

**AN ANALYSIS OF THE SOUTHERN REGIONAL  
COTTON MARKETING RESEARCH PROJECT  
COMMITTEE'S RECOMMENDATIONS ON THE  
COTTON INDUSTRY IN  
NORTHEAST ARKANSAS**

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**Abstract**

The Southern Regional Cotton Marketing Research Project Committee made several recommendations on the cotton industry in Northeast Arkansas<sup>1/</sup> in 1981. This study examined those recommendations and compared the theoretical model with the present cotton industry in Northeast Arkansas in 1996.

**Introduction**

Throughout history economics has usually been the catalyst for change in the cotton industry. During the Twentieth Century the cotton industry has undergone remarkable change, not just in Northeast Arkansas but wherever cotton is grown, assembled, processed and marketed. The Southern Regional Cotton Marketing Research Project Committee made several recommendations on the cotton industry in Northeast Arkansas in 1981. This study examined those recommendations and compared the theoretical model with the present cotton industry in Northeast Arkansas.

The drive toward increased economic efficiency in a global market place has dictated greater efficiency in cotton production, processing and transportation. This has resulted in new harvesting practices, better processing procedures, storing and transporting of cotton.

A study entitled "Efficiency of Identification, Assembly and Transportation of Cotton to Domestic Mills and Export Outlets" was started in 1976 by the Southern Regional Cotton Marketing Research Committee. The project had three major objectives: (1) To determine the methods, problems and costs associated with cotton for shipment from assembly points to domestic mills or export outlets. (2) To determine the rates and other costs of moving cotton from assembly points to domestic mills or export outlets by alternative modes of transportation. (3) To construct a quantitative model of the cotton marketing system in the Southeastern United States. Objectives one and two were

completed in 1978 (Lafferty et. al., 1979). Objective three was completed in 1981 (Lamkin et. al., 1982).

A mathematical model was formulated to determine the optimal sizes and locations for gins and warehouses in the Southeastern United States and to investigate the long-run planning problem for the cotton industry. An evaluation of an extended ginning season was conducted to determine what impact it would have on the optimum organization for the cotton industry. In order to introduce an opportunity cost into the extended ginning season a "delayed marketing charge" was utilized. The study made a determination of the most economically feasible mode or modes of transporting cotton where possible. The greatest benefit the quantitative model provided was that of a policy tool. The study provided policy makers with insight into the optimum organization of cotton gins and warehouses in the Southeastern United States. It also provided investors a means by which to select the most feasible size and location for replacements and expansions in the cotton industry. The opportunity cost analysis provided a more realistic assessment of an extended ginning season in the Southeastern United States.

The quantitative model provided the foundation for several studies (Brooker et. al., 1982) (Capstick et. al., 1983) (Emerson and Lamkin, 1995) (Hudson et. al., 1983) (Lamkin, 1994) (Lamkin, 1995) (Lamkin, 1996) (Lamkin et. al., 1981). These studies laid the groundwork for the present study. This study only concerned itself with Northeast Arkansas. The mathematical study was designed to incorporate several unique programs and multi source input data to provide as realistic a view of the cotton industry as possible (Bounds and Cole, 1987) (Candler et. al., 1972) (Chern and Polopolus, 1970) (Cleveland, 1976) (Fuller and Washburn, 1974) (Gass, 1964) (Ghetti et. al., 1977) (Graves, 1969) (Hawks, 1970) (Hurt and Tramel, 1965) (Hurt) (International Business Machine Corporation, 1968) (King and Logan, 1964) (Kloth and Blakely, 1971) (Knudtson, 1958) (Ladd and Halvorson, 1970) (Moore and Courtney) (Rodriguez, 1980) (Shaw et. al., 1977) (Sperry-Univad Corporation) (Stennis) (Stennis, 1970) (Stennis and Hurt, 1974) (Stollsteimer, 1963) (Toft et. al., 1970) (Tramel and Seale, Jr., 1963) (United States Department of Commerce, 1978) (United States Department of Commerce, 1980).

**The Problem**

It has been approximately fifteen years since the final results of the Committee's study were published. Using the information contained in the report on assembling, processing, storing and transporting cotton a comparison was made between the theoretical information published in 1981 and actual industry practices in Northeast Arkansas in 1996.

