# THE COST OF GINNING COTTON – 2007 SURVEY RESULTS

**Thomas D. Valco**
**USDA – ARS**
**Stoneville, MS**
**J. Kelley Green**
**Texas Cotton Ginners' Association**
**Austin, TX**
**Roger A. Isom**
**California Cotton Ginners' Association**
**Fresno, CA**
**Dennis S. Findley**
**Southeastern Cotton Ginners Association**
**Dawsonville, GA**
**Timothy L. Price**
**Southern Cotton Ginners Association**
**Memphis, TN**
**Harrison Ashley**
**National Cotton Ginners Association**
**Cordova, TN**

## Abstract

The 2007 United States cotton crop was 18.7 million running bales, 11 percent below 2006 production. This crop was gathered from 10.2 million acres, which yielded a record high 879 pounds per acre and was ginned with 806 operating gins, averaging over 23,000 bales per gin. There has been a yearly reduction in gin numbers and an upward trend in United States cotton production and average ginning volume. Since 2006, there has been a decline in cotton acres production, and average gin volume.

The ginning cost survey has been conducted since 1990, to identify variable costs in an attempt to document key cost components of ginning cotton and help ginners make comparisons with other ginning operations in an effort to reduce costs. Cost surveys were mailed to gin managers to identify variable costs that included labor (seasonal and full-time), bagging and ties, repairs and maintenance, drying and electrical costs. Gin managers also reported performance information, which included ginning rate, length of season, number of bales, and type of cotton ginned. Additional information on module tarps and hauling cost information was requested. The average total variable cost was $21.58 per bale, with seasonal labor as the largest single expense item reported. Full-time labor cost was the second largest expense. Cost comparison based on gin annual volume showed that larger volumes help to reduced per bale cost, primarily as a result of reduced labor cost. Regional cost data revealed that the Mid-South and Southeastern region gins have the lowest per bale cost, while the Southwest and West region gins had the highest cost. West region gins reported the highest energy cost per bale.

Ginners are encouraged to compare their individual cost data with the average values determined by this study, to help identify operational status. Additional information can be obtained from the USDA, ARS Ginning Technology website, GinTech. The address is http://msa.ars.usda.gov/gintech.

## Introduction

Cotton has experienced a reduction of acres and production due to reduced demand and prices as compared to other commodities in the past two years. Grain has replaced long time cotton acres in many production regions. The 2007 United States cotton crop was 18.7 million running bales, 11 percent below 2006 production. This crop was gathered from 10.2 million acres, which yielded a record high of 879 pounds per acre. This production was ginned with 806 operating gins averaging over 23,000 bales per gin. Figure 1 shows the annual crop production and the number of gins operating in the United States since 1982. During this period, there has been a yearly reduction in gin numbers and an upward trend in United States cotton production and average ginning volume. The 2008 ginning season, albeit not complete, recorded significantly fewer gins, as a result of the decreasing cotton production.

The cost of ginning cotton is an important concern for producers and ginners. This survey identifies variable costs in an attempt to document key cost components of ginning cotton and help ginners make comparisons with other ginning operations in an effort to reduce costs. These data also identify historical trends of ginning cost information and helps to document the incorporation of new technology to maintain or reduce ginning costs, in spite of ever increasing labor, energy, equipment and regulatory cost.

