A DETERMINATION OF COTTON MARKET PRICES REQUIRED TO JUSTIFY THE USE OF A FIELD CLEANER IN COTTON STRIPPING

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Abstract

This study addresses whether there are certain cotton price levels that would justify by-passing the field cleaner in cotton stripper harvesting due to the increased value of lint loss. Further, this study also attempts to address whether the ginning sector is benefiting from the use of a field cleaner in cotton harvesting. Results indicated that the value of total lint loss in the harvesting and ginning stages was higher for field cleaned cotton than non-field cleaned cotton. However, the field cleaned cotton realized additional ginning cost savings when cotton was field cleaned. A comparison of net returns to the production sector indicated that field cleaned cotton produced higher net revenues than non-field cleaned cotton for all ranges of cotton price and lint loss of the study when one-priced ginning is used. Similar results were found for two-priced ginning except when cotton prices were extremely high and total lint loss for field cleaned cotton was also high. Results also indicated that the ginning sector does realize a cost savings associated with lower module transportation costs when hauling field cleaned cotton. However, the ginning sector's net returns for field cleaned cotton were found to be lower regardless of whether one-priced or two-priced ginning was used. A comparison of one-priced versus two-priced ginning suggests that two-priced ginning produced higher net returns for the ginning industry for both field cleaned and non-field cleaned cotton.

Introduction

Cotton producers utilizing the stripper method of harvesting cotton also have access to the use of a field cleaner. Until recently, field cleaners could be purchased and attached to cotton strippers. The ability to harvest cotton with and without the use of a field cleaner prompted several studies regarding the economic viability and performance of such additional equipment. Specifically, previous studies have addressed the issue of the effect of field cleaners on fractionation attributes of cotton as well as the most cost efficient manner to clean cotton both in the field as well as the gin plant. Richman et al. (1993) found that cotton turnout can be improved with the use of a field cleaner in stripper harvesting. Misra et al., (1997) found similar results, but also that quality attributes were not statistically different from cotton that is stripper harvested with and without the use of a field cleaner. Boman et al., (2005) and Foulkner and Shaw (2008) found similar results that lint quality was not altered by the use of a field cleaner in stripper harvested cotton. In terms of costs, Bennett and Misra (1997) found that the use of a field cleaner in stripper harvesting can provide lower costs at both the harvesting stage as well as for costs associated with cleaning cotton throughout the entire industry based on the level of initial trash content of the seed cotton and the number of lint cleanings in the gin plant.

Studies have also suggested that, while extraneous matter is removed from seed cotton when a field cleaner is used during the harvesting process, additional lint is lost during this process as well. Results from Boman et al. (2005) suggested that about 1.4 percent of the lint is lost when cotton is subjected to a field cleaner during harvesting. Wanjura et al. (2009), however, found that lint loss levels can be reduced to one percent or lower with proper design as well as optimizing the loading rate.

The level of lint cleaning has also been addressed at the gin plant stage. Specifically, this study found that two lint cleanings were the best general rule if the effects on prices, lint loss, and cost of lint cleaning are to be taken into consideration. Ethridge et al. (1995) considered only the energy costs of lint cleanings in their cost estimates and estimated price per pound of lint based on a pre-HVI market price structure that existed in 1992. Bennett et al. (1997) further addressed the consequences of successive stages of lint cleaning by considering the criteria of maximizing net revenue. The study found that net returns were consistently higher for one lint cleaning in the gin plant for all cultivars regardless of the time

of harvest. It was concluded by Bennett et al. (1997) that the pricing structure for cotton had changed with the inception of the HVI measurements of fiber attributes in 1993. This change in the pricing structure was hypothesized to be primarily responsible for redefining the optimal level of lint cleaning at the gin plant as determined in this study. A further study by Bennett et al. (2003) found that the optimal number of lint cleanings in the gin plant was dependant on the actual price level of cotton. This finding was based on the fact that cotton lint is lost as the cotton is subjected to more cleaning. At higher price levels, the cotton that is lost is more valuable than at lower price levels. Thus, as the price increases, less cleaning is more desirable.

