United States Department of Agriculture
USDA Climate Hubs
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INFORMATIONAL MEMORANDUM

THROUGH: **David Lytle**, Executive Committee Chair, USDA Climate Hubs
Deputy Chief, U.S. Forest Service Research and Development

DAVID LYTLE Digitally signed by DAVID LYTLE Date: 2024.03.08 12:40:22 -05'00'

William Hohenstein, Executive Committee Vice-Chair, USDA Climate Hubs
Director, Office of Energy and Environmental Policy

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FROM: **William Gould**, National Lead, USDA Climate Hubs
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SUBJECT: USDA Climate Hubs Status Report for the Fourth Quarter of FY 2023

Accomplishment highlights are presented for Q4 (July-September 2023).

In the Fourth quarter, Climate Hubs hosted or participated in **66** workshops and webinars that engaged with **7,021** people through capacity-building activities.

The Climate Hubs produced **63** publications in the **Fourth** quarter with **14** peer reviewed publications and **49** white papers or grey literature products. The Climate Hubs developed **7** new educational modules reaching **6,379** students.

Highlight

The USDA Climate Hubs initiated a five-year national project supported by the Inflation Reduction Act and the Natural Resource Conservation Service. The project, *Climate Mitigation Outreach and Education* will apply the expertise and resources of the Hub network to reduce GHG emissions, improve soil carbon, and increase GHG sequestration on working lands. The Regional Hubs are collaborating with NRCS and their partners to increase the awareness and implementation of agriculture and agroforestry practices that mitigate climate change. The three-phase project will build on previous NRCS Climate Conversations to understand regional challenges and solutions to reducing GHG emissions and increasing carbon sequestration, develop decision support tools and information specific to mitigation practices, and assess research needs for regionally important mitigation practices.

Climate Hub Highlights for FY23 Q4 (July-September 2023)
The following accomplishments provide a snapshot of the USDA Climate Hubs' work and are organized into three workstreams: (1) *Science and data synthesis*, (2) *Technology/tool co-development and support*, and (3) *Outreach, convening, and training*.

Science and data synthesis
Beef is the top agricultural commodity produced by Southern Plains states in terms of dollar receipts. As such, it plays a key role in sustaining rancher livelihoods and local economies across the region. The **USDA Southern Plains Climate Hub** partnered with the Sustainable Southwest Beef Coordinated Agriculture Project and Western Section of the Society of Animal Science to convene regional experts to discuss climate adaptation strategies for the beef industry of the Great Plains and Western US. Approximately 200 symposium attendees learned about the predicted effects of projected climate change on the beef industry, and climate adaptation strategies including heritage genetics and precision livestock farming tools available for climate-smart ranching and feedlot operations.

Aquaculture or sea farming is connected to the health of ocean ecosystems and is impacted by the effects of climate change. Gulf of Maine sea surface temperatures are rising three times faster than the global average and this ocean warming increases the risk of disease, predation, and organ stress in farmed species. Meanwhile ocean acidification makes it harder for shellfish to build their shells and sea level rise threatens aquaculture infrastructure. To support aquaculture within the Gulf of Maine region, it is important to understand these climate impacts as the first step towards strengthening the industry's climate resilience. In collaboration with the Gulf of Maine Research Institute, the **USDA Northeast Climate Hub** has created a research brief describing the ways in which climate change will affect farmed aquaculture species in this coastal region.

California is the top winegrowing state in the U.S. and the fourth-largest winegrowing region in the world. Under climate change, California viticulture is facing increased heat and extreme events, reduced water availability, greater pest pressure, and other stressors. It is important for viticulture experts to consider what future vineyards will need to look like to sustain production under projected future climate. The **USDA California Climate Hub** partnered with the California Sustainable Winegrowing Alliance to develop and facilitate a technical workshop bringing together more than 30 viticulture experts, including researchers, growers, and industry representatives to vision the vineyard of the future. The two-day workshop identified priority actions for climate adaptation and climate mitigation that growers can adopt now to improve resilience and carbon sequestration potential, as well as priority actions that research and industry must consider to ensure Californian viticulture's long-term resilience in the face of climate change.

