ANALYSIS OF THE SOUTHERN REGIONAL COTTON MARKETING RESEARCH PROJECT COMMITTEE'S RECOMMENDATIONS ON THE COTTON INDUSTRY IN SOUTHWEST TENNESSEE

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Abstract

The Southern Regional Cotton Marketing Research Project Committee made several recommendations on the cotton industry in Southwest Tennessee1 in 1981. This study examined those recommendations and compared the theoretical model with the present cotton industry in Southwest Tennessee in 1995.

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 Southwest Tennessee but wherever cotton is grown, assembled, processed and marketed. The Southern Regional Cotton Marketing Research Project Committee made several recommenda-tions on the cotton industry in Southwest Tennessee in 1981. This study examined those recommendations and compared the theoretical model with the present cotton industry in Southwest Tennessee.

The drive toward increased economic efficiency in a global market place has dictated greater efficiency in cotton production, processing and transportation. Thus, resulting 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[21].2/ Objective three was completed in 1981[24].3/

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. These studies laid the groundwork for the present study. This study only concerned itself with Southwest Tennessee. The mathema-tical 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.

The Problem

It has been approximately fourteen 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 compari-son was made between the theoretical information published in 1981 and the actual industry practice in Southwest Tennessee in 1995.

Objectives

The purpose of this project was to analyze the recommendations made on the cotton industry in Southwest Tennessee 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 Southwest Tennessee 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 Southwest Tennessee in 1995.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:460-466 (1996)
National Cotton Council, Memphis TN

2) To evaluate the estimated least-cost spatial flows identified in the Committee's study in 1981 to see if they have been adopted inSouthwest Tennessee in 1995.

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 Southwest Tennessee in 1995.

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 Southwest Tennessee in 1995.

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 Southwest Tennessee in 1995.

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 Southwest Tennessee and compare the theoretical model with the real-world practices in 1995. This study focused on the recommendations which related directly to Southwest Tennessee. 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 Southwest Tennessee, 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, ginners, warehouses, cotton merchants, and transportation firms to determine the present practices now employed by the cotton industry in Southwest Tennessee in 1995. A similar procedure was used by the researchers in the Committee's original study in 1976.

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 1995. This was accomplished by on-site interviews with cotton industry persons.Southwest Tennessee for purposes of this study will consist of Chester, Crockett, Fayette, Hardeman, Haywood, Henderson, Lauderdale, McNairy, Madison, Shelby and Tipton Counties in Southwest Tennessee.These counties were identified as having significant cotton production in 1994 in Southwest Tennessee.See Table 10. A determination as to whether or not cotton production in Southwest Tennessee 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 Southwest Tennessee or whether an extended ginning season had been brought about by other factors. The role the module maker has played in Southwest Tennessee was explored in the interviews. Information in the interviews was used to determine if cotton in 1995 was moving by the least expensive transportation mode.

Stability of the Supply Area

Southwest Tennessee has shown a remarkable increase in the amount of cotton that is produced in the area as demonstrated in Table 10. This increase in production can be attributed to increased irrigation and the improved varieties and better use of chemicals in Southwest Tennessee. This has resulted in changes in the infrastructure of the cotton industry in Southwest Tennessee.

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 1995. The potential gin locations identified for the normal ginning season in the 1981 study in Southwest Tennessee are shown in Table 1. The same potential gin locations were also identified for the extended ginning season in 1981 in Southwest Tennessee. 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 actual gin locations in 1981 in Southwest Tennessee are shown in Table 4. The Actual gin locations in 1994 in Southwest Tennessee are shown in Table 5.

The potential warehouse locations identified for the normal ginning season in the 1981 study for Southwest Tennessee are shown in Table 6. The same potential warehouse locations were also identified for the extended ginning season in 1981 in Southwest Tennessee. The warehouse locations chosen by the computer model, no opportunity cost solution, for 1981 are shown in Table 7. The warehouse locations chosen by the computer model, opportuni-ty cost solution, for 1981 are shown in Table 8. The federally licensed warehouse locations remaining in 1994 in Southwest Tennessee are shown in Table 9.

