

**ECONOMIC ANALYSIS  
OF ULTRA-NARROW-ROW  
COTTON PRODUCTION IN THE COASTAL  
PLAIN REGION OF GEORGIA**

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**Abstract**

Crop enterprise budgets were developed for both ultra narrow row cotton (UNRC) and conventional row cotton to evaluate and compare the total costs of each system. This study involved three replicated trials at two locations during the 1998 crop year. Results from these three trials indicated that UNRC had a slightly lower total cost per pound compared to conventional cotton in 2 of the 3 tests. In the third test, cost of production for UNRC was approximately 10 cents per pound higher. An analysis of the Variable Costs found that UNRC was considerably more costly when compared to conventional row cotton ranging from \$17.32 to \$31.84 per acre more. The difference in Variable Costs was largely a function of higher seed and chemical expenses. Fixed Costs, however, were less for UNRC compared to conventional row cotton averaging \$30.10 per acre less. This decrease in Fixed Costs was largely due to the lower investment cost of a finger stripper compared to a conventional picker harvester. Fixed Costs for pre-harvest machinery and equipment were highly variable. These costs for UNRC can be higher or lower than conventional production depending on jobs saved or added, method of UNRC planting and ability to spread fixed costs over other enterprises. Yield differences for two of the trials were negligible ranging from 7 to 13 lbs of lint cotton. However, the third trial had a significant yield difference in which the conventional 38" row cotton out-yielded the UNRC cotton by 153 lbs of lint. Although not included in this study, several on-farm trials both replicated and non-replicated reported yield increases including 48, 123, 306, and 428 lbs of lint for the UNRC system. Grade and quality data and price differences were not yet available for this study. Assuming no quality discounts, Net Income for UNRC averaged \$19.18 per acre higher than conventional in 2 of 3 trials. In the third trial, Net Income from UNRC was \$103.58 per acre less than conventional production. In 2 of the 3 trials, Total Cost of production for UNRC averaged 2.2 cents per pound less than conventional. Experiences thus far suggest, however, that price discounts for UNRC are more than this amount. Without considerable yield or cost advantage to UNRC, such discounts would negate cost savings of the magnitude found in this study.

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**Introduction**

Cotton producers continue to strive for ways to reduce production costs and improve efficiency. As in other cotton-producing states, Georgia farmers are also investigating the costs and benefits of ultra-narrow-row cotton production (UNRC). UNRC has been defined as cotton grown in row widths of 10 inches or less with plant populations ranging from 100,000 to 150,000 plants per acre.

In addition to university-based and private research trials, a number of Georgia producers planted UNRC in 1998 to test this practice under their own farm conditions and management levels.

Lower cotton prices during the past 2-3 seasons combined with increased cost of inputs, has caused cotton growers to search for ways to improve profit margins. Availability and use of complimentary inputs such as over-the-top herbicides, herbicide-resistant varieties, and plant growth regulators have made UNRC more practical.

The objectives of this study were to evaluate the profitability of UNRC compared to conventional cultural practices typical of cotton production in the Coastal Plain region of Georgia.

**Production Practices and Sources Of Data**

This study consisted of 3 replicated trials at 2 locations during the 1998 crop year. The first trial consisted of UNRC and conventional cotton under irrigation on the same soil type produced at the Southwest Georgia Experiment Station at Plains. The second trial consisted of UNRC and conventional cotton, non-irrigated, on the same soil type produced at the Southwest Georgia Experiment Station at Plains. The third trial consisted of UNRC and conventional cotton under irrigation on the same soil type produced at the Southeast Georgia Experiment Station at Midville.

Detailed records of inputs and production practices were kept and used to compile enterprise cost for both UNRC and conventional production. Costs were derived by adjusting from University of Georgia Extension Service budgets (Givan and Shurley) for the actual costs and inputs, machinery and equipment, and yields from the trials.

Tables 1-3 show a side-by-side comparison of inputs and practices employed under UNRC and conventional production at each location.

**Results**

**Yield Per Acre**

At this time, ginning data has not been received. Yields for both UNRC and conventional cotton were estimated from

seed cotton yields assuming a gin turnout of 28% for UNRC and 35% for conventional.