While now it is standard for new cotton strippers to have a field cleaner attached, producers do have the option of by-passing this machine while harvesting. Due to the fact that cotton producers still have the choice of cleaning stripper harvested cotton with the use of a field cleaner, the question is raised whether the findings of Bennett et al. (2003) would translate to decisions in the field. More specifically, the current study addresses the optimal decision of a producer to use or choose to by-pass the field cleaner based on the level of cotton price. Further, this study also attempts to address whether the ginning sector is benefiting from the use of field cleaner in cotton harvesting.

Materials and Methods

Since stripper harvesters come equipped with field cleaners, the costs associated with determining the optimal decision of a producer to use or by-pass the field cleaner during stripper harvesting required analyzing the value of lint that is lost during harvesting and ginning for both harvesting methods while also including the ginning charge for both harvesting methods. This result will indicate the preferred method of harvesting the industry is signaling to the production sector. Determination of whether the ginning sector is benefiting from the use of a field cleaner in the harvesting stage would suggest that the revenues associated with the ginning process for both harvesting methods should be compared while taking into account any cost savings the ginning sector may realize from reduced module transportation costs associated with field cleaned cotton. A discussion of the methods used to determine the optimal producer decision and impact on the ginning industry is discussed below.

Determining the Level of Lint Lost During the Harvesting and Ginning Stages

As mentioned earlier, Boman et al. (2005) suggested that about 1.4 percent of the lint is lost when cotton is subjected to a field cleaner during stripper harvesting. Wanjura et al. (2009) found that the level of lint loss can be reduced to one percent or lower. Thus, this study performed a sensitivity analysis of lint that is lost during the harvesting stage of cotton ranging from a 0.5 percent lint loss to a 1.5 percent lint loss during cotton harvesting. These percentages were then multiplied by 480 pounds, which represents one bale of cotton, and yielded a range of total pounds of lint lost during the harvesting stage with the use of a field cleaner.

Wanjura et al. (2010) found that the level of lint lost during the ginning process differed for cotton that is harvested with the use of a field cleaner and without as well as by the number of stick machines (extractors) used in the ginning process. Specifically, the study found that 0.74, 0.17, and 0.05 pounds of lint was lost for extractor 1, extractor 2, and the extractor feeder, respectively when cotton was harvested with the use of a field cleaner. On the other hand, the study found that more lint was lost in the ginning process when cotton was harvested without the use of a field cleaner. Specifically, it was determined that 2.08, 0.26, and 0.22 pounds of lint was lost for extractor 1, extractor 2, and the extractor feeder, respectively when cotton was harvested without the use of a field cleaner.

Determination of the total pounds of lint lost during the harvesting and ginning stages for cotton harvested with and without the use of a field cleaner required the summation of the total pounds lost for each stage of cleaning. Specifically, the results of the total pounds of lint lost during the harvesting stage with the use of a field cleaner (the sensitivity analysis of lint loss) was added to the lint lost after each extractor in the gin plant for cotton harvested with the use of a field cleaner. A similar approach was used to determine the level of lint lost when cotton was not subjected to a field cleaner in the harvesting stage. However, the additional lint lost during the harvesting stage was equal to zero since a field cleaner was not used.

