ECONOMIC EVALUATION OF ULTRA NARROW ROW COTTON ON A WHOLE FARM BASIS

S. Gary Bullen and Blake Brown
North Carolina State University
Raleigh, NC

Abstract

Cotton growers are showing renewed interest in Ultra Narrow Row Cotton (UNR) because of the potential for higher yields and lower machinery costs. Most studies have compared the costs of UNR cotton and conventional cotton by developing enterprise budgets. The objective of this study was to compare whole farm returns of Ultra Narrow Row cotton to alternative crops of soybeans, and wheat/soybean double crops, with various price and yield variations. North Carolina crop budgets were used in FINPACK, a whole farm financial planner, to determine farm level effects. With increased yields and a three-cent discount, UNR had a higher net farm income than soybeans or wheat/soybean double crop. With a six-cent price discount, UNR was more profitable than soybeans. Some studies have suggested UNR have the most potential on marginal cropland. Crop yields were reduced ten and twenty percent to simulate marginal land crop yields. With reduced yields, UNR was the most profitable.

Introduction

UNR cotton is planted in rows of 10 inches or less with high plant populations. This prevents the use of mechanical cultivation and hooded herbicide sprayers. UNR has been made possible because of improvements in weed control and plant growth regulators. Cotton specialists are predicating UNR acreage will continue to increase. Cotton growers are interested in UNR because of the potential for increased profitability through increased yields and reduced per unit costs. Machinery costs is one of the main areas of cost reduction. The initial cost of stripper harvesters is about half the initial cost of spindle pickers. In addition, stripper harvesters are considerably less expensive to maintain.

It is often assumed that UNR cotton has a potential to lower costs by increasing yields. However, past studies have not been conclusive. One study found little difference between UNR yields and conventional cotton yields on two of three trials (Wilson et al.1998). While a North Carolina study found substantial increased yields on four of the five farms reviewed (Brown, Cole, and Alphin, 1997). It is difficult to compare the yields in most studies, since UNR and conventional cotton are not always grown on similar quality soil types. This study will assume UNR cotton and conventional cotton yields are the same, at 700 lbs. per acre.

This will be the base for comparing alternative price discounts and variations in yield.

Recent studies compare UNR cotton and conventional cotton by developing enterprise budgets. Variable costs per acre have been found to be $30 to $40 lower for conventional cotton as compared to UNR cotton. Higher chemical and seed costs are the main differences. Variation in fixed costs will be a function of a number of operations performed and type of equipment used. Fixed costs for conventional cotton is usually five to fifteen dollars higher than UNR cotton. While most studies conclude that UNR cotton has the potential to lower per lb. costs and increase profitability, few studies looked at quality discounts of UNR cotton vs. conventional cotton. One Tennessee study found significantly more trash in stripper cotton which lead to quality discounts (Gwathmaey, 1998). The key to UNR cotton success is the acceptance by the end users. Currently, discounts for UNR cotton range from three to twelve cents per lb.

Objectives

With depressed commodity prices, cotton growers are looking for ways to increase farm income. The objective of this study is to address three questions on UNR cotton. 1How does UNR cotton compare with traditional crop enterprises? 2. What enterprises could result in higher net farm income on marginal land? 3. How quality discounts will affect profitability of UNR cotton?

Data and Methods

The model cotton farm data was compiled by interviewing cotton growers and county extension agents in North Carolina. Most Central Coast cotton farms have a crop mix of tobacco, cotton and soybeans, or wheat/soybeans double crop. The model farm has 81 acres of tobacco and 800 acres of cotton. The total acres farmed will be 1,231. The model farm was developed to review income effects of adding different enterprises for the remaining 350 acres. FINPACK a whole farm financial planning software package was used to address this question. Analyzing UNR cotton with FINPACK allows for the comparison of whole farm effects of adding UNR cotton, soybeans or wheat/soybean double crop on the additional 350 acres. FINPACK requires balance sheets and enterprise budgets that were developed from the farm interviews.

Several important assumptions were incorporated into the model farm. It was assumed that the cotton farm had a debt to asset ratio of 35 percent, and that approximately 25 percent of the land farmed are owned. The other 75 percent would be rented for $60 per acre for cotton land and $40 for all other crops.

Since the 350 acres could not justify additional equipment, it was assumed that the only new equipment purchased would be a stripper head. The additional cropland would be custom harvested. Purchase of a stripper harvester or a combine could not be justified unless additional land was acquired. The decision to purchase a combine or stripper harvester could affect the outcome of this study. New combines usually cost around $200,000, compared to $100,000 for a stripper harvester.

North Carolina State University enterprise budgets were used to develop variable costs for this study. UNR cotton budgets were adapted from a previous UNR study. Based on the North Carolina budgets, seed and chemical costs are substantially higher for UNR cotton as compared to conventional cotton. UNR cotton machinery cost is $24 less for UNR cotton, with total cost for UNR cotton being $30 more than conventional cotton. Enterprise costs are given in Table 1. Most crop budgets develop fixed costs assuming new equipment prices and full utilization of machinery. However, for this study FINPACK is used to develop fixed costs from depreciation, insurance, taxes, and interest.

Results

UNR Cotton Compared to Traditional Crops
Table 2. shows the farm level affects of adding the various enterprises to the additional 350 acres. The base for comparing price and yield variation on the different crop enterprises was taken from the North Carolina budget. The budget assume yields of 50-bushel wheat and 30-bushel soybeans and an average price of $3.00 per bushel for wheat and $5.50 for the soybeans, $0.65 per lb. for conventional cotton and $0.62 for UNR cotton, with cotton yields of 700 lbs. Net farm income with wheat/soybean double crop alternative had the highest net farm income of $117,975 followed by UNR cotton with a return of $105,575. Full season soybeans returned $85,950, $32,000 less than the wheat/soybean double crop. According to North Carolina Statistics Service, the state average soybean yield was 27 bushels in 1998. If the double crop soybean yields are reduced 5 bushels per acre to 25, UNR cotton has the highest net farm income.

