EFFICIENCY IN COTTON MARKETING WITH SPECIAL EMPHASIS ON COUNTY MARKETING PROGRAM ADJUSTMENT

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By

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AN ABSTRACT

Submitted to the School for Advanced Graduate Studies of
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ABSTRACT

The objectives of this study were to assist Henderson County leaders in planning the marketing segment of a program of agricultural development and to establish procedures suitable to aid county marketing program planning and conduct. The program projection concept of doing extension work provides the vehicle through which the program may be conducted. Increased efficiency in the marketing system is the goal of the program. Techniques for measuring efficiency of the present system and instituting change are involved in the program adjustments.

Program expansion of county marketing work depends upon the assembly of data showing potential gain from suggested changes. Form and time aspects of pricing efficiency provide the basis for examining efficiency at the producer level.

Form efficiency in the cotton market can be evaluated through comparison of the product being marketed with that resulting from reasonable adjustment. A net county income increase of more than $15,000 could be effected by changing seed stocks alone.

Pricing efficiency can be improved in the producer selling operation based on the 1957 observations. Ginners bought 53 per cent of the cotton but only one per cent was bought on official grades. Ginner grades averaged out the actual grade differences between lots where value differences amounted to one-fourth of the cotton value.

The analysis of time aspects of pricing efficiency revealed that growers were marketing at the desirable time. Price increases derived from holding the cotton for a delayed marketing date would not have offset carrying costs.

Educational work in cost analysis with cotton ginners can be done by comparative analysis and through break-even analysis. Comparative analysis permits measurement of the individual gin costs against the county or state averages. This encourages self-inspection by the firm.

In measuring efficiency of the present ginning system a model gin was designed to meet the requirements of the area. Average total costs per bale, at a volume of 2880 bales, were somewhat less than costs for existing gins.

Cost analysis of the existing gins revealed that in 1957 total ginning costs amounted to about $15.49 per bale. Fixed costs per bale for the model gin were higher than for existing gins, indicating that additional volume would further increase the cost advantage of the model gin. Cost items varied considerably between gins, emphasizing that cost groups are subject to some cost control by management.

Break-even analysis offers to ginners a technique that facilitates cost and returns planning. A statistically derived variable cost function per bale described the county gin cost structure. By accepting this as the county standard, individual ginners can readily compare their operations with the county average. The use of this function in break-even analysis permits the ginner to use break-even techniques in managerial planning with more precision than can be achieved graphically.

It was concluded that the program with producers can be conducted within the framework of what, when and where to sell. Producer action may be measured against standards of the state or producing area. The County Planning Committee can aid marketing efficiency development by

encouraging producers and ginners to use the tools of analysis available and by suggesting standards of performance.

Recognition is given to the need for a study of total resource use in Henderson County. Such a project would have assumed priority over this study had all possible projects been ranked in order of importance to the county.

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The writer admits the impossibility of recognizing all those who contributed to the preparation of this study. However, this occasion is taken to acknowledge indebtedness to some who graciously shared their time and talents in the process of planning, conducting and reporting results.

Deep appreciation is expressed to Dr. Lawrence W. Witt, now Director of Studies, Office of International Programs, for his patience and consideration while the research idea germinated and in the manuscript preparation. To Dr. Dale E. Butz, now with Illinois Farm Supply Company, gratitude is expressed for guidance in outlining the study. Dr. Vernon Sorensen, Department of Agricultural Economics, gave valuable suggestions in organizing and presenting the data. To Dr. Edward Brand, Department of General Business, and Dr. Victor Smith, Department of Economics, who also served on the thesis committee, gratitude is expressed.

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To the cotton producers and cotton ginners of Henderson County who provided data, to county agents and others who gathered data through interviews, to the U. S. Department of Agriculture, A.M.S. Cotton Division which provided cotton quality data and to Mrs. Eva P. Rhyne, Mrs. Dorothy Brown and Mrs. Alice Ewing who typed the manuscript and to Miss June Wakefield who prepared the charts, appreciation is expressed for their contribution so willingly made.

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INTRODUCTION

New Extension Marketing programs have recently been conceived and the expansion of current marketing work has been advocated by various groups involved in Agricultural Education. Legal justification is cited in the original Smith-Lever Act of 1914. The marketing educational work carried out for about four decades in Tennessee placed much emphasis on assistance with organizing cooperative marketing ventures for farmers. Analysis of the firms' problems was not part of the program. Very little marketing work was done with private marketing firms or with consumers. With the passage of the Research and Marketing Act in 1946, administrative interest in marketing began to increase and take form as more funds were made available for new work. In the "Joint Committee Report on Extension Programs, Policies and Goals" attention was called to a much-broadened field of activity that the State Extension Services should be concerned with.... "Extension's responsibilities are not limited to farm people, or even to rural residents. Its obligation, as stated in the Smith-Lever Act, is to "the people of the United States"....[1] In looking to the future, this same report listed marketing as one of the primary fields with which programs would be vitally concerned.

In 1950 a Committee of State Directors of Extension and Deans of Agriculture prepared a report entitled "Marketing Challenges the Extension

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[1]Joint Committee Report on Extension Programs, Policies and Goals, U. S. Department of Agriculture and Association of Land-Grant Colleges and Universities, Washington, D. C. 1948.

Service" for distribution to all states.[2] This report was focused directly on the marketing field and laid out objectives, methods and anticipated costs of the proposed work. The overall objectives in that report were stated as follows:

1. To aid farmers in understanding the demands of the market, costs involved, and in helping them adapt their production and marketing to these demands.

2. To aid processors and distributors in becoming better informed concerning market conditions, and more efficient in performing their services to the end that farm products may move smoothly through the distribution channels with less waste, less decline in quality and at lower costs, thus benefiting producers, handlers and consumers.

3. To aid consumers in becoming more discriminating and more skillful in buying and using farm products and in gaining a better understanding of the marketing system.

More recently the Marketing Sub-Committee of the Extension Committee on Policy has issued statements designed to encourage program development in marketing. While these statements have maintained interest in the marketing field, they also have pointed out additional ways in which marketing educational work has developed in the states.

The most recent administrative statement of significance, The Cooperative Extension Service....Today - A Statement of Scope and Responsibility, reiterates and strengthens previous statements on the subject.[3] This particular report is a current stimulus to various states in their

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[2]"Marketing Challenges the Extension Service," a statement prepared by a Committee of State Directors and Deans of Agriculture in Cooperation with the U. S. Department of Agriculture, Extension Service, Washington, D. C., 1950, p. 1.

[3]The Cooperative Extension Service Today, 1957 Extension Committee on Organization and Policy, Sub-Committee on Scope and Responsibility, Land-Grant College Association.

program initiation and development. One of the eight areas of program emphasis is concerned with "Efficiency in Marketing, Distribution and Utilization" as follows:

> Paralleling efficiency in production is the necessity for developing the maximum practicable efficiency in the marketing, distribution, and utilization (including the consumption) of agricultural products. Herein lies a challenge and a responsibility for Extension to contribute to the welfare of the producer, the handler, and the general public simultaneously. Expanded Extension efforts are needed to:
>
> > Create greater efficiencies in processing, handling and distribution through the application of new technology and improved marketing practices.....
> >
> > Guide those performing marketing services in developing the most efficient market organization and facilities.....
> >
> > Get rapid adjustment by farmers, consumers, and marketing firms to changes in technology, supply and demand through improved understanding and communication.

This and other reports echo the murmurings of the public, the researcher and the administrator and call for increasing effort from educational agencies. They call for assistance in helping make efficiency adjustments faced by producers, marketing firms and consumers in a rapidly changing economy.

County Program Projection

Efficiency studies may be valuable for pointing the way to improvement in marketing systems, but implementation of such studies has proven difficult unless special personnel have been available to work with the market system. One technique of implementation is County Program Projection. This technique is expected to go beyond the elementary stage of assisting people with immediate adjustment to present problems. It

introduces to the county the scientific method of problem solving. It encourages properly identifying and formulating problems, assembling pertinent data, analyzing information in the most appropriate manner, interpreting the findings and determining the course of action.

Following this process, action is instituted to solve the problem. Re-evaluating the problem and adjusting action are involved as time passes. Through the use of this method, long-range planning is established as part of the going county program. County objectives and a county program of work to achieve these objectives are required. This procedure demands that a framework for program development be conceived and specified. It involves bridging the gulf between policy or program and the portions of economic and business theory and principle which will be usable in the planning process.

Association of the program projection concept and efficiency studies will merge two basic techniques in problem solving: one in determining the situation and the other in getting action initiated.

Framework for Development

To workers in marketing it is evident that marketing programs are derived from many sets of assumptions and that many approaches to marketing program development are used.[4] The idea of a market-wide program has appeal and possibly much merit, but to date Tennessee Agricultural

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[4]Donald E. Larimore, and John D. Black, Extension Education In Marketing, No. 6 - H Harvard Studies in Marketing Farm Products, Cambridge, 1953, pp. 18-25.

Extension Programs are strongly oriented to political boundaries. The county forms the basic unit through which programs are extended. There are area programs concerning agricultural production, but these programs are extended through county offices and in the final analysis the county program determines the success of area programs.

With the county unit conducting most programs, a question arises as to the contribution that can be made by the county in marketing program development. Various county programs have been started which would emphasize marketing improvements. These programs have met with little local support and to date they have seemingly contributed little to total development of the county. This inquiry is directed at marketing program development on the county level and some methods useful in program development.

Henderson County leaders requested assistance in the selection of new farm enterprises to be added by agricultural producers. A counter-proposal was adopted which first called for an examination of the present enterprises and farming systems. This examination was to include the marketing systems and to that end this study is directed. Two objectives are recognized.

(1) The first objective of this study is to assist Henderson County leaders in planning the marketing segment of a program of agricultural development. In this process it is necessary to deal with a commodity situation in that county. The cotton industry occupies a place of considerable significance in this particular county, and thus the primary analysis involves portions of the cotton industry.

In pursuit of the first objective, a study of the existing cotton marketing system is made. Efficiency in ginning and in the area of pricing is explored. The work done to achieve the first objective will contribute greatly to the second objective.

(2) The second objective is simply concerned with the development of procedures suitable to aid county marketing program planning and conduct. Such procedures if properly set up will serve for any county area involved in cotton marketing.

Theoretical Considerations

Market problems may often be formulated in terms of departure from ideal or optimum conditions. This approach usually lends itself to methodical analysis.

The perfect competition model provides a setting for the perfect or ideal market. Under perfect competition homogeneous products, freedom of entry, many buyers and sellers and perfect knowledge are assumed to exist. When these conditions are met in the markets where firms buy their inputs and sell their outputs and output is so allocated among the producing firms that the marginal inputs of factors are the same, the industry will be at its optimum.[5] When the industry is at its most efficient level of operation, the firms composing the industry must also be at their most efficient level.

The perfect market is often used as a model with accompanying assumptions to make the system static, specify utility and profit motiva-

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[5]Tibor Scitovsky, Welfare and Competition, Richard D. Irwin, Inc. Chicago, 1951, p. 150.

tions and to eliminate non-random elements. This does not necessarily make it acceptable as a model to attempt to duplicate in an individualistic society. Considerable cotton marketing efficiencies have been brought about by increasing the monopoly aspects through governmental programs where efficiency is the goal; the methods used to achieve it must be acceptable to the groups affected. Ginners operate under real world conditions and are not concerned with the perfect market, but they are concerned with efficiency.

The optimum or ideal market is therefore conceived in terms of efficiency. Efficiency is a relative concept and as such it is useful in comparing one situation with another or in comparing a situation with the optimum. The more efficient operation in a technical sense will be the one that produces from a given set of inputs a greater output or similarly, the operation that produces the same output from a smaller set of inputs.

Technical efficiency and pricing efficiency are two concepts useful in measuring the performance of marketing firms or in measuring the departure of the actual system from ideal or achievable standards.

A technically efficient marketing system is one that performs the physical task of marketing using a minimum of manpower, equipment and other resources. Technical efficiency is a major consideration in the maximization of net returns. The basis for analysis of technical efficiency lies in the field of static production economics.

A complete consideration of economic theory applicable to processing cost functions would involve rate and time possibilities of production,

plant segmentation, and the resulting discontinuous cost curves, and the possible combinations resulting from these factors. Since this study deals with cotton ginning operations the technical efficiency concepts will be narrowed to consider the situation under which the gins operate.

In the short-run, only variable costs and inputs enter into the production decisions, while the investment in buildings and equipment are fixed for the production period. In the usual timeless marginal cost analysis, the marginal cost curve is a function of volume. In the cotton ginning process the rate of operation is fixed by the nature of the plant. With the rate of output being held constant a constant marginal cost will result. Earlier work by Paulson shows that variations in total gin volume and total cost result almost entirely from variations in total operating time where cotton flow permits continuous operation.[6] Since both total cost and volume are linear functions of hours they are also linear functions of each other.[7]

In addition to technical efficiency, aspects of price efficiency as related to product form and time of selling need to be considered. Under a perfect competition system complete pricing efficiency is expected to prevail. Individuals and firms would reach equilibrium when all are in their best position, or following the most profitable alternative.

Under a simplified price model, the derived demand (for a raw

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[6]W. E. Paulson, Cost and Profit of Ginning Cotton in Texas, Texas Agricultural Experiment Station, Bulletin 606, College Station, 1942, p. 36.

[7]B. C. French, L. L. Sammett and R. G. Bressler, "Economic Efficiency in Plant Operations with Special Reference to the Marketing of California Pears." Hilgardia Volume 24, No. 19, July 1956, p. 548.

material) that is reflected back to producers, reflects the value of the raw material at each stage of the marketing process. The product value at each stage of the marketing process includes the cost entailed in carrying the raw material through the marketing process. Each firm in the marketing process makes its particular contribution and the costs of such services would be reflected on the supply price schedule. The derived demand as altered by these forces would then be reflected to the cotton producer.

In the opposite direction the supply costs would be transmitted toward the consumer by the marketing firms through the interplay of demand and supply forces. Equilibrium would be reached when all sellers and buyers are willing to accept the market price and profits are normal. To investigate the pricing efficiency aspect of cotton under this system a complete analysis would be required of (1) consumer demand for different products made from cotton; (2) costs of converting cotton into different products including conversion ratios between cotton and the products; (3) costs of moving cotton products through time and space; (4) production costs of different types of cotton, in effect the supply function of producers. Assuming all individuals in the system rational it would be determined that equilibrium would be reached when all individuals are at their optimum position.[8]

Pricing efficiency in the cotton market is related to the product form and time of sale, storage and related costs and location of production. Efficient pricing is expected to guide the allocation of resources

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[8]James B. Hassler, "Pricing Efficiency in the Manufactured Dairy Products Industry," Hilgardia, Vol. 22, No. 8, August, 1953, p. 243.

in production and to move products into trade with minimum frictions. A complete model designed to permit measurement of differences between the ideal and existing conditions would be extremely complicated and would require numerous detailed analyses. On the other hand if the model is simplified many details can be eliminated. In actual practice existing conditions must be measured and the achievable standards must bear close scrutiny from the operating firms if they are acceptable as guides. This modification will be followed in studying the pricing efficiency of the Henderson County market.

The procedure to be followed in appraising the efficiency of the Henderson County cotton ginning industry will involve the construction of a model gin plant. Costs for this plant will be compared with actual costs incurred by present plants in operation. Differences in costs will be interpreted in terms of efficiency. Pricing efficiency related to product form and to the time of selling cotton will be investigated also. Inefficiency of pricing will be assumed to exist where prices are unequal for similar products or where carrying costs are less than the value increase of cotton over a period of time.

The concept of a county marketing area requires considerations similar to those necessary in dealing with an industry. While the county market cannot be separated from the industry it is tacitly recognized that the industry concept is vague under imperfect competition. Product and service differentiation occur as firms try to develop a distinct demand for their output. Where firms produce different products a comparison of efficiency at any level may become meaningless. In such case analysis can be made of individual firms only. This does not permit

market-wide analysis which is necessary where standards of performance or some measures of efficiency are required.

In the actual market few firms produce identical products or services. Where services or products produced by firms have very limited differences, area-wide or market-wide analyses may be meaningful. This assumption is made for the purpose of this investigation. Problems of analysis are insurmountable where wide differences exist in technology and management over broad geographic areas. By confining the analysis to smaller areas a more homogeneous group of cotton ginning firms is obtained.

The Program

Comparison of optimum market conditions, as herein defined, with the existing situation should yield evidence on which to base educational programs. This should apply in the two areas of technical and pricing efficiency. It does not follow, however, that departure from a standard suggests an educational program to encourage adjustment of all firms to the standard. Economic efficiency and social welfare cannot be directly compared and conclusions may not be drawn that an increase in economic efficiency will increase social welfare. On the other hand, economic efficiency has an important bearing on general welfare and it will usually be consistent with generally accepted welfare goals.

Extension marketing programs are usually conducted in areas where conflict is at a minimum between changes in efficiency and the resulting welfare implications. The methods involved in explaining efficiency changes to firms in the affected area influence their acceptance. Educa-

tional programs are then required which communicate effectively with the firm, management or persons affected. The Extension Program aspects must include the ideas or concepts to be taught and techniques which can be used.

Procedure

In achieving the objectives, 221 operating agricultural producers in Henderson County were interviewed. These producers were chosen through a systematic block sampling technique to assure representation of the many soil types, farm enterprise combinations and production districts of the county. Detailed questions were asked concerning producer cotton marketing practices. (As this study is a portion of a much broader investigation, considerable other data were obtained from producers at the time of the interview.) Data for the marketing firm analysis were obtained from records and interviews with the 16 operating cotton gins in Henderson County. The schedule used in this phase covered marketing practices of gins and cost and returns from their activities.

The approach used in the study was determined after giving consideration to program objectives, audiences involved and other related factors. The going program in a county is dynamic and calls for the use of techniques from many fields. This has resulted in the need to work with a broad area of subject matter.

From the maze of Extension activities, it stands out that most successful Extension Marketing Programs have some common characteristics.

They are organized around a particular commodity or commodity group or on a functional basis. They are confined to a market area rather than to a geographic or political sub-division.[9] With the county serving as the basic unit from which programs are conducted in Tennessee it follows that the exploration of a commodity within a county would meet only some of these specifications. Yet, it fulfills the objective of the county program projection concept which is central to this study.