Reduced Module Transportation, Ginning Charges, and Effects on the Ginning Sector

Because cotton that is harvested with the use of a field cleaner will result in higher turnout, module transportation costs can be less for cotton harvested with the use of a field cleaner. The module transportation cost savings as a result of the use of a field cleaner was determined by utilizing the "Cotton Module Transportation Calculator" (Parnell, 2012). Information submitted to the calculator that was held constant for field cleaned and non-field cleaned cotton included the gin capacity, estimated bales within certain distances of the gin plant and the cost per gallon of fuel for the module truck. Specifically, the gin capacity was held constant at 40 bales per hour. The total number of bales was held constant at 4,000 bales less than 15 miles, 6,000 bales between 15 and 25 miles, 12,000 bales between 25 and 45 miles, 6,000 bales between 35 and 45 miles, and 4,000 bales between 45 and 55 miles from the gin plant. This produced an average distance of about 27 miles for most of the cotton which is consistent with the findings of Harrison and Johnson, 2007. It also assumes that the gin is operating at 100 percent utilization. Utilizations of 90 percent and 80 percent were also estimated for this study but the results proved not to differ from the 100 percent utilization rate. Finally, the fuel price was held constant at $3.50 per gallon. The information supplied to the calculator that was allowed to change was the average number of bales per module truck based on whether the cotton was field cleaned or not. Per findings from Bennett and Misra, 1996, the average number of bales per module truck was held at 11.33 bales for field cleaned cotton and 9 bales for non-field cleaned cotton. The "Cotton Module Transportation Calculator" then estimated the fixed cost, transportation cost, and total hauling cost per bale for cotton harvested under the two different scenarios.

Ginning charges were determined by examining and averaging the ginning rate posted at 20 gins across Texas. Because it was found that gins across Texas were utilizing either a one-price ginning charge (dollars per hundred pounds of seed cotton) or a two-price ginning charge (dollars per hundred pounds of seed cotton plus bagging and ties), both scenarios were included in this study. To determine the ginning charge for field cleaned cotton, lint turnout was assumed to be 30 percent. This turnout was reduced to 25 percent for non-field cleaned cotton. Multiplying the average ginning charge per hundred pounds of seed cotton brought into the gin and the turnout percentage yielded the ginning charge per pounds of cotton lint for both field cleaned and non-field cleaned cotton. Multiplying the ginning charge per pound and 480 pounds per bale resulted in the ginning charge per bale of cotton. Under scenarios where a two-price ginning structure was used, the average price per bale for bagging and ties was added to the ginning charge per bale of cotton.

To determine whether the ginning sector is benefiting from the use of a field cleaner in cotton harvesting, a comparison was made of the ginning charges, incorporating module transportation cost savings. Specifically, the ginning charge per bale would represent revenue to the gin plant. Thus, the total ginning charge for field cleaned cotton was increased by the module transportation savings per bale (because the cost savings associated with transporting field cleaned cotton is a benefit to the gin) and compared to the ginning charge for non-field cleaned cotton.

Cotton Price Thresholds Required to Justify Using or By-Passing the Field Cleaner

Determination of whether producers should choose to use or by-pass the field cleaner was determined by first applying a range of cotton price levels to the levels of cotton lint lost during the harvesting and ginning stages. These price levels ranged from $0.50 per pound of cotton lint to $1.50 per pound of cotton lint at $0.10 intervals. Each price level was multiplied by the total number of pounds of lint lost during the harvesting and ginning stages for cotton that was harvested with and without the use of a field cleaner. The result was the total value of lint lost during each stage. The price levels were also multiplied by the total pounds required to yield one bale of cotton (480 pounds). The result was the total revenue a producer would receive from one bale of cotton.

Adding the ginning charge for field cleaned cotton to the value of lint loss in the harvesting and ginning stages resulted in the total cost of harvesting with the use of a field cleaner. Similarly, adding the total ginning charge for non-field cleaned cotton and the lint lost during the ginning stage for non-field cleaned cotton resulted in the total cost of by-passing the field cleaner during harvest.

Subtracting the total cost of harvesting under the two different scenarios from the total revenue received yielded the net value of using a field cleaner versus by-passing the field cleaner in the harvesting process. Threshold decisions of using versus by-passing the field cleaner based on net returns were determined by identifying which harvesting practice yielded the highest net revenues.

