Water Conservation and Water Pricing in the Lower Rio Grande Valley

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Abstract:
The recent droughts in Texas have exacerbated the need for investigating water conservation methods to be used in the Lower Rio Grande Valley. This analysis illustrates the financial incentives to conserve water that may exist under volumetric water pricing. The Harlingen Irrigation District along with the Texas Water Development Board have recently implemented a project demonstrating water conserving practices. Initial demonstrations, for two 38-acre water sites, suggest the possibility of conserving water through the use of surge irrigation instead of traditional flood. However, the current abundance of surface water from the Rio Grande and existing pricing structures create no incentives for producers to invest in water conservation.

Introduction:
Surface water in the Texas Lower Rio Grande Valley is managed by the local irrigation districts. Historically, water usage in this area is paid for by access rather than volume. This pricing structure works well at times, but provides no financial incentive for the individual producer to conserve water. Existing state laws indicate that water is to be sold by volume. However, lack of metering equipment, tradition and the current availability of water makes these laws unenforceable. The potential of volumetric pricing structure is critical to financial viability and adoption of water conserving practices and systems.

Data:
Two specific 38-acre site demonstrations were linked to the Harlingen Irrigation District and the Texas Water Development Board demonstration projects in the Lower Rio Grande Valley. The 38-acre sites compare the use of surge irrigation to traditional flood in the production of cotton and sugarcane.

Methodology:
10 year financial simulation of returns for a specific enterprise using stochastic commodity prices and yields. Scenarios compare the financial performance of the enterprise under the existing water price structure and two volumetric pricing structures.

Results:
The implementation of surge irrigation appears to save water, but requires an initial investment of new equipment. With current water pricing the purchase of a surge irrigation valve is a losing proposition. However, if the current availability of low cost and plentiful irrigation water changes or if water districts switch to volumetric pricing, the profitability of both cotton and sugarcane production could be affected and the economic incentives to switch to surge irrigation systems will increase.

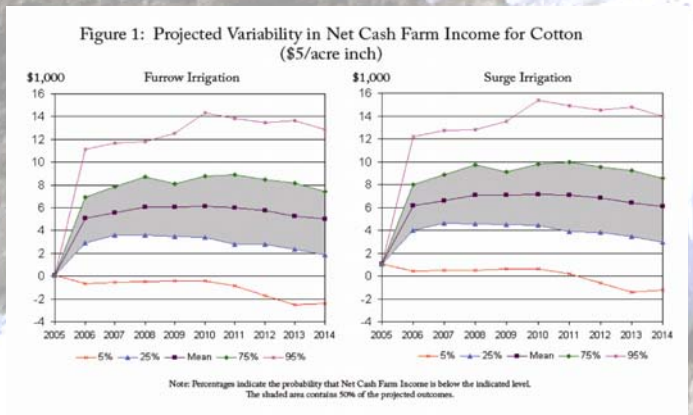
Cotton

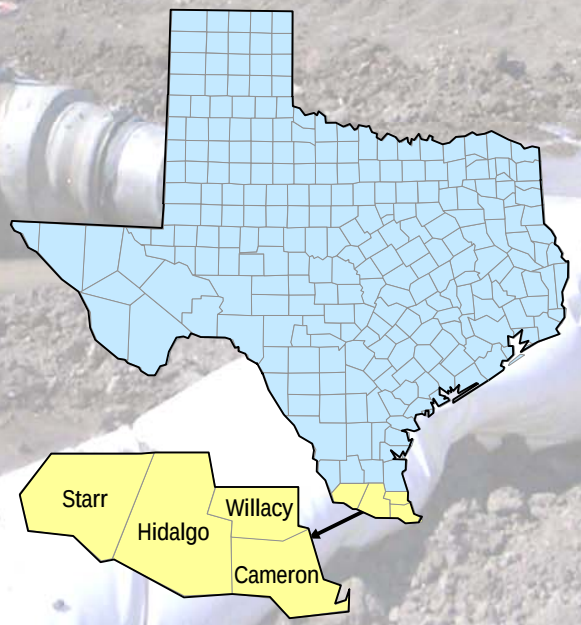
Table 1: Irrigation Application and Cost Information for 38 acre Cotton site, Volumetric Pricing

Irrigation Method	Acre Inches Applied	Cost Per Acre Inch	Water Cost Per Acre	Polypipe & Irrigation Labor Per Acre	Irrigation Cost per Acre	Surge Valve
Furrow-1	19.53	$1	$19.53	$18.00	$37.53	
Surge-2	13.48	$1	$13.48	$18.00	$31.48	$1,800
Furrow-3	19.53	$5	$97.65	$18.00	$115.65	
Surge-4	13.48	$5	$67.40	$18.00	$85.40	$1,800

Table 2: 10-year Average Financial Indicators for 38 acre Cotton site, Volumetric Pricing

Irrigation Method	Net Cash Farm Income ($1,000)	Prob Net Cash Income < 0 (%)	Avg Annual Operating Expense/Receipts
Furrow-1	8.28	1.00	0.74
Surge-2	8.35	1.00	0.74
Furrow-3	5.09	8.30	0.85
Surge-4	6.15	3.90	0.81





Conducted in Partnership with:

Agricultural Water Conservation Demonstration Initiative (ADI)

Harlingen Irrigation District

Texas Water Development Board

Sugarcane

Table 3: Irrigation Application and Cost Information for 38-acre Sugarcane site, Volumetric Pricing

Irrigation Method	Acre Inches Applied	Cost Per Acre Inch	Water Cost Per Acre	Polypipe & Irrigation Labor Per Acre	Irrigation Cost per Acre	Surge Valve
Furrow-1	30.68	$1	$30.68	$26.00	$56.68	
Surge-2	14.64	$1	$14.64	$26.00	$40.64	$1,800
Furrow-3	30.68	$5	$153.40	$26.00	$179.40	
Surge-4	14.64	$5	$73.20	$26.00	$99.20	$1,800

Table 4: 10-year Average Financial Indicators for 38-acre Sugarcane site, Volumetric Pricing

Irrigation Method	Net Cash Farm Income ($1,000)	Prob Net Cash Income < 0 (%)	Avg Annual Operating Expense/Receipts
Furrow-1	4.99	23.60	0.67
Surge-2	5.36	22.40	0.65
Furrow-3	0.70	46.30	0.84
Surge-4	3.33	30.90	0.73