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[9]Wendell Earle and Jean Evans, "A Critical Look At Extension," Proceedings of Marketing Section - Association of Southern Agricultural Workers, 1958, p. 1.

CHAPTER II

OPTIMUM AND OBSERVED EFFICIENCY OF HENDERSON COUNTY COTTON GINS

In this chapter the cost relationships in a technically optimum cotton gin and in those gins operating in Henderson County will be investigated. If this were done in a complete manner, considerable detail would be required in specifying the model gin, its operation and resulting costs. In addition, the actual gins now operating would need to be examined in much detail throughout their quality of services rendered and the accompanying costs. For the purposes here, costs of the model gin as constructed by engineers will be established. Synthesis of these costs will permit the establishment of a standard.

While efficiency of the county cotton ginning system is of concern, the analysis must deal with individual firms since they constitute the system. Costs will therefore be derived for the operating gins and they will be compared with the model gin plant.

The specific objectives of this chapter are (1) to develop cost estimates for a technically optimum cotton gin to be operated under Henderson County conditions and (2) to determine costs of the gins operating in Henderson County and establish the difference in ginning costs under both types of operations. Comparison of these costs will provide a measure of potential improvement.

Economic Nature of Ginning Operations

Cotton ginning in Tennessee is classified as a homogeneous industry.

The season of operation is the same for all firms, usually September - December. The functions performed by the gins in processing are standardized. The mechanical processes of separating seed from lint and disposing of both differ from gin to gin in scale, but little in technique. [The basic process of ginning has changed little in more than a century. New equipment has been developed to permit closer quality control and flexibility in product handling. This equipment supplements the basic ginning process and is available in units adapted to current size of gins.]1

Producers demand continuous ginning service throughout the active harvest season. Operating hours are determined by the flow of cotton, custom, competition for business and seasonal factors such as weather. Early in the harvest season and during the later stages of harvest, gin operation is sporadic--determined by cotton delivery by producers. During the peak season, gins will operate on a clean-up basis, attempting to gin all cotton during the day received. This policy requires "overtime" operation but does not justify a second or third shift. Intermittent operation of the gin plant increases problems of cost control and discourages adequate seasonal or long-range planning. If the firm is committed to operate daily regardless of volume, unit costs may be very high with low daily volume.

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[1]Some of these specialized units are: lint cleaners, magnets, seed cotton drier, overhead cylinder cleaner, burr extractors, boll or rock traps.

Size of Market Territory

Cotton ginning is a raw material oriented industry. Gins are located in local communities where the major portion of the cotton is grown. Raw cotton is bulky and transportation costs per ton mile were very high several decades ago when the gins were established. Recent transportation improvements have had only minor influences on the cotton marketing territories, but the opportunity is available for transportation to cause considerable change in the market territories. Greater mobility of the producers has served notice on the ginners that their locational advantage is only minor. This has tended to equalize ginning charges and has had a strong influence on the ginners in modernizing their plants. In other counties various ginners have combined good equipment, good service, higher than average prices and other technology to expand their market territory and increase their share of the market. This has not been experienced widely in Henderson County but some of these factors are used as competitive devices periodically.

The sixteen active cotton gins are widely distributed over the county and each has a primary market territory in which it is located. In 1957 the average Henderson County gin obtained 67 per cent of its cotton volume within a radius of five miles and 87 per cent within a ten mile radius of its location. Gin location is closely associated with the heavier producing sections of the county, but some ginners worked vigorously to obtain cotton in other communities where competition was not as intense as nearby. Only three per cent was obtained from distances greater than 15 miles (Table I).

TABLE I

PROPORTION OF COTTON TRANSPORTED SPECIFIED DISTANCES BY GROWERS IN MAKING DELIVERY TO GINNERS--HENDERSON COUNTY, 1957

Distance Transported	Per Cent of Cotton
0 - 2 miles	17
3 - 4 miles	37
5 - 6 miles	18
7 - 8 miles	9
9 -10 miles	6
11 -12 miles	7
13 -14 miles	3
15 miles and over	3

Size of market territory was larger for the gins located in the fringe production areas. The gins tended to be located closer together in concentrated production areas.

Specification for the Model Gin

Economic performance of cotton gins can be measured against a model or standard for the area. Any proof of inefficiency is only relative to the standard chosen for comparison. It is necessary therefore that the model for comparison be acceptable to the industry as a feasible operation. This requires the establishment of a model gin from the array of available equipment that most nearly fits local conditions. Therefore the acceptable gin must provide all the services considered essential in

the ginning process. Size of the gin must be influenced by the quantity of cotton available for ginning. Availability is interpreted in terms of procurement and therefore the volume must be considered obtainable by competent management. It is assumed that the smallest unit capable of rendering the services demanded without having excess capacity is required for the county.

Organization of the Model Gin

Equipment for cotton gins is not available in all gradations of size and the capacity of each piece of equipment must be considered in establishing the plant. The lint cleaners and driers are designed to accommodate two or more gin stands and planning must consider their inflexibility. The ginning process demands essentially the following equipment: cotton driers, foreign-matter traps, magnets, over-head cylinder cleaners, overhead boll and burr extractors, cotton distributors, automatic feeding devices and the gin stands, lint cleaners, and the bale presses.

All the equipment considered necessary for the model gin is available from equipment manufacturers. Some differences exist between the specific pieces of equipment available to do a particular chore since different manufacturers may be involved. The equipment selected was considered to represent the best combination of performance and price.[2]

The model gin essentially consists of two tower driers, four gin

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[2]Engineering estimates guided the selection of equipment used in the model gin.

stands complete with supporting equipment already listed and the bale press. This particular combination assures steady product flow and all units can operate simultaneously near capacity. Two tower driers will adequately serve four gin stands.

Any less number of stands would under-utilize the driers and might provide incentive for the ginner to overload the gin stands when operating at peak capacity.

An itemized list of major equipment and the associated costs are shown in Table II.

TABLE II

BUILDINGS AND EQUIPMENT FOR MODEL GIN

Item	Cost
Lint cleaner - double	$12,500
Distributor	1,500
Burr machine	14,000
Press	15,000
Seed scales	4,000
Automatic feed controls	6,000
Gin stands	12,000
Extractor feeders	6,000
Overhead cleaners	14,000
Tower driers	8,000
Installation and miscellaneous costs	17,000
Building	15,000
Total cost	$125,000

System of Calculating Costs for the Model Gin

Cost studies are not available to establish precise data for the model gin but adequate checks with industry establish the following techniques as acceptable:

Management. Adequate management for a four-month operating period on a single shift basis can be obtained for $200 monthly. When two shifts are operated, costs increase to $300 monthly.

Office. Office or bookkeeping requirements can be obtained through monthly expenditures of $125 for a single shift operation. This would increase to $200 monthly for two shifts.

Labor. The labor crew for the gin consists of five men. The total labor bill is calculated at $3,600 (five men for eight hours daily, six days per week for 15 weeks), overtime is not considered, since usual arrangements involve average work day lengths and a daily wage is paid. For 10-12 hour operations, the crew is split to avoid excessive hours.

Fuel. Fuel for cotton driers is normally butane gas. Its cost will average about 60 cents per bale.

Power. All power units are electrical. The applicable demand charge will be $125 monthly plus .8 cents per kilowatt hour of electricity consumed.

Repair. Repair is primarily a function of operation or bales ginned. It is calculated to cost $1.25 per bale.

Miscellaneous. These costs are a combination of travel, advertising, office supplies, etc. An average of $1.25 per bale will be expended in this category.

Depreciation. Straight line depreciation is assumed. Salvage value is ignored since the market is poorly organized for used equipment. The rate of 10 per cent annually as used by the Internal Revenue service was adopted for equipment. A rate of 4 per cent was used on buildings.

Interest. Interest was calculated at the rate of 5 per cent on the present investment.

Insurance. Insurance rate under a good fire prevention system was calculated at $1.66 per $100 valuation plus $100 monthly for cotton-yard insurance.

Taxes. The gin property was assessed at 8 1/3 per cent of its new value and taxed at a rate of $3.50 per $1,000 valuation.

Cost Structure of Model Gin

Several possibilities must be explored in dealing with costs of the model gin. First, the plant may be operated on a 24-hour basis for the 15 weeks which permits the maximum volume to flow through the fixed plant. Second, the plant may be assumed to operate for two eight-hour shifts during the 15 weeks. This condition may be approached under top flight procurement conditions. Third, the plant may be assumed to operate only a single 10-hour shift. This latter approaches the system used by gins under the present county organization. Only these three day lengths will be examined as they relate to the cost function, though other possibilities might be explored.

Under actual conditions in Henderson County the operating time is dependent upon the ability of management to induce farmers to patronize

the gin. The first situation mentioned above is not achievable under present conditions but it offers one efficiency goal. It will not be explored further. The second situation while not presently achieved by any gin is entirely reasonable as a goal. The third situation represents the present operating system in Henderson County.

Costs Associated with Durable Assets

The durable assets of buildings and equipment usually provide the basis from which major fixed costs arise. Depreciation in value of buildings and machinery occurs through physical wear due to operation, deterioration over time due to non-operation and obsolescense.[3] The influence of these factors can seldom be separated and consequently total annual depreciation is determined through some acceptable system. (Straight-line, declining balance and sum-of-the-years digits are outlined by the Internal Revenue Act of 1954 as equally acceptable.) Ginners ordinarily anticipate at least ten years usage from equipment and twenty-five years from buildings and have generally adopted straight-line depreciation.

Interest on the undepreciated balance of the capital investment, insurance and taxes are associated with the durable assets. By combining annual costs for these items with the annual depreciation charge, the total annual durable asset cost or total fixed cost is derived.

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[3]Joel Dean, Managerial Economics, Englewood Cliffs, Prentice-Hall, Inc., 1951, p. 149.

Costs That Vary With Output

Other ginning costs not associated with durable assets vary with operating time. Labor, power, fuel, management and office, repair and miscellaneous costs vary with the planned operating period. The gin plant expects to operate for fifteen weeks or approximately 90 days. The hourly rate of output multiplied by the hours operated per season (days x hours per day) provides the basis for estimating the annual volume.[4]

When the annual volume can be approximated the resulting variable costs can be established as on pages 20 and 21. These cost ratios are not constant over a wide volume range but are applicable over the volume range anticipated. Some variable cost items are subject to less control than others. Power costs are expected to vary directly with operating time and therefore with volume. Labor costs are less subject to control by management and any great change from the anticipated volume can affect unit labor costs considerably. Other limitations in the variable cost ratios are apparent if volume varies from the expected level. Acknowledgement is given to such limitations but they are assumed to be non-applicable in the cost function to follow. (This is realistic since ginners estimate volume from the predicted crop size and their market

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[4]The rated capacity of the model gin is 52 bales daily after allowing for "down-time" caused by maintenance and repairs. This daily capacity is further reduced to 32 bales by making allowance for irregular delivery of cotton. Ninety operating days with a daily volume of 32 bales provide the seasonal total of 2,880 bales. This allowance for lack of volume permits the model gin to operate at the rate experienced by actual gins or about 60 per cent of capacity.

share.)

Short-Run Cost Function for the Model Gin

The process of presenting short-run cost functions is simplified when fixed costs, variable costs and annual volume can be established. The expected volume of the model gin provides the basis from which the cost function illustrated below was derived. The total annual ginning cost for the model gin is determined by adding the total annual fixed costs and total annual variable costs or by adding all cost components which are anticipated at the normal volume. By using volume and total costs the short-run cost curve can be derived.

In order to illustrate this approach, situation three, or the single shift operation, will be used. The model gin is expected to process 2,880 bales of cotton during the 15-week processing period by operating a 10-hour shift six days each week. The total fixed cost for the plant at this volume is estimated to be $20,900 and the total variable cost is estimated at $15,134 or $5.25 per bale.[5]

This relationship may be described as:

$$\text{Total Cost} = \$20{,}900 + \$5.25\,X \text{ (Where } X = \text{No. of bales) or}$$

$$\text{Average Cost} = \frac{\$20{,}900}{X} + \$5.25$$

At the volume of 2,880 bales the cost per bale is $12.51. The short-run cost curve for this situation is illustrated in Figure 1.

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[5]Variable costs shown here are based on the assumption of operation at the stated volume of 2,880 bales. Many of the variable cost items become constant once the decision is made to operate the plant daily, whether or not the daily quota of total volume is ginned. Therefore, unit variable cost is constant over the entire output.

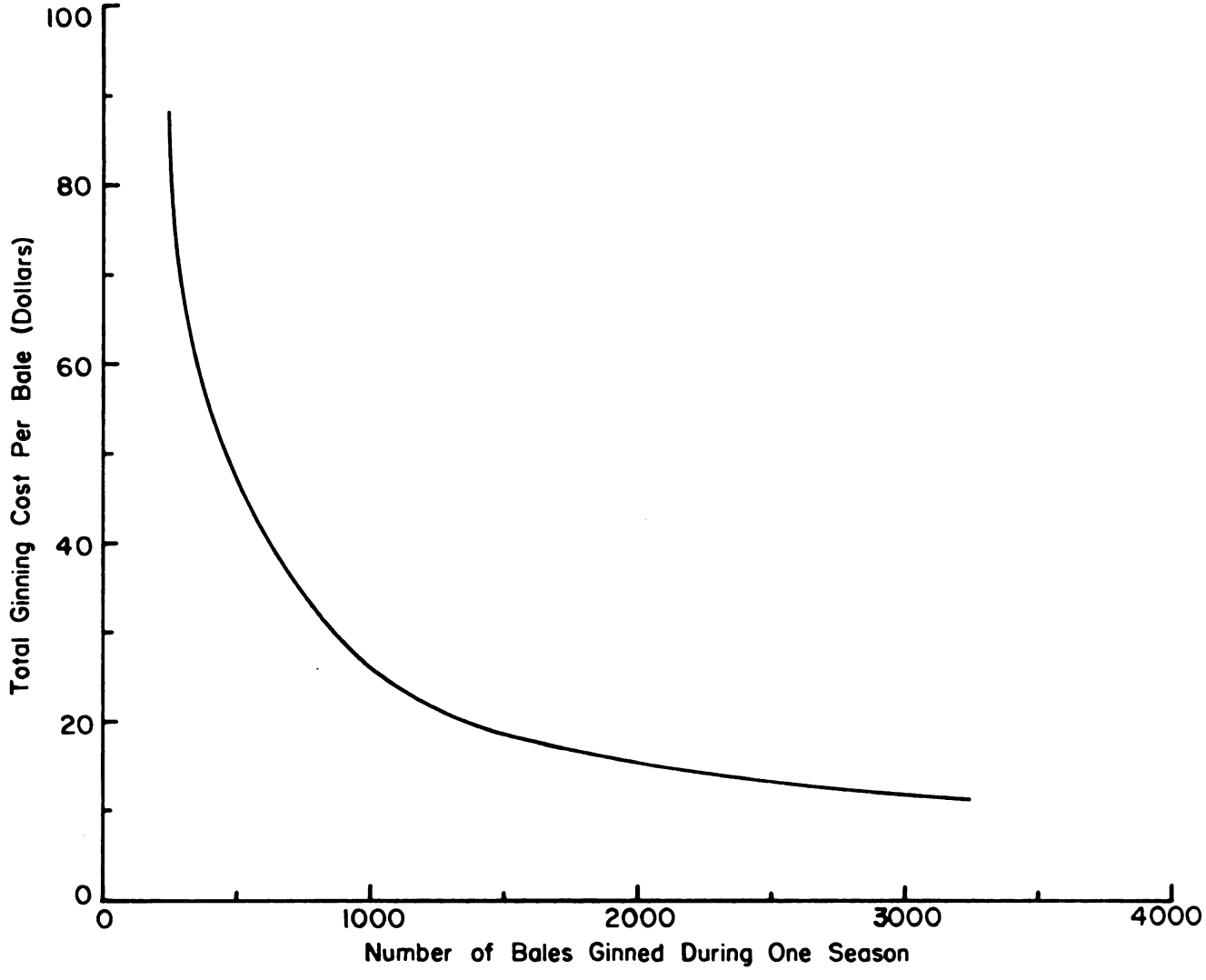

Figure 1. Short run average ginning cost function.

It is evident that total unit cost declines less rapidly as the capacity of the ten-hour shift, or 2,880 bales, is reached. The cost per bale at this point is $12.51.

If only 2,500 bales are ginned the cost per bale rises to $13.61.

Actual Gin Plant Capacity and Utilization

In 1957, Henderson County gins maintained work crews for about 15 weeks of the harvest period. Some gins operated with a full crew 12 weeks and others only 4-6 weeks. Skeleton crews were on hand in the beginning and at the end of the harvest season.

Operation time of the gin plant depends on the flow of cotton and the "down-time" involved. "Down-time" consists of all complete stops during regular operating hours and results from two conditions. Complete plant shutdown due to planned factors is the most important. Insufficient cotton and maintenance operations (oiling, repair, cleaning, etc.) constitute the bulk of this type of shut-down. Mechanical failure, including gin saw difficulties, constitutes the second type of shut-down.

Empty or idle gin stands constitute a type of "out-of-operation" time not included in "down-time." Individual gin stands may be idled by failure in the flow of cotton through the distributor and extractor-feeders. Insufficient cotton flowing through the intake system may idle the last gin in the battery or cause it to operate at less than normal capacity. Individual gin stands may be shut down temporarily for adjustment or to remove foreign matter from the saw and seed roll area. It is necessary to run each gin stand empty for a short period between bales

to avoid mixing. This delay is necessary and can be minimized with careful operation.

The significance of the out-of-operation time is evident. During the peak season when producers wait in line for the ginning service, downtime loses customers and potential revenue. This affects the industry and the individual operator's efficiency.

The sixteen gins operating in Henderson County in 1957 had a combined hourly capacity rating of 54 bales. Individual capacity ranged from 2 1/2 to 5 bales per hour. Under usual operating conditions out-of-operation time can be expected to reduce operations to three-fourths capacity. Under this assumption the combined effective capacity of the sixteen gins is 40.5 bales per hour.

The sixteen ginners reported the volume of cotton ginned in 1957 as 13,091 running bales. At the rate of 40.5 bales per hour the gins could have processed the 1957 cotton crop in 323 hours. This is equivalent to 33 operating days. The ginners reported operating full time for 15 weeks, or 90 operating days, and periodically for several more weeks.