Results

Results of the study are presented below in four sections. First, a discussion of the sensitivity analysis of the lint loss during the harvesting and ginning stages with and without the use of a field cleaner is presented. Second, a discussion of the total value of lint lost during the harvesting and ginning stages is presented. A discussion of the differences in ginning charges, transportation savings, and gin revenues is then presented, followed by a comparison of the net returns to the production sector for field cleaned versus non-field cleaned cotton.

Lint Lost During the Harvesting and Ginning Stages

Results of the level of lint lost during the harvesting and ginning stages are presented in Table 1. The sensitivity analysis of lint lost during the harvesting stage suggested that between 2.40 and 7.20 pounds of cotton lint per bale can be lost when the field cleaner is by-passed. As previously mentioned, due to the scope of this study no lint loss is assumed when cotton is not subjected to a field cleaner during the harvesting process. Further analysis suggests that an additional 0.96 pounds of lint per bale is lost during the ginning stage for cotton harvested with the use of a field cleaner versus 2.56 pounds of lint lost per bale during ginning for cotton that by-passes the field cleaner during cotton harvest. In total, cotton harvested with the use of a field cleaner lost between 3.36 and 8.16 pounds of cotton lint per bale versus 2.56 pounds of cotton lint lost per bale when cotton by-passed the field cleaner during harvest. Thus while cotton harvested with the use of a field cleaner loses less lint in the ginning process than cotton harvested without the use of a field cleaner, the level of lint lost during the harvesting stage produces significantly more lint loss with the use of a field cleaner.

Table 1. Cotton lint lost during the harvesting and ginning stages.

Harvesting Practice	Lint Loss During Harvesting		Lint Loss in the Gin Plant			Total Lint Loss
	(%/Bale)	(lbs./ Bale)	Extractor #1 (lbs./ Bale)	Extractor #2 (lbs./ Bale)	Extractor #3 (lbs./ Bale)	(lbs./ Bale)
With a Field Cleaner	0.50	2.40	0.74	0.17	0.05	3.36
	0.55	2.64	0.74	0.17	0.05	3.60
	0.60	2.88	0.74	0.17	0.05	3.84
	0.65	3.12	0.74	0.17	0.05	4.08
	0.70	3.36	0.74	0.17	0.05	4.32
	0.75	3.60	0.74	0.17	0.05	4.56
	0.80	3.84	0.74	0.17	0.05	4.80
	0.85	4.08	0.74	0.17	0.05	5.04
	0.90	4.32	0.74	0.17	0.05	5.28
	0.95	4.56	0.74	0.17	0.05	5.52
	1.00	4.80	0.74	0.17	0.05	5.76
	1.05	5.04	0.74	0.17	0.05	6.00
	1.10	5.28	0.74	0.17	0.05	6.24
	1.15	5.52	0.74	0.17	0.05	6.48
	1.20	5.76	0.74	0.17	0.05	6.72
	1.25	6.00	0.74	0.17	0.05	6.96
	1.30	6.24	0.74	0.17	0.05	7.20
	1.35	6.48	0.74	0.17	0.05	7.44
	1.40	6.72	0.74	0.17	0.05	7.68
	1.45	6.96	0.74	0.17	0.05	7.92
	1.50	7.20	0.74	0.17	0.05	8.16
Without a Field Cleaner	0.00	0.00	2.08	0.26	0.22	2.56

Total Value of Lint Loss

Results of the value of lint loss in both the harvesting and ginning stages for cotton harvested with and without the use of a field cleaner are presented in Table 2 with the sensitivity analysis of cotton price ranging from $0.50 to $1.50 per pound of cotton lint presented across the top and the total pounds of lint loss per bale during harvesting and ginning on the left. Results

indicate that at no price level were the values of lint loss for field cleaned cotton less than that of non-field cleaned cotton. For example, with a cotton price of $0.50 per pound of cotton and a lint loss of 3.36 pounds per bale of cotton that is field cleaned, the total value of lint loss equals $1.68 per bale. The value of lint lost equaled $1.28 per bale without the use of a field cleaner at this same price level. Likewise, a price level of $1.50 per pound of cotton lint and a lint loss of 8.16 pounds per bale of field cleaned cotton resulted in a lint loss value of $12.24 per bale versus $3.84 per bale of non-field cleaned cotton at the same price level.

