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# Tobacco production practices and net returns per acre from burley tobacco in Anderson County, Tennessee

E. F. Ivens

To the Graduate Council:

I am submitting herewith a thesis written by E. F. Ivens entitled "Tobacco production practices and net returns per acre from burley tobacco in Anderson County, 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 Extension.

Robert S. Dotson, Major Professor

We have read this thesis and recommend its acceptance:

Lewis H. Dickson, Frank F. Bell, S. A. Griffin, Gilbert N. Rhodes

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

May 20, 1964

To the Graduate Council:

I am submitting herewith a thesis written by E. F. Ivens entitled "Tobacco Production Practices and Net Returns Per Acre from Burley Tobacco in Anderson County, Tennessee." I recommend that it be accepted for nine quarter hours credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Extension.

Robert S. Ortner
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We have read this thesis and
recommend its acceptance:

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Accepted for the Council:

Hilton A. Smith
Dean of the Graduate School

# TOBACCO PRODUCTION PRACTICES AND NET RETURNS PER ACRE FROM BURLEY TOBACCO IN ANDERSON COUNTY, TENNESSEE

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A Thesis

Presented to

the Graduate Council of

The University of Tennessee

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In Partial Fulfillment

of the Requirements for the Degree

Master of Science

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by

E. F. Ivens

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# CHAPTER I

## INTRODUCTION

The Anderson County Extension Program Development Committee met in May of 1961 and decided that a special study should be made of the agricultural needs and problems of the county, taking into consideration the present situation and resources (1:6).* The committee recognized that the needs of the people would dictate the Extension Program in the future and they decided to use the following steps of scientific procedure: collect facts; analyze the situation; identify major problems; state objectives, and consider alternatives.

A collection of all available information pertaining to the agricultural situation in Anderson County was compiled and presented to the Program Development Committee. Livestock, dairying and tobacco, in that order, were noted to be the three principal sources of farm income. After a study was made of the information, the Program Development Committee designated study committees to make detailed studies of the different areas of Extension responsibility. Each study committee was asked to study the situation; identify the major problems; list program objectives, and recommend some promising ways of reaching the desired objectives.

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*Numbers in parentheses refer to numbered references in the bibliography; those after the colon are page numbers.

## I. IMPORTANCE OF TOBACCO

The tobacco study committee found that relatively low net returns from tobacco was a major problem (1:19). The committee also stated that county net income from tobacco could be increased by as much as 25 percent if the growers followed recommended practices.

In 1959, Anderson County had 936 farms which averaged 68.6 acres per farm (16:144). In 1961, Anderson County had 660 farms with allotments totaling 324.86 acres of tobacco (13:41). The total poundage harvested was 480,520 from 268.80 acres for an average yield of 1,788 pounds. The 1,788 pounds sold for an average of $1,176.63 per acre, and the total gross sales from tobacco in 1961 was $318,632.42 (4).

Since the tobacco income annually constitutes approximately 20 percent of the total farm income, the committee recommended that the county Extension staff give priority to the study of tobacco problems and work toward finding some solution through future courses of action.

## II. YIELD SITUATION

The average annual yields in Anderson County for the period 1957 through 1961 increased from 1,598 pounds per acre in 1957 to 1,788 pounds per acre in 1961 for an average of 1,678 pounds per acre per year for the five-year period (2). The state average annual yield was 1,661 pounds per acre in 1957 and 1,869 pounds per acre in 1961, or an average of 1,726 pounds per acre per year for the five-year period (13:39). Thus it can be seen that the Anderson County average annual yield for the

above period was 48 pounds per acre less than the state average for the same period.

In 1961, counties surrounding Anderson had the following tobacco production average per acre: Campbell 2,176 pounds; Knox 2,030 pounds; Roane 1,560 pounds; Union 2,127 pounds; Morgan 1,773 pounds, and Scott 2,250 (13:41). Of the seven counties, Anderson therefore ranked fifth with a 1,788 pounds average.

There have been wide ranges in per acre annual yields and net returns of tobacco grown by farmers in Anderson County. Some growers have consistently produced relatively high yields and high net returns; while others have consistently produced relatively low yields and low net returns. During the five-year period 1957 through 1961, annual farm yields and net returns have ranged from a low average of 654 pounds per acre with a net income of $32.93 per acre to a high average of 2,608 pounds and $1,422 net income per acre (2).

## III. IMPORTANCE OF THE STUDY

A study made by the Anderson County Agricultural Agent and the Special Agent in Test Demonstration Work showed that the average test demonstration farmer in Anderson County in 1959 produced 2,352 pounds of tobacco per acre; while the county average for the same year was 1,795 pounds (3). The average gross income from tobacco on the average test demonstration farm was $1,455 per acre, and the average gross income from tobacco on the average county farm was $1,017 per acre, or an increase

of $438 on the test demonstration farms. Gross income from tobacco on the 324.86 acres allotment (1961) in Anderson County could be increased $142,288 if the average farmer could do as well as the average test demonstration farmer.

A study of yield data and certain production practices was needed to identify the following representative groups: County growers with a consistently high average level of net returns per acre of tobacco; growers with a consistently medium average level of net returns per acre of tobacco, and growers with a consistently low average level of net returns per acre of tobacco. Data also were needed to identify practices that were either contributing to increased yields and net income or limiting them. Such data should be helpful for use in formulating teaching objectives.

## IV. OBJECTIVES

The study, then, was made: 1) to determine the present levels of annual average net returns per acre for all tobacco producers in Anderson County who had a tobacco allotment of one-half of an acre or more; 2) to identify the production practices used by Anderson County tobacco growers that influence high net returns, and low net returns; 3) to identify other factors that contribute to high, medium, and low net returns, and 4) to develop an Agricultural Extension teaching approach, based on local data, that will help Anderson County tobacco growers recognize the economic importance of following recommended tobacco production practices.

## CHAPTER II

## REVIEW OF THE LITERATURE

The county is recognized as the basic unit for Extension Program Development and the first stage in the development cycle is the completion of a county Extension program statement. The program statement provides guidelines for county personnel as they plan each year's work and helps to base the program on the needs of people within the county (14:53). The program statement results from an organized process of long-range (usually five-years) planning that takes into consideration the situation, identifies problems, states objectives, and suggests promising ways of working toward desired objectives. Extension's purpose for developing a county program statement is to give greater assistance to people as they attempt to analyze their major problems and plan logical courses to take in solving the problems (6).

The second stage of the program development cycle, annual planning, results in the annual Extension plan of work. The plan of work is a written statement of procedure to be followed by county Extension personnel in carrying out the different teaching objectives to be worked toward during a specific year. Teaching methods are selected, ways of measuring progress are considered, and final plans for the Extension teaching are made (14:53).

After the annual plan of work has been formulated, the educational phase must be performed. Therefore, the third stage of the program development cycle is Extension teaching. The success of county Extension

program efforts in a given year depends on how well the county staff gets the educational job done (14:54).

The fourth and final part of the program development cycle is Extension evaluation and reporting. Evaluation is essential in order to determine the effectiveness of educational programs, and also to decide where improvements are needed (14:54).

According to Kelsey and Hearne,

> Extension work is an out-of-school system of education in which adults and young people learn by doing.
>
> It is a partnership between the government, the land-grant colleges, and the people, which provides service and education designed to meet the needs of the people.
>
> Its fundamental objective is the development of the people (8:1).

Lowe (9:6), in his study of tobacco production practices on 144 sample farms in a Tennessee county noted that research workers had written extensively about cultural practices of burley tobacco, but that very little had been written on reasons why yields varied among farmers within a given area. It also would appear that very little research work has been done concerning why net returns varied from relatively low to relatively high among tobacco farmers within a given area.

Williams (17:69) found, in studying costs and returns of tobacco, that producers could remove some of the risk and uncertainty in producing burley tobacco by following the approved practices recommended by professional agricultural workers.

Lowe also found that: 1) most study farmers in Williamson County did not recognize the low tobacco yield situation and potentially high

yield opportunities through use of recommended practices; 2) a large majority of the farmers did not fertilize tobacco according to the soil test recommendations; 3) most farmers did not top and sucker tobacco properly, and 4) Extension programs should emphasize the adoption of recommended tobacco production practices (9:74).

Hale (7:22), in his study of soils, fertility levels and the relation of management practices to yields of tobacco on 26 sample farms in Bradley County Tennessee, found that approximately 30 percent of the tobacco produced by growers with relatively low average yields was grown on excellent to good soils. The fact that a large number of low yields were produced on good to excellent soils emphasized the need for a study of management practices. Hale also found that the usual assumption that taking a soil test and fertilizing according to the recommendations of a state soils laboratory will produce a relatively high yield and high net returns per acre may be entirely false if the grower fails to follow other proven recommended practices (7:28).

Rhodes (12:19) found in a two-year study that methyl bromide and cyanamid could be used successfully for weed control in tobacco plant beds. However, he found that methyl bromide was more consistent in giving more adequate weed control, sufficient stand of plants and desirable quality of plants for transplanting than was cyanamid.

In listing recommended practices for producing burley tobacco in Tennessee counties, Rhodes* (11) recommended the following: 1) The plant bed site should be on a well-drained loamy soil with southern or southeastern exposure; 2) burn or use recommended chemicals for weed control; 3) use 50 to 75 pounds of 4-12-8 fertilizer, or its equivalent, for each 9 x 100 foot bed, March 1 to March 15; 5) water plant bed when crust forms on the soil surface; 6) control diseases and insects with recommended chemicals; 7) select an appropriate recommended variety; 8) grow tobacco following grass or grass-legume sod; 9) fertilize according to soil test needs; 10) do not use over 10 tons of manure per acre; 11) transplant good, stocky, disease-free plants between May 15 and June 1; 12) set plants 15 to 18 inches apart in 42 inch rows; 13) control insects in field with recommended chemicals; 14) cultivate shallow; 15) top tobacco when 30 to 50 percent of plants are in early bloom stage; 16) keep suckers pulled; 17) harvest ripe tobacco; 18) prime one time to save bottom leaves and also to let remainder of plant ripen; 19) after cutting, house tobacco after it has wilted sufficiently for handling; 20) provide ample space in barn (five to six stalks on each stick and hand sticks 10 to 12 inches apart); 21) begin stripping and grading after tobacco is thoroughly cured; 22) after stripping, place tobacco down in an open center square with the tied ends toward the outside, and 23) be sure the crop is dry and clean when placed on the warehouse floor (see Appendix D).

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*Tennessee Agricultural Extension Agronomist and Leader, University of Tennessee, Knoxville.

## CHAPTER III

## METHODS AND PROCEDURE

Records of the Anderson County Agricultural Stabilization and Conservation Office were used to determine the five-year (1957-1961) average per acre yield of tobacco on all farms having an allotment of one-half of an acre or more. Also, the same records were used to determine the average price received per pound marketed on all these farms during a three-year period, 1959 through 1961. Price records were not available previous to 1959. Farms that had changed ownership, or that had not grown tobacco at least three years within the study period (1957-1961) or that had not grown tobacco at least two of the last three years of the study were eliminated.

The gross returns received by each tobacco grower within Anderson County with a tobacco allotment of one-half of an acre or more was obtained by multiplying the average five-year yield by the average three-year price per pound.

A cost data sheet, which is presented as Table I, was developed for estimating annual per acre variable and fixed expenses incurred in producing an acre of tobacco in Anderson County (a total of $288.88). Since the marketing costs of selling tobacco vary with the poundage sold, the actual marketing cost for each farm had to be determined. This cost was based on the charges made on the Knoxville Tobacco Market, January 1963, which was $0.60 per hundred pounds plus a four percent commission. .85

TABLE I

BURLEY TOBACCO: ESTIMATED ANNUAL PER ACRE VARIABLE AND FIXED EXPENSES FOR PARTIALLY MECHANIZED PRODUCTION IN ANDERSON COUNTY, TENNESSEE, 1963

| Item and Description | Unit | Quantity | Per Unit Price ($) | Amount ($) | Total Amount ($) |
|---|---|---|---|---|---|
| A. Variable Expenses: | | | | | |
| 1. Plant Bed (9' x 100') | | | | | |
| a) Fumigation | | | | | |
| (1) Methyl bromide | lb. | 9 | .80 | 7.20 | |
| (2) Plastic cover (9' x 50') | | 1 | 4.95 | 4.95 | |
| (3) Applicator (5-yr. life) | | 1 | 6.95 | 1.39 | |
| b) Canvas (2-yr. life) | | 1 | 10.95 | 5.48 | |
| c) Fertilizer (4-12-8) | lb. | 50 | .0255 | 1.28 | |
| d) Tobacco seed[a] | oz. | 0.25 | 1.50 | 1.50 | |
| e) Pest control | | | | | |
| (1) Blue mold treatment (15% Ferbam) | lb. | 18 | .35 | 6.30 | |
| (2) Wildfire treatment (15% Streptomycin Sulphate)[b] | oz. | 5.00 | .81 | 4.05 | |
| (3) Insect treatment (10% D. D. T.) | lb. | 5 | .23 | 1.15 | |
| 2. Field expenses | | | | | |
| a) Fertilizer[c] | | | | | |
| (1) 5-10-15 | lb. | 1200 | .0309 | 37.08 | |
| (a) Ammonium nitrate | lb. | 250 | .0400 | 10.00 | |

TABLE I (CONTINUED)

| Item and Description | Unit | Quantity | Per Unit Price ($) | Amount ($) | Total Amount ($) |
|---|---|---|---|---|---|
| b) Pest control | | | | | |
| (1) Malathion (50%) | pt. | 2.0 | 2.10 | 4.20 | |
| (2) Endrin (20% emulsion concentrate for 3 treatments) | pt. | 4.5 | 2.20 | 9.90 | |
| c) Tractor[d] | hr. | 35.0 | .45 | 15.75 | |
| 3. Marketing[e] | | | | | |
| a) Hauling | | | 1.35 | 10.00 | |
| TOTAL VARIABLE EXPENSES[e] | | | | | 120.23 |
| B. Fixed Expenses: | | | | | |
| 1. Depreciation | | | | | |
| a) Barn (½ of cost 30-yr. life)[f] | | 1 | | 33.33 | |
| b) Transplanter (10-yr. life)[g] | | 1 | | 24.00 | |
| c) Tobacco sticks (10-yr. life)[h] | | 2000 | | 8.00 | |
| 2. Building Repairs (2% of ½ cost)[f] | | 1 | | 20.00 | |
| 3. Interest on Investment[i] | | | | | |
| a) Barn (3% of ½ cost)[f] | | 1 | | 30.00 | |
| b) Transplanter (3% of cost)[g] | | 1 | | 7.20 | |
| c) Tobacco Sticks (3% of cost)[h] | | 2000 | | 2.40 | |
| 4. Taxes (Real estate = ½ barn + one acre land)[j] | $100 | 1.95 | 5.90 | 11.51 | |
| 5. Insurance on ½ barn ($2000)[k] | | | | 9.00 | |
| 6. Tractor[l] | hr. | 32.1 | .51 | 16.37 | |

TABLE I (CONTINUED)

| Item and Description | Unit | Quantity | Per Unit Price ($) | Amount ($) | Total Amount ($) |
|---|---|---|---|---|---|
| 7. Other machines[1] | | | | 6.84 | |
| TOTAL FIXED EXPENSES | | | | | 168.65 |
| GRAND TOTAL EXPENSES[e] | | | | | 288.88 |

[a]Since seed is sold only in one ounce packets, the annual cost assigned is $1.50.