Excess capacity has existed in the cotton ginning industry for many years. The number of active plants in Tennessee has declined from 833 in 1902 to 297 in 1958. Individual gin capacity has increased with equipment changes, and fewer operating days are required at present than at the turn of the century.

Actual Costs of Ginning

Use of the individual gin plant is closely associated with costs and returns. An understanding of the nature of costs and returns is

expected to provide management with aid in expense control and profit prediction through items related to total costs and returns. In order to understand the total cost involved in cotton ginning it is necessary to examine the individual cost components. Gin management exercises influence on total cost through individual cost items of management, office salaries, labor, repairs, power, insurance, taxes, capital investment, depreciation and miscellaneous. These items constitute the cost breakdown of the sixteen firms studied.

Management and Office Salaries

Costs of firm management are usually separated from office salaries. In the cotton ginning business these and other functions may be combined to hold down costs. Half of the sixteen firms maintained separate cost categories for these two items and the others combined them in function and in cost allocation. Small gins with a highly seasonal operation could not maintain a full staff without incurring excessive costs. The manager often supervised the operation, acted as weighman or ginner, and kept the records as well. The exact division of duties of the manager varied from gin to gin and only when gin volume exceeded 800 bales was a bookkeeper employed. Since the owner usually occupies the role as manager, the division of duties depends upon the owner's decision.

Combined costs of management and bookkeeping ranged from $600 to $2,050 per gin per season. Although interruptions in the flow of cotton prevented continuous operation late in the season the payments were only for time worked. The owner-manager was left to his own initiative to work at other enterprises during the delay periods.

Labor

Wage rates for gin employees were established on an hourly basis by some gins with increased payments for overtime. Seventy-five cents or one dollar per hour were the hourly rates most often paid. Gins that employed on a daily basis paid $6.00, $8.00, or $10.00 per day depending on skill, experience and length of day worked. Employees ranged from one to three in number in addition to the manager.

Labor cost was the most important variable cost item for the gins. It amounted to 19 per cent of total costs for the average gin. Payments for labor cost ranged from $200 for a gin primarily operated by the owner-manager to $5,200 for a gin with four employees.

Laborers worked steadily when cotton was available. On rainy days and other days when cotton was not expected at the gin, the laborers did not report for work. This situation involved an understanding with management that jobs depended on cotton delivery. Usually the management maintained a full crew until the beginning of periodic gin days. Labor costs for all gins averaged $3.03 per bale. The range in labor costs was from 57 cents to $4.65 per bale.

Repair

Costs of repair per gin ranged from $26 to almost $2,700. These costs related to maintenance and not to improvements on present equipment. Major repairs are made just prior to the operating season and only the repairs essential to plant operation are made during the ginning period. The repair costs might be the results of the previous year's operation; however, mostly they were incurred in preparation for the current ginning

season and were regarded as current costs.

The repair costs per bale averaged $1.00 for the 13,091 bales ginned in 1957. Individual gin repair costs ranged from 16 cents to $2.11 per bale.

Insurance

Insurance carried by the gins was mostly of two kinds--(1) building and machinery and (2) cotton-yard insurance. Separate policies were written for these two with an annual policy on building and machinery and a seasonal policy on cotton and cottonseed on hand.

The amount of building and machinery insurance varied according to the investment in the gin. The amount of cotton-yard insurance was related to the actual quantities of cotton on the gin lot during the ginning season.

The total cost of insurance carried by gins varied from $97 to $1,486. Applying these costs to the number of bales ginned, insurance costs per bale ranged from 27 cents to $2.99.

Taxes

Property taxes varied with location of the gins and with assessed value. The city rate was $2.25 per $100 appraised value. The county rate was $3.00 per $100 appraised value. The total tax costs for gin ranged from $63 to $278. When allocated on a per bale basis these costs ranged from 7 cents to $1.07.

Depreciation

Depreciation is a function of the investment in equipment, machinery

and buildings. Each firm handles depreciation in the way most advantageous to it. The straightline method was most often reported by gins. Some were using the decline-in-balance method for equipment and felt that they gained by writing off a larger portion early in the life of the equipment. Other gins did not report depreciation as a cost of doing business.

In order to arrive at a standardized depreciation method, the expenditures for buildings during the past 25 years and expenditures for equipment for the past 10 years were recorded. Using the straightline method of depreciation, the annual depreciation rate for buildings was established assuming a usable life of 25 years. The equipment was handled the same way but was assumed to have a life of 10 years. These depreciation periods are used by the Internal Revenue Office. Total depreciation charges ranged from $100 to $4,900 per gin. When allocated on a per bale basis the charges ranged from 49 cents to $8.68 per bale.

Power and Fuel

Power and fuel costs included electricity for all purposes at the gin and fuel for the driers and office heat. One electric meter generally served the entire operations and a separation of office and gin plant electric costs was not possible. The same situation existed with the fuel for driers and heat. Those gins with driers (9) used a wide variety of fuels as heat source. Four used butane, one propane, two natural gas, and two diesel fuel. Power and fuel costs ranged from 72 cents to $3.37 per bale. The total power and fuel costs varied from $225 to $2,088 per gin.

Miscellaneous

Items of cost under miscellaneous included office supplies, travel, advertising, telephone and other small items. This category serves as a "catch-all" for all costs not included under other major groups. Under larger volume operations separate groupings would be needed for travel, telephone and advertising. Miscellaneous costs per bale ranged from 25 cents to $2.12, while the totals per gin varied from $340 to $2,642.

Suitability of Data for Analysis

Accounting records are not designed to yield data explicitly suited for economic analysis. However, variable and fixed costs may be approximated from accounting records. For this study nine cost groups are considered and four of these (taxes, interest, insurance and depreciation) comprise the fixed costs. Portions of other cost groups may be considered fixed in the accounting sense but they cannot be separated without reclassification of the individual cost items. This process is laborious and neither the gin manager nor bookkeeper make such separations in practice. The gin manager does identify those cost groups which do not change with volume and the remainder can be handled in the linear equation.

Influence of Cost Variables

A mathematical description of the different cost functions is desirable in analyzing and estimating costs for the firm. Statistical

analysis of the cost functions provides this description and permits a measure of its reliability.[6]

Simple linear correlation described the relationship between volume and total cost for the 16 cotton gins as follows:

Y (total cost) = \$824 + \$14.75 x (No. bales ginned)

At this point linear correlation has yielded no specific information of significance for managerial planning. The total cost relationship is known but no direction is given for use in cost control. Such information may be obtained by examination of individual cost items. Estimating equations can be set up for all variable cost items to describe more accurately the nature of the variable costs.[7] These equations have been developed for the Henderson County cotton gins (Table III).

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[6]The statistical association of cost items with volume provides help in planning the gin operation. However, considerable difference in costs for items among Henderson County gins were shown in the discussion of cost ranges on pages 27 to 33. Discretion of management may play a considerable role in the actual cost-volume relationships.

[7]While these linear equations for separate cost items permit a more careful examination of total cost they are recognized as applicable only to a limited volume range and to plants not larger than the model gin. If the gin size increases, the cost items are expected to vary in a different manner than if more volume is pushed through the existing plant. It is suggested that research to clarify the nature of cost functions for different sizes of gin plants be considered.

TABLE III

LINEAR ESTIMATING EQUATIONS FOR GROUPS OF COTTON GIN COST, 1957

Items of Cost	Constant Factor	Per Bale Costs
Management and office	$ 579	$ .74
Labor	-106	3.16
Repair	- 42	1.05
Power and fuel	268	1.33
Bagging and tie	0	2.40
Miscellaneous	76	1.11

The relationship between the cost variables and volume is given in Table IV. The correlation between volume and power cost was the highest for the individual variables. Management and office costs exhibited the least association with volume.

TABLE IV

RELIABILITY OF ESTIMATING EQUATIONS

Cost Items	Correlation Coefficient	Coefficient of Determination	t Value[a]
Total cost	.932	.877	10.03
Management and office	.571	.326	2.56
Labor	.805	.650	5.11
Repair	.712	.507	3.80
Power and fuel	.986	.974	10.15
Miscellaneous	.605	.365	3.05

[a]In testing the hypothesis that the true correlation between volume and the individual cost groups = 0, the critical t value = 2.13 at the 5 per cent level.

Cotton Gin Revenues

Cotton gin revenues ordinarily come from four sources:

1. Ginning service
2. Bagging and tie sales
3. Margins for marketing cottonseed
4. Margins for marketing cotton

These revenue sources are related to services provided by the gin. Revenue for ginning and for bagging and ties are a direct result of the service rendered. Charges may be levied separately for these services or combined for convenience. Cottonseed and cotton are by-products of the ginning service and the ginner provides the initial market for cottonseed and is expected to make a market offer for the cotton. Margins on these latter two items may be large or small depending on the market situation.

Ginning and Conditioning

The method of levying ginning charges varied among the gins but generally followed two systems. The fixed fee per bale was used by eight gins. These gins were mostly in the smaller volume group, below 800 bales. The fixed fee included the charge for both ginning and bagging and ties. The other eight gins established a fixed fee for ginning and a separate charge for bagging and ties (Table V).

There was no evidence as to why a ginner preferred one system of assessing charges over the others. Custom, competition and related factors were given as reasons with no reference to actual costs.

TABLE V

METHODS OF ESTABLISHING GINNING SERVICE CHARGES

Gins	Fixed Charge per Bale	Fixed Price per CWT	Bagging & Ties	Total Charge
No.	$	$	$	$
6	10.00			10.00
1	10.50			10.50
1	11.00			11.00
8		.50	4.00	11.00[a]

[a]This total charge is based on $4.00 for bagging and ties and 1400 pounds seed cotton @ 50 cents per hundredweight.

Cottonseed Margins

Cotton gin firms are the first buyers of cottonseed in Henderson County, as in other Tennessee cotton-producing counties. Only cottonseed retained by farmers for use as planting seed or for feeding fails to follow this route.

The cottonseed margin may come from two sources. The first source is the difference between purchase and selling price. This amounted to $5.00 per bale in 1957. Contracts exist between ginners and cottonseed oil mills concerning disposition of the seed.

A second source of margin may arise from the cottonseed weight gain. Cottonseed scales are not used to determine the seed quantity per bale. It is established by first deducting from the gross gin weight of seed cotton a specified amount for trash and foreign material. This dockage varies according to the season, ranging from 5 - 10 per cent.

The weight of the finished bale is also subtracted from the gross weight. The residual is considered as the net weight of cottonseed and the farmer is paid on a per ton basis.

The only reliable way to compare the actual foreign material content with dockage by ginners is to install cottonseed scales.[8] Observations indicate that an average of 5 per cent dockage for the season is not excessive and in some seasons may be too little. All of the ginners reported dockage of 5 per cent, with some variation late in the ginning season. This does not indicate a net cottonseed gain by the gins and consequently is not assumed to have contributed to gin revenues.

Margins for Marketing Cotton

Cotton gins have traditionally provided a cash market for seed cotton and lint. The ginner assumes this service is necessary to attract and hold customers for his ginning service. Under the present system, gin revenues may be supplemented if the ginners buy successfully. Losses are possible and are often reported by ginners.

Ginners reported the purchase of 53 per cent of the cotton in 1957. Net margins on these purchases are not available for all gins and an industry average cannot be compiled. Individual gins that gave complete data provide an insight into the total revenue picture.

Total Gin Revenue

With only one fixed or stable revenue source from the three discussed, it is evident that total revenue must be considered primarily

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[8] B. D. Raskopf, Factors Affecting Cotton Prices, University of Tennessee Agricultural Experiment Station, Bulletin No. 251, 1956, pp. 10-11.

as a function of management. With manager capability varying widely between gins, it is not meaningful to discuss the average gin revenue. It is more realistic to associate the total cost function with revenue for a particular gin and this procedure will be followed in later use of these data.

Implication of Costs Under Model and Existing Gin Organization

In Table VI per bale costs of the model gin are compared with average costs experienced by cotton gins in 1957. The per bale costs of ginning by the model gin are $12.51 for a single shift operation compared to $13.10 for the county average.

Fixed costs per bale for the Henderson County gins amounted to $5.40 compared to $7.26 for the model gin. Variable costs were $7.70 and $5.25 respectively. Under this cost structure the model gin has considerable opportunity to lower unit fixed costs by spreading them over greater volume. This could be done by operating more hours daily. Unit variable costs would be expected to remain about constant. Opportunities for decreasing unit fixed costs for the Henderson County gins are less than for the model gin and with higher variable costs, reduction in unit total costs through volume would be less. Comparison of these costs indicates that greater efficiency could be achieved under the model gin than under current conditions. Data for one year may be insufficient to give the complete cost pattern, however, it must be accepted as a close approximation. Total savings to all gins would be $7,724 annually under model gin operations as calculated here.

TABLE VI

1957 AVERAGE COSTS OF HENDERSON COUNTY GINS COMPARED TO COSTS OF THE MODEL GIN[a]

Cost Item	Per Bale Cost	
	16 Gins	Model Gin
	$	$
Depreciation	3.16	4.03
Interest	1.11	2.17
Insurance	.97	.86
Taxes	.16	.20
Total fixed costs	5.40	7.26
Management and office	1.26	.45
Labor	3.03	1.25
Fuel and power	1.40	1.05
Repairs	1.00	1.25
Miscellaneous	1.01	1.25
Total variable costs	7.70	5.25
Total all costs	13.10	12.51

[a]Costs of bagging and ties excluded from this computation.

Additional benefits created by the model gin occur through the quality of service. As stated earlier, the ginning process is basically the separation of lint from the seed. This job may be done very satisfactorily with gin equipment that is a half-century old. However, recent changes in market demand have influenced some gins to add newer equipment such as driers, lint cleaners, boll traps and magnets. Some gins do not have this equipment and operate only when the cotton is dry enough or has little trash, or they operate continuously and the grower is prepared to accept a lower grade.

Actual values could not be assigned to the contribution of the new equipment, but it is indicated that the cotton grade is raised from one-fourth to one-half a full grade by the lint cleaner alone when cotton has considerable trash in it. This increases the bale value by $4.00 to $6.00. This will more than offset the weight losses caused by the process. Potential savings are considerably greater over time due to the demand for uniform lots of cotton.

CHAPTER III

FORM ASPECTS OF PRICE EFFICIENCY IN THE HENDERSON COUNTY COTTON MARKET

Although the perfectly competitive market does not exist and any attempt to establish the demand and supply functions in such detail would meet with endless problems, this type of model is one against which actual market situations can be measured. The desirable market in practice is conceived as one in which products are priced to reflect value in the consumer market. The extent to which homogeneous products are priced unequally in the same market or the extent to which unlike products are priced alike may be indicative of an imperfection in the price mechanism.

A complete examination of the market on this basis presents innumerable difficulties. Differences in cotton characteristics are measured in different ways and many of these characters have not been evaluated as they affect consumer utility. It is in this area, however, that an indication of price efficiency as related to product form may be obtained.

It is the purpose of this chapter to investigate price in the farm level market as related to product form. Cotton grades have been established for all types of cotton offered for sale. Under the present market system daily price quotations reflect the value of these grades. The price support system provides another basis of price-quality comparison. By determining the action of farmers in producing cotton varieties and in selling cotton, a measure of price efficiency may be obtained. Any discrepancy between present farmers' actions and practical courses

of action which could increase net revenues will indicate price inefficiency.

The Cotton Producer's Action

Within the framework of economic theory the agricultural producer is often characterized as an atomistic producer in a price taker's market. This is accepted as the generally prevailing situation. The producer under pure competition still has decisions to make and alternative courses of action from which to choose. The producer's first decisions are accepted as determining (a) what to produce, (b) how much to produce, and (c) what inputs to use in the production process. A slightly different statement of this decision is embodied in Scitovsky's treatment of the producer's problem.

> The question we now have to answer is how the firm makes use of its freedom of choice to maximize profit. This clearly depends on market conditions. Facing given prices in product and factor markets and having freedom of action circumscribed by its production function, the firm must make three decisions. It must decide (1) how to produce; (2) how much to produce; and if it produces several products, (3) what combination of products to produce. The three decisions are not independent of each other and all of them are determined by the same principle of profit maximization.[1]

These production decisions cannot be made individually nor can they be made without complete consideration for the market. The profit maximizing position of the producer can be calculated only after the market has determined value for the product. This is very well phrased by Dummier and Heflebower . . .

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[1]Tibor Scitovsky, Welfare and Competition, Richard D. Irwin, Inc., 1951, p. 122.

> Human effort or ingenuity cannot create matter. Production of tangible goods is not creation in the sense that something new is made out of nothing but is the process of so changing or controlling goods and services that they will have increased power to satisfy human wants. Production is the creation of utility. From the statement that utility is created, it should not be inferred that utility arises from the productive effort, for utility must come ultimately from human desire. But production is the process of so changing or controlling goods or services that they will better fit the desires of consumers, and therefore the utility of the goods is increased. The producer does not know whether his efforts have resulted in increased power to satisfy wants until he has sold his goods, as purchase by the consumer in general reflects the consumer's approval of the productive process.[2]

The cotton producer does not know the exact value of his product until the cotton is marketed. However, under the present system of cotton price supports, minimum price expectations are relatively fixed. If the producer can predict the qualities of his cotton crop, he can approximate its market value at the end of the production period. The first problem is to determine which product to produce and the qualities to strive for.

The cotton producer is not unlike other agricultural producers. The decision to produce cotton is made only after due thought is given to alternative use of resources that will be involved in cotton production. The commitment of resources to cotton production in Henderson County is accepted as evidence that this is a profitable crop to produce considering knowledge of their alternatives.

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[2]Edwin F. Dummier and Richard E. Heflebower, Economics with Application to Agriculture, McGraw-Hill, 1934, pp. 73-74.

Varietal Consideration of Henderson County Cotton

Market value of cotton is closely associated with grade and staple. Prices quoted on the spot markets and under the governmental loan program are based on both grade and staple characteristics. Under Tennessee conditions cotton staple length is greatly influenced by variety, weather, and quality of the seed. The grade is very closely associated with harvest methods and ginning preparation.

Since growing conditions are not easily adjusted under Henderson County production methods, staple length is consciously affected when the producer selects his seed stocks. Agronomic recommendations for cotton varieties are widely disseminated over the cotton production area through the Extension Service and by private firms. Even with a recommended list, growers may stray far from the most profitable varieties, considering market value.

