

NRCS and Drought: Investing in Water Conservation & Resilience, 2012-15



With technical experts across the country, NRCS offers science-based solutions to producers that help mitigate the effects of drought and prepare against future weather events. These practices enable farmers, ranchers and forest landowners to use water more efficiently as well as boost the health of soil, which is better able to store water for when it's needed most. This work not only helps our natural resources but also strengthens farming and ranching operations, making them more resilient.

Since 2012, historically dry conditions in large parts of the United States have compelled NRCS to make substantial investments to help producers manage acute drought conditions and increase the resilience of their operations against extreme weather events. From 2012 to 2014, NRCS has invested more than \$1.5 billion to help producers implement conservation practices that have a benefit to water conservation or resilience. On average, these producers contribute half the cost of implementing practices.

This substantial investment includes \$27 million in special funding directed toward States impacted most severely by the historic drought of 2012. During this drought, NRCS partnered with nearly 2,000 producers to implement practices to protect soil, reduce water use and increase the resiliency of their operations.

Investing in Water Conservation and Resilience in 2015

California's snowpack hit historic lows in the spring of 2015, portending another difficult summer ahead for the State's farmers and ranchers. Producers in Nevada, Oregon and other Western states will also be challenged by limited water availability in the 2015 growing season. NRCS's work with our producers and investment in conservation will continue to strengthen farming and ranching operations and increase resilience.

In 2015, NRCS has committed substantial investments to help producers conserve water and build resilience in their operations. NRCS states have already targeted significant portions of their fiscal 2015 Environmental Quality Incentives Program (EQIP) allocations to address water conservation and resilience. In California alone, more than \$27 million of fiscal 2015 EQIP funding is directed towards practices that benefit water conservation and resilience. NRCS has announced an additional \$21 million in Farm Bill funding targeted to western states experiencing extreme (D3) or

exceptional (D4) drought, as defined by the U.S. Drought Monitor as of May 5, 2015.

NRCS is investing \$6.5 million in the Ogallala Aquifer region, where a significant portion of states overlying aquifer are suffering from severe drought conditions. NRCS is targeting funding to seven priority areas to further reduce withdrawals while strengthening agricultural operations. The approaches include assistance in converting to dryland farming in New Mexico, improving nutrient and irrigation management in Nebraska, and demonstrating critical irrigation technologies in Colorado and Texas.

USDA also announced a \$235 million funding opportunity through the Regional Conservation Partnership Program, highlighting drought and water conservation as a resource concern for potential projects. In addition, NRCS and Bureau of Reclamation are currently reviewing WaterSMART grant applications for 2015, with an announcement of 2015 awardees expected in June.

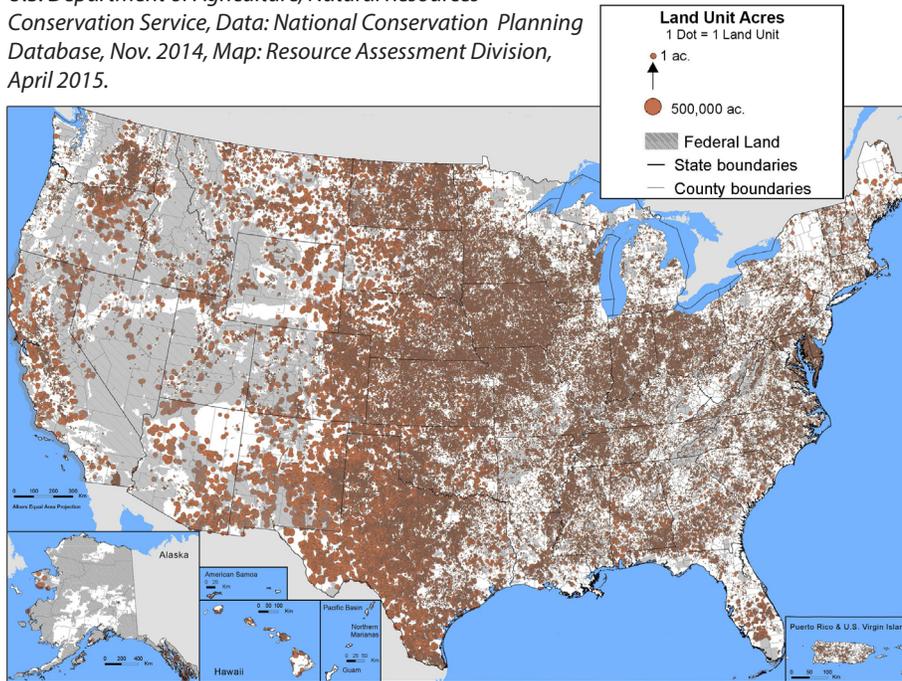


Water Conservation: Using Every Tool in the Toolbox

FY 2012 - 2014 Water Management Practices Applied on Unique Land Unit Acres

Sources:

U.S. Department of Agriculture, Natural Resources Conservation Service, Data: National Conservation Planning Database, Nov. 2014, Map: Resource Assessment Division, April 2015.



