Overview of Selected USDA Agencies and Efforts Related to Agriculture, Groundwater, and Water Availability

Mary Scruggs
Senior Advisor for Water Resources
Office of the Chief Scientist
United States Department of Agriculture

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United States Agriculture

• Includes crops, rangeland and forests
• 16% of the $9 trillion gross domestic product
• 8% of U.S. exports
• 17% of employment
• <2% U.S. workforce on farms
• 100% of citizens are users
• ~80% of water consumption is related to agriculture
• ~70% of the drinking water supply originates in nation’s forestland
Irrigation from Groundwater in 2010

Source: USGS, Circular 1405, 2014
Sources of irrigation water, total and by region

Acre-feet (1,000)

- Pacific: 32,000
- Mountain: 58,000
- Southern Plains: 11,000
- Northern Plains: 11,000
- East Central: 18,000
- Eastern: 5,000

Surface water: 58%
Groundwater: 42%

Source: NRCS analysis of USGS Water Use data
USDA: Key Water Functions and Roles

- Manage National Forests and grasslands – major sources of freshwater
- Conduct research to enhance water resources and develop science-based policies
- Provide and protect wildlife habitats
- Provide:
  - Tools and technologies to conserve and protect water resources
  - Water-related recreational opportunities
- Support rural water infrastructure and water market development
Featured USDA Agencies

- Agricultural Research Service
  - National Agricultural Library
- Economic Research Service
- National Agricultural Statistics Service
- National Institute of Food and Agriculture
- Forest Service
- Natural Resources Conservation Service
- Rural Development
- Office of the Chief Economist
Wireless sensor network monitors crop canopy for automatic irrigation scheduling

GPS unit-wireless sensor node or a component of the irrigation system

Embedded computer for wireless data acquisition and pivot control

Canopy temperature is calculated using a scaling procedure based on one-time-of-day measurements from the moving wireless infrared thermometers on the irrigation lateral.
Improving Water Management in the Western US
Boise, ID and NASA JPL Partnership

Widespread, multi-year drought
- Estimated loss of $2.2 billion to agriculture (2015)

Airborne LiDAR and Snow Model

**iSnobal**: the ARS snow model - providing densities to determine Snow Water Equivalent

NASA-JPL provides
Weekly basin-scale airborne measurements of snow depth and albedo using Lidar and spectrometer data (Spring (2013, 2014, 2015))

ARS provides
Simulated snow water storage using the *iSnobal* model developed by the ARS at the Reynolds Creek Experimental Watershed in Idaho.

Highly successful outcomes
Product shared with water managers for operations
With improved water supply forecasting the program is expanding to cover the entire Sierra Nevada Range
Crop progress and condition are reported weekly at state and district levels by the National Agricultural Statistics Service (NASS). The ground data collection supporting this effort is time consuming and subjective. HRSL scientists have developed remote sensing approaches for mapping crop phenology by fusing Landsat and MODIS satellite imagery. The remotely sensed crop phenology at field scale (30m) is clearly related to observed crop growth stages and crop types.
National Agricultural Library

https://www.nal.usda.gov/waic/water-availability

Water Availability

- Drought and Weather
- Water Conservation

AGRICOLA Database
Automated literature and keyword searches
http://agricola.nal.usda.gov/
Data Products – available on ERS website with supporting data sets

- U.S. Irrigated Agriculture – Farm Size Analysis
- Western Irrigated Agriculture
- ERS State Fact Sheets

Challenges for US Irrigated Agriculture in the Face of Emerging Demands and Climate Change

• Introduction
• Water Supply and Demand Challenges for US Irrigated Agriculture
• How Important Is Irrigation to US Agriculture?
• How Efficient Is Irrigated Agriculture?
• Irrigation Investments and Funding Sources
• Water Conservation Policy: A Watershed Perspective
• References
National Agricultural Statistics Service

Census for Agriculture – 2017
Farm and Ranch Irrigation Survey – 2018
Published every 5 years

Additional question -- how many acres irrigated in past 5 years?
National Institute for Food and Agriculture

Small Agency with a Large Budget Water Related Ag Research/Outreach/Education

• $1.7 Billion
• Capacity programs
• Competitive grants
• Targeted programs
• Agreements with other Federal agencies
• Awarded 53 groundwater identified projects for total of $41,406,000 in the last two years
Selected Water for Agriculture Recent Awards

- $9,847,443 to Colorado State University Sustaining Agriculture through Adaptive Management to Preserve the Ogallala Aquifer under a Changing Climate
- $3,449,757 to University of Maryland CONSERVE: A Center of Excellence at the Nexus of Sustainable Water Reuse, Food, and Health
Water for Agriculture Priorities for FY 2016

- Water Availability for Diverse Agricultural Uses: The Right Water for the Right Place and Time
- Understanding Decisions and Behaviors Connected with Agriculture and Post-harvest Processing Industry Water Use
- Understanding the Human Health Impacts to Exposure from Nontraditional Water Used in Agriculture
Groundwater Dependent Ecosystems Field Guides

Kendall Warm Springs Dace, WY
Natural Resources Conservation Service
Water Management Activities with EQIP and CIG

Surface Irrigation

Sprinkler Irrigation

Micro Irrigation
Western Streamflow Forecast
11 States
Rocky Mountain
Pacific NW
Alaska
(Not CA)
Done by NRCS since 1935
Combination of manual & automated snow sites
USDA Rural Development

Serves areas and towns with fewer than 10,000 people

Rural water and waste infrastructure

Emergency water assistance
U.S. Drought Monitor

June 21, 2016
(Released Thursday, Jun. 23, 2016)
Valid 8 a.m. EDT

Drought Impact Types:
- Delineates current impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:
- D3 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/
USDA can provide
- Technical Assistance
- Grants and Loans
- Research
- Data and more

www.usda.gov

• Starting point for information and contacts for all USDA agencies
Questions?