Variety Planted

Two questions were asked of the 221 growers to determine their practices pertaining to the cotton planting seed used. In response to the first question "What variety was planted in 1957?" 69 per cent of the producers revealed that they were using recommended varieties. Sixteen per cent were using varieties not recommended, these varieties having shorter staple and other undesirable lint characteristics. Fourteen per cent did not respond to this question.

The distribution of production among the different varieties with expected average staple length is shown in Table VII.

TABLE VII

COTTON PRODUCTION IN HENDERSON COUNTY BY VARIETIES AND EXPECTED STAPLE LENGTH, 1957

Variety	Bales	Average Staple Length (32nd inch)
DPL	3,704	34
Empire	5,077	34
Fox	444	33
Hibred	1,644	31
Other	2,599	--
Total	13,468	

All varieties listed except Hibred were in good demand during the harvest period in the Memphis District. While the October price for Middling inch cotton was 36.39 cents per pound, the premium for 1 1/16 inch staple was 185 points.[3] At the same time the discount for 31/32nds inch staple was 109 points. The difference in value for the two staple lengths was 294 points or $14.70 per bale (Table VIII).

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[3]The length of cotton staple is usually designated in fractions of an inch, with gradations of one thirty-second inch.

Official cotton grades are Good Middling, Strict Middling, Middling, Strict Low Middling, Strict Good Ordinary and Good Ordinary. Color designations of White, Spotted, Tinged, Yellow and Gray are used to denote variations in cotton color. (Example) A single bale of cotton may have a staple length 1 1/32 inch and a grade of Good Middling Gray.

Cotton price changes are quoted in terms of "points." One point is equivalent to .01 cent per pound, or similarly a change in the cotton price of 100 points indicates a change of $5.00 per bale (500 pounds).

TABLE VIII

COTTON PRICES, PREMIUMS AND DISCOUNTS FOR MEMPHIS TERRITORY GROWTHS, BY SPECIFIED QUALITIES, LANDED GROUP 201, SELECTED MONTHS 1957

Grade and Staple Length	Month			
	September	October	November	December
M 31/32"	-121	-109	-100	-82
M 1"	35.55	36.39	37.72	37.82
M 1 1/16"	190	185	182	142

By adjusting the 1644 Hibred bales to match the average seasonal flow to market during the four heavy months the real value differential is established. If the 1644 Hibred bales had been of the DPL variety with average staple length and grade, their value would have been $22,198 greater.

One offsetting factor reputedly in favor of the Hibred variety was a greater lint turnout at the gin. Variety performance trials indicate that lint turnout between Hibred and DPL strains have narrowed remarkably since 1935.[4] The range has narrowed from about 10 per cent to about one per cent in this period of time. The one per cent difference in lint turnout existing in 1957 was worth about $1.85 per bale more to the Hibred variety producer, based on the average mill price for the four months.

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[4]Variety Performance Trials of Cotton, University of Tennessee Agricultural Extension Experiment Station Bulletins, 1935-1957.

A second income factor, assuming the same yields per acre and the same ginning charge, arises from a premium offered for Hibred variety seed by local seedmen. By diverting the seed from the oil mill market to the planting seed market almost $5.00 per bale is added to income from the Hibred variety. This will, however, apply to only half of the Hibred seed since the demand is limited.

After crediting the Hibred variety producer with income from both greater lint turnout and a special seed market, the county cotton value is lowered $15,000 annually by use of the Hibred variety.

Varietal Purity

The fact that 68 per cent of the producers used recommended varieties does not assure the highest yield. Variety must be combined with other practices. Varietal mixture occurs from two sources in most cotton-producing communities. The mechanical process of ginning is such that seed mixtures occur readily at the gin. Secondly, cross-pollination of varieties from field to field causes varietal change. Since most of the seed planted in a community is ordinarily produced the previous year within the community, maintaining varietal purity could be a considerable factor in staple value for the producer and for the county. Sixty per cent of the cotton planting seed was saved by growers or obtained from their neighbors, 20 per cent was provided by ginners, 5 per cent was obtained from breeders and the remainder from other sources. The 60 per cent obtained within the community indicates a very likely source of mixtures since this was ginned locally. To further verify the varietal problem, growers were asked about the breeding of seed planted. Only 10 per cent

used registered or certified seed which would assure expected lint characteristics. Twenty-six per cent used seed two years removed from the foundation stocks, 40 per cent used three-year seed and 10 per cent used four-year seed.

In counties where several varieties have been produced simultaneously by cotton producers, costly variation in staple length and cotton characteristics has occurred. Mill buyers seeking even-running lots of cotton have avoided counties where varietal mixtures are known to be extreme.

Research studies indicate that staple length is not affected by seed source but that considerable variation occurs in lint turnout from seed obtained from different sources. Lint turnout may decline by as much as 11 per cent from foundation stock within three years because of mixing of cotton in the field or at the gin.

Assuming a lint turnout decline of only 2 per cent on the cotton produced by the 60 per cent of the growers who saved their own seed, a loss of about 160 bales, worth about $25,600, would have been experienced. The only added cost necessary for achieving the greater output is assumed to be a seed cost of approximately $9000.

Determination of Cotton Characteristics

The acceptance of government standards by the cotton industry provided measures of quality which were indicative of market value. The Smith-Doxey Bill in 1938 provided free cotton classing service for producers and was designed to facilitate informed trading in cotton. The basis for grade determination is color, foreign matter and preparation.

Systems of determining cotton characteristics have been refined in recent years. Mills with certain cotton specifications often buy on the basis of Micronaire, Pressly or Steleometer testings. These are fiber tests for fineness, tensile strength and length respectively. None of the producers or ginners reported selling on the basis of these tests.

Variety has been reported as one consideration of buyers for cotton mills in Tennessee.[5] Ginners stated that they knew the variety when purchasing 90-95 per cent of the lots. This permitted the local identification of most lots of cotton sold, although variety is not marked specifically on each bale. When cotton is routed through brokers this variety identification is lost and only the area of growth is known. Identification by area of growth provides a basis for preducting cotton staple characteristics which vary with climate and soil conditions. It does not aid varietal identification at the mill, which is desired by some mills.

Selling on Actual Grade by Producers

All the gins in Henderson County are organized under the Smith-Doxey Program, entitling growers to free cotton classification. Seventy-five per cent of the growers reported that sales were made on the basis of staple and grade, yet ginners reported buying on their own grade. This inconsistency is explained through the time of sale, with the cotton

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[5] B. D. Raskopf, Improvements in Tennessee Cotton Quality and Marketing Practices to Meet Mill Requirements, Monograph 259, Tennessee Agri. Exp. Sta. 1950, p. 53.

being sold before official results were obtained from the cotton sample.

Uninformed trading can be supplanted by informed trading by delaying the cotton sales date for a period of four days. In this period of time the cotton sample has been analyzed and the results are mailed to the ginner and producer on a "green card." Risk from physical loss during this delay can be covered by cotton-yard insurance. Risk involved in price changes can be only approximated, because prices fluctuate continuously during the harvest period. During the three-year period 1955-1957, September, October, November and December, spot cotton prices changed in the following way: 136 quotations were higher than four days previously, 30 registered no change and 178 quotations were down. The magnitude of change ranged from one point to 23 points daily. During the three-year period chances for price gain are considered equal to chances for loss. This leaves the question of value increase from knowing the grade. A one-price market averages out the grades expected and pays producers on the basis of the expected grade average. The producer with better than average grade and staple on any particular day would thus enhance his position by holding until grade is established.

Another method of arriving at a potential saving in the buying system is through comparison of the ginner price and the Memphis Spot Price for the cotton produced in Henderson County. Table IX shows the quantity-quality index and value of Henderson County cotton produced in 1957 based on these two prices.

The difference in ginner prices paid and the cotton value based on the Memphis Spot Market amounted to $35,759. Using the assumption that cotton must be transported to Memphis for its value to equal the

TABLE IX

VALUES OF THE 1957 HENDERSON COUNTY COTTON CROP BASED ON GINNER PRICES AND MEMPHIS SPOT PRICES

	Month					
	September	October	November	December	January	Total
Cotton Ginner (Bales)	647	9,378	2,598	460	385	13,468
Cotton Ginned (%)	4.8	69.6	19.3	3.4	2.9	100
Ginner Price (¢ per lb.)	33.9	34.0	32.0	27.0	25.0	
Total Value (dollars)	109,667	1,594,260	415,680	62,100	48,125	2,229,832
Cotton Quality Index	97.8	97.0	90.8	78.3	78.3	
Memphis Spot Price for White M 1 1/16" (¢ per lb.)	34.98	35.32	36.22	36.69	36.59	
Memphis Spot Price discounted by Quality Index (¢ per lb.)	34.21	34.26	32.89	28.73	28.65	
Total Value (dollars)	110,669	1,606,451	427,241	66,079	55,151	2,265,591
Difference (dollars)	1,002	12,191	11,561	3,979	7,026	35,759

Spot price, transportation costs would amount to approximately $20,200. This leaves a ginner margin of $15,459 or slightly more than one dollar per bale if the entire crop was handled in this manner.

Cotton Bought by Ginners

The treatment of cotton buying and selling practices of firms in a county area must be preceded by market-wide considerations. The county as a market has no significance in terms of market structure. It is assumed that price-making forces are market wide and the county firms cannot pursue independent pricing policies. A large number of buyers and sellers in a market leads to atomistic power relations and a single buyer or seller cannot influence the product or service price. The large number of cotton producers assures this atomistic relationship on the producer selling side of the market.

Cotton ginning and buying firms are less numerous than producer-sellers but they are numerous in terms of market structure. While the number of firms within the industry or within the market area is not completely indicative of uniform price relationships, it may have specific influences on price. Nicholls has pointed out that spatial dispersion of firms and service differentiation may introduce imperfections in a market where buyers are fairly numerous.[6] Imperfections at the county or local level are assumed to exist and can be treated only with increased knowledge of the particular situation.

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[6]William H. Nicholls, Imperfect Competition Within Agricultural Industries, The Iowa State College Press, Ames, Iowa, 1941, p. 3.

Considerable variation exists in the buying methods used by ginners over the cotton belt. Specific questions were asked of the buyers to determine their methods. The practice of offering a single price daily for all grades of cotton simplifies the buyer's role. As a method of pricing, it works to the disadvantage of the uninformed seller facing a well-informed buyer, and to the disadvantage of the seller with a high quality of cotton. Six of the gins reported buying some of their cotton on a one-price (hog round) basis (Table X). The others bought on a quality basis--i.e., the offering price varied according to the buyer's estimate of grade and staple length. Practically all buying transactions at the ginner level occurred before the cotton was officially classed and graded. Only one buyer reported buying a small amount on the basis of the green card grade. Therefore the majority of the cotton was bought on the ginner's grade, which was his estimate of its value.

TABLE X

QUALITY BASIS ON WHICH GINNERS PURCHASED COTTON FROM PRODUCERS IN HENDERSON COUNTY, 1957

Methods of Establishing Value	Ginners[a]	Bales Purchased[b]
	Number	Number
Hog-round basis	6	1,202
Ginner grade	11	6,660
Basis of green card	1	80
	18	7,942

[a]Three ginners used a combination of two methods and one did not buy cotton.

[b]Does not include cotton purchased in the seed.

It is here that inequities of trading exist. Cotton grades at a single gin varied from White Strict Middling to White Strict Good Ordinary in one day. This is only four grade differences but the value between these two grades amounted to 1,305 points or about $65.25 per bale, based on Premiums and Discounts adopted by the Loan Program of the U. S. Department of Agriculture.[7] The usual grade range at the gins amounted to three, which was equivalent to 400 - 800 points.

Cotton staple variations at the gins were of about the same character as cotton grade variations. Staple differences amounted to five thirty-seconds of an inch in extreme cases and averaged about three thirty-seconds. The extreme range of five thirty-seconds inch established a value difference of 320 points. On the average, value differences due to staple length amounted to about 125 points.

Ginners stated that they lowered price on lots where grade and staple were far below the daily average but their stated goal was to average out during the day's purchases. The individual using a hog-round ginner market as a cash market in 1957 received a price based on the average quality bought by the ginner that day. He received actual value of the cotton only if the grade and staple coincided with the ginner's daily average receipts.

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[7]Cotton Price Statistics, U. S. Department of Agriculture, Agricultural Marketing Service, Vol. XXXIX, No. 13, Season 1957-58, p. 4.

Cotton Bought in Seed

Cotton is usually bought after ginning when a true weight can be established for the lint. Remnants and late harvestings are often sold by the producers on a weight basis before ginning. A single price is established for all cotton offered for sale in the seed. This price is related to the going price for lint cotton, considering the seed-lint ratio and the amount of trash and foreign matter contained. The ginner buys the seed cotton lots offered and gins them out when the custom ginning has slowed.

Since the system of buying in the seed is based on estimates of trash and seed, it is considered undesirable, especially from the producer standpoint. Almost two and one-half per cent of the cotton produced in Henderson County was sold in the seed in 1957. This compares with 5 per cent for the State and is not considered excessive.

Changes Related to Product Form

Some ginners encourage production of the most valuable varieties by giving high quality seed to the producer. Producers receiving this favor are expected to reciprocate by delivering all their cotton to this ginner. While this promotes efficiency in one area it may encourage inefficiency in another. The joint problem of variety and source of planting seed may be influenced by a state law, such as California has enacted, which limits production to selected varieties and provides penalties for infractions. This appears impractical as a solution in Henderson County at the present.

Since the county leaders are vitally concerned about income from farm production this problem of keeping cotton seed pure should become one of their major projects. Without means of enforcing the use of recommended seed, voluntary compliance would need to be secured. Bankers, ginners, seedmen and other leaders concerned should attack the problem in a joint effort. By publicizing the lost income occurring when improper seed is planted, additional influence could be exerted on the situation.

Summary

Data presented in this chapter show that Henderson County income from cotton was reduced several thousand dollars in 1957 by the use of improper varieties and undesirable seed stocks. Both of these factors may be influenced through education programs and are therefore points where inefficiency may be influenced.

The one-price buying system encourages uninformed trading and is generally inequitable. The total crop value may not be influenced by this factor, but the distribution of income is affected and as such is considered undesirable.

CHAPTER IV

TEMPORAL ASPECTS OF PRICE EFFICIENCY IN THE HENDERSON COUNTY COTTON MARKET

Cotton is not a homogeneous product. However, grade and staple classifications are used to designate value differences between bales. It is accepted that the product description permits informed trading and essentially fulfills the requirement of a homogeneous product. Firms are numerous on the buying and selling sides of the market at the Henderson County market level as indicated in the following section. In addition to daily current price information, future prices are quoted daily and such information is available to buyers and sellers alike. While these conditions appear to be sufficient to promote some aspects of efficient pricing over time, a more complete examination must be made. The following analysis will be directed (a) at determining grower actions relative to selling or storing; (b) to determine if opportunities have existed for producers to benefit by storing cotton.

In the first phase, grower actions in selling and storing will be explored. Such actions should be rationally explained by costs and returns from holding as revealed by the second part of the investigation.

In the investigation of the second phase opportunity must be interpreted as opportunity for financial gain through the storage process over time. Under a perfect competition model it is recognized that cotton price in time period B plus one would be equal to cotton price in period B plus storage and related holding costs. Deviations from this pattern would indicate imperfections in the pricing mechanism. In the

actual market, price variation measured against carrying costs should reveal opportunities for price gain or loss through storage.

Market Channels and Cotton Movement in Henderson County

An understanding of market channels is important in educational work because firms are control points at which programs must be directed.

Movement of cotton through the marketing system varies from year to year. Cotton demand by mills and the government loan program have considerable influence on the route that cotton will take to the manufacturer. The Henderson County cotton market is depicted in Figure 2. The channels remain the same from year to year but their importance changes with changing conditions.

The 1800 producers patronized the 16 gins for the processing service. They retained ownership to this point. The ginners bought 53 per cent of the crop and sold 31 per cent to brokers and the remaining 23 per cent to mills. Forty-seven per cent went to the government loan with only a fraction of one per cent being sold direct to brokers by the producer.

The complexity of the market channel influences the growers' use of storage as a device to attempt to gain price advantage. Small lots of cotton flowing through a complex storage system result in higher costs and growers use storage only when prospects of price improvements are considered good.[1]

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[1]Growers with small acreage stored little cotton during the early years following World War II even though expectations were for a stronger market. The small quantity of cotton owned by the individual was felt to be responsible for part of this action.

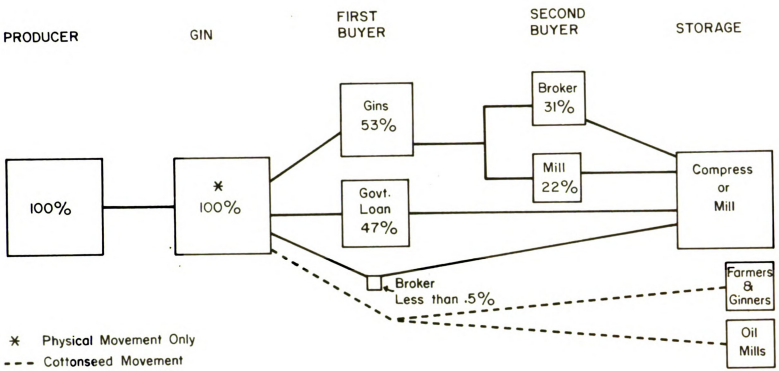

Figure 2. Marketing channels for the 1957 cotton crop, Henderson County.

Sources of Information

The Henderson County cotton producer has considerable choice among places to sell. Current market information from each of the different possible market outlets is essential, however, if the wisest choice of markets is to be made. Producers were asked the question, "What is your source of market information?" in an attempt to determine their degree of knowledge about markets.

Table XI shows the sources of market information used by producers.

TABLE XI

SOURCES OF COTTON MARKET INFORMATION, HENDERSON COUNTY COTTON PRODUCERS, 1957

Source of Market Information	Only Source	Plus One Other Source[a]	Plus Two Other Sources[a]	Total Using
	%	%	%	%
Radio	2	23	28	53
Daily Paper	1	15	15	31
Gov't Price Report	-	6	11	17
Gin Bulletin Board	9	21	22	52
Cotton Brokers	1	2	-	3
Verbal Inf.	6	12	12	30
Price Offer Only	12	-	-	12
Total	31	79	88	

[a]Producers reporting use of two or more sources cause totals to exceed 100 per cent.

