



## Furrow Diking to Improve Water Capture and Soil Erosion

### PROBLEM:

Crop production in Georgia and the Southeast is water limited. Drought-prone soils are susceptible to runoff and erosion. Agricultural and urban water demand as well as rising fuel costs causes producers to reduce input costs in farming operations. Sound irrigation/water management decisions ensure efficient water use, natural resource conservation, and farm profitability. Increased water capture would efficiently improve natural water use and reduce supplemental irrigation and other input costs, thus sustaining crop production and improving producer's profit margin. Furrow diking creates a series of surface storage basins between crop rows to catch and retain rainfall and/or irrigation. We evaluated furrow diking as a practice to improve water capture and reduce soil loss.

### STUDY DESCRIPTION:

The field site (loamy sand soil) near Dawson, GA was managed to diked tillage and non-diked conventional tilled systems (with and without a shank) to irrigated cotton. Diking and simulated rainfall (2 in/h for 1 h) were performed at 0 and 60 days after planting.



### APPLIED QUESTIONS:

***What was the effect of diked tillage on infiltration, runoff, and soil loss?*** Diked tillage increased infiltration and plant available water up to 26%; and decreased runoff up to 43%, and soil loss up to 2.8-times.

***When is the best time to dike - at planting or at the beginning of a critical water requirement time for cotton (60 after planting)?*** Diked tillage at 60 days after planting increased infiltration and plant available water up to 26%, decreased runoff up to 2.3-times, and decreased soil loss up to 33%.

***Given energy/fuel, equipment, and convenience considerations, is diking more effective when a shank is used?*** Diked tillage using shank increased infiltration and plant available water up to 23%; and decreased runoff up to 61% and soil loss up to 2.2-times.

### BENEFIT TO CUSTOMER:

Diked tillage with a shank at 60 days after planting cotton had 90% more infiltration and days of water (rainfall) for crop use, 67% more days of irrigation for crop use, and 3-times less runoff and soil loss than non-diked tillage without a shank. Based on \$12 per acre\*inch to pump irrigation water and \$7.50/A for furrow diking, producers would recover 60% of their diking cost by saving the first acre-inch of water and 100% of their diking cost by saving 1.25 acre-inches of water. Water and financial savings do not include the environmental benefits of reduced natural resource consumption, runoff, soil erosion, and associated contaminants. Furrow diking with a shank is a cost-effective management practice for producers in Georgia and the Southeast that positively impacts natural resources, producer profit margins, and environmental quality.



Tillage	Shank	Rainfall DAP	Infiltration		Runoff		Erosion t/A	PAW 1 inch days	PAW 2 inch days	Irrigation in or #	Cost per A*in \$
			in/h	%	in/h	%					
CT		0	1.5	72	0.6	28	1.16	7.8	6.5		
<b>CT</b>		<b>60</b>	<b>0.9</b>	<b>47</b>	<b>1.0</b>	<b>53</b>	<b>1.08</b>	<b>4.8</b>	<b>3.8</b>	<b>20</b>	<b>240</b>
DT		0	1.5	74	0.6	26	0.43	8.0	6.3		
DT		60	1.1	59	0.8	41	0.55	6.2	4.8		
DT	✓	0	1.7	83	0.4	17	0.41	7.8	7.0		
DT	✓	60	1.3	66	0.7	34	0.36	6.5	5.7		
<b>DT*</b>	<b>✓</b>	<b>60</b>	<b>1.7</b>	<b>85</b>	<b>0.3</b>	<b>15</b>	<b>0.33</b>	<b>8.0</b>	<b>7.2</b>	<b>16.7</b>	<b>200</b>
<b>Diff</b>				<b>38</b>		<b>38</b>	<b>0.75</b>	<b>3.2</b>	<b>3.4</b>	<b>3.3</b>	<b>40</b>
						<b>3.5X</b>	<b>3.3X</b>	<b>66%</b>	<b>89%</b>	<b>20%</b>	<b>20%</b>

**Furrow diking net savings: \$40-\$7.50=\$32.50/A**

PAW=plant available water for 1 & 2 inch rainfall amounts (assume ET=0.25 in/day).

\$12 per A\*in; Furrow diking=\$7.50/A

\*60 Days after planting

Dr. Clint Truman  
 USDA-ARS Southeast Watershed Research Lab  
 POB 748, 2375 Rainwater Rd., Tifton, GA 31793  
 229-386-7174 (O)  
[Clint.Truman@ars.usda.gov](mailto:Clint.Truman@ars.usda.gov)

Dr. Russell Nuti  
 USDA-ARS National Peanut Research Lab  
 POB 509, 1011 Forrester Dr., Dawson, GA 39842  
 229-995-7449 (O)  
[Russell.Nuti@ars.usda.gov](mailto:Russell.Nuti@ars.usda.gov)