

**THE COST OF GINNING COTTON – 2021 and 2022 SURVEY
RESULTS**

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Introduction

The cost of ginning cotton is an important concern for producers and ginners. Data from this survey provides information about key variable costs as a component of the overall cost of ginning cotton. These data also identify historical trends of gin operation and help document how the adoption of new technologies in cotton harvesting and ginning has impacted ginning cost. This is the first-time results for two years have been presented at the same time. The survey is now accessible year around through a web portal maintained by the National Cotton Council allowing for data to be compiled annually. These survey results are from the 2021 and 2022 cotton crop, which produced 17.1 and 14.1 million running bales (USDA-NASS, 2022 and USDA-NASS, 2023a) and 5.3 and 4.4 million tons of cottonseed, respectively (USDA-NASS, 2023b). The 2021crop was gathered from 10.2 million acres with an 819 lb/acre average yield while the 2022 crop was gathered from 7.3 million acres with a 950 lb/acre yield. In 2021, there were 510 operating gins, averaging a little over 33,500 bales per gin. In 2022, there were 479 operating gins, averaging 29,469 bales per gin.

Procedure

Unlike the surveys conducted prior to 2019, this survey was completed by each participating cotton gin through a web portal, similar to the 2019 cotton crop data. However, unlike the 2019 web portal survey the survey and associated data is maintained by the National Cotton Ginners Association (NCGA) on a server at the National Cotton Council (NCC) headquarters in Cordova, TN. In addition to the Executive Vice President of NCGA having access to all the data, the individual regional and state ginning associations have access to data associated with survey participants in their respective areas. The data entered into the survey is confidential so that no data can be associated with any specific gin but only one of the four regions of the cottonbelt, Western, Southwest, Mid-South (or South) and the Southeast. Ginners were asked to identify variable costs, including labor, bagging and ties, repairs, maintenance, drying, and electrical costs. Gin managers also reported performance information, which included number of bales, ginning rate, length of season, and type of ginning performed (saw or roller ginning). The survey also requested a description and cost of capital improvements, dryer fuel types, bale tie material (wire or plastic), and number of round modules ginned. The data were analyzed by production regions (Southeast (SE), Mid-South (MS), Southwest (SW), West (W)) and divided into five processing categories: gins producing 20,000 or less bales per year, greater than 20,000 to 35,000 bales per year, greater than 35,000 to 50,000 bales per year, greater than 50,000 to 65,000 bales per year and greater than 65,000 bales. Labor cost figures included wages, Workers Compensation Insurance, Social Security, fringe benefits, bonuses, housing, H2A fees, etc. In previous surveys (Valco et al., 2003, Valco et al., 2006,

Valco et al., 2009, Valco et al., 2012, and Valco et al, 2015, Valco et al, 2018) the four processing categories were listed as gins producing fewer than 15,000 bales per year, 15,000 to 25,000 bales per year, 25,000 to 40,000 bales per year, and greater than 40,000 bales. In the 2019 survey results report (Holt et al., 2021), the four processing ranges were modified from those reported by Valco to account for the shift of the industry towards fewer gins but an increase in the number of bales produced from each gin. This report changed the processing ranges from four to five to give more granularity to the number of gins in each range and increase the upper range to greater than 65,000 to account for changes in the industry.

The data obtained using the web-based survey is unlike the data collected in previous paper surveys, where the data was deleted after the paper for the Beltwide proceedings was produced, in that it resides in the National Cotton Ginners Associations database so that ginners can use the data on an ongoing basis to create graphs and see how their gin is doing versus regional or national ginning trends. Confidentiality is still maintained with the data with all gin identification information removed but with the data being available to participants a ginner would be able to see how their costs of operation compare on a national and regional basis. The new web-based survey contains a total of 46 questions. The questions are divided up into four different cost categories (i.e. four pages on the website): Production, Labor, Energy, and Auxiliary Cost. The pages of the questionnaire are shown in Figures 1-4. The breakdown of questions on each page is: Production - 18 questions, Labor - 11 questions, Energy - 9 questions, and Auxiliary Cost - 8 questions. Production has the largest number of questions but the first four are associated with gin identification and location to ensure the gin is placed into the proper production region for cost comparisons and analyses. Even though question 2 in Fig. 1 (Production) is “Survey Crop Year (22 – 23?)”, any past crop year can be entered.