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

Fewer Larger Sized Gins

Fewer larger-sized gins characterized the remaining units in Southwest Tennessee. 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 got 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 Southwest Tennessee, as evidenced in the present structure of the cotton industry in the area. In 1981, there were 69 actual cotton gin locations. (See Figure 9) The mathematical model evaluated 24 gin sites in Southwest Tennessee. In 1994, only 47 active gins remain. The amount of cotton ginned in the area varies greatly from year to year as shown in Table 10.

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 Southwest Tennessee 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 inSouthwest Tennessee.

Least Expensive Transportation Mode

Trucks were determined to be the least expensive mode of transporting cotton from Southwest Tennessee in 1981. In 1994, most cotton moved via truck from Southwest Tennessee to domestic mills, concentration points or export outlets. Only a few warehouses in Southwest Tennessee 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 Southwest Tennessee.

Results

The results found: (1) There has been a move by the cotton industry in Southwest Tennessee toward the optimal cotton marketing system that was identified by the mathematical model in 1981; (2) Because of the use of the module maker is becoming the norm in Southwest Tennessee. (3) There are fewer and larger sized gins in Southwest Tennessee than in 1976; (4) Modular storage of cotton is being practiced in Southwest Tennessee; (5) Most cotton is moved via truck from Southwest Tennessee to domestic mills and export outlets.

Implications and Conclusions

The cotton industry in Southwest Tennessee is continually moving toward the optimal. The changes evident in the structure in the past fourteen 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 Southwest Tennessee. Southwest Tennessee 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.

Endnotes

1/ Southwest Tennessee for the purposes of this study is defined as the following eleven counties:Chester, Crockett, Fayette, Hardeman, Haywood, Henderson, McNairy, Madison, Tipton, Lauderdale and Shelby.

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. Southwest Tennessee: Potential Gin Locations Used in Computer Model, by County and Town, 1981.

County	Town
Chester	Jacks Creek
Crockett	Bells
	Friendship
	Gadsen
	Maury City
Fayette	Braden
	Oakland
	Somerville
Hardeman	Whiteville
Haywood	Brownsville(2)
	Stanton(2)
Henderson	Lexington
Lauderdale	Gates
	Ripley
McNairy	Adamsville
Madison	Jackson
	Mercer
Shelby	Arlington
	Collierville
Tipton	Gilt Edge
	Covington
	Charleston
Total = 24	

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

County	Town
14-Week Season	
Chester	Jacks Creek
Crockett	Bells
Fayette	Somerville
McNairy	Adamsville
Shelby	Arlington
32-Week Season	
Haywood	Brownsville(2)
Madison	Jackson
Tipton	Covington

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

County	Town
14-Week Season	
Chester	Jacks Creek
McNairy	Adamsville
Madison	Jackson
Shelby	Collierville
32-Week Season	
Crockett	Bells
Fayette	Somerville
Haywood	Brownsville
Lauderdale	Gates
Tipton	Covington

Table 4. Number of Actual Cotton Gins in Southwest Tennessee, by County, 1981.

County	Number of Gins
Chester	0
Crockett	11
Fayette	9
Hardeman	6
Haywood	11
Henderson	0
Lauderdale	6
McNairy	1
Madison	6
Shelby	10
Tipton	9
TOTAL = 69	

Source: Cotton Ginnings in the United States.

Table 5. Southwest Tennessee: Actual Gin Locations by County and Town, 1994.

County	Town
Crockett	Alamo (3)
	Bells (2)
	Crockett Mills
	Friendship
	Gadsen
	Humboldt
	Maury City
Fayette	Laconia
	Mason
	Oakland
	Somerville
Hardeman	Grand Junction
	Hickory Valley
	Middleton
	Whiteville
Haywood	Brownsville(7)
	Stanton(2)
Lauderdale	Halls (3)
	Henning
	Ripley (2)
McNairy	Guys
	Ramer
Madison	Denmark
	Jackson (3)
	Mercer
Tipton	Atoka
	Brighton
	Burlison
	Crockett Mills
	Covington (2)
	Stanton
TOTAL = 47	

Table 6. Southwest Tennessee: Potential Warehouse Locations Used byComputer Model, by County and Town, 1981.

