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Cost and returns from the burley tobacco enterprise in the central basin of Tennessee

Lewis Blanton Williams Jr.

To the Graduate Council:

I am submitting herewith a thesis written by Lewis Blanton Williams Jr. entitled "Cost and returns from the burley tobacco enterprise in the central basin of Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

John L. Fischer, Major Professor

We have read this thesis and recommend its acceptance:

W. P. Ranney, S. W. Atikins

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

May 18, 1951

To the Graduate Council:

I am submitting to you a thesis written by Lewis Blanton Williams, Jr., entitled "Cost and Returns from the Burley Tobacco Enterprise in the Central Basin of Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

John F. Fischer
Major Professor

We have read this thesis
and recommend its acceptance:

W. P. Ramsey

S. W. Atkins

Accepted for the Council

E. A. Wales
Dean of the Graduate School

COST AND RETURNS FROM THE BURLEY TOBACCO ENTERPRISE IN THE CENTRAL BASIN OF TENNESSEE

A THESIS

Submitted to
The Graduate Council
of
The University of Tennessee
in
Partial Fulfillment of the Requirements
for the degree of
Master of Science

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by

Lewis Blanton Williams, Jr.

June 1951

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Acknowledgment is also due to the farmers interviewed for their cooperation in furnishing data on cost and returns from their burley tobacco enterprise.

L. B. W.

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THE PROBLEM

Studies have been made of the cost and returns of producing burley tobacco in east Tennessee,[1] as well as in the neighboring states of North Carolina, Kentucky, and Virginia. No such study has been made in the Central Basin of Tennessee, although burley tobacco is an important cash crop in the Central Basin. This is a study of the cost and returns of producing burley tobacco in the Central Basin of Tennessee.

Statement of the Problem

Producers of burley tobacco need basic information pertaining to its cost of production to improve their farm organization. This study of the cost and returns from the burley tobacco enterprise will furnish information for one farm enterprise. Combined with studies of other farm enterprises, this study will aid producers in formulating a detailed budget of all requirements anticipated for each of their crops. Such budgeting is essential for sound managerial decisions in farm organization.

Individual producers in the Central Basin will be able to use this study to compare their production and marketing practices with other producers and find methods of improvements. Other farmers will

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[1] Fenske, Leo J. and Allred, C. E., Burley Tobacco Enterprise on Upland Farms Near Douglas Reservoir, Department of Agricultural Economics and Rural Sociology, Agricultural Experiment Station, University of Tennessee, Knoxville, Tennessee, Rural Research Series Monograph 147, March 15, 1943.

be able more closely to figure costs of raising burley tobacco as to the requirements of labor, capital and land, and calculate how such a crop will fit into their own farm programs before actually undertaking it.

Professional agricultural workers such as county agents, Farm Bureau personnel and reporters for farm publications need basic costs of production figures for information to be used in advice to burley tobacco producers. Through studies of this nature, sound information can be obtained and passed on to the agricultural producers.

Agricultural policy makers need the type information provided in this report if a sound policy concerning acreage and marketing quotas is to be formulated. With information on cost and returns from the burley tobacco enterprise available, it will be possible to formulate a better policy concerning tobacco.

Objectives

Objectives of the study were as follows:

(1) To determine the physical inputs and costs of producing burley tobacco, and

(2) To determine the gross and net income from the burley tobacco enterprise, and factors related thereto.

Importance of the Study

The counties of the Central Basin have a total of 25,737 farms with 9,201, or 35.8 percent of the total, reporting production of burley

tobacco in 1944. The value of the tobacco production was $7,756,657.00 or 19.6 percent of the total value of all farm products sold and 61.9 percent of all crops sold. The four counties surveyed, Smith, Williamson, Trousdale, and Maury, had a total of 10,118 farms. Of the 10,118 farms, 63 percent or 6,373 of the total reported growing some burley tobacco.[2] Tobacco amounted to 35.8 percent of the value of all farm products sold and 82.4 percent of all crops sold.

The agricultural worker will be able to combine this study with other farm enterprise studies and by comparison draw up a complete budget for a given farm in the Central Basin of Tennessee, or in areas with similar biological, economic and physical conditions.

Definition of Terms

In this study, a production practice is defined as any operation performed by man starting with the preparation of tobacco plant beds until those plants have completed the growing cycle in the field and are in condition to be cut. A harvesting and marketing practice is defined as any operation performed by man from the time the tobacco is ready to be cut until the tobacco is sold on the market.

As is true of all studies, certain restrictions under which the study was made must be stated so that the recorded data will not be misleading to the reader and therefore misconstrued by him. One of

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[2] United States Department of Commerce, United States Bureau of the Census, United States Census of Agriculture, Volume 1, Part 20, Washington, D. C., 1945.

those misconceptions may lie in the geographical definition of the Central Basin. This definition is included in the description of this area which follows.

Description of the Area

The Central Basin lies near the center of the state, entirely surrounded by the Highland Rim (Figure 1). Roughly elliptical in shape, it is about 60 miles wide and 120 miles long, the longer axis lying northeast and southwest across the state. This is the only physiographic region which does not extend entirely across both the norhtern and southern borders of the state. The surface includes about 5,400 square miles, with an average elevation of about 500 feet. The terrain of the basin is generally rolling, and, in some places, hilly. The hills are often outliers of the rim, or remnants of the Rim limestones overlying the basin.[3]

The Central Basin includes eleven counties lying mostly within that geographical unit. They are: Maury, Giles, Lincoln, Bedford, Marshall, Williamson, Rutherford, Wilson, Davidson, Smith, Trousdale, and Sumner. Of those eleven, only Smith, Williamson, Trousdale, and Maury Counties are important burley tobacco producers. This study was made in those four counties. The Central Basin as referred to in this connection, therefore, includes only those four counties.

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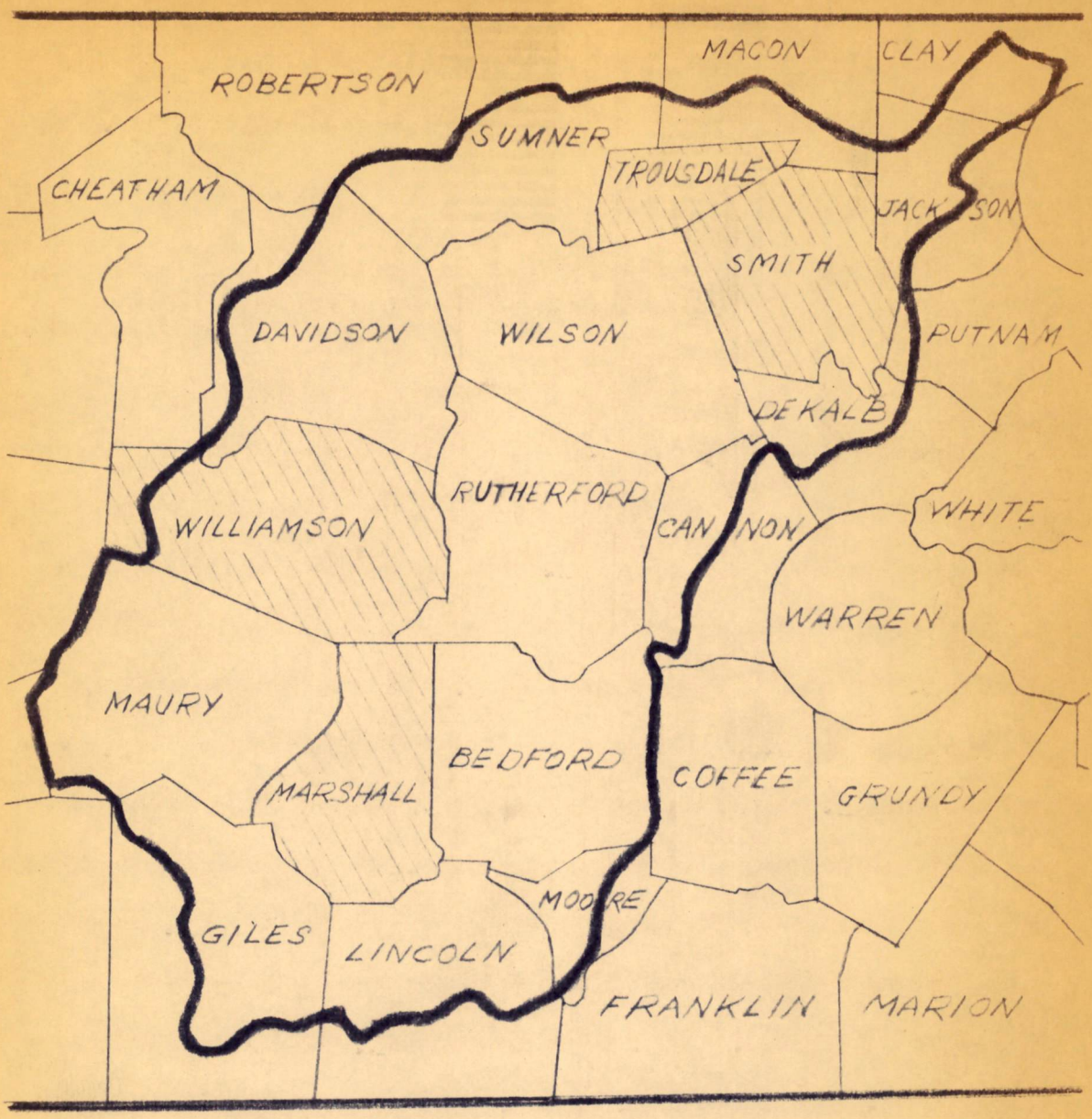
[3]Luebke, B. H., Atkins, S. W., and Allred, C. E., Types of Farming in Tennessee, University of Tennessee Agricultural Experiment Station and United States Bureau of Agricultural Economics, Knoxville, Tennessee, Bulletin 169, 1939.



THE COUNTIES IN WHICH BURLEY TOBACCO STUDY WAS MADE

FIGURE 1. THE CENTRAL BASIN OF THE STATE OF TENNESSEE

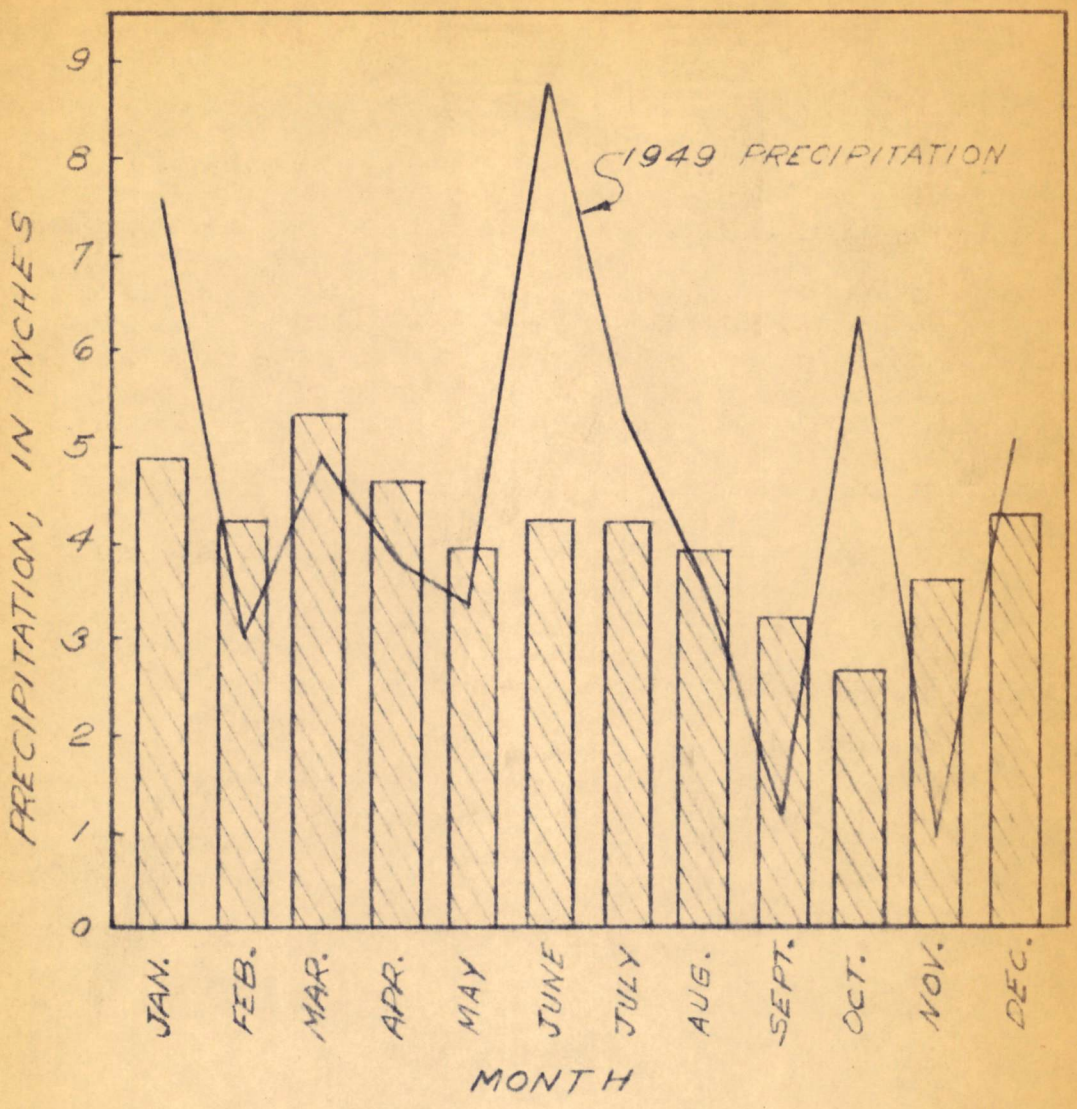
Limitations to This Study

The 1949 burley tobacco crop in the Central Basin of Tennessee was greatly affected by the excessive rainfall in September and October. Because of it, producers had losses in the field and in the barn. This factor decreased marketable yields from the crops, lowered average prices per pound, and ultimately decreased returns to burley tobacco producers. (See Figure 2 which shows the 33-year average precipitation by months for Smith, Maury, and Williamson Counties as compared to the monthly average precipitation for 1949. No climatological data were available for Trousdale County.)