To meet the public's climate-related needs, regional climate service-providers are building and leveraging partnerships. In support of collaboration, the **USDA Northern Plains Climate Hub** hosted a retreat for 20 members of the Department of the Interior North Central Climate Adaptation Science Center, NOAA Climate Adaptation Partnerships, and the Western Water Assessment. Each center offers unique expertise in agriculture, water, and ecosystems - essential and interwoven fibers of the region's landscapes and rural communities. The three Federal climate centers meet twice each year to enhance efficiency through coordination, knowledge exchange, and collaboration. This retreat's focus was serving frontline communities.

The USDA Forest Service is increasingly interested in considering the effects of climate change in project planning. Robust considerations of climate change in project planning can help to reduce risk and ensure investments persist over time. The **USDA Northern Forests Climate Hub** facilitated conversations using the Adaptation Workbook on two National Forests, the Chequamegon-Nicolet and White Mountain National Forest. Using this approach during project planning provided a platform to document how

changes in climate are expected to affect the project area, and to describe how plausible management actions if implemented can reduce potential risks, enhancing the sustainability of ecosystems and resources.

Technology/tool co-development and support

There is increasing interest from land managers to understand how climate mitigation and carbon targets can be considered alongside other management goals. Yet, there are few practical resources to assist in understanding the benefits, and tradeoffs of actions that affect carbon and other management goals, such as diversity. Therefore, the Nature Conservancy (TNC) and the Norther Institute of Applied Climate Science (NIACS) at the **USDA Northern Forests Climate Hub** are partnering on a project to help illustrate and describe potential tradeoffs and co-benefits when managing for multiple objectives. TNC and NIACS hosted a climate adaptation workshop with an ecosystem carbon management lens for 30 participants focusing on southeastern Wisconsin ecosystems (oak savannas, prairies, and non-forested wetlands).

The Farm Planning Tool has been updated and enriched with critical climate projection data! Previously limited to Puerto Rico, the **USDA Caribbean Climate Hub** is happy to share that the tool now covers the U.S. Virgin Islands! With its refreshed interface and comprehensive data, including soil information, hydrology data, and crucial climate projections for 2041-2060, such as projected rainfall changes, maximum and minimum temperatures, and sea-level rise, this tool empowers users to make proactive and climate-resilient decisions. Users can explore data layers, download KML data, and create a report to gain insights into environmental characteristics and climatic scenarios.

To support NRCS understanding of current conditions and the potential to impact practice implementation, the **USDA Midwest Climate Hub** delivered an update on current climate conditions, agricultural impacts, and seasonal outlooks to the NRCS climate points-of-contact (POCs) in the Midwest region. The Hub intends to provide these updates monthly to the POC to help inform about current climate issues impacting agriculture and to improve success in practice adoption. The information shared with NRCS can also support NRCS stakeholders.

Many Tribal nations lack the capacity and resources to conduct climate change vulnerability assessments to guide revisions of management plans. In particular, many tribal forest management plans are outdated and do not integrate climate change. The **USDA Northwest Climate Hub** is working with forestry staff of the Nez Perce Tribe to conduct a climate change vulnerability assessment for forests and update the Nez Perce forest management plan.

Producers in the southeast US need guidance based on sound, peer-reviewed science to remain resilient and productive in the face of climate change and variability. As risks increase and threats arise, new guidance must be developed to educate producers and help them make climate-informed decisions. Therefore, the **USDA Southeast Climate Hub** published two peer-reviewed papers and three fact sheets to advance the science around sound agricultural land management in the Southeast.