## **Objectives**

The purpose of this project was to analyze the recommendations made on the cotton industry in Northeast Arkansas by the Southern Regional Cotton Marketing Research Project Committee. The general objective of this research was to determine whether the Committee's recommendations to the cotton industry in Northeast Arkansas materialized.

Specific objectives were:

- 1) To evaluate the Committee's work that used a basic mathematical programming model to approximate the gin and warehouse locations and see how the suggested locations in 1981 compared to the actual locations of gins and warehouses in Northeast Arkansas in 1996.
- 2) To evaluate the estimated least-cost spatial flows identified in the Committee's study in 1981 to see if they have been adopted in Northeast Arkansas in 1996.
- 3) To evaluate the least-cost spatial organizations for gins and warehouses identified by the Committee's study in 1981 to see if they approximate the present spatial organizations for gins and warehouses in Northeast Arkansas in 1996.
- 4) To evaluate the "opportunity cost concept" used by the Committee's study in 1981 and see if an extended ginning season has been adopted in Northeast Arkansas in 1996.
- 5) To evaluate the most efficient mode or modes for transporting cotton from warehouses to domestic mills and export outlets by use of rail and/or truck transportation identified by the Committee's study in 1981 and see if those mode or modes have been adopted in Northeast Arkansas in 1996.

## **The Model**

The purpose of this research was to do an analysis of the recommendations made by the Committee in 1981 to the cotton industry in Northeast Arkansas and compare the theoretical model with the real world practices in 1996. This study focused on the recommendations which related directly to Northeast Arkansas. The results of the theoretical study were: (1) The mathematical model suggested that a more efficient cotton marketing infrastructure would be possible not just in Northeast Arkansas, but for the entire Southeastern United States. (2) Even with the addition of an opportunity cost, the extended ginning season would be competitive with the 14-week season. (3) Fewer larger sized gins would be the trend of the future. (4) An extended ginning season would imply the

use of modular storage of cotton. (5) Most cotton would move via truck to domestic mills and export outlets. There has never been an assessment to see how the theoretical model measured up against the actual industry. The previous research related to the field does not do a comparison of the theoretical and the real world.

## **Research Design**

Actual field interviews were made of farmers, ginner, warehouses, cotton merchants, and transportation firms to determine the present practices now employed by the cotton industry in Northeast Arkansas in 1996. A similar procedure was used by the researchers in the Committee's original study in 1976 (Lafferty et. al., 1979).

## **Data Sources and Description**

The data from the previous study were analyzed. It was theorized in 1981 that the industry would 1) move toward the economic optimal, 2) that in the future there would be fewer larger sized gins, 3) an extended ginning season would come about because it was competitive with the normal 14-week season, 4) the extended ginning season would necessitate the use of the module maker, and 5) cotton would move via the least expensive mode of truck and/or rail transportation to the domestic mills and export outlets. In order to determine whether the industry had moved toward the economic optimal a comparison of the recommended structure in 1981 was made with the existing structure in 1996. This was accomplished by on-site interviews with cotton industry persons. Northeast Arkansas for purposes of this study will consist of Clay, Craighead, Crittenden, Cross, Greene, Jackson, Mississippi and Poinsett counties in Northeast Arkansas. These counties were identified as having significant cotton production in 1995 in Northeast Arkansas. See Table 11. A determination as to whether or not cotton production in Northeast Arkansas has changed since 1976 was made. A determination was made from the information gathered in the interviews as to whether the traditional 14-week ginning season was still being used in Northeast Arkansas or whether an extended ginning season had been brought about by other factors. The role the module maker has played in Northeast Arkansas was explored in the interviews. Information in the interviews was used to determine if cotton in 1996 was moving by the least expensive transportation mode.

## **Stability of the Supply Area**

Northeast Arkansas has shown a remarkable increase in the amount of cotton that is produced in the area as demonstrated in Table 11. This increase in production can be attributed to increased irrigation and the improved varieties and better use of chemicals in Northeast Arkansas. This has resulted in changes in the infrastructure of the cotton industry in Northeast Arkansas.