Damages from the rainfall came in September and October when harvesting and curing were underway. The rainy season began in the middle part of September and continued through October with an average of 6.40 inches above the 33-year average (See Table XII, Appendix). The heavy rainfall in September prevented some producers from harvesting all of their tobacco. Continuous heavy rainfall through October prevented proper curing and caused producers to lose some of their tobacco. The unusual amount of rainfall in September and October with the resultant losses brought about conditions making the findings of this study limited insofar as application to years where there is a normal fall season are concerned.

Review of Related Studies

Tobacco as an enterprise in Tennessee has been the subject of considerable study. As a rule, the studies have considered the entire tobacco enterprise and its effects upon the farmers' incomes.



SOURCE: TABLE XII.

FIGURE 2. 1949 AND 33 YEAR AVERAGE PRECIPITATION FOR SMITH, MAURY AND WILLIAMSON COUNTIES, CENTRAL BASIN OF TENNESSEE

The Annual Report on Tobacco Statistics, published by the U. S. Department of Agriculture, gives a break-down of the tobacco enterprise by states. This study lists the acreage for each type of tobacco such as fire-cured, burley, and other types grown in each of the states. In addition, the report lists the yield per acre, the price per pound received on the market, and the total value of the crop. This annual report also provides a listing of the state markets, reporting the total pounds each market received in the past year and the average price paid per pound.

Another publication of importance to individuals studying price trends, markets, and states and national production is the "Tobacco Market Review" published also by the U. S. Department of Agriculture. This report duplicates much of the information presented in the Annual Report, such as the total production by states and prices per pound by markets. In addition, however, the "Tobacco Market Review" includes discussions and maps of the auction markets, warehouse charges and responsibilities, and loan rates of the government on different types of tobacco crops. This information is very essential and useful today with our complex economy. For example, if the price of tobacco is to be maintained by restriction of acreages, or allotments, a close watch over total production will have to be maintained along with the producers' attempts to intensify and continue higher production. The type of information issued by the government publications is best utilized in studies of the abovementioned nature. Actually, it is questionable as to whether the data contained in these publications might not be of

greater value if the results of different aspects of tobacco growing had been listed separately rather than being grouped together into a few listings.

Other studies of the tobacco enterprise pertained only to its cultivation or only to the significance of the role of tobacco as an enterprise.[4] In the studies of tobacco cultivation, the most prominent practices are listed, with recommendations based on the findings. These studies, which emphasize the social and economic evaluation of tobacco as an enterprise, are confronted with the problem of stating its importance in relation to other farm enterprises rather than concentrating on the aspects of tobacco alone. None of these studies on tobacco in Tennessee presents the costs of growing burley tobacco in the Central Basin.

Agriculturists have compiled studies on the costs of producing tobacco in other states, one being a study of burley tobacco in Jefferson County, Indiana.[5] This cost study begins with a statement of the volume of farm business and distribution of man-work units, a statement which provides the reader with a complete picture of the labor supply ordinarily available on a tobacco farm. A list of the labor requirements per acre

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[4]Milton, Roy H., Burley Tobacco Culture, Agricultural Extension Service, University of Tennessee, Knoxville, Tennessee, Bulletin 161, February 1948.

[5]Smith, F. V., Costs, Returns, and Practices in Producing Tobacco in Jefferson County, Indiana, Agricultural Experiment Station, Purdue University, Lafayette, Indiana, Bulletin 519, 1946.

of tobacco along with the individual operations necessary for the production of tobacco then follows. The information is narrowed down to all the types of tobacco grown within the boundaries of Jefferson County, Indiana. A table of costs of individual operations is included, as well as the costs of preparing tobacco for market and marketing. The study is then followed by a summary which enables readers to determine returns from tobacco as well as selection of the most profitable procedures and practices.

Dr. F. L. Underwood made a similar study of cost in the state of Virginia. Instead of including all types of tobacco, his study was limited to flue-cured tobacco. The objectives of the study were to collect and analyze statistical data collected from tobacco farmers and then determine and measure the relative importance of the major differences between farmers' methods of production, harvesting and marketing and their corresponding returns from tobacco as well as overall incomes.[6]

The only study of cost of burley tobacco made in the state of Tennessee was in east Tennessee.[7] This study included the past trends and the present status of the tobacco enterprise in the area affected by the construction of the Douglas Dam. Another part of the report included the position tobacco occupies in the farm organization on

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[6]Underwood, F. L., Flue-Cured Tobacco Farm Management, Virginia Agricultural Experiment Station, Virginia Polytechnic Institute, Blacksburg, Virginia, Technical Bulletin 64, January 1939.

[7]Fenske and Allred, loc. cit.

upland farms in this area. The remaining portion of the study was devoted to a cost analysis of the burley tobacco enterprise. This study breaks down the operations of growing burley into plant-bed, growing, cutting and housing, stripping and marketing, giving the costs of each operation, and labor requirements. Net returns were figured for management and labor on a per acre basis. This study did not give any recommendations as a result of the findings.

Considered as a cost study to be related to cost studies of other farm enterprises, this study is not a new idea. Cost studies already have been made on other farm enterprises, for example, the study performed on the dairy enterprise by members of the University of Tennessee Department of Agriculture Economics. However, this study will be the first ever compiled on burley tobacco in the Central Basin of Tennessee. It will be of value within itself and also will be a supplement to recorded data already in existence on the burley tobacco enterprise.

Sources of Data and Methods of Procedure

The data were obtained by personal interview with 65 farmers in Maury, Williamson, Smith and Trousdale Counties, located in the Central Basin of Tennessee. This primary information was obtained in June and July, 1950, and pertained to the previous year's crop.

Maps of Smith, Williamson, Trousdale, and Maury Counties showing boundaries of civil divisions were obtained from the United States Department of Agriculture. Information was compiled by the United States Department of Agriculture showing districts which produced the

greatest quantity of burley tobacco. The number of records taken in each district depended upon the number of districts in each county in which there were producers of burley in significant quantities. The records were obtained from districts which were stratified by intensity of tobacco production and selected at random from the producers within the districts. The enumerators were made aware of the possibility of biased information if a particular class of producers was constantly questioned rather than including producers from all classes available. The enumerators tried to obtain a uniform representation of the practices followed in each district and when a small producer of burley was interviewed, a larger producer would be questioned for balance.

Each farmer was visited by an enumerator who asked particular questions concerning the operation of the farmer's burley tobacco enterprise, and recorded the answers, in the presence of the farmer, on a blank furnished by the United States Department of Agriculture. All questions were reduced to terms with which that individual farmer was familiar. In case of hesitation due to misunderstanding it was the duty of the enumerator to restate the question in words the interviewee could understand but which would not influence the answer.

Information reported by farmers in a given area concerning prices paid for materials and services was checked against prices reported by dealers when such action seemed feasible. For example, the price paid for labor, canvas, tobacco seeds, chemicals and other farmers' needs in that area was checked at the source of each so that when the surveys were edited, errors could be caught in the farmers' answers and the questions rechecked with him.

The records were tabulated to provide a working basis for the information used in the correlation of inputs to returns, and in the study of labor requirements per acre of tobacco, average yield per acre and costs of growing an acre of burley tobacco and other information to follow in the text.

To make this study more meaningful, the 65 producers studied were classified by size of operations according to tobacco acreages into the distinct classifications of small, medium, and large enterprise groups.

The following table presents the classification of the farms surveyed according to the number of acres each producer planted for the growing of burley tobacco. A logical breaking point on size of tobacco acreage was established for the 65 surveys so approximately the same number could be placed in each group. To establish groups the records were arrayed according to size of tobacco enterprise. Approximately 1/3 of the total was placed in each group; however, the process of placing 1/3 in each group was used only as a guide. The decision as to where to establish group boundaries was finally reached by breaking the groups at a point where there was a reasonable spread between the largest in the small group and the smallest in the medium group, the largest in the medium group and the smallest in the large group, with the grouping still getting relatively close to 1/3 in each group. After beginning to analyze the data, it was discovered that there were significant differences within the large group; therefore, the large group was divided into a large and extra large classification (See Table I). This classification is used throughout this study.

TABLE I

CLASSIFICATION OF FARMS
(ACCORDING TO ACREAGE OF TOBACCO)

Group	Number of Acres	Number of Farms
Small	1.0 - 1.9	21
Medium	2.0 - 3.5	24
Large	3.6 - 6.3	14
Extra Large	6.4 -18.9	6
Total		65

Organization of the Study by Chapters

Chapter I states the importance of the study of the burley tobacco enterprise in the Central Basin of Tennessee and discusses source of data and method of procedure.

Chapter II relates to the cost of producing burley tobacco and is broken down into operations by producers from the time the plant bed is prepared until the tobacco is sold on the market.

In Chapter III factors affecting the gross income from the burley tobacco enterprise are discussed and some means of increasing the gross income are suggested.

Chapter IV deals with profits in producing burley tobacco. The net income and returns to management and labor are also given with some factors affecting each.

Chapter V is a summary of the principal findings throughout the study together with some general recommendations based upon the findings and observations of the study.

CHAPTER II

COST OF PRODUCING BURLEY TOBACCO

Items of Cost

The cost of producing tobacco as computed in this study includes all costs incurred regardless of whether the items represent cash outlay or fixed costs. Fertilizer, seed, manure, cover crop expense, poison, crop insurance, building expense and land are included in these costs. Also included are the costs of labor, power and equipment used in producing plants, land preparation, transplanting and replanting, growing the tobacco, harvesting the tobacco crop and also all the operations involved in preparing the tobacco for marketing and the actual marketing.

Cost of Producing Plants

Of the 65 producers, 64 produced plants on their own farms; one bought all plants. Only one farmer of the 64 bought some plants, a necessity brought on by plant-bed failure due to diseases (See Table II).

There was a significant difference in the number of square yards contained within the plant-beds.[8] The average size plant-bed per acre of tobacco for the small size group was 111.7 square yards, compared to 97.2 for the medium size group, 93.1 for the large size group and 73.5 for the extra large size group. The difference in average size plant-bed

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[8] Test for significance was computed using the analysis of variance method.

TABLE II

AVERAGE COST OF PRODUCING PLANTS FOR AN ACRE OF BURLEY TOBACCO BY SIZE GROUPS

Cost Item[a]	21 Small 1 - 1.9 Acres		24 Medium 2 - 3.5 Acres		14 Large 3.6 - 6.3 Acres		6 Extra Large 6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	32.7	$14.40	35.9	$15.82	37.2	$16.37	18.7	$ 8.24
Horse Hours	24.9	4.98	20.9	4.18	9.9	1.98	2.2	.44
Tractor Hours	0	0	.5	.60	1.8	2.16	2.7	3.24
Machinery	...	.97	...	1.07	...	.63	...	.83
Investment Chemicals, Canvas, etc.	...	10.78	...	11.20	...	11.83	...	10.81
Average Cost per Acre of All Farms		$31.13		$32.87		$32.97		$23.56

[a]Fertilizer, manure, and land charge were not calculated in producing plants because of the producers' inability to state accurately the amount used in plant-beds. The total amount of these two was allocated to growing cost.

per group resulted because the producers enumerated had planted excess plant-bed space. Some producers left walking space in the plant-bed for convenience and also to prevent damage to the plants. As the size of the plant-bed was doubled, the number of plants was more than doubled, and thus as the acreage of tobacco per farm increased, the size of the plant-bed increased also, but at a lower rate.

The average size plant-bed for the 64 farms producing plants was 100 square feet. This size was in standard use throughout the Central Basin and canvas and other essential equipment were measured in terms of square feet. When the average producer of plants required 200 square feet of plant-bed, two separate beds were seeded. When only 150 square feet of plant-bed was actually required, many producers expressed the desire to have 200 square feet for ease of operation in two beds and because they found it easier to figure requirements for 100 square feet in each bed.

