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To the Graduate Council:

I am submitting herewith a thesis written by William Keith Hart entitled "Characteristics of East Tennessee Christmas tree producers and their farm operations." 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.

Cecil E. Carter Jr, Major Professor

We have read this thesis and recommend its acceptance:

Robert S. Dotson, John Sharp

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

To the Graduate Council:

I am submitting herewith a thesis written by William Keith Hart, Jr., entitled "Characteristics of East Tennessee Christmas Tree Producers and Their Farm Operations." I have examined the final 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.

Cecil E. Carter, Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor
Graduate Studies and Research

CHARACTERISTICS OF EAST TENNESSEE CHRISTMAS TREE PRODUCERS AND THEIR FARM OPERATIONS

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

William Keith Hart, Jr.

December 1982

3065098

DEDICATION

This thesis is dedicated to my parents, Mr. and Mrs. William K. Hart, Sr. and my wife Patricia Cornett Hart. Throughout my life my parents have given me encouragement and guidance in my endeavors. My wife has provided patience and understanding for my job responsibilities and supported me during the preparation of this thesis.

ACKNOWLEDGMENTS

The author is grateful for the assistance and guidance given him by his graduate committee chairman, Dr. Cecil E. Carter, Jr. Appreciation is also given to the other members of his graduate committee, Dr. Robert S. Dotson and Dr. John Sharp, for their helpful suggestions in reviewing this thesis.

Gratitude is expressed to Dr. W. W. Armistead, Vice President for Agriculture, Institute of Agriculture, The University of Tennessee, Knoxville; Dr. M. Lloyd Downen, Dean, Agricultural Extension Service; Mr. Jesse E. Francis, District Supervisor; Mr. John Brower, Associate District Supervisor; and the Carter County Agricultural Committee for granting this study leave.

The writer expresses particular appreciation to the Christmas tree producers who provided the information to complete the Christmas tree survey for this thesis.

ABSTRACT

The major purpose of this study was to describe Christmas tree producers in Upper East Tennessee and their farm operations. It was believed that the information would help Extension Agents in Carter, Johnson, and Unicoi Counties to do a better job of planning programs to meet the interests and needs of the Christmas tree clientele. Thirty Christmas tree producers were interviewed. The survey instrument was developed by the researcher with the help of the graduate committee. Data obtained were selected characteristics of Christmas tree producers and their farm operations.

Data were coded and punched on computer cards and computations were made by the University of Tennessee Computing Center. The analysis of variance F test and Chi-square test were used to determine the strength of relationships between variables. F values and x^2 values which achieved the .05 probability level were accepted as significant.

Major findings included the following:

1. Only four producers were operating on Christmas tree farms which a family member had previously established. Eighty-three percent of the producers were under the age of 50 with 40% between the ages of 30 and 40 years.

2. Eleven producers surveyed were members of a state Christmas tree growers' association and five were members of the National Christmas Tree Growers' Association. Producers who were

members of a state Christmas tree association had grown trees an average of 10.3 years while the non-members had grown trees an average of 3.2 years. The producers who were members of the National Christmas Tree Association had grown trees an average of 13.2 years.

3. The largest number of Christmas trees in production was Frazer fir with 19 producers growing this species. The second largest number of trees in production was White pine with 23 producers growing this species.

4. Producer employment off the farm was significantly related to the average number of years producers had grown Christmas trees. Six producers not employed off the farm grew Christmas trees an average of 13 years, while 24 producers employed off the farm had grown Christmas trees an average of 4 years.

5. Producer employment off the farm was significantly related to the number of Extension Christmas tree meetings attended. Six producers employed on the farm attended 3 Extension Christmas tree meetings while 24 producers employed off the farm attended an average of 1.5 meetings.

6. Most Christmas tree producers had made contact with the Extension Service. Twenty-one producers attended 1 to 3 Extension Christmas tree meetings during the past 12 months. Seventeen producers did visit the Extension office 1 to 3 times, 17 producers telephoned the Extension office 1 to 4 times, and 16 producers received 1 to 3 farm visits from Extension agents. Three producers visited the Extension office 4 to 5 times. Nine producers telephoned

the Extension office 5 to 12 times and 5 producers received 4 to 7 visits from Extension agents.

7. Producers having friends growing Christmas trees did significantly influence the number of Extension Christmas tree meetings attended. Those 7 producers not having close friends growing Christmas trees attended an average of 0.7 Extension Christmas tree meetings, while the 23 producers with close friends growing Christmas trees attended an average of 2.1 Extension Christmas tree meetings.

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THE PROBLEM AND ITS SETTING

I. INTRODUCTION

The Christmas Tree industry varies widely in economic importance among regions and individual states throughout the United States. Nationwide some 12,000 producers grow natural evergreens for the Christmas tree market. Some 100,000 workers are involved in some way with the nation's 450,000 acres of Christmas trees which are produced primarily by hand labor. The annual wholesale value of the Christmas tree crop is about $300 million dollars and the retail value was around $600 million in 1981 (12).* The three counties of Carter, Johnson, and Unicoi in Upper East Tennessee market approximately $200,000 worth of trees at the wholesale level (6).

The Upper three counties of East Tennessee, Carter, Johnson, and Unicoi are geographically located to have the elevation and rainfall necessary to sustain a thriving Christmas tree industry. Much of the land in these counties cannot be used for cultivated farming without severe loss of soil through erosion. A high percentage of this land either is not in production or is being grazed by beef cattle.

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*Numbers in parentheses refer to alphabetically listed items in the Bibliography; those after the colon are page numbers.

The Tennessee Extension Service through the years has been involved to at least some degree in assisting Christmas tree producers. Western North Carolina has developed within the past 15 years a thriving Christmas tree industry with strong Extension support. Since the upper three Tennessee counties of Carter, Johnson, and Unicoi border Western North Carolina and have basically the same geographic conditions, it has been natural for an increasing number of calls and other requests for information on Christmas tree production to be received by Extension agents in these Tennessee counties. This need for more additional information on Christmas tree producers and their use of production practices brought about this study on Christmas tree production.

II. PURPOSES AND SPECIFIC OBJECTIVES

Purpose

The major purpose of this study was to describe Christmas tree producers in Upper East Tennessee and their farm operations. It was believed that the information would help Extension agents to do a better job of planning programs to meet the interests and needs of this clientele.

Specific Objectives

The specific objectives of this study were:

1. To describe Christmas tree producers with regard to their personal, family, attitudinal, and managerial characteristics.

2. To determine relationships between the size of Christmas tree operations and selected producer and farm characteristics.

3. To determine relationships between the number of years producers had grown Christmas trees and characteristics of the producers and their farm operations.

4. To determine relationships between species of Christmas trees grown and major land classes, land elevation, and spacing of trees.

5. To determine relationships between producers' satisfaction with Christmas tree production and their personal and farm characteristics.

6. To determine relationships between the number of Extension Christmas Tree Meetings attended by producers and their personal and farm characteristics.

III. LIMITATIONS OF THE STUDY

This study was limited to data collected during a personal interview with thirty (30) Christmas tree producers who had at least one acre of Christmas trees in production and lived in Carter, Johnson, and Unicoi counties in Upper East Tennessee during 1980-81.

IV. METHOD OF INVESTIGATION

Population

The population of this study included all 30 Christmas tree producers in Carter, Johnson, and Unicoi counties of Upper East Tennessee who were managing at least one acre of Christmas trees.

Sample

All known Christmas tree producers living in Carter, Johnson, and Unicoi counties were surveyed during 1980-81. Twenty-one producers from Carter County were surveyed plus six producers from Johnson County and three producers from Unicoi County.

Instrument

The questionnaire was designed to obtain information regarding the personal and farm characteristics of Christmas tree producers. It was developed in cooperation with the graduate committee. It consisted of questions divided into five major sections which included: general information about the producer, characteristics of the farm operation, producers' attitudes toward Christmas tree production, production practices, and marketing.

Interview Technique

Interviews were conducted using a survey instrument especially designed for this study. The researcher conducted a personal interview at the home, farm, or business location of each Christmas tree producer. During the interview the survey instrument was completed and all data recorded.

Method of Analysis

The data from the survey were coded and punched on computer cards. Computations were made by The University of Tennessee Computing Center. The analysis of variance F test and Chi-square test were used to determine the strength of relationship between variables.

F values and Chi-square values which achieved the .05 probability level were accepted as indicating a significant relationship between variables.

V. DEFINITION OF TERMS

The following terms were described below in order to aid the reader in understanding the content of this study.

Attitudinal Characteristics - Producers' expressions of thoughts and feelings toward their production of Christmas trees.

Christmas Tree - A sheared tree of the coniferous species which is normally marketed during the Christmas season.

Christmas Tree Producer - An individual making management decisions regarding at least one acre of Christmas trees.

Extension Contact - The number of Extension meetings attended, number of visits made to the County Extension Office, number of telephone calls, and the number of farm visits received from Extension agents by Christmas tree producers during the previous 12 months.

Family Characteristics - Traits of different family units as they work together to produce Christmas trees.

Managerial Characteristics - Various techniques of production management employed in the growing of Christmas trees.

Personal Characteristics - Individual traits distinguishing Christmas tree producers from each other.

Professional - An individual who has specialized in a certain work area and has expertize in that area.

Skilled Labor - An individual trained in a special field which enables him or her to perform competently.

Unskilled Labor - An individual lacking in technical training in a given work area.

VI. REVIEW OF PERTINENT CHRISTMAS TREE DATA

This section is divided into five main areas. The first subsection is an overview of the geographic area in which the three counties studied are located. Subsection two relates to pertinent production data included in the study. The third subsection includes statements relative to attitudinal factors concerning Christmas tree production. The fourth subsection includes data about producer relationships with Extension agents, while the fifth mentions characteristics of growers from a similar area in Georgia.

Geographic Characteristics of The Area Studied

Carter, Johnson, and Unicoi Counties are located in the extreme northeastern part of Tennessee. Both Carter and Unicoi Counties adjoin North Carolina, while Johnson County borders North Carolina and Virginia. The elevation of Johnson County ranges from about 1,800 feet to approximately 3,200 feet, averaging about 2,500 feet (8). Elevation of Carter County ranges from about 1,532 feet in Elizabethton to 6,313 feet on the Roan High Knob. Most of the land in Carter County ranges in elevation from 1,800 feet to 3,000 feet (7). The elevations of Unicoi County are very similar to those of Carter County.

Climatic conditions in the three counties are similar. Johnson County has cool summers and lacks a distinct dry season (8). Carter and Unicoi Counties have a humid temperature climate, but due to elevation differences have hot summers at lower elevations and cool summers in the mountains (7).

Soils in all three counties have developed in an environment of moderately high temperature and moderately heavy and well-distributed rainfall. Many of the soils have been severely leached and are consequently acid and low in fertility. Also, practically all soils have formed under a forest vegetation, principally of hardwoods (7).

Data were not available with regard to the acreages in different classes of land in Carter, Johnson, and Unicoi Counties.

Area Situation

The area of Upper East Tennessee in which this study of the Christmas tree industry was researched has several characteristics which help make it a unique area of Tennessee. In addition to the extremes of land elevation mentioned above, this area as of 1978 had a relative small number of farms in production. Carter County had 874 farms averaging 58 acres in size. This accounted for 50,428 acres which was 23% of the total land area of this county. The total value of nursery and greenhouse products sold was $2,631,000. Johnson County had 947 farms averaging 67 acres in size. This accounted for 63,615 acres which was 34% of the land area of Johnson County. The total value of nursery and greenhouse products

sold was $3,242,000 during 1978. Unicoi County had 365 farms averaging 43 acres in size. This comprised 15,821 acres which accounted for 13% of the land area of Unicoi County. The total value of nursery and greenhouse products sold in Unicoi County during 1978 was $1,117,000 (11).

Production Characteristics

Growing Christmas trees is an important industry. Various estimates indicate that as many as 35 million Christmas trees or more are used in the United States each year (13). Data collected by the National Christmas Tree Association show that in 1972 almost 20 million Christmas trees were planted and about 9.5 million harvested. In 1982 their surveys show 19 million Christmas trees harvested and 69 million planted. The discrepancy between the Christmas tree estimates of the National Christmas Tree Association and others could be due to the fact that several states did not report the number of trees planted or harvested to the National Christmas Tree Association. Spacing of Christmas trees range from a 4x4 foot spacing to 8x8 feet. These differences are usually decided on because of different types of mowing equipment and total volume of trees needed from an acre of ground (13).

Nationally the Scotch Pine accounted for 46.7% of the marketed Christmas trees in 1980 (10). The three species of Christmas trees primarily grown in the counties of Carter, Johnson, and Unicoi accounted for the following percentages of national sales

in 1980: Fraser Fir 0%; White Pine 4.7%; and Norway Spruce 1.8% (10).

Data were not available concerning the percentage of Christmas trees sold in East Tennessee which were produced in East Tennessee.

Statements Depicting Attitudinal Factors About Christmas Tree Production

According to Charles R. MacLean, Christmas Tree Grower, Blue Springs, Nebraska:

> It has been my experience and observation that successful Christmas tree growers are those who produce a high-quality product. Those are the people who have the discipline and are willing to make long-term investments in resources, time, labor, and money. They are willing to set priorities of time and labor to do essential work when it needs doing. They are agreeable to learning how to meet each new management situation as it develops including labor, insects, diseases, rodent control, marketing techniques, working with people, and experiencing disasters (14).

Larry Wise of Alabama said, "If you're not interested in lots of hard work and if you don't have the time to spend with them, leave Christmas tree growing to someone else." Larry further emphasizes that ". . . many people abandon the project because they can't wait four to five years for their payday (4)."

According to Donald M. Young and Dr. Dale L. Shaw (14), a major and critical point to remember is that Christmas tree production, just as with any other farm crop, requires knowledge, time, effort, and money. Sites must be properly prepared, trees properly planted, protection provided from wind and rodents, trees must be shaped and irrigated on most sites, and marketing must be done

intelligently. In addition, insect and disease problems must be dealt with when and if they occur.

Potential Christmas tree producers, then, should consider going into the business ". . . with their eyes open . . ." and not expect it to be a ". . . get-rich-quick . . ." scheme (14).

Jane A. Svinicki of the National Christmas Tree Association notes that:

> While a potential for overproduction does seem to exist, a large number of retailers still indicated they are dissatisfied with the quality of trees delivered to them. This year 43% of retailers indicated they did not receive the quality of tree they wanted (up from 36% last year) (10).