At the Plains location, irrigated UNRC averaged 13 pounds per acre higher than conventional irrigated production (Table 4). For non-irrigated cotton at Plains, UNRC averaged 7 pounds per acre high than conventional. These differences were statistically insignificant.

Irrigated UNRC at Midville averaged 153 lbs per acre less than irrigated conventional production.

### **Cost of Production**

An examination of Tables 1-3 reveals that, in general, with exception of the obvious difference in harvest technique, production practices and inputs for UNRC were similar to conventional production. The only notable differences include elimination of bedding in UNRC, increased seed population per acre in UNRC, lack of cultivation in UNRC, and additional application of harvest-aid in UNRC. Fertilizer, herbicide, and insecticide programs were the same for either system. UNRC was irrigated the same as conventional cotton.

Cost budgets are shown in Tables 5-7. Total Cost was calculated as Variable Cost plus machinery and equipment and irrigation Fixed Cost (depreciation, interest, and insurance). Total Cost excludes land, management, and miscellaneous overhead.

Total Cost per acre was less for UNRC compared to conventional cotton in 2 of the 3 tests. For irrigated production at Plains, Total Cost per acre (excluding land, management, and miscellaneous overhead) was \$496.85 per acre and \$484.00 per acre for conventional and UNRC respectively. For non-irrigated production at Plains, Total Cost per acre was \$332.51 per acre and \$320.01 per acre for conventional and UNRC respectively. For irrigated production at Midville, Total Cost per acre was \$566.88 per acre and \$571.01 per acre for conventional and UNRC respectively.

Variable Cost was higher for UNRC due to increased inputs such as seed, chemicals, and custom application. Results show machinery and equipment fuel/lube/repair expenses to be less for UNRC. Although previous study (Brown, Cole, and Alphin) shows savings in labor, results of this study show little difference in labor expense. UNRC labor savings during the pre-harvest period related to less tillage appear to be offset by additional chemical sprays and higher labor requirement of handling more material (more trash, etc. per pound of lint) at harvest.

UNRC was planted with a precision drill and harvested with a finger stripper. Fixed Cost of UNRC production averaged \$30.11 per acre less than conventional production. UNRC savings on Fixed Cost were largely offset by higher

Variable Cost thus less savings in Total Cost for UNRC than otherwise might be realized.

### **Profitability**

Data on grade and quality differences were not available at this time. Thus, any price differentials (gin and/or merchant discounts) that might be applicable have not been included in the study. Nevertheless, profitability can be determined for the costs and yields observed and assuming various scenarios regarding quality and price.

Table 8 presents a summary of costs and benefits of UNRC versus conventional assuming 65 cents per pound and no quality discounts. This price approximates the expected average market price for the 1998 crop.

Irrigated UNRC at Plains produced \$21.30 higher Net Income than conventional. For non-irrigated production at Plains, Net Income for UNRC was \$17.05 per acre higher than conventional. Irrigated UNRC at Midville resulted in \$103.58 lower Net Income than conventional production.

Although quality data is not yet available for this study, discussions with cotton growers and merchants suggest that it is common for UNRC to quality receive discounts for trash and bark and or other factors such as staple and micronaire. Others suggest that some gins discount UNRC to cover additional cost of handling and cleaning. Assuming a 4-cent discount for UNRC, Change In Net Income in Table 8 would be -\$23.30 per acre for the irrigated trial at Plains, -\$8.11 per acre for the non-irrigated trial at Plains, and -\$139.26 per acre for the irrigated trial at Midville.

### **Conclusions**

For ultra-narrow-row cotton to be a viable alternative to conventional cotton, it must be proven to be cheaper to grow and/or have increased yields. Grades, quality, industry acceptance, and further agronomic and economic evaluation will be necessary before adoption will be common-place.

This study represents only 1 year's data at 2 locations. Thus, it is difficult to draw specific long-term meaningful comparisons. Results of this study are mixed. Whereas UNRC was more profitable than conventional production in 2 of the 3 tests, this was contingent on no price discounts.

