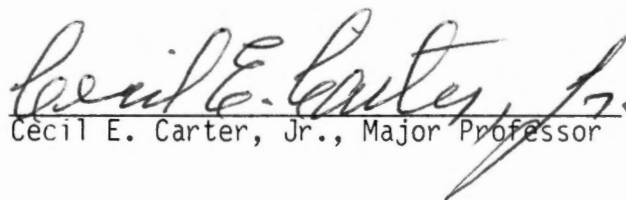
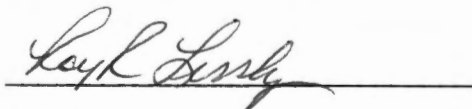


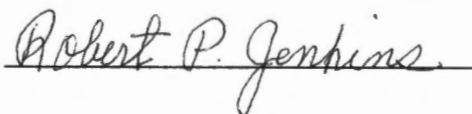
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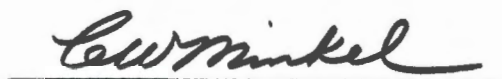

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PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE COMMERCIAL
TOMATO PRODUCERS AS RELATED TO EXTENSION CONTACTS
AND TYPES OF MARKET OUTLETS USED
IN 1984

A Thesis
Presented for the
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Sharon E. Rice
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ABSTRACT

The major purpose of this study was to determine the relationships between producer and farm characteristics and the type of market outlet chosen by farmers and the number and type of contacts growers had with Extension. Data were obtained through personal interviews with 117 Tennessee tomato producers located in 10 counties. An interview schedule was developed by Extension specialists and used in 1984 to collect data from tomato producers. Using updated mailing list, Extension agents were instructed to use the "nth" numbering technique to identify commercial tomato producers who were raising at least one-fourth acre. The instrument was designed to obtain data regarding producer, farm, chemical, market characteristics, contacts made with Extension agents, and production practices used by the commercial tomato producers.

The coded data were processed for computer analysis. The University of Tennessee Computing Center facilities were used to analyze the data. The chi square statistical test was used to determine the strength of relationships between dependent and independent variables. The .05 level of probability was accepted as significant.

The major findings included:

1. A slight majority of tomato producers had vegetables as their major source of farm income, about 70 percent were not employed full-time off the farm, and 77.7 percent were not employed part-time off the farm. Just over 64 percent were under the age of 50. Producers had

small acreage. Just over 68 percent who farmed 100 acres or under planted 17,000 plants or under. A slight majority of producers obtained yields over 4.0 tons, grew a shipping variety, and raised their own tomato transplant. Just over 68 percent used container grown plants. The mean yield was 10 tons per acre and the median was 4 tons.

2. The majority of producers used 60 pounds or less of nitrogen and over 95 percent used 240 pounds or less of potash and phosphate at planting. Over 60 percent of producers applied fertilizer and lime by soil test. Nitrogen applied at sidedressing was evenly divided with 49.6 percent using 30 pounds or less and 50.4 percent using 31 pounds or more. Just over 68.0 percent applied a nitrogen sidedressing to plants after first fruit set. A strong majority of just under 95 percent applied their first foliar fungicide before disease appeared. Almost 92 percent did not soil test for nematodes and just over 65 percent did use a disease resistant variety.

3. Almost 86 percent did receive one or more Extension contacts of some type during the year. Only 14.5 percent of the commercial tomato producers in Tennessee did have some type of personal contact with Extension agents through meetings, office visits, telephone calls or farm visits during 1984. On the average each producer had 11.4 contacts with Extension that year. Just over 58 percent had attended an Extension meeting of some type in the past 12 months. Just under 54 percent attended one or more tomato Extension meetings during the past 12 months and just over 52 percent of producers received a farm

visit by an Extension agent. Almost 74 percent of producers telephoned the Extension office and almost 77 percent of producers received a farm visit in the past 12 months from an Extension agent.

Producers who grew more tomato plants (17,000 and over) were more likely to attend a tomato meeting than producers who grew fewer numbers of tomato plants. However, producers who grew more tomato plants were no more likely to receive a farm visit, visit the office, or telephone the office, than producers who grew fewer tomato plants. Tennessee tomato producers who grew a homegrown variety were more likely to receive a farm visit and telephone calls by an Extension agent than tomato producers who grew a shipping variety. However, tomato producers who grew a shipping variety were no more or less likely to visit the Extension office or attend a tomato meeting than tomato producers who grew a homegrown variety.

4. Producers who had vegetables as their major source of farm income were more likely to raise a shipping variety than a producer who had some other enterprise as their major source of farm income. Conversely, tomato producers who had some other enterprise as their major source of farm income were more likely to plant a homegrown variety than a shipping variety.

Producers who were employed part-time off the farm and were of the age of 50 or under, were no more likely to choose a shipping variety than producers who were employed part-time off the farm or was over 50 years old.

Producers who grew a shipping variety were more likely to use a shipping market outlet than producers who grew a homegrown variety. Conversely, producers who grew a homegrown variety were more likely to use a local market outlet than producers who grew a shipping variety.

5. Producers who harvested vine ripe tomatoes for their primary market were more likely to choose a shipping market outlet than producers who harvested vine ripe tomatoes for a secondary market. Conversely, producers who harvested vine ripe tomatoes for a secondary market were more likely to use a local market outlet than producers who harvested vine ripe tomatoes for a primary market. Producers who farmed 100 acres or under, planted 17,000 or less plants, harvested mature green tomatoes for a secondary market, harvested 10 percent or under of their tomatoes at the vine ripe stage, and yielded 4.0 tons per acre or under were no more or less likely than producers who farmed over 100 acres, planted more plants, harvested mature green tomatoes for their primary market, harvested over 10 percent of their tomatoes at the ripe stage, or those who yielded over 4.0 tons per acre to choose a shipping market outlet.

6. Producers who had vegetables as their major source of farm income were more likely to harvest vine ripe tomatoes for a secondary market than producers who had some other enterprise as their major source of farm income.

Producers who were not employed part-time off the farm and those who were age 50 or under were no more or less likely to harvest vine

ripe tomatoes for a secondary market than producers who were employed part-time off the farm or those who were over 50 years old.

Producers who planted more plants (17,000 and over) were more likely to harvest their vine ripe tomatoes for a secondary market than producers who planted less tomato plants. Conversely, producers who planted fewer tomato plants were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew more tomato plants.

Producers who grew a shipping variety were more likely to harvest their vine ripe tomatoes for a secondary market than producers who grew a homegrown variety. Conversely, producers who grew a homegrown variety were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew a shipping variety.

Producers who used a local market outlet were more likely to harvest their vine ripe tomatoes for a secondary market than producers who used a shipping market outlet. Conversely, producers who used a shipping market outlet were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew for a local market.

Producers who farmed under 100 acres and those who grew for an early market were no more likely to harvest their tomatoes at the vine ripe stage than producers who had over 100 acres of land or those who grew tomatoes for a late market.

7. Producers who grew a homegrown variety were more likely to harvest mature green tomatoes for a secondary market than producers

who grew a shipping variety of tomatoes. Conversely, producers who grew a shipping variety were more likely to harvest mature green tomatoes for a primary market than producers who grew a homegrown variety.

Producers who farmed 100 acres or under, those who grew 17,000 or under tomato plants, those who raised tomatoes for an early market, those who used a shipping market outlet, and those who yielded 4.0 tons per acre or under, were no more or less likely to harvest mature green tomatoes for a secondary market than producers who farmed over 100 acres, grew over 17,000 plants, raised tomatoes for a late market, used a local market outlet, or those who yielded over 4.0 tons per acre.

Implications and recommendations also were included in the study.

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CHAPTER I

THE PROBLEM AND ITS SETTING

I. INTRODUCTION

Fruits and vegetables contribute a substantial amount of income to Tennessee producers and the prospects for the future appear good. Reasons are:

1. Closeness to consumers (i.e., about two-thirds of all U.S. consumers are located within one day's haul of Tennessee);
2. Ample water supplies, in contrast to some major production areas;
3. More adapted varieties, with university researchers regularly finding better suited cultivars;
4. Increasing awareness and support for fruit and vegetable production by farm groups and government; and
5. Development of marketing facilities and expertise, both for instate and national sales (10).*

According to Dr. Alvin Rutledge, Tennessee's Agricultural Extension Service's vegetable specialist, Tennessee vegetable producers are only selling 75 million dollars worth of fruits and vegetables in the state. However, fruits and vegetables actually account for one billion dollars of sales in the state. With Tennessee's climate

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

and length of growing season, local producers could potentially capture a third of our own states' market which would be 300 to 400 million dollars.

The key question, in this regard, is marketing. Marketing is extremely important for any farm product. It is often the single most important element in a farmer's entire business (15). In 1983, Tennessee's fruit and vegetable sales were approximately 55 million dollars. North Carolina's fruit and vegetable sales were slightly over 198 million dollars. Growing conditions and locations in the Appalachian Mountains are similar between North Carolina and Tennessee. However, acreage in North Carolina farms totaled 11,000,000. Tennessee's total acreage in farms was 13,400,000 acres. Tennessee had 97,000 farms in 1982. North Carolina had 79,000 farms. It seems logical that North Carolina's state supported fruit and vegetable marketing infrastructure could very well be the reason North Carolina, with 23 percent fewer farms and 22 percent fewer acres in farms, has nearly four times the fruit and vegetable income obtained by Tennessee growers (7).