In the report for the 2019 survey results (Holt et al., 2021), there were several “lessons learned” that were stated. Those lessons, along with others resulting from the transition to the NCC server, were incorporated into the 2021 and 2022 surveys. The main items that were changed included increasing the upper limits on several questions as well as improving options on some pulldown menus. The one item that was recently verified is that the website graphics and figures contain the necessary logic statements to handle “N/A”, zeros, and non-responses so they are not used in calculating averages.

Results

For 2021, there were 64 responses submitted; representing 3.4 million bales, or 19.8% of the total bales ginned in the United States. For 2022, 65 responses were submitted; representing just over 2.4 million bales, which is 17.0% of the total bales ginned in the United States. Not all survey questions were completed, or in some cases, entry figures were identified as incomplete and omitted from the data set. Like the 2019 data survey, labor values are inclusive of full-time and seasonal employees.

Table 1 summarizes the Beltwide average, minimum, and maximum variable cost for the 2021 and 2022 ginning seasons. The minimum and maximum variable cost are true values associated with each column and are not related to each other. For instance, the minimum value of 5,481 bales ginned in 2021 does not correspond the minimum Bagging and Ties cost of \$2.67 per bale. Table 2 shows the average variable ginning cost for each category by region compared to the beltwide averages for the 2021 and 2022 ginning seasons. Tables 3 – 5 contain gin operational data of the survey respondents for 2021 and 2022 ginning season. Table 3a shows the number of ginning shifts, hours per ginning shift, number of truck shifts, hours per truck shifts and the kilowatts per bale. The value for hours per shift, 2.0, for the 2021 ginning season in the Midsouth is due to the low number of respondents and the erratic operation over the average 63 days of ginning. Table 3a shows the lowest kWh/bale were for the Southeast and the highest was for the West for both the 2021 and 2022 seasons. Table 3b shows the average and rated ginning rates for the region and beltwide for the 2021 and 2022 seasons. The difference between rated and actual can vary widely depending on the weather conditions during harvest and the quality of the cotton. Table 4 shows the percent of respondents, by region and beltwide, that use natural gas and propane along with the average cost of the fuel and the average cost of repairs for the season. Table 5 shows the percent of module type, round or conventional, and the percent of saw ginned versus roller ginned cotton. The numbers in red on table 5 are different than what was presented in the PowerPoint presentation at the Beltwide Cotton Conference. The difference is due to the numbers in the PowerPoint presentation being from complete surveys whereas the numbers below are from all surveys that answered that particular question whether they completed the other questions in the survey or not. This situation illustrates the importance of completed surveys when analyzing the data so as not to include zeros or “no entries” into the averages. Table 5 shows the increase in round modules over conventional modules over 75% in 2022. Even though there is roller ginning in regions besides the West, only the surveys from the West indicated roller ginning.

Tables 6a and 6b show variable costs for the 2021 and 2022 ginning seasons for different ginning capacities (≤ 20 , 21-30, 31-40, 41-50, >51 bales/hr) and different number of bales ginned during the season, respectively. Table 6a is based on actual bales/hr and instead of rated (see table 3b). The total variable costs in table 6a, for 2021, generally follows the economy-of-scale with the smaller ginning rates having larger variable costs, however, in 2022, the variable costs for the 21-30 bale/hr production rates are much higher than the ≤ 20 bale/hr ginning rates which is believed to be due to the fact that the variable costs are associated with actual ginning rates and not rated capacity. During the 2022 season, many high-capacity gins either had very tough cotton or very little cotton to gin and found themselves operating with the same number of personnel as they normally have but having to operate at lower capacities. Table 6b also shows variable costs being higher for gins that had $\leq 20,000$ bales. Similar to the values in table 6a, there were several gins that were used to processing 100,000+ bales per year that ginned less than 20,000 but still had to pay for their labor force in hopes of not losing them next year, which drove up the total variable cost significantly as seen in 2022. In table 6b, the large costs of repairs, compared to the other bale counts, are more likely associated with large gins that made repairs after the 2021 season, in hopes of a better 2022, only to have a short crop.