It is also a conclusion of this study that the success and profitability of UNRC may be more dependent on the management skills and production techniques employed. Machinery costs, for example, vary depending on method used for planting and fixed costs spread over other enterprises. Further, although many practices and inputs were the same for UNRC and conventional cotton in this study, this may not be the case in all situations.

In summary, the technology now exist for UNRC to be a potentially viable alternative to conventional cotton production. Individual farmer management can make a difference (Kerby). Potential advantages on UNRC would include possible yield increase, reduction in harvest costs, earlier maturity, more uniform fiber quality, later planting, and suitability on marginal land. Disadvantages would include price discounts, possible higher pre-harvest variable costs, and higher labor requirement.

In the irrigated test at Plains, Total Cost was 45.1 cents per pound of lint for conventional and 43.4 cents per pound for UNRC. In the non-irrigated test at Plains, Total Cost was 53.5 cents per pound for conventional and 50.9 cents per pound for UNRC. In the irrigated test at Midville, Total Cost was 54.2 cents per pound for conventional and 64 cents per pound for UNRC. Thus, in 2 of the 3 tests, Total Cost of production for UNRC averaged 2.2 cents per pound less than conventional. Experience suggest, however, that price discounts for UNRC may be equal to or more than this amount. Therefore, without considerable yield and cost advantage to UNRC, such discounts would negate cost savings of the magnitude found in this study.

### References

- Brown, A.B., T.L. Cole, and J. Alphin. Ultra Narrow Row Cotton: Economic Evaluation of 1996 BASF Field Plots. 1998 Proceedings of the Beltwide Cotton Conference. 88-91.
- Givan, William, and Don Shurley. Crop Enterprise Cost Analysis: South Georgia 1998. Cooperative Extension Service, University of Georgia, November 1997.
- Kerby, Tom. UNR Cotton Production System Trials In The Mid-South. 1998 Proceedings of the Beltwide Cotton Conference. 87-88.

Table 1. Comparison of UNRC and conventional production practices for irrigated trials, Plains, Ga, 1998.

	Conventional	UNRC
Fertilizer 300# 3-9-18	X	X
Subsoil 2x	X	X
Bed	X	
Disk with Treflan	X	X
Plant (3 seed per ft)	X (36" rows)	X (10" rows)
Cotoran + Prowl	X	X
Irrigation 8x	X	X
Orthene	X	X
Cultivate	X	
Apply N	X	X
Pix	X	X
Karate + Ovasyn or Dimethoate	X	X
Scout + Ovasyn	X	X
Cotton Quick + Dropp	X	X
Starfire		X
Harvest and Mow Stalks	Picker	Finger Stripper

Table 2. Comparison of UNRC and conventional production practices for non-irrigated trials, Plains, Ga, 1998.

	Conventional	UNRC
Fertilizer 500# 0-14-14	X	X
Disk 2x	X	X
Subsoil 2x	X	X
Bed	X	
Disk with Treflan	X	X
Plant (3 seed per ft)	X (36" rows)	X (10" rows)
Cotoran + Prowl	X	X
Orthene	X	X
Cultivate 2x	X	
Apply N	X	X
Karate + Ovasyn or Dimethoate	X	X
Scout + Ovasyn	X	X
Cotton Quick + Dropp	X	X
Starfire		X
Harvest and Mow Stalks	Picker	Finger Stripper

Table 3. Comparison of UNRC and conventional production practices for irrigated trials, Midville, Ga, 1998.

	Conventional	UNRC
Fertilizer 453# 7-11-18	X	X
Disk	X	X
Bed	X	
Chisel		X
Tillovate	X	X
Plant (3 seed per ft)	X (38" rows)	X (10" rows)
Cotoran + Prowl	X	X
Irrigation 12x	X	X
Buctril	X	X
Cygon	X	X
Pix	X (12 oz)	X (20 oz)
Karate + Larvin	X	X
Cotton Quick + Dropp	X	X
Starfire		X
Harvest and Mow Stalks	Picker	Finger Stripper

Table 4. Yield (lbs per acre) of UNRC and conventional cotton under irrigated and non-irrigated production, Plains and Midville, Ga, 1998.