[b]Not applicable when Wildfire resistant varieties are used.

[c]Recommendations based on average Anderson County tests indicating soils are low in $P_2O_5$ and medium in $K_2O$.

[d]Taken from Ranney, W. P., Labor Requirements on Tennessee Farms, Tennessee Experiment Station Bulletin 316, September 1960.

[e]Commission and floor charges omitted because of wide variations in per acre production.

[f]$2000 barn used for machinery storage and other purposes during balance of year.

[g]Original cost of transplanter was $240, 10% depreciated annually.

[h]Original cost of sticks was $80, 10% depreciated annually.

[i]Interest on land value omitted because of insufficient information.

TABLE I (CONTINUED)

[j]Taxes based on local conditions of $5.90 tax rate with assessments of 15% of value. Formula used: $\frac{.15\ (1000 + 300)}{100} = 1.95 \times 5.90 = 11.51$.

[k]One half of first $1000 insurance at $13.50 = $6.75, and one half of second $1000 insurance at $4.50 = $2.25 or $9.00 charged to tobacco production.

[l]Taken from Coutu, Arthur J. and Mangum, Fred A., Farm Management Manual, Department of Agricultural Economics, North Carolina State College, December 1960.

The production and the marketing costs, then, were figured for each tobacco farm, thus computing the total estimated cost of producing and selling an acre of tobacco for each farm. Each total estimated cost figure was subtracted from the appropriate gross income figure in order to get the estimated net returns per acre to land, labor, and management for each of the 388 Anderson County tobacco farms with an allotment of one-half of an acre or more.

A frequency distribution of the 388 growers was made to determine the number that had consistently averaged high and low levels of estimated net returns. Intervals of $400 in net returns per acre were used. Table II shows that, of the 388 growers: 60 had average net returns of less than $400 per acre to land, labor, and management; 152 had average net returns of $400 through $699 per acre; 132 had average net returns of $700 through $999 per acre, and 44 had average net returns of $1,000 or more per acre to land, labor, and management. Twenty-seven growers, for inclusion in this study, were selected by random sampling from each of the four intervals for a total sample of 108 tobacco producers.

An interview schedule developed by Lowe (9:80) was adapted and used for interviews with the growers selected (see Appendix A).

TABLE II

DISTRIBUTION OF TOBACCO PRODUCTION BY FIVE YEAR AVERAGE NET RETURNS PER ACRE, TO LAND, LABOR, AND MANAGEMENT IN VARIOUS INTERVALS, NUMBER OF GROWERS AND NUMBER SAMPLED IN EACH INTERVAL, ANDERSON COUNTY, TENNESSEE, 1957-1961

| Net Returns to Land, Labor, and Management | Number of Growers | Number Sampled |
|---|---|---|
| Considerably Below Average (Below $400) Net Returns to Land, Labor, and Management | 60 | 27 |
| Below Average ($400-$699) Net Returns to Land, Labor, and Management | 152 | 27 |
| Above Average ($700-$999) Net Returns to Land, Labor, and Management | 132 | 27 |
| Considerably Above Average ($1,000 or More) Net Returns to Land, Labor, and Management | 44 | 27 |
| TOTAL | 388 | 108 |

# CHAPTER IV

## RESULTS AND DISCUSSION

As stated earlier, of the 388 tobacco farmers studied, 16 percent fell in the considerably below average (below $400 net returns per acre to land, labor, and management) group; 39 percent were in the below average ($400-$699 net returns per acre to land, labor, and management) group; 34 percent fell in the above average ($700-$999 net returns per acre to land, labor, and management) group, and 11 percent were in the considerably above average ($1000 or more net returns per acre to land, labor, and management) group.

Twenty-seven growers in each of the four groups were selected by random sampling. All growers selected for this study willingly gave all the information asked by the interviewer.

Facts concerning each farm and family were obtained, including: the size of farm; the age and name of tobacco grower; managerial responsibility; schooling; sex, and major sources of income.

Other information was obtained concerning individual practices, or factors that might possibly influence yields and net returns. These included: the soil mapping unit; the soil rating; manure usage; the use of soil tests; fertilizer usage; total amount of plant nutrients used; fertilizer placement; amount of plant bed fertilization; size of plant bed; kind of plant bed sterilization; time of plant bed sterilization; tobacco varieties used; plant bed seeding rate; degree of plant bed weed

infestation; quality of plants; degree of plant bed insect control; time and method of transplanting; rotation practices; use of cover crops; depth of cultivation; spacing between and within the rows; uniformity of stand; time of topping; time between topping and harvest; height of topping; method and degree of sucker control; degree of disease and insect damage; maturity at harvesting; whether tobacco was primed or not, and farmer's reasons for high, low or no higher yields.

Following interview, each farmer also was rated by the interviewer concerning: how quickly the respondent adopted new recommended tobacco production practices; the respondent's interest in improved tobacco production practices and increasing net returns; the respondent's attitude toward the survey, and how well the interviewer knew the respondent.

## I. FARM AND PERSONAL DATA

Size of Farm and Cropland. Table III shows that 17 (63 percent) of the 27 growers in the considerably below average group had farms with less than fifty acres in size, or 43 percent of all the farms with less than fifty acres, fell in the group with less than $400 net income per acre. Forty percent of the farms with less than 25 acres of cropland also fell in the considerably below average group. The trend indicates that as the total acreage and cropland acreage increased the net returns increased. Of the 28 farms with over 100 total acres, 11 (about 39 percent) were in the considerably above average group with over $1000 or

TABLE III

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO SIZE OF FARM AND CROPLAND, IN ACRES, ON 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Size of Farm Acres | | | | | | Cropland Acres | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Below 50 | | 50-100 | | Over 100 | | Total | | Below 25 | | 25-50 | | Over 50 | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 17 | 15.8 | 9 | 8.3 | 1 | 0.9 | 27 | 25 | 16 | 14.8 | 11 | 10.2 | 0 | 0 |
| Below average ($400-$699) | 27 | 25 | 9 | 8.3 | 12 | 11.1 | 6 | 5.6 | 27 | 25 | 11 | 10.2 | 13 | 12.0 | 3 | 2.8 |
| Above average ($700-$999) | 27 | 25 | 9 | 8.3 | 8 | 7.4 | 10 | 9.3 | 27 | 25 | 7 | 6.5 | 12 | 11.1 | 8 | 7.4 |
| Considerably above average ($1000 or more) | 27 | 25 | 4 | 3.7 | 12 | 11.1 | 11 | 10.2 | 27 | 25 | 7 | 6.5 | 11 | 10.2 | 9 | 8.3 |
| Total Study | 108 | 100 | 39 | 36.1 | 41 | 37.9 | 28 | 26.0 | 108 | 100 | 41 | 38.0 | 47 | 43.5 | 20 | 18.5 |

more net income per acre. Nine (45 percent) of the 20 farms that had over 50 acres of cropland were also in the considerably above average group. Increases in size of farm and size of cropland appear to be proportional to increases in net returns.

Soil Type Classification. The fifty-nine soil types identified on the 108 farms were classified into five groups: superior; excellent; good; fair, and poor. Table IV shows that 21 (19.5 percent) grew tobacco on soils classified as superior, 35 (32.5 percent) on excellent soils, 26 (24.0 percent) on good soils, 12 (11.1 percent) on fair soils, and 14 (12.9 percent) on poor soils. Seven farmers (33.3 percent of those having superior soils) in the two groups below average reported growing tobacco on superior soils while 14 (66.7 percent of those having superior soils) in the two groups above average grew tobacco on superior soils. There was a general relation between better soil and higher net returns per acre. In the two groups below average, 21 farmers grew tobacco on fair and poor soils, but in the two higher groups only five farmers grew tobacco on fair and poor soils. There was some indication that factors other than soil type were responsible for low net returns on land of high productive capacity.

Tenure Status and Managerial Responsibility. The tobacco was grown by the owners on 71.3 percent of the farms and by the tenants or sharecroppers on the other 28.7 percent of the farms as shown in Table V. Owners appeared to receive higher net returns than did tenants and sharecroppers. In the considerably below average group the tobacco was grown

TABLE IV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO SOIL TYPE CLASSIFICATION OF LAND ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers Producing Tobacco by Soil Type Group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Superior | | Excellent | | Good | | Fair | | Poor | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 4 | 3.7 | 3 | 2.8 | 7 | 6.5 | 5 | 4.6 | 8 | 7.4 |
| Below average ($400-$699) | 27 | 25 | 3 | 2.8 | 10 | 9.3 | 6 | 5.5 | 4 | 3.7 | 4 | 3.7 |
| Above average ($700-$999) | 27 | 25 | 7 | 6.5 | 11 | 10.2 | 8 | 7.4 | 0 | 0 | 1 | 0.9 |
| Considerably above average ($1000 or more) | 27 | 25 | 7 | 6.5 | 11 | 10.2 | 5 | 4.6 | 3 | 2.8 | 1 | 0.9 |
| Total Study | 108 | 100 | 21 | 19.5 | 35 | 32.5 | 26 | 24.0 | 12 | 11.1 | 14 | 12.9 |

TABLE V

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TENURE AND DECISION MAKING STATUSES ON 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Tobacco Grown By | | | | | | Tobacco Decisions Made By | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Owner | | Tenant | | Share Cropper | | Owner | | Tenant or Share Cropper | | Jointly | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 17 | 15.8 | 8 | 7.4 | 2 | 1.8 | 17 | 15.8 | 9 | 8.3 | 1 | 0.9 |
| Below average ($400-$699) | 27 | 25 | 15 | 13.9 | 7 | 6.5 | 5 | 4.6 | 15 | 13.8 | 6 | 5.6 | 6 | 5.6 |
| Above average ($700-$999) | 27 | 25 | 20 | 18.5 | 4 | 3.7 | 3 | 2.8 | 21 | 19.5 | 1 | 0.9 | 5 | 4.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 0 | 0 | 26 | 24.1 | 1 | 0.9 | 0 | 0 |
| Total Study | 108 | 100 | 77 | 71.3 | 21 | 19.5 | 10 | 9.2 | 79 | 73.2 | 17 | 15.7 | 12 | 11.1 |

by the owner on 17 farms (62.9 percent), and by a tenant or sharecropper on 10 farms (37 percent). But on the considerably above average group, owners grew the tobacco on 25 farms (92.6 percent), and tenants grew the tobacco on the other two farms. Decisions on the 108 farms were made by the owners on 79 farms, by the tenant or sharecropper on 17 farms, and made jointly on 12 farms. The net returns tended to be higher where owners made the decisions. Of the 17 tenants or sharecroppers making all the decisions, nine (53 percent) were in the considerably below average group and only one in the considerably above average group. No trend was indicated where decisions were made jointly, though in the majority of these cases net returns were in below average groups.

Age. Data in Table VI show that 12 (11.1 percent) of the 108 growers were under 40 years of age; 38 (35.2 percent) were between 40 and 60 years of age, and 58 (53.7 percent) were over 60 years of age. Very little difference in net returns was to be noted in age levels excepting in the considerably above average group in which 21 (78 percent) of the 27 were above 60 years of age. Although there appears to be a positive relation between increased age and increased income, the difference in age does not appear to be a limiting factor in influencing net returns.

Educational Level. The data relating to educational levels of the 108 tobacco growers in Table VII show that 22 (20.4 percent) had not gone beyond the fourth grade, 46 (42.6 percent) had not gone beyond the eighth grade, 28 (25.9 percent) had completed nine to twelve years of schooling,

TABLE VI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO AGES OF 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers by Age Groups | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Young Below 40 | | Medium 40 to 60 | | Old Over 60 | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 5 | 4.6 | 10 | 9.3 | 12 | 11.1 |
| Below average ($400-$699) | 27 | 25 | 4 | 3.7 | 11 | 10.2 | 12 | 11.1 |
| Above average ($700-$999) | 27 | 25 | 2 | 1.9 | 12 | 11.1 | 13 | 12.0 |
| Considerably above average ($1000 or more) | 27 | 25 | 1 | 0.9 | 5 | 4.6 | 21 | 19.5 |
| Total Study | 108 | 100 | 12 | 11.1 | 38 | 35.2 | 58 | 53.7 |

TABLE VII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO EDUCATIONAL LEVELS ATTAINED BY 108 SELECTED FARM OWNERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns Land, Labor, and Management | All Farmers Included | | Number of Years of School Completed | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0-4 | | 5-8 | | 9-12 | | 13 or More | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 7 | 6.5 | 13 | 12.0 | 6 | 5.6 | 1 | 0.9 |
| Below average ($400-$699) | 27 | 25 | 5 | 4.6 | 14 | 13.0 | 5 | 4.6 | 3 | 2.8 |
| Above average ($700-$999) | 27 | 25 | 6 | 5.6 | 7 | 6.5 | 10 | 9.2 | 4 | 3.7 |
| Considerably above average ($1000 or more) | 27 | 25 | 4 | 3.7 | 12 | 11.1 | 7 | 6.5 | 4 | 3.7 |
| Total Study | 108 | 100 | 22 | 20.4 | 46 | 42.6 | 28 | 25.9 | 12 | 11.1 |

and 12 (11.1 percent) had some college training. The two below average groups had a total of 15 (13.9 percent) farmers that had some schooling above the eighth grade levels; while the two groups above average had a total of 25 (23.3 percent) that had some schooling above the eighth grade. It appears that education does have some influence; farmers that had completed nine or more years of schooling had somewhat higher net returns per acre than did those at lower educational levels.

