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**Evaluation of experimental teaching approaches for use with
above and below average burley tobacco production groups in
Greene County, Tennessee**

James O. Cunningham

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To the Graduate Council:

I am submitting herewith a thesis written by James O. Cunningham entitled "Evaluation of experimental teaching approaches for use with above and below average burley tobacco production groups in Greene 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.

Lewis H. Dickson, Major Professor

We have read this thesis and recommend its acceptance:

Robert S. Dotson, Lloyd F. Seatz

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

EVALUATION OF EXPERIMENTAL TEACHING APPROACHES FOR USE WITH ABOVE
AND BELOW AVERAGE BURLEY TOBACCO PRODUCTION GROUPS IN
GREENE COUNTY, TENNESSEE

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
James O. Cunningham
December 1966

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CHAPTER I

INTRODUCTION

I. THE PROBLEM

In Greene County, tobacco is the major agricultural crop and annually accounts for nearly one-half of the gross sales from agricultural products. According to Greene County Agricultural Stabilization and Conservation Service (A.S.C.S.) office records for 1965, there were 5,445 tobacco producers in the county whose gross sales from tobacco totaled \$7,470,000. This was produced on about 4,854 acres for an average allotment of 0.89 acres.

The average per acre yield in 1965 was 2,111 pounds. By comparison, the Greene County three-year (1961-1963) average was 1,977; while the average for Tennessee was 1,856 pounds. (8:10)*

A study of the A.S.C.S. office records revealed that yields ranged from 743 to 3,007 pounds per acre for the study period. Likewise, it was found that 46 percent of the growers had average per acre yields of less than the state average for the three-year period. Previous studies have shown that the use of research-verified, recommended production practices is positively associated with yield and with

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

net returns per acre.(3:89;10:92) Also there is evidence to indicate that tobacco production of the remaining 54 percent of the growers in Greene County could be increased through following the practices.

Therefore, it seems to follow, that in Greene County if the burley tobacco producers (both above and below average) could be taught to use more recommended practices, their average yields and, hence, net returns per acre might be increased.

It has been found in earlier studies that higher percentages of high producers (those producing above the county average yield per acre) are usually known by the local county agents than is true for low producers (those producing below the county average yield per acre).

(3:92)

① appears that the below average producers tend to have characteristics similar to those of the late adopters described in diffusion studies by Bohlen and Beal, (2:10). This group has been found to depend first on local adoption leaders for information and ideas, although some have contacts with agricultural agencies including Agricultural Extension.

Previous studies also have shown that low producers, when compared with high producers, are less well educated and are less inclined to attend countywide educational meetings. This group has been found to be more likely to attend small group meetings.(6:9)

No previous efforts have been made, prior to this study, to use and test the intensive teaching unit developed by Webster (10:69) with

separate above and below average groups of burley tobacco producers. It was felt that such testing might provide Extension workers in counties similar to Greene with new information useful to them in program development efforts aimed at burley tobacco producers.

II. PURPOSE

The purpose of this study was to evaluate two separate Extension teaching approaches (based on intensive survey of the tobacco growers and their practices) as evidenced by changes in knowledge and practice use by two different Extension audiences, namely "above average" tobacco growers, referred to hereafter as Group A, and "below average" tobacco growers, referred to as Group B in the study,

61 words

CHAPTER II

REVIEW OF LITERATURE

I. PREVIOUS RESEARCH RELATED TO PRODUCTION PRACTICES

Considerable research has been done and reported on burley tobacco cultural practices, but comparatively little has been written on the teaching of research-verified burley tobacco production practices to adult farmers.

In a 1962 study, Lowe surveyed 144 tobacco growers in Williamson County to secure data in regard to family, personal, soil type, soil test and production factors. Lowe concluded the following: (1) most farmers did not recognize the low tobacco yield situation and the potentially high-yield opportunities available through the use of recommended practices; (2) most farmers in the county were not properly fertilizing their tobacco based on soil test recommendations; (3) most farmers in the county were not properly topping tobacco and controlling suckers; (4) most negroes and most women farm owners needed special attention if they were to be expected to efficiently produce tobacco; and (5) more Extension program emphasis needed to be placed on encouraging the adoption of recommended tobacco production practices (10:74-75).

Webster (10:68) conducted a similar study in Trousdale County, Tennessee, in 1964 finding that: (1) tobacco farmers needed to develop

the necessary skills in sterilizing plant beds according to latest research-verified practices; (2) tobacco farmers needed to realize that yield and quality may be obtained by following proper spacing recommendations in the field; and (3) farmers could benefit by developing the necessary skills in preparing tobacco for market according to group, quality and color.

Ivens (3:92), in a 1964 Anderson County study, made these observations: (1) many tobacco producers were not following approved cultural and management practices; (2) some 80 percent of the tobacco producers were overfertilizing the tobacco bed; and (3) 60 percent of the producers were growing tobacco in continuous culture.

II. PRINCIPLES OF ADULT TEACHING AND LEARNING

Requirements for Teaching

According to Mursell (6:1), successful teaching consists of properly organizing learning experiences. The important question is not which methods and procedures are to be used or whether they are old or new, time-tested or experimental. Such considerations may be of value, but not ultimate, for they have to do with means, not ends. The ultimate criterion for success is in the results obtained. Mursell calls attention to six principles of successful teaching, including: (1) context, meaning that teaching is best done in the proper setting; (2) focus, meaning that pivotal points (like recommended practices such as fertilizing based on soil tests) should be clear; (3) sequence,

meaning that proper background, seasonal sequence, level of previous learning related to tobacco production should be considered; (4) individualization, meaning that tobacco growers are individuals and some need special help; (5) socialization, meaning that tobacco growers are resource people since they have grown tobacco, and that they should learn from participation and sharing; and (6) evaluation, meaning that results should be made known to them so they can see improvement.

Requirements for Learning

Wilson and Gallup (11:6-7) indicated that of the many requirements for learning the following four have important application for Extension: (1) adults learn most rapidly when they have a strong desire to learn; (2) adults learn best when they have clear goals; (3) adults learn best when they put forth effort to learn; and (4) adults learn best when they receive satisfaction from what they have learned. It is well known that learners, including interested tobacco growers, seek success in what they do and that they tend to avoid situations which frustrate them. They learn best when they are rewarded. For example, a tobacco farmer who receives more net income per acre as a result of fertilizing his land according to soil test recommendations is likely to continue using this practice.

Effects of Age on Learning

Malcolm S. Knowles noted that adults who engage in learning activities throughout a lifetime tend to lose very little of their

intellectual ability. He drew two significant conclusions from the fact about mental development: first, that adults can learn throughout life, hence they can take part profitably in adult education, and, secondly, that adult education can help them retain their intellectual power throughout life (4:18).

III. TENNESSEE COUNTY EXTENSION PROGRAM DEVELOPMENT

The cooperative Extension Service, as provided for in the Smith-Lever Act of 1914, has as its fundamental objective the development of people to the end that they may learn to solve more wisely their major problems in the areas of program emphasis for which Extension has legal responsibility. The basic unit for Extension work is the county, and a staff is assigned in each United States county to develop a continuing and effective Extension program (9:67).

County Extension program development consists of four inter-related processes, including: (1) five-year planning; (2) annual Extension planning; (3) Extension teaching; and (4) Extension evaluation and reporting (9:53). Regardless of the amount of time spent on Extension program planning, all may be useless unless it is effectively carried out in the county. Therefore, the success or failure of the county Extension program efforts in a given year depends ultimately on how well the job of teaching is done in the county by local Extension staff members (9:54).

The county Extension program is the sum of all Extension work done in the county, including plans and planning, the carrying out of long-range and annual plans, and evaluation and reporting of progress made toward objectives. There is a single county Extension program in each county consisting of all activities in those program areas which may be appropriate for emphasis in that county (9:67).

IV. INTENSIVE EXTENSION EDUCATIONAL TEACHING

Webster (10:65) developed and tested a teaching approach for use with tobacco growers in Trousdale County. Plans were made to conduct three two-hour classes on consecutive Monday nights. Those who had been interviewed were encouraged to participate. Each farmer was requested to return a card indicating his or her intentions to attend. Some 32 attended the three classes with 19 qualifying by attending all three sessions and taking the necessary pre-tests and post-tests. Webster noted that the attitude of those attending was very favorable. It was further noted that they were most cooperative during the teaching. His instruments included a true-false test and two practice checklists for use before and after teaching to determine progress made in terms of knowledge and use of subject matter related to burley tobacco production.

Differences between scores received on true-false tests and on practice checklists administered before and after teaching were the observations used for analysis. A t-test comparison of before and after

tobacco production test scores made on the Burley Tobacco Production Practice Checklist by the growers disclosed that means were significantly different at the one percent level of probability--some significant improvement being indicated. Differences in before and after true-false test scores were not significant at the required level, but were significant at lower levels of confidence.

Since evaluation of the intensive teaching unit by means of general appraisal and use of the Burley Tobacco Production Practice Checklist did show the approach to be effective, it was concluded that the unit developed for use and testing in Webster's study successfully achieved the objective intended--to develop an effective intensive teaching unit for use with tobacco growers.

CHAPTER III

METHODS AND PROCEDURES

I. SCOPE OF THE STUDY

The study consisted of the evaluation of two separate intensive teaching approaches, one each for above average and below average tobacco producers. The actual teaching followed and was based on a production practice random sample survey of 100 Greene County tobacco farmers. One and eight-tenths percent of the burley growers in Greene County were interviewed in the survey. Measuring devices were used at the beginning and at the close of the series to evaluate the effectiveness of the approach.

II. NULL HYPOTHESES

Four null hypotheses (1:229) were stated for testing in the study, including: (1) there is no difference between scores made by selected above average tobacco growers (referred to as Group A for study purposes) before and after intensive teaching as measured by a General Principles of Tobacco Production True-False Test; (2) there is no difference between scores made by Group A tobacco growers before and after intensive teaching as measured by a Recommended Tobacco Production Practice Checklist; (3) there is no difference between scores made by selected below average tobacco growers (referred to as Group B for study

purposes) as measured by a General Principles of Tobacco Production True-False Test, and (4) there is no difference between scores made by Group B tobacco growers before and after intensive teaching as measured by a Recommended Tobacco Production Practice Checklist.