Fresh fruit and vegetable marketing by growers in Tennessee can be described as a two-category system comprised of direct market outlets and wholesale market outlets. The various direct market outlets are identified by the growers' use of a selling technique to bypass middlemen with the intent of personally selling to the final consumer. Wholesale market outlet encompass the middlemen between growers and buyers. These middlemen include brokers, jobbers,

merchants, wholesalers, and retailers that represent the "commercial" portion of the Tennessee fruit and vegetable marketing system.

Tennessee's fruit and vegetable industry is characterized by having a majority of small volume producers. Direct market outlets are primarily used by the smaller volume growers, due to the time constraints on growers personally selling the products and the relatively small volumes that can be sold. Therefore, the pressure on current and direct-market opportunities are rather strong. Some growers have been able to enter the so-called "commercial" market system successfully by supplying restaurants and retailers without the assistance of other middlemen; however, this represents a modest share of the produce grown in Tennessee.

Most of the produce handled by Tennessee fruit and vegetable wholesalers is obtained from major production regions outside of Tennessee. Efforts by Tennessee growers to sell to Tennessee wholesalers and/or retailers have been severely limited due to the inability of growers to grade and package the produce in volumes required by commercial market and the absence of financial motivation for wholesaler-retailers to handle locally grown produce (1).

In order to provide farmers with an alternative enterprise and market their product, regional food distribution centers have been proposed across the state. A food distribution center is a comprehensive concept. Food wholesalers of all types are encouraged to conduct business at the distribution center because of the drawing power for buyers representing retail stores and restaurants (3).

These regional food distribution centers would provide several things such as facilities for retail sales by farmers directly to consumers; year round vendors who would purchase from farmers for resale; wholesalers who could purchase from local farmers to supply restaurants and independent grocers. The presence of wholesale distributors would help pay for the operation of the market by paying rent, as well as giving farmers access to the wholesale market (8).

It has been suggested that the facilities should be phased in over time beginning with a trucker's shed, retail building, and wholesale facilities followed by an administration building, nursery center, and additional retail space (8).

Tomatoes constitute a large part of the vegetable industry in the state. Tennessee ranks fourth in the nation in fresh market tomato production behind Florida, California, and South Carolina. Approximately 4,800 acres were planted in Tennessee in 1987, worth 19 million dollars (6). Tomatoes accounted for just over one third of all vegetable sales in Tennessee.

Although Tennessee tomato producers grow a considerable amount of product, some small growers still face the problem of raising enough volume to enter a shipping or wholesale market outlet. Other producers who have established themselves as "homegrown" tomato producers, selling to local markets, are also limited in the volume that they can grow and sell.

This study was performed to assist Extension agents in developing a produce industry in their locality through a better understanding

of the personal and farm characteristics of Tennessee tomato producers and the markets that they chose.

II. NEED FOR THE STUDY

It is appropriate for Extension to help assess and develop alternative agriculture markets so Americans can maintain economic viability of traditional agricultural resource bases.

Today's Cooperative Extension Service seeks to deliver useful and practical information by focusing its efforts on National Priority Initiatives so it can use its resources on issues critical to the economy, social and environmental progress of Americans.

Among the list of national initiatives, alternative agricultural opportunities deals with a critical need to cultivate agricultural opportunities because "the profitability and viability of American agriculture is dependent on competitiveness in world markets, stability of rural communities and expansion of our human resource bases. These are currently at risk. Existing alternative agriculture opportunities could help to improve conditions, but many managers lack the abilities to assess and implement these alternatives effectively" (12:1).

On a county level, Extension agents need to be able to evaluate the potential success of using particular types of marketing outlets for alternative agricultural enterprises in their own locality. It was believed that examining personal and farm characteristics of tomato producers could help Extension agents assist farmers in choosing

the type of marketing outlet for their alternative enterprise that might be used successfully in their county.

III. PURPOSE OF THE STUDY

The purpose of the study was to assist Extension agents in the establishing or developing a tomato market outlet in their county by describing 1984 Tennessee tomato producers, their farming characteristics, their marketing characteristics, and their contact with Extension.

Objectives

The specific objectives were:

1. To describe Tennessee tomato producers as to their producer and farm operation characteristics, chemical usage, market outlets, and their contact with Extension in 1984.
2. To determine the relationships between the number and types of contacts Tennessee tomato producers had with Extension and the number of plants planted and whether producers were growing shipping or homegrown varieties.
3. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the type of market outlet chosen.
4. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the type of variety grown.

5. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producer and the percent of tomatoes harvested at the vine ripe stage.

6. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the percent of tomatoes harvested at the mature green stage.

IV. LIMITATIONS OF THE STUDY

This study was limited to the analysis of the data available from the 1984 Tennessee Tomato Survey. The data were obtained by Extension agents through personal interviews with commercial tomato producers who grew one-half acre or more of tomatoes for the market. Producers who grew less than one half acre may impact this study by reducing the population in the number of growers raising vine ripe tomatoes. The number of personal interviews varied among counties based upon the total number of tomato producers in their county.

Although 16 or more counties could have responded to this survey, only 10 counties in Tennessee did conduct the 1984 Tennessee Tomato Survey. A total of 117 producers responded to the survey.

V. METHODS AND PROCEDURES

Population

The population of this study included commercial tomato producers in Tennessee counties who grew one-half of an acre or more of tomato plants in 1984.

Producers in the following counties were surveyed: Gibson, Lauderdale, Shelby, Hamilton, Rhea, Grundy, Caliborne, Cocke, Grainger, and Jefferson and any other county with one or more producers growing at least one-half acre of tomatoes.

Selection of the Sample

Extension agents were instructed to use their updated county lists of commercial tomato producers to obtain the sample population. The "nth" number technique was to be used to identify individual producers to be surveyed. Alternative producers also were selected to replace those who for some good reason could not be interviewed. A total of 117 producers were surveyed.

Survey Instrument

The three page survey contained 53 questions relating to producer and farm characteristics, chemical usage, harvesting and marketing characteristics, and Extension contacts.

Conducting the Survey

The survey was conducted by Extension agents in 10 Tennessee counties through personal interviews. The Extension agents scheduled interviews with producers and completed the survey on the farm or at the county Extension office.

Method of Analysis

Following the completion of the survey by Tennessee Extension agents, the data were coded and processed for computer analysis.

Computation were made by the University of Tennessee Computing Center. The chi square test was used to determine the strength of the relationships between the dependent and the independent variables. The .05 probability level was selected as the point at which a relationship was considered significant.

VI. DEFINITIONS OF TERMS

The following terms are defined to give the reader and the researcher a common understanding of selected terms used in the study:

1. Shipping Varieties. A round meaty type of tomato that has enough firmness and shelf life for long road shipments to distant wholesale and retail markets. The tomato should be uniform in size, shape, and color and have freedom from external blemishes or abnormalities. The shipping varieties included in this survey were Floradade, Mountain Pride, and Sunny. These varieties are harvested at the mature green stage, but they can also be harvested for the vine ripe market.

2. Homegrown Variety. A flavorful, large, round, juicy type tomato that is an early producer and is fairly uniform in size, shape, and color and has freedom from external blemishes or abnormalities (9). The homegrown varieties included in this survey were Better Boy, Supersonic, Jetstar, and Royal Flush. These varieties are usually harvested when they obtain 5 to 50 percent of their red color.

3. Shipping Market. A channel of distribution that carries the commodity to be sold over distant areas between the growing area and the point of consumption that are not regularly, conveniently reached by the tomato producer. These outlets usually require preparation and handling of the product and require an intermediary who handles or assembles the product. The market outlet in this survey that met these criteria were wholesalers/retailers, packing sheds, and truckers in field.

4. Local Markets. A channel of distribution that usually carries the product over short distances and more directly with consumers. The producer can regularly, conveniently, and directly sell his product to the consumer. The market outlet in this survey that met these criteria were farmers markets, grocery stores, pick-your-own, and cooperatives.

5. Mature Green Tomato. The fruit is fully green and shows a brownish ring at the stem scar after removal of the calyx; the light green color at the blossom end has changed to a yellow green cast and the seeds are surrounded with a jelly like cells filling the seed cavity.

6. Vine Ripe Tomatoes. The fruit is fully grown and shows coloration from a slight pink color to nearly 50 percent pink color. For the purpose of this study "breakers" and "pinks" were combined into the category of vine ripens.

7. Ripe Tomato. The fruit is fully grown and shows over 50 percent pink color. At this point in its maturity it can only be

sold to consumers and not to wholesalers because it has almost exhausted its shelf life.

8. Early Market Time. In Tennessee the majority of the tomatoes are harvested after July 4th, therefore anything preceding this date would be considered an early market time.

9. Late Market Time. In Tennessee the majority of the tomato producers have finished harvesting their tomatoes before the middle of August, so a late market would be any following this time period.

10. Primary Market. Producers who harvested over 50 percent of their tomatoes at a certain color stage are said to be looking primarily to sell their product at that color stage.

11. Secondary Market. Producers who harvested less than 50 percent of their tomatoes at a certain color stage are not looking to sell their tomatoes at that point of maturity, but must develop an alternative market known as a secondary market, to sell a certain percentage of their crop.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to review findings from other studies involving related research. There have been very few studies that have been done to characterize tomato producers, their farming operation, their contact with Extension, and their choice of market outlets.

