

MEASURING THE SUPPLY OF COTTON GINNING STRUCTURE IN LOUISIANA

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Abstract

The purpose of this technical paper is to estimate changing geographic capacity of cotton ginning infrastructure in Louisiana. In particular, cotton field locations are compared to cotton gin locations using geographic information system (GIS) technology. We compare changing average field to gin distance between 2006 and 2009 production years. We then evaluate how field to gin distance changes when we evaluate 2009 gins operating in Louisiana with 2006 cotton fields (last high acreage year of cotton for Louisiana). Results indicate that average cotton field to gin distance increased approximately 20% from 2006 to 2009. When comparing 2006 fields against 2009 gins, field to gin distance increased only an additional 1%. However, visual analysis of GIS maps suggests that some traditional cotton growing regions of Northwest and Central Louisiana are vulnerable if certain gins were to shut down.

Introduction and Background

The cotton ginning industry has faced numerous challenges during the past three production seasons. A combination of reduced acreage combined with poor weather during harvest season, resulted in many gins choosing to either not operate or run at well below capacity in 2009. Within the five state Mid-South region of Arkansas, Louisiana, Missouri, Mississippi and Tennessee, total bales ginned dropped from 5.1 million in 2006, to just under 3.4 million in 2008 (Cotton Ginnings 2008 Summary, 2009). In Louisiana, production declined almost 75% from 1.2 million bales in 2006, to approximately 280,000 bales in 2008. While some of this loss was due to reduced yield in 2008, from poor harvest conditions brought about by the 2008 hurricane season, the key driving force was reduced cotton acreage planted.

Challenging market conditions in 2009, resulted in only 240,000 acres planted for the state. This combined with flooding rains at the time of harvest resulted in only 31 gins operating during harvest season. A total of 44 gins operated in the state during the same period during 2006.

Reduced acreage across the Mid-South has resulted in gins closing at an accelerated rate, relative to historic trends. While anecdotal evidence from some ginners suggests their closure is temporary (especially for larger gins and gins with modern equipment), historical evidence suggests many gins that shut down never return to operation. Many in the cotton industry, including ginners in the Mid-South, are concerned that eroding ginning infrastructure may at some point in the future inhibit traditional cotton growing regions from being able to grow cotton, thereby cutting off those areas from supplying their raw product into the remainder of the cotton marketing supply chain.

A recent research proposal submitted and funded by USDA's Agricultural Marketing Service Federal State Marketing Improvement Program by LSU AgCenter, economists Matthew Fannin and Kenneth Paxton, attempts to gain a better understanding how current and future ginning infrastructure loss might impact the cotton marketing supply chain. The project evaluates the current geographic capacity of ginning infrastructure, foregone income lost to agricultural producers if cotton cannot be grown due to a lack of infrastructure, and applying alternative gin seed rebate models to expand geographic coverage of existing gins. This paper focuses on geographic capacity of ginning infrastructure in Louisiana, one of three states (including portions of Arkansas and Mississippi) that are part of the project.

Methods, Data, and Results

To address changes in geographic capacity, distances between cotton fields and operating gins were measured. Cotton fields geographically coded as part of the Louisiana boll weevil eradication program were compared to the addresses of cotton gin locations, provided by the Southern Cotton Ginners Association and the Louisiana Cotton and Grain Association. Based on these data, constructed were three distance calculations: 1) 2006 cotton fields to

2006 gins; 2) 2009 cotton fields to 2009 gins, and 3) 2006 cotton fields to 2009 gins. The third distance calculation was constructed to assess how sensitive current gin infrastructure would be to higher cotton acreage. Descriptive statistics for these calculations appear in Table 1.

Table 1. Changes in Average Distance Between Louisiana Cotton Fields and Gins.