Each dot represents one land unit with applied water management practices during the FY 2012 to FY 2014 time period.

The dot size is determined by the relative unique land unit acres for each land unit. They are scaled from small (1 acre) to large (500,000 acres).

Investing in Irrigation to Improve Efficiency

Every day, NRCS works with producers to implement proven conservation practices that help them conserve water – benefitting their operations, their bottom lines and the environment.

Technical and financial assistance from NRCS enables farmers and ranchers to improve irrigation efficiency, to ensure each drop of water is used wisely. This assistance helps farmers and ranchers

adopt more efficient irrigation practices. Improvements in irrigation can help maintain the long-term viability of the irrigated agriculture sector. Water savings at the farm level can help offset the effect of rising water costs, as well as reduce expenditures for energy, chemicals, and labor inputs, while enhancing revenues through high crop yields and improved crop quality.

Since 2012, NRCS has invested \$638 million to increase irrigation efficiency. Common practices funded include

conversion to more efficient irrigation systems such as micro irrigation or subsurface drip irrigation, installation of irrigation pipeline, irrigation water management and structure for water control and flow meters.

Delivering Healthy Soils to Build Resilience

The drought has led farmers and ranchers to be more innovative. In addition to conservation practices to conserve water, they're also adopting practices that improve soil health. Healthier soils store more water, making farms and ranches more resilient to drought.

Cover crops, no-till and residue management are a few conservation practices that can mitigate impacts of drought. Since 2012, we've worked with farmers and ranchers to plant cover crops on more than 3.7 million acres and to use no-till on more than 1.7 million acres.

Healthy soil is more resilient to erosion and better able to store water through extended drought periods, leading to a more durable operation. An increase in organic matter is the best outcome – each pound of organic matter can hold up to 20 pounds of water. Every 1 percent increase in organic matter results in as much as 25,000 gallons of soil water per acre. Each 1 percent increase in organic matter can also provide up to 30 pounds of more available nitrogen per acre.

Since 2012, NRCS has invested approximately \$481 million in soil health practices, helping farmers save money and improve their operation's efficiency while at the same time improving the water quality that leaves the fields.

Adopting Grazing Systems for Resilient Ranches

Drought also impacts grazing lands, and NRCS works with ranchers to increase the resilience of livestock operations. Ranchers can adapt to dry

conditions in two main ways—increasing the availability and suitability of forage, and ensuring that cattle have an adequate and reliable source of water. For forage, rotational or prescribed grazing (rotating cattle among pastures) can relieve pressure on stressed vegetation

and ensure a more consistent supply of forage for animals. NRCS conservationists can also work with producers to plant more drought-tolerant forage species, plants best suited to local soils and conditions. To increase water availability for animals,

NRCS can help producers plan and install watering facilities for livestock.

Since 2012, NRCS has invested \$410 million to help ranchers implement practices such as prescribed grazing, watering facilities, forage harvesting and brush management.

Fostering Innovation through CIG
Climate forecasters tell us that climate change will increase the frequency, longevity and severity of future droughts. With an eye toward the future, in 2013 NRCS invested more than \$5 million in Conservation Innovation Grants to develop approaches and technology that help producers adapt to extreme weather events such as drought. The 13 project recipients are working to evaluate innovative, field-based conservation technologies and approaches, including the development of irrigation schedule smartphone applications and the development of warm-season forage systems for livestock operations. These projects will be completed starting in 2016.

Leveraging Partnerships for Targeted Water Conservation
Through the new Regional Conservation Partnership Program, NRCS is empowering local communities and private landowners to take control and identify their conservation needs. Working with partners across the country, NRCS will be investing \$60 million in 20 projects that directly address water conservation and helping producers mitigate the effects of drought, and another \$24 million in 15 projects that address soil health. These funds will be matched dollar-for-dollar by our partners, resulting in a total investment of nearly \$190 million in water conservation and resilience across the country.