	Irrigated- Plains	Non-Irrigated- Plains	Irrigated- Midville
UNRC	1,115	629	892
Conventional	1,102	622	1,045
Difference	+13	+7	-153

Table 5. Cost of production per acre for UNRC and conventional trials, irrigated production, Plains, Ga, 1998.

	Conventional	UNRC
Seed *	8.80	31.67
Fertilizer and Lime	34.01	34.01
Chemicals	112.27	121.08
Custom Operations	3.50	7.00
Irrigation	36.00	36.00
Fuel, Lube, and Repair	50.01	34.04
Scouting and BWEP	11.00	11.00
Labor	26.24	26.55
Ginning and Warehousing (Net)	50.18	49.59
Operating Interest	14.09	15.07
<b>Total Variable Cost</b>	<b>346.10</b>	<b>366.01</b>
Machinery/Equip- Preharvest	21.67	20.91
Irrigation	70.00	70.00
Machinery/Equipment- Harvest	59.08	27.08
<b>Total Fixed Cost **</b>	<b>150.75</b>	<b>117.99</b>
<b>Total Cost **</b>	<b>496.85</b>	<b>484.00</b>

\* Sure Grow 125 Orthene (3-way) treated seed

\*\* Excluding land, management, and miscellaneous overhead

Table 6. Cost of production per acre for UNRC and conventional trials, non-irrigated production, Plains, Ga, 1998.

	Conventional	UNRC
Seed *	8.80	31.67
Fertilizer and Lime	50.76	50.76
Chemicals	61.49	70.30
Custom Operations	3.50	7.00
Fuel, Lube, and Repair	52.84	35.38
Scouting and BWEP	11.00	11.00
Labor	26.17	24.64
Ginning and Warehousing (Net)	27.99	28.31
Operating Interest	10.73	11.54
<b>Total Variable Cost</b>	<b>253.28</b>	<b>270.60</b>
Machinery/Equip- Preharvest	31.32	27.45
Machinery/Equipment- Harvest	47.91	21.96
<b>Total Fixed Cost **</b>	<b>79.23</b>	<b>49.41</b>
<b>Total Cost **</b>	<b>332.51</b>	<b>320.01</b>

\* Sure Grow 125 Orthene (3-way) treated seed

\*\* Excluding land, management, and miscellaneous overhead

Table 7. Cost of production per acre for UNRC and conventional trials, irrigated production, Midville, Ga, 1998.

	Conventional	UNRC
Seed *	36.29	66.67
Fertilizer and Lime	52.68	52.68
Chemicals	120.46	135.35
Custom Operations	3.50	7.00
Irrigation	54.00	54.00
Fuel, Lube, and Repair	47.68	34.21
Scouting and BWEP	11.00	11.00
Labor	23.01	24.79
Ginning and Warehousing (Net)	47.03	40.14
Operating Interest	17.44	19.29
<b>Total Variable Cost</b>	<b>413.29</b>	<b>445.13</b>
Machinery/Equip- Preharvest	24.51	28.80
Irrigation	70.00	70.00
Machinery/Equipment- Harvest	59.08	27.08
<b>Total Fixed Cost **</b>	<b>153.59</b>	<b>125.88</b>
<b>Total Cost **</b>	<b>566.88</b>	<b>571.01</b>

\* Stoneville 4740BG

\*\* Excluding land, management, and miscellaneous overhead

Table 8. Summary partial budget of per acre costs and benefits of UNRC compared to conventional production, Plains and Midville, Ga, 1998.

	Irrigated- Plains	Non-Irrigated- Plains	Irrigated- Midville
Change In Cotton Income *	+8.45	+4.55	-99.45
Change In Variable Costs	+19.91	+17.32	+31.84
Change in Fixed Costs	-32.76	-29.82	-27.71
<b>Change in Net Income</b>	<b>+21.30</b>	<b>+17.05</b>	<b>-103.58</b>

\* Assuming 65 cents per pound for both UNRC and conventional production and assuming no quality or other discounts.