### **The Economic Optimal**

Using the results of the study conducted by Mississippi State University in 1981 as the mathematical optimal system, let us compare that with the actual economic reality of 1996. The 38 potential gin locations identified for the normal ginning season in the 1981 study in Northeast Arkansas are shown in Table 1. The same potential gin locations were also identified for the extended ginning season in 1981 in Northeast Arkansas. The gin locations chosen by the computer model, no opportunity cost solution, for 1981 are shown in Table 2. The gin locations chosen by the computer model, opportunity cost solution, for 1981 are shown in Table 3. The number of actual gin locations in 1981 in Northeast Arkansas are shown in Table 4. The actual gin locations in 1991 in Northeast Arkansas are shown in Table 5. The actual gin locations in 1995 in Northeast Arkansas are shown in Table 6.

The potential warehouse locations identified for the normal ginning season in the 1981 study for Northeast Arkansas are shown in Table 7. The same potential warehouse locations were also identified for the extended ginning season in 1981 in Northeast Arkansas. The warehouse locations chosen by the computer model, no opportunity cost solution, for 1981 are shown in Table 8. The warehouse locations chosen by the computer model, opportunity cost solution, for 1981 are shown in Table 9. The federally licensed warehouse locations remaining in 1995 in Northeast Arkansas are shown in Table 10.

There are many factors that cause any industry to continually move toward the economic optimal system. Northeast Arkansas has experienced market forces, use of irrigation, improved varieties, new and improved chemicals, insects, disease, weather, and structural changes such as farmers retiring and alternative crops. All these changes have resulted in a more efficient cotton industry in Northeast Arkansas.

### **Fewer Larger Sized Gins**

Fewer larger sized gins characterized the remaining units in Northeast Arkansas. Many of the old abandoned gins stand as monuments to an industry that has witnessed massive consolidation over the last sixty years. Cotton went from being "King" to near extinction. However, the industry did not die. It became competitive by realizing survival was dependent upon economies of size and scale. This was true not only for the cotton industry as a whole but also for Northeast Arkansas as evidenced in the present structure of the cotton industry in the area. In 1981, there were 74 actual cotton gin locations. See Table 4. The mathematical model evaluated 38 gin sites in Northeast Arkansas. In 1995, only 39 active gins remain. This is a dramatic drop in the number of actual gins as compared with the 74 found in the study area in 1981. Compared with 52 in 1991, we have witnessed the industry moving more toward equilibrium

with a massive reduction in the number of gins over the last 15 years. The amount of cotton ginned in the area varies greatly from year to year as shown in Table 11.

### **Extended Ginning Versus The Normal**

The advent of an extended ginning season was caused in part by the appearance of the module maker which will be addressed in a later section of this report. The extended ginning season allows a gin to spread its fixed costs over a longer period of time. The longer one can operate a gin each year, the lower the average fixed costs become to the operator. However, interviews indicated that in Northeast Arkansas the module maker has resulted in more efficient processing of cotton at the gin. The gin is better able to process cotton on a more even schedule than ever before because of the module maker. The module maker frees trailers that might not be available when needed by the farmers and the module maker guarantees the gin a steady supply of cotton. Thus, the actual ginning season may not be any longer because the module maker allows for the constant processing of cotton and improved ginning efficiency. The gins are actually able to process a greater amount of cotton in less time.

### **Impact of the Module Maker**

The module maker provided the cotton industry with a tool to be more efficient. It helped reduce overtime and cut down on equipment wear because there was time to properly service the equipment. Employees can actually have better working conditions and time-off. In the past this was not possible due to the deterioration of the crop that would take place if the cotton was not processed (ginned) quickly. It allows the gins to be able to better schedule their work. The module maker has had a tremendous impact on the ginning efficiency in Northeast Arkansas. The advent of the boll buggy in the field and the module feeder at the gin have all served to further increase productivity in the cotton industry.

### **Least Expensive Transportation Mode**

Trucks were determined to be the least expensive mode of transporting cotton from Northeast Arkansas in 1981. In 1996, most cotton moved via truck from Northeast Arkansas to domestic mills, concentration points or export outlets. Only a few warehouses in Northeast Arkansas have access to both rail and truck transportation modes. Truck transportation was preferred over rail because of the service reliability of trucks. Trucks deliver on time. Rail transportation does not have a timely reputation in Northeast Arkansas.