FY 2012-2014
Conservation Practices
by Category, with Top 5 Practices for Each

Practices	Practices Implemented	Financial and Technical Assistance
Irrigation	134,000	\$638,000,000
Irrigation Water M	59,276	\$24,156,448
Irrigation Pipeline	13,547	\$94,678,564
Pumping Plant	12,055	\$67,922,576
Structure for Water Control	11,718	\$45,534,970
Sprinkler System	10,277	\$163,394,6949
Soil Health	1,092,000	\$481,000,000
Conservation Cover	127,292	\$16,783,236
Residue and Tillage M, No Till	16,796	\$30,753,059
Crop Rotation	407,379	\$53,514,590
Residue and No Till	175,729	\$51,499,127
Cover Crop	127,932	\$115,566,913
Livestock	507,000	\$410,000,000
Prescribed Grazing	230,967	\$68,373,294
Access Control	91,737	\$17,270,410
Brush M	41,579	\$145,502,142
Waste Recycling	20,282	\$8,428,611
Watering Facilities	46,884	\$77,938,336

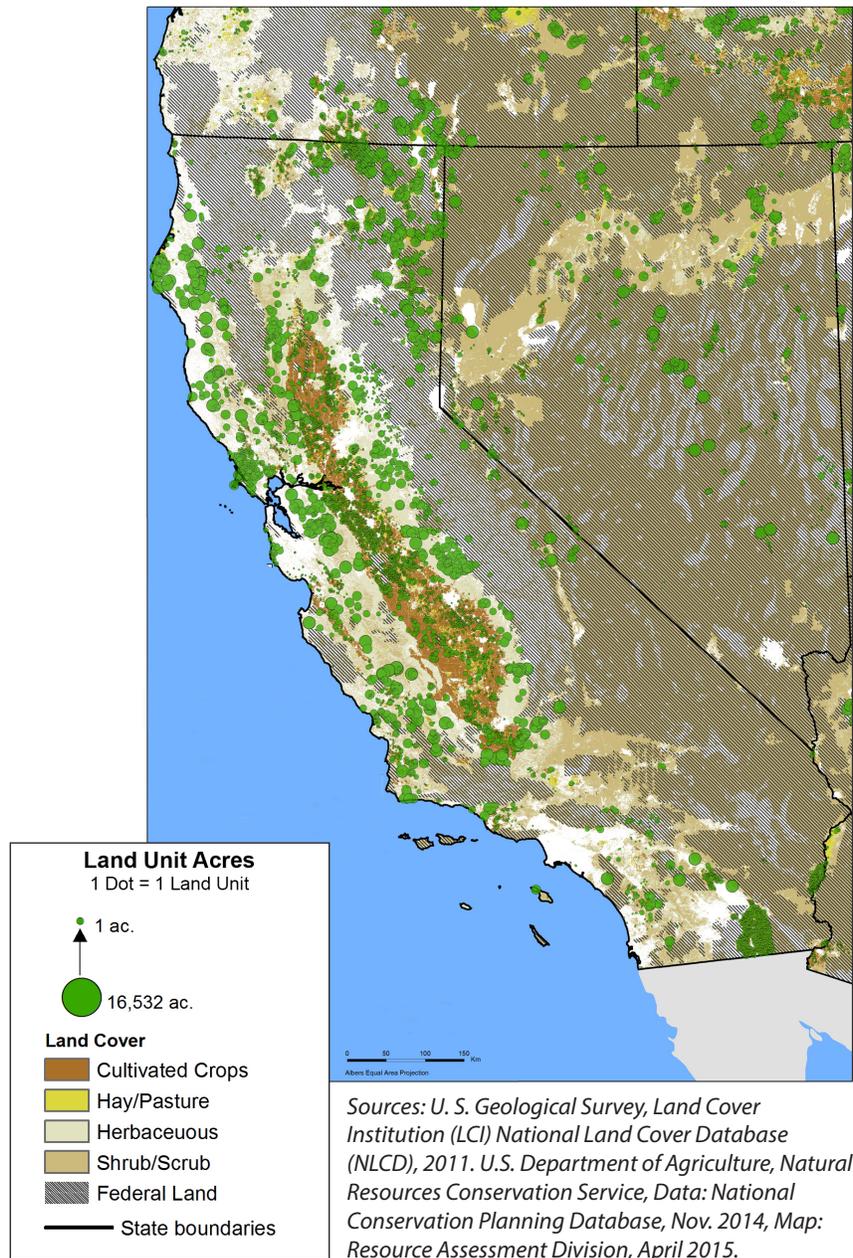
Data source: NRCS Resource Economics, Analysis and Policy Division, January 2015.