She further states that quality is also an important factor to the consumer, who continues to choose his or her tree according to the quality and the species.

Theran R. Stone states that one fact is readily discernible about the 1982 planting and harvesting survey. Since 1972, the number of trees being planted has more than tripled while the number of trees harvested has only doubled (9).

Producers Relationship With Extension Agents

Melvin H. Arnett, Extension Agent in Wilson County, Tennessee, conducted a study in 1973 that indicated that the number of agricultural visits made by clients to Extension offices was significantly related to the educational levels of 203 farmers who visited the Wilson County Extension office at least once over a 3-year period. Those producers who had attended high school or

college tended to make more visits to the Extension office than those with less formal education (1).

Pat Freeman in his study of Grade A dairy producers in Tennessee during 1978 found that the educational level of farm operators was significantly related to the number of office visits made to the Extension office during a 12-month period. Those producers with more formal education tended to make significantly more visits to the Extension office than those with less education (3).

Jamieson H. Jenkins reported in his 1977 study of soybean producers in Fayette County, Tennessee, that the producers' major occupation was not significantly related to the number of soybean meetings attended, office visits and telephone calls made to the Extension office, and farm visits received from Extension agents. Jenkins did report, however, that producer's major occupation was significantly and postively related to the total number of Extension meetings attended (5).

Characteristics of Growers

According to Douglas C. Bachtel, the results of a 1980 statewide Extension survey in Georgia found that Christmas tree growers were, by and large, under 50 years of age, primarily from professional and managerial occupations and 70% were growing trees on five acres or less. The study also revealed that Virginia Pine was the most popular type of Christmas tree grown in Georgia followed by White Pine and Red Cedar (2).

The following chapters will report findings regarding some of the variables reported in the above brief report of related studies.

CHAPTER II

CHARACTERISTICS OF CHRISTMAS TREE PRODUCERS AND THEIR FARM OPERATIONS

Presented in Table I are data regarding "Characteristics of Producers" and "Characteristics of Producers' Farm Operations." Data are summarized using numbers and percentages to aid in interpreting responses of the 30 producers surveyed.

I. CHARACTERISTICS OF PRODUCERS

This section was divided into four sub-sections. They are presented in this order: Personal Characteristics, Family Characteristics, Attitudinal Characteristics, and Managerial Characteristics of Christmas Tree Producers. The purpose of this section was to characterize Christmas tree producers.

Personal Characteristics of Christmas Tree Producers

Regarding age, Table I shows that of the 30 producers surveyed in Carter, Unicoi, and Johnson Counties 83.3 % were under the age of 50 with nearly 40% between the ages of 30 and 40 years. Employment off the farm was indicated by 80% of the producers, with 50% of the total having obtained a college degree. Twenty-two of the 30 producers (i.e., nearly three-fourths) worked in a professional or skilled labor position. Of the producers surveyed, about 77% had close friends growing Christmas trees, and 70% had been growing Christmas trees for less than three years.

TABLE I

CHARACTERISTICS OF CHRISTMAS TREE PRODUCERS AND THEIR FARM OPERATIONS

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Percent of Producers %
Personal Characteristic		
Age of Christmas tree producers (in years)		
19-30	6	20.0
31-40	12	39.9
41-50	7	23.4
51-67	5	16.7
Employed off the farm		
No	6	20.0
Yes	24	80.0
School grades completed		
Eight or less	1	3.3
High school	14	46.7
College	15	50.0
Occupation off farm		
Professional	14	46.7
Skilled labor	8	26.7
Unskilled labor	2	6.7
Not employed off farm	6	20.0
Had close friends growing Christmas trees		
No	7	23.3
Yes	23	76.7
Years grown Christmas trees		
3 years or less	21	70.0
6 years and over	9	30.0
Family Characteristic		
Number children in 4-H		
0	22	73.3
1	6	20.0
2	2	6.7

TABLE I (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Percent of Producers %
Wife employed off farm		
No	19	63.3
Yes	6	20.0
Not married	5	16.7
Had family members who previously grew Christmas trees		
No	26	86.7
Yes	4	13.3
Attitudinal Characteristic		
Christmas trees practical for other farmers in their community		
No	1	3.3
Yes	29	96.7
Christmas trees provide adequate family income		
No	5	16.7
Yes	25	83.3
Banks would make loans to Christmas tree farmers		
No	6	20.0
Yes	24	80.0
Christmas trees were a wise use of their land		
Yes	30	100.0
Extent satisfied with Christmas tree operation		
Very satisfied	13	43.3
Satisfied	16	53.3
Dissatisfied	1	3.3
Very dissatisfied	0	0.0
Extent Christmas trees fit into total farm operation		
Very well	15	50.0
Well	15	50.0
Not very well	0	0.0
Not at all	0	0.0

TABLE I (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Percent of Producers %
Managerial Characteristic		
Soil samples taken before planting Christmas trees		
No	14	46.7
Yes	16	53.3
Land limed by soil test		
No	14	46.7
Yes	16	53.3
Land fertilized by soil test		
No	16	53.3
Yes	13	43.3
Planting methods		
Hand	24	80.0
Machine	6	20.0
Methods used to market Christmas trees		
Wholesale	5	16.7
Combination	3	10.0
None sold	22	73.3
Member of a state Christmas Tree Growers' Association		
No	19	63.3
Yes	11	36.7
Member of the National Christmas Tree Growers' Association		
No	25	83.3
Yes	5	16.7
Source of Christmas tree information		
Extension - Tennessee	5	16.7
Extension - North Carolina	1	3.3
Farmers	2	6.7
Combination	21	73.3

TABLE I (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Percent of Producers %
Total number of Extension meetings attended past 12-months		
0	7	23.3
1-3	19	63.3
4-6	4	13.3
Number of Extension Christmas tree meetings producers attended past 12-months		
0	6[a]	20.0
1-3	21	70.1
4-6	3	9.9
Number of visits to Extension office past 12-months		
0	10	33.3
1-3	17	56.7
4-5	3	10.0
Number of telephone calls to Extension office past 12-months		
0	4	13.3
1-4	17	56.7
5-12	9	29.9
Number of farm visits received from Extension agents past 12-months		
0	9	30.0
1-3	16	53.3
4-7	5	16.6
Characteristic of Producers' Farm Operations		
Major farm enterprise		
Tobacco	6	20.0
Livestock	5	16.7
Christmas trees	17	56.7
Timber	2	6.7

TABLE I (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Percent of Producers %
Total acres of land owned by producers		
0	3	10.0
1-20	6	20.0
20-50	8	26.7
50-100	6	20.0
100-600	7	23.3
Acres in production		
Under 10	24	80.0
10 and over	6	20.0
Elevation of Christmas tree farms (in feet)		
1,500	2	6.7
2,000	1	3.3
2,500	6	20.0
3,000	10	33.3
3,500 - up	11	36.7
Major land classes		
Three	9	30.0
Four	16	53.3
Six	4	13.3
Seven	1	3.3
Space between Christmas trees (in feet)		
4 x 4	8	26.7
5 x 5	19	63.3
5 x 6	2	6.7
6 x 6	1	3.3

[a]One producer indicated he did not attend any Extension meetings but did report attending a Christmas tree meeting.

Family Characteristics of Christmas Tree Producers

Of the 25 married producers, 63.3% of the wives were not employed off the farm. It was evident as the survey was being made that most wives were very supportive of their husbands in the tree operation. Only four of the producers were operating Christmas tree farms which were previously established by a family member. Survey data also revealed that 26.7% of producers had children active in 4-H work.

Attitudinal Characteristics of Christmas Tree Producers

It is revealed in Table I that more than 96% of the producers surveyed felt that Christmas tree production was practical for other farmers in their community and more than 83% indicated that such production could provide their immediate families with an adequate income. Data also revealed that 80% of producers felt bank loans could be obtained by Christmas tree producers. It was unanimously expressed that Christmas tree production was a wise use of their land. None of the producers was very dissatisfied with production and only one was dissatisfied. Those satisfied composed 53.3% and those very satisfied with production totaled 43.3%. All producers felt that Christmas tree growing fit well or very well into their total farm operation.

Managerial Characteristics of Christmas Tree Producers

Of the 30 producers surveyed, 16 took soil samples before planting, also liming according to soil test recommendations.

Sixteen producers indicated that they did not fertilize based on soil test reports. A large number, 80%, planted trees by hand rather than machine. Of 8 producers selling Christmas trees, 5 marketed wholesale and the other 3 sold trees using a combination of marketing methods. Eleven of the producers were members of a state Christmas tree growers' association and 5 were members of the National Christmas Tree Growers' Association. Five producers indicated they received most of their information from the Tennessee Extension Service, 1 from the North Carolina Extension Service, and 2 from other farmers. Other producers used several sources of information. Seven growers indicated attending no Extension meetings in the past 12 months and 6 did not attend any Extension Christmas tree meetings. Nineteen producers attended 1 to 3 Extension meetings and 21 producers attended the same number of Extension Christmas tree meetings. Four producers attended 4 to 6 Extension meetings and 3 producers attended the same number of Extension Christmas tree meetings during the past 12 months. Survey data revealed two-thirds of producers visiting Extension offices, 87% making telephone calls to Extension offices and 70% receiving farm visits from Extension agents. Seventeen producers visited the Extension office 1 to 3 times; 17 producers telephoned the Extension office 1 to 4 times and 16 producers received 1 to 3 farm visits from Extension agents. Three producers visited the Extension office 4 to 5 times; 9 telephoned the office 5 to 12 times, and 5 producers received 4 to 7 visits from Extension agents.

II. CHARACTERISTICS OF PRODUCERS' FARM OPERATIONS

Survey analysis revealed that Christmas trees constituted the major farm enterprise of 56.7% of the producers. Three other major farm enterprises reported were tobacco, livestock, and timber in that descending order. Total acres owned varied widely among producers. Three producers owned no land; 6 owned 1 to 20 acres; 8 producers owned 21 to 50 acres; 6 owned 51 to 100, and 7 producers owned 101 to 600 acres. Eighty percent had less than 10 acres in Christmas tree production. Land elevations varied widely among the producers. Two reported production at 1,500 feet, 1 at 2,000 feet, 6 at 2,500 feet, 10 at 3,000 feet and 11 at 3,500 feet or above. The predominant land classes also varied. Nine producers related growing trees primarily on class three, 16 on class four, 4 on class six, and 1 on class seven land. All producers spaced trees from 4'x4' to 6'x6' apart. Eight producers reported tree spacing of 4'x4', 19 producers 5'x5', two 5'x6' and one 6'x6' apart.

CHAPTER III

FACTORS AFFECTING SIZE OF CHRISTMAS TREE OPERATIONS

Table II summarizes data regarding the influence of the "Characteristics of Christmas Tree Producers" and the "Characteristics of Their Farm Operations" upon the size of the Christmas tree operation. The Chi-square test was used to determine the degree and significance of observed relationships between dependent and independent variables.

I. CHARACTERISTICS OF PRODUCERS AND SIZE OF OPERATION

This section was divided into four subsections. The subsections are: Personal Characteristics of Christmas Tree Producers, Family Characteristics of Christmas Tree Producers, Attitudinal Characteristics of Christmas Tree Producers, and Managerial Characteristics of Christmas Tree Producers as related to size of the farm operation. The major purpose of analysis reported in this section was to determine the relationship between producer characteristics and the size of Christmas tree operations.

Relationship Between Personal Characteristics of Christmas Tree Producers and Their Size of Christmas Tree Operation

Results of data analysis summarized in this section indicate how producers' employment off the farm, their occupation if employed

TABLE II

FACTORS RELATED TO SIZE OF CHRISTMAS TREE OPERATIONS

Characteristics of Producers and Their Farm Operation	Size of Christmas Tree Operation: Under 10 Acres N	Under 10 Acres %	Over 10 Acres N	Over 10 Acres %	x^2 Value	df	p Level
Characteristics of Producers							
Personal Characteristic							
Employed off farm							
No	2	8.3	4	66.7			
Yes	22	91.7	2	33.3			
Total	24	100.0	6	100.0	6.9	1	0.008
Occupation off farm							
Professional	12	54.5	2	100.0			
Skilled labor	8	36.4	0	0.0			
Unskilled labor	2	9.1	0	0.0			
Total	22	100.0	2	100.0	1.6	2	0.458
School grades completed							
Eighth grade or less	1	4.2	0	0.0			
High school	12	50.0	2	33.3			
College	11	45.8	4	66.7			
Total	24	100.0	6	100.0	1.0	2	0.621
Had close friends growing Christmas trees							
No	7	29.2	0	0.0			
Yes	17	70.8	6	100.0			
Total	24	100.0	6	100.0	0.9	1	0.331
Years grown Christmas trees							
Under 6 years	20	83.3	1	16.7			
Over 6 years	4	16.7	5	83.3			
Total	24	100.0	6	100.0	7.2	1	0.007

TABLE II (Continued)

Characteristics of Producers and Their Farm Operation	Size of Christmas Tree Operation: Under 10 Acres N	Under 10 Acres %	Over 10 Acres N	Over 10 Acres %	x^2 Value	df	p Level
Family Characteristic							
Children in 4-H							
0	17	56.7	5	83.3			
1	5	16.7	1	16.7			
2	2	6.7	0	0.0			
Total	24	100.0	6	100.0	0.6	2	0.724
Wife employed off farm							
No	17	81.0	2	50.0			
Yes	4	19.0	2	50.0			
Total	21	100.0	4	100.0	0.5	1	0.490
Had family member who previously grew Christmas trees							
No	22	91.7	4	66.7			
Yes	2	8.3	2	33.3			
Total	24	100.0	6	100.0	0.9	1	0.347
Attitudinal Characteristic							
Christmas trees provide adequate family income							
No	5	20.8	0	0.0			
Yes	19	79.2	6	100.0			
Total	24	100.0	6	100.0	0.4	1	0.540
Banks would make loans to Christmas tree producers							
No	3	12.5	3	50.0			
Yes	21	87.5	3	50.0			
Total	24	100.0	6	100.0	2.2	1	0.138
Extent satisfied with Christmas tree operation							
Very satisfied	10	41.7	3	50.0			
Satisfied	13	54.2	3	50.0			
Dissatisfied	1	4.2	0	0.0			
Very dissatisfied	0	0.0	0	0.0			
Total	24	100.0	6	100.0	0.3	3	0.842

TABLE II (Continued)