Table 7 shows the variable costs over the years from 2000 to 2022. The largest jumps were in labor and repair costs. Labor has shown a gradual increase over the years until 2021, after the Covid pandemic. As of 2021, the cost of labor has become a serious issue, not only affording labor but finding a reliable labor force that is willing to work the hours associated with the ginning season. Likewise, the jump in repair costs for 2022 was due in large part to the increase in the costs of materials and supplies not the fact that a large number of cotton gins had large major repairs. The combination of labor and an increase in the costs of materials and supplies was the primary contributors to such a large total variable cost that has more than doubled from the 2019 survey.

Figures 5 and 6 show the breakdown of survey respondents based on actual ginning capacity and total number of bales ginned for the 2021 and 2022 ginning seasons. Figure 5 shows the largest number of respondents from the gins in the 31 to 40 bales/hr range for both 2021 and 2022 at 27% and 26 %, respectively. Based on ginning capacity, the lowest number of respondents, for 2021, were from ≤ 20 at 11%. For 2022, there was a tie at 17% for three ginning capacities: ≤ 20 , 21- 30, and 41-50 bales/hr. The number of respondents based on total number of bales ginned, Figure 6, was 25% for those ginning more than 65,000 and 9% for those ginning less than 20,000 in 2021. In 2022, the highest number of respondents, based on number of bales ginned, was 29% from both the less than 20,000 and the 20,000 to 35,000 bales categories. The lowest number of respondents in 2022 was from the 50,000 to 65,000 bales at 8%. The change in the pie chart, Figure 6, from 2021 to 2022 makes sense when considering that many of the larger than 65,000 bale gins in 2021 ginned less than 20,000 bales in 2022 due to the drought in the Southwest.

Table 1. 2021 and 2022 Beltwide average variable ginning cost per bale summary along with the true minimum and maximum values recorded in each variable cost category.

Beltwide Survey		Average Cost per Bale (\$/bale)					
	Bales Ginned	Bagging and Ties	Repairs	Electric	Dryer Fuel	Labor	Total Variable
2021							
Average	53,134	5.68	7.46	3.98	1.56	16.29	34.97
Min*	5,481	2.67	1.04	0.37	0.07	0.39	4.53
Max*	225,800	9.46	30.43	14.02	5.52	55.75	115.18
2022							
Average	38,163	6.46	13.26	5.23	1.69	22.67	49.31
Min*	1,380	2.72	0.55	0.38	0.25	0.35	4.24
Max*	205,000	99.77	98.66	19.76	9.97	93.72	231.88

* The Min (minimum) and Max (maximum) values are the true Min and Max values for each individual column and are not related to the value in other columns.

Table 2. 2021 and 2022 Regional and beltwide average variable ginning cost (\$) per bale

Region*	Bagging and Ties	Repairs	Electric	Dryer Fuel	Labor	Total Cost / Bale
2021						
MS	5.01	7.12	5.61	1.80	18.24	37.77
SE	6.03	11.39	3.04	2.18	13.72	36.36
SW	5.58	7.00	3.87	1.35	16.24	34.04
W	6.79	7.19	8.33	2.10	28.69	53.09
BW	5.68	7.46	3.98	1.56	16.29	34.97
2022						
MS	6.22	8.97	4.31	1.36	19.97	40.84
SE	6.44	5.48	3.58	1.53	16.44	33.47
SW	6.38	18.18	5.30	1.34	24.53	55.73
W	7.48	7.88	9.81	5.04	34.10	64.31
BW	6.46	13.26	5.23	1.69	22.67	49.31

* MS - Mid-South, SE - Southeast, SW - Southwest, W- West, BW- Beltwide

Table 3a. 2021 and 2022 Gin operational statistics by region and beltwide.