Sex of Operators. Table VIII shows that 98 (90.7 percent) of the farms were operated by male operators and 10 (9.3 percent) were operated by female operators. Four (3.7 percent) of the 27 in the considerably below average group were operated by females; while only one (0.9 percent) owner in the considerably above average group was a woman, and the tobacco was actually grown with the help of her son. The percentage of female operators was low, but, generally, net returns per acre decreased as the number of female operators increased.

Major Source of Income. The data relating to the major source of income are presented in Table IX. The largest proportion, 53 (49.2 percent) depended on tobacco as the major source of income; on 12 (11.1 percent) farms, dairying was the major source of income; livestock was the major source on 11 (10.1 percent) farms, and 32 (29.6 percent) depended on other sources or off the farm employment as their major source of income. No significant trends were indicated in any of the groups when tobacco was the major source of income. Eleven of the 12 operators,

TABLE VIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO SEX OF FARM OWNERS ON 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | All Farm Owners | | | |
|---|---|---|---|---|---|---|
| | | | Male | | Female | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 23 | 21.3 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 24 | 22.2 | 3 | 2.8 |
| Above average ($700-$999) | 27 | 25 | 25 | 23.1 | 2 | 1.9 |
| Considerably above average ($1000 or more) | 27 | 25 | 26 | 24.1 | 1 | 0.9 |
| Total Study | 108 | 100 | 98 | 90.7 | 10 | 9.3 |

TABLE IX

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO MAJOR SOURCE OF INCOME ON 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Major Sources of Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tobacco | | Dairying | | Livestock | | Other | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 15 | 13.9 | 0 | 0 | 2 | 1.8 | 10 | 9.3 |
| Below average ($400-$699) | 27 | 25 | 10 | 9.3 | 1 | 0.9 | 1 | 0.9 | 15 | 13.9 |
| Above average ($700-$999) | 27 | 25 | 10 | 9.3 | 8 | 7.4 | 4 | 3.7 | 5 | 4.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 18 | 16.7 | 3 | 2.8 | 4 | 3.7 | 2 | 1.8 |
| Total Study | 108 | 100 | 53 | 49.2 | 12 | 11.1 | 11 | 10.1 | 32 | 29.6 |

that reported dairying as their major source, were in one or the other of the above average groups; and eight of the 11 that reported livestock as their major source were also in one or the other of the two groups above average. Twenty-five of the 32 that reported "other" or outside farm income as their major source were in one or the other of the two below average groups. Higher percentages of the operators depending on dairying and livestock as major sources of income had higher net returns from tobacco than was true for the other groups.

## II. INDIVIDUAL PRODUCTION PRACTICES

Manure Usage. Data presented in Table X show that a relation appears to exist between the amounts of manure used and net returns per acre. Of the 108 growers interviewed, 37 (34.7 percent) reportedly used no manure, 27 (24.9 percent) used up to ten tons per acre, 21 (19.5 percent used from ten to fifteen tons per acre, and 23 (21.4 percent) used fifteen tons or more per acre. Forty percent of the producers that used no manure at all were in the considerably below average group, while only 5 percent were in the considerably above average group. Of the 44 growers that reported using ten tons of manure per acre or more, 12 (27.2 percent) were in the two below average groups, and 32 (72.8 percent) were in the two above average groups. Data suggest that the use of manure may be a very important consideration to growers desiring to get a relatively high net income per acre.

TABLE X

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TONS OF MANURE APPLIED TO TOBACCO APPLIED PER ACRE BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns Land, Labor, and Management | All Farmers Included | | Farmers by Tons Applied Group Per Acre Per Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | Below 10 | | 10-15 | | 15 or more | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 15 | 13.9 | 9 | 8.3 | 3 | 2.8 | 0 | 0 |
| Below average ($400-$699) | 27 | 25 | 13 | 12.0 | 5 | 4.6 | 3 | 2.8 | 6 | 5.6 |
| Above average ($700-$999) | 27 | 25 | 7 | 6.5 | 9 | 8.3 | 8 | 7.4 | 3 | 2.8 |
| Considerably above average ($1000 or more) | 27 | 25 | 2 | 1.8 | 4 | 3.7 | 7 | 6.5 | 14 | 13.0 |
| Total Study | 108 | 100 | 37 | 34.2 | 27 | 24.9 | 21 | 19.5 | 23 | 21.4 |

Soil Testing. Table XI shows that, of the 108 tobacco growers interviewed, only 10 reported having followed soil test recommendations--the remaining 98 reported not having taken soil tests on the tobacco soils. Though a slightly larger number of those in the two above average groups (6) reported using soil tests as a guide to fertilization of tobacco than was true with those classified below average (4), differences between groups were not large enough to suggest significance.

Commercial Fertilizer Usage. As seen in Table XII, the total number of pounds of commercial fertilizer used did not indicate any consequential differences, though more farmers in above average categories used more fertilizer than was true in below average categories. None of the 108 growers interviewed reported using less than 500 pounds per acre, 4 reported between 500 and 899 pounds, 6 reported between 900 and 1,299 pounds, 27 reported between 1,300 and 1,799 pounds, 32 reported between 1,800 and 2,299 pounds, and 39 reported using over 2,300 pounds.

Nitrogen Usage. Data in Table XIII, showing the reported use of nitrogen per acre, do not appear to indicate any large differences between net return groups. Of the 108 growers, 72 (66.7 percent) were applying over 100 pounds of nitrogen per acre, 31 (28.8 percent) reported 50 through 99 pounds, and 5 (4.5 percent) reported one through 49 pounds. However, there were twice as many growers using above 150 pounds of nitrogen in the considerably above average group than in the considerably below average group. Few differences are to be noted between groups where other amounts of nitrogen were used.

TABLE XI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO NUMBERS OF GROWERS WHO FERTILIZED TOBACCO ACCORDING TO SOIL TEST RECOMMENDATIONS AS REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers Following Soil Test Recommendations | | | |
|---|---|---|---|---|---|---|
| | | | Yes | | No | |
| | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 27 | 25.0 |
| Below average ($400-$699) | 27 | 25 | 4 | 3.7 | 23 | 21.3 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 27 | 25.0 |
| Considerably above average ($1000 or more) | 27 | 25 | 6 | 5.6 | 21 | 19.4 |
| Total Study | 108 | 100 | 10 | 9.3 | 98 | 90.7 |

TABLE XII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO AVERAGE POUNDS OF COMMERCIAL FERTILIZER USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers by Commercial Fertilizer Applied Group Average Pounds Per Acre Per Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | 100-499 | | 500-899 | | 900-1299 | | 1300-1799 | | 1800-2299 | | 2300 or More | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 0 | 0 | 1 | 0.9 | 3 | 2.8 | 9 | 8.3 | 7 | 6.5 | 7 | 6.5 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.9 | 6 | 5.6 | 8 | 7.4 | 12 | 11.1 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 0 | 0 | 1 | 0.9 | 0 | 0 | 8 | 7.4 | 12 | 11.1 | 6 | 5.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 0 | 0 | 2 | 1.8 | 2 | 1.9 | 4 | 3.7 | 5 | 4.6 | 14 | 13.0 |
| Total Study | 108 | 100 | 0 | 0 | 0 | 0 | 4 | 3.6 | 6 | 5.6 | 27 | 25.0 | 32 | 29.6 | 39 | 36.2 |

TABLE XIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO AVERAGE POUNDS OF NITROGEN USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers by Average Pounds of Nitrogen Applied Per Acre in Commercial Fertilizer | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | 1-49 | | 50-99 | | 100-149 | | 150-200 | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 2 | 1.8 | 10 | 9.3 | 10 | 9.3 | 5 | 4.6 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 0 | 0 | 7 | 6.5 | 15 | 13.9 | 5 | 4.6 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 1 | 0.9 | 8 | 7.4 | 11 | 10.2 | 7 | 6.5 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 2 | 1.8 | 6 | 5.6 | 9 | 8.3 | 10 | 9.3 |
| Total Study | 108 | 100 | 0 | 0 | 5 | 4.5 | 31 | 28.8 | 45 | 41.7 | 27 | 25.0 |

Phosphate Usage. All of the 108 growers interviewed reported using 50 or more pounds of phosphate per acre. As seen in Table XIV, 4.6 percent reported using between 50 and 99 pounds per acre, 14.8 percent reported using between 100 and 149 pounds, 24.2 percent reported using between 150 and 199 pounds, 31.5 percent reported using between 200 and 249 pounds, and 24.9 percent reported using 250 pounds or more per acre. The information in this study did not show enough differences in the use of $P_2O_5$ between the different groups to be an important factor in the net returns. Only 4.6 percent of the growers used below 100 to 149 pounds of $P_2O_5$ per acre. Based on the average Anderson County tests indicating that soils are generally low in $P_2O_5$, the University of Tennessee Soils Laboratory recommends 120 pounds of $P_2O_5$ per acre for growing tobacco. Therefore, it can be assumed that most of the 95.4 percent of the growers that reported using 100 pounds or more of $P_2O_5$ per acre could be considered to be fertilizing at near the recommended rate. At the same time, it would appear that fully 80 percent of the growers were using more $P_2O_5$ than needed.

Potash Usage. Data in Table XV show that only 3 (2.7 percent) applied less than 100 pounds of $K_2O$ per acre, 6 (5.5 percent) applied from 100 pounds through 149 pounds of $K_2O$ per acre, 21 (19.5 percent) reported 150 pounds through 199 pounds of $K_2O$ per acre, and 78 (72.3 percent) reported above 200 pounds of $K_2O$ per acre. A summary of soils tested in Anderson County in 1958 through 1960 shows that the average soil test was medium in available $K_2O$. The University of Tennessee

TABLE XIV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO AVERAGE POUNDS OF PHOSPHATE USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers by Average Pounds of $P_2O_5$ Applied Per Acre in Commercial Fertilizer | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | 50-99 | | 100-149 | | 150-199 | | 200-249 | | 250 and Above | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 1 | 0.9 | 7 | 6.5 | 8 | 7.4 | 6 | 5.6 | 5 | 4.6 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 0 | 0 | 4 | 3.7 | 6 | 5.6 | 9 | 8.3 | 8 | 7.4 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 1 | 0.9 | 1 | 0.9 | 10 | 9.3 | 10 | 9.3 | 5 | 4.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 3 | 2.8 | 4 | 3.7 | 2 | 1.9 | 9 | 8.3 | 9 | 8.3 |
| Total Study | 108 | 100 | 0 | 0 | 5 | 4.6 | 16 | 14.8 | 26 | 24.2 | 34 | 31.5 | 27 | 24.9 |

TABLE XV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO AVERAGE POUNDS OF POTASH USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers By Average Pounds of $K_2O$ Applied Per Acre in Commercial Fertilizer | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | Below 100 | | 100-149 | | 150-199 | | 200-299 | | 250 Above | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 2 | 1.8 | 3 | 2.8 | 7 | 6.5 | 2 | 1.9 | 13 | 12.0 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 6.5 | 4 | 3.7 | 16 | 14.8 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 0 | 0 | 1 | 0.9 | 1 | 0.9 | 10 | 9.3 | 15 | 13.9 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 1 | 0.9 | 2 | 1.8 | 6 | 5.6 | 2 | 1.9 | 16 | 14.8 |
| Total Study | 108 | 100 | 0 | 0 | 3 | 2.7 | 6 | 5.5 | 21 | 19.5 | 18 | 16.8 | 60 | 55.5 |

Agronomy Department recommends the application of 180 pounds of $K_2O$ per acre on tobacco when the soil test indicates the available $K_2O$ to be medium. Based on these data, the use of $K_2O$ does not appear to be a limiting factor. However, it appears that more than 80 percent of the farmers were using more $K_2O$ than recommended.

Fertilizer Placement. Table XVI shows that 75 percent of the tobacco growers interviewed used the broadcast method, 11 percent used the row application method, and 14 percent used both methods. Farmers in all groups generally preferred the broadcast method of applying fertilizer. No differences are to be noted.

Plant Bed Fertilization. Data in Table XVII disclose that 79.8 percent of the 108 tobacco producers interviewed used more than the .5 to .74 pounds of fertilizer per square yard of plant bed. The trend was toward over-fertilization; however there was a much larger percent in the two lower groups that over-fertilized the plant bed than in the two higher groups. Of the 63.1 percent that used one pound per square yard, 21.3 percent fell in the considerably below average group, while only 13.0 percent were in the considerably above average group.