Table 2. Total value of lint loss.

Total Lint Loss Per Bale (lbs)	Cotton Price (Dollars per Pound)										
	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
	Field Cleaned Cotton Lint Loss Value (Dollars/Bale)										
3.36	1.68	2.02	2.35	2.69	3.02	3.36	3.70	4.03	4.37	4.70	5.04
3.60	1.80	2.16	2.52	2.88	3.24	3.60	3.96	4.32	4.68	5.04	5.40
3.84	1.92	2.30	2.69	3.07	3.46	3.84	4.22	4.61	4.99	5.38	5.76
4.08	2.04	2.45	2.86	3.26	3.67	4.08	4.49	4.90	5.30	5.71	6.12
4.32	2.16	2.59	3.02	3.46	3.89	4.32	4.75	5.18	5.62	6.05	6.48
4.56	2.28	2.74	3.19	3.65	4.10	4.56	5.02	5.47	5.93	6.38	6.84
4.80	2.40	2.88	3.36	3.84	4.32	4.80	5.28	5.76	6.24	6.72	7.20
5.04	2.52	3.02	3.53	4.03	4.54	5.04	5.54	6.05	6.55	7.06	7.56
5.28	2.64	3.17	3.70	4.22	4.75	5.28	5.81	6.34	6.86	7.39	7.92
5.52	2.76	3.31	3.86	4.42	4.97	5.52	6.07	6.62	7.18	7.73	8.28
5.76	2.88	3.46	4.03	4.61	5.18	5.76	6.34	6.91	7.49	8.06	8.64
6.00	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00
6.24	3.12	3.74	4.37	4.99	5.62	6.24	6.86	7.49	8.11	8.74	9.36
6.48	3.24	3.89	4.54	5.18	5.83	6.48	7.13	7.78	8.42	9.07	9.72
6.72	3.36	4.03	4.70	5.38	6.05	6.72	7.39	8.06	8.74	9.41	10.08
6.96	3.48	4.18	4.87	5.57	6.26	6.96	7.66	8.35	9.05	9.74	10.44
7.20	3.60	4.32	5.04	5.76	6.48	7.20	7.92	8.64	9.36	10.08	10.80
7.44	3.72	4.46	5.21	5.95	6.70	7.44	8.18	8.93	9.67	10.42	11.16
7.68	3.84	4.61	5.38	6.14	6.91	7.68	8.45	9.22	9.98	10.75	11.52
7.92	3.96	4.75	5.54	6.34	7.13	7.92	8.71	9.50	10.30	11.09	11.88
8.16	4.08	4.90	5.71	6.53	7.34	8.16	8.98	9.79	10.61	11.42	12.24
	Non-Field Cleaned Cotton Lint Loss Value (Dollars/Bale)										
2.56	1.28	1.54	1.79	2.05	2.30	2.56	2.82	3.07	3.33	3.58	3.84

Ginning Charges, Module Transportation Cost Savings, and Effects on the Ginning Sector

Ginning charges for one-price and two-price ginning associated with cotton harvested with and without the use of a field cleaner are presented in Table 3 along with the module transportation cost savings and net gin revenues. Results indicate that producers harvesting with the use of a field cleaner pay, on average, $44.80 per bale for ginning when one-price ginning is used. On the other hand, by-passing the field cleaner during the harvesting stage had an associated $53.76 per bale ginning charge under one-price ginning. These results suggest that producers harvesting with the use of a field cleaner are paying $8.96 per bale less for ginning charges under a one-priced ginning pricing system than producers who choose to harvest without the use of a field cleaner.