III. THE SAMPLE SURVEY

Sampling

Records of the Greene County Agricultural Stabilization and Conservation Service Office were used to determine the three-year average per acre yield of tobacco in Greene County for the period 1961 through 1963. Farms with less than 0.5 acre allotments were excluded from the study, as were farms that changed hands during the study period. Also, the tobacco producer had to be the same individual for at least two of the three years involved in the study in order to qualify for inclusion.

A frequency distribution of all growers by yield groups was made from which stratified samples of growers were selected. As seen in Table I, the twenty 100-pound tobacco yield intervals in the frequency distribution chart were classified under four major yield groups: (1) considerably below average (below 1,400 pounds per acre), including 7 percent of the population; (2) below average (1,400 to 1,899 pounds per acre), including 37 percent of the population; (3) above average (1,900 to 2,399 pounds per acre), including 48 percent of the population; and (4) considerably above average (2,400 or more pounds per acre),

TABLE I

DISTRIBUTION OF TOBACCO PRODUCERS BY THREE-YEAR AVERAGE TOBACCO YIELDS PER ACRE (IN 100 POUND INTERVAL), AND NUMBER OF GROWERS AND NUMBER SAMPLED IN EACH INTERVAL, FOR GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

3-Year Average Yield Per Acre, Lbs.	Number of Growers	Number Sampled
Considerably Below Average Group		
Below 1,000	18	5
1,000-1,099	24	5
1,100-1,199	28	5
1,200-1,299	52	5
1,300-1,399	55	5
Below Average Group		
1,400-1,499	75	5
1,500-1,599	119	5
1,600-1,699	211	5
1,700-1,799	221	5
1,800-1,899	254	5
Above Average Group		
1,900-1,999	272	5
2,000-2,099	289	5
2,100-2,199	236	5
2,200-2,299	194	5
2,300-2,399	151	5
Considerably Above Average Group		
2,400-2,499	87	5
2,500-2,599	47	5
2,600-2,699	31	5
2,700-2,799	12	5
2,800 and above	12	5
TOTAL	2,388	100

including 8 percent of the population. Five names were drawn randomly from each of the twenty yield intervals for a total of 25 from each of the four major groups and a grand total of 100 from the population of 2,388 county tobacco growers eligible for the study.

Pertinent tobacco production data were secured by means of personal interviews with the 100 selected growers. All growers interviewed were cooperative in answering all questions asked.

Interviews were made between March 7 and May 14, 1966. Data were obtained in each case from the farm owner, operator, or sharecropper. The same schedule was used with all interviews by the same interviewer.

The Interview Schedule

Only five kinds of personal data were asked for in the interview schedule (see Appendix A), including: (1) size of farm; (2) managerial responsibility; (3) age; (4) educational level; and (5) major source of income. The schedule was patterned after one developed by Lowe who conducted an earlier study with tobacco growers in a Tennessee county.

Data were obtained concerning 34 individual production practices or factors known to influence yield differentials. These included blackshank data, general value of soil for tobacco production, tons of manure applied per acre, fertilizer rate and placement, number making soil tests, pounds and analysis of plant bed fertilizer, method of plant bed sterilization, time of plant bed sterilization, variety of tobacco used, rate of seeding, plant bed weed infestation, quality of plants,

plant bed insecticides used, degree of insect control in plant bed, transplanting method, transplanting date, rotation system followed, kind of cover crop used, depth of cultivation, spacing in field, uniformity of stand, time of topping, sucker control methods used, disease and insect damage in field, stage of maturity at harvest, time elapsed between topping and harvest, priming data, farmer's reason for high, low or no higher yield and number of grades into which the tobacco was sorted.

Results of the Study

As a basis for the teaching approaches, 25 growers were selected for interview in each of the four yield groups by use of stratified random sampling techniques.

Personal and Farm Data

Yield as related to gross income. Table II indicates that the considerably below average group (below 1,400 pounds per acre) realized between \$200 and \$1,000 gross income per acre, the below average (1,400 to 1,899 pounds per acre), representing 37 percent of the population, had gross returns between \$800 and \$1200. The above average (1,900 to 2,399 pounds per acre), representing 48 percent of the eligible population, grossed between \$1,200 and \$1,600, while the considerably above average (2,400 or more pounds per acre), 8 percent of the population, grossed between \$1,400 and \$2,200 per acre. The respective production groups of growers grossed averages of \$707.69, \$1,137.57, \$1,517.57, and

\$1,885.32 per acre. The overall average gross income was \$1,312.04, while total production was 1,971 pounds for those interviewed.

Size of farm. Table III shows that 78 of the 100 farms were below 100 acres, 17 were between 100 and 200, and 5 were over 200 acres in size. About 54 percent of the farmers on farms of less than 100 acres were in Group B; whereas, only 36 percent of those on the 100 to 200 or more acre farms were in that group. This means that Group A producers constituted the minority, 46 percent, of those having farms of less than 100 acres in size and the majority, 64 percent, of those with 100 acres or more.

Tenure status. Tobacco was grown by owners themselves on 76 of the 100 farms, by sharecroppers on 20, and by tenants on only 4 farms, as shown in Table IV. A slightly higher percent, 40, of those in the two above average categories were owners than was true for those in the below average groups (36 percent) growing tobacco. In other words, there seemed to be a slight tendency for more above average producers to be owners. Only 4 percent of those surveyed considered themselves to be tenants.

Age. Reference to Table V reveals that only 14 of the 100 farmers interviewed in this study were below 40 years of age. Fifty-three percent were between 40 and 60 years of age; while 33 percent were over 60. No trend was shown relating yield levels to any definite

TABLE III

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO SIZE OF FARM IN ACRES, OF 100
SELECTED FARMS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Total		Size of Farm, Acres			
	No.	Per Cent	Below 100	100 - 200	Over 200	Per Cent
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	23	23	2	0
Below average (1,400 - 1,899 lbs. per acre)	25	25	19	19	4	2
Above average (1,900 - 2,399 lbs. per acre)	25	25	16	16	7	2
Considerably above average (2,400 or more lbs. per acre)	25	25	20	20	4	1
Total Study	100	100	78	78	17	5

TABLE IV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TENURE STATUS OF 100 SELECTED FARMERS
IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included			Tobacco Grown By					
	No.	Per Cent	No.	Owner		Tenant		Sharecropper	
				No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	22	22	0	0	3	3	
Below average (1,400 - 1,899 lbs. per acre)	25	25	14	14	2	2	9	9	
Above average (1,900 - 2,399 lbs. per acre)	25	25	19	19	2	2	4	4	
Considerably above average (2,400 or more lbs. per acre)	25	25	21	21	0	0	4	4	
Total Study	100	100	76	76	4	4	20	20	

TABLE V

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO AGES OF 100 SELECTED FARMERS
IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		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 1,400 lbs. per acre)	25	25	3	3	12	12	10	10
Below average (1,400 - 1,899 lbs. per acre)	25	25	6	6	15	15	4	4
Above average (1,900 - 2,399 lbs. per acre)	25	25	3	3	12	12	10	10
Considerably above average (2,400 or more lbs. per acre)	25	25	2	2	14	14	9	9
Total Study	100	100	14	14	53	53	33	33

age category. The data do show that 86 percent of Greene County's growers were over 40 years of age.

Educational levels. Data with regard to educational levels of tobacco growers in Greene County as associated with different yield levels are shown in Table VI. Sixty-seven percent of all farmers interviewed had less than a ninth grade education. Thirty-two percent had completed training between the ninth and twelfth grade levels. Of those producers who had completed 9 or more years of schooling, a larger percent, 66, were in above and considerably above average categories than in below average groups, 34 percent.

Major sources of income. Eighty-nine percent of the 100 farmers interviewed depended upon tobacco as their major source of agricultural income. Reference to Table VII shows no apparent relationship between yield and the reporting of tobacco as the major source of income. Nine of the 11 reporting other major sources were dairy farmers, the remaining two received their major agricultural income from the sale of livestock. Some 25 percent of farmers interviewed worked off the farm.

Blackshank. Greene County was the first county in East Tennessee to have blackshank occur. It appeared first in 1949. Twenty-five percent of the 100 surveyed indicated that the disease had been a problem at some time (since 1948) on their farm. Because of the prevalence of blackshank in the county, all 1,361 producers need to select

TABLE VI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO EDUCATIONAL LEVELS ATTAINED BY
 100 SELECTED FARM OWNERS IN GREENE COUNTY, TENNESSEE,
 1961 THROUGH 1963

Yield Group	All Farmers Included		Number of Years of School Completed					
	No.	Per Cent	0 - 8		9 - 12		13 or More	
			No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	21	21	4	4	0	0
Below average (1,400 - 1,899 lbs. per acre)	25	25	17	17	8	8	0	0
Above average (1,900 - 2,399 lbs. per acre)	25	25	13	13	12	12	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	16	16	8	8	1	1
Total Study	100	100	67	67	32	32	1	1

TABLE VII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO MAJOR SOURCES OF INCOME OF 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	No.		Per Cent		Major Source of Income					
	No.	Per Cent	Tobacco No.	Per Cent	Dairying No.	Per Cent	Livestock No.	Per Cent	Dairying No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	22	22	3	3	0	0		
Below average (1,400 - 1,899 lbs. per acre)	25	25	22	22	2	2	1	1		
Above average (1,900 - 2,399 lbs. per acre)	25	25	22	22	3	3	0	0		
Considerably above average (2,400 or more lbs. per acre)	25	25	23	23	1	1	1	1		
Total Study	100	100	89	89	9	9	2	2		

varieties that are resistant to this particular disease. Actually many producers use a resistant variety to prevent an outbreak on their farm. In 1965, a few farms were found to have had trouble with blackshank. There was no apparent relationship between yield and a history of blackshank. In spite of the previous countywide problem with blackshank, only 54 percent reportedly had purchased varieties resistant to this disease. (See Table VIII.)

