USDA Climate Hubs: Promoting Resiliency in Agriculture and Forestry
2016 National Nonpoint Source Training Workshop
October 31-November 3, 2016
Boston, Massachusetts

David Hollinger, Director, Northeast Hub
Randy Johnson, National Lead
Rachel Steele, National Coordinator

USDA’s Regional Climate Hubs are providing information and tools to land managers to build resilience to climate variability.

http://www.usda.gov/climatehubs
In 2013 USDA identified a major issue in that much of the current science is not in a usable form for land managers (farmers, ranchers, forest land managers)

Stakeholders
- USDA Service Agencies
- Cooperative Extension
- Land Grant Universities
- Farmers
- Ranchers
- Forest land owners

http://www.usda.gov/climatehubs
The Climate Hubs were initiated to improve the information flow to stakeholders by translating science into useful tools and products.

Stakeholders:
- USDA Service Agencies
- Cooperative Extension
- Land Grant Universities
- Farmers
- Ranchers
- Forest land owners

http://www.usda.gov/climatehubs
The Hubs improve the information flow from stakeholders to provide feedback to research agencies.
The President’s Climate Action Plan:

Maintaining Agricultural Sustainability:

1. Cut Carbon Pollution in America
2. Prepare the United States for the Impacts of Climate Change
3. Lead International Efforts to Combat Global Climate Change and Prepare for its Impacts

USDA Regional Climate Hubs

“...to deliver tailored, science-based knowledge to farmers, ranchers, and forest landowners to support climate resilience.”

http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf
Feb 2014 – USDA announced 10 Regional Climate Hubs

http://www.usda.gov/climatehubs
**Vision:** Agricultural production and natural resources maintained and strengthened under increasing climate variability and environmental change.

**Mission:**
To help people preserve their land and stay profitable in the face of climate variability and change.

http://www.usda.gov/climatehubs
There were many existing assets already in place
Climate Hubs

Climate Change Research in the US

- USDA Research
- Other Federal Programs
- States / Land Grant Universities
- Private
- NGOs
- Other Federal Climate Change Networks
Existing Outreach Avenues

- County Extension Agent or eXtension network
- Certified Crop Consultant Forestry Consultant
- Seed Dealer Fertilizer Salesperson
- University Professors
- USDA Service Center FSA / NRCS
- Friends or Family
- State Climatologist

Stakeholders:
- Farmers
- Ranchers
- Forest landowners

http://www.usda.gov/climatehubs
USDA Contributions to the Hubs

National Institute of Food and Agriculture (funding)

Agricultural Research Service

NRCS (Tech Centers & Service Centers)

Forest Service (R&D, S&PF, NFS)

- Natural Resources Conservation Service
- Farm Service Agency
- Risk Management Agency
- RD, APHIS, others

Stakeholders
- Farmers
- Ranchers
- Forest Mgrs

Feed back on stakeholder needs and effectiveness of products and services
Climate Hubs

The most valuable asset

Feature: USDA Climate Hub Leaders
Left to Right: Beatrice Van Horne (Northwest), David Hollinger (Northeast), Jerry Hatfield (Midwest), Rachel Steele (National Office), Christopher Swanston (Northern Forests), Justin Derner (Northern Plains), Randy Johnson (National Office), Mike Wilson (NRCS), Emile Elias (Southwest), Steve McNulty (Southeast), Kris Havstad (Southwest), Dick Hart (Retired-ARS), Kerri Steenwerth (California), Howard Skinner (Northeast), Peter Stine (California), Jean Steiner (Southern Plains), William Gould (Caribbean), Sarah Wiener (Southeast). Photo credit: Sarah S. Wiener.
Climate Hubs

Framework/Network for a USDA Regional Hub

Science and Technology providers:

**Federal Partners**
- NOAA RISA
- USGS CSC
- DOE
- NASA
- etc

**USDA Intramural Research** (ARS/FS/ERS/NRCS)

**USDA Extramural funded Research** (NIFA)

**Non-Federal Partners**
- Agricultural Exp Stations
- Many others

Links with other Hubs & National Coordinator

Technology Transfer providers (Tech-Transfer Stakeholders):

- Cooperative Extension & eXtension
- USDA Service Centers
- Forest Service Threat Centers
- State Foresters
- State Climatologists
- USDA Program Agencies

Land Management Stakeholders

- Farmers / Ranchers / Forest Managers / Tribes / States / Feds / LCCs / Others

http://www.usda.gov/climatehubs
Hub Actions/Activities

• Partnerships / Coordination
• “Research”
• Information synthesis / Tool development
• Assessments
• Education
• Adaptation and mitigation demonstrations

http://www.usda.gov/climatehubs
Climate Hubs

Climate Science Centers (USGS Dept. Interior)

