



# USDA Climate Hubs

Diverse landscapes, risks and climate solutions

Climate Hubs Executive Committee  
March 30, 2023



U.S. DEPARTMENT OF AGRICULTURE



# Translating climate science into action



- **Mission:** Develop and deliver science-based, region-specific information and technologies to agricultural and natural resource managers that enable **climate-informed decision-making**.
- **Vision:** Robust and healthy agricultural production and natural resources under increasing climate variability and climate change.

# Goals

- Climate awareness
- Resilient, productive working lands



Science and data syntheses



Tool/technology co-development and support



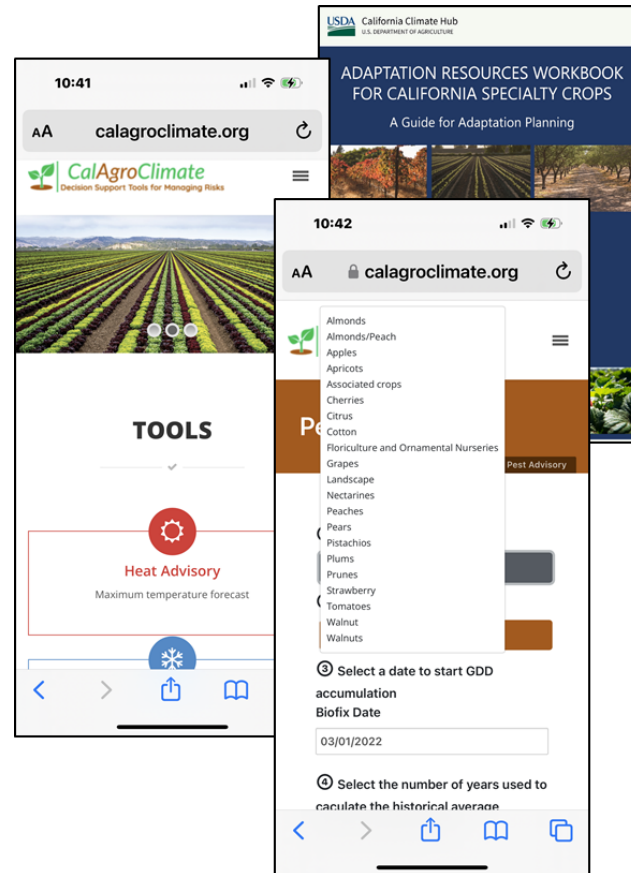
Outreach, convening, and training

# California Hub – Enabling climate-informed decision making for California's natural and working lands

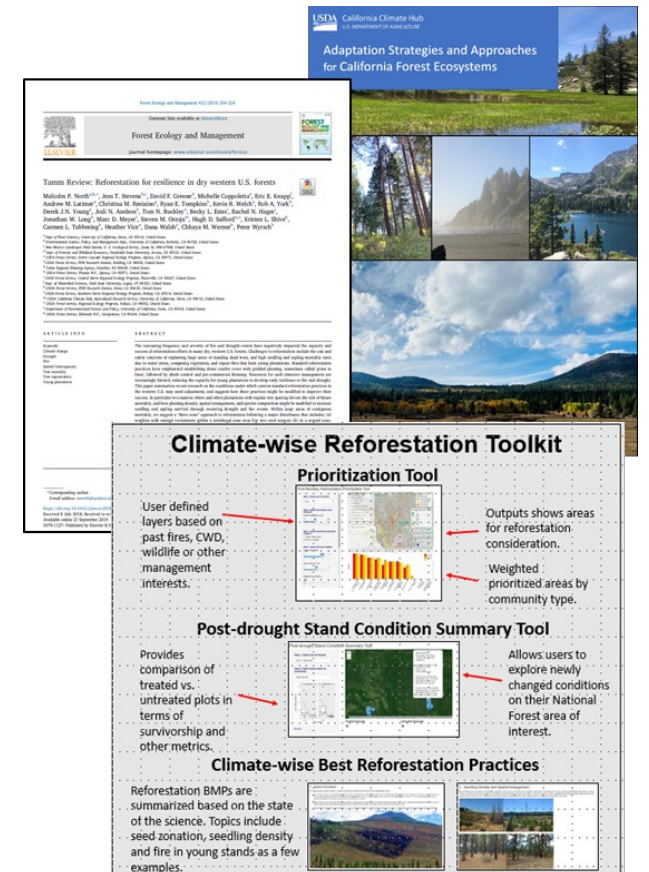
Climate impacts are far reaching across agriculture and forestry