Review of related studies in this chapter will be discussed under the headings: (1) Producer and Farm Characteristics of Tennessee Vegetable Producers, (2) Relationships Between Farm Characteristics of Tomato Producers and Types of Extension Contacts, and (3) Relationships Between Personal and Farm Characteristics of Producers and Their Choice of Market Outlets.

I. PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE VEGETABLE PRODUCERS

Parker (13) in a 1983 study involving 30 randomly selected commercial tomato producers in Lauderdale County found the following producer and farm characteristics: Vegetables were the major source of farm income among producers surveyed. Producers planted an average of 6.9 acres and nearly two-thirds chose to grow a tomato variety other than Floridade, Supersonic, or Jetstar. Ninety percent of producers grew homegrown plants and

in individual containers. The majority of producers did not fertilize (66 percent) or lime (40 percent) by soil test. Producers on the average applied at planting 105 pounds of phosphate, 115 pounds of potash, and 114 pounds of nitrogen. The majority of producers applied sidedressing fertilizer to the plants when first fruits were about an inch in diameter. Chemical weed control was used by 13 percent of the producers. Fungicides were applied on the average of seven times. Insecticides were applied an average of 6.9 times. A majority of tomatoes were harvested for an early market as vine ripers by using hired labor. Producers mainly sold to wholesale/retail market outlets. The average harvested yield was 5.2 tons per acre.

Booker (5) in a 1980 study involving 108 fruit and vegetable producers in a 13 county area surrounding Chattanooga found that fruit and vegetable producers using the farmers market were older producers who did not receive the majority of their income from vegetables. Almost a third were employed either part-time or full-time off the farm. Most of their labor was provided by family members.

In April of 1990 a study done by Booker, Eastwood, and Brenchley (3) involving 173 randomly selected fruit and vegetable producers in nine counties in Southeast Tennessee showed that only 25 percent received all of their income from farming. Income from vegetables accounted for over one-half of growers total farm income. The majority of growers' ages ranged from 30 to 60 years old. Twenty five percent of producers were in their thirties. Most growers also

hired labor for harvest. Among the producers who raised tomatoes, they planted 14.3 acres with the range of 0.25 to 65 acres and harvested slightly over 7 tons per acre.

Traunfeld's study of the Bradley County farmers market (14) found that 20 percent of producers were full-time farmers, and the majority of producers did not consider vegetables as their major source of farm income. The majority of producers grew under 3 acres in 1978.

Booker's (2) study in 1984 among 101 fruit and vegetable growers in 105 counties in Tennessee, Alabama, Kentucky, Missouri, and Mississippi found that the average acreage in fruit and vegetable production was 43.8 acres. Thirty three percent of producers grew less than 10 acres compared to 13.4 percent who grew 100 acres or more of fruits and vegetables.

Dr. Robert Jenkins in an unpublished letter to Marketing Division of the Tennessee Department of Agriculture (11:1) said: "there are three types of producers with interest in horticultural enterprises. They are:

1. Established horticultural producers in most parts of Tennessee. A few are large producers earning their family living from produce and often have good market contacts, but most are part-time producers who supplement their off farm income and use available family labor to produce horticultural crops.

2. Beginning producers located primarily in east and middle Tennessee, usually with small acreages, often working off the farm,

sometimes depending on family labor and either pessimistic about the future of tobacco program or in need of more income than the tobacco program can provide. These producers depend on fresh market sales.

3. Producers located primarily in the western part of Tennessee who are full-time farmers, highly mechanized, farm large acreage of grain or livestock, and who earn most of their income from farming."

II. RELATIONSHIPS BETWEEN CHARACTERISTICS OF FARMING OPERATION AND NUMBER OF CONTACTS WITH EXTENSION

Parker (13) in 1980 found that total Extension meetings, the number of office visits, the number of telephone calls to the office, and farm visits received were not significantly related to major source of farm income.

Parker also found that total Extension meetings, office visits, telephone calls to office, and farm visits received were not significantly related to variety of tomato grown. It was found, however, that producers who grew a shipping variety called Floridade attended more Extension tomato meetings than producers who grew other varieties.

Parker also reported that the majority of tomato producers did contact Extension in some way in the past year.

III. RELATIONSHIPS BETWEEN PRODUCER AND FARM CHARACTERISTICS AND MARKET OUTLET CHOSEN

Booker's study of market access consideration of small quantity producers of fruits and vegetables indicated that markets are not readily available to farmers because of certain impediments to entry, especially entry to wholesale outlets. On the supply side, fruits and vegetables are often produced by small quantity producers who individually lack volume of produce necessary to meet the needs of the wholesale buyer. Producers in general were older and generally considered to be part-time farmers who were attempting to supplement their income. These characteristics plus the preference for direct marketing, especially through farmers markets, resulted in infrequent marketing to wholesalers and retailers (5).

Traunfeld's (14) study also agrees with Booker's study regarding the preference of small scale producers in marketing their produce to direct market outlets. Many of the farmers who had sold to wholesalers and retailers were dissatisfied with their relationship to them.

Booker's (2) 1984 study found 50 percent of growers reported direct type sales from farmers markets. Only 20 percent of producers indicated that they used wholesale type sales and most of these sales were to processors. Growers also indicated that their market outlet was their major reason that they did not produce more fruits and vegetables.

CHAPTER III

FINDINGS REGARDING PRODUCER, FARM, AND CHEMICAL USE CHARACTERISTICS
OF TENNESSEE TOMATO PRODUCERS AND RELATIONSHIPS BETWEEN FARM
CHARACTERISTICS AND THE NUMBER AND TYPE OF CONTACTS
WITH EXTENSION IN 1984

The purpose of this chapter was to characterize 1984 Tennessee tomato producers according to selected producer characteristics, farm characteristics, and chemical usage characteristics. This chapter also will describe the number and type of contacts individuals had with Extension over a 12 month period of time.

The data presented in this chapter are summarized in two tables. The findings presented in this chapter are organized and discussed in two sections. Each section consists of subheadings presenting findings regarding related variables of that subsection. The chi square test was used to determine the strength of the relationship between the variables, and the .05 probability level was accepted as significant.

Section I presents findings regarding producer, farm, and chemical usage of 1984 Tennessee tomato producers, and the number and types of contacts they had with Extension over a 12 month period.

Section II presents findings concerning the relationships between types of contacts Tennessee tomato producers had during the past 12 months with Extension agents and the number of plants planted

and the predominant variety of tomatoes grown. The dependant variable is Extension contacts and the independent variables are producer and farm characteristics.

I. PRODUCER, FARM, AND CHEMICAL USAGE CHARACTERISTICS OF TENNESSEE
TOMATO PRODUCERS AND THE NUMBER AND TYPE OF CONTACTS
WITH EXTENSION IN 1984

This section presents findings regarding the characteristics of tomato producers in Tennessee, their farm, and their chemical usage characteristics, and the number of contacts with Extension. Findings were organized into four subsections: (1) producer characteristics, (2) farm characteristics, (3) chemical usage, and (4) Extension contact in a 12 month period. Findings regarding these characteristics are summarized in Table 1. The number and valid percent of tomato producers are given for each variable. The mean, mode, and median are also given for selected quantitative variables.

Producer Characteristics

Findings concerning selected producer characteristics are presented in Table 1 including: (1) major source of farm income, (2) employed full-time off farm, (3) employed part-time off farm, and (4) the age of the producer. These characteristics were used to describe 1984 Tennessee tomato producers.

Major source of farm income. Data in Table 1 reveal that of the 117 total respondents, 64 (54.7 percent) producers had vegetables

Table 1. Producer, Farm, and Chemical Usage Characteristics of Tennessee Tomato Producers and the Number and Type of Contacts With Extension

Characteristics and Extension Contacts	Number of Producers n=117	Valid Percent of Producers
PRODUCER CHARACTERISTICS		
Major Source of Farm Income		
Vegetables	64	54.7
Other	53	45.3
TOTAL	117	100.0
Employed Full-Time off Farm		
No	81	69.8
Yes	35	30.2
No Response	1	Missing
TOTAL	117	100.0
Employed Part-Time off Farm		
No	87	77.7
Yes	25	22.3
No Response	5	Missing
TOTAL	117	100.0
Age of Producers		
50-Under	75	64.1
Over 50	42	35.9
TOTAL	117	100.0
FARM CHARACTERISTICS		
Acres Farmed		
100 Acres-Under	80	68.4
Over 100 Acres	37	31.6
TOTAL	117	100.0
Number of Plants Planted		
17,000-Under	77	65.8
Over 17,000	40	34.2
TOTAL	117	100.0
Mean = 20,634; Median = 10,000; Mode = 8,000		
Yield Per Acre in Tons		
4.0-Under	55	47.0
Over 4.0	62	53.0
TOTAL	117	100.0
Mean = 10.0 tons; Median = 4.0 tons; Mode = 0		
Predominant Variety Grown		
Shipping Varieties	64	53.8
Homegrown Varieties	30	40.2
Do Not Know	23	6.0
TOTAL	117	100.0
Type of Plant		
Homegrown	63	53.8
Purchased Certified	47	40.2
Purchased Non-Certified	7	6.0
TOTAL	117	100.0
Plant Container Used		
Container Grown Plant	80	68.4
Bare Root Plant	37	31.6
TOTAL	117	100.0
Market Time		
Early	84	71.8
Late	33	28.2
TOTAL	117	100.0