Thirty-one per cent had only one source of information while sixty-nine per cent had two sources or more. All gins posted prices that they paid and also posted the daily cotton market news bulletin. Radio stations covering the area carried noon and evening broadcasts of the spot cotton markets. Futures prices were carried by newspapers and the radio. It is accepted that adequate daily price information was available on which producers could base the time of selling. Seasonal prices in the form of futures quotations were available and they were distributed widely enough for all producers to have access to them.

Immediate Sales at the Gin

Uniform pricing is expected to occur under an efficient pricing system. Competition compels this uniformity in a highly developed market. To determine the growers' role in pricing policies they were asked how many buyers were contacted before selling.

Producers selling on the ginner market sell mostly in single bale lots on an ungraded basis. Their knowledge of grades and staple length is limited. The ginner-buyer ordinarily knows the variety, can estimate the staple length within 1/32 of an inch and can usually determine the grade. The relatively uninformed producer thus faces a buyer who is well-informed, though not completely informed. The individual producer sale is very small in terms of the total purchases of the buyer and carries no bargaining power in the ginner market except potential ginning revenue from unharvested or unsold cotton. The ginner is not ordinarily well informed in the market where he sells, unless he handles a large and

consistent quantity of cotton. The result of a poorly informed seller dealing with a well-informed buyer is expected to be inefficient pricing.

Cotton producers in Henderson County exercised little flexibility in the selection of buyers. Sixty-seven per cent of the producers interviewed only one buyer before selling, 26 per cent interviewed two buyers, and 7 per cent interviewed more than two.

Producers were asked to give reasons for the selection of buyers to determine the nature of business relationship between buyers and sellers. Only one per cent of the producers mentioned indebtedness to the buyer. Factors relating to price were mentioned by 69 per cent of the producers responding to this query. Custom was given as the reason by 17 per cent and various other reasons were given by the remaining 13 per cent.

With a considerable degree of freedom to choose among selling places, the producers exercised this to only a small degree. Ten per cent of the producers sold to some firm other than the ginner they had patronized. Part of this small show of flexibility is explained by the fact that 48 per cent of the producers placed their cotton under loan, usually without inquiry of other buyers about prices.

Immediate sales made to the ginner-buyers were made thus without information from other ginner-buyers. This action implies considerable faith in uniform pricing between gins, whereas actual or observed differences ranged up to 100 points per bale.

Farmers' Use of Government Loan Programs

Ginners have provided much of the primary market for cotton ever

since it has been produced in Tennessee. They occupy the natural position for this function since they serve as processors. Cotton is not a merchantable commodity until the seed is removed and the lint is baled. Immediately after ginning, the price offer by the ginner permits the producer to compare this with other market alternatives provided by other ginners, brokers and the government price support program.

The cotton price support program is administered by the Cotton Division, Commodity Stabilization Service. Loan papers may be drawn up by the producer at ginning time with the loan value being established after the cotton sample has been classed by the regional cotton classing laboratory. Following the usual practice, growers submit a cotton sample to the Cotton Classing Division, U. S. D. A., under the Smith-Doxey Program for classification at ginning time. A card is mailed to the producer stating grade and staple length. From this information and a loan schedule, the producer can determine loan value. The classification card is received by the producer within four or five days after the sample is taken.

If a non-recourse loan is obtained immediately, the producer receives the full price support less write-up charges, transportation, entry cost plus one month storage at the warehouse. If a loan is obtained at a later date, additional storage charges accrue and are borne by the producer. Under current regulations the producer may obtain a loan and redeem the cotton anytime before August 15 of the next crop year. This enables the producer to shift to the spot cotton market if prices rise above the loan price for comparable grades. The actual decision to place

the cotton in the loan and to later redeem the cotton for sale on the open market is complicated and none of the growers placing cotton in the loan redeemed it in 1957. This redemption process encourages trading by highly informed persons only. The practice of "buying" green cards (the grade card) has been used by cotton buyers in years of favorable spot market to loan price.[2]

According to records, the producer's choice to place cotton under the loan resulted in acceptance of the loan price without recourse. In 1957, 48 per cent of the Henderson County producers used the cotton loan program. The question to be asked here is what price relationships existed during the period to influence producers to take the loan route, and can any judgment be made of their action? In Table XII the loan rate and Memphis Spot Price for Middling inch cotton are shown for the heaviest sales period.

TABLE XII

COMPARISON OF LOAN RATE AND THE MEMPHIS SPOT PRICE MIDDLING INCH COTTON DURING SELECTED MONTHS, 1957

Price		Month			
		Sept.	Oct.	Nov.	Dec.
Memphis Spot Price	Middling Inch	33.34	33.50	33.89	34.93
Loan Rate	Middling Inch	32.51	32.51	32.51	32.51

[2]Buyers report that this process was unprofitable during crop years 1956-1957.

Recent records indicate that when the Memphis Spot Market Price exceeds the Loan Price by as much as 140 points growers place little of their cotton under the loan.[3] This situation did not prevail until December when the spot price exceeded the loan price by 242 points and by this time very little cotton remained in the hands of the producers.

Seasonal Price Patterns of Cotton

After the cotton is harvested and ginned the producer must decide when the cotton is to be sold. Several alternatives are available to growers and the factors involved in the selection of the most profitable date of sale are numerous. Cotton is a storable commodity and the producer has the opportunity to chance gain from seasonal price variation by regulating his sales date.

Using 1952-56 as the historical period for analysis, the seasonal variation of prices received by Tennessee farmers for cotton in Tennessee is shown in Figure 3. For September the price was 9 per cent above the average, 5 per cent above the average for October, declining to average for November and remaining below average until April.

Thus, if the grower has a price advantage on the spot market it should normally be during September and October. The primary source of this seasonal price variation, however, lies in the cotton qualities

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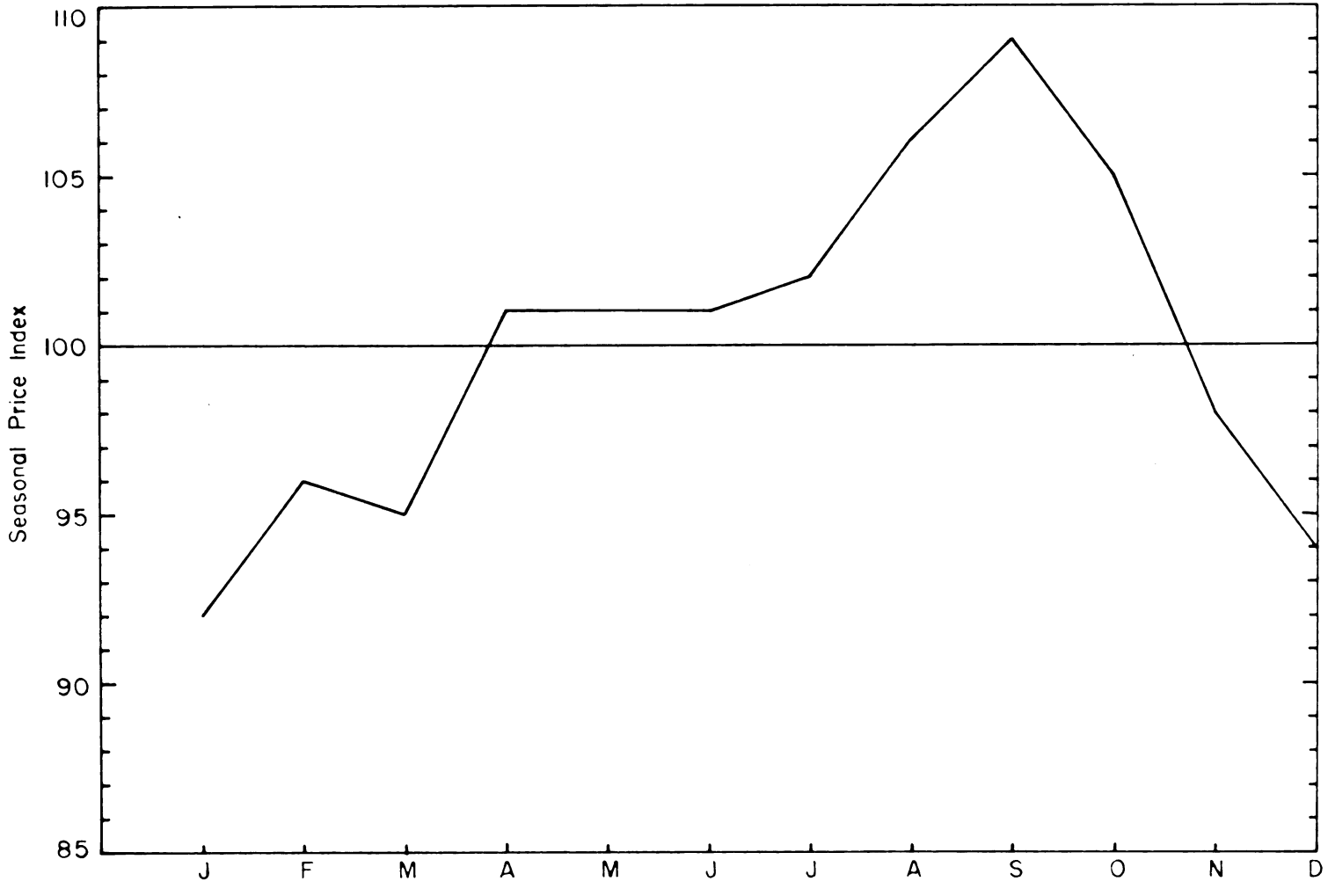
[3]B. D. Raskopf, Factors Affecting Cotton Prices in Ginner Markets in Tennessee, University of Tennessee Agricultural Experiment Station, Bulletin No. 251, 1956.


Seasonal Price Index
110
105
100
95
90
85
J
F
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A
M
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J
A
S
O
N
D

offered for sale during these months.[4] An historical price series of this nature has limited value to farmers in determining time to sell.

The index of seasonal variation of inch middling grade cotton prices in the Memphis spot market for 1952-56 is shown in Figure 4. This index provides the needed basis for comparison of current prices against expected future prices less carrying costs. Price variation has been small during the time period studied, with the seasonal peak of 101.9 per cent having been reached in June.

The average bale value is assumed to be $160. If the price advances 1.9 per cent from harvest to the seasonal high, an increase in bale value of $3.04 occurs. This anticipated increase must be measured against the costs involved in holding to determine if storage would have been profitable during this period.

Storage and Related Holding Costs

Cotton may be withheld from the market in a number of different ways. Home storage, once practiced by cotton producers, has been almost completely eliminated by the alternatives offered under the government price program and will not be considered further.

Ownership of the cotton may be retained by the producer and the cotton stored in a cotton warehouse. In this system the producer carries all the costs and all the risks of price change. Assuming the seasonal

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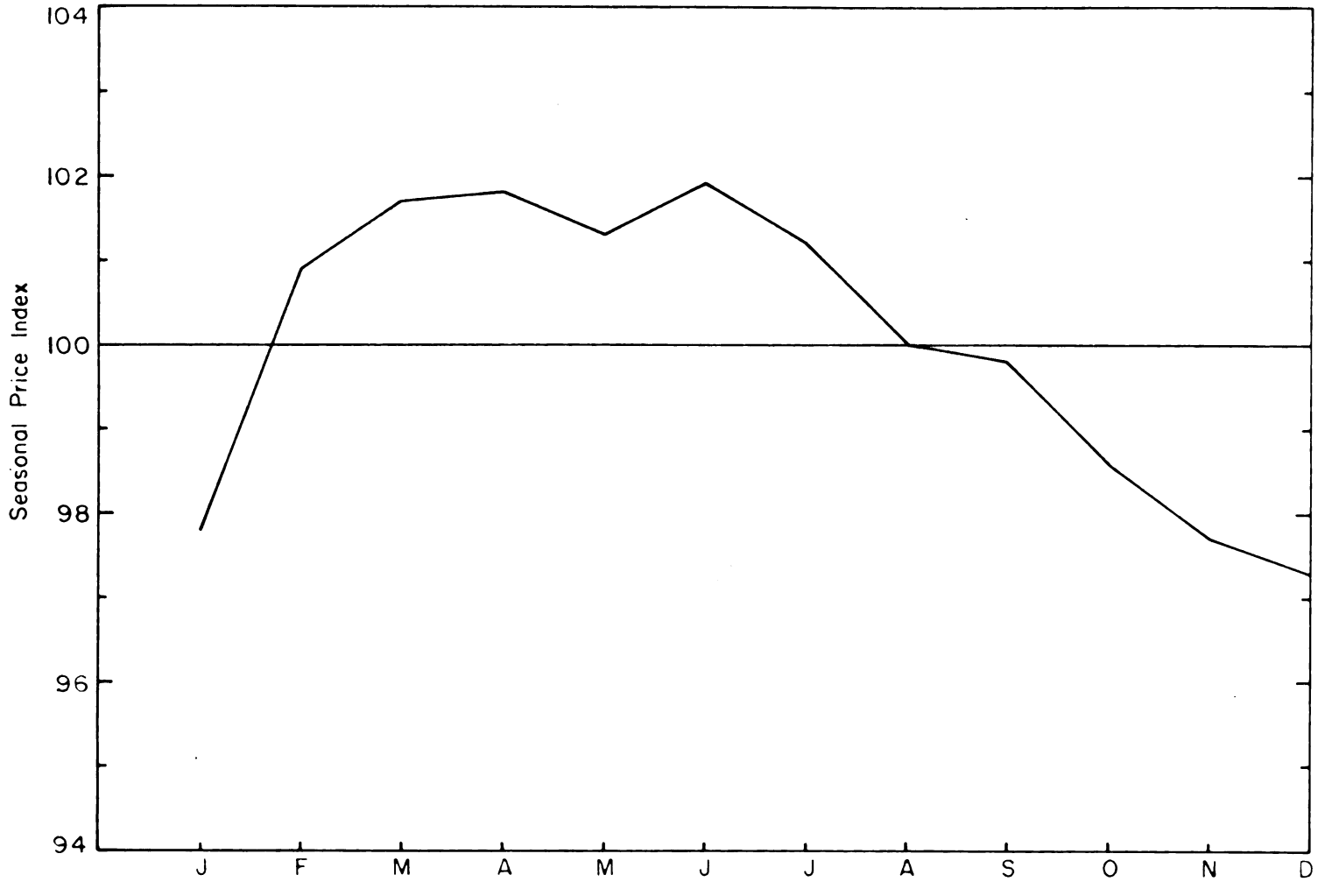
[4]Cotton marketings are very heavy during the harvest months of September through December, the period when cotton quality is best. Later harvestings are heavily discounted for lower grade and shorter staple.


104
102
100
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96
94
Seasonal Price Index
J
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M
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high will be reached in June of each year, the following storage and related costs are incurred for each bale:

Transportation to cotton warehouse	.50
Warehouse entry plus one month storage	1.15
Storage for 8 additional months	3.44
Interest on cotton value (5% on $160 for 9 mo.)	6.00
Total	$11.09

The anticipated increase in value of $3.04 is $8.05 less than anticipated costs. This route also carries with it risk from price fluctuation.

Cotton may be placed under government loan at harvest with the producer retaining option to redeem it and sell on the open market by August of the year following harvest. Costs involved in placing cotton under the loan until July of the year following harvest are:

Transportation to cotton warehouse	.50
Warehouse entry and one month storage	1.15
Storage for 8 additional months	3.44
CCC write up charges	2.50
Interest on loan money advanced ($100 at 3½% for 9 months)	2.63
Total	$10.22

In this case carrying costs amount to $10.22. The anticipated seasonal gain of $3.04 does not cover these costs. The loan price less the charges is paid to the producer unless the cotton is redeemed before August 15. In this instance the producer bears no risk of price change.

Buying and Selling Practices of Ginners

The quantity of cotton bought by ginners ranged from 4 to 1,130 bales per gin. The distribution of purchases among buyers is shown in Table XIII.

TABLE XIII

PURCHASES OF COTTON BY GINNERS IN HENDERSON COUNTY, 1957

Total Cotton Purchased	Ginners
Bales	Number
Less than 50	5
50-249	2
250-499	1
500-749	4
750-999	3
1000-1249	1
	16

The significance of the quantities bought by ginners lies in the nature of their buying and selling operations. The act of buying and selling in an informed manner requires that close attention be given to the market prices and costs. The ginner buying a small volume has the same problems concerning market information, market contacts, transportation and other functions as the larger buyer. Costs of providing this service are higher per unit for smaller buyers; consequently many of the buyers interviewed stated a desire to relinquish the buying function if it

would not decrease their ginning volume.

Cotton purchases are made daily and prices fluctuate daily. Risk involved in carrying cotton may be high for relatively uninformed buyers. Systems for transferring risk are available and most ginners are expected to conduct their buying and selling operations to minimize risk. Actions of Henderson County ginners with respect to the lapse of time between buying and selling are shown in Table XIV.

TABLE XIV

LAPSE OF TIME BETWEEN BUYING AND SELLING BY HENDERSON COUNTY GINNERS, 1957

Method of Selling	Ginners*
	Number
Daily Sales	9
Weekly Sales	6
Sales as Truck Loads Accumulate	5

*Some ginners used 2 methods.

While the Government Loan Program tends to stabilize the cotton market it is not available to the ginner-buyer as a market. Therefore cotton purchased by the ginner must be sold on the open market where prices fluctuate. The ginners who do not sell daily carry the risk of price change. Carrying unnecessary risk is not conducive to efficient marketing.

Transfer of Risk

Transfer of risk is commonly achieved by delivering on the basis of a prior contract or passing title to some other firm. Table XV shows the methods of transferring risk used by ginners in 1957. Some ginners used a combination of two methods. Cotton carried in the open market was held for periods of one to four weeks. In general the smaller buyers made immediate sales while the larger buyers sold futures, made offsetting call transactions or carried cotton in the open market. Less than 10 per cent of the cotton was handled under immediate sales.

TABLE XV

GINNER METHODS OF TRANSFERRING RISK--HENDERSON COUNTY, 1957

Methods of Risk Transfer	Ginners Using Method*
	Number
Sale of Future and Offsetting Call Transaction	3
Immediate Sale	8
Carried in Open Market	8

*Some ginners used 2 methods.