CalAgroClimate supports the largest subnational agricultural economy



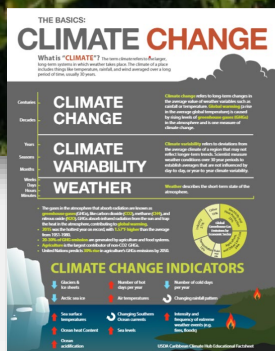
Supporting climate-informed forest management and postfire reforestation



# Caribbean Hub – Connecting science and people to reduce climate risks and increase resilience of tropical forests and agriculture



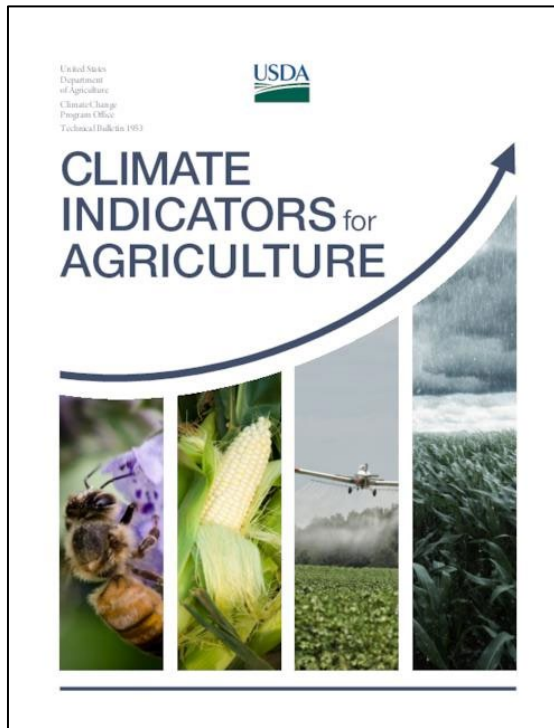
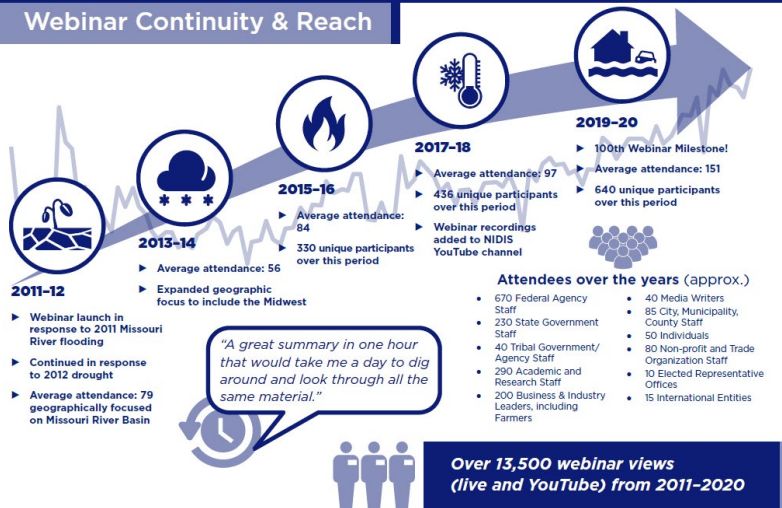
- Climates range from arid grasslands to tropical rainforests
- Risks include hurricanes, drought, sea level rise, and high heat
- Spanish and English-speaking farmers, foresters, and advisors
- High diversity of people, crops, and governance



# Midwest Hub – Ag-climate change information/supporting decisions

## The North Central U.S. Monthly Climate and Drought Summary and Outlook

Webinar Continuity & Reach



## Climate Change Impacts on Illinois' Agriculture

### Specific Products

- USDA Climate Indicators
- State ag climate change summaries
- Wide range of impact assessments



United States Department of Agriculture  
National Institute of Food and Agriculture

# Northeast Hub – Advancing climate equity

A focus on facts, understanding, empathy, and action



[Tribal Climate Equity Fellow \(NRS\)](#)

