring by 1) promoting rainfall monitoring through the CoCoRaHS program and 2) advocating for increased drought impact reporting through direct reports and the Condition Monitoring Observer Reports (CMOR) drought tool.
- The Climate Hubs continue to work with partners to gather and share information on drought management resources in a variety of ways. The **California Climate Hub** website "Emergency Resources" shares drought management tools. The **Northern Plains Climate Hub** team is collaborating on the Colorado Drought Handbook developed by the Colorado Drought Advisors, and helping compile drought management tools with the Wyoming Condition Monitoring Team.
- Work through the OCE-National Drought Mitigation Center cooperative agreement provides timely and relevant drought resources, tools, and engagement opportunities in all Hub regions. In addition, regional Hub staff collaborate with the NOAA National Integrated Drought Information System (NIDIS) and Drought Early Warning Systems (DEWS). In summer 2022, the **Southern Plains Climate Hub**, in collaboration with NOAA/NIDIS, co-organized the most recent Southern Plains DEWS Partners meeting in Norman, Oklahoma.

Learning from disasters and preparing for hurricanes

- Four years after Hurricanes Irma and Maria devastated the Caribbean, there is still urgency to understand how to best prepare farmers and working lands for future hurricanes. Agricultural advisors are first responders and witnesses of hurricane impacts and strategies used in hurricane preparedness and recovery. New research led by the **Caribbean Climate Hub** found that advisors and farmers need more information and resources relating to hurricane preparedness. The research was featured in a USDA blog, as well as the local newspaper *El Nuevo Día* on November 9th (English translation available here). Another research article examines food security in Puerto Rican farmers households' in the aftermath of 2017's Hurricane Maria.

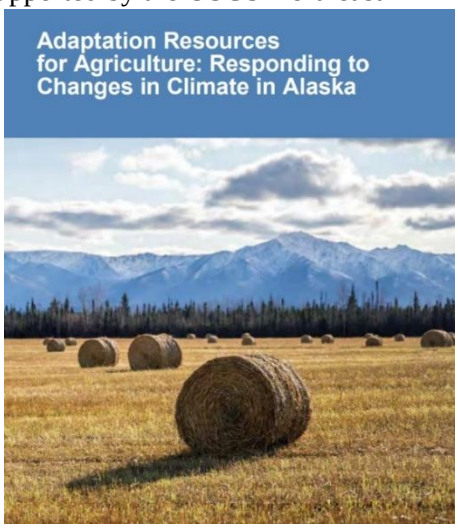
Sharing adaptation practices

The success of the Adaptation Workbook continues to be shared and translated with new audiences and across new landscapes including Tribal forest areas, Alaska, California forests, wildlife populations and habitats, and the Great Lakes region.

- The **Northern Forests Climate Hub** co-organized a webinar series on the Tribal Forest Protection Act and the Tribal Adaptation Menu. The panel discussion included Tribal representatives and National Forests staff sharing lessons learned from TFPA projects. Speakers included representatives from the Intertribal Timber Council, Leech Lake Band of Ojibwe, Yakama Nation, Pueblo of Acoma, Chippewa National Forest, Cibola National Forest, Mt. Baker-Snoqualmie National Forest, and the Okanogan-Wenatchee National Forest.
- The Adaptation Strategies and Approaches for California Forest Ecosystems provides a menu of specific options for integrating climate change considerations into management. To further support

the implementation of these resources, the **California Climate Hub** supported a series of workshops to apply the Workbook and menu to restoration planning for forest health on Laguna Mountain in the Cleveland National Forest.