Average Gin Operation Values						
Region*	Days of Operation	Number of Gin Shifts	Hours/ Gin Shift	Number of Truck Shifts	Hours/ Truck Shift	kWh/ Bale
2021						
MS	63.0	1.0	2.0	1.0	14.0	41.1
SE	67.8	1.8	11.6	1.0	11.6	33.0
SW	95.9	1.8	12.2	1.3	12.0	46.3
W	63.3	1.7	11.3	1.0	10.7	48.4
BW	90.7	1.8	12.1	1.2	11.9	45.2
2022						
MS	66.4	1.7	12.0	1.7	11.8	33.1
SE	75.1	1.7	11.7	1.0	10.3	27.1
SW	59.2	1.3	11.7	1.1	11.3	42.2
W	57.0	1.8	11.5	0.8	8.0	59.0
BW	62.6	1.5	11.9	1.1	4.0	39.7

* MS - Mid-South, SE - Southeast, SW - Southwest, W- West, BW- Beltwide

Table 3b. 2021 and 2022 Gin operational statistics by region and beltwide.

Average Gin Operation Values				
Region*	Days of Operation	Gin Rate (bales/hr)	Rated Gin Capacity (Bales/hr)	kWh/Bale
2021				
MS	63.0	25.0	30.0	41.1
SE	67.8	39.6	44.6	33.0
SW	95.9	37.2	46.8	46.3
W	63.3	28.7	35.7	48.4
BW	90.7	37.5	46.4	45.2
2022				
MS	66.4	53.8	65.2	33.1
SE	75.1	30.3	37.8	27.1
SW	59.2	43.4	53.9	42.2
W	57.0	31.3	38.8	59.0
BW	62.6	42.0	51.9	39.7

* MS - Mid-South, SE - Southeast, SW - Southwest, W- West, BW- Beltwide

Table 4. 2021 and 2022 Gin fuel used (%) and average cost (\$) of fuel and improvements by region and beltwide.

Region*	Natural Gas	Propane	Average Cost Natural Gas (\$)	Average Cost Propane (\$)	Average Improvement Cost (\$)
2021					
MS	95.5%	4.5%	34,664.00	3,232.00	592,000.00
SE	100.0%	0.0%	12,079.00	103,067.18	831,572.67
SW	95.9%	4.1%	53,370.02	118,318.97	213,424.74
W	100.0%	0.0%	23,690.91	43,044.54	253,980.00
BW	65.9%	34.1%	51,769.25	103,095.75	306,315.19
2022					
MS	75.0%	25.0%	59,504.25	8,689.25	614,703.86
SE	50.0%	50.0%	23,133.00	24,222.42	189,531.63
SW	81.3%	18.7%	24,263.56	12,282.39	150,147.51
W	75.0%	25.0%	64,486.29	31,271.75	124,716.70
BW	74.6%	25.4%	33,011.72	15,137.04	230,489.55

* MS - Mid-South, SE - Southeast, SW - Southwest, W- West, BW- Beltwide

Table 5. 2021 and 2022 Gin statistics on module type and gin type for both regional and beltwide.

Region*	Module Type		Gin Type	
	Conventional Modules	Round Modules	Saw Ginned	Roller Ginned
2021				
MS	10.2%	89.8%	100%	0.0%
SE	16.3%	83.7%	100%	0.0%
SW	35.5%	64.5%	100%	0.0%
W	42.0%	58.0%	48.5%	51.5%
BW**	32.4%	67.6%	97.6%	2.4%
2022				
MS	3.3%	96.7%	100%	0.0%
SE	32.4%	67.6%	100%	0.0%
SW	24.8%	75.2%	100%	0.0%
W	51.0%	49.0%	36.4%	65.1%
BW**	24.2%	75.8%	96.1%	4.0%

* MS - Mid-South, SE - Southeast, SW - Southwest, W- West, BW- Beltwide

** The values in red are from averaging all of the responses and are different than the values presented at the Beltwide which were only of the fully completed surveys.

Table 6a. 2021 and 2022 average variable ginning cost (\$) per bale based on production rate (bales/hr.).