Under two-priced ginning, producers were found to be charged $49.77 per bale on average for field cleaned cotton ($33.60 ginning charge per bale plus $16.17 bagging and ties per bale). On the other hand, by-passing the field cleaner resulted in a total ginning charge of $56.49 per bale ($40.32 ginning charge plus $16.17 bagging and ties per bale) under two-priced ginning. These results suggest that producers harvesting cotton with the use of a field cleaner under two-priced ginning save $6.72 per bale on ginning charges when compared to producers who harvest without the use of a field cleaner.

When the module transportation cost savings to the gin ($2.67 per bale) were applied to the ginning charge for field cleaned cotton, it was found that gins using one-price ginning had a total revenue of $47.47 per bale for field cleaned cotton versus $53.76 per bale for non-field cleaned cotton. These results suggest that net returns for gins are $6.29 per bale lower for field cleaned cotton than non-field cleaned cotton when one-priced ginning is used. Similar results were found for gins using two-priced ginning. Specifically, net revenues realized by the ginning sector for field cleaned cotton under two-priced ginning equaled $52.44 per bale compared to $56.49 (a $4.05 per bale difference) for non-field cleaned cotton.

Table 3. Ginning charges paid by cotton producers, module transportation savings, and net gin revenues.

	One Price Ginning			Two Price Ginning				
Harvesting Method	Ginning Charge ($/bale)	Module Hauling Cost Savings ($/bale)	Net Gin Revenue ($/bale)	Ginning Charge ($/bale)	Bagging and Ties ($/bale)	Total Two Price Ginning Charge ($/bale)	Module Hauling Cost Savings ($/bale)	Net Gin Revenue ($/bale)
Field Cleaned	44.80	2.67	47.47	33.60	16.17	49.77	2.67	52.44
Non-Field Cleaned	53.76		53.76	40.32	16.17	56.49		56.49
Difference	- 8.96		- 6.29			- 6.72		- 4.05

Net Returns to the Production Sector

Results indicated that at no price and lint loss combination did the total net returns of non-field cleaned cotton exceed field cleaned cotton under one-priced ginning (Table 4). Specifically, cotton producers would receive a net return of $193.52 per bale of field cleaned cotton when the cotton price equals $0.50 per pound and the level of total lint loss equaled 3.36 pounds per bale. On the other hand, cotton harvested without the use of a field cleaner would receive $184.96 per bale in net revenues at the same lint price. The difference in net returns between field cleaned and non-field cleaned cotton does decrease, though, as the level of lint lost during the harvesting stage increases and as the price level increases. Specifically, if the price equals $1.50 per pound for field cleaned cotton and 8.16 pounds of lint is lost per bale, total net revenues equaled $662.96 per bale. Non-field cleaned cotton at this same price level yielded net revenues of $662.40 per bale.

Net producer returns were found to differ slightly with gins that utilize two-priced ginning (Table 5). At most lint loss and price combinations, net producer returns for field cleaned cotton were higher than non-field cleaned cotton net returns when using two-priced ginning. However, at high price levels combined with high lint loss levels for field cleaned cotton, net returns were higher for cotton that by-passed the field cleaner. For instance, cotton producers would receive a net return of $188.55 per bale of field cleaned cotton when the cotton price equaled $0.50 per pound and the level of total lint loss equaled 3.36 pounds per bale. At the same lint price level, net returns for non-field cleaned cotton equaled $182.23 per bale. At the upper end of the lint price level ($1.50 per pound) and lint loss level (8.16 pounds per bale) for field cleaned cotton, producer net returns equaled $657.99 per bale for field cleaned cotton and $659.67 for non-field cleaned cotton.

Table 4. Harvesting stage net returns with and without the use of a field cleaner incorporating the value of lint loss and one price ginning charges.