California Drought and WaterSMART

California has suffered from historically low precipitation in 2013 and 2014. Agricultural producers in the State have been impacted by severe cuts to their water allocations. Reacting nimbly and decisively, NRCS responded to the 2014 California drought with nearly \$30 million to help farmers and ranchers implement practices that conserve water, reduce wind erosion on drought-impacted fields and improve livestock access to water.

Since 2011, NRCS has also been working on an innovative program with Bureau of Reclamation (BOR) to improve water management on both regional and farm scales within the Bay-Delta region of California. Through its WaterSMART program, BOR provides grants to fund large-scale irrigation district management improvements. NRCS partners on these projects to work within the same water systems to help producers with on-farm irrigation infrastructure improvements. Investing over \$14.5 million since 2011, NRCS has worked with farmers to achieve an average irrigation efficiency improvement of 25 percent.

Unique Land Unit Acres with Applied Water Management Practices, FY 2012 - 2014



Each dot represents one land unit with applied water management practices during the FY 2012 to FY 2014 time period.

The dot size is determined by the relative unique land unit acres for each land unit. They are scaled from small (1 acre) to large (16,532 acres).

California Success Story

California farmer helps conserve water, adopt dryland farming practices

Almonds have been hit especially hard by drought conditions in California, with producers pulling trees that they cannot water out of the ground. NRCS worked with almond grower Sacramento Aguilar to install a micro-irrigation system and install cover crops between his rows, substantially increasing his irrigation efficiency and

turning his 13 acres into a model of conservation in California's Central Valley.

"I cut my irrigation usage from seven acre feet to three acre feet but that isn't even the best part," said Aguilar. "It is the reduced weeds that I don't

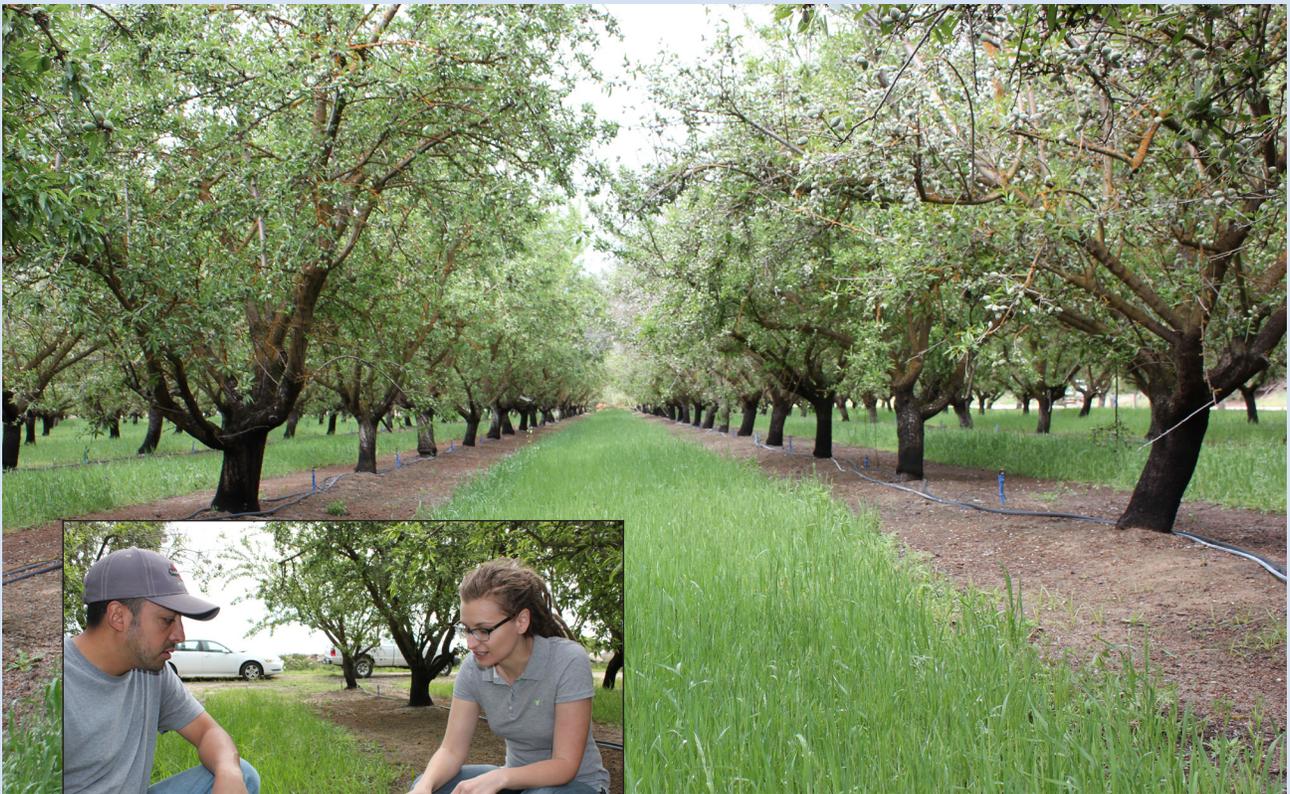
have to worry about anymore that really makes this work worthwhile."