Use of manure. As seen in Table IX, there seemed to be a definite positive relationship between the tons of manure used and the yield level. By way of comparison, considerably above average producers averaged using 13.48 tons of manure per acre; while considerably below average growers averaged only 8.76 tons. Of the 100 growers interviewed, 10 percent used no manure, 27 percent used from 1 to 10 tons per acre, 33 percent used from 11 to 15 tons per acre and 30 percent reportedly used 16 or more tons of manure per acre. This indicates that the abundant use of manure seems to be an important consideration for tobacco growers desiring to produce high yields.

Soil test usage. Data in Table X show that 10 percent of the farmers interviewed in this study reportedly were following soil test recommendations. A slightly larger percent of the farmers in the two above average groups were following soil test recommendations than was true of farmers in the two below average groups, though numbers were small for all.

TABLE VIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBERS OF FARMERS
EXPERIENCING BLACKSHANK DISEASE AS REPORTED BY 100
SELECTED FARMERS IN GREENE COUNTY, TENNESSEE,
1961 THROUGH 1963

Yield Group	All Farmers Included		Number of Farmers Experiencing Blackshank Disease			
	No.	Per Cent	Yes		No	
			No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	4	4	21	21
Below average (1,400 - 1,899 lbs. per acre)	25	25	9	9	16	16
Above average (1,900 - 2,399 lbs. per acre)	25	25	5	5	20	20
Considerably above average (2,400 or more lbs. per acre)	25	25	7	7	18	18
Total Study	100	100	25	25	75	75

TABLE IX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TONS OF MANURE APPLIED TO TOBACCO AND AVERAGE TOTAL TONS APPLIED PER ACRE BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers										Average Total Tons Manure Applied Per Acre
	Included	None		1 - 10		11 - 15		16 or More		Per Cent	
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	2	2	14	14	4	4	5	5	8.76
Below average (1,400 - 1,899 lbs. per acre)	25	25	5	5	6	11	11	11	3	3	9.20
Above average (1,900 - 2,399 lbs. per acre)	25	25	2	2	3	9	9	9	11	11	13.26
Considerably above average (2,400 or more lbs. per acre)	25	25	1	1	4	9	9	9	11	11	13.48
Total Study	100	100	10	10	27	27	33	33	30	30	11.17

TABLE X

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBERS OF GROWERS WHO
 FERTILIZED TOBACCO ACCORDING TO SOIL TEST RECOMMENDATIONS AS
 REPORTED BY 100 SELECTED FARMERS IN
 GREENE COUNTY, TENNESSEE
 1961 THROUGH 1963

Yield Group	All Farmers Included		Farmers Following Soil Test Recommendations			
	No.	Per Cent	Yes		No	
			No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	0	0	25	25
Below average (1,400 - 1,899 lbs. per acre)	25	25	1	1	24	24
Above average (1,900 - 2,399 lbs. per acre)	25	25	5	5	20	20
Considerably above average (2,400 or more lbs. per acre)	25	25	4	4	21	21
Total Study	100	100	10	10	90	90

Fertilizer usage. As seen in Table XI, 94 percent of the 100 growers interviewed used 1,000 or more pounds of commercial fertilizer per acre (all analyses included). Seventy-four percent used in excess of 1,500 pounds per acre. An increasingly greater proportion of the higher producers reported having used the larger amounts of commercial fertilizer.

Fertilizer placement. Ninety-four percent of the farmers interviewed reportedly used the broadcast method of fertilizer placement. One percent applied fertilizer in the row, and 5 percent used both row and broadcast methods, as shown in Table XII.

Commercial fertilizer application to plant bed. As seen in Table XIII, 88 percent of the farmers interviewed used from 50 through 100 pounds of plant bed fertilizer per 100 square yards of bed. Forty-one percent used 50 pounds per 100 square yards, as recommended by tobacco research work in Tennessee. The largest percent of those in above average categories, 46, used the 50 pounds recommended; while the largest percent of below average growers used 100 pounds.

Method and Time of Plant Bed Sterilization

Table XIV reveals that, of the 100 producers interviewed, 23 percent were burning, 18 percent were using cyanamid, and 50 percent were using the recommended methyl bromide gas. Of the remaining 9 percent, 3 purchased plants, one did not sterilize the plant bed, and 5 used two or more methods of sterilization. Seven percent of this last 9 percent were in the below average groups.

TABLE XI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO AVERAGE POUNDS OF FERTILIZER NUTRIENTS APPLIED TO TOBACCO BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Farmers by Commercial Fertilizer											
	Included		400 - 699		700 - 999		1,000-1,500		1,501 or More		No.	Cent
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
Considerably below average (below 1,400 lbs. per acre)	25	25	1	1	2	2	9	9	13	13		
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	2	2	4	4	19	19		
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	1	1	4	4	20	20		
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	0	0	3	3	22	22		
Total Study	100	100	1	1	5	5	20	20	74	74		

TABLE XII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO METHODS OF FERTILIZER PLACEMENT
 USED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE,
 1961 THROUGH 1963

Yield Group	All Farmers Included										Farmers by Method of Fertilizer Placement					
	No.		Per Cent		None		Broadcast		In Row		Both		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 1,400 lbs. per acre)	25	25	0	0	22	22	1	1	2	2						
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	24	24	0	0	1	1						
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	24	24	0	0	0	0	1	1				
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	24	24	0	0	0	0	1	1				
Total Study	100	100	0	0	94	94	1	1	5	5						

TABLE XIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO COMMERCIAL FERTILIZER TREATMENT OF TOBACCO PLANT BED AS REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Pounds of Commercial Fertilizer Applied Per 100																		
	All Farmers Included			Plants Purchased			25			50			75			100			
	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	No.	Cent	Per	
Considerably below average (below 1,400 lbs. per acre)	25	25	3	3	3	3	3	3	10	10	10	0	0	0	0	9	9	9	9
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	1	1	1	8	8	8	8	0	0	0	0	16	16	16	16
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	4	4	4	9	9	9	9	0	0	0	0	12	12	12	12
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	1	1	1	14	14	14	14	0	0	0	0	10	10	10	10
Total Study	100	100	3	3	9	9	9	41	41	41	41	0	0	0	0	47	47	47	47

TABLE XIV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO METHODS AND TIMES OF PLANT BED
STERILIZATION REPORTED BY 100 SELECTED FARMERS
IN GREENE COUNTY, TENNESSEE
1961 THROUGH 1963

Yield Group	All Farmers Included		Method of Sterilization										Time of Sterilization							
	No.	Per Cent	None	Burning		Cyanamid		Methyl Bromide		2 or More Methods		None		Fall		Spring		Both		
				No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.
Considerably below average (below 1400 lbs. per acre)	25	25	4 ^a	4	7	7	1	1	12	12	1	1	4	4	1	1	19	19	1	1
Below average (1400-1899 lbs. per acre)	25	25	0	0	7	7	6	6	10	10	2 ^c	2	2	2	8	8	15	15	0	0
Above average (1900-2399 lbs. per acre)	25	25	0	0	5	5	4	4	15	15	1 ^b	1	0	0	8	8	15	15	2	2
Considerably above average (2400 or more lbs. per acre)	25	25	0	0	4	4	7	7	13	13	1 ^d	1	0	0	13	13	11	11	1	1
Total Study	100	100	4	4	23	23	18	18	50	50	5	5	6	6	30	30	60	60	4	4

^aThree people purchased the plants; One person did not use anything.

^bDid not sterilize the bed.

^cUsed cyanamid and gas

^dUsed vapum

When time of sterilization was considered, 30 percent of those interviewed reported fall application of a weed sterilant and 60 percent reported spring application. The highest percent of considerably above average producers, 52 percent, sterilized plant beds only in the fall, while most considerably below average growers, 76 percent, sterilized their beds only in the spring. Fall sterilization is recommended.

Burley Varieties

Fifty-four percent of the 100 farmers interviewed reported using a blackshank-resistant variety of tobacco (see Table XV). Seven percent used Burley 11A or 11B varieties, 32 percent used Burley 37 and 15 percent used Burley 49, all of these varieties being resistant. Twenty-seven percent used Burley 21, a recommended variety not resistant to blackshank. The remaining 16 percent used one of nine non-recommended varieties. When different production groups were compared little difference was noted.

Plant Bed Seeding Rate

Reference to Table XVI shows that 91 percent of the 100 farmers in the study followed research recommendations of two to three level teaspoons of seed per 9 by 100 feet of plant bed. It is noted that a higher percent of the considerably above average yield group, 84 percent, than of the considerably below average group, 40 percent, used only two teaspoons of seed suggesting a possible advantage to this lower rate.

TABLE XV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO VARIETIES USED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Plants Purchased		Burley 49 ^a		Burley 11A or 11B ^a		Burley 21		Burley 37 ^a		Other ^b	
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	3 ^a	3	2	2	3	3	5	5	6	6	6	6
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	4	4	1	1	4	4	14	14	2	2
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	3	3	1	1	11	11	6	6	4	4
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	6	6	2	2	7	7	6	6	4	4
Total Study	100	100	3	3	15	15	7	7	27	27	32	32	16	16

^aBlackshank resistant varieties.

^bOther varieties included Ky. 9, 12, 16, 35, 41, Hybrids and Highleaf.