The small group of producers spent an average of 32.7 hours per acre for producing plants, the medium group 35.9 hours, and the large group 37.2 hours. There was a difference of 4.5 hours per acre spent on plant-beds between the small and large groups, with a difference of only 1.3 hours between the medium and large farms. The extra large group of producers spent fewer man hours per acre for producing plants than either of the others averaging only 18.7 hours. This group contained records of only 6 farms, and the information might have been incomplete on that account. The cost of family labor comprised the greatest portion of the total cost of producing plants with the small group being 46.3 percent, the medium 48.1 percent and the extra large being 35.0 percent.

The number of hours of family labor per acre for the four size groups was tested for significant difference using the analysis of variance method.[9] There was no significant difference among the small group and medium group, medium group and large group, but there was some significant difference between the large and the extra large group. The difference between the large and extra large group is reliable, but, since the small number of surveys available in that group restricted its possibilities for furnishing a correct representation of that group, explanation was not attempted.

The average number of hours of horse labor used per acre decreased as the number of acres of tobacco increased. As average horse hours per acre decreased, the average number of tractor hours per acre increased. The farmers worked tobacco with either horse or tractor power. Since the larger farms usually have the larger tobacco allotments, and, because of larger scale operations, these producers can more practically invest in the purchase of a tractor and use tractor power. The average horse hours used per acre decreased from 24.9 in the small group to 20.9 in the medium, to 9.9 in the large, and 2.2 in the extra large. The average tractor hours used per acre increased from none used in the small group to .5 hour per acre in the medium, 1.8 in the large and 2.7 in the extra large group.

The average number of hours of use for machinery was not computed because of the wide range of different farm implements used. There was no significant difference in size groups in machinery charges.

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[9]Ezekiel, Mordecai, "Analysis of Variance," Methods of Correlation Analysis (2d ed.; New York: John Wiley and Sons, Inc., 1950).

The investments as computed in Table II take into consideration all costs incurred in producing plants, other than labor and machinery. These were canvas, poison, seeds, fertilizer, plants, wire and other miscellaneous costs. Canvas was the largest cost item of this group, with a fairly uniform rate of $9.00 per 100 square yards being paid for canvas and the average life of canvas in use being 2 years for all producers.

Seed was the next largest cost item. Fifty-eight of the 65 producers purchased seed and 7 producers saved their own seed. Seeds were purchased in 1/4-ounce, 1/2-ounce, and 1-ounce lots. The average amount of seeds sowed per 100 square feet of plant-bed was 1/2 ounce (approximately) and the average cost was $1.50 per ounce.

The fertilizer and chemicals used on the plant-beds were not broken down into component parts because of the producers' inability to state accurately the amounts used. The chemicals and fertilizers were purchased in large quantities for the entire tobacco crop and the needed amount was used on the plant-beds. However, the farmer's estimate was used in figuring the investment costs.

The number of plants needed to set an acre of tobacco depends upon the distance between the rows and the distance between the plants in the row. A wide variation was found in the setting distances used. On the average, for all farms, the number of inches between the rows was 36, distance between plants was 16, and 10,918 plants were required to set an acre.

Cost of Land Preparation

Seeding cover crops and the cost of land preparation include all operations involved in working down the soil prior to setting the plants (See Table III).

The cost of land preparation per acre decreased in the large and extra large groups, with the extra large group cost being least at $27.53 per acre. The small, medium, and large groups were more comparable, for the large group cost of an average of $44.67 per acre, the small group cost of $46.50 and the medium group cost of $57.77 per acre are more nearly the same. Comparing the small, medium, and large group costs, the medium group costs are the largest, probably due to the fact that this group of producers intensified more as to family hours of labor as well as having considerably more tractor hours involved in preparing the land.

The costs per acre of horse labor decreased from small $17.33 to $13.14 per acre for medium to $4.89 for large. This was just the reverse of tractor costs per acre, which was small $1.28, medium $12.67 and large $18.44 per acre. The extra large group was not considered in this comparison because only 17.04 hours of horse labor were used which gives an adequate sample.

The small group had only 4 producers using tractors for a total of 35 hours in land preparation. This constituted the tractor cost of $1.28 per acre for this group. It was not that these producers did not own their own tractors, but, rather, that the producers did not find it feasible to use the tractors on so small a field.

TABLE III

COSTS OF LAND PREPARATION FOR AN ACRE OF BURLEY TOBACCO BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small		24 Medium		14 Large		6 Extra Large	
	1 - 1.9 Acres		2 - 3.5 Acres		3.6 - 6.3 Acres		6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	55.06	$24.33	64.10	$28.20	40.14	$17.66	31.53	$13.87
Horse Hours	86.66	17.33	65.70	13.14	24.45	4.89	17.04	3.41
Tractor Hours	1.07	1.28	10.56	12.67	15.37	18.44	7.27	8.72
Machinery	...	3.56	...	3.76	...	2.98	...	1.53
Cash for Tractor Power[a]	...	0	...	0	...	.70	...	0
Average Costs of Land Preparation per Acre (for All Farms)		$46.50		$57.77		$44.67		$27.53

[a]Number of hours unavailable.

The small, medium and extra large size groups all supplied their own labor and power for land preparation with the exception of a few cases of swapping power for labor and other agreements among neighbors. Three producers in the large group paid cash for labor and power, amounting to $48.00 or 70 cents per acre.

The average costs of land preparation for the small group were $46.50 per acre, for the medium $57.77 and for the large $44.67 per acre. The medium group had the largest cost in land preparation but had the lowest total costs.

Transplanting Costs

Transplanting costs consisted of the labor in pulling the plants from the plant-bed, hauling the required water, power in transporting plants, watering and setting of the plants, machinery costs, cash payments for labor and machinery and the operations involved in resetting the tobacco field because of plant death (See Table IV).

Costs of family labor hours were smallest for the medium group at $21.09 per acre; the small group was next with $22.14 per acre, and the large group followed at $23.11 per acre. The extra large group had the highest costs with $26.65 per acre. There was no significant difference among groups for costs of family hour labor.

The costs for horse hours labor were smallest with the extra large group at $1.20 per acre and second smallest in the small group at $1.53 per acre. These two groups used the horse power very little in setting the tobacco plants with a transplanter. The small group set

TABLE IV

COSTS OF TRANSPLANTING AN ACRE OF BURLEY TOBACCO BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small 1 - 1.9 Acres		24 Medium 2 - 3.5 Acres		14 Large 3.6 - 6.3 Acres		6 Extra Large 6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	50.33	$22.14	47.94	$21.09	52.54	$23.11	60.57	$26.65
Cash Labor	...	1.60	...	.56	...	2.95	...	.25
Horse Hours	7.65	1.53	9.32	1.86	7.78	1.55	6.03	1.20
Tractor Hours	0	0	.16	.19	2.22	2.66	.67	.80
Machinery	...	1.52	...	5.72	...	2.30	...	1.56
Average Cost of Transplanting per Acre		$26.79		$29.42		$32.57		$30.46

plants by hand and the large and extra large group used more tractor power. The large group had a cost of $1.55 per acre for horse hour labor, and the medium group used the most horse hour labor with a cost of $1.86 per acre.

The small group did not use any tractor power, and the medium group used comparatively little, having a cost of only 19 cents per acre for tractor power. The large group used tractors mostly for transplanting purposes and had a cost of $2.66 per acre. The extra large group had a cost of 80 cents per acre for tractor use. However, this group was not considered significant because of the small number of schedules taken.

Machinery costs were the least for the small group which had a cost of only $1.52 per acre. The extra large group costs were $1.56, large group $2.30 and the medium group had the largest cost with a cost of $5.72 per acre for machinery. The medium group was highest because of the number of producers buying transplanters since 1946 at a higher cost than was required previous to that time.

The cash labor cost per acre represents the amount paid for labor in transplanting the plants the first time or for resetting the field. The producers had records of only the amount paid for help in setting plants rather than the number of hours of labor. The extra large group had the smallest cost per acre at 25 cents, medium 56 cents, small $1.60 and large $2.95 per acre. The large group had to hire the most labor since in some cases this group had absentee owners who had to hire the majority of labor used for setting the plants. However, each producer in this group used the transplanter for setting the plants.

Growing Costs

The growing costs embody all the operations after the tobacco is transplanted to the field and is ready for cultivation, until the tobacco is mature and ready to be harvested. The growing costs include cost of materials used to grow the tobacco, including manure, fertilizer, and chemicals. The hours of labor include family labor hours, horse hours, and tractor hours. Machinery costs and land charge complete the cost of growing tobacco (See Table V).

Family labor was the largest cost item for growing tobacco. The large group had the highest cost per acre at $55.07. The small group had the second highest cost of man hours labor with $50.59, the medium had the cost of $47.10 per acre, and the extra large group had $37.44. The reason for the small group of producers having a higher cost of family labor was that this group performed more hand labor in their tobacco by picking worms and hoeing and used more labor for all operations using smaller machinery.

The horse hours labor cost was highest in the large group having $5.21 per acre, medium, $4.83, small $3.90 and extra large $3.33 per acre. While the horse labor cost was the lowest for the extra large group, the tractor power cost was highest at 80 cents per acre, small 44 cents and large 18 cents per acre. The medium group did not use any tractor power for growing. This combination comparison of horse and tractor power cost tended to equal out the labor required since one of the two kinds of power had to be used. The extra large group of producers tended to cultivate the tobacco first two times with the tractor as power; the small group usually used the tractor power the first time only.

TABLE V

GROWING COSTS PER ACRE OF TOBACCO BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small 1 - 1.9 Acres		24 Medium 2 - 3.5 Acres		14 Large 3.6 - 6.3 Acres		6 Extra Large 6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	114.99	$ 50.59	107.06	$ 47.10	125.17	$ 55.07	85.10	$37.44
Cash Labor[a]	...	0	...	1.91	...	1.18	...	.20
Horse Hours	19.53	3.90	24.10	4.83	26.09	5.21	16.67	3.33
Tractor Hours	.37	.44	0	0	.15	.18	.67	.80
Machinery	...	.69	...	.92	...	1.02	...	.72
Cover Crop Seed	...	5.28	...	6.25	...	3.52	...	5.53
Land Charge	...	12.00	...	12.00	...	12.00	...	11.98
Manure	7.87[b]	15.82	14.87[b]	29.09	8.56[b]	18.08	6.02[b]	15.37
Fertilizer	...	18.13	...	12.64	...	15.89	...	19.42
Chemicals	...	4.05	...	4.93	...	5.78	...	3.51
Sprayer	...	.50	...	.38	...	.31	...	.13
Average Cost of Growing per Acre		$111.40		$120.05		$118.24		$98.43

[a]Cash paid for labor--number of hours not known.

[b]Tons per acre per group.

The machinery cost was dependent upon the number of hours used. The producers used many different implements in cultivating their tobacco and as often as they deemed feasible. The large group had the highest machinery cost at $1.02 per acre, medium 92 cents per acre, extra large 72 cents and small 69 cents per acre.

The cover crop seed cost was widely variable. Some producers saved their own seeds for cover crops; others bought from the cheapest to highest price seed possible. The most common cover crops for the tobacco field in the Central Basin were crimson clover, rye, oats and barley. The small group had 18 of 21 samples taken or 85.7 percent using a cover crop on their tobacco fields, with a $5.28 cost per acre for seed. The medium group had a total of 24 producers with 23 using a cover or 95.8 percent with a cost of $6.25 per acre for seed; the large group had 10 from a total of 14, or 71.4 percent using a cover crop with $3.52 cost per acre for seed. The extra large group had 100 percent using cover crops of some nature on the tobacco fields with a cost of $5.53 per acre for seed. The cost of machinery, labor and power for the soil preparation in sowing the cover crop is considered in Table III.

The land charge, which is calculated on the producers' estimated value of their tobacco fields, was a fairly uniform rate for the 4 groups. The small, medium and large groups had a land charge of $12.00 per acre, and the extra large group was just a little lower at $11.98 per acre. The tobacco land was in most cases the best land available on the farm and farmers would not sell this land unless they could sell the entire farm.

The medium group applied the most manure per acre at 14.87 tons with a cost of $29.09 per acre, and had the lowest application of commercial fertilizer with a cost of $12.64 per acre. The large group applied the second most manure with 8.56 tons per acre and a cost of $18.08, and that group applied $15.89 of commercial fertilizer per acre. The small group of producers applied 7.87 tons of manure per acre at a cost of $15.82 per acre and commercial fertilizer valued at $18.13. The extra large group applied 6.02 tons of manure per acre at a cost of $15.37 per acre and applied commercial fertilizer at the rate of $19.42 per acre. The most common commercial fertilizer being applied by the producers surveyed in the Central Basin was 3-9-6, which is commonly called bright burley fertilizer.