Characteristics of Producers and Their Farm Operation	Size of Christmas Tree Operation: Under 10 Acres N	Under 10 Acres %	Over 10 Acres N	Over 10 Acres %	x^2 Value	df	p Level
Extent Christmas trees fit into total farm operation							
Very well	13	54.2	2	33.3			
Well	11	45.8	4	66.7			
Not very well	0	0.0	0	0.0			
Not at all	0	0.0	0	0.0			
Total	24	100.0	6	100.0	0.2	3	0.648
Managerial Characteristic							
Soil samples taken before planting							
No	12	50.0	2	33.3			
Yes	12	50.0	4	66.7			
Total	24	100.0	6	100.0	0.1	1	0.783
Land limed by soil test							
No	12	50.0	2	33.3			
Yes	12	50.0	4	66.7			
Total	24	100.0	6	100.0	0.1	1	0.783
Land fertilized by soil test							
No	14	60.9	2	33.3			
Yes	9	39.1	4	66.7			
Total	23	100.0	6	100.0	0.6	1	0.455
Planting methods							
Hand	20	83.3	4	66.7			
Machine	4	16.7	2	33.3			
Total	24	100.0	6	100.0	0.1	1	0.732
Methods used to market Christmas trees							
Wholesale	2	50.0	3	75.0			
Combination	2	50.0	1	25.0			
Total	4	100.0	4	100.0	*		

TABLE II (Continued)

Characteristics of Producers and Their Farm Operation	Size of Christmas Tree Operation: Under 10 Acres N	Under 10 Acres %	Over 10 Acres N	Over 10 Acres %	x^2 Value	df	p Level
Member of a state Christmas Tree Growers' Association							
No	18	75.0	1	16.7			
Yes	6	25.0	5	83.3			
Total	24	100.0	6	100.0	4.7	1	0.029
Member of the National Christmas Tree Growers' Association							
No	22	91.7	3	50.0			
Yes	2	8.3	3	50.0			
Total	24	100.0	6	100.0	3.4	1	0.066
Characteristic of Producers' Farm Operations							
Major farm enterprise							
Tobacco	6	25.0	0	0.0			
Livestock	5	20.8	0	0.0			
Christmas trees	11	45.8	6	100.0			
Timber	2	8.3	0	0.0			
Total	24	100.0	6	100.0	5.7	3	0.125
Elevation of Christmas tree farms (in feet)							
1,500	2	8.3	0	0.0			
2,000	1	4.2	0	0.0			
2,500	5	20.8	1	16.7			
3,000	8	33.3	2	33.3			
3,500 and over	8	33.3	3	50.0			
Total	24	100.0	6	100.0	1.2	4	0.885
Major land classes							
Three	8	33.3	1	16.7			
Four	13	54.2	3	50.0			
Six	3	12.5	1	16.7			
Seven	0	0.0	1	16.7			
Total	24	100.0	6	100.0	4.5	3	0.210

*x^2 not computed due to small number of producers.

off the farm, their school grades completed, close friends growing Christmas trees, and years producers had grown Christmas trees were related to the size of their Christmas tree operations. Major findings regarding the nature of the relationships are summarized below under appropriate paragraph headings.

Employed off the farm. Data in Table II report that about 92% of producers growing under 10 acres of Christmas trees were employed off the farm compared to 33% of those producers growing over 10 acres of Christmas trees. The Chi-square test revealed that differences between the size of Christmas tree operations groups whether or not the producer was employed off the farm were significant at the .05 probability level. Therefore, the size of Christmas tree operation was significantly related to off the farm employment. Producers working full time on the farm tended to have more acres of Christmas trees than those producers who were not full time farmers.

Occupation off the farm. Producers in professional occupations off the farm comprised about 55% of those producers growing under 10 acres of Christmas trees compared to 100% of those raising over 10 acres. Those producers working off the farm in skilled and unskilled labor positions comprised 36% and 9% respectively for those growing under 10 acres of Christmas trees compared to no producers growing over 10 acres of trees. The Chi-square test indicated that differences in producers' occupations off the farm by size of Christmas tree operations were not significant at the .05 probability level.

School grades completed. Among producers growing under 10 acres of Christmas trees 1 producer had an eighth grade education or less, 12 producers obtained a high school degree and 11 obtained a college degree. Of those producers growing over 10 acres of Christmas trees, 2 had high school degrees and 4 were college graduates. The Chi-square test indicated that these observed differences between school grades completed and size of Christmas tree operations were not significant at the .05 probability level. Producers' school grades completed did not significantly influence the size of Chrsitmas tree operations.

Had close friends growing Christmas trees. Reference to Table II shows that nearly 71% of producers growing under 10 acres of Christmas trees had close friends growing trees compared to 100% of those producers growing over 10 acres of Christmas trees. The Chi-square test indicated that differences in friends growing Christmas trees by the size of Christmas tree operations were not significant. Having close friends in Christmas tree production did not significantly influence the size of Christmas tree operations. However, the data suggest that producers, regardless of their size of operation, tended to have close friends in Christmas tree production.

Years grown Christmas trees. About 83% of those producers with under 10 acres of Christmas trees had grown Christmas trees less than 6 years compared to 17% of those producers having over 10 acres in production. The Chi-square test indicated that differences in

years grown trees by size of Christmas tree operations were significant at the .05 probability level. Producers who had grown more acres of Christmas trees tended to have been in the business a longer period of time than those with fewer acres.

Summary. From Chi-square test analysis of the personal characteristics of producers, occupation off the farm, school grades completed, and producers having close friends growing Christmas trees were not significantly related to the size of Christmas tree operations, while employment off the farm and years grown trees were significantly related. The data indicated that producers who had more acres in production tended to be fully employed on the farm and had grown Christmas trees for a longer period of time than those who had fewer acres of trees.

Relationship Between Family Characteristics of Christmas Tree Producers and the Size of Christmas Tree Operations

Results of data analyses presented in this subsection were directed toward determining the influence of producers having children in 4-H, their wife being employed off the farm, and having other family members growing Christmas trees upon the size of their Christmas tree operations.

Number of children in 4-H. Among producers growing under 10 acres of Christmas trees 17 had no children enrolled, 5 had one child, and 2 had 2 children enrolled in 4-H club work. Of the 6 producers with over 10 acres in production, 5 had no children in 4-H

work and 1 producer had 1 child enrolled. The Chi-square test indicates that differences between the observed and expected number of producers with children in 4-H club work by size of Christmas tree operations were not significant. However, the data suggest more smaller producers had children in 4-H club work.

Wife employed off farm. Table II shows that 19% of producers growing under 10 acres of Christmas trees had wives employed off the farm compared to 50% of those producers growing over 10 acres. The Chi-square test indicated no statistically significant difference between producers' wives being employed off the farm according to the size of Christmas tree operations.

Had family members growing Christmas trees. Survey data revealed that about 92% of those producers who had under 10 acres of trees had no family member who previously grew trees compared to about 67% of those producers growing over 10 acres. The Chi-square test indicated that these observed differences between producers with family members who previously grew Christmas trees and size of Christmas tree operations was not significant at the .05 probability level. However, data suggested that producers, regardless of size of operation, tended not to have family members who had previously grown Christmas trees.

Summary. None of the family characteristics analyzed by the Chi-square test were significantly related to the size of Christmas tree operations. However, survey data suggest more smaller

producers tended to have children in 4-H, their wives tended not to be employed off the farm, and most interviewees, regardless of size of operation, reported no family members who previously had grown Christmas trees.

Relationship Between Attitudinal Characteristics of Christmas Tree Producers and the Size of Their Farm Operation

The attitudes of producers as related to the size of Christmas tree operations was summarized in this section of Table II by analyzing whether producers felt Christmas trees could provide adequate family income, whether banks would loan money to Christmas tree producers, the extent to which producers were satisfied with Christmas tree production, and the extent to which producers thought Christmas tree production would fit into their total farm operation.

Felt that Christmas trees could provide adequate family income. Data in Table II indicate that about 79% of those producers growing under 10 acres of Christmas trees felt that Christmas tree production could provide adequate family income compared to 100% of those producers growing over 10 acres of trees. The Chi-square test indicated no significant relationship between feelings about Christmas trees providing an adequate family income and the size of Christmas tree operations. However, the data suggest that both of the producer groups (i.e., those raising under 10 acres and those with over 10 acres of Christmas trees) tended to feel that Christmas trees could provide adequate family income.

Felt that banks would make loans to Christmas tree producers. About 88% of producers growing under 10 acres of Christmas trees felt that banks would loan money to Christmas tree operations compared to 50% of those producers growing over 10 acres. The Chi-square test indicated that differences in producer feelings about banks making loans to Christmas tree producers did not differ significantly by the size of Christmas tree operations. However, data seemed to suggest that a higher proportion of the smaller producers felt that banks would make loans to Christmas tree producers. Larger producers were split on the issue.

Extent satisfied with Christmas tree operations. Those producers growing under 10 acres of Christmas trees expressed the following satisfaction with Christmas tree production: nearly 42% "very satisfied," about 54% "satisfied," and more than 4% "dissatisfied." Producers growing over 10 acres of Christmas trees were equally divided between being "very satisfied" and "satisfied" with their Christmas tree production. The Chi-square test indicated that these observed differences between extent satisfied with Christmas tree operations and size of Christmas tree operations was not significant at the .05 probability level. Survey data did reveal most producers were either "very satisfied" or "satisfied" with Christmas tree production.

Extent Christmas trees fit into total farm operation. Those producers growing under 10 acres of Christmas trees expressed that

about 46% felt Christmas trees fit "well" into their total farm operation while more than 54% reported very well. Producers growing over 10 acres reported about 67% felt Christmas trees fit "well" into their total farm operation, while 33% said "very well." The Chi-square test indicated that these observed differences between extent Christmas trees fit into total farm operations and size of Christmas tree operation were not significantly related. Survey data did show that all producers felt Christmas trees fit either "well" or "very well" into their total farm operation regardless of Christmas tree acreage.

Summary. Chi-square analysis showed that the attitudinal characteristics regarding Christmas trees providing adequate family income, banks making loans to Christmas tree producers, producer satisfaction with Christmas tree operation, and extent Christmas trees fit into total farm operation were not significantly related to the size of Christmas tree operations. However, the data suggested that most producers felt that Christmas trees could provide adequate family income, that they were either "satisfied" or "very satisfied" with Christmas tree production, and that Christmas tree farming fit "well" or "very well" into their total farm operations.

Relationship Between Managerial Characteristics of Christmas Tree Producers and Their Size of Operation

The purpose of this section of Table II, p. 23, was to summarize findings regarding relationships between managerial practices

carried out and the size of Christmas tree operations. This was done by comparing the producers' use of selected practices (i.e., soil samples taken before planting, liming by soil test, fertilizing by soil test, planting methods, marketing methods, and membership in a state or the National Christmas Tree Growers' Association) with the size of Christmas tree operations.

Soil samples taken before planting. Table II, p.23, indicates that 50% of producers growing under 10 acres took soil samples before planting compared to 67% of those producers growing over 10 acres of Christmas trees. The Chi-square test indicated that differences in soil testing by size of Christmas tree operations were not significant at the .05 probability level. However, the data indicate that a higher proportion of producers with over 10 acres of Christmas trees took soil samples before planting than those with under 10 acres.

Land limed by soil test. Producers revealed that 50% growing under 10 acres of Christmas trees limed based on soil test recommendations compared to 67% of those producers growing over 10 acres of trees. The Chi-square test indicated that these differences in liming by soil test between the two size of Christmas tree operation groups were not significant. However, the data show that a higher percentage of the producers with over 10 acres of Christmas trees followed soil test liming recommendations than those producers with fewer acres.

Land fertilized by soil test. Table II showed that 39% of producers growing under 10 acres of Christmas trees fertilized their trees by soil test compared to 67% of those producers with over 10 acres in production. The Chi-square test indicated that differences between fertilizing by soil test and size of Christmas tree operations were not significant. The data suggest that a lower percentage of small producers than large fertilized by soil test.

Planting methods. Of those producers growing under 10 acres of Christmas trees, about 17% planted by machine compared to over 33% of those producers growing over 10 acres of Christmas trees. A Chi-square test indicated that differences in planting by machine or hand for the two groups were not significant at the .05 probability level. However, the data seemed to suggest that smaller producers planted by hand while larger producers used machine planting.

Methods used to market Christmas trees. Table II shows that 50% of those producers growing under 10 acres marketed their trees wholesale compared to 75% of those producers growing over 10 acres. The other 50% of producers marketing under 10 acres sold their trees in a combination of ways compared to the 25% of producers growing over 10 acres of Christmas trees. Chi-square was not computed due to the small number of producers responding.

Member of a State Christmas Tree Growers' Association. Among those producers growing under 10 acres of Christmas trees 25% were reported members of a state Christmas tree growers' association

compared to 83% of those producers growing over 10 acres of Christmas trees. The Chi-square test indicated that differences in membership in a state Christmas tree growers' association according to size of their Christmas tree operation were significant at the .05 probability level. Producers who had more acres in production tended to be members of state Christmas tree growers' associations.

Member of the National Christmas Tree Growers' Association. Among those producers growing under 10 acres of Christmas trees 8% were members of the National Christmas Tree Growers' Association compared to 50% of the producers with over 10 acres in production. The Chi-square test indicated that differences in membership in the National Christmas Tree Growers' Association according to size of Christmas tree operation were not significant at the .05 probability level. However, the data suggest that a greater proportion of the larger producers compared to the smaller ones were members of the National Christmas Tree Growers' Association.

Summary. Only one of the variables used to indicate managerial characteristics (i.e., whether or not the producers belong to a state Christmas tree growers' association) was significantly related to the size of Christmas tree farms. The other variables, soil samples taken before planting, liming and fertilizing by soil test, planting methods, marketing methods, and membership in the National Christmas Tree Growers' Association were not significantly related to the producers' size of operation. However, data show that higher

proportions of the larger producers took soil tests before planting, limed by soil test, and tended to join the National Christmas Tree Growers' Association.

II. CHARACTERISTICS OF PRODUCERS' FARM OPERATIONS AND SIZE OF OPERATIONS

The second part of Table II, p.23, presents data regarding the "Characteristics of Producers' Farm Operations." This section summarizes finding regarding major farm enterprises, elevation of Christmas tree operations (in feet) and the major land classes producers had on their farm, as related to the size of Christmas tree producers' farm operations.