Price fluctuations occur daily, as cited earlier. Ginners carry much of the risk of price change while immediate sales and other means are available for shifting risk.

Appraisal of Price Efficiency as Related to Time

Information presented in this chapter shows that there is little opportunity for chance of price gain by producers who hold cotton to sell on the open market. Growers are presently placing their cotton in the loan program or selling at harvest time. Either route offers a greater reward than holding the cotton independent of the loan program. In this respect growers appear to be following the most profitable course of action open to them in time of sale.

Ginners who hold the cotton for several days before disposing of it are risking price fluctuations. Ginners who used the futures and offsetting call transaction were convinced that they were following the safest policy. Other ginners were not positive that they were taking advantage of their alternatives. This situation could be clarified with further research.

CHAPTER V

EDUCATIONAL APPROACHES TO AID ADJUSTMENT IN THE HENDERSON COUNTY MARKET

It has been the purpose of the previous chapters to investigate efficiency of the Henderson County cotton market at the producer and ginner level. Pricing efficiency as related to product form and timing of sales, along with operational efficiency of gins, were major considerations in that phase of the investigation. These are all component parts of studies to be needed in marketing program work. Individually they would be acceptable as a basis for beginning marketing work with the producer or ginner groups, but these parts must be fitted into an educational framework in order for maximum use to be made of them.

It is the purpose of this chapter to use some of the data from the previous chapters, combine them with generally available secondary data and develop the direction for an educational program to take in Henderson County.

The underlying hypothesis of this chapter is that an approach to educational work in marketing can be made systematic and meaningful. This requires that attention be directed toward analysis of marketing problems of the cotton industry and the techniques needed to present the findings to producers and ginners. The previous chapters have pointed out places where efficiency might be improved. At this point some of the data from previous chapters will be combined with additional data to establish how the educational program could be organized.

It is within the program projection framework that Tennessee

Extension Marketing Programs should find a major outlet.[1] Specifically, the program projection concept deals with the selection of problem areas by the local farm and farm-related business people with such selection based jointly on local opinion and through examination of facts pertaining to the situation. County Extension workers are given the responsibility of developing with local groups a program designed to solve some of their recognized problems. Direction is given to the program by a local group of leaders. These leaders are selected by their interest group or are recognized for their influence on farm programs in the county. They assume leadership in selecting problems, assembling information, deciding a course of action and some methods of procedure. Program development is jointly in the hands of local steering committees and the extension leadership in the county.[2] The attack on the problem then becomes of joint concern when several groups are involved in problem selection and solution. Finite objectives or goals are established and the educational program is launched to motivate people to make desirable adjustments.

Adjustments to be made must be realistic and capable of showing a net increase in benefits to individuals and to the county as a whole. This is in essence the adoption of a proposition that the results of the proposed change must exceed the results now experienced. The primary method of measurement must be in economic terms, though the social result is a definite consideration. In the process of county program development

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[1]See Chapter I, p. 4.

[2]This does not preclude programs based on the district or statewide approach where the program need not be so sensitive to local attitudes.

it is assumed that primary concern must be with the economic aspects of the change. These programs must be concerned with efficiency goals and how they may be implemented through group action. Such an organized approach has not been attempted for marketing since few county extension staffs feel confident in dealing with problems of marketing firms. Local leaders have been slow to suggest programs in marketing because results are often difficult to measure.

Measurement and evaluation thus become an important part of the marketing program. There are few standards used in measuring marketing results. However, it is not difficult to measure a practice against a recommended standard or to compare a county statistic with that of the whole market or against state averages. The same is true with performance of individual cotton ginning firms in cost analysis and in their marketing practices. This system requires the establishment of standards or goals on which to base comparisons. The model gin cost data developed in Chapter II provides a long-range objective. It does not provide an adequate model against which to measure performances of gins as presently organized. Technology of the model is somewhat more advanced than in the older gins. Many of the older gins have a very low depreciated value with resulting low annual depreciation and interest charges. For these reasons other standards based on the actual costs are desirable in educational work at this stage.

Program planning requires the adoption of basic assumptions about the cotton industry. Adjustment in the assumptions and consequently in the program will be made periodically as conditions change. The following

assumptions are appropriate as a basis for the present Henderson County program development.

1. Numerous government programs affecting cotton have developed over the years. These programs will continue in the short run essentially as they now exist. Major activities of market news, cotton classing, price supports in some form, acreage controls and acreage allocation to states will remain essentially the same.
2. Technology will continue to push adjustments toward more mechanization in production and harvest. This will require greater investment in cotton ginning equipment by the individual gin, and greater gin capacity will be one result.
3. Fiber testing will increase as a means of quality determination and such tests will be made on individual bales of cotton at the ginner level and at other concentration points.

Adjustment by Producers

The actual program will involve essentially two groups: producers and ginners. Actions by one group will likely affect the other but the educational program must be tailored to the particular audience that will make the change. Therefore, educational considerations for both segments of the market are appropriate.

It was indicated earlier that production of a commodity is usually considered sufficient evidence that it has a comparative advantage or

least comparative disadvantage in the community where grown. This is not a sufficient basis for program planning. Two steps are necessary in setting out the commodity situation--the history of past action and some indication of present opportunity with the crop.

Since 1934, except for war year interruptions, cotton production has been allotted to individual growers. Table XVI shows the number of acres and production of cotton in Tennessee and Henderson County by census years since that time. Henderson County produced 2.9 per cent of the Tennessee cotton in 1934 and increased this to 3.9 per cent in 1954.

TABLE XVI

ACRES AND PRODUCTION OF COTTON IN HENDERSON COUNTY AND TENNESSEE, CENSUS YEARS 1934-1954[a]

	Henderson County			Tennessee		
Year	Acres (000)	Bales	Acres as Per Cent of State Total	Acres	Bales	Acres as Per Cent of U. S. Total
1934	25.7	12.9	2.94	758.5	397.5	2.82
1939	20.2	12.2	2.99	676.8	436.1	2.97
1944	22.6	18.4	4.19	655.2	541.4	3.36
1949	31.0	15.3	5.04	887.9	616.7	3.26
1954	19.7	15.5	3.90	633.9	505.5	3.36

[a]Source: U. S. Bureau of Census, United States Census of Agriculture, 1934-54 (Washington: Government Printing Office).

During this time Tennessee cotton production changed from 2.8 per cent of the U. S. total to 3.4 per cent. Henderson County experienced greater growth than the state during this period, which indicates its willingness

to devote resources to cotton.

The relation of cotton returns to returns from competing enterprises is of importance to the county planning group. This applies in terms of survival of cotton as an income source and in maintaining its relative share of the state production. The cost of cotton production in Henderson County under high management conditions on good soil is about eighteen cents per pound. Costs are similar in other parts of the same type-of-farming area.[3] Costs in the concentrated Delta section amount to about sixteen cents per pound.

Comparative returns for cotton, corn and soybeans are shown in Table XVII. While labor is plentiful under present conditions, land devoted to cotton is controlled. Cotton will produce the highest acre income and provide the greatest labor market now. Changes can be expected over the long run due to labor mobility.

TABLE XVII

RETURNS FROM COTTON, CORN AND SOYBEANS IN TYPE-OF-FARMING AREA, 1955[a]

Crop	Per Acre Returns (above costs including labor)	Hourly Labor Returns
	$	$
Cotton[b]	64.00	1.30
Corn[c]	20.50	1.64
Soybeans[d]	18.50	4.20

[a]Yields derived from three-year average.

[b]Cotton yield of 500 pounds of lint with market price of 30 cents per pound.

[c]Corn yield of 55 bushel with a farm value of $1.10.

[d]Soybeans yield of 25 bushel with a farm value of $2.00.

[3]Data taken from budget used in farm management planning schools.

After establishing history of production and present profitability of the enterprise, it is possible to proceed in pulling together the framework.

What, When and Where to Sell

A sense of direction based on fact must be achieved by the planning committee. If producer practices or the status of producer actions can be assessed within the framework of what to sell, when to sell and where to sell, they must be measurable, actually or relatively.

Practices concerning "What to Sell" are presented in Table XVIII, which was drawn up from data in Chapter III, from Table XVII, and from secondary sources. The Henderson County producer action is measured against the statewide data. Considerable difference exists between the two for variety and varietal purity. Difference alone is insufficient as the basis for action but it does suggest investigation. Such differences may be explored with Production Specialists who can justify or challenge the differences.

Data in Chapter III showed that the market value of Henderson County cotton was lowered several thousand dollars by the use of improper or mixed varieties. Staple Index and Lint Turnout suggest other points where losses may occur in the county and where changes by producers might be profitable. This suggests that other factors related to product form not explored here should be included in an overall examination.

It is accepted that only the producer can make the decision of When To Sell. However, the producer's decision is important to the

TABLE XVIII

COMPARISON OF FACTORS ASSOCIATED WITH VALUE OF COTTON CROP IN HENDERSON COUNTY AND TENNESSEE, 1957

Influenced by	Measured by	Status	
		Henderson County	Tennessee
Variety	Per Cent Use of Recommended Varieties	77	99
Varietal Purity	Per Cent of Farmers Following Recommendation	10	NA
Grade Index	Per Cent	94.05	93.10
Staple Index	32nd inch	33.0	33.5
Lint Turnout	Per Cent	NA	NA

planning group in checking performance against other possible avenues of action. Table XIX sets out the price information needed by the producer to make the best selling decisions. Ability to preduct price changes along with current price information would be needed to ascertain the most profitable route.

TABLE XIX

PRICE INFORMATION NEEDED TO DETERMINE TIME OF SALE, 1957

Availability of Information in	Data Needed for Decision Making				
	Price at Harvest	Weekly Price Variation	Seasonal Price Variation	Cyclical Price Variation	Carrying Cost
Henderson County	a	*	*	*	*
Tennessee	a	*	*	*	*

[a]Available to all segments of the industry.

*Data not generally available to public.

Availability of the data alone is not sufficient to guide action of producers. Interpretation and training in its use should perhaps be a function of the planning group also.

On the local level, it is difficult to counsel with producers on Where To Sell. This can become a part of the training program when it concerns the types of market outlets available. The choice of selling places must be made by the individual, but the actual sale should be preceded by price comparison at different markets. Table XX compares the producer status in Henderson County and the State.

TABLE XX

FACTORS RELATED TO "WHERE TO SELL" AT THE PRODUCER LEVEL, 1957

Producer Action and Status	Locality	Available Markets			
		Ginner	Gov't Loan	Broker	Mills
Per Cent of Growers Checking Price Before Selling	Henderson Co.	*	*	*	*
	Tennessee	-	-	-	-
Per Cent of Producers Having Access to Prices	Henderson Co.	100	100	100	-
	Tennessee	100	100	100	-
Per Cent of Crop Sold to	Henderson Co.	47	53		-
	Tennessee	78	13	9	-

*Reference in Chapter II cites 61 per cent of the growers checking prices on one market only before selling.

-No data.

Availability is not always associated closely with use. Producer unwillingness to exercise the opportunity to shop for the best price is considered a problem within the province of the planning group.

Cotton Ginner Program Adjustments

Cotton ginning firms in Tennessee are, for the most part, small single-unit enterprises. They are locally oriented and deeply involved in the web of local business. They often serve as assembler, buyer, processor, distributor, and source of market news for farmers in the

vicinity. They have played a vital role in the survival of producing areas and will continue in this capacity as long as they themselves survive in their business.

The casual observer can see such conditions as over-investment in various inputs, underemployment of other inputs, and many combinations of maladjustment in average firm operations. The firm management may be oblivious to these conditions or may recognize them, yet lack the ability to institute change. Semi-skilled management without special staff assistance afforded by larger firms has difficulty in making adjustment to changing economic conditions. In a highly competitive industry such as cotton ginning, the gin management has many adjustments to make in technology and in resource use. The problem of increasing managerial understanding and improving the economic performance of the local cotton gin is important to ginners, producers and the community at large.[4]

The first objective in working with marketing firms must be to assist them in making economic adjustment. Assistance can be best based on knowledge of their economic condition as an industry and as individuals and then provide a standard against which they may be measured. In Chapter II costs and returns of the individual gins were investigated. Reference will be made to these costs and the industry status in considering the ginner program.

Active cotton ginner educational programs have been of two kinds

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[4]Break-even analysis is the primary approach used later in this chapter to acquaint ginners with their cost situation, and to demonstrate cost analysis. Other data and other business analysis techniques are required by management in planning, organizing, directing and controlling the enterprise over the long run.

in the past. The first was product improvement through variety change. This program was sponsored by leaders in agronomic production. The second program, currently underway, deals with engineering efficiency. It stresses the use of equipment adapted to the ginner situation and efficient machine operation, with special emphasis on cotton quality maintenance. The important area of intra-firm analysis has not been adopted as a program, yet it is in this area that the ginner problem is centered. The nature of this problem parallels that in other industries where change has been slow and technological developments pertaining to the industry have been rapid.

Gin numbers have decreased constantly statewide since 1900. Significant decreases have also continued since cotton acreage controls were begun in the 1930's. (See Table XXI.) Henderson County has not made the same rate of adjustment downward but this is related to the county location.[5] Other fringe area counties have shown similar decline where acreage has been maintained.

Gin capacity has not declined with the decline in gin numbers. Technological changes and the additions of more gin stands to existing plants have increased the rated plants capacity in both Henderson County and the state since 1935. Cotton ginning costs have risen sharply during the past two decades as ascertained from annual reports by 56 gins. Total

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[5]Many fringe counties have experienced a large actual and relative decline in cotton acreage during the past three decades. Henderson County, while now on the fringe areas, has increased its production during this same period.

TABLE XXI

GIN CAPACITY AND UTILIZATION, HENDERSON COUNTY AND TENNESSEE, 1957, WITH COMPARISONS

Factors	Henderson County	Tennessee
Number of Active Gins		
1935	20	438
1957	16	323
Hourly Gin Capacity (bales)		
1935	54	1,380
1957	60	1,453
Average No. Bales Per Gin		
1935	450	720
1957	842	1,260
Days Needed to Gin Crop at 3/4 Capacity, 1957	33.0	27.5
Days Used to Gin Crop, 1957	90	90
Per Cent of Capacity Used:[a]		
September	6.65	26.72
October	96.48	70.19
November	26.72	34.40
December	8.69	21.47

Source: Annual Reports of Cotton Production in the U. S., Bureau of Census.

[a]Assumes 24 operating days monthly.

ginning costs rose from $6.54 per bale in 1941 to $24.59 in 1957[6] (Table XXII). Items of cost contributing most to this increase were depreciation, interest, management and fuel. Adjustments to these costs are occurring in two ways: smaller and more inefficient gins are dropping out at an increasing rate and ginning charges are increasing. Ginning charges have not increased at the same rate as ginning costs but they have been substantial. The average charge by the 56 gins increased from $5.21 per bale to $13.26 since 1941.[7]

It is recognized that comparative analysis of the firms total position can be best made through use of the balance sheet and operating statements. However, comparative analysis of individual cost components will yield data suitable for decision making in cost control. Limited statewide data permit comparison of some Henderson County ginner costs with the state average. Other comparisons between gins within the county permit the individual firm to assess its position in the operating community.

Henderson County cotton gin costs differ widely from the state average (Table XXIII). Little assistance can be gained by the Henderson County ginner through comparison with these data.

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[6]B. D. Raskopf, The Cotton Ginning Industry in Tennessee, Bulletin No. 303, University of Tennessee Agricultural Experiment Station, 1959, p. 56.

[7]Differences between costs of ginning and revenues from ginning indicate a revenue deficit in the ginning enterprise. While this study has not attempted to examine all joint enterprise aspects, the revenues from cottonseed and cotton purchases will supplement revenues from ginning. Some gins are not covering all costs, however, and this explains why the number of gins continues to decline.

TABLE XXII

GINNING COSTS AND CHARGES PER BALE, TENNESSEE, 1941-57[a]

Crop Year	Ginning Charge Per Running Bale	Ginning Cost Per Running Bale	Ginning Charge As Per Cent of Cost
1941	5.21	6.54	80
1942	5.52	6.88	80
1943	5.77	8.74	66
1944	6.07	8.03	76
1945	6.17	10.43	59
1946	7.75	10.69	72
1947	7.77	12.25	63
1948	8.40	11.16	75
1949	8.48	12.20	70
1950	10.02	17.40	58
1951	10.40	15.11	69
1952	10.42	14.15	74
1953	10.91	13.16	83
1954	11.12	16.22	69
1955	11.86	15.27	78
1956	12.04	18.49	65
1957	13.26	24.57	54

[a]Source: B. D. Raskopf, op. cit.

TABLE XXIII

GIN INVESTMENT AND TOTAL GINNING COST, HENDERSON COUNTY AND TENNESSEE, 1957

	Henderson County	Tennessee[a]
Average Gin Investment - $	18,412.00	83,111.00
Average Gin Investment Per Bale - $	21.85	66.38
Ginning Cost Per Bale - $	15.75	24.59

[a]Source: B. D. Raskopf, The Cotton Ginning Industry in Tennessee, Bulletin 303, University of Tennessee Agricultural Experiment Station, 1959, p. 12.

Two approaches may be made to assist cotton ginners in making adjustments based on this study.

1. Establishment of cost ranges for individual items among gins.
2. Development of cost functions for individual items of cost and their use in break-even analysis.

Comparative Analysis

In the first approach a comparative analysis of the individual cost items is made. Costs for the high, low, and average firms are calculated and are made available to the gins for comparison. Individual gin costs may vary considerably from the average, and any such cost item should be subjected to closer examination. While the ginner may not be able to adjust costs of all the items, some costs should yield to better management. In Table XXIV the high, low and average cost of the 16 gins

in Henderson County are shown. These permit the ginner to begin the self-analysis necessary for total cost control.

TABLE XXIV

HIGH, LOW AND AVERAGE OF COST GROUPS, HENDERSON COUNTY GINS, 1957

Cost Items	Cost-Dollars Per Bale		
	High	Low	Average
Management and Office	3.77	.38	1.26
Labor	4.65	.57	3.03
Repair	2.04	.16	1.00
Power and Fuel	3.43	.72	1.40
Depreciation	8.68	.49	3.16
Taxes	1.23	.07	.16
Insurance	2.99	.27	.97
Miscellaneous	2.08	.25	1.01

Break-even Analysis

Break-even analysis is a method of projecting cost and revenue of a firm as related to output. Adaptations of the basic application may be made which will relate costs to sales or to other bases of output. When cost and revenue functions have been empirically determined break-even analysis is useful in bringing them together to permit managerial planning. By varying the assumptions made about cost and revenue or by varying the specific elements in cost and revenue, a considerable amount of flexibility may be incorporated into this technique.