Aguilar also plans to install soil moisture sensors to provide more accurate information on when irrigation water is needed and how much to apply. Recognizing that California's drought will not go away anytime soon, Aguilar said irrigation efficiencies are essential for survival.

"NRCS saved my farm," concluded Aguilar. "I would not be able to survive any longer with flood irrigation. I now have the tools and know-how to conserve water and be a successful farmer."

NRCS
saved
my farm.

— Sacramento Aguilar



Sacramento Aguilar (left) and NRCS Soil Conservationist Jeanne Dunn discuss the cover crop varieties in Aguilar's seed mix. Aguilar's conservation plan included conversion from flood irrigation to a micro-sprinkler system.

Ogallala Aquifer

The Ogallala Aquifer is one of the world's largest, lying beneath approximately 225,000 square miles in eight states in the central U.S. Nearly 15.1 million irrigated acres of agricultural land are located in this vast region, representing 30 percent of all groundwater used for irrigation in the United States. In 2011, NRCS launched the Ogallala Aquifer Initiative to target financial and technical assistance to this unique resource. Since the Initiative's inception, NRCS has invested more than \$66 million in financial assistance to more than 1,540 producers to help them implement groundwater conservation on approximately 325,000 acres of agricultural lands.

Agricultural producers participating in the Ogallala Aquifer Initiative have increased water efficiency in the most vulnerable areas of the aquifer. In 2013, NRCS analyzed the extent of reduced water withdrawals resulting from the agency's work with farmers in the region. NRCS found that conservation work during the previous four years reduced water withdrawals from the Ogallala Aquifer by at least 1.5 million acre-feet, or more than 489 billion gallons. These practices also reduced irrigation energy needs equivalent to almost 33 million gallons of diesel fuel.

Ogallala Success Story

New Mexico family helps conserve water, adopt dryland farming practices

Joseph and Jeremy Gonzales are doing something different with their Gonzales Land and Cattle operation in Lovington, N.M., and it's hard not to notice. The Gonzaleses' vibrant, green fields of alfalfa stand out from the surrounding brown fields. Some might wonder how these producers are beating the odds considering New Mexico's drought.

The secret is in the water—not how much is used, but how it is applied to crops. Thanks to the NRCS's EQIP program, the Gonzales brothers replaced their antiquated and inefficient pivot systems with the Low-Elevation Spray Application (LESA) system.

The LESA system provides a more even spray pattern so that most of the water dispensed reaches the soil. Other center pivot systems spray from a higher plane and are subject to solar and wind evaporation. The Gonzales brothers have also installed special nozzles and other additions to the system to make it even more efficient.

And instead of having to physically drive to the pivot system or turn a nozzle, they can use an app on their smartphones.

"Even with the drought and persistent heat and wind we have actually seen yield increases," Jeremy says.

The Ogallala Aquifer is the Gonzaleses' main source of water. The aquifer, which is vital to U.S. agriculture, has been shrinking at a rapid, unsustainable rate, making conservation even more important. In addition, the Gonzaleses have installed flow meters, chemigation valves and computerized pivot panels. The flow meters allow for a better measurement of the proper amount of water needed. The chemigation valve stops harmful pesticides and herbicides from entering groundwater.

“Even with the drought and persistent heat and wind we have actually seen yield increases.”

— Jeremy Gonzales

LESA/LEPA system on Gonzales' alfalfa field.

The computerized pivot panels allow the brothers to remotely operate their equipment and to easily adjust the amount they are applying, and the pivot panels have a text messaging feature that alerts the Gonzales brothers of any problems the system encounters.

"We are beginning farmers and the help from NRCS allows us to implement practices such as the LESA system," Jeremy says.