TABLE XVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO PLANT BED SEEDING RATE USED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Plants Purchased		Level Teaspoons Seed Used Per 9 x 100 Feet of Plant Bed					
	No.	Cent	No.	Cent	No.	Cent	No.	Cent	No.	Cent
					2	3	4	5		
					Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	3	3	10	11	1	1	0	0
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	16	7	7	0	2	2
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	16	8	8	1	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	21	2	2	1	1	1
Total Study	100	100	3	3	63	28	28	3	3	3

Plant Bed Weed Infestation

As seen in Table XVII, 38 percent of the 100 farmers interviewed reported no weeds in their tobacco beds, 49 percent reported some weeds and 9 percent reported heavy weed infestation. The study shows some indication that the higher yield groups (46 percent reporting no weeds) did a better job of controlling weeds than did the below groups (30 percent reporting no weeds).

Quality of Tobacco Plants

Reference to Table XVIII shows that 28 percent of the farmers interviewed stated that they had tobacco plants of "excellent" quality and 60 percent said that their plants were of "good" quality. This gave a total of 88 percent who indicated they had plants of proper quality to take to the field at setting time. Ten percent said that their plants were of "fair" quality, and 2 percent reported having plants of "poor" quality. Nearly all, 96 percent, of the growers with considerably above average yields had "excellent" and "good" plants; while only 68 percent of the considerably below average producers were so fortunate.

Insecticides Applied to Plant Beds

Reference to Table XIX shows that 35 percent of the farmers interviewed in this study applied insecticides on their seedling plants. Sixty-two percent reported that they applied no insecticides directly to the plants in the bed; however, some indicated that they applied

TABLE XVII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEGREE OF PLANT BED WEED INFESTATION OF 100
SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Plants Purchased		Degree of Weed Infestation in Plant Bed					
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	3	3	7	7	10	10	5	5
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	8	8	16	16	1	1
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	11	11	11	11	2	2
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	12	12	12	12	1	1
Total Study	100	100	3	3	38	38	49	49	9	9

TABLE XVIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO QUALITY OF TOBACCO PLANTS REPORTED
 BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE,
 1961 THROUGH 1963

Yield Group	All Farmers Included		Farmers by Plant Quality Group							
	No.	Per Cent	Excellent		Good		Fair		Poor	
			No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	2	2	15 ^a	15	7	7	1	1
Below average (1,400 - 1,899 lbs. per acre)	25	25	5	5	18	18	2	2	0	0
Above average (1,900 - 2,399 lbs. per acre)	25	25	11	11	13	13	1	1	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	10	10	14	14	0	0	1	1
Total Study	100	100	28	28	60	60	10	10	2	2

^aOne purchased the plants.

^bTwo purchased the plants.

TABLE XIX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO USE OF INSECTICIDES
ON PLANT BEDS AS REPORTED BY 100 SELECTED FARMERS IN
GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Crop	All Farmers Included		Insecticides Applied to Plant Beds			
			Yes		No.	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	9	9	16 ^a	16
Below average (1,400 - 1,899 lbs. per acre)	25	25	4	4	21	21
Above average (1,900 - 2,399 lbs. per acre)	25	25	7	7	18	18
Considerably above average (2,400 or more lbs. per acre)	25	25	15	15	10	10
Total Study	100	100	35	35	65	65

^aThree purchased the plants.

'poisoned fertilizer' which was fertilizer impregnated with an insecticide. A higher percent of those in the considerably above and above average yield groups, 44 percent, did apply insecticides than was true of those in the considerably below average yield groups, 26 percent.

Effectiveness of Insect Control

Reference to Table XX shows that 87 percent of the group interviewed reported 'good' insect control. Nine percent of the producers reported 'fair' insect control and only 1, a considerably below average producer, reported 'poor' control. There seems to be a tendency for a slight positive relation between the degree of insect control and yields since a larger percent, 96, of those in the considerably above average group had 'good' control than was true for the considerably below average group, 72 percent.

Time and Method of Transplanting

Data presented in Table XXI show that 98 percent of the 100 producers set their plants at 'early' to 'medium' planting dates. The facts indicate that 'early' planting has a relation to higher production.

Ninety-one percent of the producers transplanted by machine rather than by hand; however, data do not show any evidence of yield differences of consequence. Most farmers did express the opinion that tobacco grew faster and is more easily cultivated after machine setting.

TABLE XX

RELATIONSHIP OF TOBACCO YIELD PRODUCED TO EFFECTIVENESS OF INSECT CONTROL IN TOBACCO PLANT BEDS OF 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Plants Purchased		Effectiveness of Insect Control in Plant Beds					
	No.	Per Cent	No.	Per Cent	Good		Fair		Poor	
					No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	3	3	18	18	3	3	1	1
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	23	23	2	2	0	0
Above average (1,900 - 2,399) lbs. per acre)	25	25	0	0	22	22	3	3	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	24	24	1	1	0	0
Total Study	100	100	3	3	87	87	9	9	1	1

TABLE XXI

RELATIONSHIP OF TOBACCO YIELD PRODUCED TO TIME AND METHOD OF TOBACCO TRANSPLANTED REPORTED
BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Farmers by Transplanting											
	All Farmers Included		Time Group				Farmers by Method Group					
	No.	Cent	Early	Medium	Late	Hand	Machine	No.	Cent	No.	Cent	
Considerably below average (below 1,400 lbs. per acre)	25	25	6	6	17	17	2	2	3	3	22	22
Below average (1,400 - 1,899 lbs. per acre)	25	25	14	14	11	11	0	0	3	3	22	22
Above average (1,900 - 2,399 lbs. per acre)	25	25	13	13	12	12	0	0	2	2	23	23
Considerably above average (2,400 or more lbs. per acre)	25	25	16	16	9	9	0	0	1	1	24	24
Total Study	100	100	49	49	49	49	2	2	9	9	91	91

Rotation Practices

Eighty-six percent of the tobacco farmers interviewed reported that they grew tobacco continuously on the same land year after year, as shown in Table XXII. Eighteen percent of producers in the two above average categories grew tobacco in a rotation of one year out of two or three years; while only 10 percent of those below average followed any but a continuous pattern.

Cover Crops Grown Preceding Tobacco

The data comparing kinds of cover crops preceding tobacco are shown in Table XXIII. Twenty-six percent of the farmers reported no cover crops used, 38 percent reported small grain alone, 5 percent used grain and crimson clover, 19 percent used clover alone, 2 percent used grass sod, 10 percent used clover and grass sod.

Visual inspection of the data seems to show an advantage for the use of the following crops in order of value: small grain, crimson clover, and various clovers and grasses since considerably above and above average producers used these clover crops, while the two below average groups preferred to use none.

Turning of Cover Crops

Reference to Table XXIV indicates that 74 percent of farmers turned cover crops. The relationship of turning cover crops to yield is evident since 96 percent of the considerably above average producers and only 40 percent of the considerably below group turned cover crops.

TABLE XXII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO CROP ROTATION PRACTICE FOLLOWED
 BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE,
 1961 THROUGH 1963

Yield Group	Farmers by Rotation Practice Followed							
	All Farmers Included		Continuous Tobacco		Tobacco One Year in Two		Tobacco One Year in Three	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	24	24	0	0	1	1
Below average (1,400 - 1,899 lbs. per acre)	25	25	21	21	2	2	2	2
Above Average (1,900 - 2,399) lbs. per acre)	25	25	20	20	3	3	2	2
Considerably above average (2,400 or more lbs. per acre)	25	25	21	21	3	3	1	1
Total Study	100	100	86	86	8	8	6	6

TABLE XXIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO KIND OF COVER CROP USED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		None		Small Grain		Grain and Clover		Crimson Clover		Grass		Clover and Grass	
	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 1,400 lbs. per acre)	25	25	15	15	6	6	1	1	3	3	0	0	0	0
Below average (1,400 - 1,899 lbs. per acre)	25	25	7	7	11	11	1	1	2	2	1	1	3	3
Above average (1,900 - 2,399 lbs. per acre)	25	25	3	3	7 ^a	7	2	2	8	8	0	0	5	5
Considerably above average (2,400 or more lbs. per acre)	25	25	1	1	14	14	1	1	6	6	1	1	2	2
Total Study	100	100	26	26	38	38	5	5	19	19	2	2	10	10

^aOne person used both small grain and clover as cover crops.

TABLE XXIV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO FARMERS TURNING
COVER CROP AS REPORTED BY 100 SELECTED FARMERS OF
GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Crop	All Farmers Included		Number of Farmers Turning Cover Crop			
			Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	10	10	15	15
Below average (1,400 - 1,899 lbs. per acre)	25	25	18	18	7	7
Above average (1,900 - 2,399 lbs. per acre)	25	25	22	22	3	3
Considerably above average (2,400 or more lbs. per acre)	25	25	24	24	1	1
Total Study	100	100	74	74	26	26

Depth of Cultivation

As seen in Table XXV, 71 percent of the 100 farmers interviewed reported shallow (two to four inches) cultivation of tobacco, 29 percent reported deep (over four inches) cultivation. More of the considerably above average producers, 92 percent, reported shallow cultivation than was true for the considerably below average group, 76 percent. Hence, depth of cultivation did appear to be positively related to yield variation in Greene County.

Width Between Tobacco Rows

Data in Table XXVI indicate an apparently greater preference among growers in all yield groups for 38 to 42 inch spacings between rows, 55 percent so reporting.

Spacing of Tobacco Plants Within Rows

Table XXVII discloses that 66 percent of those in the two above average yield groups and 54 percent of those in the two below average yield groups were in the 16 to 18 inch planting category for a total for all producers of 60 percent. It appears that there may be some advantage to the 16 to 18 inch spacing since two-thirds (68 percent) of the considerably above average and only 44 percent of the considerably below average producers so reported.

