Irrigation Research and Extension Projects in the LRGV

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- 600,000 irrigated acres
- Cost of water ($7-$26.5 per acre-ft)
Main Crops in the LRGV

- Cotton: 26%
- Sunflower: 26%
- Sorghum: 16%
- Corn: 11%
- Oats: 12%
- Peanuts: 7%
- Vegetables: 1%
- Citrus: 1%
Irrigation systems in the LRGV

- Earth ditches: 33%
- Gated pipe: 10%
- Drip: 3%
- Sprinkler: 2%
- Poly-pipe: 52%

67% laser leveled
Grants projects

- Rio Grande Basin Initiative
- Arroyo Colorado Agricultural Nonpoint Source Assessment-Best Management Practices. TSSWCB
- Agricultural Demonstration Initiative. Harlingen Irrigation District. TWDB
- Evaluation of drip Irrigation. Cotton Incorporated-TSSC.
Objectives: trigger irrigation at various % ET levels and centibar readings

Design: 50%, 75% and 100% ET and 20 cb, 30 cb, and 50 cb

6 treatments replicated 3 times
Irrigation Scheduling (Melons)

- **Yield production functions**

- **Design:** 4 treatments replicated 3 times for irrigation scheduling (100%, 75%, 50% ET) variety primo.
Evaluation of SDI-Cotton Incorporated

Two journal paper in Fertigation
Demonstrations in Water Management

Water savings 5-40%
Comparison drip versus furrow irrigation on onions
Irrigation of citrus with microirrigation
Irrigation Scheduling—sensors

tensiometers

Granular matrix-watermark

echoprobess

[Images of various irrigation scheduling sensors and a person using an echoprobe in a field]
Drip tape experiments

- Emitter spacing
- Emitter flow rate
- Drip depth 6 in
Irrigation training
Irrigation Monitoring with Soil Water Sensors

Juan M. Enciso, Dana Porter and Xavier Pärés*

Monitoring soil water content is essential to help growers optimize production, conserve water, reduce environmental impacts and save money. Soil moisture monitoring can improve irrigation decisions, such as how much water to apply and when to apply it. It can also match water-applied irrigation with crop water requirements, avoiding over- or under-irrigating the crop. Over-irrigation can increase energy consumption and water cost as well as leaching of fertilizers below the root zone, erosion, and transport of soil and chemical particles to the drainage ditches. Under-irrigation can reduce crop yields.

Basic concepts

Soil water storage capacities are summarized by soil texture in Table 1. They are characterized by soil-specific parameters and are key to efficient irrigation management. These are defined as follows:

Field capacity is the soil water content after a heavy irrigation has finished and when the drainage rate changes from rapid to slow. This point is reached when all the gravitational water has drained (Figure 1). Field capacity is normally attained two to three days after irrigation and reached when the soil water tension is approximately 0.3 bars (30 centibars or 3 m of tension) in clay or loam soils, or approximately 0.1 bar in sandy soils.

Permanent wilting point is the soil water content at which plants cannot recover overnight from excessive drying during the day. This parameter, which may vary with plant species and soil type, has been determined in greenhouse experiments. It is attained at a soil water tension between 10 and 20 bars (102 to 204 m of tension).

Advantages of Using Pipes to Deliver Irrigation Water

Aimed at farmers and irrigators who want to irrigate their crops using flexible plastic pipes (commonly called “poly-pipes”), this publication highlights (1) advantages of using poly-pipes, (2) factors to consider in selecting such pipe, and (3) considerations for installing it.

- Increases in on-farm irrigation efficiency by avoiding water losses due to deep percolation from uneven or over-watered fields.
- Better irrigation control: Fluctuations in irrigation-related water levels are common. Using steel drums and siphon tubes requires intensive labor to avoid water spills as a result of such fluctuations (for example, siphon tubes may lose their vacuum and stop working). In contrast, a siphon-tubing system needs only to have an outlet opened to deliver water through the pipe to fields. Irrigation can be left unattended, even when fluctuations in water levels occur.

Using Flexible Pipe (poly pipe) with Surface Irrigation

Juan Enciso and Xavier Pärés*

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Advantages of Using Pipes to Deliver Irrigation Water

- Labor savings: In the Rio Grande Valley, water is distributed through pipes coming from the river and is delivered at different outlets (called turnouts). Systems designed to deliver one “head” of water at each turnout (one head equals approximately 8.8 or 15.48 gpm). One turnout is installed for each 60-acre field. Farmers may have field blocks larger than 40 acres, and sometimes farmers may irrigate several fields at the same time. With pipe-irrigation systems, one operator can control six to eight irrigation heads.

Types of Pipes Used to Deliver Water

Both gated pipes and poly-pipes can convey and deliver irrigation water. Gated pipes are rigid, made of aluminum or PVC, and generally less than 12 inches in diameter. Poly pipes are expensive but are flexible and expand when filled. They are made from polyethylene and are generally used for the larger pipe diameters needed to irrigate larger crops.

Selecting the Correct Type of Poly-pipe

The most important of several pipe-selection characteristics are thickness and diameter (see Table 1). Thickness determines pipe durability. Some farmers prefer thinner poly-pipe (6 mil) because poly-pipe is sold by weight; they can save money by accommodating on thickness. Poly pipes also come in larger thicknesses (15 mil), allowing more pressure to be contained (up to 5 feet of water head or 35 psi).
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