### **Results**

The results found: (1) There has been a move by the cotton industry in Northeast Arkansas toward the optimal cotton

marketing system that was identified by the mathematical model in 1981. (2) The use of the module maker is becoming the norm in Northeast Arkansas. (3) There are fewer and larger sized gins in Northeast Arkansas than in 1976. (4) Modular storage of cotton is being practiced in Northeast Arkansas. (5) Most cotton is moved via truck from Northeast Arkansas to domestic mills and export outlets.

### **Implications and Conclusions**

The cotton industry in Northeast Arkansas is continually moving toward the optimal. The changes evident in the structure in the past fifteen years point to a more competitive system. This had been predicted by the 1981 study. The 1981 study did a good job of foreseeing the dramatic changes that were going to occur in the cotton industry in Northeast Arkansas. Northeast Arkansas has moved to a more efficient cotton marketing structure since 1981. This move was in part due to the use of irrigation and improved varieties and use of chemicals and more efficient practices being employed by the cotton industry. However, it must be noted that only 38 gin sites were evaluated in 1981 and in 1996 only 39 gins remained out of the 74 actual in 1981. It would appear that even more consolidation is on the way for the Northeast Arkansas study area.

### **Endnotes**

1/ Northeast Arkansas for the purposes of this study is defined as the following eight counties: Clay, Craighead, Crittenden, Cross, Greene, Jackson, Mississippi and Poinsett.

2/ Numbers in brackets refer to items in the literature cited.

3/ For the purposes of the study, the Southeastern United States was delineated as the cotton producing counties or parishes in the states of Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina and Tennessee. Cotton producing counties or parishes were defined as those counties or parishes in which 500 or more bales of cotton were produced during the 1976 crop year (August 1, 1976 through July 31, 1977).

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Table 1. Northeast Arkansas: Potential Gin Locations Used in Computer Model, by County and Town, 1981

County	Town
Clay	Success
	Corning
	Peach Orchard
Craighead	Rector
	Bono
	Cash
	Jonesboro
	Bay
Crittenden	Monette
	Caraway
	Earle
	Turrell
	West Memphis
Cross	Proctor
	Chatfield
	Cherry Valley
Greene	Wynne
	Parkin
	Marmaduke
	Beech Grove
Jackson	Paragould
	Waclott
	Tuckerman
	Amagon
Mississippi	Tupelo
	Leachville
	Manila
	Dell
	Blytheville
Poinsett	Armored
	Luxora
	Osceola
	Wilson
	Joiner
	Lepanto
	Marked Tree
	Tyronza
	Trumann

Table 2. Northeast Arkansas: Gin Locations Chosen by Computer Model, No Opportunity Cost Solution, by County and Town, 1981

County	Town	Bales/Hr.
14-Week Season:		
Clay	Rector	10
	Success	5
Cross	Cherry Valley	2
	Wynne	2
	Parkin	2
Greene	Waclott	15
	Tuckerman	9
32-Week Season:		
Craighead	Jonesboro	28
	Monette	33
Crittenden	West Memphis	24
Mississippi	Osceola	35
	Joiner	32

Table 3. Northeast Arkansas: Gin Locations Chosen by Computer Model, Opportunity Cost Solution, by County and Town, 1981.

County	Town	Bales/Hr.
14 Week Season:		
Clay	Rector	10
Cross	Wynne	2
Greene	Paragould	13
32-Week Season:		
Craighead	Monette	21
Mississippi	Joiner	21
	Luxora	26
Poinsett	Marked Tree	25

Table 4. Northeast Arkansas: Actual Gin Locations by County and the Number in each county, 1981.

County	Number of Gins
Clay	3
Craighead	18
Crittenden	6
Cross	1
Greene	4
Jackson	0
Mississippi	27
Poinsett	15
Total	74

Source: Cotton Ginnings in the United States.

Table 5. Northeast Arkansas: Actual Gin Locations by County and the number in each county 1991.