Major Farm Enterprise

All of the producers who grew over 10 acres of Christmas trees said that Christmas tree production was their major farm enterprise compared to 46% of those who grew under 10 acres of trees. Other major farm enterprises of producers with under 10 acres were tobacco (25%), livestock (21%), and timber production (8%) in that descending order. A Chi-square test indicated that differences in producers' major farm enterprise according to size of Christmas tree operation were not significant at the required .05 probability level. However, a higher percent of larger producers tended to have Christmas trees as their major farm enterprise.

Elevation of Christmas Tree Operations (in Feet)

Those producers growing under 10 acres of Christmas trees reported the following elevations: 8% growing at 1,500 feet, about 4% growing at 2,000 feet, 21% growing at 2,500 feet, more than 33% growing at 3,000 feet, and more than 33% growing at 3,500 feet and above. Producers raising over 10 acres of Christmas trees reported these elevations: 17% growing at 2,500 feet, more than 33% growing at 3,000 feet, and 50% growing at 3,500 feet and above. A Chi-square test indicated that differences in elevation of Christmas tree operation by size of Christmas tree operation were not significant. However, producers' Christmas tree farm operations tended to be at higher elevations.

Major Land Classes

A study of data in Table II show that producers growing under 10 acres of Christmas trees grew their trees on the following land classes: more than 33% on class three land, over 54% on class four land, and 13% on class six land. Those producers growing over 10 acres of Christmas trees reported the following land classes: nearly 17% on class three land, 50% on class four land, almost 17% on class six land, and about 17% on class seven land. The Chi-square test indicated no significance between major land classes and the size of Christmas tree operations. Data show that most producers grew trees on class four land.

Summary.

Data regarding "Characteristics of Producers' Farm Operations and Size of Operations," indicated no statistical significance in the relationship between producers' major farm enterprise, farm elevation, and major land classes and the size of Christmas tree operations. However, the data suggest that larger producers have Christmas trees as their major farm enterprise.

CHAPTER IV

FACTORS INFLUENCING YEARS CHRISTMAS TREES GROWN

Data in Table III are presented in two major sections: "Relationships Between Characteristics of Producers and Years Christmas Trees Grown" and "Relationships Between Characteristics of Producers' Farm Operations and Years Christmas Trees Grown." The analysis of variance F test was used to determine the strength of the relationships between the dependent variable (i.e., years Christmas trees grown) and independent variables. F values which achieved the .05 probability level were accepted as indicating a significant relationship between dependent and independent variables.

I. CHARACTERISTICS OF PRODUCERS AND YEARS CHRISTMAS TREES GROWN

The major section "Characteristics of Producers" is divided into four subsections: Relationship Between Personal Characteristics of Christmas Tree Producers and Years They Have Grown Christmas Trees, Relationship Between Attitudinal Characteristics of Christmas Tree Producers and Years They Have Grown Christmas Trees, and Relationship Between Managerial Characteristics of Christmas Tree Producers and Years They Have Grown Christmas Trees. The purpose of this section was to determine the influence of producer characteristics upon years producer had grown Christmas trees.

TABLE III

FACTORS RELATED TO YEARS CHRISTMAS TREES GROWN

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Mean Number Years Grown Christmas Trees	F Value	df	p Level
Characteristics of Producers					
Personal Characteristic					
Employed off farm					
No	6	13.0			
Yes	24	4.0	12.2	1	0.001
Occupation off farm					
Professional	14	5.0			
Skilled labor	8	3.0			
Unskilled	2	1.0	0.9	2	0.417
School grades completed					
Eight or less	1	3.0			
High School	14	4.9			
College	15	6.8	0.4	2	0.687
Had close friends growing Christmas trees					
No	7	3.1			
Yes	23	6.6	1.4	1	0.240
Family Characteristic					
Number children in 4-H					
0	22	6.3			
1	6	4.3			
2	2	4.5	0.2	2	0.799
Wife employed off farm					
No	19	4.3			
Yes	6	8.8	2.2	1	0.154
Had family member who previously grew Christmas trees					
No	26	5.4			
Yes	4	8.3	9.7	1	0.004

TABLE III (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Mean Number Years Grown Christmas Trees	F Value	df	p Level
Attitudinal Characteristic					
Christmas trees provide adequate family income					
No	5	2.0			
Yes	25	6.6	2.0	1	0.170
Banks would make loans to Christmas tree farmers					
No	6	6.2			
Yes	24	5.7	0.02	1	0.872
Extent satisfied with Christmas tree operation					
Very satisfied	13	6.6			
Satisfied	16	5.4			
Dissatisfied	1	1.0			
Very dissatisfied	0	0.0	0.4	3	0.692
Extent Christmas trees fit into total farm operation					
Very well	15	6.7			
Well	15	4.8			
Not very well	0	0.0			
Not at all	0	0.0	0.6	3	0.436
Managerial Characteristic					
Soil samples taken before planting					
No	14	5.6			
Yes	16	5.9	0.0	1	0.926
Land limed by soil test					
No	14	5.6			
Yes	16	5.9	0.0	1	0.926
Land fertilized by soil test					
No	16	5.5			
Yes	13	6.5	0.1	1	0.708

TABLE III (Continued)

Characteristics of Producers and Their Farm Operations	Number of Producers (N=30)	Mean Number Years Grown Christmas Trees	F Value	df	p Level
Planting methods					
Hand	24	5.5			
Machine	6	7.0	0.3	1	0.620
Methods used to market Christmas trees					
Wholesale	5	16.0			
Combination	3	8.3	2.5	1	0.162
Member of a state Christmas Tree Growers' Association					
No	19	3.2			
Yes	11	10.3	10.6	1	0.003
Member of the National Christmas Tree Growers' Association					
No	25	4.3			
Yes	5	13.2	9.7	1	0.004
Characteristic of Producers' Farm Operations					
Major farm enterprise					
Tobacco	6	1.7			
Livestock	5	2.8			
Christmas trees	17	8.5			
Timber	2	2.0	2.7	3	0.068
Elevation of Christmas tree farms (in feet)					
1,500	2	2.5			
2,000	1	1.0			
2,500	6	5.0			
3,000	10	6.6			
3,500 - up	11	6.5	0.3	4	0.872
Major land classes					
Three	9	4.2			
Four	16	5.6			
Six	4	5.0			
Seven	1	25.0	3.8	3	0.021

Relationship Between Personal Characteristics of Christmas Tree Producers and Years They Had Grown Christmas Trees

Results of data analysis presented in this subsection were directed toward determining the relationship of producers' employment off the farm, their occupation off the farm, school grades completed, and having close friends growing Christmas trees, upon the years producers had been producing trees.

Employed off farm. Study of data in Table III shows that producers employed off the farm had been growing Christmas trees an average of 4 years compared to 13 years for those not employed off the farm. An analysis of variance F test indicated that differences between those employed and not employed off the farm as to years Christmas trees had been grown were significant at the .05 probability level. Thus, the average years producers had grown Christmas trees was significantly related to producers' employment off the farm. Producers who were not employed off the farm tended to have been growing trees for a longer period of time.

Occupation off farm. Producers' employed in professional positions (e.g., doctor, lawyer) had been growing trees for an average of 5 years as compared to skilled labor (e.g., clerk, mechanic) 3 years and unskilled labor (e.g., day laborer) 1 year. These differences were significant at the .05 level. Thus, the data indicated that producers holding off the farm professional positions tended to have grown Christmas trees for a longer period of time than those employed in skilled or unskilled labor positions.

School grades completed. Reference to Table III information also discloses that producers who had completed college had grown Christmas trees an average of 6.6 years as compared to 4.9 years for producers with a high school education and 3.0 years by the one with only an eighth grade education. These differences were not significant at the .05 level. However, data suggest that college graduates had grown trees a larger number of years than producers with a high school education or less.

Had close friends growing Christmas trees. Producers who did not have close friends growing Christmas trees had grown trees for an average of 3.1 years as compared to 6.6 years for those producers having close friends growing trees. An analysis of variance F test indicated that differences between producers with and without close friends growing Christmas trees as to years grown trees were not significant at the .05 probability level. However, the data indicated that producers with close friends growing Christmas trees had grown Christmas trees a greater number of years than those producers without close friends in Christmas tree production.

Summary. The analysis of variance F test indicated that the personal characteristic, "employment off the farm" was significantly related to years producers grew trees. Producers who were employed off the farm tended to have grown trees a shorter period of time than those who were not employed off the farm. Producers' occupation off the farm, school grades completed, and having close friends growing

Christmas trees were not significantly related to years trees grown. However, the data suggested that producers with close friends growing Christmas trees tended to have grown trees a longer period of time than those producers without close friends in Christmas tree production.

Relationship Between Family Characteristics of Christmas Tree Producers and Years They Had Grown Christmas Trees

Findings from data analyses presented in this subsection summarize the relationships between producers with children in 4-H work, wife's employment off farm, and having family members growing Christmas trees previously, as to the years producers had been producing Christmas trees.

Number of children in 4-H. Table III data show the reader that the 22 producers with no children in 4-H work had grown trees the longest, an average of 6.3 years as compared to producers with one child in 4-H, averaging 4.3 years, and producers with two 4-Hers, averaging 4.5 years. The analysis of variance F test indicated that years trees grown did not differ significantly in terms of the numbers of children producers had in 4-H work.

Wife employed off farm. Producers with wives employed off the farm averaged growing Christmas trees 8.8 years as compared to only 4.3 years for those producers with wives not employed off the farm. An analysis of variance F test indicated these differences were not significant at the .05 level. However, the data indicate that

producers with wives employed off the farm tended to have grown trees for a longer period of time than producers with wives not employed off the farm.

Had family members who previously grew Christmas trees. Table III showed that producers with family members who previously had grown Christmas trees had been producing trees an average of 8.3 years compared to 5.4 years for those whose family had not grown Christmas trees before. The analysis of variance F test indicated that differences in years trees grown did differ significantly between those who did and those who did not have family members who had previously grown Christmas trees. Thus, producers who had family members who previously had grown Christmas trees tended to have grown trees longer than those producers who did not have family members who had been Christmas tree producers.

Summary. Producers having family members who had previously grown Christmas trees was significantly related to the number of years producers had grown Christmas trees. The family characteristics, children in 4-H work and wife's employment off the farm were not significantly related to years trees had been grown.

Relationship Between Attitudinal Characteristics of Christmas Tree Producers and the Years They Had Grown Christmas Trees

The purpose of this subsection of Table III was to summarize findings regarding relationships between the attitudes of producers and years producers had grown Christmas trees. Variables included in

this analysis concerned producers' feelings about Christmas trees providing adequate family income, banks loaning money to Christmas tree producers, extent producers were satisfied with Christmas tree production and extent Christmas tree production fit into producers' total farm operation.

Christmas trees could provide adequate family income. As seen in Table III, producers who felt Christmas trees could provide an adequate family income had grown trees an average of 6.6 years compared to 2.0 years for those producers who did not feel Christmas trees could provide an adequate family income. The analysis of variance F test was not significant. However, the data suggested that producers who felt Christmas trees could provide an adequate family income tended to have grown trees longer than those producers who felt Christmas trees could not provide an adequate family income.

Banks would make loans to Christmas tree farmers. Producers who felt banks would make loans to Christmas tree producers had grown trees an average of 5.7 years compared to 6.2 years for those who felt banks would not make loans to Christmas tree farmers. The analysis of variance F test was not significant at the required .05 probability level.

Extent satisfied with Christmas tree operation. Producers who indicated they were "very satisfied" with Christmas tree production had grown Christmas trees a mean of 6.6 years as compared

to 5.4 years by those who were "satisfied" and 1.0 years by a "dissatisfied" producer. The analysis of variance F test was not significant. However, data did show that all but one producer were at least "satisfied" with Christmas tree production.

Extent Christmas trees fit into total farm operation. As shown in Table III, p. 41, producers who felt Christmas trees fit "very well" in their farm operation had grown trees 6.7 years compared to 4.8 years for those producers who felt Christmas trees fit "well" into their farm operation. No producer felt Christmas trees fit "not very well" or "not at all" in their farm operation. The analysis of variance F test was not significant at the .05 probability level. However, producers who felt Christmas trees fit "very well" into their total farm operation tended to have grown trees longer than those producers who felt Christmas trees fit only "well" into their total farm operation.

Summary. Producers' attitudes regarding Christmas tree production "providing an adequate family income," "satisfaction with Christmas tree production," "banks making loans to Christmas tree producers," and the "extent Christmas tree production fit into total farm operation" were not significantly related to numbers of years producers had grown Christmas trees. The data do show that producers felt that Christmas trees did fit "well" or "very well" into their total farm operation. They also were "satisfied" or "very satisfied" with Christmas tree production.

Relationship Between Managerial Characteristics of Christmas Tree Producers and Years They Had Grown Christmas Trees

The purpose of this subsection was to present the results of data analysis to determine the influence of producers' managerial characteristics upon the years producers had grown Christmas trees. Variables included in this analysis were: soil samples taken before planting, land limed and fertilized by soil test, planting methods, methods used to market Christmas trees, and membership in a state or the National Christmas Tree Growers' associations.

Soil samples taken before planting Christmas trees. Reference to Table III, p. 41, shows that producers who took soil samples before planting Christmas trees had grown trees 5.9 years compared to 5.6 years for those not taking soil tests before planting. The analysis of variance F test was not significant. Visual analysis reveals only slight differences between the average numbers of years producers had grown trees as to whether or not they soil tested before planting.

Land limed by soil test. Producers who limed by soil test had grown Christmas trees 5.9 years compared to 5.6 years for producers not liming by soil test. Again the analysis of variance F test was not significant at the .05 probability level. Visual reference reveal only slight differences between the average numbers of years trees were grown by producers who limed by soil test and those who didn't.

Land fertilized by soil test. Producers who fertilized by soil test had grown Christmas trees an average of 6.5 years compared to 5.5 years for producers not fertilizing by soil test. An analysis of variance F test was not significant at the .05 probability level. However, data did show that producers who fertilized by soil test recommendations tended to have grown trees for a longer period of time than those producers not fertilizing by soil test.

Planting methods. As seen in Table III, p. 41, producers who planted trees by machine had grown trees an average of 7.0 years compared to 5.5 years for those who hand planted. The analysis of variance F test was not significant at the .05 probability level. Data did suggest that those who planted by machine tended to have grown trees for a longer period of time than the others.