Plant Bed Sterilization. As seen in Table XVIII, 70.4 percent of the tobacco producers interviewed reported burning as the method used to sterilize tobacco plant beds, 6.5 percent used cyanamid, 22.2 percent used methyl bromide, and 0.9 percent did not sterilize the plant bed. From the data presented in this table, it did not appear that either the

TABLE XVI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO FERTILIZER PLACEMENT ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Methods of Applying Fertilizer to Field | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Broadcast | | Row | | Broadcast and Row | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 18 | 16.7 | 5 | 4.6 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 22 | 20.4 | 1 | 0.9 | 4 | 3.7 |
| Above average ($700-$999) | 27 | 25 | 21 | 19.4 | 2 | 1.9 | 4 | 3.7 |
| Considerably above average ($1000 or more) | 27 | 25 | 20 | 18.5 | 3 | 2.8 | 4 | 3.7 |
| Total Study | 108 | 100 | 81 | 75.0 | 11 | 10.2 | 16 | 14.8 |

TABLE XVII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO FERTILIZER TREATMENTS OF TOBACCO BEDS ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Pounds of Commercial Fertilizer Applied Per Square Yard of Plant Bed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | 0-.49 | | .50-.74 | | .75-.99 | | 1.0 and Above | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 1 | 0.9 | 0 | 0 | 2 | 1.9 | 1 | 0.9 | 23 | 21.3 |
| Below average ($400-$699) | 27 | 25 | 1 | 0.9 | 0 | 0 | 2 | 1.8 | 7 | 6.5 | 17 | 15.8 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 2 | 1.8 | 9 | 8.3 | 2 | 1.9 | 14 | 13.0 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 1 | 0.9 | 4 | 3.7 | 8 | 7.4 | 14 | 13.0 |
| Total Study | 108 | 100 | 2 | 1.8 | 3 | 2.7 | 17 | 15.7 | 18 | 16.7 | 68 | 63.1 |

TABLE XVIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO METHODS AND TIME OF PLANT BED STERILIZATION ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Method of Sterilization | | | | | | | | Time of Sterilization | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | Burned | | Cyanamid | | Methyl Bromide | | None | | Fall | | Spring | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 22 | 20.4 | 1 | 0.9 | 4 | 3.7 | 0 | 0 | 0 | 0 | 27 | 25.0 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 19 | 17.6 | 2 | 1.8 | 6 | 5.6 | 0 | 0 | 3 | 2.8 | 24 | 22.2 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 16 | 14.8 | 2 | 1.9 | 9 | 8.3 | 0 | 0 | 2 | 1.9 | 25 | 23.1 |
| Considerably above average ($1000 or more) | 27 | 25 | 1 | 0.9 | 19 | 17.6 | 2 | 1.9 | 5 | 4.6 | 1 | 0.9 | 4 | 3.7 | 22 | 20.4 |
| Total Study | 108 | 100 | 1 | 0.9 | 76 | 70.4 | 7 | 6.5 | 24 | 22.2 | 1 | 0.9 | 9 | 8.4 | 98 | 90.7 |

method or the time of plant bed sterilization had any important influence on the net returns per acre.

Tobacco Varieties. Table XIX shows that Burley 21 and Kentucky 16 were the varieties most often grown. Of the 108 Anderson County farmers included in this study, 26.8 percent grew Kentucky 16, 48.2 percent grew Burley 21, 1.8 percent grew Burley 11A or 11B, 7.5 percent grew Burley 37, and 15.7 percent grew other varieties. The variety grown did not seem to influence the net returns to a large degree, however there was some indication that the growers with higher net returns grew the Burley 21 variety. Of the growers interviewed, 11.1 percent in the two lower groups grew varieties other than the five most commonly grown, while only 4.6 percent in the two higher groups grew other than the five most common varieties.

Plant Bed Seeding Rate. The University of Tennessee Agronomy Department recommends that tobacco seed be planted at the rate of two to three level teaspoonfuls per 900 square feet of plant bed. Table XX shows that 40 (36.9 percent) of the 108 Anderson County tobacco growers interviewed followed the recommended rate. Of those reporting use of 2 to 3 teaspoons, thirteen (12.0 percent) fell in the two below average groups, and 27 (24.9 percent) fell in the two above average groups. The trend seemed to indicate that the lower net income groups seeded the plant beds heavier than the higher net income groups.

TABLE XIX

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TOBACCO VARIETIES USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Tobacco Varieties | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ky. 16 | | Burley 21 | | Burley 11A or 11B | | Burley 37 | | Other[a] | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 13 | 12.0 | 8 | 7.4 | 0 | 0 | 3 | 2.8 | 3 | 2.8 |
| Below average ($400-$699) | 27 | 25 | 5 | 4.6 | 11 | 10.2 | 0 | 0 | 2 | 1.9 | 9 | 8.3 |
| Above average ($700-$999) | 27 | 25 | 8 | 7.4 | 15 | 13.9 | 1 | 0.9 | 0 | 0 | 3 | 2.8 |
| Considerably above average ($1000 or more) | 27 | 25 | 3 | 2.8 | 18 | 16.7 | 1 | 0.9 | 3 | 2.8 | 2 | 1.8 |
| Total Study | 108 | 100 | 29 | 26.8 | 52 | 48.2 | 2 | 1.8 | 8 | 7.5 | 17 | 15.7 |

[a]Other varieties included Ky. 35, Ky. 31, and Burley 2.

TABLE XX

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO PLANT BED SEEDING RATE USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Level Teaspoons Seed Used Per 900 Square Feet of Plant Bed | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 | | 3 | | 4 | | 5 | | Higher | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 7 | 6.5 | 3 | 2.8 | 13 | 12.0 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 2 | 1.8 | 4 | 3.7 | 7 | 6.5 | 6 | 5.6 | 8 | 7.4 |
| Above average ($700-$999) | 27 | 25 | 5 | 4.6 | 5 | 4.6 | 7 | 6.5 | 6 | 5.6 | 4 | 3.7 |
| Considerably above average ($1000 or more) | 27 | 25 | 5 | 4.6 | 12 | 11.1 | 4 | 3.7 | 4 | 3.7 | 2 | 1.9 |
| Total Study | 108 | 100 | 12 | 11.0 | 28 | 25.9 | 21 | 19.5 | 29 | 26.9 | 18 | 16.7 |

Plant Bed Weed Infestation and Control. Reference to data presented in Table XXI shows that 21 (19.5 percent) of the 108 Anderson County tobacco growers interviewed reported no weeds in tobacco plant beds, 59 (54.7 percent) reported good weed control, 27 (24.9 percent) reported fair control, and 1 (0.9 percent) reported poor weed control. There is some indication that the higher net returns groups did a better job of controlling weeds in the plant bed than did the others, since, of the total of 21 reporting no weeds at all, 15 were in the former groups and only six were in the latter groups.

Quality of Tobacco Plants. Data presented in Table XXII show that of the total of 27 that reported they had excellent quality plants 14 were in the considerably above average group and one was in the considerably below average group, eight were in the above average group and four were in the below average group. None in the two groups above average net returns reported poor plants, while four growers in the two groups below average reported poor quality plants. From these data it would appear that tobacco producers with higher net returns per acre tended to have better quality plants.

Plant Bed Insect Control. Table XXIII discloses that of the 108 Anderson County tobacco growers interviewed, 44 (40.7 percent) used insecticides on the tobacco plant bed and 64 (59.3 percent) did not treat the plant bed with insecticides. Of the 44 that did apply insecticides, 19 were in the considerably above average group and five were in the

TABLE XXI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO PLANT BED WEED INFESTATION AND CONTROL OF 108 FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Weed Infestation and Degree of Control in Plant Beds | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | Good | | Fair | | Poor | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 3 | 2.8 | 15 | 13.9 | 8 | 7.4 | 1 | 0.9 |
| Below average ($400-$699) | 27 | 25 | 3 | 2.8 | 19 | 17.6 | 5 | 4.6 | 0 | 0 |
| Above average ($700-$999) | 27 | 25 | 8 | 7.4 | 10 | 9.3 | 9 | 8.3 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 7 | 6.5 | 15 | 13.9 | 5 | 4.6 | 0 | 0 |
| Total Study | 108 | 100 | 21 | 19.5 | 59 | 54.7 | 27 | 24.9 | 1 | 0.9 |

TABLE XXII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO QUALITY OF TOBACCO PLANTS REPORTED BY 108 FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Quality of Plants | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Excellent | | Good | | Fair | | Poor | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 1 | 0.9 | 19 | 17.6 | 5 | 4.6 | 2 | 1.9 |
| Below average ($400-$699) | 27 | 25 | 4 | 3.7 | 19 | 17.6 | 2 | 1.8 | 2 | 1.9 |
| Above average ($700-$999) | 27 | 25 | 8 | 7.4 | 14 | 13.0 | 5 | 4.6 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 14 | 13.0 | 12 | 11.1 | 1 | 0.9 | 0 | 0 |
| Total Study | 108 | 100 | 27 | 25.0 | 64 | 59.3 | 13 | 11.9 | 4 | 3.8 |

TABLE XXIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO USE OF INSECTICIDES AND EFFECTIVENESS OF INSECT CONTROL IN TOBACCO PLANT BEDS OF 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Insecticides Used on Plant Bed | | | | Effectiveness of Insect Control in Plant Beds | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Yes | | No | | Good | | Fair | | Poor | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 5 | 4.6 | 22 | 20.4 | 8 | 7.4 | 15 | 13.9 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 8 | 7.4 | 19 | 17.6 | 14 | 13.0 | 11 | 10.2 | 2 | 1.8 |
| Above average ($700-$999) | 27 | 25 | 12 | 11.1 | 15 | 13.9 | 19 | 17.6 | 8 | 7.4 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 19 | 17.6 | 8 | 7.4 | 21 | 19.4 | 6 | 5.6 | 0 | 0 |
| Total Study | 108 | 100 | 44 | 40.7 | 64 | 59.3 | 62 | 57.4 | 40 | 37.1 | 6 | 5.5 |

considerably below average group. Eight in the considerably above average group did not use insecticides and 22 in the considerably below average group did not use insecticides. Therefore, it is seen that a large percent of those with per acre net returns above the average (57.4 percent) reported using insecticides on plant beds than was true for those with per acre net returns below the average (24.1 percent).

The effectiveness of the insect control on the tobacco plant bed also increased as the net returns increased. Tobacco farmers with higher net returns per acre apparently tended to do a better job of plant bed insect control than did farmers with lower net returns per acre.

Time and Method of Transplanting Tobacco Plants. Reference to Table XXIV shows that, of the 108 Anderson County tobacco farmers interviewed, 43 transplanted early, 54 transplanted during the mid-period, and 11 transplanted relatively late. A large percent of those in the low net returns groups (77.8 percent) transplanted from the mid-period to the late; while most of the growers in the higher net returns group (98.1 percent) were transplanting from early to the mid-period. Eighteen of the 27 growers in the considerably above average group transplanted early, while only five in the considerably below average transplanted early. It would seem that the time of season that tobacco is set does have an influence on net returns per acre.

Seventy-two of the growers interviewed set their tobacco plants by hand and 36 set them by machine. Data in Table XXIV do not show any differences between the groups as to methods of setting tobacco.

TABLE XXIV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TIME AND METHOD OF TRANSPLANTING TOBACCO PLANTS REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Time of Transplanting[a] | | | | | | Method of Transplanting | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Early | | Mid-Period | | Late | | Hand | | Machine | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 5 | 4.6 | 16 | 14.8 | 6 | 5.6 | 18 | 16.7 | 9 | 8.3 |
| Below average ($400-$699) | 27 | 25 | 7 | 6.5 | 16 | 14.8 | 4 | 3.7 | 20 | 18.5 | 7 | 6.5 |
| Above average ($700-$999) | 27 | 25 | 13 | 12.1 | 13 | 12.0 | 1 | 0.9 | 16 | 14.8 | 11 | 10.2 |
| Considerably above average ($1000 or more) | 27 | 25 | 18 | 16.7 | 9 | 8.3 | 0 | 0 | 18 | 16.7 | 9 | 8.3 |
| Total Study | 108 | 100 | 43 | 39.9 | 54 | 49.9 | 11 | 10.2 | 72 | 66.7 | 36 | 33.3 |

[a]Early: Before May 20; Mid-Period: May 20-31; Late: June 1 or later.

Rotation Practices. Table XXV shows that 59.3 percent of the growers interviewed reported that they grew tobacco continuously on the same land, 27.7 percent reported growing tobacco one year out of every two years, and 13.0 percent reported growing tobacco one year out of each three years on the same land. A larger percentage of the growers in the higher net return groups apparently had used rotation practices than was true with the others.

Cover Crops Grown. Data presented in Table XXVI shows that 49.1 percent of the 108 tobacco producers interviewed did not use a cover crop, 14.8 percent used small grain as a cover crop, 11.2 percent reported a mixture of grain and clover, 23.1 percent used clover, and 1.8 percent reported using grass as a cover crop. Nineteen of the 53 growers that reported using no cover crops were in the considerably below average net returns group, and only six were in the considerably above average group. Clover was found to be the cover crop predominately used, with small grain next, and grass last. Generally, the trend was toward higher net returns as the percentage of the growers using cover crops increased. This indicates that the use of cover crops may be an important factor in increasing net returns from tobacco.

Depth of Cultivation. Table XXVII shows that out of the 108 Anderson County tobacco producers interviewed, 25.1 percent practiced deep cultivation on first cultivation, and 74.9 percent used shallow cultivation. Approximately the same percentages existed during other cultivations. Depth of cultivation did not appear to be an important

TABLE XXV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO CROP ROTATION PRACTICES FOLLOWED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Rotation Practices Followed | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Continuous | | Tobacco One Yr. in Two | | Tobacco One Yr. in Three | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 16 | 14.8 | 8 | 7.4 | 3 | 2.8 |
| Below average ($400-$699) | 27 | 25 | 19 | 17.6 | 6 | 5.6 | 2 | 1.8 |
| Above average ($700-$999) | 27 | 25 | 15 | 13.9 | 6 | 5.5 | 6 | 5.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 14 | 13.0 | 10 | 9.2 | 3 | 2.8 |
| Total Study | 108 | 100 | 64 | 59.3 | 30 | 27.7 | 14 | 13.0 |

TABLE XXVI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO KIND OF COVER CROP USED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Kind of Cover Crop | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | None | | Small Grain | | Grain Clover | | Clover | | Grass | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 19 | 17.6 | 3 | 2.8 | 3 | 2.8 | 2 | 1.8 | 0 | 0 |
| Below average ($400-$699) | 27 | 25 | 19 | 17.6 | 1 | 0.9 | 3 | 2.8 | 4 | 3.7 | 0 | 0 |
| Above average ($700-$999) | 27 | 25 | 9 | 8.3 | 5 | 4.6 | 2 | 1.9 | 10 | 9.3 | 1 | 0.9 |
| Considerably above average ($1000 or more) | 27 | 25 | 6 | 5.6 | 7 | 6.5 | 4 | 3.7 | 9 | 8.3 | 1 | 0.9 |
| Total Study | 108 | 100 | 53 | 49.1 | 16 | 14.8 | 12 | 11.2 | 25 | 23.1 | 2 | 1.8 |

TABLE XXVII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO DEPTH OF CULTIVATION REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Farmers by Depth on First Cultivation | | | | Farmers by Depth on Other Cultivations | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Deep | | Shallow | | Deep | | Shallow | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 6 | 5.6 | 21 | 19.4 | 6 | 5.6 | 21 | 19.4 |
| Below average ($400-$699) | 27 | 25 | 7 | 6.5 | 20 | 18.5 | 8 | 7.4 | 19 | 17.6 |
| Above average ($700-$999) | 27 | 25 | 7 | 6.5 | 20 | 18.5 | 8 | 7.4 | 19 | 17.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 7 | 6.5 | 20 | 18.5 | 4 | 3.7 | 23 | 21.3 |
| Total Study | 108 | 100 | 27 | 25.1 | 81 | 74.9 | 26 | 24.1 | 82 | 75.9 |

factor in net returns received per acre by the growers interviewed in this study.