Past studies suggest UNR cotton can lead to higher net farm income by increased yields. With a ten-percent yield increase from 700-lbs. to 770 lbs., UNR cotton had a slightly higher net farm income than wheat/soybean double crop or full season soybeans. With a twenty-percent increase in UNR cotton yields to 840 lbs. per acre, net farm income rose to $131, 055 per acre, or $13,080 more than the next highest farm income alternative.

UNR Cotton on Margin Land
If UNR cotton yields were held constant at 700 lbs. per acre and other crop yields were reduced ten-percent to simulate production on marginal land, UNR cotton had $35,9000 higher net farm income compared to soybeans and wheat/soybean double crop. When UNR cotton yields were reduced 10 percent as well, net farm income is comparable to wheat/soybeans double crop, $69,175 for UNR cotton as compare to $69,675 for double crop wheat/soybeans. Soybeans with yields of 31 bushels per acre produce net farm income of $41,850 or 40 percent less than the two other alternatives. With 31-bushel yields, soybeans showed $14,029 cash deficit, which would need to be replaced with off farm income or additional loans. With a twenty- percent reduction in yields, UNR cotton has the highest net farm income of $43,975 as compared to $33,275 for wheat/soybean double crop and $10,875 for soybeans. However, all crop alternatives showed a cash flow deficit. Results of farm level effects of yield reduction are shown in Tables 4 and 5.

UNR Quality Price Discounts
The results of the farm level effects of UNR quality discounts are presented in Table 6. UNR cotton has a net farm income of $90,875 with a six- cent discount, $83,525 with a nine-cent discount, and $76,175 with a twelve-cent discount. With a six-cent discount UNR cotton is more profitable than full season soybeans by almost $5,000. With a twelve-cent discount net farm income is reduced $29,400 as compared to the three-cent discount. If you compare the net income of UNR with 6-12 cent discount with the net farm income of the alternative crops with reduced yields, UNR cotton results in substantially greater net farm income.

Conclusions

Cotton growers are looking for ways to increase profitability. UNR cotton offers an alternative to wheat/soybean and full season soybeans. UNR cotton has the greatest potential on marginal land. Even with quality discounts, UNR cotton is very competitive with alternative crops on marginal land.

References

Wilson, S. Gibbs, Shurley s. Don, Bednarz Craig, and Bader Michael 1998,*Economic Analysis of Ultra Narrow-Row Cotton Production in the Coastal Plain Region of Georgia* .

Brown A B, Cole T.L. Alphin J. 1998 *Ultra Narrow-Row Cotton: Economic Evaluation of 1996 BASF Filed Plots*, Proceedings Beltwide Cotton Conference pp. 88-91 Proceedings Beltwide Cotton Conference pp. 91-92t

Table 1. North Carolina Enterprise Budgets

	UNR	Conv.	Soyb.	W/S
Seed	61	8	12	17
Fertilizer	50	61	30	62
Chemicals	118	95	32	54
Insurance	9	9	6	6
Hired labor	26	30	18	21
Mach.Repair	51	58	26	44
Ginning	70	70		
Variable costs	**385**	**331**	**124**	**204**
Fixed cost	72	96	47	83
Total cost	**457**	**427**	**171**	**287**

Table 2. Farm Level Affects of Alternative Enterprises

	UNR	Soyb.	W/S	W/S
Yield	700	35	50/30	50/25
Price	.62	5.5	3/5.5	3/5.5
Net Farm Income	105,575	85,950	117,975	102,925
R OA	5.9%	5%	6.9%	5.9%
Cash Surplus or Deficit	25,137	12,950	32,590	23,492

Table 3. Farm Level Affects of UNR Yield Adjustments

	10 %	20%	B. UNR	W/S	Soyb.
Yield	770	840	700	50/30	35
Price	.62	.62	.62	3/5.5	5.5
Net Farm Income	118,315	131,055	105,575	117,975	85,950
R OA	6.7%	7.5%	5.9%	6.9%	5%
Cash Surplus or Deficit	32,788	40,222	25,137	32,590	12,950

Table 4. Farm Level Affects of 10% Reduced Yields

	B. UNR	UNR	W/S	Soyb.
Yield	700	630	45/27	31
Price	.62	.62	3/5.5	5.5
Net Farm Income	105,575	69,175	69,675	41,850
R OA	5.9%	3.2%	3.9%	2.2%
Cash Surplus or Deficit	25,137	2,533	2,843	(14,029)

Table 5. Farm Level Affects of 20% Reduced Yields

	B. UNR	UNR	W/S	Soyb.
Yield	700	560	40/24	28
Price	.62	.62	3/5.5	5.5
Net Farm Income	105,575	43,975	33,275	10,875
R OA	5.9%	2.1%	1.7%	.03%
Cash Surplus or Deficit	25,137	(12,696)	(19,435)	(35.110)

Table 6. Farm Level Affects of UNR Quality Discounts

	B. UNR	UNR 6 cent	UNR 9 cent	UNR 12 cent
Yield	700	700	700	700
Price	.62	.56	.53	.50
Net Farm Income	105,575	90,875	83,525	76,175
R OA	5.9%	5%	4.6%	4.1%
Cash Surplus or Deficit	25,137	16,009	11,444	6,888