Methods used to market Christmas trees. Producers who wholesale marketed their Christmas trees had been growing Christmas trees a mean of 16.0 years compared to 8.3 years for those who used a combination of ways to market trees. The analysis of variance F test was not significant. Data suggested that those producers who wholesale marketed tended to grow trees more years than those producers marketing in combination.

Member of a state Christmas tree growers' association. As indicated in Table III, producers who were members of a state Christmas tree growers' association had been growing Christmas trees for an average of 10.3 years compared to 3.2 years for those

not being members. The analysis of variance F test was significant at the .05 probability level. Therefore, producers who were members of a state Christmas tree growers' association tended to have grown Christmas trees for significantly more years than those producers who were not members.

Member of the National Christmas Tree Growers' Association. Producers who were members of the National Christmas Tree Growers' Association had grown trees an average of 13.2 years compared to 4.3 years for those non-members. An analysis of variance F test also was significant at the .05 probability level. Thus, producers who were members of the National Christmas Tree Growers' Association tended to have grown Christmas trees more years than non-members.

Summary. Producers' memberships in state and/or National Christmas Tree Growers' associations were significantly related to years producers had grown Christmas trees. Other variables, taking soil test before planting, liming and fertilizing by soil test, planting methods, and marketing methods were not significantly related with numbers of years producers had grown Christmas trees.

II. RELATIONSHIP BETWEEN CHARACTERISTICS OF PRODUCERS' FARM OPERATIONS AND YEARS CHRISTMAS TREES GROWN

This section summarizes findings regarding relationships between three farm operation variables: major farm enterprise, elevation of Christmas tree farm, and major land classes, as to the years producers had grown Christmas trees.

Major farm enterprise. As seen in Table III, p. 41, producers whose major farm enterprise was Christmas trees had grown trees a mean of 8.5 years compared to those producers whose major farm enterprise was livestock, 2.8 years, timber, 2.0 years, and tobacco, 1.7 years. The analysis of variance F test was not significant at the required .05 probability level. Data do suggest producers whose major farm enterprise was growing Christmas trees tended to have grown trees longer than those producers whose major farm enterprise was tobacco, livestock, or timber.

Elevation of Christmas tree farms (in feet). Analysis of producers' Christmas tree farm elevations revealed that those producing at 3,500 feet and above had been growing trees a mean of 6.5 years compared to 6.6 years for growers producing at 3,000 feet, 5.0 years for those at 2,500 feet, 1.0 years for those producing trees at 2,000 feet, and 2.5 years for those producing at 1,500 feet. An analysis of variance F test was not significant. However, the data did indicate that producers whose farms were at higher elevations had grown trees for more years.

Major land classes. Study of information in Table III shows that producers growing Christmas trees on class seven land had been growing Christmas trees an average of 25.0 years as compared to class six land, 5.0 years, class four land, 5.6 years, and class three land, 4.2 years. The analysis of variance F test was significant at the .05 probability level. Therefore, producers who grew Christmas

trees on higher land classes tended to have grown trees longer than those produced on lower land classes.

Summary. Major land classes was significantly related to years producers had grown Christmas trees. The two variables, major farm enterprise and elevation of Christmas tree farms were not significantly related to years producers have grown Christmas trees. In conclusion, producers who grew Christmas trees on higher land classes (i.e., class seven) tended to have grown trees longer than producers who grew trees on other land classes.

CHAPTER V

FACTORS INFLUENCING SPECIES OF CHRISTMAS TREES GROWN

Presented in Table IV are results of data analysis regarding, "Influences of Major Land Classes on Species Grown," "Influences of Land Elevation on Species Grown," and "Influence of Spacing on Species Grown." The analysis of variance F test was used to determine the strength of relationships between dependent and independent variables. F values which achieved the .05 probability level were accepted as indicating a significant relationship between variables.

I. RELATIONSHIP BETWEEN LAND CLASS AND SPECIES GROWN

The purpose of this section is to present results of an analysis of the relationship between the number of trees grown in each of four species and the class of land upon which the trees were grown. Regarding Fraser fir, the number of trees grown did not differ significantly by class of land upon which they were grown. The data did suggest, however, that of the 19 producers growing Fraser fir, 10 were using class four land, also, although only one producer was growing Fraser fir on class seven land, this producer was growing a relatively large number of trees.

The number of Blue spruce trees grown did not differ by land classes. It is interesting, however, that only a relatively small number of Blue spruce trees were being grown, all on either class

TABLE IV

FACTORS RELATED TO SPECIES OF CHRISTMAS TREES GROWN

Name of Variable	Fraser Fir N	Fraser Fir Mean No. Trees Grown	Blue Spruce N	Blue Spruce Mean No. Trees Grown	Norway Spruce N	Norway Spruce Mean No. Trees Grown	White Pine N	White Pine Mean No. Trees Grown
Major land class								
Three	5	7,440	3	1,266	5	3,000	8	3,437
Four	10	14,200	4	1,250	5	4,400	11	8,363
Six	3	5,666	0	0	1	5,000	3	9,333
Seven	1	25,000	0	0	1	4,000	1	2,000
	F Value 0.25		F Value 0.00		F Value 0.30		F Value 0.70	
	p level 0.863		p level 0.978		p level 0.830		p level 0.571	
Land elevation (in feet)								
1,500	0	0	1	1,000	1	1,000	2	4,000
2,000	0	0		0		0	1	2,000
2,500	2	18,500	1	500	4	3,750	6	4,333
3,000	8	5,212	4	5,299	3	3,000	5	10,800
3,500	9	15,833	1	2,000	4	5,250	9	6,611
	F Value 0.50		F Value 0.60		F Value 1.00		F Value 0.50	
	p level 0.578		p level 0.635		p level 0.433		p level 0.754	

TABLE IV (Continued)

Name of Variable	Fraser Fir N	Fraser Fir Mean No. Trees Grown	Blue Spruce N	Blue Spruce Mean No. Trees Grown	Norway Spruce N	Norway Spruce Mean No. Trees Grown	White Pine N	White Pine Mean No. Trees Grown
Spacing between Christmas trees (in feet)								
4 x 4	7	4,214.3	3	1,500.0	1	2,000.0	5	10,000.0
5 x 5	10	18,920.0	4	1,074.9	11	4,000.0	15	5,066.7
5 x 6	1	2,000.0		0.0		0.0	2	11,500.0
6 x 6	1	500.0		0.0		0.0	1	500.0
	F Value 0.68 p level 0.573		F Value 0.60 p level 0.488		F Value 0.60 p level 0.459		F Value 0.80 p level 0.515	

three or class four land. The number of Norway spruce or White pine did not differ as to the class of land upon which they were being grown. However, the data did show that a larger number of producers were growing White pine than any other species.

II. RELATIONSHIP BETWEEN LAND ELEVATION AND SPECIES GROWN

The purpose of data analysis presented in this section was to determine whether or not the number of trees grown in each of four species studied was related to the class of land upon which the trees were grown. The data indicated that the numbers of Fraser fir, Blue spruce, Norway spruce or White pine grown did not differ significantly by the land elevation at which the trees were grown. However, the data indicated that only a very few trees were being produced by farmers studied on land below an elevation of 2,500 feet.

III. RELATIONSHIP BETWEEN SPECIES GROWN AND SPACING BETWEEN TREES

The purpose of data analysis presented in this section was to determine whether or not the numbers of trees of each species differed by spacing between the trees. The data indicate that for each species grown the number of trees grown did not differ significantly by the distance apart at which the trees were planted. However, results do show that regardless of species grown the most frequently used spacing between trees was a 5 ft. by 5 ft. The next most frequently used spacing was 4 ft. by 4 ft. Hardly any of the producers were using either the 5 ft. by 6 ft. or the 6 ft. by 6 ft. spacings.

CHAPTER VI

FACTORS INFLUENCING PRODUCERS' SATISFACTION TOWARD CHRISTMAS TREE FARMING

Presented in Table V are data regarding "Characteristics of Producers" and "Characteristics of Producers' Farm Operations" as related to producers' satisfaction with their Christmas tree operations. The Chi-square test was used to determine the significance of relationships. The .05 probability level was selected.

I. RELATIONSHIP BETWEEN THE CHARACTERISTICS OF PRODUCERS AND THEIR SATISFACTION WITH CHRISTMAS TREE PRODUCTION

The purpose of this section was to present findings regarding the relationship between the personal and behavioral characteristics of producers and their level of satisfaction with Christmas tree production. The first subsection deals with the personal characteristics.

Relationship Between Personal Characteristics of Christmas Tree Producers and Their Satisfaction With Christmas Tree Production

Results of data analysis presented in this subsection were directed toward determining the relationship between producers' age, employment off farm, occupation off farm, school grades completed, and their satisfaction with Christmas tree production.

TABLE V

FACTORS RELATED TO PRODUCERS' SATISFACTION TOWARD CHRISTMAS TREE FARMING

Characteristics of Producers and Their Farm Operation	Satisfaction With Christmas Tree Farming: Very Satisfied N	Very Satisfied %	Satisfied N	Satisfied %	Total %	x^2 Value	df	p Level
Characteristics of Producers								
Personal Characteristic								
Age of Producer (in years)								
19-35	5	35.7	9	64.3	100			
Over 36	8	53.4	7	46.6	100			
Total	13	-	16	-	-	0.3	1	0.562
Employed off farm								
No	3	50.0	3	50.0	100			
Yes	10	43.5	3	56.5	100			
Total	13	-	6	-	-	0.0	1	1.000
Occupation off farm								
Professional	8	57.2	6	42.8	100			
Laborer	2	22.2	7	77.8	100			
Total	10	-	13	-	-	1.5	1	0.223
School grades completed								
Less eighth grade	1	10.0	0	0.0	100			
High school	2	15.4	11	84.6	100			
College	10	66.6	5	33.4	100			
Total	13	-	16	-	-	8.7	2	0.013

TABLE V (Continued)

Characteristics of Producers and Their Farm Operation	Satisfaction With Christmas Tree Farming: Very Satisfied N	Very Satisfied %	Satisfied N	Satisfied %	Total %	x^2 Value	df	p Level
Managerial Characteristic								
Member of a state Christmas Tree Growers' Association								
No	7	38.8	11	61.1	100			
Yes	6	54.5	5	45.5	100			
Total	13	-	16	-	-	0.2	1	0.661
Member of the National Christmas Tree Growers' Association								
No	10	41.6	14	58.4	100			
Yes	3	60.0	2	40.0	100			
Total	13	-	16	-	-	0.1	1	0.798
Sources of Christmas tree information								
Extension - TN	2	50.0	2	50.0	100			
Extension - N.C.	0	0.0	1	100.0	100			
Farmers	0	0.0	2	100.0	100			
Combination	11	52.4	10	47.6	100			
Total	13	-	15	-	-	3.8	3	0.436
Total number of Extension meetings attended past 12-months								
None	2	33.4	4	66.6	100			
Over one	11	47.8	12	52.2	100			
Total	13	-	16	-	-	0.03	1	0.861

TABLE V (Continued)

Characteristics of Producers and Their Farm Operation	Satisfaction With Christmas Tree Farming: Very Satisfied N	Very Satisfied %	Satisfied N	Satisfied %	Total %	x^2 Value	df	p Level
Number of Extension Christmas tree meetings attended past 12-months								
None	2	40.0	3	60.0	100			
One-over	11	45.8	13	54.2	100			
Total	13	-	16	-	-	0.0	1	1.000
Number of visits to Extension office past 12-months								
None	3	33.4	6	66.6	100			
One-over	10	50.0	10	50.0	100			
Total	13	-	16	-	-	0.2	1	0.666
Number of telephone calls to Extension office past 12-months								
None	3	75.0	1	25.0	100			
One-over	10	40.0	15	60.0	100			
Total	13	-	16	-	-	0.6	1	0.444
Number of farm visits received from Extension agent past 12-months								
None	4	44.5	5	55.5	100			
One-over	9	45.0	11	55.0	100			
Total	13	-	16	-	-	0.0	1	1.000

TABLE V (Continued)

Characteristics of Producers and Their Farm Operation	Satisfaction With Christmas Tree Farming: Very Satisfied N	Very Satisfied %	Satisfied N	Satisfied %	Total %	x^2 Value	df	p Level
Characteristic of Producers' Farm Operations								
Major farm enterprise								
Other	4	33.4	8	66.6	100			
Christmas trees	9	52.9	8	47.0	100			
Total	13	-	16	-	-	0.4	1	0.505
Total acres of land owned								
Under 100	7	41.2	10	58.8	100			
Over 100	5	55.5	4	44.5	100			
Total	12	-	14	-	-	0.1	1	0.774

Age of producer. Data in Table V indicate that of those producers who were over the age of 36 years, over 53% were "very satisfied" with Christmas tree production, as compared to almost 36% who were in the age bracket of 19 to 35. The Chi-square test was not significant at the .05 probability level. The data did show that most older producers seemed to be "very satisfied" with Christmas tree production, while most younger producers were just "satisfied."

Employed off farm. Data on employment indicated that over 43% of those producers who were employed off the farm and 50% who were not were "very satisfied" with Christmas tree production. A Chi-square test was not significant.

Occupation off farm. Of those producers employed in laborer positions, just over 22% felt "very satisfied" with Christmas tree production, as compared to over 57% who were employed in professional positions. The Chi-square test was not significant. However, data did show that a higher percentage of producers in professional positions felt "very satisfied" with Christmas tree production than was true for laborers.

School grades completed. Reference to data in Table V shows 67% of producers with college educations felt "very satisfied" with Christmas tree production, as compared to just over 15% for the high school graduates and 100% for those with less than an eighth grade education. The Chi-square test was significant at the .05 probability level. Thus, producers with college educations tended

to be better satisfied with Christmas tree production than those with high school degrees or less.

Summary. Chi-square tests showed that the personal characteristic school grades completed was significantly related to producers' satisfaction with Christmas tree production. Producers' age, employment off farm, and occupation off farm were not significantly related to producers' satisfaction with Christmas tree production. Data did suggest that a higher percentage of producers employed in professional positions felt "very satisfied" with Christmas tree production than was true for producers in laborer positions.

Relationship Between Managerial Characteristics of Christmas Tree Producers and Their Satisfaction With Christmas Tree Production

Findings from data analysis presented in this subsection summarize the relationships between producer satisfaction with Christmas tree production and producers' membership in state Christmas tree growers' association, membership in the National Christmas Tree Growers' Association, sources of Christmas tree information, total number of Extension meetings attended during the past 12 months, number of Extension Christmas tree meetings attended during the past 12 months, number of visits to Extension office during the past 12 months, number of telephone calls to Extension office during past 12 months, and number of farm visits received from Extension agents during the past 12 months.