Table 1 (Continued)

Characteristics and Extension Contacts	Number of Producers n=117	Valid Percent of Producers
Percent of Hired Labor for Harvest		
50-Under	69	59.0
Over 50	48	41.0
TOTAL	117	100.0
Mean = 36.8; Median = 10.0; Mode = 0.00		
Percent of Crop Harvested at Mature Green Stage		
Secondary (50 Percent-Under)	75	64.1
Primary (Over 50 Percent)	42	35.9
TOTAL	117	100.0
Mean = 35.8; Median = 20.0; Mode = 0.00		
Percent of Crop Harvested at Vine Ripe Stage		
Secondary (50 Percent-Under)	62	53.9
Primary (Over 50 Percent)	53	46.1
No Response	2	Missing
TOTAL	117	100.0
Mean = 22.5; Median = 8.0; Mode = 1.0		
Percent of Crop Harvested at Ripe Stage		
10-Under	85	72.6
Over 10	32	27.4
TOTAL	117	100.0
Mean = 14.5; Median = 1.0; Mode = 0.00		
Type of Market Outlet		
Shipping Market	76	65.0
Local Market	41	35.0
TOTAL	117	100.0
CHEMICAL USAGE		
Pounds of Nitrogen Used at Planting		
60-Under	70	59.8
Over 60	47	40.2
TOTAL	117	100.0
Mean = 77.0; Median = 60.0; Mode = 60.0		
Pounds of Potash Used at Planting		
240-Under	112	95.7
Over 240	5	4.3
TOTAL	117	100.0
Mean = 116.5; Median = 100.0; Mode = 60.0		
Pounds of Phosphate Used at Planting		
240-Under	112	95.7
Over 240	5	4.3
TOTAL	117	100.0
Mean = 115.9; Median = 101.5; Mode = 60.0		
Fertilizer Applied by Soil Test		
No	73	62.9
Yes	43	37.1
No Response	1	Missing
TOTAL	117	100.0
Lime Applied by Soil Test		
No	74	63.8
Yes	42	36.2
No Response	1	Missing
TOTAL	117	100.0

Table 1 (Continued)

Characteristics and Extension Contacts	Number of Producers n=117	Valid Percent of Producers
Pounds of Nitrogen Applied at Sidedressing		
30-Under	58	49.6
Over 30	59	50.4
TOTAL	117	100.0
Mean = 45.0; Median = 30.0; Mode = 0.00		
Plant Size When Sidedressed		
Before Fruit Set	37	31.6
After Fruit Set	80	68.4
TOTAL	117	100.0
Foliar Fungicide Applied First		
Before Disease Appeared	111	94.9
After Disease Appeared	6	5.1
TOTAL	117	100.0
Soil Tested for Nematodes		
No	96	91.4
Yes	9	8.6
No Response	12	Missing
TOTAL	117	100.0
Use of Disease Resistant Varieties		
No	40	34.8
Yes	75	65.2
No Response	2	Missing
TOTAL	117	100.0
EXTENSION CONTACTS IN 12 MONTH PERIOD		
Number Extension Meetings of all Types Attended in 12 Months		
Not Any	49	41.9
One or More	68	58.1
TOTAL	117	100.0
Mean = 1.35; Median = 1.00; Mode = 0.00		
Number Tomato Extension Meetings Attended in 12 Months		
Not Any	54	46.2
One or More	63	53.8
TOTAL	117	100.0
Mean = 0.71; Median = 1.00; Mode = 0.00		
Number Visits to Extension Office in 12 Months		
Not Any	56	47.9
One or More	61	52.1
TOTAL	117	100.0
Mean = 1.53; Median = 1.00; Mode = 0.00		
Number Telephone Calls to Extension Office in 12 Months		
Not Any	31	26.5
One or More	86	73.5
TOTAL	117	100.0
Mean = 3.70; Median = 2.00; Mode = 0.00		
Number of Farm Visits Received in 12 Months		
Not Any	27	23.1
One or More	90	76.9
TOTAL	117	100.0
Mean = 4.15; Median = 2.00; Mode = 0.00		
Total Number of Extension Contacts in 12 Months		
Not Any	17	14.5
One or More	100	85.5
TOTAL	117	100.0
Mean = 11.4; Median = 9.00; Mode = 0.00		

as their major source of farm income while 53 tomato producers (45.3 percent) had some other enterprise as their major source of farm income.

Employed full-time off farm. Of the 116 total respondents, 81 (69.8 percent) producers were not employed full-time off the farm while 35 tomato producers (30.2 percent) were employed full-time off the farm.

Employed part-time off farm. Of the 112 respondents, 87 (77.7 percent) producers were not employed part-time off the farm while 25 (22.3 percent) tomato producers were employed part-time off the farm.

Age of producer. Of the 117 total respondents, 75 (64.1 percent) producers were of the age of 50 and under while 42 tomato producers (35.9 percent) were over 50 years of age.

Farm Characteristics

In this subsection (Table 1), findings are presented concerning farm characteristics. These characteristics include: (1) acres farmed, (2) number of plants planted, (3) yield per acre, (4) predominant variety grown, (5) types of plant, (6) plant container used, (7) percent of hired labor used for harvest, (8) primary market time, (9) percent harvested at mature green stage, (10) percent harvested at vine ripe stage, (11) percent harvested at ripe stage, and (12) type of market outlet. These characteristics were used to

help describe 1984 Tennessee tomato producers. The mean, mode, and median were also calculated when quantitative data were available.

Acres farmed. Data presented indicated that of the 117 total respondents, 80 (68.4 percent) producers farmed 100 acres or under while 37 tomato producers (31.6 percent) farmed over 100 acres.

Number of plants planted. The data indicated that 77 of the 117 producers (65.8 percent) planted 17,000 plants or under while 40 tomato producers (34.2 percent) planted over 17,000 plants. The mean number of tomato plants planted was 20,634, the median was 10,000, and the mode was 8,000.

Yield per acre. The data indicated that among 117 total respondents, 55 (47.0 percent) producers had yields of 4 tons per acre or under while 62 tomato producers (53.0 percent) had yields of over 4.0 tons per acre. The mean yield of 1984 Tennessee tomato producers was 10.0 tons per acre. The median yield was 4.0 tons per acre, and the most frequently cited number or mode was zero yield per acre.

Predominant variety grown. The data indicated that among 117 producers 63 (53.8 percent) grew a shipping variety of tomatoes while 30 tomato producers (40.2 percent) grew a homegrown variety and 23 (6.0 percent) did not know what variety they grew.

Type of plant. The data indicated that 63 of the 117 producers (53.8 percent) used homegrown plants while 47 tomato producers

(40.2 percent) used purchased certified plants, and 7 (6.0 percent) used purchased non-certified plants.

Plant container used. The data indicated that among the 117 total respondents, 80 (68.4 percent) producers used container grown plants while 37 (31.6 percent) tomato producers used bare root plants.

Percent of hired labor for harvest. The data indicated that of the 94 producers responding 69 (59.0 percent) hired 50 or under percent of their labor for harvest while 48 (41.0 percent) hired over 50 percent of their labor for harvest. The mean percent of hired labor was 36.8 percent, the median was 10.0 percent, and the mode was zero.

Market time. Data indicated that among the 117 total respondents, 84 (71.8 percent) producers did market their tomatoes early while 33 (28.2 percent) tomato producers marketed their tomatoes late.

Percent of crop harvested at mature green stage. The data indicated that of the 117 total respondents, 75 (64.1 percent) producers harvested mature green tomatoes for their primary market while 42 (35.9 percent) tomato producers harvested mature green tomatoes for their secondary market. The mean percent of tomatoes harvested at the mature green stage was 35.8 percent, the median was 20 percent, and the mode was zero percent.

Percent of crop harvested at vine ripe stage. Of the 115 total respondents, 62 (53.9 percent) producers harvested vine ripe tomatoes for their secondary market while 53 (46.1 percent) tomato producers harvested vine ripe tomatoes for their primary market. The mean percent of tomatoes harvested at the vine ripe stage was 22.6 percent, the median was 8.0 percent, and the mode was zero percent.

Percent of crop harvested at ripe stage. Of the 117 producers, 85 (72.6 percent) harvested 10 percent or under of their tomatoes at the ripe stage while 32 (27.3 percent) tomato producers harvested over 10 percent of their tomatoes at the ripe stage. The mean percent of tomatoes harvested at the ripe stage was 14.5 percent, the median was 1.0 percent, and the mode was zero percent.

Type of market outlet. The data indicated that of the 117 total respondents, 76 (65.0 percent) producers chose a shipping market outlet to sell their tomatoes while 41 (35.0 percent) tomato producers chose a local market outlet to sell their tomatoes.

Chemical Usage

In this subsection, findings are presented concerning chemical usage. The variables relating to chemical usage were: (1) pounds of nitrogen used at planting, (2) pounds of potash used at planting, (3) pounds of phosphate used at planting, (4) fertilizer applied by soil test, (5) lime applied by soil test, (6) pounds of nitrogen applied at sidedressing, (7) plant size when sidedressed, (8) when foliar fungicide was first applied, (9) soil tested for nematodes, and (10)

use of disease resistant varieties. The mean, median, and mode were calculated when quantitative data were available.