Landscape Conservation Cooperatives (FWS)

Partnerships:

Regional Integrated Sciences & Assessments (RISA) program (NOAA)

Regional Climate Centers (NOAA)

http://www.usda.gov/climatehubs
Cooperative Extension

• In every state – Associated with the Land Grant Universities
• Offices in most every county
• Funded by federal, state and local sources
• Extension agents work directly with farmers

http://www.usda.gov/climatehubs
Partnerships:

USDA Incentive Programs

- **Natural Resources Conservation Service**
- **Farm Service Agency**
- **Rural Development**

Opportunities for Farmers and Ranchers

Farmers and ranchers selling into local and regional food systems have unique needs - from seeds and breeds and production systems to on-farm risk management and food safety activities. USDA has a variety of tools to help food producers grow and raise products for local and regional markets. Below, you will find resources to assist with all aspects of local food production, including resources to get started as a new farmer.

Start to Farm:

- USDA New Farmers Initiative - Get connected and get started in agriculture!
- FarmAnswers.org - Provides resources to help you get started farming, as well as tools to help more seasoned producers succeed.
- USDA People’s Garden Initiative - USDA Agencies work with other Federal, state and local partners to start and sustain gardens to grow healthy food, people and communities.
- USDA Urban Agriculture Initiative - Check out the latest movement to challenge traditional farming.

Land Conservation and Food Production:

- USDA Agroforestry - Blend agriculture and forestry to enhance productivity, profitability, and environmental stewardship
- Alternative Farming Systems Information Center (AFSIC) - Sustainable food systems and practices from USDA’s National Agricultural Library
- Appropriate Technology Transfer for Rural Areas (ATTRA) - Information for farmers and other rural users on a variety of sustainable agricultural practices
- USDA Organic Portal - Information on organic practices
- USDA Organic Resource Guide - USDA programs that serve organic agriculture
- Sustainable Ag Research and Education (SARE) Learning Center - Practical publications for farmers and ag professionals

USDA Funding Availability:

- Agricultural Conservation Easement Program
- Conservation Reserve Program
- Conservation Stewardship Program
- Environmental Quality Incentives Program
- Microloans
- Farm Storage Facility Loans
- Noninsured Crop Disaster Assistance Program
- Rural Energy for America Program
- Whole-Farm Revenue Protection Program
- Organic Cost Share Programs

http://www.usda.gov/climatehubs
Research:

- Communicate stakeholder needs to research leadership within and outside USDA
- Identify research that meets stakeholder needs,
- Be part of research proposals where the Hub mission can contribute to the success of a proposal.

Co-sponsored a special issue in the journal Rangelands – Drought on Rangelands: Effects and Solutions
The recently launched Climate Hubs Tool Shed is an online, searchable database of tools (data-driven, interactive websites and mobile apps) that can assist land managers, land owners, and extension professionals in adapting working lands to the impacts of climate change. [http://climatehubs.oke.usda.gov/content/tools-and-data](http://climatehubs.oke.usda.gov/content/tools-and-data)
Information synthesis / Tool development:
United States Department of Agriculture

Climate Hubs

Adaptation Resources for Agriculture and Forestry Workbooks

Will be officially released in the fall 2016, and digitized by early 2017.

Available at http://adaptationworkbook.org/

http://www.usda.gov/climatehubs
Information synthesis / Tool development:
United States Department of Agriculture

Effects of Drought on Forests and Rangelands in the United States: A Comprehensive Science Synthesis

Drought Impacts on Forests and Rangelands in the Pacific Northwest and Alaskan Regions

Overview:
The Pacific Northwest states of Oregon and Washington are known for abundant precipitation, especially in the eastern regions where rainfall is consistent throughout the year. The coastal regions tend to be more humid, with mild winters and cool summers, whereas the interior regions experience more variable weather, with hot summers and cold winters. These differences in climate and topography have significant impacts on the ecosystems and human activities in the region.

Less of snowfall from winter storms is already occurring and is projected to continue to decline given the effects of climate change on warmer winters (higher minimum rates) and warmer temperatures that will reduce soil moisture and temperatures throughout the Northwest. This is expected to increase the frequency and intensity of extremes that are known to cause damage to forests and rangelands, such as droughts, floods, and wildfires. These changes will likely lead to altered forest patterns and altered species distributions.

Climate change is expected to alter the timing and magnitude of water availability, streamflow, and river temperatures. Snowpack is projected to decrease in the region, leading to reduced spring runoff and increased summer streamflow. Simultaneously, increased winter snowfall and reduced summer streamflow could lead to higher water temperatures. Reduced snowpack could also lead to more extreme drought conditions.

