ECONOMIC COMPARISON OF 30 AND 38 INCH ROW SPACING IN NO-TILLAGE COTTON

Chuck Danehower, Delton C. Gerloff,
and Estel H. Hudson,
Agricultural Extension Service
The University of Tennessee
Knoxville, TN

Abstract

With the advancement in narrow-row technology, cotton producers in Tennessee are exploring the validity of changing from 38-inch row to 30-inch row production systems. Narrow-row production systems are more costly, thus making it necessary for an increase in production to offset that cost. Narrow row systems also require more intensive management than conventional row width systems. Before making a change in production systems, cotton producers should examine their individual situation through whole farm financial planning.

Introduction

There have been several articles written about the viability of changing cotton production over to a narrow row system. Extension and Research Specialists from various states have researched and discussed the subject. The purpose of this paper is to review the latest research on row width, and provide an economic analysis of narrow versus conventional width production systems.

Review of Research

In Mississippi, Williford conducted a five-year study (1987-1991) on 40 inch versus 30 inch row production in cotton. Five year average yields were 73 to 79 pounds more per acre in the narrow row cotton. However, the produc-tion system used in the Williford study may not be comparable with Tennes-see research. Williford noted that equipment modifications were required to change to the 30 inch production system. Also, higher management levels were required in the narrow row production system, primarily due to the shorter time frames available for production input applications (insecticide, herbicide, growth regulator, etc.)

An Arkansas study similarly found significantly higher yield in narrow rows (30 inch) cotton, compared to 38 inch rows (Keisling). In conventional tillage, 222 pounds more cotton were harvested from the narrow row system. The study was only for one year, 1991.

A three year (1992-1994) South Carolina study (Khalilian) reported a one year increase of 23 percent in narrow-row 30-inch conventional tilled cotton as compared to 38-inch conventional tilled cotton. However, there was no significant difference in yield due to row spacing in either of the other two years.

In a three year (1992-1994) Tennessee study, row spacing had no significant effect upon lint yields. However, in individual years, a given row spacing tended to produce more, about the same, or less cotton than the other spacing. Thus, the effect of row spacing upon lint yield appears to be highly dependent upon the nature of the production season.

From the research conducted, it would appear that there is no consensus, at present, for yield differences when comparing 30 and 38 inch cotton production systems.

Comparing The Costs

To compare the two systems, a partial-budgeting technique was used. Differences in production costs for both systems were calculated for cotton, and yield differences necessary to equate the break even costs for the two systems were computed. Machinery costs for cotton are taken from Table II and III . Costs are affected by expected life of the machine, in hours (column 2), and the hours of use per year (column 3). For example, the 4 and 5 row cotton pickers' cost is based on harvesting 900- 1,000 acres per year.

The cost items that will be affected in changing from 38" to 30" row spacing for cotton include machinery, seed, and chemicals. Machinery costs for the 38" spacing were based on using an 8-row planter and a 4-row picker, with an investment cost of $200,000. For the 30" row spacing, a 10-row planter and a 5-row picker were used, at an investment cost of $221,000 (see Table II for cost breakdown).

Also, with a 38" row spacing, there are 13,756 linear feet per acre, compared with 17,424 linear feet with 30" spacing. This increase of 27% in row feet results in a 27% increase for in-furrow fungicides that are banded. The seed costs also reflect the combination of changed row space and seeding rates for the 30" cotton.

Other costs, such as tractor, spraying, and fuel costs would not be affected significantly by the change to 30" row spacing, because an 8-row 38" planted and a 10-row 30" cover a width of 304" and 300", respectively. The same analysis applies to the 4 and 5 row pickers.

Table I lists the increased costs associated with changing to 30" rows for cotton as $13.37 per acre. Dividing the cost of changing to the 30" rows by the price of cotton gives the additional yield required to equate the two systems financially. For example, if the price of cotton were $0.65 per pound, it would require 20.5 pounds more cotton lint produced per acre on the 30" cotton to pay for switching to

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the narrower row spacing. Yield increases above 20.5 pounds per acre would give positive returns to switching to the narrower row system. However, no clear signal has come through the research as to the yield differences in narrow row cotton production.