County	Number of Gins
Clay	2
Craighead	15
Crittenden	4
Cross	1
Greene	3
Mississippi	16
Poinsett	11
Total	52

Table 6. Northeast Arkansas: Actual Gin Locations by County and the number in each county 1995.

County	Town
Clay	Rector (2)
Craighead	Bay (2) Black Oak (1) Lake City (2) Monette (3)
Crittenden	Crawfordsville (2) Hughes (1) Marion (1)
Cross	Wynne (1)
Greene	Marmaduke (1) Paragould (1)
Mississippi	Armored (1) Blytheville (3) Dell (2) Driver (1) Joiner (1) Keiser (1) Leachville (1) Lepanto (2) Luxora (2) Manila (1) Osceola (1) Tyronza (1) Wilson (1)
Poinsett	Marked Tree (1) Trumann (3)
Total	39

Table 7. Northeast Arkansas: Potential Warehouse Locations Used by Computer Model, by County and Town, 1981.

County	Town
Clay	Rector
Craighead	Jonesboro
Crittenden	West Memphis
Mississippi	Leachville Blytheville Osceola
Poinsett	Marked Tree

Table 8. Northeast Arkansas: Warehouse Locations Chosen by Computer Model, No Opportunity Cost Solution, by County and Town, 1981

County	Town
Clay	Rector
Craighead	Jonesboro
Crittenden	West Memphis
Mississippi	Leachville Osceola
Poinsett	Marked Tree

Table 9. Northeast Arkansas: Warehouse Locations Chosen by Computer Model, Opportunity Cost Solution, by County and Town, 1981

County	Town
Clay	Rector
Craighead	Jonesboro
Crittenden	West Memphis
Mississippi	Leachville Osceola
Poinsett	Marked Tree

Table 10. Northeast Arkansas: Actual Warehouse Locations, by County and Town, 1994.

County	Town
Craighead	Monette (1)
Mississippi	Blytheville (3) Dell (3) Driver (1)
Poinsett	Marked Tree (1) Trumann (2)
Total	11

Table 11. Bales of Cotton Produced in the Six Counties of Northwest Mississippi 1976-1995.

Year	Number of Bales Produced Per County					
Year	Clay	Craighead	Crittenden	Cross	Greene	
Jackson						
1976	13,900	54,500	36,400	3,980	12,600	8,300
1977	20,600	79,400	48,400	4,700	18,500	12,700
1978	15,000	60,000	36,300	3,000	17,500	3,390
1979	9,300	46,300	20,500	1,700	11,000	1,200
1980	9,350	21,900	19,300	1,320	7,150	500
1981	12,500	49,600	22,800	1,760	13,900	300
1982	12,500	53,000	27,200	1,400	13,400	---
1983	3,500	22,200	14,500	500	6,000	---
1984	10,800	60,000	26,600	1,000	12,600	---
1985	9,700	62,800	39,100	1,100	14,000	---
1986	11,600	59,100	29,100	1,000	12,800	---
1987	19,000	89,400	41,000	1,400	17,000	---
1988	17,800	84,300	47,800	1,890	17,600	---
1989	14,900	68,000	44,000	2,000	13,500	---
1990	17,200	84,600	53,600	1,400	18,500	---
1991	14,000	89,000	63,500	2,700	23,300	600
1992	35,000	148,800	98,000	5,000	32,000	500
1993	17,900	94,700	50,400	1,900	16,000	700
1994	29,000	146,000	113,000	---	33,000	---
1995	32,000	127,000	86,000	2,000	22,000	2,000

Table 11 Continued

Year	Mississippi	Poinsett
1976	88,900	44,700
1977	127,300	61,800
1978	79,300	54,600
1979	46,900	40,700
1980	56,500	24,800
1981	72,200	46,200
1982	66,500	41,500
1983	24,000	15,500
1984	73,500	43,500
1985	87,400	42,200
1986	74,600	34,800
1987	146,800	56,300
1988	150,900	55,500
1989	136,800	52,200
1990	174,400	62,300
1991	224,000	65,500
1992	330,000	101,000
1993	229,100	55,800
1994	402,000	110,000
1995	283,000	94,000

Source: National Agricultural Statistic Service; United States Department of Agriculture.