Cotton Field to Gin (Distances in Miles)	2006	2009	2006 Fields to 2009 Gins
Average	6.90	8.25	8.33
Median	5.80	6.66	6.86
Standard Deviation	4.58	6.60	5.69

As can be seen from the table, average distance from cotton field to gin increased by 1.35 miles, or approximately 20%, between 2009 and 2006. Median distances were slightly shorter, but showed the same growth. There was a measurable change between average gin location to 2009 fields, compared to 2006 fields. This was likely due to the geographic closure of gins between 2006 and 2009. Gins during this period that closed may have been next door to other gins that remained open. Hence, fields that would have been nearest a closed gin did not have that much further to travel to the next closes gin.

A more detailed analysis of field proximity to multiple gins is presented in Tables 2, 3, and 4. Here, evaluated were the percentage of all Louisiana cotton fields that are within five, 10, 15, and 25 miles of their closest three gins.

Table 2. Cotton Fields to Nearby Gins, 2006.

	1st Closest	2nd Closest	3rd Closest
	Miles	Miles	Miles
Average	6.89	10.76	15.95
Median	5.80	9.53	13.82
	Percent	Percent	Percent
Less than 5 miles	42.39	12.87	0.64
Less than 10 miles	78.12	52.45	27.53
Less than 15 miles	93.10	79.30	54.94
Less than 25 miles	99.91	97.70	88.59

As can be seen by Table 2, average distance to the third closest cotton gin expands to almost 16 miles in 2006. However, almost 89% of all 2006 cotton fields were within their third closest cotton gin based on gins operating in 2006.

Table 3 shows a better picture of how gin closures are affecting infrastructure capacity. The operating gin closures have expanded the average distance to the third nearest gin to 21 miles. Since some gins in Louisiana are private gins; that is, gins that only gin the gin owner's cotton, the first, and in a few cases the second, gin may not be a gin that will take an individual producer's cotton. Further, the percentage of gins that are within 25 miles of their closest gin drops to 72%. This means if the two closest gins would not take a producer's cotton, there is a 28% chance that the producer's field would be beyond 25 miles of the next available gin.

Table 3. Cotton Fields to Nearby Gins, 2009.

	1st Closest	2nd Closest	3rd Closest
	Miles	Miles	Miles
Average	8.25	12.58	20.12
Median	6.65	10.85	17.23
	Percent	Percent	Percent
Less than 5 miles	35.11	9.24	0.61
Less than 10 miles	72.74	44.02	17.66
Less than 15 miles	86.09	70.87	44.10
Less than 25 miles	98.74	93.41	72.46

In Table 4, there is as great a growth in the average distance to the third closest gin, or a reduction in the percentage of cotton fields more than 25 miles from their third closest gin. It does create concern, however, that beyond these statistics there may be certain geographic cotton producing areas that are more vulnerable to future gin closures than others. By overlaying distance buffers around 2009 gins on 2006 cotton fields, it showed which cotton fields fell inside or outside the respective buffers (Figure 1).

Table 4. 2006 Cotton Fields to 2009 Nearby Gins.

	1st Closest	2nd Closest	3rd Closest
	Miles	Miles	Miles
Average	8.33	13.65	21.21
Median	6.86	12.39	19.52
	Percent	Percent	Percent
Less than 5 miles	34.00	6.90	0.57
Less than 10 miles	68.88	35.76	12.27
Less than 15 miles	85.89	62.90	33.51
Less than 25 miles	99.19	92.07	69.18

As can be seen from Figure 1, there is reasonable coverage of gins to most cotton fields in Northeast Louisiana. There is some increased distance between cotton gins bordering the Ouachita River on the western edge of Northeast Louisiana due to gin closures. Of greater concern is the gin infrastructure availability in Northwest and Central Louisiana. These areas are much more vulnerable to a gin closure and cotton producers would have more difficulty finding a gin to take their cotton without some concessions on transportation costs.

Conclusion

This technical paper represents initial results of understanding the geographic capacity of ginning structure on the cotton marketing supply chain in the Mid-South. Results show that while a 20% reduction in Louisiana gins has increased field to gin distances somewhat, almost all cotton fields are within 25 miles of a nearby gin. There is concern if the closure of ginning infrastructure continues and producers have to go to their second, and especially third, closes gin options.

