



Western SARE Program

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Western SARE PDP

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Western SARE Grant Categories

- Research & Education
- Professional Development
- Farmer/Rancher
- Professional + Producer
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- Sustainable Farm Tours

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GROWING CROPS A DROP AT A TIME

Situation

Concern over aquifer dewatering in southeastern Colorado prompted the Baca Conservation District to join the Natural Resource Conservation Service in 2003 to offer irrigators a 75% cost-share incentive of \$900 an acre to install subsurface drip irrigation.

The idea was that drip irrigation, with efficiencies as high as 98%, could more efficiently deliver increasingly scarce water than either commonly used furrow irrigation or recently introduced center pivot systems. Frequent high winds reduce the efficiencies of both systems, furrow through evaporation and center pivot from interrupted spray patterns.

Driven by the need to use remaining groundwater more efficiently and by the high cost of pumping, growers are



Computer controls and filters for the drip irrigation system.

looking for more efficient, profitable systems to produce current crops that include corn, grain sorghum, sunflowers and wheat as well as high-value crops like cantaloupe, onions, squash and other vegetables.

Early experience with drip showed the need to develop better management practices suited to local conditions.

Objectives

- Test the performance of subsurface drip irrigation on high-value crops
- Assess tillage methods for maintaining beds over



Furrows are roughed to prevent damage from windblown sand.

subsurface drip lines in the same location

- Test plants for their ability to protect emerging high-value crops from blowing sand
- Find ways to improve the movement of water from subsurface drip lines to shallow-planted seed for adequate germination and emergence
- Disseminate findings to growers through field days and publications

Actions

Cooperators are Brent and Penni Morris, Baca County producers who own or rent 1,600 acres of dryland ground, growing wheat, grain sorghum and sunflowers, and 1,780 acres of irrigated ground, growing corn, grain sorghum, onions, sunflowers and wheat. Test plots were conducted on two zones (6.3

Professional + Producer

Project Number: FW05-309
Title: Management Practice for Drip Irrigation in Baca County, Colorado

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Producer Cooperator:
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Amount Funded: \$9,353



Western SARE, a USDA organization, funds grants for research and education that develop or promote some aspect of agricultural sustainability, which embraces

- *profitable farms and ranches*
- *a healthy environment*
- *strong families and communities.*

The Western Region, one of four SARE regions nationwide, is administered through Utah State University.

Western SARE:
<http://wsare.usu.edu>

National SARE:
www.sare.org

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acres each) of a 170-acre drip irrigation system, installed in 2003. Also involved was Mary Kay Higgins, a landowner and partner in the drip operation and considered locally as an agricultural innovator.

A specially designed disk (Arizona Drip Wide Bed Disk) was purchased and used to maintain beds as close as possible to the same location each year over the subsurface drip lines.

In spring 2005, oats were planted on the middle of the bed and in the furrow. In spring 2006, a mix of oats, triticale and wheat were planted on the middle of the bed, and the furrows were roughed.

AgriBlend (a combination of Hydrogel, a water-absorbing polyacrylamide, and Zeolite, a water-transporting volcanic material) were incorporated into beds in an attempt to improve germination of small, shallow-planted onion seed.

Results

- Tilling the beds with the specially designed wide-bed disk maintained the beds in the same location above the drip lines preventing their damage.
- The shield crops (oats and a mix of oats, triticale and wheat) and roughing of furrows substantially reduced damage from blowing sand and resulted in excellent stands of onions from seed.
- With well-timed rains in 2005 and 2006, germination in areas treated with AgriBlend and Zeolite and untreated areas produced similar stands.
- In 2005, onion yields in treated and untreated areas were similar: 986 50-pound bags per acre



Oats, triticale and wheat are planted in row middles to reduce wind erosion

under AgriBlend and 944 bags untreated.

- In 2006, yields varied widely by treatment: 955 bags under AgriBlend; 843 bags untreated. The area treated with AgriBlend also produced a higher number of jumbo-size onions, 628 bags per acre, compared with 510 bag untreated. (A bacterial soft rot infected onions in 2006, preventing commercial harvest.)
- A subsurface drip irrigation workshop was held Jan. 8, 2007, in Springfield, the seat of Baca County, attended by 20 people despite a 3-foot snowstorm the week before. A poster was presented and discussed at the 2006 Bi-annual Field Day at the Colorado State University Arkansas Valley Research Station in Rocky Ford attended by more than 120 people. The final report was also delivered to all area Natural Resource

Conservation Service offices. The final report, with photos, is on the CSU webpage, www.colostate.edu/depts/prc/pubs/tr07-13.pdf. The report is also available at: www.colostate.edu/~cwis303.

- The printed Technical Report TR07-13, June 2007, is available from the Colorado State University Agricultural Experiment Station, 121 Shepardson Building, Colorado State University, 3001 Campus Delivery, Fort Collins, CO 80523-3001.

Benefits/Impacts

Many of the groundwater aquifers in Colorado, Kansas and Texas and throughout the Southwest are being rapidly dewatered. With fuel costs rising, water tables dropping and pumping rates diminishing, subsurface drip irrigation offers a way to use less water and still produce a comparable or better crop, making it an economically sound method of irrigation, especially in windy, arid regions.

Many areas of the Southwest are faced with circumstances similar to those in Baca County, making information from this project useful in prolonging groundwater supplies and sustaining local economies.



Onions in September.