Pounds of nitrogen used at planting. Of the 117 total respondents, 70 (59.8 percent) used 60 pounds or under per acre of nitrogen at planting while 47 tomato producers (40.2 percent) used over 60 pounds per acre of nitrogen at planting. Producers on the average used 77 pounds of nitrogen at planting time. The median pounds was 60 and the mode also was 60.

Pounds of potash used at planting. The data indicated that among the 117 total respondents, 112 (95.7 percent) applied 240 pounds of potash or under per acre while 5 (4.3 percent) tomato producers used over 240 pounds of potash per acre at planting. The mean pounds of potash used at planting was 116.5, median was 100, and the mode was 60 pounds.

Pounds of phosphate used at planting. Among the 117 total respondents, 112 (95.7 percent) applied 240 pounds of phosphate or under per acre at planting while 5 (4.3 percent) tomato producers used above 240 pounds of phosphate per acre at planting. The mean pounds of phosphate used at planting was 115.9, the median was 101.5, and the mode was 60 pounds.

Fertilizer applied by soil test. Of the 116 total respondents, 73 (62.9 percent) did not apply fertilizer by soil test while 43 (37.1 percent) tomato producers indicated that fertilizer was applied by soil test.

Lime applied by soil test. The data indicated that of 116 total respondents, 74 (63.8 percent) did not apply lime by soil test while 42 tomato producers did apply lime by soil test.

Pounds of nitrogen applied at sidedressing. Of the 117 producers, 58 (49.6 percent) applied 30 or under pounds of nitrogen sidedressing per acre while 59 tomato producers (50.4 percent) applied over 30 pounds of nitrogen at sidedressing. The mean was 45 and the median was 30 pounds of nitrogen applied by sidedressing.

Plant size when sidedressed. Among the 117 total respondents, 37 (31.6 percent) producers sidedressed with fertilizer before the fruit set while 80 (68.4 percent) tomato producers sidedressed with fertilizer after the fruit set.

Foliar fungicide applied first. The data indicated that 111 of the 117 producers (94.9 percent) applied their first foliar fungicide before disease appeared while 6 (5.1 percent) tomato producers applied their first foliar fungicide after disease appeared.

Soil tested for nematodes. Among the 105 producers responding, 96 (91.4 percent) did not test their soil for nematodes while 9 (8.6 percent) tomato producers did test their soil for nematodes.

Use of disease resistant varieties. Of 115 total respondents, 40 (34.8 percent) did not use a disease resistant variety while 75 (65.2 percent) tomato producers did use a resistant variety.

Extension Contacts in 12 Month Period

In this subsection (Table 1), findings are presented concerning the number and percent of producers who had contact with Extension either by: (1) Extension meetings, (2) Extension tomato meetings, (3) visits to Extension office, (4) telephone calls to Extension office, (5) farm visits received from Extension, and (6) total number of Extension contacts were analyzed. These characteristics help to describe the 1984 Tennessee tomato producers. The mean, median, and mode were calculated when quantitative data were available.

Number Extension meetings of all types attended in 12 months.

The data indicated that of the 117 total respondents, 49 (41.9 percent) producers did not attend any type of Extension meetings while 68 (58.1 percent) tomato producers did attend one or more Extension meeting. The mean number of Extension meetings of all types attended was 1.35, the median was 1.0, and the mode was zero.

Number Extension tomato meetings attended in 12 months. The data indicated that 54 of the 117 producers (46.2 percent) did not attend an Extension tomato meeting during the past 12 months while 63 (53.8 percent) tomato producers did attend one or more Extension tomato meetings. The mean number of Extension tomato meetings attended was 0.7, the median was 1.0, and the mode was zero.

Number of visits to Extension office in 12 months. The data indicated that among the 117 total respondents, 56 (47.9 percent)

producers did not visit the Extension office while 61 (52.1 percent) tomato producers did visit the Extension office one or more times. The mean number of visits to the Extension office was 1.5, the median was 1.0, and the mode is zero.

Number telephone calls to Extension office in 12 months. The data indicated that among the 117 total respondents, 31 (26.5 percent) producers did not call the Extension office while 86 (73.5 percent) tomato producers did call the Extension office one or more times. The mean number of calls made to the Extension office was 3.7, the median was 2.0, and the mode was zero.

Number farm visits received in 12 months. Of the 117 total producers, 27 (23.1 percent) did not receive a farm visit while 90 (76.9 percent) tomato producers did receive one or more farm visits. The mean number of farm visits received during the past 12 months was 4.2, the median was 2.0, and the mode was zero.

Total number of Extension contacts in 12 months. The data indicated that of the 117 total respondents, 100 (85.5 percent) tomato producers did have one or more contacts with Extension during the past 12 months while 17 (14.5 percent) producers did not make any contact with Extension. The mean total number of Extension contacts was 11.4, the median was 9.0, and the mode was zero.

II. RELATIONSHIPS BETWEEN TYPES OF CONTACTS TENNESSEE TOMATO
PRODUCERS HAD DURING PAST 12 MONTHS WITH EXTENSION
AGENTS AND THE NUMBER OF PLANTS PLANTED AND
PREDOMINANT VARIETY GROWN

This section presents findings regarding the relationships between the number of plants planted, the predominant variety grown, and total number of contacts of all types Tennessee tomato producers had during the past 12 months with Extension agents.

This section was organized into two subsections: (1) number of plants planted, and (2) predominant variety grown. They were the independent variables. The type of Extension contacts was the dependant variable. Findings regarding these relationships are summarized in Table 2. The number and valid percent of tomato producers responding are given for each variable, as well as results of the chi square test and the level of probability.

The purpose of this section was to determine if size, which is indicated by the number of plants planted, and the type of tomato variety grown were related to the number of contacts of various types that producers had with Extension agents during the previous 12 months.

Number of Plants Planted

The number of plants planted was used as an indication of the size of operation. The number of plants planted was analyzed in two categories: (1) 17,000 plants or under, and (2) over 17,000 plants.

Table 2. Relationships Between Types of Contacts Tennessee Tomato Producers Had With Extension and Number of Plants Planted and Predominant Variety Grown

Extension Contacts	Number of Plants Planted			Predominant Variety Grown			
	17,000 Under		Over 17,000	Shipping		Homegrown	
	Number of Producers	Percent of Producers	Number of Producers	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers
FARM VISITS							
Not Any	21	27.3	6	22	34.4	1	3.3
One or More	56	72.7	34	42	65.6	29	96.7
TOTAL	77	100.0	40	64	100.0	30	100.0
Chi square test	$\chi^2 = 1.60; p = 0.21$			$\chi^2 = 9.04; p < 0.01$			
TOMATO MEETINGS ATTENDED							
Not Any	45	58.4	9	31	48.4	16	53.3
One or More	32	41.6	31	33	51.6	14	46.7
TOTAL	77	100.0	40	64	100.0	30	100.0
Chi square test	$\chi^2 = 12.27; p < 0.01$			$\chi^2 = 0.05; p = 0.83$			
VISIT TO OFFICE							
Not Any	42	54.3	14	36	56.3	11	36.7
One or More	35	45.5	26	28	43.8	19	63.3
TOTAL	77	100.0	40	64	100.0	30	100.0
Chi square test	$\chi^2 = 3.29; p = 0.07$			$\chi^2 = 2.40; p = 0.12$			
TELEPHONE TO OFFICE							
Not Any	22	28.6	9	25	39.1	1	3.3
One or More	55	71.4	31	39	60.9	29	97.7
TOTAL	77	100.0	40	64	100.0	30	100.0
Chi square test	$\chi^2 = 0.24; p = 0.63$			$\chi^2 = 11.31; p < 0.01$			

Four types of Extension contacts were analyzed: (1) farm visits, (2) tomato meetings, (3) visits to office, and (4) telephone calls to Extension office.

Farm visits. Eighty-five percent of tomato producers who planted over 17,000 plants received one or more farm visits from an Extension agent during the last 12 months compared to just under 73 percent of tomato producers who planted 17,000 plants or under. These differences, however, were not significant as tested by the chi square test using the .05 level of probability. Thus, larger tomato producers were no more or less likely to receive a farm visit by an Extension agent than the smaller producers.

Tomato meetings attended. Slightly more than 77 percent of tomato producers who planted over 17,000 plants attended one or more tomato meetings during the past 12 months compared to just under 42 percent of tomato producers who planted 17,000 plants or under. The chi square test indicated that these differences were significant at the .05 level of probability. Thus, larger tomato producers were more likely to attend one or more tomato meetings than smaller tomato producers.

Visits to office. Sixty-five percent of tomato producers who planted over 17,000 plants made one or more visits to the Extension office during the past 12 months compared to 45.5 percent of tomato producers who planted 17,000 plants or under. The differences, however, were not significant at the .05 level as tested by the

chi square test. Thus, larger tomato producers were no more or less likely to visit the Extension office than smaller tomato producers.

Telephoned to office. Almost 78 percent of tomato producers who planted over 17,000 plants made one or more telephone calls to the Extension office during the past 12 months compared to just over 71 percent of tomato producers who planted 17,000 plants or under. These differences, however, were not significant at the .05 level as tested by the chi square test. Thus, larger producers were no more or less likely to make telephone calls to the Extension office than small producers.