Plant Population Per Acre

Table XXVIII reveals that the considerably below average group were using approximately 1,000 plants more per acre than the other

TABLE XXV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEPTH OF
CULTIVATION REPORTED BY 100 SELECTED FARMERS IN
GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Farmers by Depth of Cultivation Group			
	No.	Per Cent	Deep		Shallow	
			No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	6	6	19	19
Below average (1,400 - 1,899 lbs. per acre)	25	25	10	10	15	15
Above average (1,900 - 2,399 lbs. per acre)	25	25	11	11	14	14
Considerably above average (2,400 or more lbs. per acre)	25	25	2	2	23	23
Total Study	100	100	29	29	71	71

TABLE XXVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED AS TO WIDTH BETWEEN ROWS AS REPORTED BY 100 SELECTED FARMERS OF GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Number of Farmers as to Width Between Rows in Inches		No.	Per Cent
	No.	Per Cent	Less than 36	36 - 38		
Considerably below average (below 1,400 lbs. per acre)	25	25	1	12	12	12
Below average (1,400 - 1,899 lbs. per acre)	25	25	1	10	14	14
Above average (1,900 - 2,399 lbs. per acre)	25	25	1	8	16	16
Considerably above average (2,400 or more lbs. per acre)	25	25	2	10	13	13
Total Study	100	100	5	40	55	55

TABLE XXVII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED AS TO SPACING WITHIN ROWS AS REPORTED
 BY 100 SELECTED FARMERS OF GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Numbers of Farmers as to Spacing Within Rows in Inches											
	No.	Per Cent	10		12 - 15		16 - 18		19 - 20		No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	1	1	9	9	11	11	4	4	4	4	4	4
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	3	3	16	16	6	6	6	6	6	6
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	4	4	16	16	5	5	5	5	5	5
Considerably above average (2,400 or more lbs. per acre)	25	25	2	2	2	2	17	17	4	4	4	4	4	4
Total Study	100	100	3	3	18	18	60	60	19	19	19	19	19	19

TABLE XXVIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO TOBACCO PLANT POPULATION OF 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Number of Farmers Included	Average Number of Tobacco Plants Per Acre	Median Number of Plants Per Acre	Range in Numbers of Plants Per Acre
Considerably below average (below 1,400 lbs. per acre)	25	11,852	11,616	8,297 - 17,424
Below average (1,400 - 1,899 lbs. per acre)	25	10,768	10,668	8,297 - 14,935
Above average (1,900 - 2,399 lbs. per acre)	25	10,688	10,668	8,297 - 14,520
Considerably above average (2,400 or more lbs. per acre)	25	11,378	10,668	8,297 - 20,909
Total Study	100	11,172	10,668	8,297 - 20,909

NOTE: University of Tennessee Agronomy Department plant count chart used.

three groups. The plant median per acre was identical for these other three groups. It is surprising to note that one of the considerably above producers had planted 20,909 plants per acre.

Uniformity of Stand

As seen in Table XXIX all producers had an average stand of 96 percent, no differences of consequence being noted among production groups.

Time Between Topping and Harvest

As presented in Table XXX, 89 percent of the farmers interviewed in the study let their tobacco stand three weeks or more between topping and harvesting. It is interesting to note that 46 percent of those in the two above average groups and only 24 percent of those in the two below average groups waited more than three weeks after topping to harvest tobacco. This suggests an apparent advantage, for farmers in Greene County, in favor of waiting more than three weeks.

Stage of Maturity and Height of Tobacco When Topped

By referring to Table XXXI, it is obvious that only 29 percent of the population surveyed topped when the tobacco was in the recommended early bloom stage. Ten percent of the considerably below average topped early as compared to 88 percent for the considerably above average producers. Most all producers (64 percent) topped in the medium bloom stage and 7 percent topped in the late. Seventy-seven percent reported topping at the medium stage. Of those topping

TABLE XXIX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO UNIFORMITY OF TOBACCO PLANT STANDS
 REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE,
 1961 THROUGH 1963

Yield Group	Farmers by Degree of Uniformity of Tobacco Stand Group ^a							
	All Farmers Included		Good		Medium		Poor	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	23	23	0	0	2	2
Below average (1,400 - 1,899 lbs. per acre)	25	25	24	24	1	1	0	0
Above average (1,900 - 2,399 lbs. per acre)	25	25	25	25	0	0	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	24	24	1	1	0	0
Total Study	100	100	96	96	2	2	2	2

^a Good Stand--90 percent or more plant liveability; Medium Stand--80 to 90 percent plant liveability, and Poor Stand--below 80 percent plant liveability.

TABLE XXX

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO WEEKS OF GROWTH OF TOBACCO BETWEEN TOPPING AND HARVEST AS REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Farmers by Group According to Weeks of Tobacco Growth Between Topping and Harvest											
	All Farmers Included		One Week		Two Weeks		Three Weeks		Over Three Weeks			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	0	0	4	4	16	16	5	5	5	5
Below average (1,400 - 1,899 lbs. per acre)	25	25	1	1	2	2	15	15	7	7	7	7
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	3	3	11	11	11	11	11	11
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	1	1	12	12	12	12	12	12
Total Study	100	100	1	1	10	10	54	54	35	35	35	35

TABLE XXXI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO STAGE OF MATURITY AND HEIGHT OF TOBACCO WHEN TOPPED AS REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included			Farmers by Stage of Tobacco Maturity Group ^a			Farmers by Group According to Height of Tobacco When Topped ^b					
	No.	Per Cent	No.	Early Per Cent	Medium Per Cent	Late Per Cent	High No.	High Per Cent	Medium No.	Medium Per Cent	Low No.	Low Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	5	5	16	4	4	3	3	21	1	1
Below average (1,400 - 1,899 lbs. per acre)	25	25	4	4	21	0	2	2	20	20	3	3
Above average (1,900 - 2,399 lbs. per acre)	25	25	9	9	14	2	5	5	19	19	1	1
Considerably above average (2,400 or more lbs. per acre)	25	25	11	11	13	1	3	3	17	17	5	5
Total Study	100	100	29	29	64	7	13	13	77	77	10	10

^aEarly topping--prior to the time when 40 percent of plants are in bloom; Medium topping--during the time when 40 to 75 percent of plants are in bloom and Late topping--after 75 percent or more of plants are in bloom.

^bHigh topping--over 26 leaves left on stalk; Medium topping--22 to 26 leaves left and Low topping--less than 22 leaves left.

at the medium stage, a large percent (41) were in the two low yield groups.

Sucker Control

Table XXXII reveals that it pays to sucker completely. Only 48 percent reported "complete" sucker control and this includes those individuals who used chemical control. Of this group, only 38 percent of the two below average groups reported "complete sucker" control, while 58 percent of the two above average groups suckered completely. Of the former groups (below average), 62 percent reported only "some" or "poor" sucker control. In 1965, 61 percent of the farmers surveyed suckered by hand, 36 percent by means of chemicals, and 3 percent both by hand and chemically (see Table XXXIII). When the two above average and two below average groups are compared, it is seen that the former favored chemical suckering, 54 percent reporting, and the latter favored hand suckering, 76 percent reporting. The chemical used by the producers was MH-30.

Diseases and Insect Damage

Table XXXIV shows that 83 percent of the farmers reported no evidence of disease damage, 15 percent reported "some" disease and 2 percent reported "much" disease damage.

Forty-four percent of all producers reported "some" evidence of insect damage, 1 percent reported "much" and 45 percent reported no insect damage. The majority of those interviewed seemed to be doing a good job of controlling all insects excepting flea beetles and

TABLE XXXII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO DEGREE OF TOBACCO SUCKER CONTROL AS REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included						Farmers by Degree of Sucker Control Group ^a					
	No.		Per Cent		Complete		Some		Poor			
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
Considerably below average (below 1,400 lbs. per acre)	25	25	6	6	18	18	1	1				
Below average (1,400 - 1,899 lbs. per acre)	25	25	13	13	12	12	0	0				
Above average (1,900 - 2,399 lbs. per acre)	25	25	15	15	10	10	0	0				
Considerably below average (2,400 or more lbs. per acre)	25	25	14	14	11	11	0	0				
Total Study	100	100	48	48	51	51	1	1				

^a Complete--no suckers allowed to grow; Some--tobacco suckered one time, or late, or two top suckers left; Poor--no suckers removed or suckered very late.

TABLE XXXIII

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO METHOD OF SUCKER CONTROL REPORTED BY
100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers						Farmers as to Method of Sucker Control			
	Included		Hand		Chemical		Hand and		Chemical	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	21	21	3	3	1	1	1	1
Below average (1,400 - 1,899 lbs. per acre)	25	25	17	17	8	8	0	0	0	0
Above average (1,900 - 2,399 lbs. per acre)	25	25	11	11	14	14	0	0	0	0
Considerably above average (2,400 or more lbs. per acre)	25	25	12	12	11	11	2	2	2	2
Total Study	100	100	61	61	36	36	3	3	3	3

TABLE XXXIV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO EXTENT OF DISEASE AND INSECT DAMAGE TO TOBACCO AS REPORTED
 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	Farmers by Tobacco Disease						Farmers by Tobacco Insect						
	All Farmers Included			Damage Group			Damage Group			Damage Group			
	No.	Cent	Per	Much	Some	None	No.	Cent	Per	Much	Some	None	
			Cent	Cent	Cent	No.	Cent	Cent	Cent	Cent	No.	Cent	
Considerably below average (below 1,400 lbs. per acre)	25	25	0	0	2	23	23	23	0	0	15	15	10
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	5	20	20	20	0	0	13	13	12
Above average (1,900 - 2,399 lbs. per acre)	25	25	1	1	6	18	18	18	1	1	15	15	9
Considerably above average (2,400 or more lbs. per acre)	25	25	1	1	2	22	22	22	0	0	11	11	14
Total Study	100	100	2	2	15	83	83	83	1	1	44	44	45

grasshoppers late in the season. These were the two insects that seemed the most difficult to control. No major differences were noted between yield groups.

Priming

Table XXXV indicates that only 4 of the 100 farmers interviewed reported priming tobacco one time. None primed more than once. The 4 that primed were in the above average yield group. Ninety-six did not prime. With only 4 percent priming, it would be impossible to relate yield to the practice.

Stage of Maturity at Harvest

Ninety-three percent of the producers interviewed reported that tobacco was "ripe" at harvest. Only 7 producers cut "green" tobacco. The data are shown in Table XXXVI. All of the considerably above producers and 88 percent of the considerably below reported harvesting "ripe" tobacco.