The chemicals used by the producers varied from home-made solutions to the best commercial poisons. The large group of producers used the most with a cost per acre of $5.78. The medium group used $4.93, the small group used $4.05 and the extra large group used the smallest amount with a cost of $3.51 per acre. The amount used on the plant-bed in producing plants was included in that total.

Sprayers when properly cared for have a long life and render good service; however, for the producers surveyed the average life of a sprayer was 6 years. This average was reached by including all the different types of tobacco sprayers; home-made and commercial sprayers of many designs, rather than just the most popular. The typical sprayer used was a sling type which holds from 3 to 4 gallons of chemicals. The cost for sprayers was highest for the small group at 50 cents per

acre, the medium was 38 cents, large 31 cents and extra large group 13 cents per acre. The small producers tended to have purchased newer equipment for spraying over the last 2 years. The small group also used the sprayer less.

The average cash labor is money paid by the producers for labor in growing the tobacco crop. This is not included with family labor because off-the-farm labor was purchased at a much higher rate. The medium group used the most cash labor with a cost per acre of $1.91, the large $1.18 and extra large only 20 cents. The small group of producers did not hire any cash labor.

The average cost of growing tobacco per acre ranged from a low of $98.43 for the extra large group to a high of $120.05 per acre for the medium group. This was a difference in cost per acre of $21.62. The small group had an average cost of $111.40 per acre, and the large group had an average cost of $118.24.

Harvesting and Marketing Costs

Harvesting Costs

Harvesting costs include all the operations from the time the tobacco is ready to be cut in the field until the tobacco is hanging in the barn ready to start curing. Harvesting costs are constituted of operations in cutting the tobacco, scaffolding the tobacco in the field, hauling the tobacco, and hanging it in the shelter. Harvesting cost also includes the equipment expense of barns, sticks, knives, sprayers and slides (See Table VI).

TABLE VI

HARVESTING COST BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small		24 Medium		14 Large		6 Extra Large	
	1 - 1.9 Acres		2 - 3.5 Acres		3.6 - 6.3 Acres		6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	105.77	$ 46.53	97.31	$ 42.81	98.20	$ 43.20	103.28	$45.44
Barn Cost	...	52.46	...	44.48	...	36.56	...	28.15
Horse Hours	63.34	12.66	38.34	7.66	39.13	7.82	44.30	8.86
Tractor Hours	0	0	.39	.46	2.32	2.78	0	0
Machinery	...	1.29	...	.95	...	1.16	...	1.25
Truck	...	0	...	.02	...	0	...	.07
Cash Labor[a]	...	4.22	...	2.62	...	7.74	...	.41
Sticks	...	2.11	...	1.28	...	1.35	...	.84
Spears	...	.24	...	.20	...	.22	...	.15
Knives	...	.20	...	.27	...	.25	...	.18
Slides	...	.05	...	.07	...	.06	...	0
Average Cost per Acre for Harvesting		$119.76		$100.82		$101.14		$85.35

[a]Cash paid for labor--number of hours not known.

Family labor hours constituted the greatest costs, because of the time involved in cutting the tobacco, spearing the tobacco and putting it on tobacco sticks, and scaffolding and hauling to the barn and hanging it up in the barn. The family labor costs were greatest in the small group, being $46.53 per acre. This group had the highest family labor cost, which can be partially explained to these farmers' practice of scaffolding entirely, whereas the other groups tended to cut the tobacco in the morning and then haul it to the barns in the afternoon. The second highest cost group for family labor hours was the extra large group with a cost of $45.44 per acre, large $43.20 and medium $42.81 per acre.

Horse hours labor costs were greatest for the small group with $12.66 per acre cost, extra large group $8.86 per acre, large group $7.82 and medium group $7.66 cost per acre. The medium and large groups had the smallest cost for horse power but made up the difference in tractor power cost to some extent, since the small and extra large group producers did not use the tractor power at all. The large group had a tractor power cost of $2.78 per acre and the medium group 46 cents per acre.

The cash labor cost per acre was highest for the large group at $7.74, small $4.22, medium $2.62 and the extra large group 41 cents per acre. This represented only the cost of labor where cash was paid and does not take into account the exchanging of labor.

There were two groups using trucks for hauling the tobacco to the barn, the medium group and extra large. The extra large group had a truck cost of 7 cents per acre and the medium 2 cents per acre.

Barn cost represents the depreciation of the original investment in the barn estimated on expected years service, the yearly repairs and the interest on investment. Barn costs were highest for the small group at $52.46 per acre because of the number of new tobacco barns which were built by this group of producers and because more acres of tobacco were hung in a barn for the larger group producers. The next highest barn cost was for the medium group at $44.48 per acre, large $36.56, and extra large $28.15 per acre.

The cost of harvesting brought about by the obtaining of sticks on which to hang the tobacco was widely different. Some of the producers cut their own sticks; others bought them at highly varied prices.

The insurance cost is not allocated to respective operations because of the irregularity with which producers bought insurance. The small group of tobacco producers had 6 out of 21 or 38.5 percent using some insurance. Their insurance covered the tobacco in the field against hail and wind, and some had coverage against spoilage in the barn and fire. The most common practice in purchasing insurance was to pay approximately $26.00 a thousand coverage, against the tobacco in the field, with past records of production being used to estimate the value of the tobacco per acre. The medium group had 5 out of 24 producers using some form of tobacco insurance or 20.8 percent of the total. The large group had 4 out of 14 producers or 28.5 percent owning an insurance policy on their tobacco crop. The extra large group had 2 out of a total of 6 producers subscribing to some form of tobacco insurance, or 33.3 percent.

The average cost of harvesting tobacco per acre was about equal, with a low of $85.35 per acre for the extra large group and a high of $119.76 for the small group. This is a difference of $34.41 per acre. The large group of producers had a harvest cost of $101.14 per acre and the medium $100.82. The main factors contributing to the difference in cost of harvesting was the amount of family labor spent in cutting the tobacco and hanging it in the barn and the barn cost per acre.

Cost of Stripping

The cost of stripping tobacco involves the operation of taking the tobacco down out of the barn, removing from the sticks, packing down to gain the required moisture content if necessary, stripping the leaves from the stalks, grading the tobacco and tying in bunches, and packing down to await the loading for transporting to market (See Table VII).

Stripping costs are made up of family labor and cash labor. They are divided into family labor and cash labor costs because producers were qualified best to give total cash spent on labor instead of hours. Family labor hours were highest for the large group with a cost per acre of $82.99, the medium group was second with $73.67 and the small group $73.57 cost per acre, while the extra large group was lowest with $68.42 cost per acre.

The cash for hired labor was highest in the large group with $17.65 per acre, the small group $4.11 per acre and the medium group averaged $3.37 per acre. The samples taken for the extra large group did not record any cash expenditure for labor.

TABLE VII

STRIPPING COST BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small		24 Medium		14 Large		6 Extra Large	
	1 - 1.9 Acres		2 - 3.5 Acres		3.6 - 6.3 Acres		6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor Hours	167.21	$73.57	167.45	$73.67	188.62	$ 82.99	155.51	$68.42
Cash Labor[a]	...	4.11	...	3.37	...	17.66	...	0
Average		$77.68		$77.04		$100.65		$68.42

[a]Cash paid for labor--number of hours not known.

The average cost for stripping tobacco per acre follows that of family labor hours with the large group being highest with an average cost of $100.65 per acre, small second with $77.68 per acre, medium $77.04 and the extra large group lowest with $68.42 average cost per acre.

Cost of Selling Tobacco

The cost of selling the tobacco does not include the cost involved in using the warehouse and baskets and selling fee. This information was not available with any degree of accuracy because this cost was deducted from the total the producer was to receive and a check was usually used in payment. The selling costs do include family labor in loading the tobacco on to trucks and unloading at the market. Time spent in selling the tobacco, driving to and from the market, and expense for trucks and equipment in hauling the tobacco to the market or the cash expenditure to hire the tobacco hauled to market are also included in selling costs (See Table VIII).

Family labor was highest for the small group at $8.38 per acre, and the others were medium $6.49 per acre, large group $4.96 per acre, and the extra large group $3.14 per acre. The reason for the small group being so much higher than the other groups was that some of those producers had the least efficient method of transporting tobacco since they used wagons drawn by horses.

The small group cost per acre for horse power was 36 cents per acre; the medium and large groups did not use horse power at all, and the extra large group had a cost of 3 cents per acre for horse power.

TABLE VIII

SELLING COST BY SIZE GROUPS

Operations	Average Cost Per Acre							
	21 Small 1 - 1.9 Acres		24 Medium 2 - 3.5 Acres		14 Large 3.6 - 6.3 Acres		6 Extra Large 6.4 - 18.9 Acres	
	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Family Labor	19.06	$ 8.38	14.76	$ 6.49	11.28	$ 4.96	7.15	$3.14
Horse Hours	1.84	.36	0	0	0	0	.19	.03
Auto	...	13.80	...	6.82	...	3.88	...	.67
Truck	...	2.69	...	4.02	...	1.93	...	0
Tractor	.37	.44	0	0	0	0	0	0
Average		$25.67		$17.33		$10.77		$3.84

The cost for automobiles for travel to and from the market to sell the tobacco was highest for the small group with an average cost of $13.80 per acre. This was due partly to the fact that the smaller producers insisted on being present at the market on the day their tobacco sold; whereas, the large producers sold partly by telephone. The medium group had automobile costs of $6.82 per acre, large $3.88 per acre and the extra large 67 cents per acre.

The truck cost is expense for hauling tobacco or paying a flat rate for having it hauled. The large group had a truck cost per acre of $1.93. The small group had a $2.69 cost, and the medium group cost was $4.02 per acre. The extra large group did not have a truck expense because, according to the records in this group, the warehouse furnished transportation to haul their tobacco at no expense to these producers.

The small group producers were the only ones having an expense for hauling their tobacco with tractor power, and this cost was 44 cents per acre.

The average cost of selling the tobacco per acre was highest in the small group at $25.67 per acre. The medium cost was $17.33, the large was $10.77 and the extra large group was $3.84 per acre.

Cost of Producing Tobacco (By Operations)

Summary and Conclusions

The costs of producing tobacco by operations are brought together here for comparison with the four groupings of producers by size. A test

for significant difference was calculated by the analysis of variance method which showed no significant difference between the small, medium, and large groups but there was a significant difference between the large and extra large groups (See Table IX).

The largest costs were those incurred in growing in all groups. The growing cost was 25.3 percent of average total cost per acre for the small, 27.5 percent for the medium, 26.8 percent for large, and 29.1 percent for the extra large group. The next largest individual cost per acre of the average total cost per acre was harvesting which was 27.0 percent for the small, 23.0 percent medium, 22.9 percent large, and 25.2 percent for the extra large. The next largest single operation cost per acre was stripping which was 17.7 percent of average total cost per acre for the small, 17.6 percent for the medium, 22.8 percent for the large and 20.2 percent for extra large group. These three operations made up 70.0 percent of the average total cost per acre for the small, 68.1 percent for the medium, 72.5 percent for the large and 74.5 percent for the extra large.

The cost of family labor accounted for 53 percent of the average total cost per acre of tobacco (See Figure 3). The producers of tobacco could decrease this cost by using more machinery and less hand labor. One operation where more machinery can be used successfully is the growing. The large size group of tobacco producers had the smallest costs per acre for growing because they used tractor plows for the first two cultivations of their tobacco and used less hand labor for hoeing the tobacco.

TABLE IX

COSTS OF PRODUCING TOBACCO
SUMMARY BY OPERATIONS IN SIZE GROUPS

Operations	Average Cost Per Acre			
	21 Small 1 - 1.9 Acres	24 Medium 2 - 3.5 Acres	14 Large 3.6 - 6.3 Acres	6 Extra Large 6.4 - 18.9 Acres
Producing Plants	$ 31.13	$ 32.87	$ 32.97	$ 23.56
Land Preparation	46.50	57.77	44.67	27.53
Transplanting and Replanting	26.79	29.42	32.57	30.46
Growing	111.40	120.05	118.24	98.43
Harvesting	119.76	100.82	101.14	85.35
Stripping	77.68	77.04	100.65	68.42
Selling	25.67	17.33	10.77	3.84
Total Cost	$438.93[a]	$435.30[a]	$441.01[a]	$337.59[b]

[a]This does not include cost per acre of insurance.

[b]This does not include cost per acre of insurance and the one producer paying $5.00 cash for tobacco field.