Predominant Variety Grown

The predominant variety of tomato grown was used as an indication of the types of producer who is growing tomatoes. Producers were classified into two categories regarding the predominant variety grown: (1) homegrown, and (2) shipping. These categories were examined to determine the relationships between type of tomato variety grown and four types of Extension contacts: (1) farm visits, (2) tomato meetings attended, (3) visits to office, and (4) telephone calls to the Extension office.

Farm visits. Almost 97 percent of tomato producers who grew a homegrown variety received one or more farm visits from Extension during past 12 months compared to almost 66 percent of tomato producers who grew a shipping variety. The chi square test indicated that these differences were significant at the .05 level of

probability. Thus, tomato producers who grew homegrown varieties were more likely to receive one or more farm visits from the Extension agent than tomato producers who grew a shipping variety.

Tomato meetings attended. Just over 53 percent of the tomato producers who grew a homegrown variety did not attend any tomato meetings during the last 12 months compared to just over 48 percent of tomato producers who grew a shipping variety. These differences, however, were not significant at the .05 level as tested by the chi square test. Thus, producers who grew a homegrown variety tomato were no more or less likely to attend a tomato meeting than those who grew a shipping variety.

Visits to office. Just over 63 percent of tomato producers who grew a homegrown variety made one or more visits to the Extension office during the past 12 months compared to 43.8 percent of tomato producers who grew a shipping variety. These differences, however, were not significant at the .05 level as tested by the chi square test. Homegrown variety tomato producers were no more or less likely to visit the Extension office than shipping variety producers.

Telephoned to office. Almost 98 percent of tomato producers who grew a homegrown variety made one or more telephone calls to the Extension office during the past 12 months compared to just under 61 percent of tomato producers who grew a shipping variety. The chi square test indicated that the differences were significant at the

.05 level of probability. Producers who grew a homegrown variety of tomato were more likely to contact Extension through telephone calls than producers who grew a shipping variety.

Table Summary

Among the four types of contacts Tennessee tomato producers had with Extension, one type of contact was significantly related to the number of plants planted. The number of tomato meetings attended was significantly related to the number of tomato plants planted. Producers who grew more tomato plants (over 17,000) were more likely to attend tomato meetings than producers who grew 17,000 or less plants.

Other types of Extension contacts analyzed included farm visits, visits to office, and telephone calls made to the Extension office. None of these was significantly related to the number of plants planted. Thus, producers who planted 17,000 or fewer plants were no more or less likely to receive a farm visit from Extension agents, or to visit or telephone the Extension office than producers who planted over 17,000 plants.

Among the four types of contacts Tennessee tomato producers had with Extension, two types were significantly related to predominant variety grown. The number of farm visits received and the number of telephone calls made to the Extension office were significantly related to the predominant variety grown. Producers who grew a homegrown variety were more likely to receive a farm visit from Extension agents than producers who grew a shipping variety. Producers

who grew a homegrown variety were also more likely to telephone the Extension office than producers who grew a shipping variety.

The other two types of Extension contacts, including visits to office and the number of tomato meetings attended, were not significantly related to the predominant variety grown. Thus, producers who grew a shipping variety were no more or less likely to visit the office or attend a tomato meeting than producers who grew a homegrown variety.

CHAPTER IV

RELATIONSHIPS BETWEEN PRODUCER AND FARM CHARACTERISTICS AND VARIABLES INFLUENCING TOMATO MARKETING

The purpose of this chapter was to present findings regarding the relationships between selected producer and farm characteristics and four selected variables regarding tomato marketing. The variables were: (1) market outlet chosen, (2) type of variety grown, (3) percent of crop harvested at the vine ripe stage, and (4) percent of crop harvested at mature green stage.

The data presented in this chapter are summarized into four tables and findings are organized and discussed in four sections. The chi square test was used to determine the strength of the relationships between variables, and the .05 level of probability was accepted as significant. Total respondents to variables may vary due to missing cases.

Section I presents findings regarding the relationships between selected producer and farm characteristics of 1984 Tennessee tomato producers and the type of market outlet chosen.

Section II presents findings regarding the relationships between selected producer and farm characteristics of 1984 Tennessee tomato producers and the type of tomato variety grown.

Section III presents findings regarding the relationships between selected producer and farm characteristics of 1984 Tennessee tomato producers and the percent of crop harvested at the vine ripe stage.

Section IV presents findings regarding the relationships between selected producer and farm characteristics of 1984 Tennessee tomato producers and the percent of crop harvested at the mature green stage.

I. RELATIONSHIPS BETWEEN SELECTED PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE TOMATO PRODUCERS AND TYPE OF MARKET OUTLET CHOSEN

This section presents findings regarding relationships between nine producer and farm characteristics and the type of market outlet chosen. Findings were organized and are discussed in two subsections: (1) producer characteristics, and (2) farm characteristics. Findings regarding these characteristics are summarized in Table 3. The chi square value and the level of probability also are given.

The purpose of this section was to determine the relationships between producer and farm characteristics and market outlets chosen by the producers.

Producer Characteristics

Three producer characteristics include: (1) major source of farm income, (2) employed part-time off farm, and (3) age of producers. These variables were used to analyze the relationships between selected producer characteristics and the choice of market outlets.

Major source of farm income. Of the 117 respondents, 64 (54.7 percent) producers had vegetables as their major source of farm

Table 3. Relationships Between Selected Producer and Farm Characteristics of Tennessee Tomato Producers and the Type of Market Outlet Chosen

Producer/Farm Characteristics	Shipping Market		Market Outlets Chosen Local Market		Totals*	
	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers
PRODUCER CHARACTERISTICS						
Major Source Farm Income						
Vegetables	44	68.8	20	31.2	64	100
Other	32	60.4	21	39.6	53	100
Chi square test	$\chi^2 = 0.56; \quad p = 0.45$					
Employed Part-Time Off Farm						
No	55	63.2	32	36.8	87	100
Yes	16	64.0	9	36.0	25	100
Chi square test	$\chi^2 < 0.01; \quad p = 1.00$					
Age of Producers						
50-Under	48	64.0	27	36.0	75	100
Over 50	28	66.7	14	33.3	42	100
Chi square test	$\chi^2 = 0.01; \quad p = 0.93$					
FARM CHARACTERISTICS						
Acres Farmed						
100 Acres-Under	54	67.5	26	32.5	80	100
Over 100 Acres	22	59.5	15	40.5	37	100
Chi square test	$\chi^2 = 0.41; \quad p = 0.52$					
Number of Plants Planted						
17,000-Under	52	67.5	25	32.5	77	100
Over 17,000	24	60.0	16	40.0	40	100
Chi square test	$\chi^2 = 0.37; \quad p = 0.55$					
Predominant Variety Grown						
Shipping Variety	50	78.1	14	21.9	64	100
Homegrown Variety	15	50.0	15	50.0	30	100
Chi square test	$\chi^2 = 6.31; \quad p = 0.01$					
Percent of Crop Harvested at Mature Green Stage						
Secondary (50 Percent-Under)	50	66.7	25	33.3	75	100
Primary (Over 50 Percent)	26	61.9	16	38.1	42	100
Chi square test	$\chi^2 = 0.10; \quad p = 0.75$					
Percent of Crop Harvested at Vine Ripe Stage						
Secondary (50 Percent-Under)	35	56.5	27	43.5	62	100
Primary (Over 50 Percent)	40	75.5	13	24.5	53	100
Chi square test	$\chi^2 = 3.75; \quad p = 0.05$					
Percent of Crop Harvested at Ripe Stage						
10-Under	60	70.6	25	29.4	85	100
Over 10	16	50.0	16	50.0	32	100
Chi square test	$\chi^2 = 3.47; \quad p = 0.06$					
Yield Per Acre in Tons						
4.0 Under	34	61.8	21	38.2	55	100
Over 4.0	42	67.7	20	32.3	62	100
Chi square test	$\chi^2 = 0.23; \quad p = 0.63$					

*Total number may vary due to missing cases.

income while 53 (45.3 percent) had some other enterprise as their major source of farm income. Almost 69 percent of tomato producers who had vegetables as their major source of farm income sold their tomatoes at a shipping market, compared to just over 60 percent of tomato producers who chose some other enterprise as their major source of farm income. These differences, however, were not significant at the .05 level of probability. Thus, producers who had vegetables as their major source of farm income were no more or less likely than producers who had some other enterprise as their major source of farm income, to choose a shipping market outlet.

Employed part-time off the farm. The data indicated that of the 112 producers responding, 87 (77.7 percent) were not employed part-time off the farm while 25 (22.3 percent) producers were employed part-time off the farm. Just over 63 percent of the tomato producers who were not employed part-time off the farm sold their tomatoes at a shipping market outlet, compared to 64 percent of tomato producers who were employed part-time off the farm. These differences were not significant at the .05 level of probability. Thus, tomato producers who were not employed part-time were no more or less likely to sell their tomatoes at a shipping market than those employed part-time off the farm.

Age of producer. Of the 117 respondents, 75 (64.1 percent) producers were of the age of 50 or under while 42 (35.9 percent) producers were over 50 years old. Sixty four percent of tomato

producers who were 50 or under sold their tomatoes at a shipping market outlet, compared to almost 67 percent of tomato producers who were over 50. These differences, however, were not significant at the .05 level of probability. Thus, tomato producers who were 50 or under were no more or less likely to sell their tomatoes at a shipping market outlet than producers over 50 years of age.