Outreach, convening, and training

The **USDA Caribbean Climate Hub** developed a video showcasing La Microfinca Farm's inspiring journey towards climate resilience in Camuy, Puerto Rico. The farm, led by Tadilka Rivera Méndez, faced challenges from the highly variable tropical climate. The challenges were worsened by climate change and impacted crop yields. With support from USDA's NRCS-Caribbean Area, the farm implemented innovative strategies, including rainwater collection, mulching, climate-resistant crops, and conservation practices. These efforts increased crop yields, bolstering the farm's economic sustainability.

This video, part of the NIFA supported Climate-Smart Caribbean program, spotlights resilience and innovation in the face of climate change.

The **USDA Caribbean Climate Hub** OneUSDA workshops, a part of the Climate-smart Caribbean Project, connect farmers and landowners with crucial climate-smart knowledge and resources. Climate change is affecting the Caribbean, making it more prone to extreme events. Farmers and landowners need strategies to adapt. Preliminary results show that over 90% of workshop attendees are likely to apply climate-smart knowledge and practices discussed in the workshops. The successful workshops promote diverse strategies and resources to build climate resilience, reduce extreme event impacts, and enhance agricultural and forestry sustainability. They facilitate knowledge exchange, boost climate literacy, and empower participants with tools to combat climate change.

Meet Josefina Arce, the driving force behind Finca Atabey Farm in Santa Isabel, Puerto Rico. She's at the forefront of climate-smart agriculture in the Caribbean, focusing on Butler avocados across her 32 acres. Climate change has brought increasing drought, affecting crop quality. Arce's resourcefulness shines as she employs practices like attracting pollinators and installing tree barriers. Her partnership with NRCS, including drip irrigation, conserves precious water from a dwindling aquifer. This video from the **USDA Caribbean Climate Hub** Adapta video series spotlights long-term strategies like enhancing soil microbiota to combat water scarcity. Josefina Arce embodies resilience and leadership, demonstrating how Caribbean farmers can grow amid climate challenges.

The **USDA Midwest Climate Hub** is working with The Ohio State University and additional Midwest university/Extension partners to establish Climate Ready Midwest, a project funded by USDA-NIFA to bolster Extension-Hub connections and develop a Climate Hub-Extension framework. Following interviews of Extension specialists and a sense-making workshop with those participants, the project team has established regular communications with Midwest Extension leadership (in particular, directors of Agriculture and Natural Resources Extension (ANR). The project team has shared project results and developed recommendations for incorporating climate efforts into Extension programming.

Four regional Climate Hubs collaborated for the annual meeting of the Soil and Water Conservation Society. The **USDA Midwest, Northern Plains, Southern Plains, and Caribbean Climate Hubs** hosted an interactive exhibitor booth, two panels, and two oral presentations to discuss Climate Hub interactions with Certified Crop Advisors, discuss Climate Smart Practice adoption and share information about the range of information, tools and services from the Climate Hubs.

The **USDA Midwest Climate Hub** established relationships with NRCS and FSA to better develop working relationships and help improve education capabilities about climate change. The Climate Hub conducted three outreach events with state level NRCS and FSA and has an ongoing meeting with each to develop stronger working relationships discussing current issues and projected developments.

Graduate scholars across the Northeast pursuing research related to natural resource management and climate change rarely consider the climate equity and justice implications of their work. The **USDA Northeast Climate Hub** with West Virginia State University has launched the Graduate Student Climate Adaptation and Mitigation Partners (GradCAMP) program to help these scholars engage with climate equity and justice through their research. Through monthly virtual meetings, scholars will explore climate equity issues in relation to their research projects.

Soil Climate Analysis Network (SCAN) and Tribal SCAN (TSCAN) meteorological station data is collected across the Northeast but must be presented in usable and useful ways to relevant stakeholders. With the **USDA Northeast Climate Hub's** support, Cornell University is hosting focus groups for tribal stakeholders to learn about climate-smart tools built on data from SCAN and TSCAN networks and

generate ideas for new tools that would be most useful to those tribal stakeholders. A factsheet describing SCAN and TSCAN has been finalized, one listening session was completed, and two presentations have been given for the purpose of soliciting feedback on existing tools and brainstorming new ones.