Row Width and Spacing. Data presented in Table XXVIII show that 81.4 percent of the 108 growers transplanted their tobacco in three and one half foot rows, which is the width recommended by the University of Tennessee Agronomy Department where plants are from 15 to 18 inches apart in the rows (11). There was a larger percentage in the higher net return groups using the recommended width, than in the lower net returns groups. Of the four producers that reported growing tobacco in rows closer than three and one half feet, all were in the two lower net return groups. Of the 8 growers spacing plants 10 and 12 inches apart in rows, 6 were in below net return groups.

Stand Obtained and Uniformity of Stand. Table XXIX shows that 75 percent of the 108 producers reported having a tobacco stand above 95 percent, 21.3 percent reported a stand from 90 to 95 percent, and 3.7 percent reported having less than a 90 percent stand. Twenty-three out of 27 in the considerably above average group reported having a stand of over 95 percent, while 11 out of 27 in the considerably below average group reported having a stand of over 95 percent. Three of the considerably below average group had less than a 90 percent stand, while none of the two groups above average reported having less than a 90 percent stand. The data in this table indicate that larger percentages of the two groups with net returns above average had better plant stands.

TABLE XXVIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO ROW WIDTH AND SPACING REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Width of Rows | | | | | | | | Spacing Within Rows | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 Feet | | 3¼ Feet | | 3½ Feet | | Other | | 10" and 12" | | 14" and 16" | | 18" and 20" | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 1 | 0.9 | 4 | 3.7 | 20 | 18.5 | 2 | 1.9 | 4 | 3.7 | 15 | 13.9 | 8 | 7.4 |
| Below average ($400-$699) | 27 | 25 | 3 | 2.8 | 1 | 0.9 | 20 | 18.5 | 3 | 2.8 | 2 | 1.9 | 12 | 11.1 | 13 | 12.0 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 2 | 1.9 | 24 | 22.2 | 1 | 0.9 | 1 | 0.9 | 11 | 10.2 | 15 | 13.9 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 2 | 1.9 | 24 | 22.2 | 1 | 0.9 | 1 | 0.9 | 15 | 13.9 | 11 | 10.2 |
| Total Study | 108 | 100 | 4 | 3.7 | 9 | 8.4 | 88 | 81.4 | 7 | 6.5 | 8 | 7.4 | 53 | 49.1 | 47 | 43.5 |

TABLE XXIX

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TOBACCO STAND AND UNIFORMITY OF STAND REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Percent of Stand | | | | | | Uniformity of Stand | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Above 95% Stand | | 90%-95% Stand | | Less Than 90% Stand | | Good | | Medium | | Poor | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 11 | 10.2 | 13 | 12.0 | 3 | 2.8 | 9 | 8.3 | 14 | 13.0 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 22 | 20.4 | 4 | 3.7 | 1 | 0.9 | 15 | 13.9 | 9 | 8.3 | 3 | 2.8 |
| Above average ($700-$999) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 0 | 0 | 21 | 19.4 | 6 | 5.6 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 23 | 21.3 | 4 | 3.7 | 0 | 0 | 21 | 19.4 | 6 | 5.6 | 0 | 0 |
| Total Study | 108 | 100 | 81 | 75.0 | 23 | 21.3 | 4 | 3.7 | 66 | 61.0 | 35 | 32.5 | 7 | 6.5 |

Concerning uniformity of stand, 66 of the 108 growers reported good uniformity. Of the 27 growers in the considerably above average group, 21 reported good uniformity; of the 27 in the considerably below average group, only 9 reported uniformity to be good. As the degree of uniformity of stand within the groups increased, the net returns appeared also to increase.

Topping. The stage of maturity at which tobacco was topped, as shown by data in Table XXX, appears to be an important factor affecting net returns. Of the 27 growers in the considerably below average group, 14 reported topping late (after 75 percent of the plants were in bloom), only 3 of the 27 in the highest net return group reported topping late. More growers with below average net returns per acre tended to top at medium (when 40 to 75 percent of the plants are in bloom) to late times; while more growers with above average net returns topped at medium to early (before 40 percent of the plants are in bloom) times.

Although the University of Tennessee Agronomy Department recommends that tobacco be topped at medium height of 22 to 26 leaves per stalk, this study did not show clearly any relation between height of topping and net returns. Generally, the majority of the growers reported topping at the recommended height.

Time Between Topping and Harvest. Table XXXI discloses that, of the 108 producers interviewed, 79 reported three weeks or more time between topping and harvest. Of the 79 producers so reporting, 48 (60.8 percent of the 79) were above average in net returns. Of the 29 that

TABLE XXX

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO STAGE OF MATURITY AND HEIGHT OF TOBACCO WHEN TOPPED AS REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Stage of Maturity[a] | | | | | | Height of Topping[b] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Early | | Medium | | Late | | High | | Medium | | Low | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 3 | 2.8 | 10 | 9.2 | 14 | 13.0 | 12 | 11.1 | 13 | 12.0 | 2 | 1.9 |
| Below average ($400-$699) | 27 | 25 | 7 | 6.5 | 14 | 13.0 | 6 | 5.5 | 3 | 2.8 | 18 | 16.7 | 6 | 5.5 |
| Above average ($700-$999) | 27 | 25 | 4 | 3.7 | 15 | 13.9 | 8 | 7.4 | 7 | 6.5 | 13 | 12.0 | 7 | 6.5 |
| Considerably above average ($1000 or more) | 27 | 25 | 9 | 8.3 | 15 | 13.9 | 3 | 2.8 | 4 | 3.7 | 19 | 17.6 | 4 | 3.7 |
| Total Study | 108 | 100 | 23 | 21.3 | 54 | 50.0 | 31 | 28.7 | 26 | 24.1 | 63 | 58.3 | 19 | 17.6 |

[a]Early Topping: Prior to the time when 40 percent of plants are in bloom; Medium Topping: During the time when 40 to 75 percent of the plants are in bloom; Late Topping: After 75 percent or more of plants are in bloom.

[b]High Topping: Over 26 leaves left on stalk; Medium Topping: 22 to 26 leaves left on stalk; Low Topping: Less than 22 leaves left on stalk.

TABLE XXXI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO TIME OF HARVEST AFTER TOPPING AS REPORTED BY 108 SELECTED FARMERS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Length of Time Between Topping and Harvest | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Immediately | | One Week | | Two Weeks | | Three Weeks | | More Than Three Weeks | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 4 | 3.7 | 9 | 8.3 | 10 | 9.3 | 4 | 3.7 |
| Below average ($400-$699) | 27 | 25 | 2 | 1.9 | 0 | 0 | 8 | 7.4 | 9 | 8.3 | 8 | 7.4 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 0 | 0 | 5 | 4.6 | 17 | 15.8 | 5 | 4.6 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 0 | 0 | 1 | 0.9 | 12 | 11.1 | 14 | 13.0 |
| Total Study | 108 | 100 | 2 | 1.9 | 4 | 3.7 | 23 | 21.2 | 48 | 44.5 | 31 | 28.7 |

reported harvesting in two weeks or less after topping, 23 were in the below average group and only 6 in the above average group. There appears to be a definite positive relationship between length of time between topping and harvest and net returns per acre, those harvesting immediately being low and those waiting three or more weeks tending to be high.

Sucker Control. Table XXXII shows that the method of sucker control does not seem to have very much influence on net returns, however the percentage of growers using chemicals to control suckers was larger in the high income groups than in the low. Of the 108 growers interviewed, 28 (26.0 percent) reported excellent sucker control, 55 (50.9 percent) reported good control, 18 (16.7 percent) reported fair control, 5 (4.6 percent) reported poor control, and 2 (1.8 percent) reported no control of suckers. Of the 28 reporting excellent control, 64 percent of them were in the considerably above average group, and only 8 percent were in the considerably below average group. Of the 54 farmers in the two below average net return groups, 20 reported none to fair control; while only 5 of the 54 growers in the two above average groups reported none to fair sucker control. As the degree of sucker control increased, net returns tended also to increase. Data presented in this table show that the degree of sucker control appears to have a decided influence on net returns per acre.

Disease and Insect Damage. Data presented in Table XXXIII show that tobacco growers in all groups reported very little or no disease and insect damage to the tobacco crop. There was very little difference

TABLE XXXII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO LEVELS OF SUCKER CONTROL ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Method of Sucker Control | | | | Degree of Sucker Control | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hand | | Chemical | | Excellent | | Good | | Fair | | Poor | | None | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 2 | 1.9 | 13 | 12.0 | 8 | 7.4 | 3 | 2.8 | 1 | 0.9 |
| Below average ($400-$699) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 4 | 3.7 | 15 | 13.9 | 6 | 5.6 | 1 | 0.9 | 1 | 0.9 |
| Above average ($700-$999) | 27 | 25 | 22 | 20.4 | 5 | 4.6 | 4 | 3.7 | 20 | 18.5 | 2 | 1.9 | 1 | 0.9 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 20 | 18.4 | 7 | 6.5 | 18 | 16.7 | 7 | 6.5 | 2 | 1.8 | 0 | 0 | 0 | 0 |
| Total Study | 108 | 100 | 92 | 85.1 | 16 | 14.9 | 28 | 26.0 | 55 | 50.9 | 18 | 16.7 | 5 | 4.6 | 2 | 1.8 |

TABLE XXXIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO EXTENT OF DISEASE AND INSECT DAMAGE ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Degree of Disease Damage | | | | | | Degree of Insect Damage | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Much | | Some | | None | | Much | | Some | | None | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 0 | 0 | 12 | 11.1 | 15 | 13.9 | 2 | 1.8 | 22 | 20.4 | 3 | 2.8 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 17 | 15.7 | 10 | 9.3 | 0 | 0 | 23 | 21.3 | 4 | 3.7 |
| Above average ($700-$999) | 27 | 25 | 0 | 0 | 13 | 12.0 | 14 | 13.0 | 2 | 1.9 | 21 | 19.4 | 4 | 3.7 |
| Considerably above average ($1000 or more) | 27 | 25 | 0 | 0 | 13 | 12.0 | 14 | 13.0 | 1 | 0.9 | 15 | 13.9 | 11 | 10.2 |
| Total Study | 108 | 100 | 0 | 0 | 55 | 50.8 | 53 | 49.2 | 5 | 4.6 | 81 | 75.0 | 22 | 20.4 |

noticed in the extent of damage reported when the groups were compared, with the exception that the considerably above average group reported the largest number having no insect damage.

Stage of Maturity at Time of Harvest. There appeared to be a definite relationship between the stages of maturity at time of harvesting, as presented in Table XXXIV. Of the 108 growers interviewed, 28.8 percent reportedly harvested tobacco at the ripe stage (entire plant ripe) of maturity, 70.3 percent harvested at the partially ripe stage (some of plant ripe), and 0.9 percent harvested when the tobacco was still green (most of plant green). Fourteen of the 27 in the considerably above average group reported harvesting at the ripe stage; while only 3 of the 27 in the considerably below average group reported harvesting at the ripe stage. An increasingly greater proportion of the two higher net return groups harvested at the ripe stage than was true with the two lower net return groups.

Of the 108 growers, 25 reported priming tobacco and 83 reported that they did not prime their tobacco. Ten of the 27 in the considerably above average group reported priming, while only 5 of the 27 in the considerably below average group reported priming their tobacco. Therefore, there is some indication that priming may possibly have influenced net returns.

Adoption of New Practices. Table XXXV shows how the interviewer rated the respondents according to how quickly they adopted new practices. Of the 108 growers interviewed, 24 were rated as being "among the first

TABLE XXXIV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO STAGE OF MATURITY AT TIME OF HARVEST AND PRIMING OF TOBACCO ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Stage of Maturity at Time Harvested | | | | | | Primed | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ripe | | Partially Ripe | | Green | | Yes | | No | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 3 | 2.8 | 23 | 21.3 | 1 | 0.9 | 5 | 4.6 | 22 | 20.4 |
| Below average ($400-$699) | 27 | 25 | 6 | 5.6 | 21 | 19.4 | 0 | 0 | 6 | 5.6 | 21 | 19.4 |
| Above average ($700-$999) | 27 | 25 | 8 | 7.4 | 19 | 17.6 | 0 | 0 | 4 | 3.7 | 23 | 21.3 |
| Considerably above average ($1000 or more) | 27 | 25 | 14 | 13.0 | 13 | 12.0 | 0 | 0 | 10 | 9.3 | 17 | 15.7 |
| Total Study | 108 | 100 | 31 | 28.8 | 76 | 70.3 | 1 | 0.9 | 25 | 23.2 | 83 | 76.8 |

TABLE XXXV

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO HOW QUICKLY NEW PRACTICES ARE ADOPTED ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Stages at Which New Practices Were Adopted | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Among First Few | | Soon After First Few | | Sooner Than Average | | Little Later Than Most | | Last Few | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 1 | 0.9 | 1 | 0.9 | 2 | 1.9 | 15 | 13.9 | 8 | 7.4 |
| Below average ($400-$699) | 27 | 25 | 0 | 0 | 3 | 2.8 | 6 | 5.6 | 17 | 15.7 | 1 | 0.9 |
| Above average ($700-$999) | 27 | 25 | 9 | 8.4 | 4 | 3.7 | 5 | 4.6 | 9 | 8.3 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 14 | 13.0 | 7 | 6.5 | 3 | 2.8 | 3 | 2.7 | 0 | 0 |
| Total Study | 108 | 100 | 24 | 22.3 | 15 | 13.9 | 16 | 14.9 | 44 | 40.6 | 9 | 8.3 |

few" to adopt new practices, 15 were rated in the "soon after the first few" group, 16 rated in the "sooner than average" category, 44 rated in the "later than most" group, and 9 were placed in the "among the last few" group. Twenty-three of the 27 in the considerably above average net returns group were rated "sooner than average" on practice adoption or better; while only 3 of 27 in the considerably below average net returns group were so rated. These data indicated that tobacco growers who rated high in practice adoption tended to have higher net returns from tobacco than did others.