Gin Production (Bales/hr)	Average Cost (\$)/Bale					
	Bagging and Ties	Repairs	Electric	Dryer Fuel	Labor	Total Cost/Bale
2021						
≤20	5.63	11.22	5.02	2.53	29.73	54.12
21-30	6.29	8.73	4.36	1.35	19.64	40.37
31-40	5.12	5.49	3.27	1.31	12.21	27.41
41-50	5.63	7.85	3.87	1.59	12.83	31.77
>51	5.72	4.96	3.51	1.30	9.81	25.29
2022						
≤20	6.61	32.47	4.54	1.55	28.32	73.49
21-30	6.62	31.92	6.30	1.82	37.87	84.54
31-40	6.49	5.96	4.16	1.47	12.98	31.06
41-50	6.23	12.94	4.99	1.42	21.88	47.47
>51	6.21	6.31	4.52	0.91	12.32	30.26

2024 Beltwide Cotton Conferences, January 3-5, 2024

Table 6b. 2021 and 2022 average variable ginning cost (\$) per bale based on number of bales ginned in the season.

Bales/Season	Average Cost (\$)/Bale					
	Bagging and Ties	Repair	Electric	Dryer Fuel	Labor	Total Cost/Bale
2021						
20,000 or less	5.87	11.96	6.20	2.25	34.09	60.37
20,001 to 35,000	5.80	9.71	4.48	1.54	20.29	41.81
35,001 to 50,000	5.99	7.35	3.60	1.46	13.17	31.56
50,001 to 65,000	5.40	5.52	3.02	1.18	12.33	27.45
More than 65,000	5.43	5.62	3.60	1.57	10.62	26.84
2022						
20,000 or less	6.52	36.70	5.93	1.67	39.28	90.11
20,001 to 35,000	6.55	9.65	4.43	0.99	14.19	35.81
35,001 to 50,000	6.09	2.77	4.97	1.82	10.11	25.74
50,001 to 65,000	5.88	9.07	4.43	0.95	22.55	42.88
More than 65,000	6.69	4.10	3.62	1.48	11.91	27.81

Table 7. Comparison of past surveys average variable ginning cost.

Survey Year	Beltwide Average Cost (\$) / Bale					
	Bags and Ties	Repairs	Electric	Dryer Fuel	Labor	Total Variable
2000	3.30	4.24	3.77	1.30	6.95	19.56
2001	3.36	4.26	3.79	1.26	6.93	19.59
2004	3.72	3.71	3.56	1.96	7.27	20.22
2007	4.16	4.75	3.89	1.84	6.93	21.57
2010	4.33	4.40	3.79	1.39	7.04	20.95
2013	4.78	6.08	4.44	1.67	7.91	24.88
2016	4.51	5.80	3.87	1.27	7.93	23.38
2019	4.41	8.10	4.03	1.10	9.21	23.93
2021	5.68	7.46	3.98	1.56	16.29	34.97
2022	6.46	13.26	5.23	1.69	22.67	49.31

Gin Survey - Page 1 of 4 - Production

- Select Your Gin (or enter your gin's name)
- Survey Crop Year (22-23?)
- State
- Zip Code
- Total # Bales Ginned
- % Picker Harvested
- % Stripper Harvested
- Gin Management System
- Plastic Cont. Mitigation Sys.
- Rated Gin Capacity (Bales/hr)
- Avg. Gin Production (Bales/hr)
- # of Upland Bales
- # of Upland Bales Roller Ginned
- #Pima Bales
- # of Conventional Modules
- Avg. Bales per Con. Modules
- # of Round Modules
- Avg. Bales per Round Module

Figure 1. Page 1 questions of the web-based gin survey associated with production.

Gin Survey - Page 2 of 4 - Labor

- # Days of Gin Operation
- #Gin Crew Shifts
- #Truck Crew Shifts
- #Gin Crew Workers/Shift
- #Truck Crew Workers/Shift
- Hours per Gin Crew Shift
- Hours per Truck Crew Shift
- Gin Crew Labor Cost (\$/Season)
- Truck Crew Labor Cost (\$/Season)
- Management Cost (\$ for Full Year)
- Total Labor Cost (this is automatically calculated if nothing is entered)

Figure 2. Page 2 questions of the web-based gin survey associated with labor.