Future extensions of this research include incorporating road networks in the field to gin measurements, including ginning capacity at each gin location, and extending the geographic analysis to Arkansas and Mississippi. This research should also assist ginners interested in evaluating the cost effectiveness of alternative transportation systems brought about by the new cotton picker baling systems. At a minimum, findings from this research should help remaining ginners have a better understanding of how they might make strategic decisions in the new world of increased volatility and uncertainty in the cotton marketing supply chain.

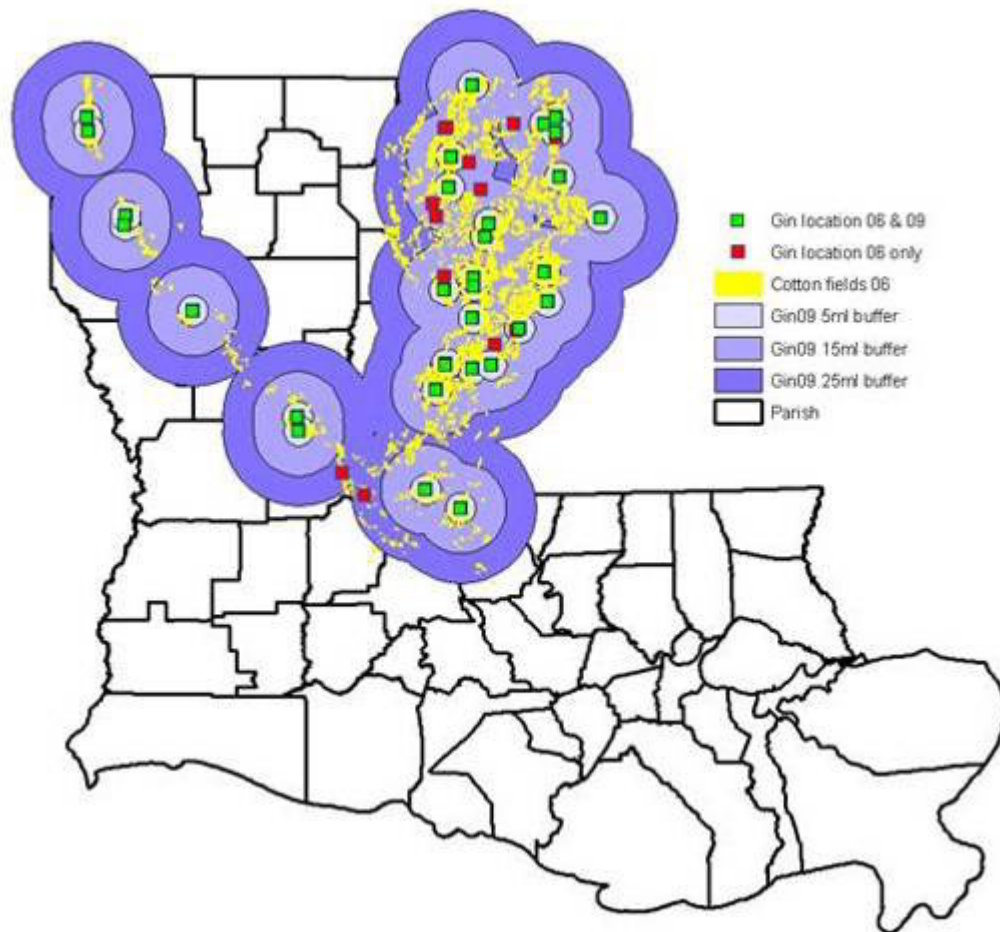


Figure 1. Coverage of gins to most cotton fields in Northeast Louisiana

References

Cotton Ginnings 2008 Annual Summary. 2009. National Agricultural Statistics Service, United States Department of Agriculture. Ct Gn 1 (2009). May.