Interest in Improving Tobacco Production and Net Returns. Table XXXVI shows the interviewer rated tobacco growers according to how interested they seemed to be in improving tobacco production and net returns. Of the 108 growers interviewed, 59 were rated "very interested," 42 were rated "somewhat interested," 6 were rated "indifferent," and one was "not interested." Twenty-six of the 27 in the considerably above average net returns group were "very interested," compared to only 5 out of the 27 so rated in the considerably below average net returns group. Data indicate that increases in interest rating were directly proportional to increases in net returns per acre.

Respondents' Rated Attitude Toward Survey. Table XXXVII summarizes the interviewers ratings of the tobacco growers' attitude toward the survey. Practically all of the 108 farmers interviewed were "friendly," or "somewhat friendly" toward the survey; only one grower

TABLE XXXVI

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO RESPONDENTS' RATED INTEREST IN IMPROVING TOBACCO PRODUCTION AND NET RETURNS ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Respondents' Interest in Improving Tobacco Production and Net Returns as Rated by the Interviewer | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Interested | | Somewhat Interested | | Indifferent | | Not Interested | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 5 | 4.6 | 17 | 15.8 | 4 | 3.7 | 1 | 0.9 |
| Below average ($400-$699) | 27 | 25 | 12 | 11.1 | 14 | 13.0 | 1 | 0.9 | 0 | 0 |
| Above average ($700-$999) | 27 | 25 | 16 | 14.8 | 10 | 9.3 | 1 | 0.9 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 26 | 24.1 | 1 | 0.9 | 0 | 0 | 0 | 0 |
| Total Study | 108 | 100 | 59 | 54.6 | 42 | 39.0 | 6 | 5.5 | 1 | 0.9 |

TABLE XXXVII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO RESPONDENTS' RATED ATTITUDE TOWARD SURVEY ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Respondents' Rated Attitude Toward Survey in the Opinion of the Interviewer | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Friendly | | Somewhat Friendly | | Indifferent | | Antagonistic | |
| | No. | Percent | No. | Percent | No. | Percent | No. | Percent | No. | Percent |
| Considerably below average (below $400) | 27 | 25 | 21 | 19.5 | 5 | 4.6 | 1 | 0.9 | 0 | 0 |
| Below average ($400-$699) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 0 | 0 | 0 | 0 |
| Above average ($700-$999) | 27 | 25 | 25 | 23.1 | 2 | 1.9 | 0 | 0 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 27 | 25.0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Study | 108 | 100 | 98 | 90.7 | 9 | 8.4 | 1 | 0.9 | 0 | 0 |

showed "indifference." A very slight trend may be noted in the direction of greater friendliness as net returns increase.

Degree to Which Interviewer Knew Respondents. Data in Table XXXVIII show how well the tobacco grower was known by the interviewer. Of the 108 farmers interviewed, 37 were "very well known," 49 were "fairly well" known, and 22 were "not very well" known. Of the 54 growers in the two below average groups, only 7 were "well known" by the interviewer; while, of the 54 growers in the two high groups, 30 were "well known." The trend indicated that the interviewer knew more of those with higher net returns better than was true with those having lower net returns.

## III. FARMERS' STATED REASONS FOR YIELD LEVEL STATUS

Upon completion of each interview, each grower was asked by the interviewer why his yields were high, low, or no higher, respectively. A summary of the actual answers given is presented in Appendix C.

Growers with considerably below average net returns (below $400 per acre) generally gave the following reasons: 1) Inadequate resources; 2) inefficient production practices; 3) need for more fertilizer and manure; 4) lack of sufficient time, and 5) did not know.

Growers with below average net returns per acre ($400-$699), as compared to the lower group, placed the blame for low yields primarily on inefficient production practices. About the same number said they

TABLE XXXVIII

RELATIONSHIP OF TOBACCO NET RETURNS PER ACRE FOR LAND, LABOR, AND MANAGEMENT TO HOW WELL THE GROWER WAS KNOWN BY THE INTERVIEWER ON 108 SELECTED FARMS IN ANDERSON COUNTY, TENNESSEE, 1957 THROUGH 1961

| Net Returns to Land, Labor, and Management | All Farmers Included | | Degree to Which Interviewer Knew Respondent | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very Well | | Fairly Well | | Not Very Well | | Not At All | |
| | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent | No. | Per-cent |
| Considerably below average (below $400) | 27 | 25 | 3 | 2.8 | 11 | 10.2 | 13 | 12.0 | 0 | 0 |
| Below average ($400-$699) | 27 | 25 | 4 | 3.7 | 17 | 15.7 | 6 | 5.6 | 0 | 0 |
| Above average ($700-$999) | 27 | 25 | 12 | 11.1 | 12 | 11.1 | 3 | 2.8 | 0 | 0 |
| Considerably above average ($1000 or more) | 27 | 25 | 18 | 16.7 | 9 | 8.3 | 0 | 0 | 0 | 0 |
| Total Study | 108 | 100 | 37 | 34.3 | 49 | 45.3 | 22 | 20.4 | 0 | 0 |

did not know; and one grower gave lack of time as a contributing factor to low yields.

Generally, farmers that had above average net returns ($700-$999), said that the land was suitable for growing tobacco. Approximately 50 percent thought they were getting as high a yield as possible; and the other 50 percent said adoption of such practices as rotation, proper topping and sucker control, and letting tobacco get ripe might increase their yield.

Approximately all growers with considerably above average net returns per acre ($1,000 or more) stated that their high yields were due to having adequate land resources and to following approved production practices.

# CHAPTER V

## APPLICATION OF FINDINGS TO DEVELOPMENT OF A SUGGESTED AGRICULTURAL EXTENSION TEACHING APPROACH FOR USE IN ANDERSON COUNTY

The Anderson County Program Development Committee met in May of 1961 to study the needs and problems of the county. The committee recognized the fact that the needs of the people would help dictate the Extension program in the future. The committee decided that facts would have to be collected and analyzed before problems and objectives could be determined.

The sub-committee designated to study tobacco decided that one of the major problems was related to the relatively low yields and low income from tobacco (1:19).

### I. SITUATIONAL DATA

Data concerning the tobacco situation in Anderson County and presented to the committee in May, 1961, include the following:

1. Anderson County farmers grew approximately 263 acres of tobacco in 1959
2. Tobacco returned a gross income of approximately $267,660 to farmers in 1959
3. Gross tobacco sales in 1959 averaged approximately $1,017.00 per acre

4. A special study in 1960 showed that the average Anderson County test demonstration farmer produced 2,352 pounds of tobacco per acre in 1959 which sold for an average of $1,455.00; while the county average production that year was 1,795 pounds per acre, and the average gross income received was $1,017.00
5. It was estimated that the gross income from tobacco on the 1959 allotment of 304 acres could be increased approximately $133,152 if the average farmer could do as well as the average test demonstration farmer.

The present study provided the following additional information concerning the tobacco situation in Anderson County:

1. It was found that 388 farmers produced 0.5 acres or more of tobacco annually
2. Net returns to land, labor, and management varied from a low five-year average of $32.93 per acre to a high of $1,442.51 per acre
3. The county five-year (1957-1961) average per acre yield was 1,678 pounds
4. The trend indicated that as the total acreage and cropland acreage increased per farm, the net returns increased
5. Differences in ages of the growers was not a limiting factor
6. It was found that farmers with nine or more years of schooling had higher net returns than did those with less than nine years of schooling

7. Approximately 90 percent of the farms were operated by male operators and 10 percent were operated by female operators; generally, male operators had higher net returns
8. Approximately 71 percent of the tobacco growers interviewed grew the tobacco themselves
9. Approximately 49 percent of the growers interviewed depended on tobacco as the most important source of income
10. Seventy-six percent of the tobacco growers interviewed were growing tobacco on superior, excellent, and good soil types
11. Approximately 90 percent of the growers interviewed were not using soil tests
12. None of the growers interviewed reported using less than 500 pounds of fertilizer per acre
13. Approximately 80 percent of the tobacco producers studied used more than the recommended amount of fertilizer on the plant bed
14. It was found that approximately 59 percent of the producers grew continuously on the same soil
15. Approximately 49 percent of the growers did not use a cover crop
16. Fifty-four percent of the growers topped tobacco at the recommended state
17. It was found that higher incomes were generally received when growers harvested at the ripe stage

18. Tobacco growers that rated high in practice adoption tended to have higher net returns than did others
19. A larger proportion of the high net returns group showed considerably more interest in improving tobacco production and net returns than did the low net returns groups
20. The tobacco growers in the higher net returns groups were slightly more friendly toward the survey than were the others
21. It was found that the interviewer knew more of those with higher net returns better than was true with those having lower net returns.

## II. MAJOR PROBLEM

The average net returns from tobacco produced in Anderson County over a five-year period are too low when compared with the potential.

Growers are not following certain research-verified tobacco production practices with the result that the following statements are true:

1. A large percent of the farmers do not recognize the economic importance of following approved management practices
2. Growers are not using scientific and approved methods of determining the need for the different plant nutrients
3. A large percent of the growers are growing tobacco continuously in the same field
4. Many growers are not topping at the proper time
5. A large percentage of the growers are not adequately controlling suckers

6. Many are harvesting tobacco before it becomes mature.

## III. PRIORITY PROGRAM OBJECTIVE

Based on the facts presented earlier in this chapter, the following priority program objective is proposed as being appropriate:

> Tobacco growers in Anderson County to increase average net returns to land, labor, and management from the five-year average of $700 (1957-1961) to an average of $1,000 (1964-1969).

## IV. TEACHING OBJECTIVES

After studying the data obtained in this study and taking into consideration the most important factors that are limiting net income from tobacco in Anderson County, the following teaching objectives are proposed:

1. To help growers to appreciate the economic importance of following recommended tobacco practices and develop favorable attitudes
2. Tobacco growers to obtain the necessary knowledge for fertilizing tobacco to obtain higher yields and top quality
3. Tobacco growers to know the economic advantage of rotating the tobacco crop, ceteris paribus, and to follow through so that tobacco will be grown only one year out of three in the same field

4. Tobacco growers to understand the importance and develop necessary skills for proper tobacco plant topping, sucker control, and harvesting at maturity.

On the following pages is a suggested teaching schedule designed for working toward the above-stated teaching objectives. The outline schedule form is one currently used by the Tennessee Agricultural Extension Service for developing county annual plans of work (15).

## V. TEACHING SCHEDULE

Teaching Objective No. 1: Tobacco growers to appreciate the economic importance of following recommended tobacco practices and develop favorable attitudes.

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| **Group Meetings** | | | | | |
| "The Latest Research Data" | County Agent | Agronomy Specialist | January | Clinton | Mail questionnaire to sample of growers to determine the change in practices adopted. |
| **Newspaper Articles** | | | | | |
| (Feature Success Stories on High Yields and High Quality) | County Agent | Selected Farmers | January and throughout the year | Local Paper | Compare yields and sales records of the ASC Office. |
| "The Latest in Tobacco Research" | County Agent | Asst. Agent | Feb.-March | Local Paper | Ask community chairman to use list of tobacco production practices to determine practices being used |
| "Do You Let Tobacco Get Ripe Before Harvesting?" | County Agent | Tobacco Specialist | July-Aug. | Local Paper | |
| **Community Meetings** | | | | | |
| "Boosting Tobacco Production" | County Agent | Community Officers; Selected Farmers | February | County-wide | Planned observation of agents |

Teaching Objective No. 1 (Continued)

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| "How to Properly Top Tobacco and Control Suckers" | County Agent | Asst. Agent | June | County-wide | Survey growers at group meetings. |
| "How I Increase Net Returns by Harvesting Tobacco at Ripe Tobacco" | County Agent | Selected Farmers | July | County-wide | |
| Radio | | | | | |
| "How I Produce High Tobacco Yields with Good Quality" | County Agent | Selected Farmers | March | Local Radio (Tape at Farm) | Compare 1962-1964 average yields and net returns to land, labor, and management with five-year (1957-1961) yields and returns) |
| "How I Rotate My Tobacco Fields" | County Agent | Selected Farmers | March | Local Radio (Tape at Farm) | |
| "How I Top, Sucker, and Harvest Tobacco for Top Quality" | County Agent | Successful Farmer | August | Local Radio (Tape at Farm) | |
| Farm Management School | | | | | |
| "Timely Tobacco Production Practices" | County Agent | Agronomy Specialist | October | Clinton | |

Teaching Objective No. 1 (Continued)

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Farm and Office Visits | | | | | |
| (Create Interest in Farmers Concerning Tobacco Production Practices) | County Agent | Asst. Agent<br>Special Agent | All Year | County-wide and Office | |

Teaching Objective No. 2: Tobacco growers to obtain the necessary knowledge for fertilizing tobacco to obtain higher yields and top quality.