[Climate Equity Fellow \(ORISE\)](#)

[Climate Equity Webinars](#)

[Art + Climate Equity](#)

*Our goal is to integrate climate equity into all our projects as part of “This is who we we are.”*



U.S. DEPARTMENT OF AGRICULTURE

# Northern Forests Hub – Advancing Tribal priorities through climate change adaptation

- Co-developed the Tribal Climate Adaptation Menu (2019)
- Launched 57 adaptation projects at 8 in-person workshops
- Hosted a national webinar series on Climate Change Adaptation and the Tribal Forest Protection Act
- USFS collaboration through Tribal Forest Protection Act and project-level planning
- Helping tribal groups around the country create similar products





# Northern Plains Hub – building tools *with agriculture*

FARMERS TRUST OTHER FARMERS:  
PEER-TO-PEER LEARNING

A story map <https://bit.ly/3n5CcJV>

## Learning From Your Neighbor: Climate Resiliency in Agriculture

### The Producers

Marlin Murdoch, Orleans, NE: Cover Crops

Doug Toussaint, Wahpeton, ND: C...

**Using No-Till To Minimize Extreme Weather Impacts**

The Northern Plains region is not a stranger to extreme weather, and too much frequent extreme weather can offer a problem when managing agricultural land. No-till is a great option for adapting to the impact highly variable and frequent weather can have on crop production.

USDA United States Department of Agriculture Northern Plains Climate Hub

RANCHERS WANT ACTIONABLE INFO:  
GRASS-CAST (Grassland Productivity Forecast)

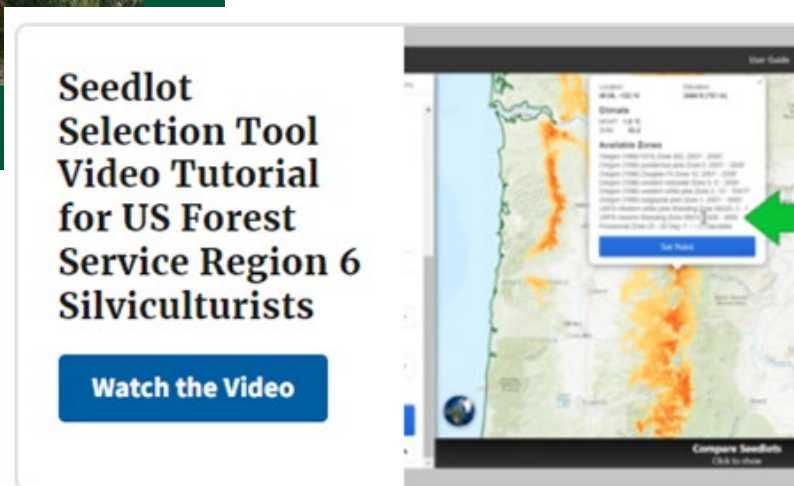
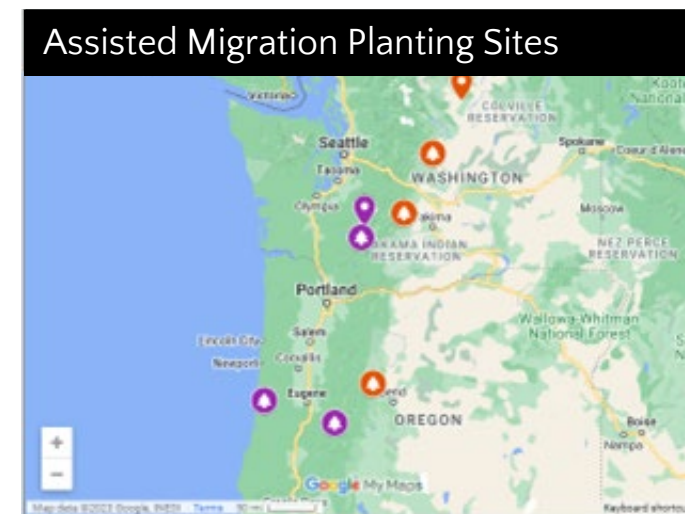
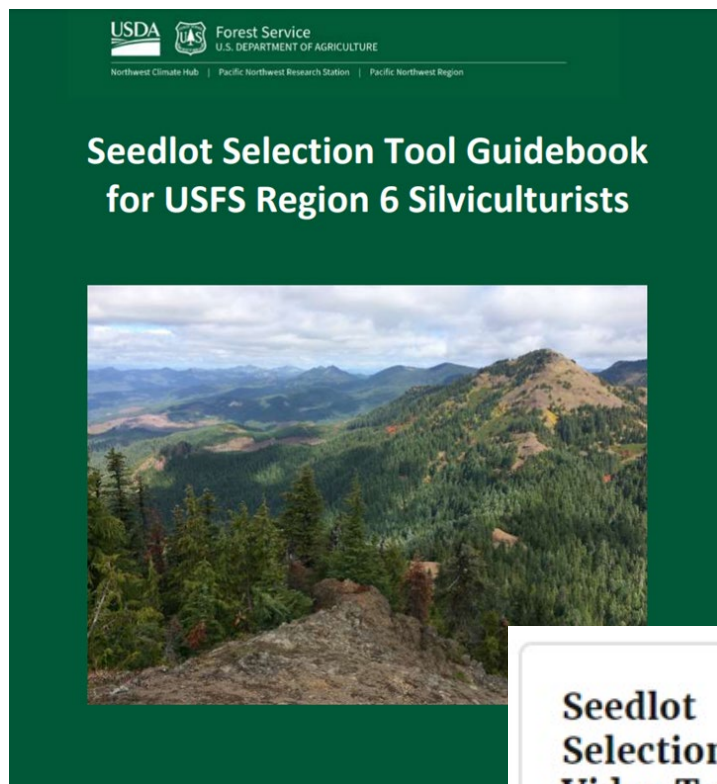
**Above-Normal**  
Percent difference in predicted 2020 Summer (June-September) ANPP compared to 1981-2019 mean ANPP assuming ABOVE NORMAL precipitation from June 16 to August 31