Adaptation and Management:

In response to these changes, adaptation and management strategies are needed to reduce the impacts of drought on forests and rangelands. Some possible strategies include:

- Implementing water conservation measures to reduce the demand for water resources.
- Developing more resilient species that can tolerate the changing conditions.
- Implementing landscape-scale strategies to reduce the potential for wildfire.
- Developing early warning systems to allow for timely intervention.

Conclusions:

- Transitioning land managers from a reactive to an anticipatory mode to reduce the impacts of drought on forests and rangelands.
- Implementing water conservation measures and developing resilient species to reduce the impacts of drought on forests and rangelands.
- Developing early warning systems to allow for timely intervention.
- Implementing landscape-scale strategies to reduce the potential for wildfire.
- Implementing water conservation measures and developing resilient species to reduce the impacts of drought on forests and rangelands.

http://www.usda.gov/climatehubs

300-page scientific document

8 regional 2-pagers
Information synthesis / Tool development:

United States Department of Agriculture

Climate Hubs

What is COMET-Farm?

COMET-Farm is a whole farm and ranch carbon and greenhouse gas accounting system.

The tool guides you through describing your farm and ranch management practices including alternative future management scenarios. Once complete, a report is generated comparing the carbon changes and greenhouse gas emissions between your current management practices and future scenarios.

Start using COMET-Farm

Enhancing existing tools

Data is always in season.

Welcome to AgBiz Logic!

AgBiz Logic is a suite of economic, financial, and environmental decision tools for businesses that grow, harvest, package, add value, and sell agricultural products.

http://www.usda.gov/climatehubs
Regional Vulnerability Assessments

USDA’s Regional Climate Hubs were established in February of 2014 to deliver science-based knowledge, practical information, and program support to farmers, ranchers, forest landowners, and resource managers to enable climate-informed decision-making in light of the increased risks and vulnerabilities associated with a changing climate. As part of their function, the Hubs were tasked with providing periodic regional assessments of risk and vulnerability to production sectors and rural economies, building on material provided under the National Climate Assessment conducted through the United States Global Change Research Program (USGCRP).

Throughout 2015, eight regional vulnerability assessments will be published representing all of the Climate Hub regions across the country. They are being published on a rolling basis and are provided here as well as on the Regional Hubs pages. With the publication of these Vulnerability Assessments, the Regional Climate Hubs are providing their stakeholders with an introduction to the region, regional sensitivities and adaptation strategies for working lands, a greenhouse gas emissions profile with mitigation opportunities, and an overview of how partner USDA agencies are being affected by a changing climate. These vulnerability assessments are an important first step in establishing a baseline “snapshot” of current climate vulnerabilities, and provides region-specific adaptation and mitigation strategies to increase the resilience of working lands in the region.

Click on a region below to read about your region’s vulnerabilities and adaptation/mitigation opportunities!

Vulnerability Assessment Abstracts
- Northeast Abstract
- Northern Plains Abstract
- Southeast Abstract
- Midwest Abstract
- Caribbean Abstract
- Northwest Abstract
- Southwest Abstract
- California Abstract

Vulnerability Assessment Full Reports
- Northeast and Northern Forests Region
- Southeast Region
- Midwest and Northern Forests Region
- Caribbean Region
- Northern Plains Region
- Southern Plains Region
- Northwest Region
- Southwest Region and California

Looking for more vulnerability assessments? Check out:
- Climate Change Response Framework Vulnerability Assessments for the Northeast Region
- Adaptation Partners Library for the Western United States
- Climate Registry for the Assessment of Vulnerability (CRAvE)
Education:

– Education module for K-12 with Asombro Institute
– eXtension Climate Learning Network
– Three podcasts demonstrating climate-wise management in Puerto Rico
– Over a dozen workshops training foresters on management in light of climate change.
– GHG Building Block workshops
– Education committee working on core training for all USDA employees
Dozens of forestry demos in Northeast with NIACS

Grazing demos in the Plains

Virtual demonstration project

http://www.usda.gov/climatehubs
Implications—Erosion and nutrient loss
Climate Hubs

Climate Change, Management, NPS

- NRCS Soil Health Program
- Reduced Tillage (MD, IN > 35% no-till)
- Cover crops (MD, DE > 15%)

http://www.usda.gov/climatehubs
Climate Change, Management, NPS

• Manure application (>15% VT, PA, NY)
  – Subsurface injection can reduce runoff 50%, NH\textsubscript{4} 80%

• Subsurface drainage (40% of Midwest)
  – Can short circuit flow paths
Contact us!

http://www.usda.gov/climatehubs