Number of Grades

Table XXXVII indicates that 79 percent of those surveyed reported dividing their tobacco into 4 or 5 grades. Thirty-six percent of the two above average groups and 12 percent of the two below average groups reported making 5 grades.

TABLE XXXV

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO NUMBER OF FARMERS
PRIMING BOTTOM LEAVES AS REPORTED BY 100 SELECTED
FARMERS OF GREENE COUNTY, TENNESSEE
1961 THROUGH 1963

Yield Group	All Farmers Included		Farmers Priming Tobacco			
	No.	Per Cent	Yes		No	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	0	0	25	25
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	25	25
Above average (1,900 - 2,399 lbs. per acre)	25	25	4	4	21	21
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	25	25
Total Study	100	100	4	4	96	96

TABLE XXXVI

RELATIONSHIP OF TOBACCO YIELDS PRODUCED TO STAGE OF MATURITY AT HARVEST AS REPORTED BY 100 SELECTED FARMERS IN GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Group	All Farmers Included		Farmers Reporting Stage of Maturity at Harvest			
			Ripe		Green	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	22	22	3	3
Below average (1,400 - 1,899 lbs. per acre)	25	25	24	24	1	1
Above average (1,900 - 2,399 lbs. per acre)	25	25	22	22	3	3
Considerably above average (2,400 or more lbs. per acre)	25	25	25	25	0	0
Total Study	100	100	93	93	7	7

TABLE XXXVII

RELATIONSHIP OF TOBACCO YIELDS TO NUMBER OF GRADES MADE BY 100 SELECTED FARMERS OF GREENE COUNTY, TENNESSEE, 1961 THROUGH 1963

Yield Groups	All Farmers Included		Farmers as to Number of Grades									
	No.	Per Cent	One		Two		Three		Four		Five	
			No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Considerably below average (below 1,400 lbs. per acre)	25	25	1	1	0	0	7	7	15	15	2	2
Below average (1,400 - 1,899 lbs. per acre)	25	25	0	0	0	0	6	6	15	15	4	4
Above average (1,900 - 2,399 lbs. per acre)	25	25	0	0	0	0	2	2	13	13	10	10
Considerably above average (2,400 or more lbs. per acre)	25	25	0	0	0	0	5	5	12	12	8	8
Total Study	100	100	1	1	0	0	20	20	55	55	24	24

IV. EXTENSION TEACHING APPROACHES

Based on the findings of the foregoing survey, an intensive Extension teaching unit developed and tested by Webster (10:65-86) with burley tobacco growers in Trousdale County, Tennessee, was adopted and modified where necessary for use in the present study.

The approaches were then developed for presenting the unit. One approach to teaching the unit consisted of working with all available Group A (i.e. above average) tobacco producers three consecutive Wednesday evenings in August of 1966 in a countywide-type of meeting held at the county seat. The growers were informed of forthcoming meetings by mail. Thirty-two of the 50 Group A growers attended one or more of the three meetings--20 of them attending all three two-hour meetings.

The other approach to teaching the unit consisted of working separately with all available Group B (i.e., below average) tobacco producers for two hours the same evening each week for three consecutive weeks in four individual small (i.e., including from four to six growers) neighborhood group settings held in August and September of 1966. Meetings were held at Mosheim, Lost Mountain-Baileyton, Glenwood and St. James. Growers were informed of meetings by personal visits. Twenty of the Group B growers attended the meetings.

V. INSTRUMENTS FOR MEASUREMENT

The General Principles of Burley Tobacco Production True-False Test

The true-false-test developed by Webster (10:105-108) was selected to measure the achievement of both Group A and Group B growers in Greene County (see Appendix B). This test was used as a pre-test the first night, before teaching, and as a post-test the third night, after teaching was completed.

Recommended Burley Tobacco Production Practice Checklists (Did and Will Do)

The checklists developed by Webster (10:114-119) were selected to measure the practice use and intent of both Group A and Group B tobacco growers in Greene County (see Appendix C and Appendix D). The first checklist was designed to determine which practices had been followed in 1965. It was given the first night as a pre-test.

The second checklist was designed to get an expression of intent concerning practices the growers planned to follow the next cropping season. It was administered at the end of the final (third) night of teaching as a post-test.

VI. STATISTICAL PROCEDURES

As in the Webster study (10:64), Student's t -test was used for analyzing data. Differences between scores received on the true-false tests and the practice checklists, administered as pre-tests and post-

tests to Groups A and B separately; were the observations used.

Snedecor's suggested formula (7:50) was used as follows:

$$\frac{\bar{d} - \mu}{\frac{s}{\sqrt{n}}}$$

$t_{n-1} = \frac{\bar{d} - \mu}{\frac{s}{\sqrt{n}}}$; when \bar{d} = the mean difference between pre-test and post-test scores

$$\frac{s}{\sqrt{n}}$$

μ = the mean of the population, here hypothesized to be zero

s

$\frac{s}{\sqrt{n}}$ = the standard deviation of the mean or standard error

The one and five percent probability levels were selected for testing significance.

CHAPTER IV

EVALUATION OF THE INTENSIVE TEACHING APPROACHES

I. A GENERAL EVALUATION

The interest of both A and B groups was evident at each meeting. Attendance possibly would have been better at an earlier date. Those attending arrived in advance of the appointed 8:00 p.m. in most cases. A total of 40 (20 in each instance) attended all sessions scheduled for Groups A and B, and took all tests given. Those producers attending made an effort to cooperate fully both in attendance, attention and in completing pre-tests and post-tests. Those in both groups were enthusiastic and cooperative. However, those in Group B tended to enter into the discussion more freely than those in Group A. The smaller groups used with Group B growers probably made for easier exchange. Sheer lack of time normally forces agents to meet with groups in larger, countywide meetings, but where low producers are involved the advisability of small group meetings alluded to in much previous research was verified by the general observations in this study.

II. RESULTS OF THE TRUE-FALSE TEST AND DISCUSSION

As shown in Table XXXVIII, the computed t -test values for differences between means of pre-test and post-test scores made on the

TABLE XXXVIII

COMPUTED t -VALUES OF BEFORE AND AFTER TOBACCO PRODUCTION
TEST SCORES FOR ABOVE AND BELOW AVERAGE GROUPS
OF GREENE COUNTY PRODUCERS

Tobacco Production Group	Instrument for Measurement	Computed t -Value
Group A: Above and Considerably Above Average	General Principles of Tobacco Production True-False Test	1.799++
	Burley Tobacco Production Practice C Checklist	1.804++
Group B: Below and Considerably Below Average	General Principles of Tobacco Production True-False Test	1.334+
	Burley Tobacco Production Practice Checklist	2.598*

+Significant at the 20 percent level of probability ($t=1.328$).

++Significant at the 10 percent level of probability ($t=1.729$).

*Significant at the 5 percent level of probability ($t=2.093$).

General Principles of Tobacco Production True-False Test by burley producers in the two groups were not significant. Therefore, the first two null hypotheses, stating that there were no differences between scores made by selected above average tobacco growers (Hypothesis One) and by selected below average tobacco growers (Hypothesis Two) before and after separate exposure to the two intensive teaching approaches as measured by the true-false test, were accepted,

However, as indicated in the table, the respective values were significant at the 10 percent level of probability for Group A and the 20 percent level of probability for Group B. This findings suggests that some degree of improvement did occur in each instance as measured by the test instrument. The slightly greater improvement indicated for the above average group may be due to the fact that, on the average, they tended to have attained slightly higher educational levels than their counterparts in Group B. Larger numbers of respondents might have made differences in test scores significant at higher levels of probability.

III. RESULTS OF PRACTICE CHECKLIST ADMINISTRATION AND DISCUSSION

Reference to Table XXXVIII discloses that the computed t -test value for differences between means of pre-test (Did) and post-test (Will Do) scores made on the Burley Tobacco Production Practice Checklists by the 20 above average growers was not significant. Consequently, the third null hypothesis, stating that there was no

difference between scores made by selected above average growers before and after exposure to an intensive teaching approach as measured by the practice checklists, was accepted. Nevertheless, it should be noted that the value was significant at the 10 percent level of significance which suggests that improvement did occur and that growers in Group A were already above average in practice use and production, as shown in the survey.

The computed t-test value for differences between the means of pre-test and post-test scores made on the Checklist by the 20 Group B growers was found to be significant at the five percent level of probability. Therefore, the fourth null hypothesis, stating that there was no difference between scores made by selected below average growers before and after exposure to an intensive teaching approach as measured by the practice checklists, was rejected--indicating that a large degree of improvement did occur that was measurable in terms of the instrument. Growers in Group B were below average to start with and had more to learn than those in Group A.

CHAPTER V

SUMMARY AND CONCLUSIONS

Approximately 47 percent of Greene County's total farm income was derived from the sale of burley tobacco in 1965. Gross sales totaled about \$7,470,000. Greene County's three year average yield per acre (1961 to 1963) was 1,977 pounds. This was 121 pounds more per acre than the state average for the same period. A study of tobacco yield data showed a wide variation in per acre tobacco yields, ranging from a low of 743 pounds to a high of 3,007 pounds. At the time of the study (1966), county producers had actually surpassed a county Extension program development goal of 2,000 pounds, set in 1959, by some 211 pounds per acre.

Since information was not available concerning current grower practices, Extension personnel had no definite way of knowing what practices needed emphasis to help tobacco producers grow more pounds of quality tobacco for higher net returns per acre.

The purpose of this study was to evaluate two separate Extension teaching approaches (based on a survey of the growers and their practices) as evidenced by changes in knowledge and practices used by two different Extension audiences, namely "above average" tobacco

growers, referred to in the study as Group A, and "below average" tobacco growers, referred to as Group B in the study.