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Newspaper Articles | | | | | |
| "Soil Testing for Tobacco" | County Agent | Special Agent Asst. Agent | March | Local Paper | Compare yields and sales records from the ASC Office. |
| "My Tobacco Success Story" | County Agent | Successful Farmers | March April | Local Paper | Comparison of Soil Test reports. |
| Group Meetings | | | | | |
| "Timely Research Data" | County Agent | Agronomy Specialist | February | Clinton | Compare sales of fertilizer. |
| Fertilizer Dealer Conferences and Handouts | | | | | |
| "Steps in Proper Tobacco Fertilization" | County Agent | Fertilizer Dealers | February | County-wide | Survey a sample group of growers to determine change in practices. |
| Community Meetings | | | | | |
| "Fertilization Tobacco" | County Agent | Selected Farmers Community Club Officers | March | All community clubs | Planned observation by agents. |

Teaching Objective No. 2 (Continued)

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| **Radio** | | | | | |
| "More Money From Tobacco" | County Agent | Selected Growers | March<br>April<br>May | Local Radio (Tape at Farm) | |
| **Farm and Office Visits** | | | | | |
| (Present Local Data on High Yields and Net Incomes) | County Agent | All men agents | February<br>March<br>April<br>May | County-wide and Office | |
| **Farm Management School** | | | | | |
| "Fertilization of Tobacco" | County Agent | Agronomy Specialist | October | Clinton | |

Teaching Objective No. 3: Tobacco growers to know the economic advantage of rotating the tobacco crop and follow through so that tobacco will be grown only one year out of three in the same field.

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Community Meetings | | | | | |
| "Rotate Tobacco" | County Agent | Selected Farmers | January | County-Wide | Ask community leaders to make survey in community. |
| Newspaper Articles | | | | | |
| "Research Data Say Rotate" | County Agent | Tobacco Specialist | April September | Local Paper | Use checklist of tobacco production approved practices to determine number of farmers changing rotation practices at group meetings. |
| Tobacco Field Day | | | | | |
| "Tobacco Production" | County Agent | Experiment Station | August | Greene-ville | |
| Radio | | | | | |
| "Why Rotate?" | County Agent | Selected Farmer | November | Local Radio (Tape at Farm) | Mail questionnaire to sample of growers |

Teaching Objective No. 3 (Continued)

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Farm and Office Visits | | | | | |
| (Create Interest by Presenting Experimental and Local Data) | County Agent | Asst. Agent | All Year | County-wide and Office | Planned observation by agents as they visit growers. Keep records of observations. |

Teaching Objective No. 4: Tobacco producers to understand the importance of and develop necessary skills for proper tobacco plant topping, sucker control and harvesting at maturity.

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Newspaper Articles | | | | | |
| "Tobacco Research Data" | County Agent | Tobacco Specialist | July | Local Paper | Compare yields and sales records of the ASC Office. |
| "How I Produce High Tobacco Yields with Good Quality" | County Agent | Selected Farmers | March July | Local Paper | Survey a sample group of growers to determine the change in practices. |
| Radio | | | | | |
| "How I Top, Sucker, and Harvest Tobacco for Higher Quality" | County Agent | Selected Farmer | August | Local Radio (Tape at Farm) | Planned observation by agents as they visit growers. Keep records of observations. |
| Tobacco Field Day | | | | | |
| "Tobacco Production" | County Agent | Experiment Station Personnel Asst. County Agt. | August | Greeneville | |
| Group and Community Meetings | | | | | |
| "Harvest for Top Dollar" (Present Slides Showing Proper Methods to Use) | County Agent | Community Officers | July | All Community Clubs Clinton | |

Teaching Objective No. 4 (Continued)

| Method and Topic | Agent Responsible | Assisted By | When | Where | Evaluative Techniques |
|---|---|---|---|---|---|
| Farm Management School | | | | | |
| "Tobacco Production" | County Agent | Agronomy Specialists | October | Clinton | |
| Farm and Office Visits | | | | | |
| (Discuss Experimental and Local Data) | County Agent | Asst. County Agent<br>Special Agent | All Year | County-wide | |

# CHAPTER VI

## SUMMARY AND CONCLUSIONS

In 1961 the Anderson County Development Committee recommended that the Agricultural Extension Staff give some priority to studying the major problems in tobacco. Studies made showed that the average gross income in 1959 from tobacco on County Test Demonstration Farms was $438 higher than the average gross tobacco income on the average farm in the county. Gross income from tobacco, on the 324.86 acres allotment, could be increased $142,288 if the average farmer could do as well as the average Test Demonstration Farmer. Relatively low yields and net returns per acre were identified by the County Extension Staff as major problems which should have a high priority in developing future plans of work.

Although it was estimated that gross income from tobacco could be increased approximately $142,000 annually, actual data concerning the cost of producing an acre of tobacco, and the practices the Anderson County tobacco growers were presently using, were not available. Therefore, this study was made with the following stated objectives: 1) To determine the approximate average cost of producing an acre of tobacco; 2) to determine the present levels of net returns per acre to land, labor, and management of all tobacco producers in Anderson County that had 0.5 of an acre or more tobacco allotments; 3) to identify the production practices used by Anderson County tobacco growers that influence high

net returns, medium net returns, and low net returns; 4) to identify other factors that contribute to high, medium, and low net returns, and 5) to develop an educational approach based on data obtained from local growers.

A five-year average per acre yield, 1957 through 1961, was determined for all the tobacco growers in the county that had an allotment of 0.5 acres or more during this study. Also the average price received per hundred pounds on the above farms was determined during a three-year period, 1959 through 1961. The gross returns for each grower were obtained by multiplying the average five-year yield by the average price per pound. The cost data sheet, which is presented as Table I, was developed for producing an acre of tobacco in Anderson County. The production cost of $288.88, and the actual marketing cost was applied to each farm as a cost and deducted from the gross income, leaving a net return per acre for land, labor, and management.

Intervals of $400 in net returns per acre were used, and a frequency distribution was made for all the 388 growers that had an allotment of 0.5 acre or more during this study. Table II shows that out of the 388 tobacco growers, 60 (15.5 percent) had an average net return below $400 per acre for land, labor, and management; 152 (39.2 percent) had average net returns of $400 through $699 per acre; 132 (34 percent) had an average net return of $700 through $999 per acre; and 44 (11.3 percent) had an average of $1,000 or more per acre net returns to land, labor, and management. Twenty-seven names were selected by random sampling from each of

the four intervals for a total sample of 108 tobacco producers.

An interview schedule form including farm, family, personal, and individual production factors were prepared and used to secure data from the 108 Anderson County farmers selected.

## I. SUMMARY OF FINDINGS

Growers with larger farms and more cropland acreage appeared to have higher net income per acre than others. Differences in age levels did not appear to be a limiting factor in this study; however, the farmers that had completed nine or more years of school had somewhat higher average net returns than did those with less schooling. Generally speaking, operators listing dairying and livestock as major sources of income had a higher net income from tobacco. Operators who depended primarily on outside income tended to have lower net returns per acre from tobacco.

The individual production practices showed a wide variation; however, growers with above-average net returns were found to be using more of the recommended cultural practices than were growers with below-average net returns. The 33 farmers in the below-average groups that produced low net returns on soils classified from good to superior, indicate that many farmers still do not follow the approved management and cultural practices.

Of the 44 growers that reported 10 tons or more of manure per acre, 32 (72.8 percent) were in the above average in net returns. Data in this study indicate that the use of 10 tons or more manure per acre is a very

important consideration to growers that desire a relatively high net return.

Only 10 of the 108 growers reported following soil test recommendation, which points out the fact that very few tobacco growers are having soil analyses made on tobacco fields. Educational work needs to be directed toward this phase of tobacco production.

The total pounds of commercial fertilizer used per acre did not indicate any consequential differences; there seemed to be a tendency by all growers to use much more fertilizer than is normally recommended by the University of Tennessee Agronomy Department. Since there was some indication that a large percent of all the growers did not use scientific and approved methods of determining the need for the different plant nutrients, net returns from tobacco might be increased in all groups studied by following the recommended practice of using a soil analysis as a guide to proper use of plant nutrients.

A large percent of all the producers interviewed used more than the recommended amount of fertilizer on the plant bed; however, there was a much larger percent in the below-average group that overfertilized than in the above-average group. The time and the method of sterilization of the plant bed did not show any significant influence on the net returns. Growers with below-average net returns tended to overseed the plant bed more than growers with higher net returns. The variety grown did not influence the net returns to a large degree; however, there was some indication that the growers with higher net returns grew the Burley 21 variety.

Tobacco growers with consistently high net returns, when compared to growers with consistently low net returns, based on the findings in this study, were found to be slightly more efficient in the following: 1) growing good quality plants, 2) controlling insects, 3) transplanting early, 4) following rotation practices, 5) using cover crops, and 6) obtaining a high percent of uniform live plants in the tobacco field. The depth of cultivation did not appear to be an important factor, but spacing and row width did influence net returns. The growers with high net returns were found to follow more closely the recommended practice of producing tobacco in rows, three and one half feet apart, and spaced 16 to 18 inches within the row.

The stage of maturity at which tobacco was topped was an important factor affecting net returns. Growers with below-average net returns tended to top medium to late, while growers with above-average net returns topped at the medium to early time. Very little effects were shown in the height of topping. Generally, the majority of all the growers reported topping at the recommended height of 22 to 26 leaves on the stalk. The time between topping and harvest is an important factor. According to this study, growers waiting at least three weeks from topping to harvest generally were above average in net returns. The study showed that as the degree of sucker control increased, the net returns increased and had a decided influence on net returns per acre. The method used to control suckers was not important. Growers in all groups reported very little disease and insect damage.

From this study, it would appear that the maturity of the tobacco at harvest time was an influencing factor on net returns; an increasing greater number of the operators with higher net income harvested at the ripe stage than did the operators in the low net income groups. Seventy-six percent of the total growers interviewed reported harvesting at the partially ripe stage, which points out the need for further educational work in this area.

The growers willingness to adopt new practices and interest in improving production were important factors in this study; generally growers that readily adopted new practices and were interested in improving production, received higher net returns from tobacco. Data in this study indicated that as the percentages of growers known very well by the County Agricultural Agents increased, the net returns increased.

## II. CONCLUSIONS

The findings in this study indicate the following: 1) many Anderson County tobacco growers do not follow the approved management and cultural practices; 2) very few tobacco producers are using scientific and approved methods of determining the need for plant nutrients; 3) approximately 80 percent of the growers overfertilize the tobacco plant beds; 4) approximately 30 percent of the tobacco growers produce tobacco on soils classified good to superior, yet they have net returns below average; 5) sixty percent of the growers produce tobacco continuously on the same field; 6) most farmers follow the recommended procedure in spacing

the plants within the row; 7) a large percent of the farmers [redacted] are not properly topping and controlling the suckers in the tobacco, and 8) more educational programs need to be developed to help tobacco producers realize the importance of adopting recommended tobacco production practices.

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# APPENDIXES

APPENDIX A

ANDERSON COUNTY TOBACCO SURVEY SCHEDULE FORM

NAME_____ ADDRESS_____ DATE_____

AVERAGE YIELD PER ACRE ____

1. Acres in farm___, Cropland acres____, Tobacco allotment _____.

2. Age: Under 30 __, 30-39___, 40-49 ___, 50-59 ___, above 60 ___.

3. Tobacco grown by: Owner___, Tenant ___, Share cropper ___, Part-time farmer ___.

4. Tobacco decisions made by: Owner ___, Cropper or tenant ___, Jointly _____.

5. Schooling: Owner:
   Grammar 0 1 2 3 4 5 6 7 8
   High School 1 2 3 4
   Higher _____
   Cropper or Tenant:
   Grammar 0 1 2 3 4 5 6 7 8
   High School 1 2 3 4
   Higher _____

6. Sex: Male ____, Female ____.

7. Major source of income: Tobacco __, Dairying __, Livestock __, Other __.

8. Soil Mapping Unit: _____.

9. Rating of soil: Superior__, Excellent__, Good__, Fair__, Poor__.

10. Tons of manure applied per acre: None__, Below 10__, 10-15__, 15 or above___.

11. Tobacco fertilized according to soil test recommendations? Yes___, No___.

12. Commercial fertilizer used per acre: Analysis_____, Lbs._____; Analysis_____, Lbs._____; Analysis _____, Lbs. _____.

13. Total commercial fertilizer used per acre: Lbs._____.

14. Total Plant nutrients applied: N____, $P_2O_5$____, $K_2O$_____.

15. Fertilizer placement: Broadcast ___, In row ___, Both ____.

16. Fertilization of plant bed in lbs: _____, Analysis _____.

17. Size of plant bed _____.

18. Plant bed sterilization: Burned __, Cyanamid__, Methyl Bromide __, Other ___.

19. Time of sterilization: Fall _____, Spring_____.

20. Variety: Ky. 16____, Burley 21 ____, 11A or 11B___, Burley 37 ___, Other ___.

21. Rate of seeding (teaspoon): 2____, 3____, 4____, 5____.

22. Plant bed weed infestation: None____, Good____, Fair____, Poor ____.

23. Quality of plants: Excellent _____, Good____, Fair____, Poor____.

24. Were plant bed insecticides used? Yes_____, No_____.

25. Insect control: Good____, Fair____, Poor_____.

26. Transplanting: Early____, Medium____, Late____.

27. How transplanted: Hand____, Machine_____.

28. Rotation: Continuous____, 2 years____, 3 years_____.

29. Cover crop turned: Yes____, No____.

30. Kind of cover crop: Small grain____, Grain & Clover____, Clover ____, Grass___. 30-A. Kind of grain: Rye___, Oats___, Other____.

31. First cultivation: Deep___, Shallow___. Other cultivation: Deep___, Shallow___.

32. Width between row: (in feet) 3____, 3¼___, 3½___, Other___.

33. Spacing in row (inches): 10___, 12___, 14___, 16___, 18___, 20___. Per cent of stand: Above 95%___, 90-95%___, less than 90%_____.

34. Uniformity of stand: Good___, Medium___, Poor___.

35. When topped: Early___, Medium___, Late___.

36. Height of topping: High___, Medium___, Low___.

37. No. days to harvest after topping: Immediately___, Week___, 2 weeks___, 3 weeks___, More___.

38. Method of sucker control: Hand ____, Chemical____.

39. Degree of sucker control: Excellent__, Good__, Fair__, Poor__, None__.

40. Disease damage: Much_____, Some_____, None_____.

41. Insect damage: Much_____, Some_____, None_____.

42. Stage of harvest: Ripe ____, Partially ripe ____, Green _____.

43. Was tobacco primed? Yes_____, No_____.

44. Farmer's reasons for high ____, low ____, or no higher _____ yields:

a. _____.

b. _____.

c. _____.