Gin Survey - Page 3 of 4 - Energy

- Name of Electric Company
- Electricity Usage (KW-Hrs)
- Total Electrical Cost (\$/Season)
- Name of Gas Company
- Natural Gas Billing Units (MMBTU, CCF, MCF)
- Total Natural Gas Usage
- Total Natural Gas Cost (\$/Season)
- Total Propane Gas Usage (Gal)
- Total Propane Cost (\$/Season)

Figure 3. Page 3 questions of the web-based gin survey associated with energy.

Gin Survey - Page 4 of 4 - Auxiliary Cost

- Total Cost of Module Tarps (\$/Season)
- Total Cost of Round Module Wrap (\$/Season)
- Total Bagging Costs (\$/Season)
- Type of Bale Ties
- Total Cost of Bale Ties/Strapping (\$/Season)
- Total Cost of Repairs/Maint. (\$/Season)
- Total Cost of Capital Improvements (\$/Season)
- Description of Capital Improvements

Figure 4. Page 4 questions of the web-based gin survey associated with auxiliary cost.

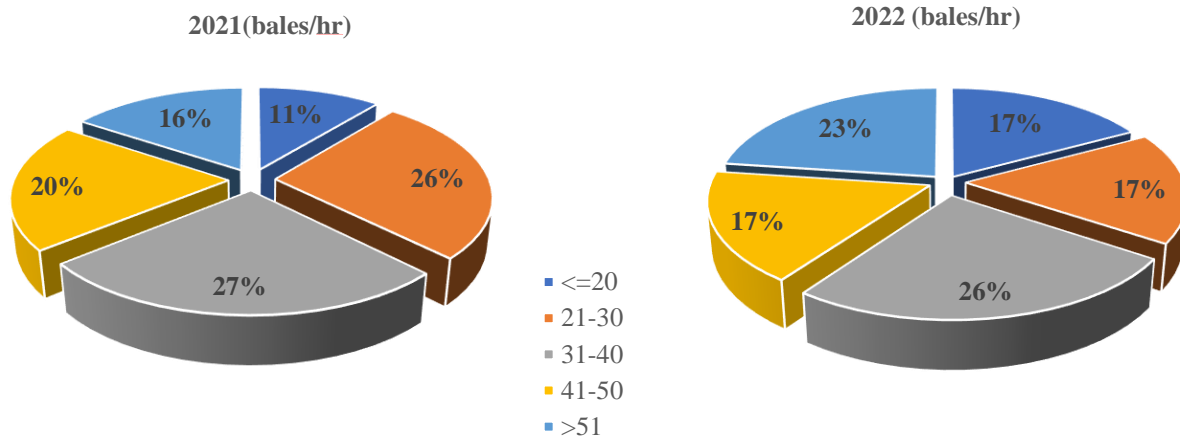


Figure 5. Pie graph of percent of survey respondents based on gin capacity in bales/hour