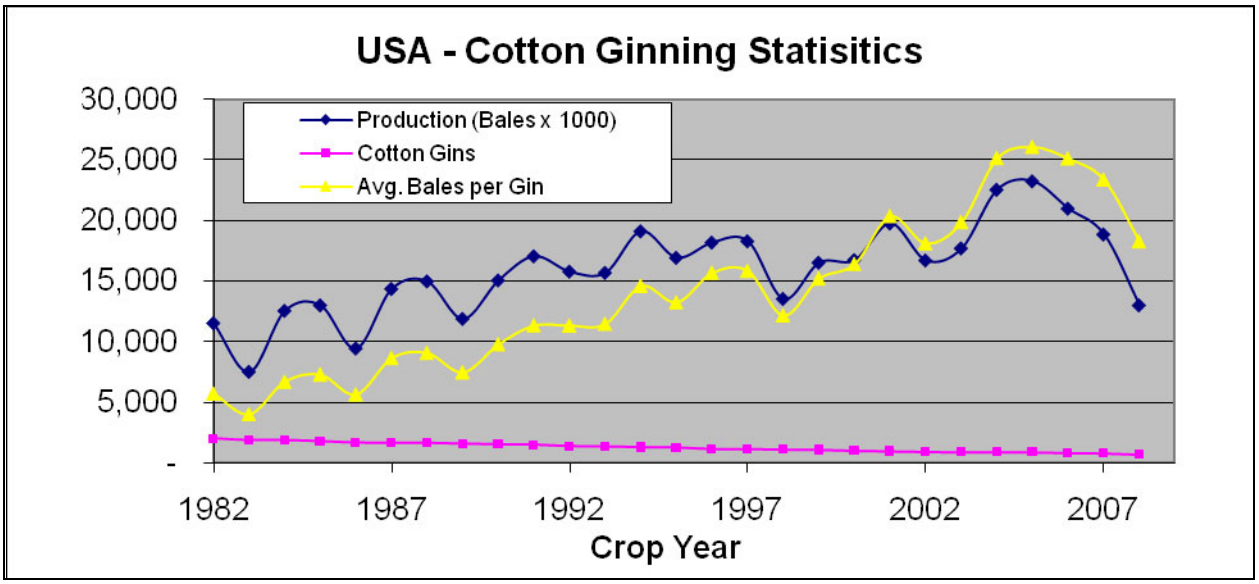


Figure 1. Cotton Ginning Statistics for 1982 to 2008. 2008 data are estimated and subject to change after the production season is completed. Source: USDA NASS

## Procedure

Surveys were mailed to gins with the understanding that gin identification would be kept confidential. The survey form was structured similar to past surveys to assist in comparisons. Ginners were asked to identify variable costs that included labor (seasonal and full-time), bagging and ties, repairs and maintenance, drying and electrical costs. Gin managers also reported performance information, which included gin make and model, ginning rate, length of season, number of bales, and type of cotton ginned (saw ginning picker or stripper, and roller ginning). The survey also included the cost of hauling modules, module covers, and insurance. However, in the Mid-South region, additional survey questions were developed to help assess the economic impact of cotton ginning to economics of Mid-South states and quantify future trends in the cotton ginning industry (Fannin and Paxton, 2009)

The data was analyzed according to annual volume, production regions, harvest, and ginning methods. Labor cost was divided into two groups, seasonal and full-time. Labor cost figures included wages, Workers Compensation Insurance, Social Security, fringe benefits, bonuses, etc. Only the seasonal labor cost was included in the total variable cost; full-time labor cost was considered a fixed cost. Fixed cost also included depreciation, interest on investment, insurance, taxes, and miscellaneous expenses.

## Results

Ginners returned 148 surveys, which represented 4.4 million bales or about 24 percent of the 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. Table 1 summarizes the average and median variable costs. The average bales ginned were 29,277 with a total variable cost of $21.58 per bale. Seasonal labor cost was the largest single expense reported in this survey. Full-time labor cost was the second largest expense, and was considered as a fixed cost in this analysis.

Table 1. 2007 Beltwide Gin Cost Summary.

| | Bales Ginned (Avg.) | Bagging and Ties ($/bale) | Repairs ($/bale) | Elec. Cost ($/bale) | Dryer Fuel Cost ($/bale) | Seasonal Labor Cost ($/bale) | Total Variable Cost ($/bale) | Full-Time Labor Cost ($/bale) |
|---|---|---|---|---|---|---|---|---|
| Surveys Returned | 148 | 122 | 136 | 144 | 138 | 139 | -- | 141 |
| Average | 29,277 | $4.16 | $4.75 | $3.89 | $1.84 | $6.93 | $21.58 | $6.74 |
| Median | 20,838 | $4.14 | $4.48 | $3.86 | $1.41 | $5.90 | $19.79 | $5.09 |

Gin operational statistics collected from the returned surveys were reported in Table 2a & 2b by both national and regional averages. The Southwest region had the longest operational time, averaging 105 days, due to an extremely large cotton crop in that area. The Mid-South region had one of the shortest operational times, with the highest ginning rates and number of seasonal workers and full-time workers per 10,000 bales ginned. About 60 percent of the crop was picker harvested, with the remainder being stripper harvested. This is a major reduction in picker harvested cotton, which is primarily due to the increased percentage of acres coming from the Southwest production region. Module hauling cost averaged $5.26 per bale, which was an increase of 29 percent over the 2004 data. The highest reported cost was in the West and lowest cost in the Mid-South. Module tarp cost averaged $1.22 per bale, a 37 percent increase from the 2004 survey data.