Language is one of the most consistent barriers to climate equity and is particularly relevant to climate change and working lands in the Northeast as immigrant and Spanish-speaking workers make up a large portion of relevant stakeholders in the region. There is consensus amongst climate equity literature that efforts need to be put towards translation at all levels such as funding mechanisms, public resources and programming and even weather warning systems for outdoor workers. As a first step, translating the most viewed pages of the **USDA Northeast Climate Hub** website to Spanish elevates the level of access and allows for more diverse audience reach.

Climate change is loading the dice towards more frequent or extreme hazards, such as floods, droughts, and wildfires. As communities are exposed more and more to these climate-fueled hazards, effective coordination among Federal agencies is crucial for helping communities successfully prepare, respond, and recover. The **USDA Northern Plains Climate Hub** therefore participated in a two-day Interagency Climate Workshop organized by the Federal Emergency Management Agency (FEMA - Region 8). During the workshop, the Hub presented to 100 Federal employees from over a dozen agencies, increasing their awareness of the Climate Hub's efforts and stimulating discussions about future opportunities for collaboration.

The Northern Plains increasingly receives too little precipitation when it's needed, and too much when it's not. Farmers and their trusted service providers are seeking information, tools, and resources to adapt. So, the **USDA Northern Plains Climate Hub** spoke recently at three events, reaching 325 attendees. At the South Dakota Climate Summit, the Hub moderated a panel on climate impacts to wildlife in agricultural landscapes. In North Dakota, the Hub presented at the National Cooperative Soil Survey conference. And at the Soil and Water Conservation Society conference, the Hub participated in a special session on 'Women Influencing USDA's Climate Response.'

A warmer climate, increased human disturbance and transport, increased propagule pressure from growing non-native plant populations, and increased areas disturbed by wildfire have created a perfect storm of conditions for the spread of non-native plant species into Alaska's boreal forest. Previous studies have primarily concentrated on short-term relationship (less than 5 years) between wildfires and non-native species, leaving a significant gap in our understanding of long-term implications. A webinar hosted by the NOAA CAP Alaska Center for Climate Assessment and Policy focused on a **USDA Northwest Climate Hub**-supported project, highlighting the status of non-native plant invasions in burned areas of Alaska's boreal forest region and ongoing research efforts to examine long-term trends.

In Washington, small forest landowners (2-2500 acres) own 15% of forested lands, and their management decisions can affect Northwest forests. Understanding the impacts of climate change can help small forest landowners make management decisions that build climate resilience on their lands and throughout Northwest forests. To assist landowners in making climate-smart management decisions, the Climate Resilience Guide for Small Forest Landowners describes climate change impacts and potential management actions that landowners can take to increase resilience on their land. The guide is geared towards small forest landowners in eastern Washington (a western guide was published previously).

Climate change has and will continue to affect national forests in myriad ways. Climate change vulnerability assessments provide the scientific basis for development of adaptation strategies to reduce the negative effects of climate change. The **USDA Northwest Climate Hub** gave a webinar on climate change vulnerability assessments for national forests as a part of the Pacific Northwest Research Stations Congressional Lunch-and-Learn webinar series.

From fall 2019 to the present, portions of the Northwest Climate Hub region have been experiencing abnormally dry to exceptional drought conditions. The Northwest Climate Hub partners with the NOAA Pacific Northwest Drought Early Warning System and the Oregon Climate Change Research Institute to co-host a bi-monthly webinar series to informed people on current conditions and short-term outlooks. In the August webinar we also included a brief overview of an online tool to support estimating drought recovery using the climate toolbox.