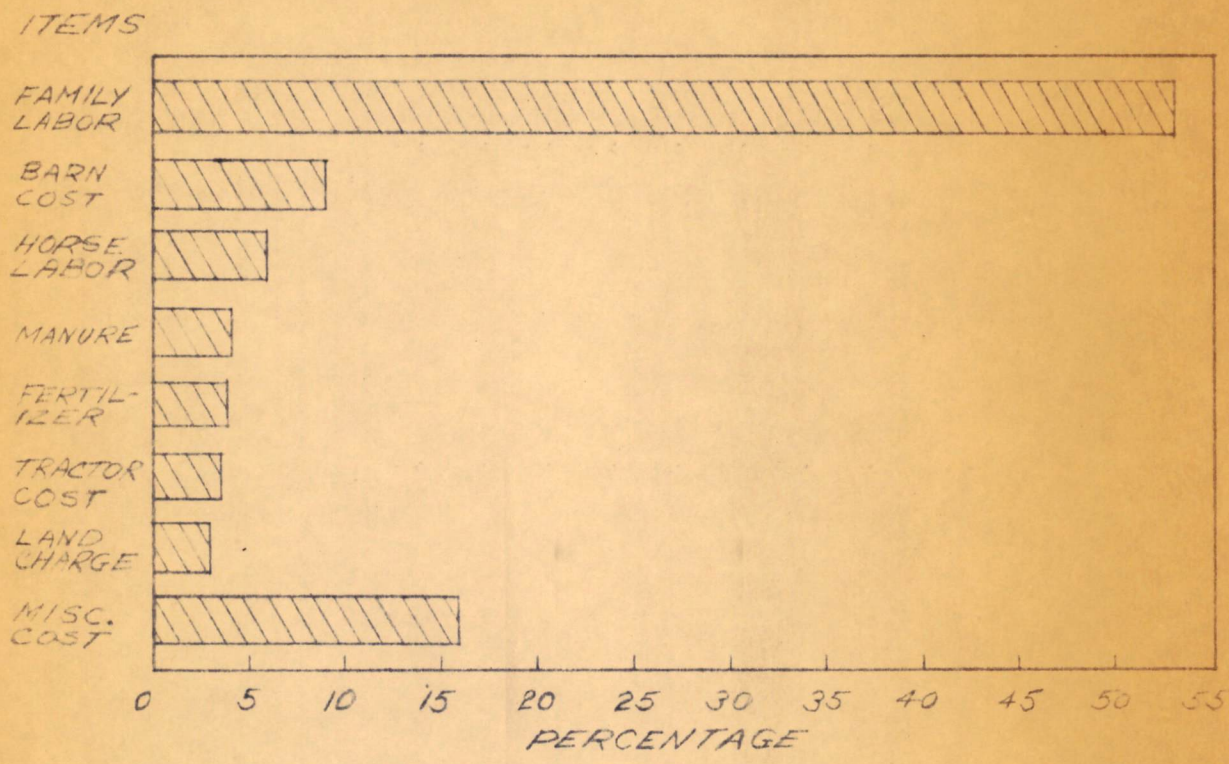

FIGURE 3. FAMILY LABOR, BARN COST, HORSE LABOR, MANURE, FERTILIZER, TRACTOR, LAND CHARGE AND MISCELLANEOUS COST PERCENTAGES OF THE AVERAGE TOTAL COST PER ACRE.

The barn cost allocated to the tobacco crop made up the next largest cost per acre at 9.7 percent per acre. Some of the producers are now cutting down on this cost by building higher barns, which will enable them to hang more tobacco under the same roof. Building higher barns also localizes the operations for curing and preparing the tobacco for market.

Horse labor was the next largest cost of the average total cost per acre at 6.6 percent, manure cost comprised 4.7 percent, fertilizer 3.9 percent, tractor cost 3.3 percent, land charge 2.9 percent, and other miscellaneous costs completed the average total costs such as spears, sticks, cash labor, sprayers, slides, etc., but it did not include the insurance cost per acre and the cash rent paid by one producer.

CHAPTER III

FACTORS AFFECTING THE GROSS INCOME FROM THE BURLEY TOBACCO ENTERPRISE

The gross income per acre received from the tobacco enterprise is influenced by two factors, the yield per acre and the price received per pound. The two are very closely related, for it follows that the producer who grows the highest yield per acre and receives the highest price per pound has, in turn, the highest total income. What is of vital importance is the method by which the producer can receive the highest yield and price, providing costs do not offset the increase. It is the objective of this chapter to show causes for higher yields and prices per acre for the producer.

The farms were grouped into small, medium, large and extra large enterprises, as in the preceding chapter. A test for significant difference between groups in average yields per acre, average market price per pound, and average income per acre was computed by the analysis of variance method. No significant differences were found. The analysis of deviations about the average will be for the 65 producers.

Yield per Acre

The average tobacco yield per acre for the 65 producers was 1297.6 pounds per acre, ranging from a low of 666.6 pounds produced per acre to a high of 2021.0 pounds. Eleven producers had yields below 1000 pounds per acre, and only one producer had a yield above 2000 pounds

per acre. The remaining 53 producers had yields per acre between these extremes, with the majority concentrated around 1200 pounds per acre.

This study does not show any relationship between marketable yields and number of plants per acre; however, the results are questionable since the year under consideration deviated substantially from what might logically be expected in the area under study. Excessive rainfall reduced marketable yields for some of the producers so that the long run effect on plants per acre and yields could not logically be determined.

An array of the 65 surveys studied was established by yields per acre to determine whether a relationship existed for fertilizer applied, for cost per acre of producing, and for the market price per pound received. This information was plotted graphically to see if any relationships existed between yields and fertilizer costs per acre (See Figure 6, Appendix). There seemed to be a slight relationship when plotted, and a simple correlation was established to determine if the relations between yield and fertilizer cost per acre were significant. No significant relationship was shown for these 65 farmers for 1949. It is probable that unfavorable weather conditions prevalent during harvesting time which damaged some of the crop was very influential in causing the lack of such a significant relationship being discovered.

The eleven producers having yields below one thousand pounds per acre were analyzed again individually in search of reasons for their low

yields. Three producers had exceptionally low marketable yields per acre at 666.6, 727.2 and 736.8 pounds per acre. The producer having yields of 666.6 pounds per acre had an allotment of 1.8 acres of tobacco and had planted up to his limit, but the weather prevented his harvesting any crop from 1.1 acres. The producer with a yield of 737.2 pounds per acre planted 5.5 acres and harvested only the best tobacco. The excessive rainfall had damaged a large part of his crop. The producer who had a yield of 736.8 pounds per acre had applied more than the average amount of fertilizer per acre to his 1.9 acre, but he still harvested a lower yield per acre than did other producers who applied less fertilizer per acre, due largely to the heavy rainfall occurring during his harvesting season. These three producers followed similar management practices of other producers studied with higher yields. They each had had cover crops the winter before the 1949 crop of tobacco and then had turned them under for green manure crops in the spring. The number of plants per acre and quality of plants set were approximately the average of that of the entire study. Therefore, it follows that the major factor contributing to low yields for these three was the heavy rainfall during the harvesting of the tobacco which ruined a part of the tobacco in the field.

There were eight other producers of the 65 studied who reported yields lower than 1000 pounds per acre. Past production records of five of these producers showed that they normally would have had higher yields than those attained. They followed management practices established as typical practices concerning fertilization, cover crop, and

number of plants set per acre. However, these five producers lost tobacco in the barn because it molded or because of improper curing, both of which they blamed on the damp and rainy fall season.

The other three of the eight producers did not follow the typical management practices. Two did not apply any commercial fertilizer; although each did make heavy applications of barn manure of 57 and 27.1 tons per acre. They accounted for their low yield per acre by the fertilization practices followed and by the rainy season which caused damage to a part of the tobacco hanging in the barn. The one remaining producer made an application of $11.26 worth of purchased fertilizer per acre and applied no barn manure. This producer did not report any loss due to the rainy weather during harvest season, but attributed the low yield to poor fertilization practices only.

The one producer of the 65 studied who had a yield of over 2000 pounds per acre was the one who was credited with the highest yield per acre at 2021 pounds but also was the one who had the highest total cost per acre of production. His high yield per acre can be attributed to the fact that he made heavy applications of fertilizer, had a cover crop, set a large number of plants per acre, and utilized only a small acreage in tobacco which enabled intensive cultivation of plants while growing.

The average yield per acre for the 65 producers studied was lower than could be expected normally because of the exceptionally rainy season that began during the harvesting period and continued until some producers' tobacco was badly damaged during the curing period. This is a case of good management practices paying dividends, if practiced, for a producer

who is able to cure the tobacco by heat, smoke or air in time to prevent molding is a producer who would not have suffered these losses in the 1949 crop. However, good management practices are practices that only the unusual producer acquires and therefore are not measurable in a study of the typical or usual producer.

Prices Received per Pound

The average market price received for tobacco was 47 cents per pound for all producers. This average market price included the sales of the entire tobacco crop.[10] There was a range in price from a low of 28 cents per pound to a high of 55 cents. The factor of unfavorably heavy rainfall which considerably lessened the producers' yield per acre of tobacco also adversely influenced the quality of the tobacco marketed and thus indirectly caused a lower price to be paid per pound.

The producer having the lowest yield per acre at 666.6 pounds also received the lowest market price per pound at 28 cents. This can be attributed again to the low quality of tobacco harvested resulting from unfavorable weather conditions. The other producers having low yields per acre received the average price per pound for the group. In these cases the producers lost part of their crop and did not market the ruined part, thus receiving normal prices for the tobacco not damaged. Six producers of the total studied received between 30 and 40 cents per

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[10] This average market price per pound of tobacco included the average price of all leaves which are the best leaves, Lugs, Tips, Fliers, and Trash.

pound, which is considered abnormally low.[11] In reviewing these producers' records, it is found that they applied an average of $10.58 worth of commercial fertilizer per acre.[12] With the exception of one producer, they made applications of barn manure, the average value of application being $18.92 per acre. The two applications of fertilizers for the six producers were low compared to the average for the entire group. This low application of fertilizer contributed partly to the low market price per pound received.

Twenty-six producers of the 65 received between 50 and 55 cents per pound for their tobacco. Of this number, five did not make application of any commercial fertilizer on the 1949 crop because they applied larger amounts on the 1948 crop than were actually needed. These five applied barn manure valued at an average of $40.33 per acre.

Taking these 26 producers as a group, a study of the records indicated that the high price per pound received for their tobacco can be credited largely to good management practices in avoiding damages insofar as these producers did not lose any tobacco or incur any damages due to a rainy harvesting and curing season.

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[11] United States Department of Agriculture, Annual Report on Tobacco Statistics, 1949, Production and Marketing Administration, Washington, D. C., December 1949, quotes the average price for burley tobacco received per pound at 47.5 cents per pound for the state of Tennessee.

[12] It is generally accepted by agronomists that application of commercial fertilizer, depending upon fertility of soil and availability of plant nutrients, improves the quality of tobacco.

The group of 32 producers receiving between 40 and 50 cents per pound for their tobacco all applied commercial fertilizer, with the exception of two who received 49.3 cents per pound in one case and 46 cents per pound in the other. Not having fertilization records available for the 1948 crop year, it was impossible to deduce how much their price received per pound could have been increased, since they made only the group average application of barn manure per acre. The data are inadequate but the study leads one to believe that others of this group would have received higher prices per pound for their tobacco had they managed to harvest their tobacco before some damage was done by the unfavorable weather. Others would have been higher but due to improper facilities in curing, they were unable to cure during this damp season.

Proper Grading

By observation, when taking surveys, it was apparent that some burley tobacco producers did not know how to grade tobacco properly. When a producer's tobacco reaches the market floor, it is then too late to retie the leaves to group them in hands of Leaves, Lugs, Tips and Fliers. If some Lugs are tied in with Tips, then a lower price per pound will be received for the Lugs than could have been obtained had the hands been of one type only. On most market floors the tobacco is placed into the lower grade when a hand includes tobacco of two grades.

While the producers were being surveyed, some expressed doubt as to the exact classification of grades. Some of the producers knew the

proper grades to tie the tobacco in while stripping, but, instead of using close supervision, left inexperienced graders on the job alone, an act which probably resulted in lower income from the tobacco.

Growers of burley suffer heavy losses from the sale of tobacco in too high order.[13] If the tobacco has a moisture content which is too high, the tobacco is graded down because of the possibility that it will mold before properly dried.

Proper care of the crop can eliminate too high order in burley tobacco, even in unfavorable seasons like the 1949 crop, and on evidence of the 1949 crop season, it would pay producers well to avoid undue moisture in their burley tobacco when placing it on the market. "It should be marketed with just enough moisture content to avoid breakage."[14]

Time and Place of Marketing the Tobacco Crop

The 65 producers of burley studied stated that they marketed their tobacco as soon as possible after the markets were opened. This might have been the best time to sell their tobacco for some reasons, but certainly not because the price was highest at the outset of the selling market. From computations made of past market prices,[15] the

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[13]Card, Danna G., Growers' Losses on Burley Tobacco Sold in High Order, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Kentucky, Bulletin 540, November 1949.

[14]Loc. cit.

[15]University of Tennessee Department of Agricultural Education, Tobacco Production, Knoxville, Tennessee, Mimeo 23, July 1949. Also unpublished data, Professor John L. Fischer, Agricultural Economics Department, University of Tennessee, Knoxville, Tennessee.

highest prices can be received between the 4th and 6th week of a 10-week market. This would vary from year to year but by close observation of the market price, it appears that a higher price can be obtained than is available during the first week of the market.