- The **Southeast Climate Hub** co-produced two case studies using the Adaptation Resources for Agriculture Workbook for a row crop farm in east central Arkansas and a poultry and beef farm in southeastern Mississippi.
- Natural resource practitioners and managers need science-based, practical guidance on adaptation strategies and approaches to effectively respond to climate change. In response, the **Northern Forests Climate Hub** and Northern Institute of Applied Climate Science (NIACS) developed new adaptation menus focused on managing (1) wildlife populations and habitats, and (2) Great Lakes coastal ecosystems. The Wildlife Adaptation Menu was also supported by the USGS Northeast Climate Adaptation Science Center, while the Great Lakes Adaptation Menu was co-developed with U.S. Fish and Wildlife.
- Alaska has warmed twice as fast as the rest of the Nation challenging agricultural production yet also providing opportunities. The **Northwest Climate Hub** developed the Adaptation Resources for Agriculture: Responding to Changes in Climate in Alaska is a workbook that reviews climate change effects on Alaskan agriculture and provides information to help producers adapt their operations. Technology transfer specialists and producers can use this workbook to consider different strategies to increase resilience to weather extremes, improve soil health, and address climate-related challenges.



The **Caribbean Climate Hub** is building on its ADAPTA project and working with NRCS, FS, and Extension to create a bilingual, sector-specific adaptation guides for tropical forestry and agriculture. This year the development team conducted 24 informative interviews with partners across sectors, 16 qualitative assessments, 5 applied research and evaluations, and 32 new partnerships, outreach activities, and workshops in order to target the guides to workable climate solutions.

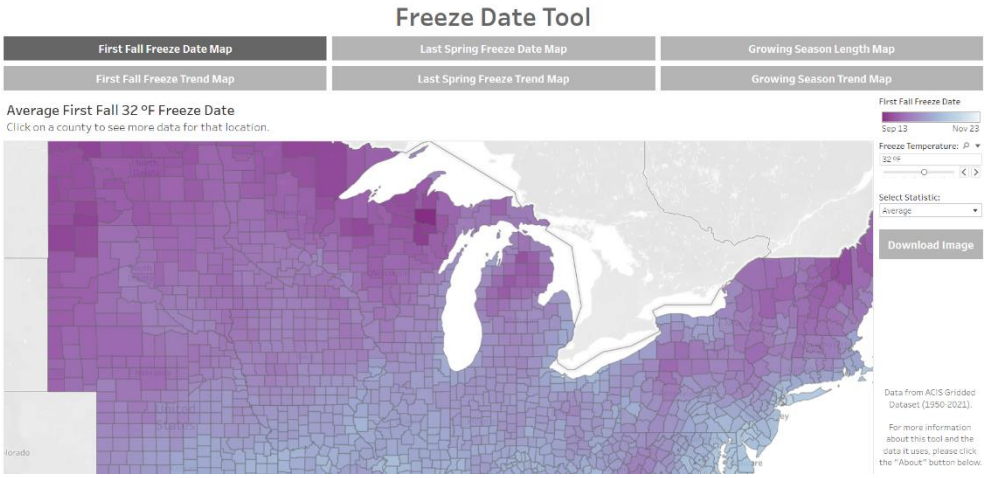
Building decision-relevant tools and technologies for climate-smart adaptation

Monitoring for precipitation, streamflow, groundwater and reservoirs is not evenly distributed across the western U.S. To help agricultural and natural resource managers understand data gaps and enhance their decision making, the **Northwest Climate Hub** and partners developed OWWLS, the Overview of Weather Water Land Sites, a decision-support tool that maps station locations and reference data combining weather, water, socio-economic, and geographic information. Hydroclimatology information includes weather stations (CoCoRaHS, COOP, RAWS, SCAN, SNOTEL), stream gauges (WaterWatch), and reservoirs operated by volunteers and federal agencies. Spatial reference data are also provided to provide additional context to these weather and water data, such as county/borough/census areas, watersheds, radar coverage, land cover, land use, land ownership type, and USDA Risk Management Agency median annual weather-related indemnity payment from 1989-2000 via AgRisk Viewer.

Rangelands provide many goods and ecosystem services, and a way of life for those on the land. Drought reduces production and is hard to recognize early in the growing season, so Grass-Cast (Grassland Productivity Forecast) was developed to provide earlier insights. The **Northern Plains Climate Hub** detailee from NRCS conducted 20 Grass-Cast outreach efforts, reaching 1700+ people, including three

presentations for tribal audiences with 103 attendees from five states and 26 tribes and pueblos. Additional stakeholders were reached through five podcast interviews, an updated Grass-Cast introductory video, and audio for the National Climate Hub's Grass-Cast video.