Three-year, 1961 through 1963, average yields were computed for the 2,388 tobacco producers in Greene County who were eligible for the study. A frequency distribution chart was made of growers by 100 pound yield increments and all growers were divided into four main yield classes, namely: (1) considerably below average; (2) below average; (3) above average; and (4) considerably above average. Twenty-five growers were selected for interview in each of the four yield categories categories.

An interview schedule form including family and personal data and production practices was adopted from an earlier study and used in collecting data from the total of 100 Greene County farmers selected.

In the pre-survey conducted as a basis for the teaching approach approaches, it was found that producers in Group A were following more research-verified practices than those in Group B. Seventy-eight of the 100 farmers surveyed operated farms of less than 100 acres. Tobacco was grown by the owner on 76 percent of all farms surveyed, 80 percent of those in Group A and 72 percent of those in Group B.

Eighty-six percent of the farmers interviewed were 40 years of age or over. The average age was 54 years with Group A farmers being slightly older, 56, than those in Group B, 52 years, on the average.

Survey data comparing educational levels indicated that, of those producers who had completed nine or more years schooling, a larger percent, 42, were in Group A than in Group B, 24 percent.

Greene County was the first county in the state to report blackshank. Thus, many farms had had histories of blackshank infestation. However, the survey showed that this particular disease may have become less of a problem than formerly since most of the 25 percent having previously had blackshank on their farms (92 percent) either used resistant varieties or practiced rotation or both.

A surprisingly low 10 percent reported following soil test recommendations in tobacco fertilization, a slightly larger percent of the farmers in Group A reportedly followed soil test recommendations than was true for Group B.

Fertilizer usage data showed that Group A farmers reported using larger amounts of commercial fertilizer than was true of those in Group B.

Forty-six percent of the farmers in Group A and 36 percent of those in Group B reported using 50 pounds of fertilizer per 100 square yards of plant bed.

Early transplanting was shown to be of importance. Low producers, 60 percent, transplanted at medium to late dates in the season; while most of the high producers, 58 percent, were transplanting before May 20.

Following summarization of the survey data and based upon it, an intensive teaching unit developed earlier by Webster was adapted for use in teaching burley tobacco production principles and practices separately to Group A and Group B tobacco growers in Greene County.

Group A farmers were taught in a three-night series of meetings in a single countywide session in the county seat. Group B growers were taught in four separate small neighborhood groups also on a three-night basis. Time devoted and subject matter used with all groups were held constant.

Webster's true-false test was adapted for use both before and after teaching to determine progress made by both Group A and Group B producers in terms of knowledge of tobacco subject matter. Webster's two recommended tobacco production checklists also were adapted for comparing their past practices (before teaching) with their plans for 1967 (after teaching).

The statistical technique used for analyzing data was a modified Student's t -test. Differences between scores received on true-false tests and the practice checklists given before and after teaching were the observations used for analysis. The one and five percent probability levels were selected for testing significance.

I. SUMMARY OF FINDINGS

Group A Tobacco Producers

A t -test comparison of before and after tobacco production test scores made on the General Principles of Tobacco Production True-False Test by twenty Group A growers who attended all three sessions of the intensive teaching unit and completed all tests, disclosed that mean differences were not significant at the required level. Therefore, the

first two null hypotheses stating: (1) there was no difference between scores made by Group A tobacco growers before and after intensive teaching as measured by a General Principles of Tobacco Production True-False Test, and (2) there was no difference between scores made by Group A tobacco growers before and after intensive teaching as measured by a Recommended Tobacco Production Practice Checklist, were both accepted.

Group B Tobacco Producers

A t -test comparison of before and after tobacco production test scores made on the General Principles of Tobacco Production True-False Test by twenty Group B growers (taught in small neighborhood group settings) who attended all three sessions of the intensive teaching unit and completed all tests, disclosed that mean differences were not significant. Therefore, the third null hypothesis, stated that there was no difference between scores made by Group B tobacco growers as measured by the General Principles of Tobacco Production True-False Test, was accepted.

The t -test comparison of before and after tobacco production test scores made on the Burley Tobacco Production Practice Checklist by the twenty Group B growers disclosed that the means were significantly different--significant improvement being indicated. Therefore, the fourth null hypothesis, stating that there was no difference between scores made by Group B tobacco growers before and after intensive

teaching as measured by a Recommended Tobacco Production Practice Checklist, was rejected.

II. CONCLUSIONS

Since evaluation of the intensive teaching unit by means of general appraisal and use of the Burley Tobacco Production Practice Checklist did show that the approach used with Group B to be effective, it is concluded that the unit adopted and modified for use and testing in this study did at least partially achieve the objective intended with that group. It should be noted, however, that though the approach with the Group A farmers proved to be less significant (in terms of the measuring devices administered), they were using many of the recommended principles and practices as shown by a survey and as indicated by the fact that they were already producing above state and county averages at the time of the study.

Had it been possible to have all 100 of the tobacco growers who were surveyed in Groups A and B take the coursework and tests, it is likely that greater significance might have been realized. Also, if control categories had been set up for both groups and if both ~~approach~~ approaches had been tried with both groups, greater evidence and better results might have been obtained.

III. RECOMMENDATIONS

Recommendations that appear to be pertinent include the following:

1. Other investigations similar to the study, and incorporating the idea of control groups, might be conducted and coordinated to develop further and test these and other teaching approaches.

2. Findings from this and similar studies could be used as a basis for development of county approaches for use in teaching tobacco culture to specific groups of growers in other Tennessee counties where burley is grown.

3. Studies similar to those mentioned above could be initiated in other crop and livestock areas that are of importance in Tennessee.

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BIBLIOGRAPHY

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APPENDIXES

APPENDIX A

APPENDIX A

GREENE COUNTY TOBACCO GROWER INTERVIEW SCHEDULE FORM*

NAME _____ ADDRESS _____ DATE _____

1. Size of farm: Below 100 acres _____ 100-200 _____ 200 or more _____
(small) (medium) (large)
2. Age: Young (below 40) _____ Medium (40-60) _____ Old (over 60) _____
3. Tobacco grown by: Owner _____ Tenant _____ Share Cropper _____
Part-time Farmer _____
4. Schooling: Grammar _____ High _____ College _____
5. Major source of income: Tobacco _____ Dairying _____
Livestock _____ Other _____
6. Have you had blackshank? Yes _____ No _____
7. Type of soil: Good _____ Medium _____ Poor _____
8. Tons of manure applied per acre: None _____ Below 10 _____
10-15 _____ Heavy _____
9. Followed soil test: Yes _____ No _____
10. Commercial fertilizer--lbs. None _____ 100-300 _____ 400-600 _____
700-1,000 _____ 1,000-1,500 _____ Above 1,500 _____
(Analysis) _____
11. Fertilizer placement: Broadcast _____ In row _____ Both _____
12. Fertilizer in plant bed: None _____ 25 lbs. _____ 50 lbs. _____
100 lbs. _____ Analysis: _____
13. Plant bed sterilization: Burnt _____ Cyanamid _____ Gas _____
14. Time of sterilization: Fall _____ Spring _____

*Adapted from Webster (10).

15. Variety: Burley 11A _____, B.21 _____, B. 37 _____, B. 49 _____,
B. 1 _____, Hybrid _____, Other _____
16. Rate of Seeding (teaspoonful) 2 _____, 3 _____, 4 _____, 5 _____
17. Plant bed weed infestation: None _____, Some _____, Much _____
18. Quality of Plants: Excellent _____, Good _____, Fair _____,
Poor _____
19. Were plant bed insecticides used? Yes _____, No _____
20. Insect control: Good _____, Fair _____, Poor _____
21. Transplanting: Early _____, Medium _____, Late _____
22. How transplanted: Hand _____, Machine _____
23. Rotation: Tobacco after tobacco _____, 1 in 2 _____, 1 in 3 _____
24. Cover crop turned: Yes _____ No _____
25. Kind of cover crop: Small Grain _____, Grain and Clover _____,
Clover _____, Grass _____, Clover and Grass _____
26. Cultivation: Deep _____, Shallow _____
27. Width between rows (feet): Less than 3 _____, 3 _____, 3½ _____
28. Spacing in Row (inches): 10 _____, 12 _____, 14 _____ 16 _____,
18 _____, 20 _____
29. Uniformity of Stand: Good _____, Medium _____, Poor _____
30. Topping, when: Early _____, Medium _____, Late _____
31. Topping, how: High _____, Medium _____, Low _____
32. Sucker Control: Hand _____, Chemical _____
33. Sucker Control: Complete _____, Some _____, Poor _____
34. Disease Damage: Much _____, Some _____, None _____
35. Insect Damage: Much _____, Some _____, None _____

36. Stage of harvest: Ripe _____, Green _____
37. No. days harvested after topping: Immediately _____, Week _____,
2 Weeks _____, 3 Weeks _____, More _____
38. Was tobacco primed: Yes _____ No _____
39. Farmer's reason for: high _____, low _____, no higher _____
yield. _____
40. How many grades did you separate your tobacco into last
year? _____
41. What did your tobacco sell for per pound? _____
42. How many dollars per acre gross income? _____

APPENDIX B

APPENDIX B

GENERAL PRINCIPLES OF BURLEY TOBACCO PRODUCTION

- | | <u>True or</u>
<u>False</u> |
|--|--------------------------------|
| 1. The success of a tobacco crop often depends upon an adequate supply of good, early, healthy plants. | _____ |
| 2. A deep, well drained, loamy soil is most suitable for tobacco. | _____ |
| 3. Locate the tobacco bed in a warm sunny place. A northern exposure will produce the earliest and best plants. | _____ |
| 4. Plant beds should be located close to a good water supply. | _____ |
| 5. Prepare plant bed in fall. Burning will control weed seed if properly done. | _____ |
| 6. Methyl bromide gas treatment has consistently given good weed control. | _____ |
| 7. Gas should be used in the spring for best results. | _____ |
| 8. "Vapam", "Mylone", "Beddrench" are other chemicals that may be used to control weed seed in bed. | _____ |
| 9. Calcium cyanamid is a nitrogen material, which is toxic to weed seed on contact, and should be used September 1 - October 15. | _____ |
| 10. Cyanamid requires very little moisture for success. | _____ |
| 11. Too much fertilizer may injure plants. | _____ |
| 12. The use of cottonseed meal and other organic materials has caused damping off in some seasons. | _____ |
| 13. A bed 75 to 100 feet long and 9 feet wide will provide sufficient plants to set an acre. | _____ |
| 14. March 1 to March 15 is most satisfactory time to seed beds. | _____ |