Farm Characteristics

Seven farm characteristics studied were: (1) acres farmed, (2) number of plants planted, (3) predominant variety grown, (4) percent harvested at mature green stage, (5) percent of crop harvested at vine ripe stage, (6) percent of crop harvested at ripe stage, and (7) yield per acre in tons. Findings regarding the relationships of farm characteristics and market outlet chosen are presented in this subsection.

Acres farmed. Eighty of the 117 producers (68.4 percent) farmed 100 acres or under while 37 (31.6 percent) producers farmed over 100 acres. Almost 68 percent of the tomato producers who farmed 100 acres or under chose a shipping market, compared to almost 60 percent who farmed over 100 acres. These differences, however, are not significant at the .05 level of probability. Thus, producers who farmed smaller acreage were no more or less likely to sell their tomatoes at a shipping market than producers who farmed larger acreage.

Number of plants planted. Of the 117 producers, 77 (65.8 percent) planted 17,000 plants or under while 40 (34.2 percent) producers planted over 17,000 plants. Almost 68 percent of the tomato producers who planted 17,000 plants or less sold their tomatoes at a shipping market outlet, compared to 60 percent of those who grew over 17,000 plants. These differences, however, were not significant at the .05 level of probability. Thus, larger producers were no more or less likely to sell their tomatoes at a shipping market outlet than smaller producers.

Predominant variety grown. Sixty four of the 94 producers responding (53.8 percent) grew a shipping variety while 30 (40.2 percent) producers grew a homegrown variety. Just over 78 percent of the tomato producers who grew a shipping variety chose to sell their tomatoes at a shipping market outlet, compared to 50 percent of those who grew a homegrown variety. These differences are significant at the .05 level of probability. Thus, producers who grew shipping varieties were more likely to sell their tomatoes at a shipping market outlet than producers who grew a homegrown variety.

Percent of crop harvested at mature green stage. Of the 117 producers responding, 75 (64.1 percent) harvested mature green tomatoes for a secondary market while 42 producers (35.9 percent) grew mature green tomatoes for their primary market. Almost 67 percent of the tomato producers who harvested mature green tomatoes for a secondary market used a shipping market outlet, compared to almost

62 percent who harvested primarily for the mature green market. These differences, however, were not significant at the .05 level of probability. Thus, producers who harvested mature green tomatoes for a secondary market were no more or less likely to use a shipping market outlet than producers who harvested mature green tomatoes as their primary market.

Percent of crop harvested at vine ripe stage. Of the 115 producers responding, 62 (53.9 percent) harvested vine ripe tomatoes for a secondary market while 53 producers (46.1 percent) harvested vine ripes as their primary market. Almost 76 percent of the tomato producers who harvested vine ripe tomatoes as their primary market sold their tomatoes at a shipping market outlet, compared to 56.5 percent of tomato producers who harvested vine ripe tomatoes for a secondary market. These differences are significant at the .05 level of probability. Thus, producers who harvested vine ripe tomatoes for the primary market were more likely to sell at a shipping market outlet than those producers who harvested vine ripe tomatoes for a secondary market.

Percent harvested at ripe stage. Of the 117 producers responding, 85 (72.6 percent) harvested 10 percent or under of their crop at the ripe stage while 32 (27.4 percent) producers harvested over 10 percent of their crop at the vine ripe stage. Almost 71 percent of tomato producers who harvested 10 percent or under of their crop at the vine ripe stage sold at a shipping market, compared to 50

percent of producers who harvested over 10 percent of their crop at the vine ripe stage. These differences, however, were not significant at the .05 level of probability. Thus, tomato producers who harvested 10 percent of their crop or under at the ripe stage were no more or less likely to sell at a shipping market outlet than producers who harvested over 10 percent at the ripe stage.

Yield per acre in tons. Of the 117 producers responding, 55 (47 percent) had yields of 4.0 tons or under per acre while 62 (53.0 percent) producers had yields over 4.0 tons per acre. Just under 68 percent of the tomato producers who had yields over 4.0 tons per acre chose a shipping market outlet, compared to 61.8 percent of tomato producers who had yields of 4.0 or under. These differences are not, however, significant at the .05 level of probability. Thus, producers with yields over 4.0 tons were no more or less likely than producers who had yields of 4.0 tons or under to use a shipping variety.

Table Summary

Among the three producer characteristics studied: (1) major source of farm income, (2) employed part-time off the farm, and (3) age of producer, none were significantly related to market outlet chosen. Thus, producers who had vegetables as their major source of farm income, were not employed part-time of the farm, or were of the age of 50 or under were no more or less likely to chose a shipping variety than producers who had some other enterprise as their major source of farm income, were employed part-time off the farm, and were over 50 years old.

Among the seven farm characteristics: (1) acres farmed, (2) number of plants planted, (3) predominant variety grown, (4) percent harvested at mature green stage, (5) percent harvested at vine ripe stage, (6) harvested at the ripe stage, and (7) yield per acre, two characteristics were significantly related to market outlet chosen.

The predominant variety grown and the percent of the crop harvested at the vine ripe stage were significantly related to market outlet chosen. Producers who grew a shipping variety were more likely to use a shipping market outlet than producers who grew a homegrown variety. Producers who harvested vine ripe tomatoes as their primary market were more likely to choose a shipping market outlet than those producers who harvested vine ripe tomatoes for a secondary market.

Farm characteristics of acres farmed, number of plants planted, percent harvested at mature green stage, percent harvested at ripe stage, and yield per acre in tons were not significantly related to market outlet chosen. Thus, producers who farmed 100 or under acres, planted 17,000 plants or under, harvested mature green tomatoes for a secondary market, harvested 10 percent or under of their tomatoes at the ripe stage, and yielded 4.0 tons per acre or under were no more or less likely to chose a shipping market outlet than producers who farmed over 100 acres, planted over 17,000 plants, harvested mature green tomatoes for their primary market, harvested over 10 percent of their crop at the ripe stage, and yielded over 4.0 tons per acre.

II. RELATIONSHIPS BETWEEN SELECTED PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE TOMATO PRODUCERS AND THE TYPE OF TOMATO VARIETY GROWN

This section presents findings regarding selected producer and farm characteristics of 1984 Tennessee tomato producers and their relationships with the type of tomato variety grown. The types of tomato varieties were classified into two groups: (1) shipping varieties, and (2) homegrown varieties. A commercial grower may chose either type. The findings in this section were organized and are discussed in two subsections: (1) producer characteristics, and (2) farm characteristics. Findings regarding these characteristics are summarized in Table 4. The number and valid percent of tomato producers are given for each variable, as well as the chi square value and the probability level. Total numbers of producers responding may vary due to missing cases. The independent variables are producer and farm characteristics. The dependent variable is type of variety grown.

Producer Characteristics

The three producer characteristics studied are: (1) major source of farm income, (2) employed part-time off the farm, and (3) age of producer. The data were analyzed to determine the relationship between producer characteristics and the type of variety that was chosen.

Major source of farm income. Of the 94 producers responding, 51 (54.3 percent) had vegetables as their major source of farm income

Table 4. Relationships Between Selected Producer and Farm Characteristics of Tennessee Tomato Producers and the Type of Tomato Variety Grown

Producer/Farm Characteristics	Shipping Variety		Type of Variety Grown		Totals*	
	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers
PRODUCER CHARACTERISTICS						
Major Source of Farm Income						
Vegetables	40	78.4	11	21.6	51	100
Other	24	55.8	19	44.2	43	100
Chi square test	$\chi^2 = 4.50; \quad p = 0.03$					
Employed Part-Time Off Farm						
No	48	69.6	21	30.4	69	100
Yes	11	55.0	9	45.0	20	100
Chi square test	$\chi^2 = 0.89; \quad p = 0.35$					
Age of Producers						
50-Under	45	73.8	16	26.2	61	100
Over 50	19	57.6	14	42.4	33	100
Chi square test	$\chi^2 = 1.89; \quad p = 0.17$					
FARM CHARACTERISTICS						
Acres Farmed						
100 Acres-Under	44	71.0	18	29.0	62	100
Over 100 Acres	20	62.5	12	37.5	32	100
Chi square test	$\chi^2 = 0.36; \quad p = 0.55$					
Number of Plants Planted						
17,000-Under	36	56.3	28	43.7	64	100
Over 17,000	28	93.3	2	6.7	30	100
Chi square test	$\chi^2 = 11.27; \quad p = < 0.01$					
Market Time						
Early	40	62.5	24	37.5	64	100
Late	24	80.0	6	20.0	30	100
Chi square test	$\chi^2 = 2.13; \quad p = 0.15$					
Percent of Crop Harvested at Mature Green Stage						
Secondary (50 Percent-Under)	30	51.7	28	48.3	58	100
Primary (Over 50 Percent)	34	94.4	2	5.6	36	100
Chi square test	$\chi^2 = 16.74; \quad p < 0.01$					
Percent of Crop Harvested at Vine Ripe Stage						
Secondary (50 Percent-Under)	44	91.7	4	8.3	48	100
Primary (Over 50 Percent)	19	43.2	25	56.8	44	100
Chi square test	$\chi^2 = 22.81; \quad p < 0.01$					
Percent of Hired Labor for Harvest						
50-Under	32	56.1	25	43.9	57	100
Over 50	32	86.5	5	13.5	37	100
Chi square test	$\chi^2 = 8.16; \quad p < 0.01$					
Major Market Outlet						
Shipping Market	50	76.9	15	23.1	65	100
Local Market	14	48.3	15	51.7	29	100
Chi square test	$\chi^2 = 6.31; \quad p = 0.01$					

*Total number may vary due to missing cases.

while 43 (45.7 percent) producers had some other enterprise as their major source of farm income. Just over 78 percent of the producers who had vegetables as their major source of farm income chose to grow a shipping variety compared to 55.8 percent of the producers who had some other enterprise as their major source of farm income. These differences are significant at the .05 level of probability. Thus, producers who had vegetables as their major source of farm income were more likely to grow a shipping variety than producers who had some other enterprise as their major source of farm income. Conversely, producers who had some other enterprise as their major source of farm income were more likely to grow a homegrown variety than producers who had vegetables as their major source of farm income.