The place a producer markets his tobacco depends upon the number of markets available within his particular locality. The difference in price and services offered by markets may not be sufficient to justify the additional cost involved in transporting the tobacco farther distances to take advantage of this difference. Still there are several means of marketing the tobacco that might pay greater incomes than those that are most convenient. One of the producers receiving the highest price per pound of the 65 studied was one of several producers who pooled their tobacco and shipped it from the Central Basin of Tennessee to Kentucky to sell through a tobacco marketing cooperative. This producer's records showed that the gain in total income was a result of smaller fees charged for selling and somewhat higher prices received than could have been obtained at his closest market.

Income Received

The gross income received ranged from a low of $188.89 per acre to a high of $1050.90 per acre (See Table X). The average gross income received for the 65 producers studied was $614.43 per acre. There were 9 producers who received less than a $400.00 per acre income. The low of $188.89 income per acre was due to a low yield per acre of 666.6 pounds and a low market price received per pound of 28 cents which was

TABLE X

FREQUENCY DISTRIBUTION OF DOLLAR INCOME RECEIVED PER ACRE FOR THE 65 BURLEY TOBACCO PRODUCERS STUDIED

Dollars	Number of Farms
$ 0 - $299	1
300 - 399	8
400 - 499	7
500 - 599	19
600 - 699	9
700 - 799	16
800 - 899	3
900 - Up	2
Total	65

due to unfavorable harvesting weather that had damaged the tobacco both in the field and in the barn. Five of this group of 9 also had low yields due to weather damage to tobacco in the field, which was really the major factor influencing low incomes per acre. The other 3 producers experienced molding and spoilage of tobacco while hanging in the barn because of improper curing which they blamed, also, on the damp weather. The ultimate result here likewise was the receipt of low prices per pound on the market.

There were 5 producers who received between $1050.90 and $800.00 per acre income. One of these producers received the highest price per pound for his tobacco and had high yields; the other 4 received large incomes per acre because they did not lose any tobacco or have any damage due to the damp and rainy fall season. Also they had yields amounting to between 1700 and 1800 pounds per acre and received a price per pound of 51 cents. The other 52 producers of the total 65 studied ranged in gross income per acre from $400.00 to $800.00, with the larger proportion receiving from $500.00 to $800.00 per acre. Of this group, practically all had returns which had been affected to some degree by the exceptionally unfavorable harvesting and curing season for tobacco during 1949. Some of the producers in this group would have received higher incomes per acre under normal weather conditions and others would have remained on this level.

Factors Influencing Gross Income Received

(Summary)

The gross income per acre received is influenced by 2 factors: (1) yields per acre and (2) price received per pound. The average tobacco

yield per acre for the 65 producers was 1297.6 pounds per acre. The average market price received was 47 cents per pound, and the average gross income $614.43 per acre.

Prominent factors influencing marketable yields were the heavy rainfall and time and method of harvesting and curing.

Factors affecting price received per pound were the producers' practices in production and the preparation of the tobacco for the market, as well as the selection of the time and place for marketing. Each producer should arrange his labor requirements on the farm so that his tobacco gets the needed attention. Other factors that affected gross income might be corrected to some extent, such as obtaining information on grading at local markets, and the acquiring of skill in observing the tobacco markets to evaluate them as to which can offer the grower the best service and largest monetary return for his product.

CHAPTER IV

PROFITS IN PRODUCING BURLEY TOBACCO

Tobacco proved to be profitable in 1949 for the 65 producers studied as a group. This year was not normal, however, from the viewpoint of net profit since losses occurred in yields because of the tobacco being ruined in the fields or spoiled in the barns. The yields per acre marketed decreased because of the weather conditions while the expenses incurred by the producers for labor and other operations remained about the same as in normal years.

For this analysis the producers are again divided into 4 size groups, small, medium, large and extra large, as shown in Chapter I. There was a significant difference between the extra large group and the other 3 groups in average net income per acre, average return to management and labor per acre, average cost of producing per pound, and net income received per pound. There were no significant differences between groups for the average gross income and the average costs of producing per acre (See Table XI). The average and deviations about the average net income per pound, cost of producing per pound, and returns to management and labor in their size groups are here explained. The total cost of producing and total net income have been discussed in Chapters II and III respectively.

Net Income

The average net income[16] per acre for the small group was $133.11,

[16] Net income was calculated by deducting all costs of producing from total income. This represented the average net income per acre to the tobacco enterprise.

TABLE XI

COST AND NET INCOMES FOR PRODUCERS BY SIZE GROUPS

Item	21 Small 1 - 1.9 Acres	24 Medium 2 - 3.5 Acres	14 Large 3.6 - 6.3 Acres	6 Extra Large 6.4 - 18.9 Acres
Total Gross Income	$572.11	$619.18	$597.60	$668.85
Cost of Producing	439.00	433.99	435.40	358.79
Net Income	133.11	185.19	162.20	310.06
Cost of Producing per Pound	.367	.324	.339	.260
Net Income per Pound	.111	.138	.126	.225
Returns to Management and Family Labor[a]	374.93	419.42	395.68	500.93
Returns per Hours to Management and Family Labor	.68	.79	.75	1.15

[a]The returns to management and labor were computed by adding the amount deducted for family hours of labor to net income for the four groups classified by size. This figure also represents a net income above all costs of production except labor.

medium $185.19, large $162.20 and the extra large $310.06 per acre. The average net income for all producers surveyed was $197.54 per acre. The small, medium and large groups had a difference of $52.08 per acre between the highest and lowest net income, and were considered as having no significant difference among these groups.[17] The extra large group had a difference of $124.87 between it and the medium group which was the next largest. This difference was significant.

The extra large group had the lowest average cost per acre for producing the tobacco, a result of this group's having less cost per acre for plant-bed, for barns and for machinery, and not because of a less significant amount of labor used. This relatively low average cost gave rise to a greater net income per acre, along with the fact that this group received a greater than average price per pound or an average of 48 cents for tobacco sold. Of the 6 producers in this classification, all made a net profit except one. This one producer had a net loss of $135.44 per acre, when deductions for family labor were made, and a return of $55.43 per acre for 10.6 acres to management and family labor when family labor was not considered. This producer would figure a net loss because most of the labor used in producing the tobacco was hired.

The next largest average net profit for the 4 groups was that of the medium group which had a profit of $185.19 per acre. Of the 24 producers in this group, only one did not make a net profit. This producer had a net loss of $17.35 per acre on 2.7 acres, because of a low marketable yield per acre. This low yield was a result of the unusually rainy

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[17] Significant difference was computed by the variance analysis test.

weather which prevented harvesting of part of the tobacco and which later damaged the harvested crop while it was hanging in the barn. These latter damages resulted in a low price per pound.

The large group had the next highest average net profit at $162.20 per acre. Of the 14 producers in this group, 2 failed to make a net profit. One of these 2 had a net loss of $61.29 per acre and 5.5 acres because of the weather's preventing his harvesting at the proper time so that part of his tobacco ruined in the field. This producer, however, had a low cost per acre because he had only a low investment in barns and equipment and he did not harvest the damaged tobacco, a decision which decreased the overall harvesting cost. These 2 factors kept him from having an exceptionally high net loss.

The other of the 2 producers had a net loss of $417.65 per acre on 5.6 acres. This heavy loss per acre was brought about not only by loss of part of his tobacco in the field, but also by damages to the harvested tobacco in the barn due to improper curing. He did not market the tobacco that had damaged beyond marketability while in the barn, but he still had spent labor hours harvesting it and hanging it in the barn. In addition, he had had high investment costs in equipment and fertilizer. Another factor contributing to the high net loss was the low price per pound received of 34.6 cents, which was the second lowest for the entire group of 65 producers studied.

The small group received the lowest average net profit per acre at $133.11. There were two good reasons for this group's having the

lowest net profit per acre. (1) It had the highest cost of production per acre of the 4 groups, and (2) it had the lowest yield per acre. These 2 factors were offset somewhat by this group's success in receiving the second highest price per pound for the 4 groups, 47.5 cents, but this price was not sufficiently high to compensate for this group's failure in other phases of the production and marketing of tobacco. The high cost of production for this group was a result of the large amount of hand labor applied during the tobacco production. The low yield per acre resulted partly from a rainy and damp harvesting season.

Taking this small group individually, there were 4 producers of the total of 21 who failed to make a net profit. Three of these producers had had exceptionally low yields because of rainy weather which had first prevented successful harvesting and then had damaged the harvested tobacco hanging in the barn. These 3 had a net loss of $39.41 per acre on 1.3 acres, $164.89 on 1.8 acres and $43.42 on 1.9 acres. The producer who lost $164.89 per acre on 1.8 acres had the lowest yield per acre for the entire producers studied because only .7 of an acre was harvested. This producer also received the lowest price per pound for the 65 producers at 28.3 cents, because his harvested tobacco was at least partly damaged by the weather. The other 2 producers received a higher price per pound, one getting 40 cents and the other 46 cents per pound. The fourth producer of this small group who had a net loss had yields just under the average for the group at 11.50 pounds per acre, and he received 45 cents per pound in the market for his tobacco, a net loss of $78.55 on 1.0 acre. This producer did not report any damages due

directly to the weather; therefore, his net loss can be attributed to poor management practices. These practices resulted in a high cost per acre of producing. In studying this producer's record, it was found that no commercial fertilizer was applied but only a heavy application of barn manure, namely, 20 tons per acre. This practice did not provide a balanced plant nutrient requirement, and this fact partly accounts for the low yields per acre. His high cost per acre can be attributed to a large investment in machinery and equipment, such as sprayers and sticks which were of the highest for the entire 65 producers studied. Two other high costs for this producer which resulted in a net loss were cover crop seed and family labor.

Cost per Pound

The average net income per pound and the costs per pound for producing are provided because data are needed for many purposes. Markets quoting daily and futures at prices per pound necessitate the producers and dealers having access to cost and selling figures for tobacco in pounds. Another reason for giving the net profit and cost of production in pounds is because this statement would facilitate predictions for the producers of burley for the next crop. In fact, many producers think in terms of pounds when relating their thoughts to cost and profits of burley tobacco.

The average costs of producing a pound of tobacco for the 4 size groups were 32.3 cents. The net incomes per pound were small 11.1 cents, medium 13.8 cents, large 12.6 cents and extra large 22.5 cents. The ratio of cost to net profit for all producers was 1:2, or, rather, the net profit was 46.6 percent of cost.

Returns to Management and Family Labor

The average returns to management and family labor are given as one figure because the total labor could be obtained with a greater degree of accuracy than could a separation of labor between tenants, children and the management. On these farms the operator and his family did a large share of the work, as well as planning the production.

The average returns to management and labor were largest for the extra large group which had $500.93 per acre, an increase of $190.87 over the net income. This was an average of $1.13 return per hour per acre for labor and management.

The medium group had the next largest returns at $419.42 per acre, an increase of $234.23 over the net income. This was an average return of 79 cents per hour per acre.

The large group had $395.68 return per acre to management and labor, an increase of $233.48 over net income. This was an average return of 75 cents per hour per acre. The small group which had the lowest return per acre of the 4 groups at $374.93 had the greatest increase over net income at $241.82, but had an average return of only 68 cents per hour per acre.

Reasons for the extra large group's highest average return of $500.93 per acre to management and labor were that this group had the lowest average cost per acre, and the highest average net income per acre. This group also had the lowest average number of family labor hours used to produce an acre of tobacco. The other 3 groups had lower average net incomes per acre than the extra large group, although they had a greater number of family labor hours used to produce the tobacco. They could not

make up the difference with more family labor hours per acre used to attain as high a return to management and labor per acre.

The groups which used the smallest amount of labor and had the largest net profit per acre had the largest return to management and labor. Some of the producers who had plenty of family labor available were interested only in the returns to management and labor rather than to the enterprise. The net profit did not mean a great deal and was not considered by them. They reasoned that as long as their children were working in the tobacco, the yields might be increased, because the children's productivity would be above what it would be in other farm work. This was often given as the explanation for the proximity of the tobacco field to the dwelling house. Others expressed the desire to have the tobacco field near the farmhouse so cultivation could take place as soon as possible in the morning after rainfall and again in late afternoons, involving only a minimum of lost time. There were 7 producers of the 65 studied who produced at a loss or only a very small profit per acre but who would have made their group average or greater returns to management and family labor when considered in this respect.