Member of a state Christmas tree growers' association. Study of data in Table V shows that of those producers almost 55% of members of state Christmas tree growers' associations were "very satisfied" with Christmas tree production, as compared to about 39% of those who were not members. A Chi-square test was not significant. However, survey data did suggest that producers who were members of a state Christmas tree growers' association tended to be better satisfied with Christmas tree production.

Member of the National Christmas Tree Growers' Association. Of those producers who were members of the National Christmas Tree Growers' Association, 60% felt "very satisfied" with Christmas tree production, as compared to 42% who were not members of the National. The Chi-square test was not significant. Data did suggest that producers who were members of the National Christmas Tree Growers' Association tended to be more highly satisfied with Christmas tree operation.

Sources of Christmas tree information. As also seen in Table V, 50% of producers who received their Christmas tree information from the Tennessee Extension Service felt "very satisfied" with Christmas tree production, compared to a similar 52% for producers who received their information from a combination of sources. The Chi-square test was not significant at the .05 level.

Total number of Extension meetings attended. Of those producers who attended one or more Extension meetings in the previous

12 months, about 48% felt "very satisfied" with Christmas tree production, compared to just over 33% who did not attend any Extension meetings. The Chi-square test was not significant at the .05 level. However, producers who attended one and over Extension meetings during the past 12 months tended to be better satisfied with Christmas tree production.

Number of Extension Christmas tree meetings attended. Of those producers who attended one or more Extension Christmas tree meetings, almost 46% felt "very satisfied" with Christmas tree production. This compared to 40% "very satisfied" who did not attend any Extension Christmas tree meetings at all. A Chi-square test was not significant at the .05 level. However, data suggested that producers who attended one or more Extension Christmas tree meetings tended to be somewhat better satisfied with Christmas tree production.

Number of visits to Extension office. Of those producers who made one or more visits to an Extension office in the past 12 months, 50% felt "very satisfied" with Christmas tree production, compared to just over 33% "very satisfied" of those who made no visits to an Extension office during the past 12 months. The Chi-square test was not significant at the .05 level. However, producers who had made visits to an Extension office tended to feel better satisfied with Christmas tree production than the others.

Number of telephone calls to Extension office. Of those producers who made one or more telephone calls to an Extension office

40% felt "very satisfied" with Christmas tree production. This compared to 75% for those who had made no telephone calls to an Extension office. The Chi-square test was not significant.

Number of farm visits received from Extension agent. Data in Table V, p. 60, indicate that of those producers who received one or more visits from an Extension agent 45% felt "very satisfied" with Christmas tree production. This was almost identical to the percentage for those who did not receive any visits from Extension agents. A Chi-square test was not significant at the .05 level.

Summary. The variables, membership in a state Christmas tree growers' association, membership in the National Christmas Tree Growers' Association, sources of Christmas tree information, total number of Extension meetings attended, number of Extension Christmas tree meetings attended, number of visits to Extension office, number of telephone calls to Extension office, and number of farm visits received from Extension agents during the past 12 months were not significantly related to producers' level of satisfaction with Christmas tree production. However, data did suggest that producers who were members of a state Christmas tree growers' association and the National Christmas Tree Growers' Association tended to be better satisfied with Christmas tree production.

II. CHARACTERISTICS OF PRODUCERS' FARM OPERATIONS

This major section summarizes findings regarding relationships between producers' satisfaction with their Christmas tree operation

and two farm operation variables: major farm enterprise and total acres of land owned.

Major Farm Enterprise

Data summarized in Table V, p. 60, indicated that of those producers whose major farm enterprise was Christmas tree production, almost 53% felt "very satisfied" with Christmas tree production, compared to just over 33% of those whose major farm enterprise was other than Christmas tree production. The Chi-square test was not significant at the .05 level. However, these data suggest that more producers whose major farm enterprise was Christmas trees tended to be "very satisfied" with Christmas tree production than was true for those producers whose major farm enterprise was other than Christmas trees.

Total Acres of Land Owned

Of those producers who owned over 100 acres of land, almost 56% felt "very satisfied" with Christmas tree production, compared to just over 41% for those who owned under 100 acres. The Chi-square test was not significant at the .05 level. However, data suggest that a higher percentage of producers who owned over 100 acres tended to be "very satisfied" with Christmas tree production.

Summary

Chi-square tests show that producers' major farm enterprise and total acres owned were not significantly related to producers' levels of satisfaction with Christmas tree production. However,

higher percentages of producers whose major farm enterprise was Christmas trees and who owned over 100 acres of land tended to be "very satisfied" with Christmas tree production.

CHAPTER VII

FACTORS AFFECTING NUMBER OF EXTENSION CHRISTMAS TREE MEETINGS ATTENDED IN PREVIOUS 12 MONTHS

This chapter is organized into two major sections: "Characteristics of Producers" and "Characteristics of Producers' Farm Operations." Each of these sections presents findings with respect to the number of Extension Christmas tree meetings producers attended during the previous 12-month period. The analysis of variance F test was used to determine the significance of observed relationships between dependent and independent variables (see Table VI).

I. CHARACTERISTICS OF PRODUCERS

This section is divided into four subsections: Relationships between the number of Extension meetings attended by Christmas tree producers and the producers' personal, family, attitudinal, and managerial characteristics. The purpose of this section is to determine the influence of producer characteristics upon their attending Extension meetings and their attending Extension Christmas tree meetings.

Relationship Between Personal Characteristics of Christmas Tree Producers and the Number of Extension Christmas Tree Meetings They Attended

This section presents findings regarding the relationship between the number of Christmas tree meeting contacts producers had

TABLE VI

FACTORS AFFECTING NUMBER OF EXTENSION CHRISTMAS TREE MEETINGS ATTENDED PAST 12 MONTHS

Characteristics of Producers and Their Farm Operation	Number of Producers	Mean Number Extension Christmas Tree Meetings Attended	F Value	df	p Level
Characteristics of Producers					
Personal Characteristic					
Employed off farm					
No	6	3.0			
Yes	24	1.5	5.0	1	0.032
Occupation off farm					
Professional	14	1.6			
Skilled labor	8	1.6			
Unskilled labor	2	0.0	1.6	2	0.233
School grades completed					
Eighth grade or less	1	6.0			
High school	14	1.4			
College	15	1.9	5.2	2	0.012
Had close friends growing Christmas trees					
No	7	0.7			
Yes	23	2.1	5.0	1	0.033
Family Characteristic					
Children in 4-H					
0	22	2.0			
1	6	1.2			
2	2	1.5	0.7	2	0.508
Wife employed off farm					
No	19	1.5			
Yes	6	2.7	2.7	1	0.116
Had family members who previously grew Christmas trees					
No	26	1.7			
Yes	4	2.3	0.4	1	0.545

TABLE VI (Continued)

Characteristics of Producers and Their Farm Operation	Number of Producers	Mean Number Extension Christmas Tree Meetings Attended	F Value	df	p Level
Attitudinal Characteristic					
Christmas trees provide adequate family income					
No	5	1.6			
Yes	25	1.8	0.1	1	0.759
Banks would make loans to Christmas tree producers					
No	6	1.3			
Yes	24	1.9	0.7	1	0.423
Extent satisfied with Christmas tree operation					
Very satisfied	13	2.5			
Satisfied	16	1.4			
Dissatisfied	1	0.0			
Very dissatisfied	0	0.0	2.7	3	0.084
Extent Christmas trees fit into total farm operation					
Very well	15	2.1			
Well	15	1.5			
Not very well	0	0.0			
Not at all	0	0.0	1.4	3	0.249
Managerial Characteristic					
Soil samples taken before planting					
No	14	1.6			
Yes	16	2.0	0.6	1	0.463
Limed by soil test					
No	14	1.6			
Yes	16	2.0	0.6	1	0.463
Land fertilized by soil test					
No	16	1.6			
Yes	13	2.2	1.0	1	0.325

TABLE VI (Continued)

Characteristics of Producers and Their Farm Operation	Number of Producers	Mean Number Extension Christmas Tree Meetings Attended	F Value	df	p Level
Planting methods					
Hand	24	1.8			
Machine	6	2.0	0.1	1	0.732
Method used to market Christmas trees					
Wholesale	5	4.0			
Combination	3	1.0	10.1	1	0.019
Member of a state Christmas Tree Growers' Association					
No	19	1.5			
Yes	11	2.4	2.4	1	0.135
Member of the National Christmas Tree Growers' Association					
No	25	1.4			
Yes	5	3.6	10.6	1	0.003
Characteristic of Producers' Farm Operations					
Major farm enterprise					
Tobacco	6	0.8			
Livestock	5	1.2			
Christmas trees	17	2.2			
Timber	2	3.0	1.9	3	0.155
Elevation of Christmas tree farms (in feet)					
1,500	2	2.0			
2,000	1	1.0			
2,500	6	1.5			
3,000	10	1.3			
3,500 - up	11	2.5	0.9	4	0.507
Major land classes					
Three	9	1.8			
Four	16	1.8			
Six	4	1.0			
Seven	1	5.0	1.9	3	0.152

with Extension agents and employment off farm, occupation off farm, school grades completed and close friends growing Christmas trees.

Employed off farm. Reference to Table VI shows that those 6 producers who were not employed off the farm attended an average of 3 Extension Christmas tree meetings compared to 1.5 for 24 producers employed off the farm. The analysis of variance F test was significant at the .05 probability level. Thus, producers who were not employed off the farm attended more Extension Christmas tree meetings, on the average, than those producers who were employed off the farm.

Occupation off farm. Producers working in a professional position attended the same number of meetings (i.e., 1.6 meetings) as those whose off farm occupation was skilled labor. The two Christmas tree producers who also worked as unskilled laborers did not attend any Extension meetings. The analysis of variance F test was not significant.

School grades completed. Producers who completed college had attended an average of 1.9 Extension meetings compared to 1.4 for high school graduates and 6.0 for the one producer with an eighth grade or less educational level. The analysis of variance F test was significant at the .05 probability level. The direction of the relationship was inconclusive.

Had close friends growing Christmas trees. Study of data in Table VI discloses that producers who had close friends growing

Christmas trees attended an average of 2.1 Extension Christmas tree meetings compared to .7 meetings for those producers who did not have close friends growing Christmas trees. The analysis of variance F test was significant at the .05 level. Thus, producers who had close friends growing Christmas trees attended more Extension Christmas tree meetings, on the average, than those producers without close friends in Christmas tree production.

Summary. Analyses indicated that the personal characteristics employment off farm, school grades completed, and close friends growing Christmas trees were significantly related to the number of Extension Christmas tree meetings producers attended. Producers who were not employed off the farm, who had completed more school, and who had close friends growing Christmas trees had attended, on the average, more Extension Christmas tree meetings than those who were employed off the farm and those who did not have close friends growing Christmas trees.

Relationship Between Family Characteristics of Christmas Tree Producers and Their Attending Extension Christmas Tree Meetings

This subsection on the Family Characteristics of Producers indicates the nature of relationships between producers' attendance at Extension Christmas tree meetings and their having children in 4-H, wives employed off the farm, and family members growing Christmas trees.

Children in 4-H. The 22 producers with no children in 4-H had attended an average of 2.0 Extension Christmas tree meetings during the previous year compared to 1.2 meetings for those producers with one child in 4-H work and 1.5 meetings for those producers with two children in 4-H work. The analysis of variance F test was not significant at the .05 probability level. Having children in 4-H work did not significantly influence producer participation in Extension Christmas tree meetings.

Wife employed off the farm. Producers with wives employed off the farm attended an average of 2.7 Extension Christmas tree meetings during the past 12-month period compared to 1.5 meetings for producers whose wives were not employed off the farm. The analysis of variance F test was not significant. However, tendencies were seen for those producers with wives employed off the farm to attend more Extension Christmas tree meetings than those producers whose wives were not employed off the farm.

Family members previously grew Christmas trees. Producers with family members previously growing Christmas trees attended an average 2.3 Extension Christmas tree meetings compared to 1.7 meetings for producers whose family members who had not previously grown trees. The analysis of variance F test was not significant at the .05 probability level.

Summary. Family characteristics were not significantly related to the number of Extension Christmas tree meetings producers

attended. However, data showed tendencies for those producers with wives employed off farm to attend more Extension Christmas tree meetings.

Relationships Between Attitudinal Characteristics of Christmas Tree Producers and Their Attending Extension Christmas Tree Meetings

The attitudes of producers were summarized in Table VI by the number of Extension Christmas tree meetings producers attended. The number of Extension meetings attended was compared as to producers' feelings about the adequacey of income from Christmas trees, bank willingness to loan money to Christmas tree producers, the extent to which producers were satisfied with Christmas tree operations, and the extent to which Christmas trees fit into their farm operations.

Felt that Christmas trees could provide adequate family income. Producers who felt Christmas trees could provide adequate family income attended an average of 1.8 Extension Christmas tree meetings during the previous 12 months compared to 1.6 meetings for those producers who did not feel Christmas trees could provide adequate family income. The analysis of variance F test was not significant at the .05 probability level.

Felt that banks would loan money to Christmas tree producers. Producers who felt banks would make loans to Christmas tree producers attended an average of 1.9 Extension Christmas tree meetings during the previous 12 months compared to 1.3 meetings for those producers who did not feel banks would make loans to Christmas tree

producers. The analysis of variance F test was not significant. Tendencies were noted for producers who felt banks would make loans to attend more Extension Christmas tree meetings than those who did not feel banks would make loans for the production of Christmas trees.

Extent satisfied with Christmas tree operations. Producers feeling "very satisfied" with their Christmas tree operations attended an average 2.5 Extension Christmas tree meetings compared to 1.4 by those who were "satisfied" and no meetings by the one "dissatisfied" producer. The analysis of variance F test was not significant at the .05 probability level. However, data suggest tendencies for the "very satisfied" producers to attend more Extension Christmas tree meetings than those who were "satisfied."

Extent Christmas trees fit into farm operation. Producers who felt Christmas trees fit "very well" in their farm operations attended an average of 2.1 Extension Christmas tree meetings during the previous 12 months compared to 1.5 meetings attended by those producers who felt Christmas trees fit "well" into their farm operation. The analysis of variance F test was not significant. Tendencies are noted for those producers who felt Christmas trees fit "very well" into their total farm operation to participate in more Extension Christmas tree meetings than those who felt they fit "well."