Table 2a. 2007 Beltwide Gin Statistics.

| Region | Bales Ginned (Avg.) | Period Days (Weeks) | Ginning Rate (bale/hr) | Rated Capacity (bale/hr) | Seasonal Workers (#/10K bale) | Full-Time Workers (#/10k bale) |
|---|---|---|---|---|---|---|
| Beltwide | 29,277 | 77 (13) | 25.9 | 32.8 | 8.0 | 1.5 |
| Southeast | 22,269 | 67 (11) | 24.2 | 27.3 | 8.9 | 1.9 |
| Mid-South | 23,195 | 51 (9) | 27.2 | 34.4 | 10.0 | 2.1 |
| Southwest | 38,681 | 105(18) | 21.4 | 26.4 | 6.6 | 1.1 |
| West | 22,898 | 80 (13) | 13.6 | 22.1 | 8.5 | 1.9 |

Table 2b. 2007 Beltwide Gin Statistics.

| Region | Picked (%) | Stripped (%) | Stripped Non-FC (% of Sp) | Roller Ginned (%) | Module Hauling Cost ($/bale) | Module Tarp Cost ($/bale) |
|---|---|---|---|---|---|---|
| Beltwide | 59.1 | 40.9 | 15.2 | 0.6 | $5.26 | $1.22 |
| Southeast | 97.2 | 2.8 | 0 | 0 | $4.98 | $0.58 |
| Mid-South | 100 | 0 | 0 | 0 | $4.53 | $1.28 |
| Southwest | 22.2 | 77.8 | 15.4 | 0 | $5.55 | $1.42 |
| West | 100 | 0 | 0 | 18.1 | $8.60 | NA |

**Variable Ginning Costs Based On Annual Volume**

Variable ginning costs were summarized according to gin annual volume (Table 3). The data were divided into four categories: 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. The number of gins in each size category responding to the survey was 35 percent producing fewer than 15,000 bales per year, 20 percent producing 15,000 to 25,000 bales per year, 19 percent producing 25,000 to 40,000 bales per year, and 26 percent producing greater than 40,000 bales per year. The category including the smaller gins had the highest variable cost, with seasonal labor being the largest cost

component. Although variable costs tended to decrease with increasing annual volume, the difference tends to decrease as gins annual volume increases.

Table 3. 2007 Beltwide Gin Cost by Annual Volume

| Bales per year x1000 | Bales Ginned (Avg.) | Bagging/ Ties ($/bale) | Repairs ($/bale) | Elec. Cost ($/bale) | Dryer Fuel ($/bale) | Labor Cost ($/bale) | Total Variable Cost ($/bale) | Full Time Labor ($/bale) |
|---|---|---|---|---|---|---|---|---|
| 15 or Less | 9,747 | $4.15 | $5.19 | $4.46 | $1.91 | $8.48 | $24.20 | $8.40 |
| >15 -<25 | 18,992 | $4.23 | $4.14 | $3.86 | $2.07 | $7.35 | $21.66 | $5.69 |
| >25-<40 | 30,424 | $4.26 | $4.82 | $3.38 | $1.90 | $6.53 | $20.89 | $4.37 |
| 40 or more | 63,277 | $3.80 | $4.64 | $3.45 | $1.49 | $4.93 | $18.31 | $4.01 |

**Regional Cost Comparisons**

Cost data were divided into four cotton production regions, as shown in Table 4. The Southeast region includes Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia, totaling 26 returned surveys. The Mid-South region includes gins located in Arkansas, Louisiana, Mississippi, Missouri, and Tennessee, with 56 surveys returned for analysis. The Southwest region includes Kansas, Oklahoma, and Texas, and provided 58 surveys. The West region, which includes Arizona, California, and New Mexico, returned 8 usable surveys.