Relation of Size of Farm to Net Income

From observation of the producers surveyed and arrays made in this study, a hypothesis was formulated that producers living on large farms make more efficient use of labor, machinery, and management than do producers on small scale operations. Figure 4, which shows the relationship of acres in the farm to average net profit per acre, disproves this assumption. There was only a small change in average net incomes per acre as the

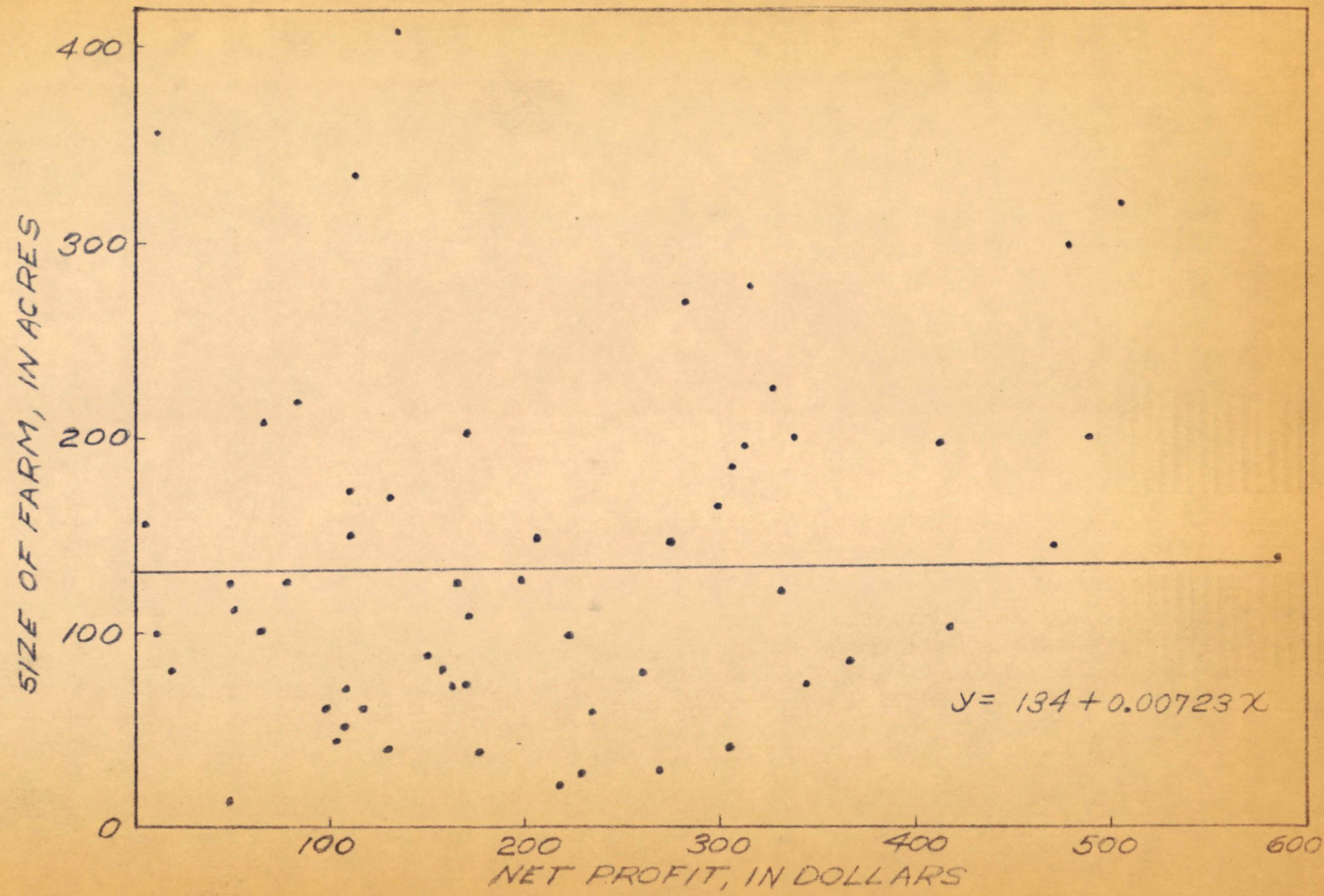

FIGURE 4. RELATIONSHIP OF NET PROFIT TO SIZE OF FARM

size of the farm increased. The reason for only a small increase lies in the fact that tobacco production is primarily a hand labor crop. It requires approximately the same amount of labor for cutting, stripping and housing tobacco for any two acres of tobacco with the same yields. Another reason for this small amount of correlation is that large farms tend to have other cash crops and incomes and their tobacco crop is only an integral part of the farm income; whereas, an outstanding characteristic in this study for the small land owners was that they had tobacco as their chief cash crop.

Summary of Profits

Under normal climatic conditions, the 65 producers studied would make a greater average net profit than they did in 1949. It is to be expected that some of the producers still would not make a net profit, but it would be a fewer number than the 8 from the total of 65, as was the case in the 1949 crop year.

The producer of burley tobacco can make a larger net profit by decreasing investment costs that will not affect yields. The larger tobacco producers use fewer valuable sticks, often making their own, and this is one good way by which cost can be decreased. While interviewing the burley tobacco producers it was learned that the larger producer usually had available the timber supply necessary to make their own sticks. Some of the smaller producers did not have the timber to make their own sticks.

The larger producers tended to apply labor only as long as it was needed while the small producer continued to apply labor after it was needed. However, small producers' excess labor was usually drawn from the family; whereas, larger producers did sometimes hire excess labor from outside sources for work in the tobacco fields beyond the point of marginal returns.

There is very little evidence that will support the belief that a more efficient use is made of the labor, machinery and management in tobacco on the larger farms than on the small. Tobacco requires approximately the same amount of labor on any acre of tobacco with the same expected yields. The small increase in the amount of net profits received as the size of operation increases is due to investments in machinery which decrease cost of growing and hauling the tobacco.

CHAPTER V

SUMMARY OF THE FINDINGS AND RECOMMENDATIONS IN RELATION TO PRODUCTION AND MARKETING PRACTICES THAT AFFECT PROFITS FROM BURLEY TOBACCO

The 1949 crop of burley tobacco in the Central Basin of Tennessee is one that will have to be classified as unusual because of the extraordinarily damp harvesting and marketing season which lowered the marketable yields and quality of the crop. For this reason, several relations of management practices to yields and prices could apply only to the 1949 crop year or years similar to it in regard toweather conditions during harvesting and marketing time (See Figure 6, Appendix).

Summary

Growing costs were the largest individual operation in the production of burley tobacco. The growing costs for the classified groups were: small, $111.40; medium, $120.05; large, $118.24; and extra large, $98.43 per acre. The average growing cost for all producers comprised 27.1 percent of the average total cost.

Harvesting operations comprised the second highest cost of individual operations. They were: small, $119.76; medium, $100.82; large, $101.14; and extra large, $85.35 per acre. For all producers, the average cost of harvesting was 24.5 percent of the average cost of production per acre.

Stripping was the third largest cost per operation, comprising 19.4 percent of the average total cost per acre for all farms or an average cost per acre for the groups of: small, $77.68; medium, $77.04; large, $100.65; and extra large, $68.42.

The fourth largest cost for individual operations in producing burley tobacco was land preparation. The average land preparation cost for the groups was: small, $46.50; medium, $57.77; large, $44.67; and extra large, $27.53 per acre.

The average total cost of all operations in producing tobacco by groups was: small, $438.93; medium, $435.30; large, $441.01; and extra large, $337.59 per acre. Of the average total cost for all producers, labor cost for family hours constituted 53 percent, barn cost 9.7 percent and horse labor 6.6 percent.

The average tobacco yields per acre for all producers was 1297.6 pounds per acre. The average price received per pound was 47 cents, with the average gross income being $614.43 per acre. (See Figure 5 for the average total cost, gross income and net profit realized for the size groups.)

The average gross income by groups was: small, $572.11; medium, $619.18; large, $597.60; and extra large, $668.85 per acre. The average net income was: small, $133.11; medium, $185.19; large, $162.20; and extra large, $310.06 per acre.

Observations made during this study indicate that the Central Basin burley tobacco producers, in spite of unfavorable weather conditions in 1949, could have increased their earnings by improving on the following points in their management practices.

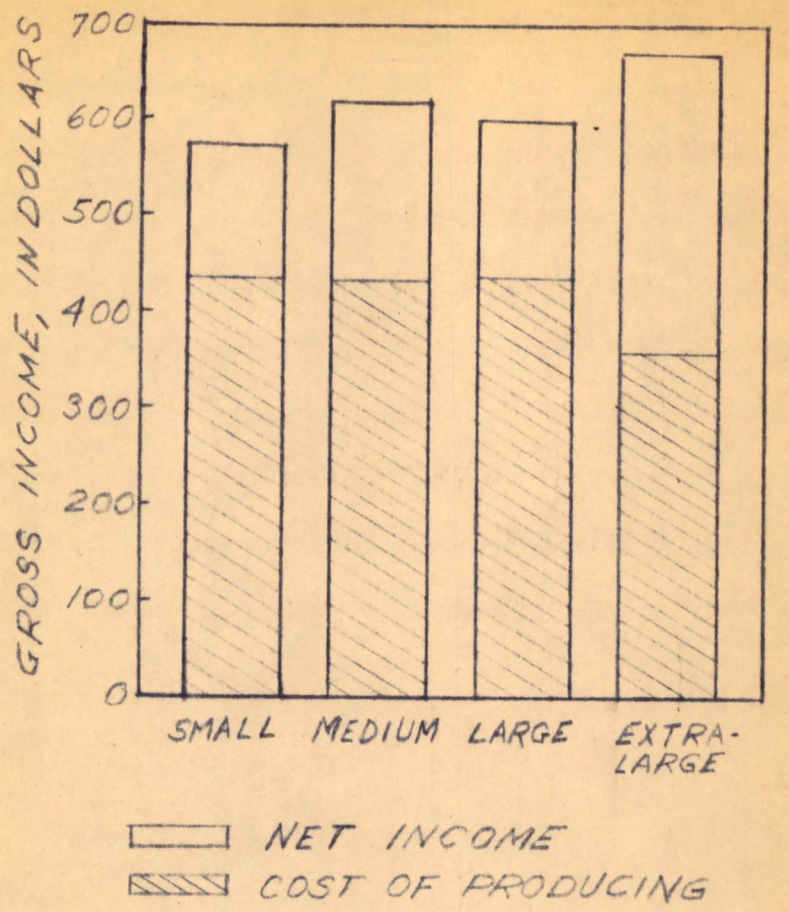

FIGURE 5. GROSS INCOME, COST OF PRODUCING AND NET INCOME PER ACRE BY SIZE OF THE TOBACCO ENTERPRISE

(1) Farm labor practices. Producers having a net loss or a very low net profit could have increased their net profits by budgeting their farm labor to allow harvesting and curing at the proper time.

(2) Investment practices. Many of the smaller producers could have increased their net profit by decreasing the amount of investment cost. The smaller producers having timber could have made a larger percentage of sticks used, as did the larger producers, and invested a little less in expensive equipment unless they plan to enlarge their tobacco enterprise. The small producers need to know when and how much labor to apply to their tobacco to increase returns, also.

Recommendations

The following general recommendations are made to producers of burley tobacco in the Central Basin of Tennessee:

(1) Producers of burley tobacco can remove some of the risk and uncertainties in producing burley tobacco by availing themselves of the progress being made by professional agricultural workers along the lines of curing as well as of production. For example,

> A warehouse at Mayfield, Kentucky, is now using tobacco electric drying equipment designed by the Tennessee Valley Authority. This new method is successfully curing 12,000 pounds of tobacco per day at considerable savings in cost of equipment and operating expenses over the old type of equipment used for this purpose. It is believed that there will be quite a demand for this new process in the Valley's growing areas.[18]

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[18] Tennessee Valley Authority, Summary of Progress, Office of the General Manager, Tennessee Valley Authority, Knoxville, Tennessee, Bulletin 228, March 1951.

(2) Producers of burley tobacco should determine in what phases of production costs could be decreased. They should observe at what point additional labor no longer increases the return in relation to input. Other growing costs that could be decreased are for equipment such as sticks, which should be made or bought cheaply and saved from year to year; canvas, and machinery or tools which should be cared for properly to increase their years of service.

(3) Producers should familiarize themselves with the risks involved, and, if economical, practice those management practices which will remove certain of these risks. An example is timely harvesting.

There is a need for more cost studies to be made in the state of Tennessee. Additional studies should be made to analyze the risks and uncertainties involved in the production of burley tobacco. Producers and agricultural workers need studies that cover a number of consecutive years so relationships can be established for all situations confronted by individual producers. At the present time, producers have to draw upon their past experience or that of their neighbors for answers to their problems. Good information is available from these sources, but only analytical cost studies can answer the questions in an organized and reliable manner.

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APPENDIX

APPENDIX

Cost Methods Used

Cost figures for this study were decided upon by comparison to other similar studies of cost in producing tobacco in Kentucky, Indiana and Virginia. Emphasis was also placed on studies of cost for other farm enterprises in Tennessee in the selection of these figures. The all commodity index was used to adjust costs to the 1949 level.

Use of Land

The land charge was calculated at 5 percent of the value of the tobacco land as estimated by the producers.