Summary. Producers' feelings about Christmas trees providing an adequate family income, banks loaning money to Christmas tree producers, extent producers were satisfied with Christmas tree

production, and the extent Christmas trees fit into farm operations were not significantly related to the number of Extension meetings attended. However, the data did show tendencies for producers who felt "very satisfied" with Christmas tree production to attend more Extension Christmas tree meetings.

Relationship Between Managerial Characteristics of Christmas Tree Producers and Their Attending Extension Christmas Tree Meetings

The purpose of this subsection was to summarize findings regarding relationships between managerial practices producers carried out and the number of Extension Christmas tree meetings they attended. Whether or not the producers sampled soil before planting, limed and fertilized by soil test, used hand or machine planting methods, marketed wholesale or combination, and their membership in a state or the National Christmas Tree Growers' associations were used to compare and analyze numbers of Extension Christmas tree meetings producers attended during the previous 12 months.

Soil samples taken before planting trees. Producers who took soil samples before planting Christmas trees had attended an average of 2.0 Extension Christmas tree meetings compared to 1.6 meetings for those producers who did not take soil samples before planting. The analysis of variance F test was not significant at the .05 probability level. Slight tendencies were seen for those who did take soil samples before planting to attend more Extension Christmas tree meetings than others.

Limed by soil test. Producers who limed by soil test attended an average of 2.0 Extension Christmas tree meetings during the previous 12 months compared to 1.6 for those producers who did not lime by soil test. Again, the analysis of variance F test was not significant.

Fertilized by soil test. Producers who fertilized by soil test had attended a mean 2.2 Extension Christmas tree meetings compared to 1.6 by those producers who did not fertilize by soil test. The analysis of variance F test again was not significant at the required .05 probability level.

Planting methods. Producers who planted by machine had attended a mean 2.0 Extension Christmas tree meetings compared to 1.8 meetings for those producers who planted by hand. The analysis of variance F test was not significant at the .05 probability level.

Marketing methods. Producers who marketed wholesale attended an average 4.0 Extension Christmas tree meetings compared to 1.0 meetings for those producers who sold their trees in a combination of ways. The analysis of variance F test was significant at the .05 probability level. Therefore, producers who marketed their trees wholesale attended significantly more Extension Christmas tree meetings than those selling in combination.

Member of a state Christmas tree growers' association. Producers who were members of a state Christmas tree growers' association attended a mean 2.4 Extension Christmas tree meetings compared

to 1.5 meetings for those producers who were not members of a state Christmas tree growers' association. The analysis of variance F test was not significant. However, these data did suggest slight tendencies for those producers who were members of a state Christmas tree growers' association to attend more Extension Christmas tree meetings.

Member of the National Christmas Tree Growers' Association. Producers who were members of the National Christmas Tree Growers' Association attended a mean 3.6 Extension Christmas tree meetings compared to 1.4 for those producers not members of the National. The analysis of variance F test was significant at the .05 probability level. Thus, those producers who were members of the National Christmas Tree Growers' Association attended more Extension Christmas tree meetings than those producers who were not members of the National.

Summary. Analyses of variance tests indicated that wholesale marketing and membership in the National Christmas Tree Growers' Association influenced the number of Extension Christmas tree meetings a producer attended. The other variables, soil sampling before planting, liming and fertilizing by soil test, planting methods, and membership in a state Christmas tree growers' association were not significantly related at the .05 probability level. Those producers who marketed wholesale and were members of the National Christmas Tree Growers' Association attended more Extension Christmas tree meetings than those producers who were not members.

II. CHARACTERISTICS OF PRODUCERS' FARM OPERATION

This section summarizes findings regarding producers' farm operations and the number of Extension Christmas tree meetings producers attended. The variables used to compare with the number of Extension Christmas tree meetings attended were producers' "major farm enterprise," "elevation of Christmas tree farm," and "major land class."

Major Farm Enterprise

Producers whose major farm enterprise was Christmas tree production attended a mean 2.2 Extension Christmas tree meetings compared to 3.0 meetings for those producers whose major farm enterprise was timber, 1.2 meetings for livestock producers, and 0.8 meetings for tobacco producers. The analysis of variance F test was not significant at the .05 probability level. However, some tendencies were noted for producers whose major farm enterprise was timber or Christmas trees to participate in more Extension Christmas tree meetings than others.

Elevation of Christmas Tree Farms (in Feet)

Producers' Christmas tree farm elevations revealed those producing at 3,500 feet and above attended a mean 2.5 Extension Christmas tree meetings compared to 1.3 meetings for producers growing at 3,000 feet, 1.5 for those at 2,500 feet, 1.0 meetings for those at 2,000 feet, and 2.0 meetings for those at 1,500 feet. The analysis of variance F test was not significant.

Major Land Classes

Further reference to Table VI, p. 72, indicates that the one producer growing Christmas trees on class seven land attended 5.0 Extension Christmas tree meetings during the previous 12 months compared to 1.0 for those producing trees on class six land, 1.8 meetings for those on class four land, and 1.8 meetings for those on class three land. The analysis of variance F test was not significant.

CHAPTER VIII

SUMMARY OF MAJOR FINDINGS

I. PURPOSES AND SPECIFIC OBJECTIVES

Purpose

The major purpose of this study was to describe Christmas tree producers in Upper East Tennessee and their farm operations. It was believed that the information would help Extension agents to do a better job of planning programs to meet the interests and needs of this segment of our clientele.

Specific Objectives

The specific objectives of this study were:

1. To describe Christmas tree producers with regard to their personal, family, attitudinal, and managerial characteristics

2. To determine relationships between the size of Christmas tree operations and selected producer and farm characteristics

3. To determine relationships between the number of years producers had grown Christmas trees and characteristics of the producers and their farm operations

4. To determine relationships between species of Christmas trees grown and major land classes, land elevation, and spacing of trees

5. To determine relationships between producers' satisfaction with Christmas tree production and their personal and farm characteristics

6. To determine relationships between the number of Extension Christmas Tree Meetings attended by producers and their personal and farm characteristics.

II. METHODS AND PROCEDURES

The entire population of 30 Christmas tree producers who lived in Carter, Johnson, and Unicoi Counties of Upper East Tennessee was selected to provide data for this thesis. A survey instrument was especially designed by the author with the help of his thesis committee to obtain data for this study. A personal interview was scheduled between the researcher and each Christmas tree grower during 1980-81. Responses were recorded on the survey instrument.

Data were coded and punched on computer cards. Computations were made by The University of Tennessee Computing Center. The analysis of variance F test and Chi-square test were used to determine the strength of relationships between variables. F values and x^2 values which achieved the .05 probability level were accepted as significant.

III. MAJOR FINDINGS

Major findings were classified and presented under headings related to the specific objectives of this study.

Producer and Farm Characteristics

1. Of the 30 producers interviewed, 83.3% were under the average age of 50 with 40% between the ages of 30 and 40 years.

2. Eighty percent of the producers were employed off the farm with 50% of this group having college degrees.

3. Twenty-five of the 30 producers were married, while 63.3% of the wives were not employed off the farm.

4. Only 4 producers were operating farms on which a family member had previously established Christmas trees.

5. Overall the producers expressed favorable attitudes toward Christmas tree growing. Ninety-six percent felt that Christmas tree production was practical for other farmers in their community and 83% indicated Christmas trees could provide their family with an adequate family income. Eighty percent of the producers felt banks would loan money to Christmas tree producers. All producers surveyed felt Christmas tree production was a wise use of their land and that Christmas tree growing fit "well" or "very well" into their total farm operation.

6. Sixteen of 30 producers took soil samples before planting and limed according to soil test recommendations.

7. Eighty percent of producers planted trees by hand rather than machine.

8. Eleven of the producers were members of a state Christmas tree growers' association and 5 were members of the National Christmas Tree Growers' Association.

9. The Tennessee Extension Service provided 5 of the 30 producers with most of their Christmas tree information. One producer received most of his information from North Carolina Extension

Service, and two producers from other farmers. Most producers used several sources of information.

10. About 80% of the producers had worked with the county Extension agent during the previous 12 months, through meetings, office and telephone calls, and through farm visits by the agent.

11. For 57% of the producers, the major farm enterprise was Christmas tree farming, followed by 3 other enterprises: in order, tobacco, livestock, and timber. Ten producers raised their Christmas trees at 3,000 feet elevation and 11 producers at 3,500 feet. Eight producers spaced trees on a 4x4 foot spacing, 19 producers on a 5x5 foot interval.

Size of Operations

1. Of those producers growing under 10 acres of Christmas trees 92% were employed off the farm. Eighty-three percent of those producers with over 10 acres in production had raised Christmas trees over 6 years. Both "employment off the farm" and "years producers had been in Christmas tree production" were significantly related to the size of Christmas tree operations.

2. The 6 producers with over 10 acres of Christmas trees in production felt that Christmas trees could provide adequate family income. These same producers felt either "very satisfied" or "satisfied" with Christmas tree production and felt that Christmas trees fit either "well" or "very well" into their farming operation.

3. Of the 6 producers with over 10 acres in production, 5 were members of a state Christmas tree growers' association and 3

producers were members of the National Christmas Tree Growers' Association. All these producers listed Christmas trees as their major farm enterprise.

4. Twenty-four producers had under 10 acres of Christmas trees in production. Of this group 83% had grown Christmas trees less than 6 years and 92% did not have family members who had previously produced Christmas trees.

Years Christmas Trees Grown

1. The 6 producers who were not employed off the farm had been growing trees an average of 13 years. The 24 producers who were employed off the farm had grown Christmas trees an average of 4 years. Employment off the farm was significantly related to the average number of years producers had grown Christmas trees.

2. Producers whose family had previously grown Christmas trees had grown trees an average of 8.3 years compared to 5.4 years for those not having family members who grew trees. Numbers of years producers had been growing Christmas trees was significantly related to having family members who had previously grown Christmas trees.

3. The 25 producers who felt Christmas trees could provide their family an adequate income raised Christmas trees an average of 6.6 years compared to 2.0 years for the 5 producers who felt Christmas trees could not provide an adequate income.

4. The 11 producers who were members of a state Christmas tree growers' association had grown Christmas trees an average of 10.3 years compared to 3.2 years for the 19 producers who were not

members. Membership in the National Christmas Tree Growers' Association was held by 5 members and they had been in production an average of 13.2 years. Producers' membership in a state or the National Christmas Tree Growers' Association was significantly related to the number of years producers had grown Christmas trees.

5. Seventeen producers whose major farm enterprise was Christmas trees had grown trees an average of 8.5 years compared to 1.7 years for those 6 listing tobacco, 2.8 years for those with livestock, and 2.0 years for those producers with timber as their major farm enterprise.

6. One producer who grew trees on class seven land had been growing Christmas trees 25 years, as compared to those on class six land with an average of 5.0 years, class four land an average of 5.6 years, and class three land an average of 4.2 years. Producers who grew Christmas trees on higher land classes had grown trees significantly longer than those producers who used lower land classes.

Species Grown

1. The largest number of Christmas tree producers were growing Fraser fir (19 producers). Ten producers grew their trees on class four land and grew an average of 14,200 Fraser firs. Five producers grew an average of 7,440 Fraser firs on class three land. No Fraser firs were raised below 2,000 feet elevation. Eight producers grew an average of 5,212 Frasers at 3,000 feet and 9 producers grew 15,833 Frasers at 3,500 feet elevation. A 5x5 foot spacing for

Fraser fir was most frequently used. Ten producers grew an average of 18,920 Frasers at this spacing.

2. Seven Christmas tree producers were raising Blue spruce. Four producers grew an average of 1,250 Blue spruce trees on class four land and 3 producers grew an average of 1,266 Blue spruce trees on class three land. The most popular elevation for Blue spruce was 3,000 feet where 4 producers averaged raising 5,300 Blue spruces each. The 5x5 foot spacing was common with 4 producers growing an average of 1,075 Blue spruces at this spacing.

3. Twelve producers were raising Norway spruce. On class three land, 5 producers grew an average of 3,000 Norway spruces. On class four land, 5 producers grew an average of 4,400 Norway spruces. Norways were grown at several elevation levels. Four producers grew an average of 3,750 Norways at 2,500 feet, 3 producers grew an average of 3,000 Norways at 3,000 feet, and 4 producers grew an average of 5,250 Norway spruces at 3,500 feet elevation. The most popular spacing for Norway spruce was 5x5 feet with 11 producers averaging 4,000 trees at this spacing.

4. The second largest number of trees in production was White pine with 23 producers growing this species. Eight producers grew an average of 3,437 White pines on class three land and 11 producers grew an average of 8,363 White pines on class four land. White pines were grown over a wide range of elevations. Six producers grew an average of 4,333 White pines at 2,500 feet, 5 producers grew at 3,000 feet with an average of 10,800 white pine trees and 9 producers grew an average of 6,611 White pine trees at 3,500 feet elevation.

Five producers grew White pine trees on a 4x4 foot spacing and averaged 10,000 White pines in production. Fifteen producers raised White pine on a 5x5 foot spacing and averaged 5,067 pines in production.

Satisfaction With Production

1. Fifty-seven percent of the producers who were employed in professional positions off the farm were "very satisfied" with Christmas tree production. The remaining producers indicated they were "satisfied" with Christmas tree production.

2. The higher the degree of education achieved the greater the satisfaction indicated by the producers with their Christmas tree production. Of those producers with a high school education 2 felt "very satisfied" with Christmas tree production while 11 producers felt "satisfied." Of those producers with a college education, 10 felt "very satisfied" with Christmas tree production while 5 felt "satisfied." The level of education was significantly related to producers' level of satisfaction with Christmas tree production.

3. Fifty-five percent of those producers who were members of a state Christmas tree growers' association were "very satisfied" with Christmas tree production compared to 45% who felt "satisfied." Sixty percent of the producers who were members of the National Association were "very satisfied" with Christmas tree production.

4. The level of producer satisfaction was not significantly related to whether or not producers attended Extension meetings, made visits or telephone calls to the Extension office, or received farm visits from Extension agents.

5. Of those producers whose major farm enterprise was other than Christmas tree production, 67% felt "satisfied" with Christmas tree production, while 53% of producers whose major farm enterprise was Christmas trees felt "very satisfied" with production of Christmas trees. Only 1 producer felt "dissatisfied" with Christmas tree production.