Total Lint Loss Per Bale (lbs)	Cotton Price (Dollars per pound)										
	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
	Field Cleaned Cotton Net Revenues (Dollars/Bale)										
3.36	193.52	241.18	288.85	336.51	384.18	431.84	479.50	527.17	574.83	622.50	670.16
3.60	193.40	241.04	288.68	336.32	383.96	431.60	479.24	526.88	574.52	622.16	669.80
3.84	193.28	240.90	288.51	336.13	383.74	431.36	478.98	526.59	574.21	621.82	669.44
4.08	193.16	240.75	288.34	335.94	383.53	431.12	478.71	526.30	573.90	621.49	669.08
4.32	193.04	240.61	288.18	335.74	383.31	430.88	478.45	526.02	573.58	621.15	668.72
4.56	192.92	240.46	288.01	335.55	383.10	430.64	478.18	525.73	573.27	620.82	668.36
4.80	192.80	240.32	287.84	335.36	382.88	430.40	477.92	525.44	572.96	620.48	668.00
5.04	192.68	240.18	287.67	335.17	382.66	430.16	477.66	525.15	572.65	620.14	667.64
5.28	192.56	240.03	287.50	334.98	382.45	429.92	477.39	524.86	572.34	619.81	667.28
5.52	192.44	239.89	287.34	334.78	382.23	429.68	477.13	524.58	572.02	619.47	666.92
5.76	192.32	239.74	287.17	334.59	382.02	429.44	476.86	524.29	571.71	619.14	666.56
6.00	192.20	239.60	287.00	334.40	381.80	429.20	476.60	524.00	571.40	618.80	666.20
6.24	192.08	239.46	286.83	334.21	381.58	428.96	476.34	523.71	571.09	618.46	665.84
6.48	191.96	239.31	286.66	334.02	381.37	428.72	476.07	523.42	570.78	618.13	665.48
6.72	191.84	239.17	286.50	333.82	381.15	428.48	475.81	523.14	570.46	617.79	665.12
6.96	191.72	239.02	286.33	333.63	380.94	428.24	475.54	522.85	570.15	617.46	664.76
7.20	191.60	238.88	286.16	333.44	380.72	428.00	475.28	522.56	569.84	617.12	664.40
7.44	191.48	238.74	285.99	333.25	380.50	427.76	475.02	522.27	569.53	616.78	664.04
7.68	191.36	238.59	285.82	333.06	380.29	427.52	474.75	521.98	569.22	616.45	663.68
7.92	191.24	238.45	285.66	332.86	380.07	427.28	474.49	521.70	568.90	616.11	663.32
8.16	191.12	238.30	285.49	332.67	379.86	427.04	474.22	521.41	568.59	615.78	662.96
	Non-Field Cleaned Cotton Net Revenue (Dollars/Bale)										
2.56	184.96	232.70	280.45	328.19	375.94	423.68	471.42	519.17	566.91	614.66	662.40

Table 5. Harvesting Stage net returns with and without the use of a field cleaner incorporating lint loss value and two price ginning charges.