Break-even analysis has been used for a long time in business as a tool in managerial planning. Its characteristics have permitted it to be used in the areas of sales forecasting, profit control, expense adjustments, and other chores of management. It has the obvious weakness of requiring careful estimates of cost functions. Once these estimates are calculated they are considered static over the useful range of the data. Any miscalculation in the cost function directly affects the profit, since profits are residuals. However, such miscalculations may arise when other techniques are used.

Several problems of break-even analysis are: (a) need for careful determination of the cost function, (b) a complete understanding of the revenue function and the assumption that it is static over the period of analysis, and (c) recognition that the dynamic forces at work may change some input costs or the revenue function within the planning period. These problems do not invalidate the use of break-even analysis but they do point out the dangers in over-simplification.

The ultimate purpose of break-even analysis is to project cost and revenue over a relevant production range and determine the point at which they are equal. Cost and revenue may not become equal within the production range and in that case it is also important to know the amount by which they fail to become equal.

Approaches to Break-even Analysis

Three approaches may be made to break-even analysis. Each has its own merits and weaknesses and each may be used effectively under certain conditions. These three approaches are:

1. Graphic break-even analysis
2. Mathematical break-even analysis
3. Tabular break-even analysis

Graphic Break-even Analysis

Graphic break-even analysis is a visual device that permits the gin operator to establish the cost and returns relationships over a range of output. By using different graphs the operator can assume different cost or return relationships and then project the results by drawing straight lines. The graphical presentation is widely used in business analysis and while not in use with cotton ginning firms it is readily adaptable to their needs. In its simplest form, cost and revenue are measured on the Y axis and volume on the X axis. Since total revenue and variable costs are assumed to be proportional to the firm's output, a diagram can be used to illustrate break-even application.

In Figure 5 the plant output is measured along OX. Fixed production costs are represented by OB and the line BL. The sum of the variable costs at different levels of output are represented by line BK. Income or total revenue is represented by OY. A perpendicular dropped from point M, intersection of BK, and OJ, will intersect the base line OX at the break-even volume N. At this volume those costs included in variable and fixed expenses will equal total revenue. As additional bales are ginned the projected profit can be measured as $J_1 - K_1$.

It has been discussed that accounting records are not readily divided into fixed and variable costs. In order to use the break-even

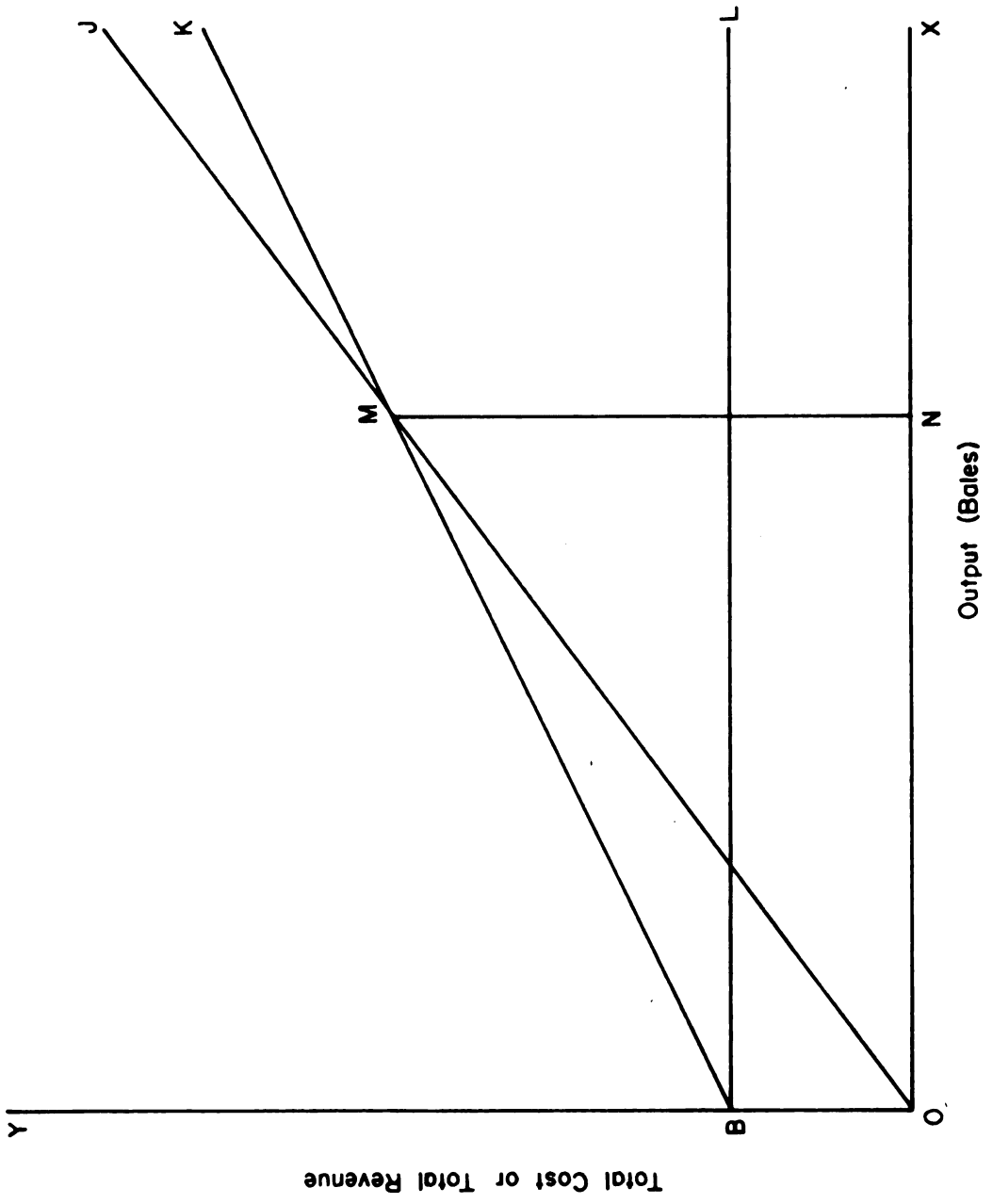

Figure 5. Basic break-even chart.

chart some approximations and adaptations to these categories must be made. The cotton ginner can readily declare the costs of taxes, interest, insurance and depreciation as fixed for the production period. In some instances other costs may be separated as fixed but these four include most fixed costs. These four costs constitute fixed costs for cotton gin No. 15 and are plotted as such in Figure 6.

The estimating equation for the 16 cotton gins derived from the 6 variable costs was Y = $775 + $9.79 per bale. The constant factor is plotted normally as fixed costs but the fixed costs have already been derived and plotted. This raises the question of the nature of the constant factor and how it can be handled in break-even analysis.

Fixed Cost and the Residual Cost

Fixed costs have already been defined as those costs which are constant for a production period and do not change with volume changes.

The five cost groups of management, labor, power, miscellaneous and repair have been considered as variable costs. When combined they yield the function Y = $775 + $9.79 per bale ginned. The constant factor $775 in the linear estimating equation is defined as the point of origin on the Y axis for the regression line bx. It does not meet the definition of fixed costs since it cannot be designated as constant for a production period with 0 production or 0 + X production.

This residual must be handled as that part of variable cost which is incurred in starting to gin the first bale of cotton. This may be explained by using one variable cost and power. When the decision is made

to begin production the electricity must be turned on. This may involve a minimum charge for the season or a charge for connecting the meter. In the case of labor, in order to start the machinery the workers must be selected and put on the payroll. This act of beginning production involves a minimum production charge that is variable, since it is incurred only when production has begun or is anticipated. In this sense then, the Residual A must be handled as a fixed cost though it is not a fixed cost in the usual sense. The residual cost may be designated on a diagram as occurring between zero production and zero plus 1 unit (see dotted line, Figure 6). Fixed costs for No. 15 were established as amount $6138. The residual is represented by the amount of $775. From the point of origin the regression line is drawn to the specification of $9.79X.

To the cotton ginner, a separation of the cost into two groups can be explained simply by defining the first as constant costs and the residual as costs of starting the gin plant. These cost separations are not made in the gin records but are understood by the ginners.

Application of Graphic Break-even Analysis

Gin No. 15 ginned 1,302 bales. Fixed costs (interest, taxes, insurance and depreciation) amounted to $6138. These are plotted in Figure 6. By combining the linear estimating equations for the remaining variable cost items derived in Chapter II, the total linear equation is:

Total Cost = $6138 + $775 + $9.79 (1302) = $19,659.58.

This same gin estimated revenue of $18.25 per bale or a total revenue of $23,761.50. By plotting in the revenue line OJ it may be seen that the break-even point is in the neighborhood of 800 bales. This

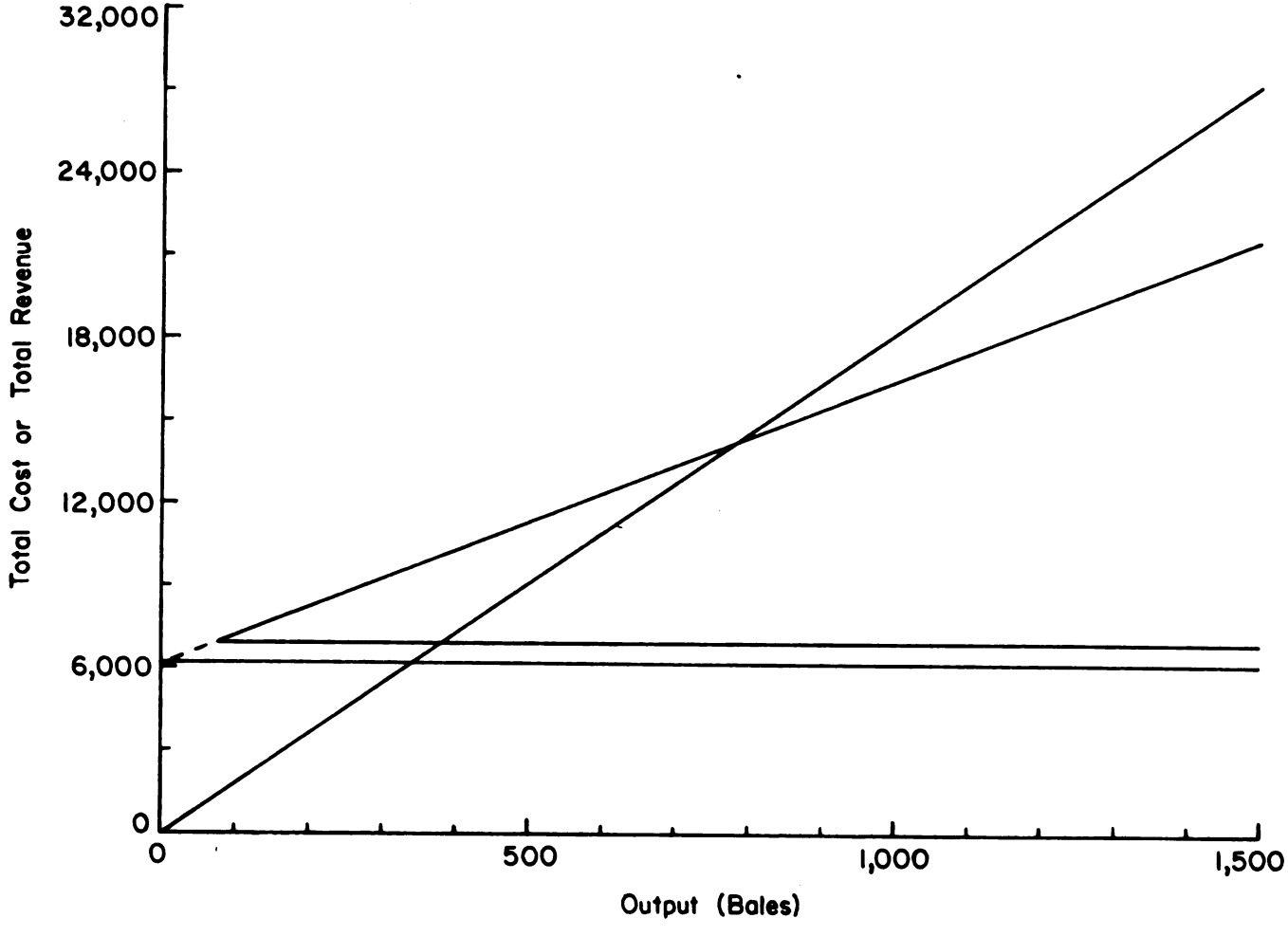

Figure 6. Break-even diagram for gin no. 15.

provides a profit of $4,101.92 at the actual volume of 1,302 bales.

In response to a specific question the gin owner reported that 500 bales would be considered the gin's break-even volume. At a 500-bale volume the total income would be $9,125.00. Total cost at this volume was $6,138 + $775 + $9.79 (500) or $11,808, producing a net deficit of $2,683.00. At the ginner's estimate of break-even volume variable costs would be covered but not all the fixed costs.

Mathematical Break-even Analysis

The break-even chart is adequate to answer some questions without difficulty. An approximation may be reached by preparing a diagram and locating the intersection of the total cost and total revenue lines. This requires a chart for each anticipated situation, or a separate line for each change. Several assumed variations in costs or revenues would make this approach laborious.

A more simple approach can be devised from the basic algebraic formulas which will provide the solution to a given set of assumptions.

Mathematical break-even analysis assumes that the gin income and variable costs are proportional to volume of cotton ginned. This assumption permits a mathematical description of the relationships which may be expressed very simply in mathematical formulas. After calculating the break-even point a diagram can be prepared for use in further planning.

In Figure 5 let:

N = No. bales ginned

R = Revenue per bale (slope of OJ)

I = RN, annual income from gin (I = RN is the equation of line OJ)

F = Fixed cost in dollars for the planning period (OB and BL)

V = Variable cost per bale (V = slope of BK)

C = Sum of fixed and variable cost of N units of product, F + VN (C = F + VN is the equation of line BK)

P = Annual profit in dollars for the operating period (P = I - C)

M = Break-even point (at this point P = 0)

Q = Output of gin (in bales)

Income will be equal to costs at the point of intersection of OJ and BK. At this point I = C and RN = F + VN. Solving for N

$$N = \frac{F}{R-V}$$

Thus the X axis is equal to $\frac{F}{R-V}$. If $\frac{F}{R-V}$ is substituted for N in I = RN or C = F + VN, the Y axis of the break-even point may be found. The value of the Y axis in terms of dollars of income or cost will be

$$I = R\,\frac{F}{R-V} \text{ and } C = F + \frac{VF}{R-V}$$

These basic equations can be used to determine the value of any single unknown in the break-even analysis.[8]

For purposes of work with the cotton ginner they may be set up in simple terms and require only simple substitution.

To illustrate, assume the following values for a situation:

Fixed cost = $6000

Predictable unit variable cost = $10.00

Predictable volume = 1200 bales

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[8]H. G. Thuesen, Engineering Economy, Prentice Hall, Inc., 1950, p. 415.

Find per bale revenue needed to break-even

$$R = V + \frac{F}{N}$$

$$R = 10 + \frac{6000}{1200} = \$15.00$$

The revenue needed to break-even under the given conditions is $15.00 per bale.

Flexibility of Mathematical Break-even Analysis

There are numerous different assumptions the ginner can make about revenue and costs in the operation period ahead. These, however, may be generally handled under three different situations:

Situation A

1. Known fixed costs
2. Predictable variable costs
3. Predictable volume
4. What revenue is required to break even?

This situation is the one most generally found. It has been illustrated in the example on the previous page.

Situation B

1. Known fixed costs
2. Preductable variable costs
3. Predictable unit revenue from all sources
4. What volume is required to break even?

Total fixed costs = $6,000.00

Unit variable cost = $10.00

Unit revenue = $15.00

Break even volume = $N = \frac{F}{R-V}$

$N = \frac{6,000}{15-10}$

N = 1,200 bales

This case is found among the smallest volume gins that do little cotton buying. The sources of revenue and their predicted unit values are known.

Situation C

1. Predictable variable costs
2. Predictable unit revenue from all sources
3. Predictable volume
4. How high can fixed costs be raised and still break-even?

   Unit variable cost = $10.00

   Unit revenue = $15.00

   Volume = 1,500 bales

   Fixed cost at break-even = F = N (R - V) = 1,500 (15-10) = $7500.

Thus, assuming a volume increase to 1,500 bales, fixed costs could be raised from $6,000 to $7,500 and still maintain a break-even position. This situation confronts most of the ginners when the problem of modernizing the machinery and gin building is considered.

The price of variable inputs seldom varies to any marked degree during a single operation period. If such variation did take place it could be handled by estimating its influence on unit variable costs and comparing this value with the standard variable cost developed earlier in

this chapter. The permissible unit variable cost at break-even is determined through the use of the following form of the equation:

$$V = R - \frac{F}{N}$$

Tabular Break-even Analysis

Tabular break-even analysis requires the preparation of tables based upon known or assumed values of the independent variables. The value of a single dependent variable may be determined by finding the intersection of the pertinent column and row. Table XXV illustrates this technique. Variable cost is assumed to be constant ($10) over the production range. Fixed costs and the number of bales ginned are permitted to vary.

To illustrate, assume that the gin has a fixed cost of $6,000 and anticipates a volume of 1,000 bales, how is the per bale break-even revenue determined? Locate the intersection of the relevant volume column and the fixed cost line. The amount $16 is the revenue needed per bale to break-even.

A separate table would be required for each change in variable cost. This would not be unwieldy assuming few changes in this cost. If the variable costs were calculated annually for a group of gins only one table would be required. A particular problem is posed by gradations between the fixed cost values and between the bales ginned. To establish all possible break-even values at single bale intervals and for $100 intervals in fixed costs would require a very large number of tables which would complicate the use of this technique.