**Near-Normal**  
Percent difference in predicted 2020 Summer (June-September) ANPP compared to 1981-2019 mean ANPP assuming NORMAL precipitation from June 16 to August 31

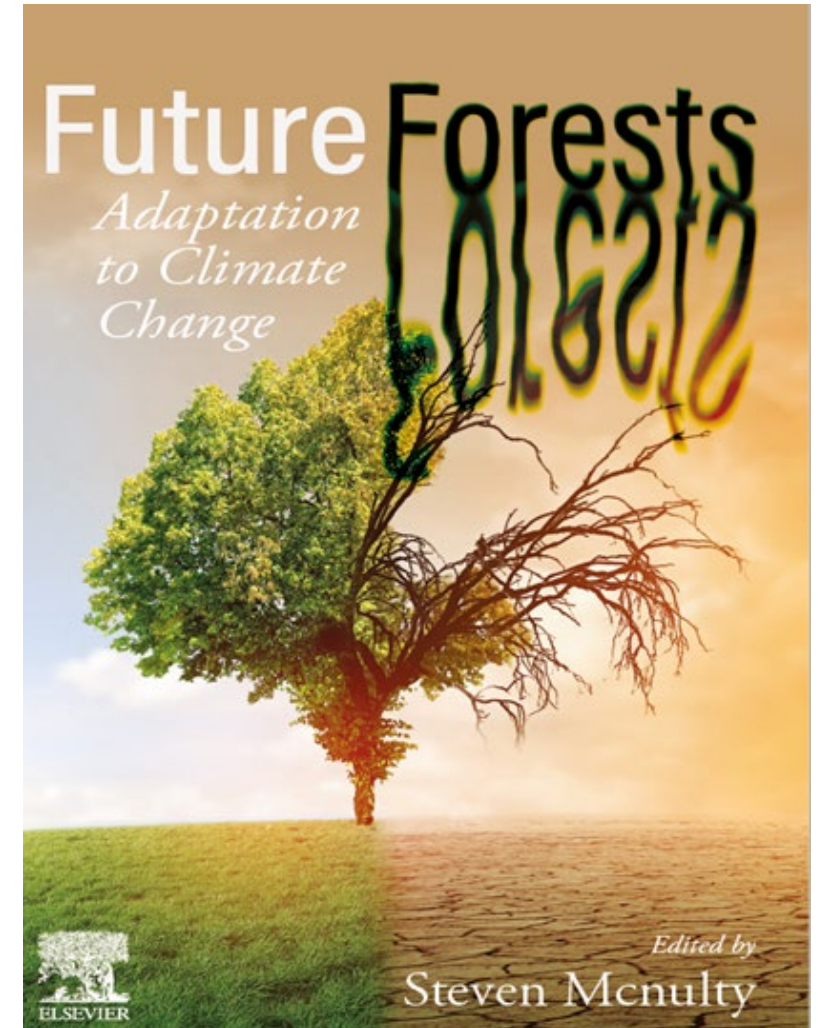
**Below-Normal**  
Percent difference in predicted 2020 Summer (June-September) ANPP compared to 1981-2019 mean ANPP assuming BELOW NORMAL precipitation from June 16 to August 31