Extension Christmas Tree Meetings Attended in Previous 12 Months

1. Producer employment off the farm did significantly influence the average number of Extension Christmas tree meetings attended. The 6 producers employed on the farm attended an average of 3 Extension Christmas tree meetings, while the 24 producers employed off the farm attended an average of 1.5 meetings.

2. School grades completed did significantly influence the number of Extension Christmas tree meetings attended. One producer with less than an eighth grade education attended 6.0 meetings while those 14 producers with a high school education attended an average of 1.4 meetings, and the 15 producers with a college degree attended an average of 1.9 Extension Christmas tree meetings.

3. Having close friends growing Christmas trees significantly influenced the number of Extension Christmas tree meetings attended. Seven producers who did not have close friends growing Christmas trees attended an average of .7 Extension Christmas tree meetings. Those 23 producers who did have close friends growing Christmas trees attended an average of 2.1 Extension Christmas tree meetings.

4. The 4 producers who had family members growing Christmas trees previously attended an average of 2.3 Extension Christmas tree meetings while the 26 producers who did not have family members growing trees previously attended an average of 1.7 Extension Christmas tree meetings.

5. Producers taking soil samples before planting Christmas trees attended an average of 2.0 Extension Christmas tree meetings, while those producers who did not take soil samples before planting attended 1.6 Extension Christmas tree meetings. Producers who limed by soil test attended 2.0 Extension Christmas tree meetings while those who did not lime by soil test attended an average of 1.6 Extension Christmas tree meetings.

IV. IMPLICATIONS AND RECOMMENDATIONS

The following implications and recommendations are based upon findings of the study and the experiences and views of the researcher:

1. It was found that of the 30 producers interviewed, 83.3% were under the age of 50 with only 4 producers operating Christmas tree farms which had been previously established by members of their family. Also, it was found that 11 producers were members of a state Christmas tree growers' association and 5 were members of the National Christmas Tree Growers' Association. Therefore, it would seem Extension does have a relatively young farming clientele in East Tennessee who are searching for information regarding this relatively new farm enterprise.

2. Producer off farm employment did significantly influence the average number of Extension Christmas tree meetings producers attended. It would seem logical for Extension agents to use circular letters, telephone calls, and personal visits with Christmas tree producers employed off the farm to help better serve those employed off the farm.

3. It was noted that the level of producer satisfaction with Christmas tree production appeared to increase for those producers having more contacts with Extension agents. The degree of satisfaction a producer has with a Christmas tree enterprise would seem to affect the production practices used. Therefore, it would seem important for Extension to make special efforts to reach and teach those Christmas tree producers who have little if any direct contact with Extension.

4. Producers who took soil tests before planting Christmas trees attended an average of 2.0 Extension Christmas tree meetings, while those producers who did not take soil tests attended 1.6 Extension Christmas tree meetings. Those producers who limed by soil test attended 2.0 Extension Christmas tree meetings while those who did not lime by soil test attended an average of 1.6 Extension Christmas tree meetings. Producers who were following a good fertilization program attended more Extension Christmas tree meetings than those not following soil test recommendations. Since this is a critical practice area, Extension should use every method available to make sure all Christmas tree producers are aware of the soil

testing program as well as their potential returns from following soil test recommendations.

5. Since producers who were not members of a state Christmas tree growers' association attended fewer Extension Christmas tree meetings than those who were members, it seems important that Extension make a special effort to reach non-members and encourage them to join an educational association while also encouraging these producers to participate in Extension educational meetings to gain the information needed to affectively manage a Christmas tree operation.

6. Since it was found that close friends growing Christmas trees significantly influenced the number of Extension Christmas tree meetings attended, it may be implied that personal visits to the producers who do not have such friends in Christmas tree production might help encourage their participation in planned meetings. Also, Extension agents might want to use other types of contacts beside group meetings with producers who do not have close friends growing Christmas trees to meet the needs of this clientele.

V. RECOMMENDATIONS FOR FURTHER STUDY

Other studies of Christmas tree producers should be conducted over a period of years to help Extension agents do a better job of planning programs to meet the interests and needs of the Christmas tree producers.

This could involve a study like the one reported herein using producers located in various regions of the state. Other studies are needed to determine the kind and amount of herbicides used,

and the loss of income from pest and disease damage to Christmas trees. Other research is needed regarding the investment potential, labor needs, and impact of Christmas trees on the economy at regional and state levels.

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APPENDIX

CHRISTMAS TREE SURVEY

Name of Respondent_____Address_____

___ ___ ___ Name of County_____Date_____
78 79 80

___ ___ ___ ___ ___ ___ ___ Telephone No. _____

___ Card Number
(1)

___ ___ Respondent Number
(2) (3)

Part A--General Information*

___ ___ ___ 1. How many acres of Christmas Trees do you operate?
(4) (5) (6)

___ ___ ___ A. Acres Owned _____
(7) (8) (9)

___ ___ ___ B. Acres Rented _____
(10) (11) (12)

___ ___ ___ C. Acres Managed _____
(13) (14) (15)

___ ___ 2. How many years have you been growing Christmas trees? _____
(16) (17)

3. Which of the following Christmas Trees species are you growing? (Code in thousands)

___ ___ A. Fraser Fir
(18) (19)

___ ___ B. Blue Spruce
(20) (21)

___ ___ C. Norway Spruce
(22) (23)

___ ___ D. White Pine
(24) (25)

___ ___ E. Other _____
(26) (27)

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*Coding Instructions: 1. Entries are right justified. 2. All card columns should be filled. 3. A zero (0) = none or not any. 4. A nine (9) in each card column for a question = no response or does not apply.

(28) 4. Do you have a close friend involved in Christmas Tree Production? (1=no; 2=yes)

(29) 5. Has anyone in your family ever grown Christmas Trees? (1=no; 2=yes)

(30) (31) 6. When did you plant your first trees (code in actual years)?

(32) 7. After becoming interested in Christmas Trees, how many years did you wait before planting your first trees?

Part B--Characteristics of Present Farm Operation

1. How many acres do you operate?

(33) (34) (35) A. Acres Owned _____

(36) (37) (38) B. Acres Rented _____

(39) (40) (41) C. Acres Managed _____

(42) (43) (44) 2. How many acres are in forest land? _____

(45) (46) (47) 3. How many acres are under cultivation? _____

(48) (49) (50) 4. How many total acres are in hay and pasture? ____

(51) 5. What is your major farm enterprise?
(1) Tobacco (2) Livestock (3) Christmas Trees
(4) Timber (5) Other Row Crops (6) Orchard Crop

(52) 6. Are you employed off the farm? (1=no; 2=yes)

(53) (54) 7. If yes, how many hours a week? _____

(55) 8. If employed off the farm, what is your primary occupation (1) Professional (2) Skilled Labor (3) Unskilled Labor

(56) 9. Which land classes are primarily available on your farm? (1) I and II (2) II and III (3) III and IV (4) IV and VI (5) VII

(57) 10. At what elevation is your farm located? (1) 1,500' (2) 2,000' (3) 2,500' (4) 3,000' (5) 3,500' - up

PART C--Attitude Toward Christmas Tree Production

(58) 1. How satisfied are you with your Christmas Tree Production? (1) Very satisfied (2) Satisfied (3) Dissatisfied (4) Very Dissatisfied

(59) 2. Do you feel Christmas Tree Production is a practical farm enterprise for some farmers in your community? (1=no; 2=yes)

(60) 3. Do you think Christmas Tree products could provide adequate income for your family? (1=no; 2=yes)

(61) 4. If needed, do you feel banks and loan agencies will provide money for Christmas Tree operations? (1=no; 2=yes)

(62) 5. Do you think Christmas Tree Production is a wise use of your land? (1=no; 2=yes)

(63) 6. How well does Christmas Tree Production fit into your total farm operation? (1) Not at All (2) Not Very Well (3) Well (4) Very Well

Part D--Practices

(64) (65) (66) 1. How many trees have you planted since you first went into production? (Code in thousands) _____

(67) (68) 2. On the average how many trees do you plant each year? (Code in thousands) _____

3. How many trees do you hope to plant in the next five years? (Code in thousands)

(69) (70) A. Blue Spruce

(71) (72) B. Norway Spruce

(73) (74) C. White Pine

(75) (76) D. Fraser Fir

(77) (78) E. Other

(79) 4. How do you obtain your seed stock? (1) buy or raise seed (2) purchase transplants from nursery (3) pull wildings (4) buy seedling and put in line-out bed (5) combination _____

2 (1) Card Number

(2) (3) Respondent Number

5. What age in years, do you feel your Christmas Trees should be before they go to the field?

(4) A. Blue Spruce (1) 2-0 (2) 3-0 (3) 2-1 (4) 2-2 (5) 2-3 (6) 3-1

(5) B. Norway Spruce

(6) C. White Pine

(7) D. Fraser Fir

(8) E. Other _____

(9) 6. What spacing between trees do you use? (1) 4x4 ft. (2) 5x5 ft. (3) 5x6 ft. (4) 6x6 ft.

(10) (11) 7. Of your total Christmas Tree acres, how many were chemically treated for weed control?

(12) 8. How many times a year do you mow between trees?___

(13) 9. How do you plant your trees? (1) Hand (2) Machine

(14) 10. Did you take a soil sample prior to planting Christmas Trees? (1=no; 2=yes)

(15) 11. Do you lime according to soil test? (1=no; 2=yes)

(16) 12. Have you fertilized according to soil test recommendations? (1=no; 2=yes)

13. Which month do you start shearing your Christmas Trees?

(17) A. Blue Spruce (1)July(2)Aug(3)Sept(4)Oct(5)Nov (6)Dec(7)Jan (Code 8 if no shearing)

(18) B. Norway Spruce (1)July(2)Aug(3)Sept(4)Oct(5)Nov (6)Dec(7)Jan (Code 8 if no shearing)

(19) C. White Pine (1)July(2)Aug(3)Sept(4)Oct(5)Nov (6)Dec(7)Jan (Code 8 if no shearing)

(20) D. Fraser Fir (1)July(2)Aug(3)Sept(4)Oct(5)Nov (6)Dec(7)Jan (Code 8 if no shearing)

(21) E. Other (1)July(2)Aug(3)Sept(4)Oct(5)Nov (6)Dec(7)Jan (Code 8 if no shearing)

14. What has your expense been for establishing one acre of Christmas Trees?

(22) (23) (24) A. Blue Spruce

(25) (26) (27) B. Norway Spruce

(28) (29) (30) C. White Pine

(31) (32) (33) D. Fraser Fir

(34) (35) (36) E. Other _____

PART E--Marketing

(37) 1. Have you been able to sell all your marketable trees? (1=no; 2=yes)

(38) 2. Do you believe there will be adequate markets for quality Christmas Trees in the future? (1=no; 2=yes)

(39) 3. How do you sell your trees? (1) wholesale (choose & cut (3) retail (4) combination _____

(40) (41) 4. What gross sales do you hope to have from Christmas Trees five years from now? (Code in thousands)

(42) (43) 5. Approximately what were your gross sales last year? (Code in thousands)

(44) 6. Have you sold some trees you intended for Christmas Trees? (1=no; 2=yes)

7. How many trees did you sell last year (Code in thousands)

(45) (46) A. Blue Spruce

(47) (48) B. Norway Spruce

(49) (50) C. White Pine

D. Fraser Fir

(51) (52)

E. Other _____

(53) (54)

8. On the average how many trees do you sell each year? (Code in thousands) _____

(55) (56)

F-Data Concerning Respondent

1. What is the age of respondent? _____

(57) (58)

2. What grade level did you attain? _____

(59)

(1) Eight grades or less (2) More than eight, but less than high school (3) High School (4) College

3. How long have you lived in Upper East Tennessee as a resident? _____

(60) (61)

4. How many children do you have? _____

(62)

5. How many children do you have in 4-H Club work?__

(63)

6. Does your wife have off the farm employment? (1=no; 2=yes)

(64)

7. Are you a member of a State Christmas Tree Growers' Association? (1=no; 2=yes)

(65)

8. Are you a member of the National Christmas Tree Growers' Association? (1=no; 2=yes)

(66)

9. Where do you get your Christmas Tree information? (1) Extension-TN (2) Extension-NC (3) Farmers (4) Magazines (5) Library (6) Combination _____

(67)

10. Over the past twelve (12) months:

A. How many Extension meetings did you attend?

(68)

B. How many Extension Christmas tree meetings did you attend?

(69)

C. How many visits did you make to the County Extension Office?

(70) (71)

D. How many telephone calls did you make to the Extension Office?

(72) (73)

E. How many farm visits did you receive from Extension Agents?

(74) (75)

____ (76) 11. Would you be interested in attending Extension Christmas Tree meetings in the next twelve (12) months? (1=no; 2=yes)

____ (77) 12. Which of the following subjects would you be most interested in relative to Christmas Tree Production? (1) Production Practices (2) Getting Started (3) Marketing (4) All Phases of Christmas Tree Production

VITA

William Keith Hart, Jr., was born February 3, 1949 to Mr. and Mrs. William K. Hart in Johnson City, Washington County, Tennessee. His formal education was begun in Stillwater, Oklahoma, where his father was stationed having been recalled to active duty with the United States Air Force. He attended various schools as his father was transferred to the following locations: Tokyo, Japan; New Albany, Indiana; Louisville, Kentucky; Montgomery, Alabama; and in May, 1967, he graduated from Science Hill High School in Johnson City, Tennessee. He entered East Tennessee State University in 1967 as a Pre-Agricultural student, transferred two years later to The University of Tennessee, Knoxville, and completed the requirements for a Bachelor of Science degree in Agricultural Economics and Rural Sociology in 1971.

He was employed as Assistant Extension Agent in Johnson County, Tennessee beginning July, 1971, and was selected as Extension Leader for Carter County in November, 1975.

He is married to the former Patricia Ann Cornett of Elizabethton, Tennessee and they have two daughters, Lora Lee (age 3 years) and Jennifer Kelley (age 1 year).

His religious affiliation is directed toward St. John's Episcopal Church in Johnson City, Tennessee.

He is a member of Epsilon Sigma Phi, an Honorary Extension Fraternity; Tennessee Association of Agricultural Extension Agents,

a Professional Organization; The University of Tennessee Century Club; Tennessee Christmas Tree Growers' Association; National Christmas Tree Growers' Association; Upper East Tennessee Christmas Tree and Shrubbery Growers' Association; and Tennessee Farm Bureau.

Through his participation in the Tennessee Association of Agricultural Extension Agents, he has received the Outstanding Young Agent Award and Achievement Award for the State of Tennessee.