

Cotton Irrigation Management with SDI (Field 2)
James P. Bordovsky, Cody Mull, and Megha Parajulee

Objective: To evaluate cotton production resulting from two management scenarios: 1) *High Input* which focuses resources on limited areas to achieve maximum lint yield and 2) *Normal Input* which distributes resources over a wider area to achieve more sustainable yields.

Methodology: Cotton was planted in a field where a ten-zone SDI system was installed. Irrigations were applied in alternate furrows of 30-inch rows with each zone 1300 ft by 16 rows wide and independently controlled and metered. Two cotton management strategies were compared. A *High Input*, high-yield management scenario with the production goal of 3.5 bales per acre and no restriction on input level was replicated in four plots. In 2004, the Fibermax 989BGRR variety received 16.3 inches of seasonal irrigation, 85 lbs. N/ac in daily seasonal drip irrigations, 17 oz. Pentia/ac in three directed spray application, and weekly scouting for insect pest control controlled at low thresholds. The *Normal Input* scenario, with an annual yield goal of 2.5 bales per acre, was also replicated four times. Paymaster 2326RR cotton variety was seasonally irrigated with 12.2 inches of water, 42 lbs of N/ac was injected with irrigations, and insects controlled at normal thresholds. Two additional plots were treated as dryland production.



Fig. 1. Measuring potential ET in SDI management plots with an ET gauge.

Results: Until 2004, the *High Input* methodology resulted in significantly higher lint yield, better fiber quality resulting in higher loan values, and higher seasonal irrigation WUE than the *Normal Input* treatments. However, in the high rainfall year of 2004, the *High Input* treatment produced 49 lb/ac less lint than the *Normal* treatment. Estimated gross lint value and seasonal irrigation WUE were also higher in the *Normal Input* treatment than *High* treatment. Over the three year period from 2002 through 2004, the average yield difference, loan value, and seasonal irrigation WUE between the two management treatments were 288 lb/ac, \$159/ac, and 6 lb lint/ac-in in favor of the *High Input* treatment. Therefore, based on the results to date, concentrating available water resources in a smaller area, meeting evaporative demand, and utilizing higher levels of inputs and management than normally used with traditional irrigation systems appears to be the better option when using SDI systems on the South Plains.

Table 1. Comparison of cotton lint yield, loan values, and water use efficiency from *Normal* and *High Input* treatments irrigated by SDI in 2004 and three year average from 2002 to 2004..

	2004		Difference	Average of 2002 -2004		
	<i>Normal Input</i>	<i>High Input</i>		<i>Normal Input</i>	<i>High Input</i>	Difference
Yield (lb lint/ac)	1655 a	1606 a	-59	1242	1530	288
Loan Values (\$/ac)	0.494 a	0.472 b	-.022	0.485	0.499	0.014
Gross Value @ Loan (\$/ac)	818	759	-59	605	764	159
Seasonal Irr. WUE (lb lint/ac-in)	68 a	48 b	-20	72	78	6

* Means followed by the same letter in the same row for a given year are significantly different (P<0.05, Duncan)