Total Lint Loss Per Bale (lbs)	Cotton Price (Dollars per pound)										
	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
	Field Cleaned Cotton Net Revenues (Dollars/Bale)										
3.36	188.55	236.21	283.88	331.54	379.21	426.87	474.53	522.20	569.86	617.53	665.19
3.60	188.43	236.07	283.71	331.35	378.99	426.63	474.27	521.91	569.55	617.19	664.83
3.84	188.31	235.93	283.54	331.16	378.77	426.39	474.01	521.62	569.24	616.85	664.47
4.08	188.19	235.78	283.37	330.97	378.56	426.15	473.74	521.33	568.93	616.52	664.11
4.32	188.07	235.64	283.21	330.77	378.34	425.91	473.48	521.05	568.61	616.18	663.75
4.56	187.95	235.49	283.04	330.58	378.13	425.67	473.21	520.76	568.30	615.85	663.39
4.80	187.83	235.35	282.87	330.39	377.91	425.43	472.95	520.47	567.99	615.51	663.03
5.04	187.71	235.21	282.70	330.20	377.69	425.19	472.69	520.18	567.68	615.17	662.67
5.28	187.59	235.06	282.53	330.01	377.48	424.95	472.42	519.89	567.37	614.84	662.31
5.52	187.47	234.92	282.37	329.81	377.26	424.71	472.16	519.61	567.05	614.50	661.95
5.76	187.35	234.77	282.20	329.62	377.05	424.47	471.89	519.32	566.74	614.17	661.59
6.00	187.23	234.63	282.03	329.43	376.83	424.23	471.63	519.03	566.43	613.83	661.23
6.24	187.11	234.49	281.86	329.24	376.61	423.99	471.37	518.74	566.12	613.49	660.87
6.48	186.99	234.34	281.69	329.05	376.40	423.75	471.10	518.45	565.81	613.16	660.51
6.72	186.87	234.20	281.53	328.85	376.18	423.51	470.84	518.17	565.49	612.82	660.15
6.96	186.75	234.05	281.36	328.66	375.97	423.27	470.57	517.88	565.18	612.49	659.79
7.20	186.63	233.91	281.19	328.47	375.75	423.03	470.31	517.59	564.87	612.15	659.43
7.44	186.51	233.77	281.02	328.28	375.53	422.79	470.05	517.30	564.56	611.81	659.07
7.68	186.39	233.62	280.85	328.09	375.32	422.55	469.78	517.01	564.25	611.48	658.71
7.92	186.27	233.48	280.69	327.89	375.10	422.31	469.52	516.73	563.93	611.14	658.35
8.16	186.15	233.33	280.52	327.70	374.89	422.07	469.25	516.44	563.62	610.81	657.99
	Non-Field Cleaned Cotton Net Revenue (Dollars/Bale)										
2.56	182.23	229.97	277.72	325.46	373.21	420.95	468.69	516.44	564.18	611.93	659.67

Conclusion

This study examined whether there are certain price and lint loss combinations that would justify by-passing the field cleaner in cotton harvesting. Results indicated that the use of a field cleaner produced higher levels of lint loss in both the harvesting and ginning stages. However, the cotton production sector also realized ginning cost savings when using a field cleaner due to higher turnout levels. These ginning cost savings were present with both one-priced ginning and two-priced ginning. When comparing the total net returns to the production sector, field cleaned cotton produced higher net returns than non-field cleaned cotton under all scenarios except when two-priced ginning was used with high cotton lint prices and high lint loss associated with field cleaned cotton. These results suggest that the savings in ginning charges outweighs the value of the loss of cotton lint associated field cleaning cotton under most conditions.

Results also indicated that the ginning sector does realize a cost savings associated with lower module transportation costs when hauling field cleaned cotton. However, the ginning sector's net returns for field cleaned cotton were found to be lower regardless of whether one-priced or two-priced ginning was used. The ginning net revenues were found to be higher, though, for two-priced ginning than one-priced ginning.

The results of this study suggest that the cotton production sector is following industry signals by using a field cleaner during harvesting. Only under extreme price and lint loss situations coupled with two-priced ginning does the industry indicate otherwise. Questions could arise regarding these signals since the ginning industry's net returns appear to be lower for field cleaned cotton and the ginning industry is sending the most prominent signal in the form of ginning charges. One conclusion is that the industry norm is to now include a field cleaner on a new cotton stripper. Thus, the industry standard is to field clean cotton suggesting the ginning sector cannot signal otherwise. Another more likely conclusion is that the ginning sector is realizing additional cost savings resulting from lower disposal costs associated with gin trash. With lower levels of extraneous matter (burrs, stems, leaf fragments, etc.) being delivered when field cleaned seed cotton is brought to the gin plant, gins have less extraneous matter to dispose of when the ginning process is complete. This would reduce the difference in net returns generated by the gin plant for field cleaned and non-field cleaned cotton even further.

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