Table 4. 2007 Beltwide Gin Cost by Regional Location

| Region | Surveys Returned | Bales Ginned (Avg.) | Bagging and Ties ($/bale) | Repairs ($/bale) | Elec. Cost ($/bale) | Dryer Fuel Cost ($/bale) | Labor Cost ($/bale) | Total Variable Costs | Full Time Labor ($/bale) |
|---|---|---|---|---|---|---|---|---|---|
| National | 148 | 29,277 | $4.16 | $4.75 | $3.89 | $1.84 | $6.93 | $21.58 | $6.74 |
| Southeast | 26 | 22,269 | $3.94 | $3.94 | $3.47 | $2.07 | $7.33 | $20.75 | $8.24 |
| Mid-South | 56 | 23,195 | $4.13 | $4.38 | $3.53 | $1.70 | $5.96 | $19.69 | $6.97 |
| Southwest | 58 | 38,681 | $4.31 | $5.78 | $4.29 | $1.72 | $7.64 | $23.74 | $5.90 |
| West | 8 | 22,898 | $4.01 | $3.69 | $5.13 | $3.21 | $7.61 | $23.64 | $6.22 |

The Southwest region saw one of the largest cotton crops, which extended the ginning season and dramatically increased the annual ginning volume. The majority of this cotton was stripper harvested, which requires additional cleaning and increased cost. The Southwest region represents the highest variable ginning cost, primarily attributed to high labor and repair cost. This is followed by the West region, which experienced the highest energy cost (both electricity and gas) and the second highest seasonal labor cost. Lower repair cost reported in the West region helped to keep total variable cost low. There was not enough information on roller ginning to do a separate analysis, but past studies have shown increased cost for roller ginned cotton (Valco et al., 2006). The Mid-South region had the lowest total variable ginning cost and the Southeast region experienced several destructive hurricanes, reducing the crop and ginning volumes.

**Picker Versus Stripper Harvesting**

The Southwest has a large number of gins that process both picker and stripper harvested cotton. Processing stripper harvested cotton requires additional cleaning equipment and processing cost (Valco et al., 2006). To identify this cost, the survey data was analyzed according to harvest type and only those surveys were used with 90 percent or greater of the cotton either picker or stripper harvested. The stripper harvest data were also divided into field cleaned (FC) cottons and non-field cleaned (NFC) cottons. The greatest percentage of the stripper gins received field cleaned seed cotton; however, additional seed cotton cleaning equipment is typically used in these gins. Stripper harvested cotton ginning cost was higher for all cost factors as compared to picker harvested cotton. The total variable cost was $23.64, as compared to $18.98 for picker harvested cotton (Table 6). NFC harvested cotton total variable cost was higher than FC harvested cotton, $30.52 and $23.64, respectively.

Table 6. Picker versus Stripper Harvesting

| Harvest Method | Bales Ginned (Avg.) | Bagging Ties ($/bale) | Repairs ($/bale) | Elec. Cost ($/bale) | Dryer Fuel Cost ($/bale) | Labor Cost ($/bale) | Total Variable Cost ($/bale) |
|---|---|---|---|---|---|---|---|
| Picker | 34,320 | $4.17 | $5.31 | $4.08 | $1.67 | $5.54 | $18.98 |
| Stripper - All | 37,544 | $4.31 | $5.88 | $4.21 | $1.73 | $8.07 | $23.64 |
| Strip FC | 36,674 | $4.35 | $6.16 | $4.05 | $1.70 | $8.38 | $23.64 |
| Strip NFC | 23,169 | $4.33 | $5.33 | $4.54 | $1.05 | $9.18 | $30.52 |

FC – Field cleaned cotton; NFC – Non-field cleaned cotton

**Previous Survey Cost Comparisons**

Variable cotton ginning cost was compared to similar analyses conducted for the 2001 and 2004 ginning seasons (Valco et al., 2003 and Valco et al., 2006). Past survey data has the average annual ginning volume for 2001, 2004 and 2007, were 27,196, 31,569, and 29,277, respectively. Figure 2 shows an increase in variable ginning costs from the 2001 to 2007 seasons. The survey results showed a noticeable increase in bagging and ties, and repair cost in 2007, while energy and labor per bale cost was slightly lower or equal to previous years. This is an indication in improved efficiency of gin operation and management.