County	Town
Chester	Henderson
Haywood	Brownsville
Lauderdale	Ripley
Madison	Jackson
Tipton	Covington
Shelby	Memphis

Table 7. Southwest Tennessee: Warehouse Locations Chosen by Computer Model, No Opportunity Cost Solution, by County and Town, 1981.

County	**Town**
Chester	Henderson
Haywood	Brownsville
Lauderdale	Ripley
Madison	Jackson
Shelby	Memphis
Tipton	Covington

Table 8. Southwest Tennessee: Warehouse Locations Chosen by Computer Model, Opportunity Cost Solution, by County and Town, 1981.

County	**Town**
Chester	Henderson
Haywood	Brownsville
Lauderdale	Ripley
Shelby	Memphis
Tipton	Covington

Table 9. Southwest Tennessee: Actual Warehouse Locations, by County and Town, 1994.

County	**Town**
Fayette	Somerville
	Mason
Haywood	Brownsville (2)
Madison	Jackson (2)
Tipton	Covington (2)
Shelby	Memphis (4)
TOTAL = 12	

Table 10. Bales of Cotton Produced in the Eleven Counties of Southwest Tennessee 1976-1994.

Crop	Number of Bales Produced Per County					
Year	Chester	Crockett	Fayette	Hardeman	Haywood	Henderson
1976	1,800	38,500	24,100	7,600	37,600	920
1977	1,950	48,000	26,300	7,050	41,400	1,600
1978	1,400	57,300	24,600	5,400	44,500	1,150
1979	700	40,100	22,500	3,820	34,500	540
1980	910	42,900	21,950	6,150	38,400	750
1981	1,880	71,900	35,700	11,800	64,000	1,500
1982	1,650	83,000	37,900	12,200	71,600	1,600
1983	700	33,700	17,900	8,100	27,300	700
1984	1,700	77,500	35,000	14,000	67,000	1,450
1985	2,200	97,000	42,000	18,000	84,500	1,790
1986	2,800	79,000	40,000	16,500	80,600	1,800
1987	4,150	111,500	62,500	24,200	123,000	2,350
1988	5,700	100,000	55,000	23,000	104,000	2,400
1989	3,800	84,200	45,700	17,200	86,000	2,050
1990	3,200	73,900	47,100	19,100	89,500	1,870
1991	4,920	100,000	52,000	22,000	121,000	2,350
1992	5,900	121,500	59,700	18,800	151,000	1,800
1993	4,000	68,000	41,800	16,000	105,000	1,400
1994	5,600	120,000	66,400	23,500	166,000	2,300

	Lauderdale	McNairy	Madison	Shelby	Tipton	Total Bales
1976	11,600	1,230	15,200	13,700	26,700	178,950
1977	14,300	1,070	18,000	14,300	27,400	201,370
1978	8,750	540	17,800	15,400	27,400	204,240
1979	5,130	465	12,900	11,400	19,200	151,255
1980	8,800	780	15,680	13,800	19,900	170,020
1981	10,200	1,550	25,850	19,700	27,800	271,800
1982	9,850	1,400	30,000	21,300	29,400	299,900
1983	5,000	1,200	15,800	9,250	11,600	131,250
1984	11,400	1,450	34,000	18,000	28,500	290,000
1985	17,000	3,540	39,000	22,500	38,700	366,230
1986	21,200	2,180	34,500	19,000	37,600	335,180
1987	45,000	3,100	57,500	28,500	72,000	533,800
1988	42,500	3,250	51,000	24,500	58,500	469,850
1989	35,500	2,300	41,500	21,200	50,500	389,950
1990	38,500	2,540	42,700	21,400	55,600	395,410
1991	58,000	2,570	57,600	32,000	75,000	525,090
1992	84,000	4,500	62,800	31,300	86,000	627,300
1993	59,300	3,200	40,500	18,000	60,600	417,800
1994	70,000	3,700	73,500	37,000	85,000	653,000

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