USDA **grasscast.unl.edu**  
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# Northwest Climate Hub - Facilitating climate-informed reforestation with the Seedlot Selection Tool



# Southeast Hub – Developing actionable forest management resources



# Southwest Hub – Building climate literacy and efficacy

## CLIMATE CONVERSATIONS



What words come to mind when you think about climate adaptation?

extremes  
regenerative  
biochar  
conservation  
sustainability  
migration  
rebound  
mobility  
wildfire  
trees  
drought  
water  
drought resilience  
soil health  
resilience

**Food Security**

## CLIMATE QUICK REFERENCE GUIDES

**USDA Natural Resources Conservation Service**  
U.S. DEPARTMENT OF AGRICULTURE  
Southwest Climate Hub

### Climate Quick Reference Guide:

**Historic Changes 1900 - 2020**      **Projected Changes 2041 - 2070**

- The first 21 years of this century have been the warmest period on record for the state.
- Temperatures in Arizona have risen about 2.5°F since the beginning of the early 1900's.
- Arizona is currently in a long-term drought that has lasted more than 20 years.
- The risk of very large wildfires is projected to increase.
- Projected warmer temperatures may lead to reductions in late-season snowpack accumulation.
- The potential for more extended droughts in the future will pose a major challenge to Arizona's environmental, agricultural, and human systems.

**Climate and Weather Information Resources**  
Maps and graphs that show climate changes and projections for your location:  
<https://climatetoolbox.org/> or <https://www.mdc.noaa.gov/>

Climate Change Adaptation and Information:  
<https://www.climatehubs.usda.gov/>

Current and predicted drought conditions and resources:  
<https://www.drought.gov/>

NOAA State summaries of past and projected climate by State:  
<https://state.summaries.noaa.gov/>  
<https://www.usda.gov/energy-and-environment/climate>

#### State Level Summary:

Season	Max Temperature (Fahrenheit)			Max Precipitation (inches)		
	Current	Future	Change	Current	Future	Change
Spring	74.7	80.6	5.9	2.2	1.9	-0.3
Summer	93.9	99.7	5.8	4.5	5.0	0.5
Fall	77.1	83.3	6.2	3.5	3.8	0.2
Winter	58.4	63.9	5.5	3.8	3.7	-0.1
Annual	76.0	81.9	5.8	14.0	14.4	0.4

<https://swclimatehub.info/data/interactive-maps>

Seasonal and annual data was calculated using mean maximum temperature and precipitation to provide broad seasonal changes at the county scale to aid planning and management and uncertainty. Current data comes from PRISM Climate Group 30 year normal data for the 1971-2000 time period. Future is derived from the CMIP5 data using the mid-century time period and higher emissions scenario (RCP 8.5).

#### Top causes of crop loss for the entire State:

Cause of Loss	Indemnity	Acres
Area Plan Crops Only	\$405,066,762	51,851,318
Decline in Price	\$31,171,298	196,104
Hail	\$18,038,921	72,383
Excess Moisture/Precip/Rain	\$13,387,054	60,091
Drought	\$1,253,472	3,963

Source: AgRisk Viewer, RMA summary crop loss data by county (1989-2020); <https://www.farmers.gov/>

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**Observed Number of Extremely Hot Days**  
Number of Days with Maximum Temperature of 100°F or higher  
1900-04, 1910-04, 1920-04, 1930-04, 1940-04, 1950-04, 1960-04, 1970-04, 1980-04, 1990-04, 2000-04, 2010-04, 2019-04