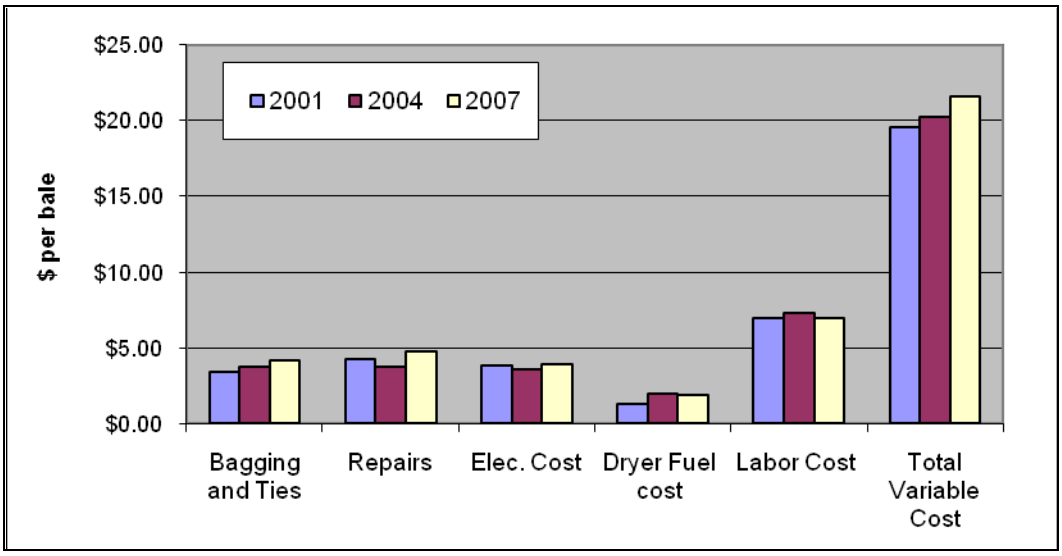


Figure 2. Comparison of variable ginning cost for the 2001, 2004 and 2007 seasons.

**Fixed and Total Cost**

Many ginners were interested in total ginning cost, which includes both variable and fixed cost. Some of the fixed cost includes capital investment, depreciation, interest, taxes, insurance, and salaries for full-time employees. There were several other variable costs, such as module hauling, module tarps, communication, supplies, etc., which were not considered in this analysis. Each of these values can vary greatly between gins and would be difficult to determine. In past reports, a worksheet based on a simplified method to assist ginners in making those total ginning cost calculations was published (Valco, et al., 2006).

## Conclusions

The number of gins in the United States continues to decrease and the annual ginning volume decreased slightly from the 2004 Beltwide survey, results are due to reduction in cotton production. The average total variable cost was $21.58 per bale, with seasonal labor as the largest single expense item reported in this survey. Full-time labor cost was the second largest expense. Cost comparison based on gin annual volume showed that larger volumes help to reduced per bale cost, primarily as a result of reduced labor cost. Typically larger annual volumes yield lower

costs per bale, but this incremental decrease becomes smaller at higher annual volumes. Regional cost data revealed that the Mid-South and Southeastern region gins have the lowest per bale cost, while Southwest and West region gins had the highest cost. West region gins reported the highest energy cost per bale in both saw and roller gins. In the Southwest region, where cotton is both picked and stripped, the 2007 survey data showed that additional repair, labor and energy costs contributed to higher total variable cost gins for stripper harvested cotton. NFC harvested cotton resulted in a higher total variable cost than FC harvested cotton, due to increased labor and electrical cost.

Total ginning cost can be calculated using a simplified analysis method which included variable cost survey data and estimated fixed cost. Cotton gin owners and investors considering increasing ginning capacity can use this information on the cost of ginning cotton. Also, gin managers can use average ginning cost data to evaluate their operations and improve efficiency. Although volunteered survey data may not be the most accurate data source, it does provide an indicator of the cost and efficiency of gin facilities and management. It is important to acknowledge that each gin plant has a unique design and seasonal operating characteristics that sets it apart from others across the cotton belt. This manuscript presents the average cost figures for selected variables with the understanding that not all costs have been included in this analysis.

## References

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## Acknowledgments

The authors would like to thank the ginners who returned survey forms and hope that this activity provides them as well as other ginners with useful information to make informed management decisions. Additional ginning cost information is available on the USDA, ARS Ginning Technology website, GinTech, at http://msa.ars.usda.gov/gintech.