NAME _____ ADDRESS _____ DATE _____

QUESTIONS FOR THE INTERVIEWER TO ANSWER FOLLOWING THE INTERVIEW:

45. All people do not adopt new practices at the same time. About where would you place the respondent with respect to adopting new recommended tobacco production practices?

a. Among the first few _____ c. Sooner than the average _____.

b. Soon after the first few _____ d. A little later than most ___.

e. Among the last few _____

46. Respondent's interest in improving tobacco production practices and net returns:

a. Very interested _____ c. Indifferent _____

b. Somewhat interested _____ d. Not interested _____

47. Respondent's attitude toward survey:

a. Friendly _____ c. Indifferent _____

b. Somewhat friendly _____ d. Antagonistic _____

48. How well do you know the respondent?

a. Very well _____ c. Not very well _____

b. Fairly well _____ d. Not at all _____

## APPENDIX B

## CLASSIFICATION OF SOILS FOR TOBACCO

## IN ANDERSON COUNTY, TENNESSEE

### SUPERIOR SOILS

Sequatchie Loam B1
Hyter Loam B1
Emory Silt Loam B1
Claiborne Silt Loam B2
Huntington Silt Loam B2
Allen Loam B1
Hermitage Silt Loam B1
Hermitage Silt Loam B2
Greendale Silt Loam B1
Etowah Silt Loam B1

### EXCELLENT SOILS

Hyter Loam C1
Hyter Loam C2
Jefferson Loam B1
Jefferson Loam C1
Dewey Silt Loam B2
Claiborne Silt Loam C2
Muse Silt Loam B1
Allen Silt Loam C2
Minvale Silt Loam B1
Minvale Cherty Silt Loam B1
Minvale Cherty Silt Loam B2
Hermitage C1
Hermitage C2
Greendale Silt Loam C1
Etowah Silt Loam C2

### GOOD SOILS

Hyter Clay Loam C3
Fullerton Cherty Silt Loam B1
Fullerton Cherty Silt Loam B2
Jefferson Loam C2
Pace Cherty Silt Loam B1
Pace Silt Loam B1
Pace Silt Loam B2
Pace Cherty Silt Loam C1
Pace Cherty Silt Loam C2
Dewey Silty Clay Loam C2
Leadvale Silt Loam B1
Leadvale Silt Loam B2
Leadvale Silt Loam C1
Claiborne Silt Loam D2
Muse Silt Loam C1
Minvale Silt Loam C2
Capshaw Silt Loam B1

### FAIR SOILS

Fullerton Cherty Silt Loam C2
Fullerton Cherty Silt Loam D2
Linside Silt Loam B1
Talbot Silty Clay Loam B2
Pace Cherty Silt Loam D2
Minvale Silt Loam D1
Minvale Cherty Silt Loam D2

## POOR SOILS

Clarksville Cherty Silt Loam C2
Clarksville Cherty Silt Loam D2
Litz Silt Loam C2
Litz Shaly Silty Clay Loam C3
Litz Silt Loam D2
Muskingum Loam D1
Talbot Clay B3
Talbot Clay C3
Pace Cherty Silt Loam E1

## APPENDIX C

### FARMERS' STATED REASONS FOR YIELD LEVEL STATUS

After each interview schedule was completed, each grower was asked by the interviewer why his yields were high, low, or no higher.

A. Reasons given by tobacco growers who had considerably below average net returns per acre (below $400) as to why their yields were low

1. Inadequate resources

   a) "I need better land."

   b) "My land is not suited to growing tobacco."

   c) "I am using by best land for other crops."

   d) "A few years ago this farm was not producing very good yields, but I have learned in the last year or so that I have to put tobacco in good land and then take care of it. You watch me get a good yield and better price this year.

   e) "Land doesn't grow tobacco too well."

   f) "Poor land selection."

   g) "Land ain't suited too well to growing tobacco."

   h) "Need better land and more fertilizer."

2. Inefficient production practices.

   a) "I need more manure and fertilizer."

   b) "The tenant does not take good care of the crop."

   c) "I need more manure and better soil."

   d) "The stand has been poor in the past."

   e) "We need to use more manure and fertilizer and take care of the tobacco better. The tenant does not know how to handle the tobacco."

f) "I believe we ought to do a better all around job of growing tobacco."

g) "I believe we are growing tobacco too often in the same patch, and we need to use a cover crop and manure."

h) "Very poor curing barn. We are growing tobacco in the best land we got, but we could perhaps use more fertilizer."

i) "Would like to see the tenant top earlier and keep the suckers controlled. Need better care during grading and storing."

j) "I could use more manure and fertilizer and the tobacco needs better care in cutting and handling."

k) "Hard to get a stand."

l) "Tenant has not been using good management and does not know how to grow tobacco."

m) "Disease always hits my crop."

3. Don't know

a) "I just don't know, I fertilize and manure heavy and try to take advantage of all new methods and information on growth and care of tobacco."

b) "Don't know why the yields are so low."

c) "I don't know how I could increase the yield. I have never received a high price for my tobacco, but I don't know what to do about it."

d) "Don't know."

e) "Don't really know what I could do to increase the production."

4. Labor

a) "I don't have time working away from home to take the proper care of my tobacco and I can't get any help that will work."

b) "Don't spent enough time in tobacco. I am too busy to take care of the crop."

c) "I could grow better tobacco if I had someone living closer to grow it. My man that grows tobacco lives six miles from here."

B. Reasons given by tobacco growers who had below average net returns per acre ($400-$699) as to why their yields were no higher

1. Inadequate resources

a) "My land won't grow heavy yields."

b) "I believe that the land may not be suited to growing tobacco; I may have a better place to grow it. I sure hope you can help me."

c) "Land is not as strong as it should be and I know I ought to take better care in cutting and handling."

2. Inefficient production practices

a) "Care in production is not as good as it should be."

b) "Tenant is a poor manager and he won't keep it worked out."

c) "Tobacco plants should be spaced 18 inches apart and in rows 4 feet wide."

d) "Need to use more manure."

e) "Believe I need to increase the amount of fertilizer on my patch."

f) "I use plenty of manure but maybe not enough fertilizer."

g) "I need to prime at least two times and keep the suckers off better."

h) "The tenant won't cultivate or take care of it in the field or barn."

i) "I should have a soil test made."

j) "I believe I am using enough fertilizer but I need more manure."

k) "I know I am not doing the job I should in taking care of my crop."

l) "Have not been getting it out early enough."

m) "I rent the tobacco and it is not worked at the right time and the entire management is very poor."

n) "I believe I could make more tobacco if I had a soil test made."

o) "Sometimes the tobacco is not cut at the right time and it does not cure properly in the barn."

p) "I ought to rotate my patch."

q) "We do not have manure to put on this tobacco and the man growing the tobacco takes care of his crop on his own place first."

r) "I need more knowledge of tobacco production, and the use of soil testing may help increase production."

3. Don't know

a) "Don't know why I can't get higher yields when I try to do everything right."

b) "Don't know what I could do to increase my yield."

c) "I don't believe it makes tobacco like it ought to. I have had the soil tested this year and I hope I can increase the yield and improve the quality."

d) "I am growing tobacco on my best soil, I try to let it get ripe, and I always have good plants; my yield seems to be fairly good but I just don't get a good price when I sell it."

e) "I believe I could get more production but I don't know what to do."

4. Labor

a) "I don't have time to take care of the crop properly."

C. Reasons given by tobacco growers who had above average net returns per acre ($700-$999) as to why their yields were high or no higher.

1. Resources

a) "I believe we are growing the tobacco on suitable soil."

b) "Land is not the best type of tobacco land."

c) "My land is good tobacco land."

d) "Better land might increase my yield a little."

e) "I am growing the tobacco on the best land available."

f) "Land is suited to growing tobacco."

2. Production practices

a) "Tenant does not practice good management."

b) "Need to use more manure."

c) "Need to rotate crop."

d) "Follow recommendations and use cover crops."

e) "I believe I could improve my crop by using more fertilizer, keeping it cultivated, and cut it when it gets ripe."

f) "Believe I am growing the tobacco as well as possible."

g) "Priming would increase yield."

h) "I always select good land and control the insects."

i) "Believe I am getting as high a yield as I can get."

j) "Guess I ought to keep it worked, handling and curing could be better, and I would like to rotate the patch to different fields."

k) "We use good plants, space them properly, and use care in cutting and handling."

l) "Believe I have been cutting too green."

m) "We follow recommendations."

n) "I am getting as high a yield as I can grow on my farm."

o) "Manure and fertilize good, prepare a good seed bed, and grow good uniform plants not too thick on the bed."

p) "Good management."

q) "Should change patch; plan to use soil test."

r) "I believe I am growing good tobacco but I might prime and make a few more pounds."

s) "Believe I could top and sucker properly and increase yield."

t) "Perhaps need to let tobacco get more ripe; need to rotate the tobacco."

u) "Might need to do a better job of grading."

3. Don't know

a) "I grow tobacco on upland, use plenty of fertilizer, but I don't know why I can't get more pounds."

4. Labor

a) "The tobacco is grown by a tenant."

b) "I would rather spend time on livestock."

c) "I have a good man growing the tobacco."

D. Reasons given by tobacco growers who had considerably above average net returns per acre ($1,000 or more) as to why their yields were high

1. Adequate resources

a) "I have good land available and plenty of barn room."

b) "I pick the best land to grow tobacco."

c) "My soil makes good tobacco and is easy to work, but I might find a field that might make more tobacco.

d) "Used the best land we had for growing tobacco."

e) "Good land selection and cover crops."

f) "Combination of management and land."

g) "I use the best land I have."

h) "I am growing tobacco on the best land on the farm."

2. Efficient production practices

a) "I believe in preparing a good seed bed, get good plants out early, and fertilize according to a soil test."

b) "I like to set out good strong plants at the right time so that it grows off even, and I take care of my tobacco at the right time; I like for my tobacco to have plenty room in the barn."

c) "I fertilize heavy, use plenty of manure, keep the suckers off, and let it get completely ripe."

d) "I try to practice good management all the way from planting through marketing."

e) "I fertilize heavy and turn cover crops; sometimes I turn under soy beans then sow crimson clover for a spring crop when I change fields."

f) "Believe I am growing tobacco as efficiently as possible."

g) "Try to get a good stand early, also I burn the bed in the fall, get good early plants and set early."

h) "I use plenty of manure and not so much fertilizer, set strong healthy plants, and prime at least two times."

i) "I use plenty of manure instead of commercial fertilizer; keep the suckers off and let the tobacco ripen good before harvesting."

j) "Been fertilizing and manuring heavy, and also we try to let the tobacco get completely ripe."

k) "Stayed in the tobacco patch everyday."

l) "Keep it plowed early then quit cultivating; practice good management and use all information available."

m) "We try to get our tobacco out early, fertilize heavy, and give attention to the entire problem of management."

n) "I seed cover crops each year, use lots of manure, prepare a good seed bed, set good plants, and try to cut, cure, and grade properly."

o) "Believe the reason the yield has been high is because I have primed and let the top leaves get ripe."

p) "I fertilize and manure heavy, top and keep suckers off, and then let it get ripe before harvest, give it plenty of room in the barn. You can't work the land too much before setting, and you have to have good strong plants."

q) "We use recommended methods."

r) "I take good care of the crop from planting to market, prime all ripe leaves, and cut individual stalks whenever one gets ripe."

s) "I try to do things right at the proper time."

t) "High fertilization and good management, believe in priming bottom leaves and letting the tobacco get completely ripe."

u) "Good management and taking care of the tobacco from the plant bed to the sales warehouse."

v) "I prime at least 2 times."

w) "Keep suckers off and let it get ripe."

x) "Good management."

APPENDIX D

# RECOMMENDED PRACTICES FOR PRODUCING BURLEY TOBACCO

Gilbert N. Rhodes - Agronomist and Leader
University of Tennessee Agricultural Extension Service
January 1963

A. Plant Production

1. Select well drained loamy soil with southern or southeastern exposure.
2. Burn or use a recommended chemical for weed control.
3. Use 50 to 75 lbs. 4-12-8 fertilizer, or its equivalent, for each 9 x 100 foot bed.
4. Sow 2 to 3 struck teaspoons of seed for each 9 x 100 foot bed - March 1 to March 15 satisfactory time for sowing.
5. Water bed when crust forms on surface of soil.
6. Control diseases and insects. (See SP-91).

B. Select One of the Following Recommended Varieties

1. Burley 21 - Has resistance to wildfire, mosaic, and black root rot.
2. Burley 37 - Has resistance to wildfire, black shank, fusarium wilt, and black root rot.
3. Burley 11-A or 11-B - Has resistance to black shank, fusarium wilt, and black root rot.
4. Ky. 16 - Has resistance to black root rot.
5. Burley 1 - Has resistance to black root rot.

C. Where possible grow tobacco following grass or grass-legume sod on good, well drained land.

D. Fertilize according to soil test recommendations. Do not use more than 10 tons of manure per acre.

E. Transplant good, stocky, disease-free plants between May 15 and June 1 - Set 15 to 18 inches apart in 42-inch rows.

F. Control insects. Obtain copy of SP-91 from county agent's office.

G. Cultivate shallow to control weeds.

H. Top tobacco when 30 to 50 percent of plants are in early bloom stage.

I. Keep suckers pulled.

J. Harvest ripe tobacco. One priming may be needed to save bottom leaves while allowing for remainder of plant to ripen.

K. After cutting, house tobacco after it has wilted sufficiently for handling.

L. Provide ample space in barn; place 5 or 6 stalks on stick and hang sticks 10 to 12 inches apart on tier rails.

M. Begin stripping and sorting after tobacco has thoroughly cured. Do not strip when stems are fat or when in too high case.

N. After stripping, place in square open center bulk for keeping until time for placing on warehouse floor.

O. Be sure crop is dry and clean when placed on warehouse floor for sale.