**Observed and Projected Temperature Change**  
Temperature Change (°F)  
1900, 1925, 1950, 1975, 2000, 2025, 2050, 2075, 2100  
Observation, Natural Variance, Lower Emissions, Higher Emissions

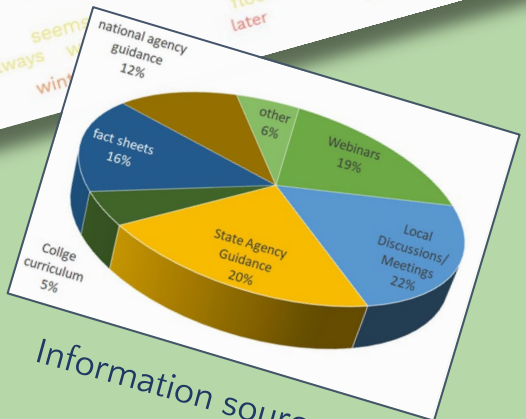
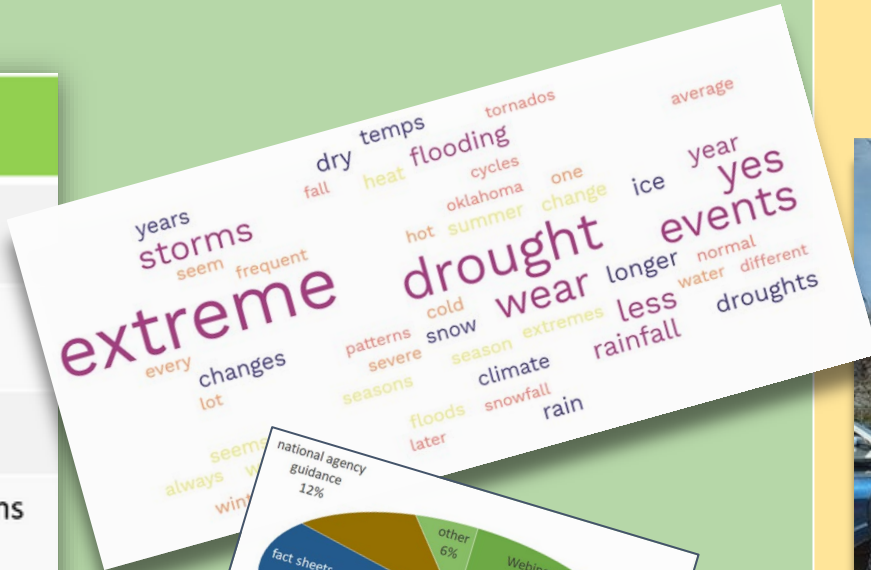
Source for Graphs: <https://climate.gov/resources/graphics>      <https://www.usda.gov/>



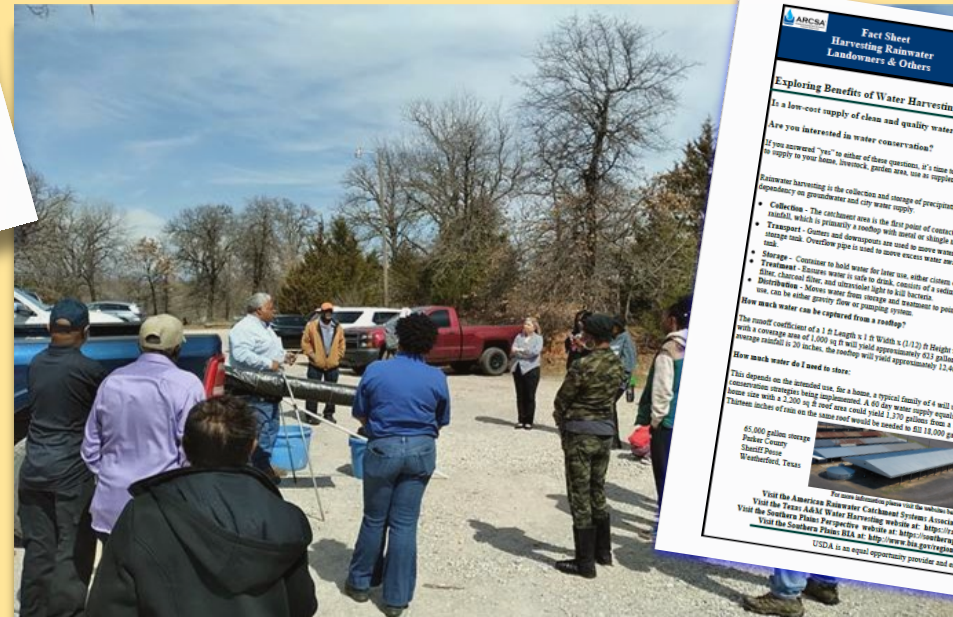
# Southern Plains Hub – Assessing county level needs and engaging underserved farmers and ranchers