The cost of fertilizer applied both in the plant-bed and in the field for the year 1949 was charged to the tobacco crop. Fertilizer applied to the field in previous years was not charged to the 1949 tobacco crop.

Manure applied to the field was charged to the tobacco crop at the rate of $1.90 per ton. The number of tons applied was estimated by individual producers. The entire cost of manure was charged to the 1949 crop of tobacco since past estimates were not available. No additional charge was made for labor, power or machinery for spreading the manure; the cost per ton was cost at the field.

Family Labor

Work done on the tobacco crop by the farmer and his family was charged at the rate of 44 cents per hour. Hired labor was charged at cost.

Horse Labor

Horse labor was charged at the rate of 20 cents per horse hour.

Tractor Use

Tractor use was charged at the rate of $1.40 per hour for one-plow tractors and $1.20 per hour for two-plow tractors. Tractor work hired was charged at cost.

Machinery Use

All general farm machinery used with horse power was charged at the rate of 4 cents per horse hour and machinery used with tractors was charged at the rate of 13 cents per tractor hour. When special tobacco equipment was used the charge was based on the net cash cost for the year, based on estimated life of machinery as predicted by producers plus 10 percent of the inventory value to cover the cost of interest, taxes, shelter, repairs and other cost that should be allocated to the machinery.

Automobile and Truck Use

The automobile was charged at the rate of 4 cents per mile. Pick-up trucks were charged at the rate of 5 cents per mile and other trucks at 6 cents per mile. Hired truck service was charged at cost.

Barn Use

The charge for tobacco barn use consisted of all costs during the year for minor repairs with annual depreciation established by the producers' estimated life of the barn and major investment, plus 6 percent of the inventory value to cover interest, taxes, insurance and other

costs that should be allocated to the barn. If the barn was used for some other purpose, the total barn cost was prorated on a percentage basis.

Other Costs

All other cash costs were charged at the rates paid.

TABLE XII

1949 MONTHLY AVERAGE AND NORMAL PRECIPITATION FOR
SMITH, MAURY, AND WILLIAMSON COUNTIES IN INCHES

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Carthage (Smith) 1949	7.52	3.53	4.56	4.45	3.74	8.17	5.83	4.33	1.38	7.16	1.33	5.42	57.75
Carthage Ave. 36 years	4.73	4.28	5.27	4.32	3.89	4.54	4.50	4.38	3.08	2.83	3.66	4.09	49.57
Columbia (Maury) 1949	7.26	2.79	5.80	3.72	2.54	9.56	3.05	4.15	1.51	7.67	0.83	4.57	52.07
Columbia Ave. 48 years	5.09	4.39	5.30	4.72	4.01	4.03	4.41	4.03	3.41	2.75	3.63	4.11	49.88
Franklin (Williamson) 1949	7.98	2.90	4.38	3.27	3.66	8.74	7.18	2.34	0.68	4.37	0.67	5.23	51.40
Franklin Ave. 33 years	4.87	4.12	5.41	4.99	3.98	4.21	3.83	3.49	3.19	2.60	3.56	4.72	49.03
Average 3 Stations 1949	7.59	3.04	4.91	3.81	3.31	8.82	5.35	3.61	1.19	6.40	0.94	5.07	53.74
Average Normal	4.90	4.26	5.33	4.68	3.96	4.26	4.25	3.97	3.23	2.73	3.61	4.31	49.16

Source: Allred, C. E., Atkins, S. W., and Outen, D. L., Inventory of Climatic and Mineral Resources of Tennessee, Agricultural Experiment Station, University of Tennessee, Knoxville, Tennessee, 1932.

TABLE XIII

INFORMATION ON NUMBER OF FARMS GROWING BURLEY TOBACCO, VALUE OF BURLEY TOBACCO AND OTHER FARM ENTERPRISES BY COUNTIES IN CENTRAL BASIN OF TENNESSEE, 1945

County[a]	Number of Farms		Value of Tobacco Produced	Value of All Farm Products Sold	Value of Crops Sold
	Total in County	Reporting Growing Tobacco			
Bedford	2,540	304	$ 158,758	$ 3,813,309	$ 754,159
Davidson	3,092	239	332,089	5,009,220	1,446,578
Marshall	1,992	663	346,113	3,654,379	634,655
Maury	3,562	2,249	2,152,095	6,313,843	2,680,520
Rutherford	4,210	199	116,573	5,557,234	1,478,837
Smith	2,357	1,772	1,468,413	3,511,553	1,518,095
Trousdale	1,080	789	830,017	1,585,100	842,696
Wilson	3,785	1,423	757,337	4,676,262	888,253
Williamson	3,119	1,563	1,595,262	5,459,448	2,296,151
Total	25,737	9,201	$7,756,657	$39,580,348	$12,539,944

[a]Nine counties lying entirely or with major portion in the Central Basin of Tennessee.

Source: United States Department of Commerce, United States Bureau of the Census, United States Census of Agriculture, Volume 1, Part 20, Washington, D. C., 1945.

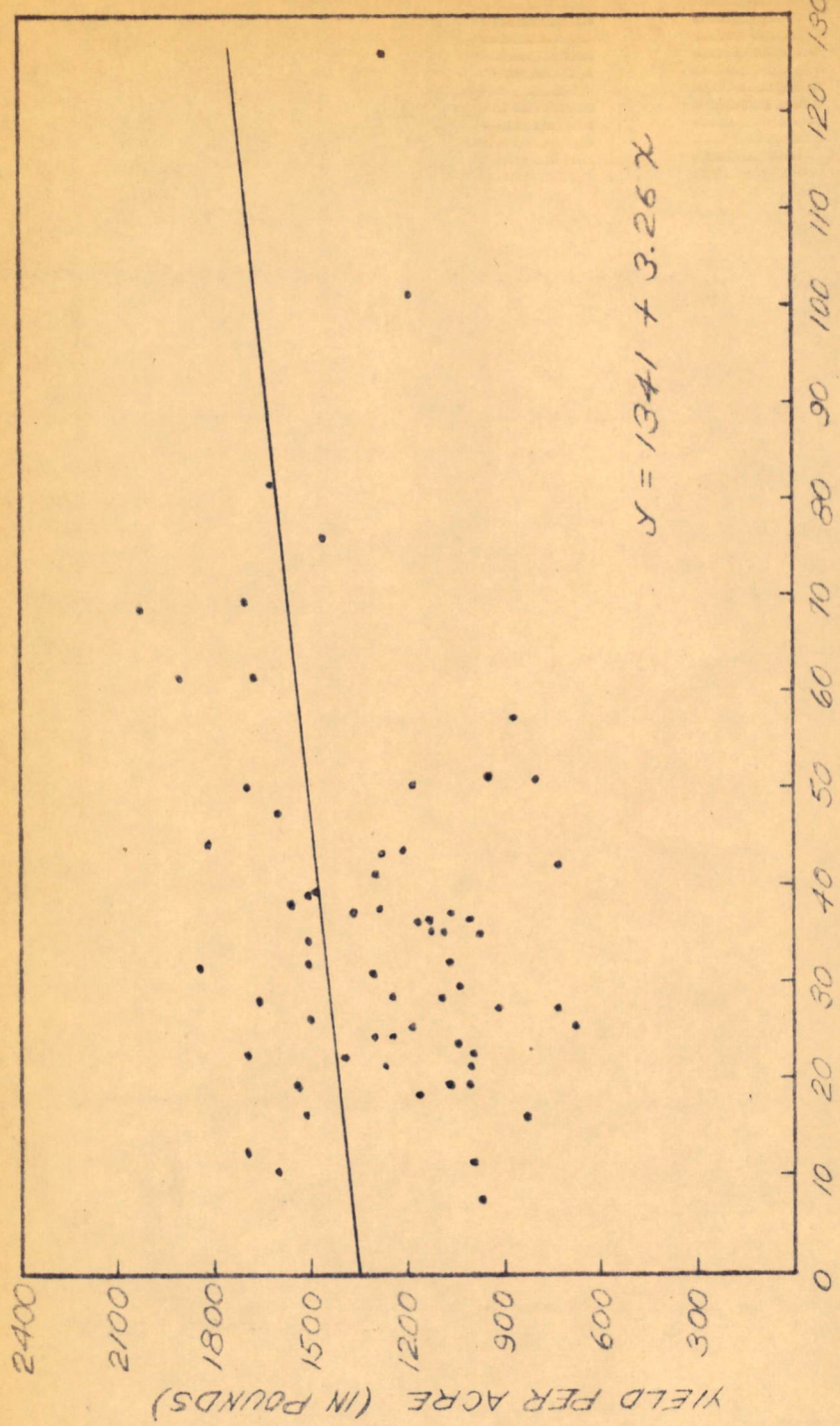

FIGURE 6. RELATIONSHIP OF YIELDS TO FERTILIZER APPLIED PER ACRE

Report No.___
County_____
State_____
Date_____
Enumerator___

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics
In Cooperation with
State Agricultural Experiment Station

Budget Bureau No.
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Tobacco Practices and Costs, 1949

Operator: Name_____ Address_____ Acres in farm_____

Acreage of tobacco on this farm___; including___acres owned, and___acres rented.
Operator's tobacco___acres; Cropper's tobacco___acres; Type_____
Yield per acre___lbs; Total production___lbs; Value $_____
Value of tobacco land per acre (excluding buildings) $_____

Special tobacco buildings and equipment

Item	Number	Value Jan. 1, 1950	Repairs in 1949	Cost of each-new	Years life
Tobacco barns					
Sticks				1/	
Curers					
Stokers					
Packhouse					
Strip room					
Transplanters					
Handsetters					
Sprayers					
Trucks					
Slides					

1/ Per 1000 sticks.

Rental arrangements for tobacco in 1949

Item	Shares Operator	Shares Landlord	Shares Operator	Shares Cropper
Tobacco				
Fertilizer				
Canvas				
Twine				
Poison				
Sticks				
Fuel for curing				
Insurance				
Labor				
Mule & equipment				
Tractor & equipment				

Tobacco plantbed - Materials

Size of plantbed _____ Sq. yds.

Item	Unit	Quantity		Cost	
		Per 100 sq. yds.	Total	Per Unit	Total
Planks 1/ (size)	Foot				
Cloth 2/	Yard				
Seed	Ounce				
Fertilizer (grade)	Pound				
Soda	do.				
Cyanamide	do.				
Fermate	do.				

1/ Same planks are used _____ years.

2/ Same cloth is used _____ years.

Tobacco plantbed - labor and power

Operation	Size of Crew	Kind of power	Size & kind of equip-ment	Days worked one time over	Hours per day	No. of times	Total hours		
							Man	Mule	Tractor
Preparation & seeding									
Picking weeds									
Watering									

Tobacco field - materials and insurance

Item	Unit	Acres covered	Quantity		Cost	
			Per acre	Total	Per unit	Total
Cover crop seed (kind)						
Manure	Ton					
Fertilizer (grade)	Pound					
Side dressing (kind)	do.					
Arsenate of lead	do.					
Paris green	do.					
Twine	do.					
Insurance						

Tobacco field 1/ - labor and power

Operation and date began	Furrows to the row 2/	Acres covered	No. of times	Size of crew	Kind of power	Kind and size of equipment	Acres per day	Hours per day
Cover crop:								
Cutting stalks	xx							
Disking	xx							
Seeding	xx							
Land preparation:								
Cutting stalks	xx							
Disking	xx							
Breaking								
Harrowing	xx							
Laying off rows								
Distributing manure	xx							
Hauling fertilizer to field	xx							
Distributing fertilizer								
Bedding rows (listing)								
Transplanting:								
Pulling plants	xx							
Setting	xx							
Resetting	xx							
Growing after planting:								
Plowing								
Hoeing (chopping)	xx							
Plowing								
Applying side dressing								
Applying poison	xx							
Topping	xx							
Suckering and worming	xx							

1/ Preceding crops _____ (kind) _____ (acres) _____ (kind) _____ (acres)

2/ Width of row _____ spacing in row _____.

Farm Hauling and Selling of Tobacco

Kind of vehicle	Total pounds hauled	Number trips 1/	Hours per trip	Size of crew	Total man hours	Total miles
Truck						
Auto and trailer						
Auto 2/						

1/ Distance to market one way _____ miles.

2/ Include selling of tobacco custom hauled.

Custom Hauling of Tobacco

Kind of vehicle	Total pounds hauled	Rate per 100 lbs.	Cost	Number trips	Hours per trip	Furnished by farmer: Size of crew	Furnished by farmer: Total man hours
Truck							

Labor Hired by Operator and Cropper for Tobacco Work 1/

Operation	Size of crew	Days	Number of times	Total days	Rate	Cost	Value of perquisites
Transplanting							
Hoeing							
Cropping							
Benchwork							

1/ Hired for general farm work _____ men at $_____ per month, and

Piece or custom work hired for tobacco

Operation	Quantity	Rate	Cost
Disking			
Grading			

Money borrowed for growing tobacco

Purpose	Amount	Date Borrowed	Date Pd.up	Rate of int.