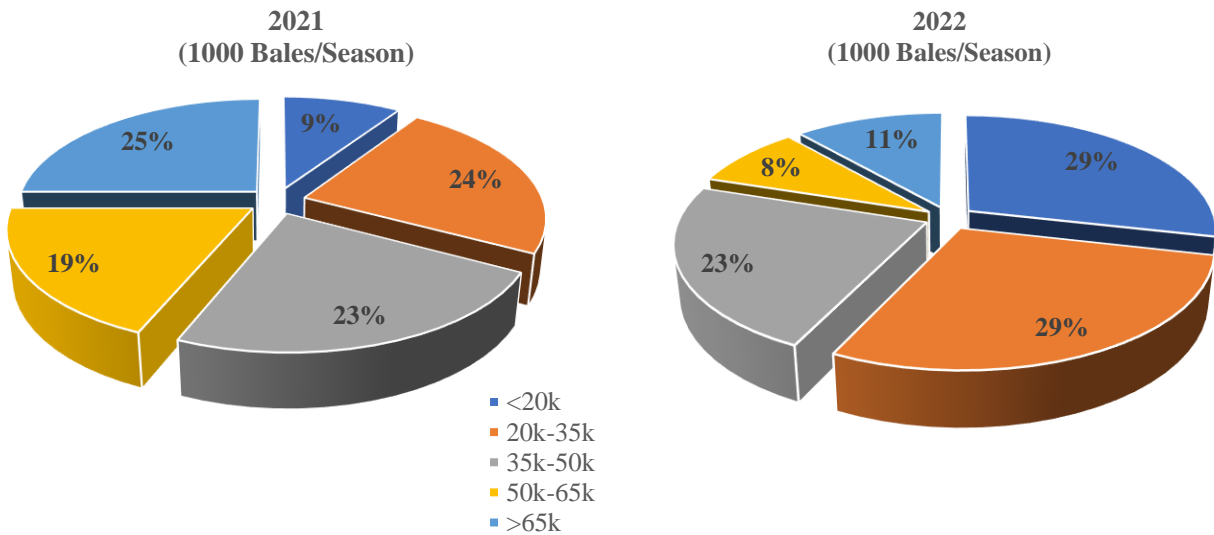


Figure 6. Pie graph of percent of survey respondents based on bales ginned in the 2021 and 2022 ginning season.

Conclusions

This is the first time the survey has been conducted in two consecutive years with the data being stored at the National Cotton Council. The survey questions were expanded and covered four main categories: Production, Labor, Energy, and Auxiliary Costs. With the survey now being completely on the web, data can be entered for any previous year allowing ginners to compare their costs to regional costs as well as other regions in the cotton belt and the beltwide averages. The 2021 and 2022 cotton crops and associated ginnings had the largest variable costs since the Cost of Ginning Survey began being reported by USDA-ARS in 1994. Average processing capacity was 53,134 bales per gin in 2021, which is the largest ever reported, and 38,163 in 2022. The average total variable cost was \$34.97 per bale, in 2021, and \$49.31 in 2022. Since the survey began, most increases/decreases from one year to the next have been relatively modest with the largest being the jump from 2010 variable costs of \$20.95 to 2013's \$24.88, an 18% increase. However, the increase from the 2019 variable costs of \$23.93 was 46% for 2021 and 106% for 2022. Labor

and Repairs were the two largest cost factors reported in this survey, averaging \$16.29 (2021), \$22.67 (2022) and \$7.46 (2021), \$13.26 (2022) per bale, respectively. Regional variable cost data showed that the SW and SE had the lowest regional per bale cost at \$34.04 (2021) and \$33.47 (2022), respectively. The West had the highest cost per bale for both years (2012 and 2022) at \$53.09 and \$64.31, respectively. Even though the SW had the lowest cost per bale in 2021, the cost per bale for 2022 was the second highest at \$55.73 which was a significant increase because of the drought and subsequent small crop. On a regional basis, the kWh/bale were lowest for the SE and highest for the W, for both years. The percentage of round modules was 67.6% (2021) and 75.8% (2022) with the highest percentage being in the Mid-South for both 2021 and 2022 at 89.8% and 96.7%, respectively. The region with the lowest percent round modules was the West for both years at 58% and 49%. The total cost per bale based on the number of bales ginned basically followed the economy of scale as expected with the highest cost per bale being the gins that processed less than 20,000 and the lowest cost being the gins that processed more than 65,000. The exception was in 2022 when the gins processing 35,001 to 50,000 were slightly lower (\$25.71) than those that processed over 65,000 (\$27.81) with the main differences being repairs and labor. The significantly larger total variable cost for the gins processing less than 20,000 bales (\$90.11) in 2022, compared to all other categories, is primarily due to large gins in the SW having a small crop and ginning less than 20,000 when they were used to ginning 75,000+. Overall, the percent respondents based on actual ginning capacity was fairly uniform for both years with the largest percent respondents being from the 31 to 40 bale/hr category. In regard to number of bales ginned, the 2021 respondents were lowest in the <20K category (11%) and highest in the >65K category (25%). In 2022, that distribution changed to 29% from both the <20K and 20K – 35K categories with 8% from the 50 – 65K and 11% from the >65K categories. The large change in respondents from the 2021 season was due to the gins that were used to processing large number of bales (50K or more) responding to the survey but only ginning <20K bales due to the poor crop. Ginners are encouraged to compare their individual cost data with regional and beltwide average values to help identify operational areas of additional focus.

Acknowledgments

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