## Surveys to identify critical issues

All Respondents
Well drilling for livestock water
Prescribed Fire
Cover crops
Rural water connections for livestock
No-Till
Pond Construction
Minimum Till



## Urban gardening and rainwater harvesting



**ARCBA Fact Sheet: Harvesting Rainwater - Landowners & Others**

United States Department of Agriculture, United States Department of the Interior, USDA, NRCS, USDA Southern Plains Climate Hub

### Exploring Benefits of Water Harvesting

**Is a low-cost supply of clean and quality water important to you?**

**Are you interested in water conservation?**

If you answered "yes" to either of these questions, it's time to explore the benefits of harvesting and storing rainwater. Dependence on groundwater and city water supply.

Rainwater harvesting is the collection and storage of precipitation for future use. Harvesting rainwater can reduce the dependence on groundwater and city water supply.

- Collection** - The catchment area is the first point of contact for rainfall, which is primarily a roofing with metal or single material storage tank. Gutter and downspout are used to move water into the tank.
- Storage** - Container to hold water for later use, either cistern or tank.
- Treatment** - Ensure water is safe to drink, consists of a sediment filter, charcoal filter, and ultraviolet light to kill bacteria.
- Distribution** - Moves water from storage and treatment to point of use, can be either gravity flow or pumping system.

**How much water can be captured from a rooftop?**

The runoff coefficient of a 1 in Length x 1 in Width x 1.32 in Height x 7.48 (gallons) equals 0.623, therefore, a roofing house size with a 2,200 sq ft roof area could yield 1,370 gallons from a 1 inch rain event (2,200 sq ft x 0.623 x 1 in). Fifteen inches of rain on the same roof would be needed to fill 18,000 gallon storage tank.

**How much water do I need to store?**

This depends on the intended use. For a home, a typical family of 4 will use around 300 gallons of water without any conservation strategies being implemented. A 40 day water supply equals approximately 12,000 gallons. An average 65,000 gallon storage tank would be needed to fill 18,000 gallon storage tank.

65,000 gallon storage tank  
 100 ft x 200 ft deep  
 18,000 gallons from 1 inch rain

For more information please visit the website below:  
 Visit the American Rainwater Catchment Systems Association <http://www.arcsa.org>  
 Visit the Texas A&M Water Harvesting website at: <http://waterharvesting.tamu.edu>  
 Visit the Southern Plains Perspective website at: <http://southernplainsperspective.wordpress.com>  
 Visit the Southern Plains BIA at: <http://www.bia.org/southernplains>

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Climate-smart ag. conversations, Luther, OK

# Contacts



## California

Steven Ostoja  
steven.ostoja@usda.gov

## Caribbean

Nora Alvarez (Acting)  
nora.l.alvarez-berrios@usda.gov

## Midwest

Dennis Todey  
dennis.todey@usda.gov

## Northeast

Lindsey Rustad (Acting)  
lindsey.rustad@usda.gov

## Northern Forests

Maria Janowiak (Acting)  
maria.janowiak@usda.gov

## Northern Plains

Dannele Peck  
dannele.peck@usda.gov

## Northwest

Jessica Halofsky  
jessica.halofsky@usda.gov

## Southeast

Steve McNulty  
steven.mcnulty@usda.gov

## Southern Plains

Andres Cibils  
andres.cibils@usda.gov

## Southwest

Emile Elias  
emile.elias@usda.gov

## USDA Climate Hubs Lead

William Gould – william.a.gould@usda.gov

## USDA Climate Hubs Coordinator

Julian Reyes – julian.reyes@usda.gov