TABLE XXV

REVENUES NEEDED PER BALE TO BREAK-EVEN AT DIFFERENT VOLUMES AND DIFFERENT LEVELS OF FIXED WITH CONSTANT UNIT VARIABLE COSTS

Variable Cost Per Bale	Total Fixed Cost	Number of Bales Ginned											
		100	200	300	400	500	600	700	800	900	1000	1100	1200
		Revenue Needed Per Bale to Break-even											
10.00	500	15.00	12.50	11.67	11.25	11.00	10.83	10.71	10.62	10.55	10.50	10.46	10.42
10.00	1000	20.00	15.00	13.33	12.50	12.00	11.67	11.43	11.22	11.11	11.00	10.91	10.83
10.00	1500	25.00	17.50	15.00	13.75	13.00	12.50	12.14	11.87	11.66	11.50	11.36	11.25
10.00	2000	30.00	20.00	16.66	15.00	14.00	13.33	12.86	12.50	12.22	12.00	11.81	11.66
10.00	2500	35.00	22.50	18.33	16.25	15.00	14.16	13.57	13.12	12.78	12.50	12.26	12.08
10.00	3000	40.00	25.00	20.00	17.50	16.00	15.00	14.18	13.75	13.33	12.00	12.71	12.50
10.00	3500	45.00	27.50	21.66	18.75	17.00	15.83	15.00	14.38	13.89	13.50	13.16	12.92
10.00	4000	50.00	30.00	23.33	20.00	18.00	16.66	15.72	15.00	14.44	14.00	13.61	13.33
10.00	4500	55.00	32.50	24.00	21.25	19.00	17.50	16.43	15.63	15.00	14.50	14.06	13.75
10.00	5000	60.00	35.00	25.66	22.50	20.00	18.33	17.15	16.25	15.56	15.00	14.51	14.16
10.00	5500	65.00	37.50	28.33	23.75	21.00	19.16	17.86	16.88	16.11	15.50	15.00	14.58
10.00	6000	70.00	40.00	30.00	25.00	22.00	20.00	18.57	17.50	16.66	16.00	15.45	15.00
10.00	6500	75.00	42.50	31.66	26.25	23.00	20.83	19.29	18.12	17.22	16.50	15.91	15.42

The tabular approach provides the easiest system of determining the break-even revenue for a single set of assumptions. It is inflexible and does not meet the requirements of a good teaching device.

Summary

In this chapter it has been established that cotton production is one of the more profitable enterprises for Henderson County. This fact permits the assumption that cotton will continue as a major income source. From this assumption the planning committee may proceed in its efforts to increase efficiency in the system. A measure of efficiency at the producer level may be set up in the framework of what, when and where to sell. Producer actions concerning the product form may be measured against the most profitable form recommended, in this instance DPL cotton grown from certified seed. The actual time of sale may be compared with the index of seasonal variation to measure grower actions against the seasonal price pattern. The availability of information on which to make decisions is essential to the program and educational assistance in using the data may be required also. Producer actions related to what to sell and when to sell at the county level may be compared to the state or area averages. This permits a measure of comparison but cannot be called a measure of efficiency.

The decision of where to sell can be made only by the producer but the state of producer knowledge about market outlets and the producer's use of present opportunity are of concern to the planning group. Efficiency of pricing will be influenced by the producers' actions, and their

actions when measured against opportunity may reveal the desirability of change from the present pattern.

Work with the ginner group can be most effectively approached through cost and returns analysis. The cost structure of the model gin serves as a guide to cost adjustment. Immediate adjustments may be influenced through comparison of the individual gins cost with cost averages for the county. In this sense the county average is one standard of measurement.

Break-even analysis can be adapted for use with the gins in cost control. Graphic and tabular break-even analyses may be used in certain instances as teaching devices. The goal, however, must be to give the ginner a flexible tool for self analysis. For this purpose the mathematical approach to break-even analysis is desired. Cost functions derived from the county or industry will make this technique easier to use.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Extension educational marketing programs are in a process of change. Past Tennessee programs have been primarily concerned with farmer marketing problems. The method of attack on these problems has largely been through the development of farmer cooperatives, while limited work has been done with marketing firms in an engineering sense. Expanding the extension marketing program requires a framework or procedure within which county programs can develop and grow. With the county as the predominant boundary within which marketing programs will be centered, the county marketing program becomes of primary importance.

Two phases are required in the program expansion; the assembly of data capable of showing gains for the county, and the framework within which such data can be gathered and disseminated. Marketing practice data for producers and marketing firms and a cost and returns analysis provide the component data to be used in the program. Efficiency aspects of the market system may be handled under the categories of technical and pricing efficiency.

One approach to measuring efficiency of the present ginning system is through the construction of a model gin. The gin designed for this area is basically tailored around two tower driers and four gin stands. Assuming constant operation for 15 weeks and a volume of 2880 bales, the average total cost per bale amounts to $12.51. The average costs incurred by the Henderson County gins in 1957 amounted to $13.10. The newer equip-

ment used by the model gin has the additional effect of raising the lint grade one-fourth to one-half full grade if foreign matter content is high. Bale value may be increased about five dollars in this instance by the proper use of ginning equipment.

Fixed costs were $7.26 per bale for the model gin compared to $5.40 for the average Henderson County gin. An equal increase in the volume of bales ginned by the model and the average existing gin would bring about a greater decline in total unit cost for the model gin. This situation provides one possible method for decreasing the cost of cotton ginning in Henderson County and other areas.

Cotton gin revenues were derived from the ginning fee, bagging and tie sales, cottonseed and cotton marketing margins. Ginning fees were established by specified charges per bale or a fixed charge per hundred weight of seed cotton. The cottonseed margin amounted to two dollars per bale. The combined bagging and tie and cottonseed margins amounted to about eleven dollars per bale. Revenue from these two sources equalled $13.00 for the average gin. In order to recover the average ginning cost of $15.75, cotton margins, or revenue from other sources in the amount of $2.75 per bale were necessary. Some ginners did not purchase cotton and therefore did not cover their costs from cotton ginning or cotton buying. This deficit was covered by income from related services or represents coverage of variable costs and only partial coverage of fixed costs. Additional research would be needed to clarify the nature of this situation.

Form efficiency in the Henderson County cotton market can be improved

through changes by cotton producers. In selecting variety the cotton producer pre-determines many market characteristics of the crop, primarily staple length and associated staple characteristics. In 1957 only 68 per cent of the producers followed the practice of using a variety proved to be best adapted to growers' needs in the county. Sixteen per cent planted a variety that yields a short staple and whose market value is lower. Fourteen per cent of the producers did not know the variety planted, which indicates lack of concern in variety selection. A value loss of $15,000 was attributed to the producers planting the variety not recommended--Hibred.

The practice of seed renewal each year is recommended and producers are urged to buy certified seed. Experimental results from other studies show that lint cotton turnout may decline as much as eleven per cent from seed three years away from the breeder. Only 10 per cent of the producers used certified seed. Twenty-six per cent used seed two years removed from foundation stocks and the remainder used three-year seed or older. This practice could not be fully evaluated in terms of monetary loss to the county.

The producer selling operation offers further opportunity for improving pricing efficiency. Ginners bought 53 per cent of the cotton sold by producers. Only one per cent of the cotton bought by ginners was bought on official grades. Eighty-four per cent was bought on ginner estimates of grades and 15 per cent was bought on a hog-round or one-price basis. Predominantly, the buying system is inequitable unless trading is done on the basis of official grades. Individuals may get an

average price for their cotton but do not get its actual value. The usual daily grade range at gins amounted to three grades. This was equivalent to 400-800 points based on Premiums and Discounts adopted by the Government Loan Program. Cotton staple variations amounted to about three-thirty seconds inch daily at the gins. This variation is equivalent to about 125 points per bale. Ginners who paid only one price daily were averaging out differences of twenty-five to forty dollars per bale. This system does not reward the grower who planted the recommended varieties and followed quality-maintenance practices.

Individual cotton ginner purchases ranged from none to 1,250 bales. Sales were made daily, weekly and as truck loads accumulated. Eight ginners reported carrying their purchases in the open market and eight reported immediate sales combined with open market and the sale of futures. Instrument testing of cotton fiber was not used by ginners in making sales.

Examination of the time aspects of pricing efficiency in the Henderson County market revealed that cotton sales were made by producers throughout the ginning season and the rate of sales closely paralleled the rate at which the crop was ginned. This indicated little delay between ginning and the time of sale. As a selling practice this appeared to be a profitable course to follow since the seasonal price rise did not begin until after harvest was complete.

Average or monthly cotton prices received by farmers cannot be used to measure the true price variation since grade differences are not included. They are not suitable to indicate when farmers should sell to get the highest prices. Price variation on the Memphis Spot Market is a

better guide to the true variation in prices since it reflects value differences between grades.

The price gain from storing and holding until July when prices were highest would have covered only half of the storage and related costs for this period. Variation from the low month of November to the high month of July amounted to only 4 per cent.

Producers who placed cotton in the Government Loan Program took the non-recourse route. This resulted in higher prices than if they had retained the option to redeem before August the following year. Carrying costs amounted to about $10 per bale, compared to an average prospective gain of $3. Costs of carrying cotton for this period without benefit of the Loan Program amounted to about $11. Adequate daily market information was available for producers to use in deciding when or where to sell. Radio, newspapers, Government Price Reports, cotton brokers and ginners served as sources of price information. (Price predictions were not available as a basis for predicting future value, except in the form of price supports). While this information may have affected the selling decision, 67 per cent of the producers interviewed only one buyer, 26 per cent interviewed two and the remainder interviewed three or more buyers. There was no evidence to indicate that producers were restricted in their choice of selling places through obligation to ginners. In view of this, 94 per cent of the cotton marketings were still made at the cotton ginner's office. This included the producers who signed Government Loan papers which the authorized ginners prepared.

Educational work in cost analysis with cotton ginners requires

the use of terminology which the ginners understand. Average variable costs over the normal operating range of the firm are considered as equivalent to marginal costs at the same volume. Therefore, fixed and variable costs are the two cost concepts needed in this short-run analysis. In later educational work with the firms, long-run costs would need be considered. Cost control must be approached by the individual firm through understanding of the different cost components. For this study cotton gin costs were broken down into nine groups. Fixed costs consisted of depreciation, interest, insurance and taxes. The variable cost items were management and office, labor, repair, power and fuel, and miscellaneous.

Linear estimating equations were derived for the Henderson County gins associating cost items with volume. Correlation between power and volume was the highest at .986 and for management and office it was lowest at .571.

By combining the individual linear regression equations for variable cost items, the following equation is derived:

Variable cost = \$775 + \$9.75 x (bales).

This equation represents an average of the total variable cost functions of the 16 gins within Henderson County.

There was a very wide range in individual cost items from gin to gin, with the greatest in depreciation costs. All of the cost groups are subject to some managerial control and these costs can be influenced over the long run by discretionary management.

Where variable cost coefficients are known and can be assumed constant for a production period, break-even analysis may be used as a

tool in managerial planning. Each of the three break-even devices can contribute to a better understanding of the influence of volume on total cost.

There are recognized dangers in expecting too much from break-even analysis. To use it in business planning requires very careful estimates of the cost coefficients and projection of unit revenue over the anticipated volume. Since profits are a residual, the profit function gets the full impact of miscalculations in either cost or revenue functions. It is impossible to predict accurately in dynamic situations even in the short-run; therefore break-even analysis cannot be used to peer into the future. Used in its proper way it can give a visual picture of the firms operations and may aid management in understanding how volume influences the profit function. The break-even device offers to ginners a new tool to supplement current techniques of business analysis.

Comparative analysis offers to producers and ginners a system of comparing their actions with industry or county averages. The industry or county average may not be the standard which the individual should strive to match since this may be an inefficient level. However, it permits self-appraisal and comparison with others which can be the stimulus to change.

Expanded marketing programs in Tennessee will find a major outlet through the Program Projection method of doing Extension work. Since this program is organized on a county basis, the approach to marketing education must be on a county basis also. This requires a procedure suitable for conducting programs in any county or with any commodity.

It is concluded that the producer portion of this program can be conducted within the framework of what to sell, when to sell and where to sell. The first part of the producer's job is to orient his production to the available market. By producing the product for which the market will pay the most, the producer will maximize his total product value. In order to maximize returns the producer must sell at the right place and at the right time. This involves the decisions that only the producer can make. Carrying costs, delay in payment time and other factors will vary with each producer situation. By keeping the producer aware of the what, when and where to sell aspects in the marketing job, changes should be stimulated to produce the maximum net revenue. This is the goal of the County Planning Committee.

The basis for work with marketing firms will be an economic analysis of their operations. The cost and returns method of analysis is extremely well suited to small firm situations. The description of individual cost components will enable the firm management to approach cost control realistically. The use of break-even analysis by the firm will add a new dimension in planning. Flexibility, precision and visual examination will be possible through use of the graphic, mathematical and tabular break-even devices. Their relative simplicity promise to make the educational job easier for the local extension worker and also easier for the firm management to comprehend.

Finally, this study has given consideration to only some aspects of the Henderson County cotton market. Additional facets of the cotton industry could have been pursued but the cost of procuring these facts was estimated to be excessive in view of the potential gain.

In a broader sense, a study of the total resource use of Henderson County would have yielded information for total county planning. Such a study would have considered alternative uses of the total labor force, capital and other resources. It is recognized that such an approach would have been more meaningful to full economic development of the county. Since the problem at hand concerned agricultural marketing program development, the resources were used in developing the study as presented.

BIBLIOGRAPHY

BIBLIOGRAPHY

Beal, George M., and Joe M. Bohlen. The Diffusion Process. Special Report No. 18. Iowa Agricultural Extension Service, Ames: 1957.

Dean, Joel. Managerial Economics. New York: Prentice-Hall Inc., 1951.

Dummier, Edwin F., and Richard E. Heflehower. Economics with Application to Agriculture. New York: McGraw-Hill Book Company, Inc., 1934.

Earle, Wendell, and Jean Evans. "A Critical Look at Extension," Proceedings of Marketing Section - Association of Southern Agricultural Workers, Little Rock, 1958.

Ezekiel, Mordecai. Methods of Correlation Analysis. New York: John Wiley and Sons, Inc., 1941.

Faught, William H. Cotton Price Relationships in Farmers Local Markets. Southern Cooperative Series, Bulletin No. 51. Agricultural Research Service, Washington: 1957.

Hassler, James B. "Pricing Efficiency in the Manufactured Dairy Products Industry," Hilgardia Vol. 22, No. 8. University of California, Berkeley: 1953.

Lutz, Friedrich, and Vera Lutz. The Theory of Investment of the Firm. Princeton: Princeton University Press, 1951.

Nicholls, William H. Imperfect Competition Within Agricultural Industries, Ames: The Iowa State College Press, 1941.

Rautenstrauch, Walter, and Raymond Villers. The Economics of Industrial Management. New York: Funk and Wagnalls Company, 1957.

Raskopf, B. D. Cotton Marketing Practices of Growers, Ginners and Buyers in Tennessee. University of Tennessee Agricultural Experiment Station. Rural Research Series, Monograph, No. 262, Tennessee: 1959.

_____. Economic Effects of Seed Renewal on Cotton Yield, Turnout and Staple Length. University of Tennessee Agricultural Experiment Station, Bulletin No. 239. Knoxville: 1955.

_____. Factors Affecting Prices in Ginner Markets in Tennessee. University of Tennessee Agricultural Experiment Station, Bulletin No. 251. Knoxville: 1956.

_____. Improvements Needed in Tennessee Cotton Quality and Marketing Practices to Meet Mill Requirements. University of Tennessee, Monograph 259. Knoxville: 1950.

Scitovsky, Tibor. Welfare and Competition. Chicago: Richard D. Irwin Inc., 1951.

Spencer, Milton H., and Louis Siegelman. Managerial Economics - Decision Making and Forward Planning. Chicago: Richard D. Irwin Inc., 1959.

Thompson, F. L. Agricultural Marketing. New York: McGraw-Hill Book Company, Inc., 1951.

Thuesen, H. G. Engineering Economy. New York: Prentice-Hall, Inc., 1950.

Vatter, William J. Managerial Accounting. New York: Prentice-Hall, Inc., 1950.

North Central Regional Publication No. 1. How Farm People Accept New Ideas. Special Report No. 15. Iowa Agricultural Extension Service, Ames: 1955.

U. S. Department of Agriculture, Agricultural Marketing Service, Cotton Division, Charges for Ginning Cotton, Marketing Research Report No. 120, Washington: 1956.

U. S. Department of Agriculture, Commodity Stabilization Service, Commodity Credit Corporation. 1957 Cotton Loan Program, Cotton Bulletin 1, Washington: 1957.

U. S. Department of Agriculture, Agricultural Marketing Service, Cotton Price Statistics, Memphis: 1953-1957.

U. S. Department of Agriculture, Agricultural Marketing Service, Cotton Division. Cotton Varieties Planted 1953-1958. Memphis: 1958.

U. S. Department of Agriculture, Farmer Cooperative Service. Estimating the Weight of Cottonseed by Gins. Service Report 29. Washington: 1957.

U. S. Department of Agriculture, Agricultural Research Service, Ginning Cotton. Farmers Bulletin No. 1748. Washington: 1953.

U. S. Department of Agriculture, Agricultural Extension Service, Report of Administrative Conference on Expanding Marketing Educational Programs. Washington: 1954.

U. S. Department of Agriculture and Association of Land-Grant Colleges and Universities, Joint Committee Report on Extension Programs, Policies and Goals. Washington: 1948.

U. S. Department of Agriculture, Production and Marketing Administration, Cotton Branch, Marketing of Cotton in Producers Local Markets, Washington: Government Printing Office, 1949.

U. S. Department of Agriculture, Agricultural Extension Service, Committee Report of State Director of Extension and Deans of Agriculture 1950. Marketing Challenges the Extension Service. Washington: 1950.

U. S. Department of Agriculture, Agricultural Research Service, Modernizing Cotton Gins. Agricultural Handbook No. 99, 1956.

U. S. Department of Agriculture, Agricultural Extension Service, Report of Administrative Conference on Expanding Marketing Educational Programs. Washington: 1954.

U. S. Department of Agriculture, Agricultural Marketing Service, Statistics on Cotton and Related Data, 1920-1926 and 1957 Supplement, Washington:

U. S. Department of Agriculture, The Cooperative Extension Service Today, 1957 Committee on Organization and Policy, Sub-Committee on Scope and Responsibility. Washington: 1957.

University of Tennessee Agricultural Experiment Station. Variety Performance Trials of Cotton, Station Bulletins. Knoxville: 1935-1957.