Outreach and education are critical for sharing the most up-to-date science and hearing feedback from partners and stakeholders. Conferences, workshops, symposiums, listening sessions, state fairs, and webinars are efficient and effective ways to communicate with stakeholders, including Extension agents, technical service providers, and NRCS field staff. Information exchanged is used to help producers make climate-informed decisions and remain productive and resilient. Therefore, the **USDA Southeast Climate Hub** 1) delivered five presentations to share research findings and climate-smart resources, 2) hosted a table at the Virginia State Fair, and 3) co-hosted the Yale Forest Forum speaker series: Understanding Climate-Smart Forestry in Practice.

Preserving key grassland ecosystem services under increased pressures of droughts and wildfires calls for new conservation tools to manage livestock grazing proactively. The **USDA Southern Plains Climate Hub** partnered with Oklahoma State University, The Sustainable Southwest Beef Coordinated Agriculture Project and New Mexico State University to host a field day on virtual fencing (VF) for ranchers of the Panhandle region. Approximately 50 participants were able to interact with VF vendors, peers, researchers, extension specialists, and both USDA and Oklahoma Conservation Commission staff to learn about VF systems, their configuration, uses, and available government programs that would support this technology. Ranchers from Oklahoma, Kansas, Texas, New Mexico, and Colorado participated in this demonstration.

Ensuring that tomorrow's leaders and agricultural producers are prepared to address the challenges associated with climate change requires climate literacy programs that begin in elementary school. The **USDA Southern Plains Climate Hub** partnered with Asombro Institute for Science Education and BlueSTEM Agri-Learning Center to host two workshops for elementary and middle school teachers from across the state of Oklahoma. Participants learned about current research on climate adaptation strategies for ranching and climate change and received access to standards-aligned lessons that break down this global issue into bite-sized pieces for their students. Many among the 30 teachers that participated in these workshops expressed excitement about returning to their classrooms to deliver these lessons to their students.

Elm, ash, and other foundational forest species face serious health threats from invasive pests and pathogens, land-use stresses, and climate change. The loss of these species has threatened city canopies, natural ecosystems, and ways of life for communities that depend on them. Recognizing the fundamental social and ecosystem roles of these species, and to proactively anticipate coming threats to similar keystone trees, scientists at the USDA Forest Service Northern Research Station (NRS) have worked to identify techniques to preserve, propagate, or replace these species and support affected communities. NRS researchers enlisted the **USDA Northern Forests Climate Hub** and Northern lnstitute of Applied Climate Science, to facilitate discussions among scientists and land managers in two conference settings (Baltimore, MD, and Duluth, MN) to discuss the ongoing loss of these species, to help disseminate research results, and to understand real-world operational capacity to respond to these threats.

The field of climate change adaptation is relatively young, but there is already a variety of conceptual frameworks and several specialized vocabularies meant to assist land managers clearly communicate the intent of their management actions. The **USDA Northern Forests Climate Hub** presented on one framework, Resistance/Resilience/Transition (RRT) of adaptation options, as part of the USFS

Adaptation Community of Practice webinar series. The presentation defined the RRT framework, shared examples of how it has been used, and discussed why it has been a useful model for land managers. One hundred people participated in the webinar and engaged in a lively discussion afterwards.

Climate change impacts in the southwest are not always well-understood by the general population, so one of the ways in which the **USDA Southwest Climate Hub** aims to increase next-generation climate literacy is through reaching K12-aged youth. This quarter, our funded partners at the Asombro institute engaged with 59 educators at three workshops, including 40 informal educators who are from and/or work in Native American communities. Educational resources shared included climate change, energy and water resources in New Mexico and other Southwest Climate Hub curriculum subjects.

Drought is common in the southwest, posing challenges for resource managers. Tools and creative solutions exist but are often isolated by geography, agency, or department. The Southwest Drought Learning Network aims to bridge these gaps, fostering regional knowledge sharing for improved drought resilience. Working with SW DLN partners, the **USDA Southwest Climate Hub** recently convened a two-day annual meeting hosted at a tribal college, bringing together 70 climate practitioners, resource managers, and stakeholders to exchange information and work together on collaborative goals for the upcoming year.