As a side-note, for conventionally-tilled cotton, the cost comparison would be essentially the same. The narrower row cotton under conventional tillage would require an additional $1.80 per acre in costs if the pre-emerge herbicide is banded.

Other Implications

When considering a whole-farm application to changing row width, the decision is more challenging. For example, if a producer grows a substantial acreage of soybeans, the decision must be made whether or not to switch all crops. It would not seem feasible, unless farming large acreage of each crop, to change cropping systems for each individual crop.

Soybeans research has shown row spacing should be 20" or less for soybeans planted late-season. If 30" row planters can not be adjusted to 20" rows for soybeans, the loss in yield of later-planted soybeans by changing to the 30" system must be taken into consideration .

The machinery costs contained in Table I were based on the hours of use reported in columns two and three of that table. Based on the hours in the table, 4 and 5 row cotton pickers could harvest 900 -1000 acres per year. The planter could plant 1000 acres based on the hours specified in Table II.

Costs for narrow row corn production are only slightly higher than wider row production. Only sight yield increases are needed for feasible narrow-row production in corn.

If a producer with substantial cotton and small corn acreage has 38" row equipment in good operating condition, it is doubtful net income could be improved by changing to 30" rows. Also, the narrow-row picker and planter are $14,000 and $7,000 higher in price than the conventional picker and planter, respectively. If this additional cost is financed over five years at 9% interest, principal and interest costs would increase over $5,400 per year. For an 850-acre farm, costs would increase about $6 per acre. This additional cost would increase the breakeven yield to switch to narrow-row production to a 30 pound increase per acre.

Summary and Conclusions

Research in the area of narrow-row production cotton is limited and inconclusive regarding yield response. Costs of narrow-row are significantly larger for cotton production. Yield increases of 20.5 pounds per acre are necessary to break even on changing to narrow-row production of cotton.

The relative number of acres of each crop grown on a farm, the management ability of the producer and the machinery requirements of either narrow row or conventional-spaced production are factors that make the decision of changing to a narrow-row system more difficult. To determine the feasibility of such a change for an individual farm, it is necessary to develop a whole farm financial plan.

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Table I. Comparison of per acre costs for 38 and 30 inch row spacing for cotton.

ITEM	38 INCH	30 INCH	DIFFERENCE
Planters	$ 4.05	$ 5.24	+1.19
Pickers	$42.30	$46.17	+3.87
Seed	$9.00	$10.50	+1.50
Insecticide	$11.02	$14.00	+2.98
Fungicide	$14.20	$18.03	+3.83
		TOTAL	+13.37

Table II. Machinery cost assumptions of 38" and 30" row (no-till)

	New Cost	Life in Hours	Hours Used/Year	Machine hrs./ac.
Planter				
8 row 38"	25,000	1,500	100	.0987
10 row 30"	32,000	1,500	100	.10
Pickers				
4 row 38"	175,000	3,000	300	.3098[1]
5 row 30"	189,000	3,000	300	.3145[1]

1. Assumes half of cotton acreage is picked twice. First picking at 3 mph and second at 5 mph.

Table III. Machinery cost assumptions of 38" and 30" row (no-till).

	Fixed Cost[1]/ acre	Repair Cost/ Acre	Interest Cost[2]/ Acre	Total Cost/ Acre
Planters				
8 row 38"	1.71	1.23	1.11	4.05
10 row3 0"	2.20	1.60	1.44	5.24
Pickers				
4 row 38"	17.42	16.75	8.13	42.30
5 row 30"	19.08	18.17	8.92	46.17

1. Assumes 10 % salvage value, insurance costs of .012 times the new cost and storage costs of .193 times storage space.
2. Interest cost per year is .09 times 1/2 the new cost.