Climate change is affecting agricultural production through shifts in the growing season including first fall freezes coming later and final spring freezes happening earlier. To help producers manage this risk, the **Midwest Climate Hub** – in partnership with the Midwestern Regional Climate Center (MRCC) – developed the Freeze Date Tool. The tool provides visualizations of changes in annual frost-freeze dates and summaries at a county scale for the Midwest and Northeast regions. Agricultural advisors, extension, weather forecasters, and state climatologists have expressed interest in this tool because it shows crops' differing sensitivities to freezing or near-freezing temperatures, and may also help producers take advantage of longer growing seasons.



Building climate literacy

With the USDA workforce

- A recent example of this work is a series of "Climate Conversations" led by the NRCS detailee to the **Southwest Climate Hub**. They led nine conversations across States in the Midwest, Northern Plains, and Southwest Climate Hub regions with over 862 NRCS employees. These conversations brought NRCS State office and field staff together with the Climate Hubs to better understand NRCS staff needs and priorities, increase climate literacy of staff, and share place-based climate adaptation options. Through these conversations, which leveraged the Climate Hubs' network of trusted advisors, NRCS and other USDA staff will be better equipped to address climate change challenges in their work.
- The Hubs and NRCS also developed the Climate Quick Reference Guides so that users can access county- and state-specific climate change information. The Guide synthesizes key climate-related information from NOAA State Summaries, AgRisk Viewer crop insurance data, and other historic and projected climate data.

With the public through outreach and education

- The **Northeast Climate Hub** premiered a highly-acclaimed full-length documentary titled *Delmarva and the Ground for Change*, which highlights three farmers in the Northeast who have adopted practices that protect and promote soil health and support climate resilience. Deputy Secretary Jewel Bronaugh provided opening remarks for a 1-hour Q&A panel that featured the film director and farmers, who were also joined by 350 USDA staff.
- In partnership with Alaska FFA, the **Northwest Climate Hub** developed engaging and scientifically rigorous secondary education units on climate change and agriculture in Alaska to help youth prepare for future changes in their environment. The seven lessons focus on weather and climate, climate change, water quality, soils, a farms on the table game, interviews, and group presentations on agricultural issues.

Supporting climate-smart agriculture and forestry practices and products that reduce GHG emissions and increase carbon sequestration

- In response to regional opportunities to build economic and climate resilience around carbon markets and wood products, the **Southern Plains Climate Hub** co-sponsored the *Managing Carbon through Healthy Forests and Forest Products in the Changing Climate of the Southern Plains* Workshop with Kansas State Forest Service, Kansas State University, and state foresters. Over 60 participants attended including community members, local landowners, state forestry agencies, academia, private sector, and non-governmental organizations.
- Our Climate Hubs continue to synthesize and translate science in support of CSAF practice adoption and application including the following topics: agrivoltatics (Northeast Climate Hub), biofuels (Northwest Climate Hub), and no-till farming for climate resilience (Northwest Climate Hub).

Supporting environmental justice and equity

- The Climate Hubs are a covered program for the Justice40 Initiative, which ensures Federal investments benefit communities that are marginalized, underserved, and overburdened by pollution and underinvestment. FY22 annual guidance highlighted equity and EJ as overarching goals, and there are opportunities to use Hub tools and products to better understand who benefits (or not) from USDA programs and services.
- The USDA Climate Hubs National Office co-chaired and co-hosted the Interagency Council for Advancing Meteorological Services (ICAMS) Social Equity Workshop in May 2022. The virtual workshop featured speakers across 10 federal agencies and was attended by over 65 participants.
- The National Office helped plan and host an in-person and virtual National Academies event on equitable community participation in federally funded research. Dr. Alondra Nelson from the White House Office of Science and Technology Policy provided the keynote. The event garnered over 100 in-person and 750 online participants. The recording is available online.