15. Tobacco seed do not germinate until soil temperature reaches 50°F. _____
16. Wood ashes, fertilizer, or sand may be used to sow seed with for a uniform distribution. _____
17. Going over bed once with seed should always get a uniform stand. _____
18. Seed beds should never be tramped or packed. _____
19. Tobacco bed covers (canvas) should be laid flat on ground. _____
20. Wildfire is not a problem in Greene County. _____
21. Bluemold is a fungus disease that may attack plants at any stage of growth. _____
22. Anthracnose is becoming a problem in Greene County and East Tennessee. _____
23. Green scum on plant beds is caused by fertilizer. _____
24. Cold injury causes bud leaves to turn blue. _____
25. Plants can be dusted with Sevin immediately before pulling to give protection in the field for several days. _____
26. The selection of a tobacco variety is one of the most important steps in producing high quality tobacco. _____
27. Burley 21, Burley 37, Burley 11A and 11B were all developed at the Kentucky Tobacco Experiment Station. _____
28. With the tobacco diseases that we have, it is advisable to find your best field and grow tobacco there year after year. _____
29. Experiments show that yield and quality are both better following continuous culture. _____
30. A good cover crop may provide as much as 50 lbs. of actual N. per acre and should be turned one week before setting. _____
31. Tobacco requires relatively large amounts of fertilizer for top yields and quality. _____

32. High quality manure contains approximately 10 lbs. N, 5 lbs. phosphorus, and 10 lbs. K per ton. _____
33. Generally a convenient way to supply the nutrients needed by tobacco is by using commercially mixed fertilizer. _____
34. A soil test is the most accurate way of determining fertilizer needs. _____
35. May 10 to June 1 is considered the ideal time to set tobacco. _____
36. Carefully pulling plants from a moist bed will result in more and better feeder roots--this will increase the percent of plants that live. _____
37. There are three methods of transplanting. Hand setting is the oldest and best. _____
38. Tobacco should not be set when the temperature is higher than 85°F. _____
39. Cultivation should be deep and continue as long as you can get through the field. _____
40. The hornworm probably does more damage than any insect in our country. _____
41. Blackshank can be spread by man, implements, and by setting diseased plants. _____
42. Black root rot causes plants to wilt in the middle of the day, but they recover later in the day. _____
43. It pays to top and control suckers. _____
44. Probably the best method is to cut tobacco and leave it in the field for several days to lose excess moisture. _____
45. Many farmers do a good job of producing a crop of tobacco but fail to prepare it properly for the market. _____
46. Tobacco is ready to strip when leaves are thoroughly cured, the midrib is dry, and when in light order. _____

47. If it is not possible to strip by florescent lights, then natural light from an eastern exposure is best. _____
48. Burley leaves are produced on the stalk in this order: lugs, flyings, leaf and may be tips. _____
49. Always hang stripped tobacco back in the barn. _____
50. A grade of burley tobacco is determined by three factors: group, quality and color. _____

APPENDIX C

APPENDIX C

RECOMMENDED TOBACCO PRODUCTION PRACTICE CHECKLIST
FOR GREENE COUNTY, TENNESSEE

Name _____ Address _____

	APPROVED PRACTICE	YES	NO
PRODUCING PLANTS:			
1.	Did you select well-drained, loamy soil with southern or southeastern exposure? (1965)	___	___
2.	Did you burn or use a recommended chemical for weed control?	___	___
3.	Did you use 50 to 75 lbs. of 4-12-8 fertilizer, or its equivalent, for each 9' x 100' bed?	___	___
4.	Did you sow 2 to 3 struck teaspoons of seed for each 9' x 100' bed?	___	___
5.	Did you sow the seed between March 1 and March 15?	___	___
6.	Did you water the bed when crust formed on surface of the soil?	___	___
7.	Did you control disease based on SP-91?	___	___
8.	Did you control insects based on SP-91?	___	___

SELECTING RECOMMENDED VARIETIES:

9.	Did you select one or more of the following varieties? (Burley 21, Burley 37, Burley 11-A, Burley 49, Burley 11-B, MS Burley 21 x Ky 10, or Burley 1)	___	___
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USING ROTATION:

10.	Did you grow tobacco following grass or grass-legume sod?	___	___
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CHECKLIST (continued)

	APPROVED PRACTICE	YES	NO
FERTILIZING:			
11.	Did you fertilize according to soil test recommendations?	___	___
12.	Did you use not more than 10 tons of manure per acre?	___	___
13.	Have you had your soil tested in the last two years?	___	___
TRANSPLANTING:			
14.	Did you transplant good, stocky, disease-free plants?	___	___
15.	Did you transplant between May 15 and June 1?	___	___
16.	Did you set plants 15" to 18" apart in 42" rows?	___	___
CONTROLLING INSECTS:			
17.	Did you control insects based on SP-91?	___	___
CULTIVATING:			
18.	Did you cultivate shallow to control weeds?	___	___
TOPPING:			
19.	Did you top tobacco when 30 to 50 percent of plants were in the early bloom stage?	___	___
SUCKERING:			
20.	Did you keep suckers pulled?	___	___
HARVESTING:			
21.	Did you prime once to save bottom leaves while allowing remainder of the plant to ripen?	___	___
22.	Did you harvest the tobacco when it was ripe?	___	___

CHECKLIST (continued)

	APPROVED PRACTICE	YES	NO
HOUSING:			
23.	After cutting, did you house tobacco after it had wilted sufficiently for handling?	___	___
PROVIDING AMPLE SPACE:			
24.	Did you place 5 to 6 stalks per stick:	___	___
25.	Did you hang sticks 10" to 12" apart on tier rails?	___	___
STRIPPING AND SORTING:			
26.	Did you begin stripping and sorting after tobacco had thoroughly cured? (not when stems are too fat or when in too high case)	___	___
KEEPING PRIOR TO PLACEMENT ON WAREHOUSE FLOOR:			
27.	After stripping did you place the tobacco in square open center buhk for keeping prior to placing on warehouse floor?	___	___
PLACING ON WAREHOUSE FLOOR:			
28.	Did you make sure crop was dry and clean when placing on warehouse floor for sale?	___	___

APPENDIX D

APPENDIX D

RECOMMENDED TOBACCO PRODUCTION PRACTICE CHECKLIST
FOR GREENE COUNTY, TENNESSEE

Name _____ Address _____

	APPROVED PRACTICE	YES	NO
PRODUCING PLANTS:			
1.	Do you plan to select well-drained, loamy soil with southern or southeastern exposure? (1967)	___	___
2.	Do you plan to burn or use a recommended chemical for weed control?	___	___
3.	Do you plan to use 50 to 75 lbs. of 4-12-8 fertilizer or its equivalent, for each 9' x 100' bed?	___	___
4.	Do you plan to sow 2 to 3 struck teaspoons of seed for each 9' x 100' bed?	___	___
5.	Do you plan to sow the seed between March 1 and March 15?	___	___
6.	Do you plan to water the bed when crust forms on surface of soil?	___	___
7.	Do you plan to control disease based on SP-91?	___	___
8.	Do you plan to control insects based on SP-91?	___	___
SELECTING RECOMMENDED VARIETIES:			
9.	Do you plan to select one or more of the following varieties? (Burley 21, Burley 37, Burley 11-A, Burley 49, Burley 11-B, MS Burley 21 x Ky 10, or Burley 1)	___	___

CHECKLIST (continued)

	APPROVED PRACTICE	YES	NO
USING ROTATION:			
10.	Do you plan to grow tobacco following grass or grass-legume sod?	___	___
FERTILIZING:			
11.	Do you plan to fertilize according to soil test recommendations?	___	___
12.	Do you plan to use not more than 10 tons of manure per acre?	___	___
13.	Do you plan to have your soil tested every two years?	___	___
TRANSPLANTING:			
14.	Do you plan to transplant good, stocky, disease-free plants?	___	___
15.	Do you plan to transplant between May 10 and June 1?	___	___
16.	Do you plan to set plants 15" and 18" apart in 42" rows?	___	___
CONTROLLING INSECTS:			
17.	Do you plan to control insects based on SP-91?	___	___
CULTIVATING:			
18.	Do you plan to cultivate shallow to control weeds?	___	___
TOPPING:			
19.	Do you plan to top tobacco when 30 to 50 percent of plants are in the early bloom stage?	___	___
SUCKERING:			
20.	Do you plan to keep suckers pulled?	___	___

CHECKLIST (continued)

APPROVED PRACTICE	YES	NO
HARVESTING:		
21. Do you plan to prime once to save bottom leaves while allowing remainder of the plant to ripen?	—	—
22. Do you plan to harvest the tobacco when it is ripe?	—	—
HOUSING:		
23. After cutting, do you plan to house your tobacco after it has wilted sufficiently for handling?	—	—
PROVIDING AMPLE SPACE:		
24. Do you plan to place 5 or 6 stalks per stick?	—	—
25. Do you plan to hang sticks 10" to 12" apart on tier rails?	—	—
STRIPPING AND SORTING:		
26. Do you plan to begin stripping and sorting after tobacco has thoroughly cured (not when stems are too fat or in too high case)?	—	—
KEEPING PRIOR TO PLACEMENT ON WAREHOUSE FLOOR:		
27. After stripping, do you plan to place the tobacco in square open center bulk for keeping prior to placing on warehouse floor?	—	—
PLACING ON WAREHOUSE FLOOR:		
28. Do you plan to make sure crop is dry and clean when placing on warehouse floor for sale?	—	—