Employed part-time off the farm. Of the 89 producers responding, 69 (77.5 percent) did not work part-time off the farm while 20 (22.5 percent) producers did work part-time off the farm. Almost 70 percent of the tomato producers who were not employed part-time off the farm grew a shipping variety, compared to 55 percent of the producers who were employed part-time off the farm. These differences, however, were not significant at the .05 level of probability. Thus, producers who were employed part-time off the farm were no more or less likely to grow a shipping variety than those who were not employed part-time off the farm.

Age of producer. Of the 94 producers responding, 61 (64.9 percent) were 50 or under years old while 33 (35.1 percent) producers

were over 50 years old. Almost 74 percent of tomato producers 50 or under grew a shipping variety, compared to 57.6 percent of those who were over 50 years old. These differences, however, were not significant at the .05 level of probability. Thus, producers who were of the age of 50 or under were no more or less likely to grow a shipping variety than producers over 50 years old.

Farm Characteristics

The seven farm characteristics studied included: (1) acres farmed, (2) number of plants planted, (3) market time, (4) percent of crop harvested at mature green stage, (5) percent of crop harvested at vine ripe stage, (6) percent of hired labor for harvest, and (7) major market outlet. The relationships between farm characteristics and type of variety grown were analyzed.

Acres farmed. Of the 94 producers responding, 62 (66.0 percent) farmed 100 acres or under while 32 producers (34.0 percent) farmed over 100 acres. Seventy one percent of tomato producers who farmed 100 acres or under grew a shipping variety, compared to 62.5 percent of tomato producers who farmed over 100 acres. These differences, however, were not significant at the .05 level of probability. Thus, producers who farmed 100 acres or under were no more or less likely to use a shipping variety than producers who farmed over 100 acres.

Number of plants planted. Of the 94 producers responding, 64 (68.1 percent) planted 17,000 plants or under while 30 producers (46.9 percent) planted over 17,000 plants. Just over 93 percent of tomato producers who planted over 17,000 plants planted a shipping variety, compared to 56.3 percent of producers who planted 17,000 plants or under. These differences are significant at the .05 level of probability. Thus, tomato producers who planted over 17,000 plants were more likely to grow a shipping variety than producers who planted 17,000 plants or under. Conversely, tomato producers who planted 17,000 plants or under were more likely to grow a homegrown variety than producers who planted over 17,000 plants.

Market time. Of the 94 producers responding, 64 (68.1 percent) grew for an early market time while 30 producers (31.9 percent) grew tomatoes for a late market time. Eighty percent of the tomato producers who grew tomatoes for an early market raised a shipping variety of tomato, compared to 62.5 percent of the tomato producers who grew for a late market. These differences, however, were not significant at the .05 level of probability. Thus, producers who grew for an early market were no more or less likely to grow a shipping variety than producers who grew for a late market.

Percent of crop harvested at mature green stage. Of the 94 producers responding, 58 (61.7 percent) harvested mature green tomatoes for a secondary market while 36 producers (38.3 percent) harvested mature green tomatoes for their primary market. Just over 94 percent

of producers who harvested mature green tomatoes for their primary market grew a shipping variety, compared to 51.7 percent who harvested their tomatoes for a secondary market. These differences were significant at the .05 level of probability. Thus, producers who harvested mature green tomatoes for their primary market were more likely to grow a shipping variety than producers who harvested mature green tomatoes for a secondary market. Conversely, producers who harvested mature green tomatoes for a secondary market were more likely to grow a homegrown variety than producers who harvested mature green tomatoes for their primary market.

Percent of crop harvested at vine ripe stage. Of the 92 producers responding, 48 (52.2 percent) harvested vine ripe tomatoes for a secondary market while 44 producers (47.8 percent) harvested vine ripe tomatoes for their primary market. Almost 92 percent of tomato producers who harvested vine ripe tomatoes for a secondary market grew a shipping variety, compared to 43.2 percent who harvested vine ripe tomatoes for their primary market. These differences were significant at the .05 level of probability. Thus, tomato producers who harvested vine ripe tomatoes for a secondary market were more likely to grow a shipping variety than producers who harvested vine ripe tomatoes for their primary market. Conversely, producers who harvested their vine ripe tomatoes for their primary market were more likely to grow a homegrown variety than producers who harvested vine ripe tomatoes for a secondary market.

Percent of hired labor for harvest. Of the 94 producers responding, 57 (60.6 percent) hired 50 percent or under of their labor while 37 producers (39.4 percent) hired over 50 percent of their labor. Almost 87 percent of tomato producers who hired over 50 percent of their labor grew a shipping variety, compared to 56.1 percent who hired 50 percent or under of their labor. These differences are significant at the .05 level of probability. Thus, producers who hired over 50 percent of their labor were more likely to grow a shipping variety than producers who hired 50 percent or under of their labor for harvest. Conversely, producers who hired 50 percent or under of their labor were more likely to grow a homegrown variety than producers who hired over 50 percent of their labor.

Major market outlet. Of the 94 producers responding, 65 producers (69.1 percent) sold their tomatoes at a shipping market while 29 producers (30.9 percent) sold their tomatoes at a local market outlet. Almost 77 percent of the producers who sold their tomatoes at a shipping market outlet grew a shipping variety, compared to 48.3 percent of tomato producers who sold their tomatoes at a local market outlet. These differences are significant at the .05 level of probability. Thus, producers who sold at shipping market outlet were more likely to grow a shipping variety than producers who sold at a local market outlet. Conversely, producers who sold at a local market outlet were more likely to grow a homegrown variety than producers who sold on a shipping market outlet.

Table Summary

Among the three producer characteristics of major source of farm income, employed part-time off farm, and age of producer, there was one characteristic that was significantly related to type of variety grown.

The major source of farm income was significantly related to type of variety grown. Producers who had vegetables as their major source of farm income were more likely to plant a shipping variety than producers who had some other enterprise as their major source of income. Conversely, producers who had some other enterprise as their major source of farm income were more likely to plant a home-grown variety than producers who had vegetables as their major source of income.

The two producer characteristics that were not significantly related to type of variety grown were: (1) employed off farm, and (2) age of producer. Thus, those producers who were employed off the farm and were 50 or under were no more likely to grow a shipping variety than producers who were employed off the farm and were over 50 years old.

Among the seven farm characteristics studied: (1) acres farmed, (2) number of plants planted, (3) market time, (4) percent of crop harvested at mature green stage, (5) percent of crop harvested at vine ripe stage, (6) percent of hired labor for harvest, and (7) major market outlet, five characteristics were significantly related to types of variety grown.

The number of plants planted, percent of crop harvested at mature green stage, percent of crop harvested at vine ripe stage, percent hired labor for harvest, and the major market outlet used were all significantly related to types of variety grown.

Producers who planted 17,000 plants or under were more likely to grow a homegrown variety than producers who planted over 17,000 plants. Conversely, producers who planted over 17,000 plants were more likely to grow a shipping variety than producers who planted 17,000 plants or under.

Producers who harvested their tomatoes at the mature green stage for their primary market were more likely to grow a shipping variety than producers who harvested mature green tomatoes for a secondary market. Conversely, producers who harvested mature green tomatoes for a secondary market were more likely to grow a homegrown variety than producers who harvested mature green tomatoes for a green market.

Producers who harvested vine ripe tomatoes for a secondary market were more likely to use a shipping variety than producers who harvested their vine ripe tomatoes for their primary market. Conversely, producers who harvested vine ripe tomatoes for their primary market were more likely to use a homegrown variety than producers who harvested vine ripe tomatoes for their secondary market.

Producers who hired the majority of their labor were more likely to grow a shipping variety than producers who hired less than half of their labor. Conversely, producers who hired less than half of

their labor were more likely to use a homegrown variety than producers who hired the majority of their labor.

Producers who used a shipping market outlet were more likely to use a shipping variety than producers who grew a homegrown variety. Conversely, producers who used a local market outlet were more likely to use a homegrown variety than producers who used a shipping market outlet.

Farm characteristics of acres farmed and market time were not significantly related to market outlet chosen. Thus, producers who grew 100 acres or under and grew tomatoes for an early market were no more or less likely than producers who grew over 100 acres and grew tomatoes for a late market to choose a shipping variety.

III. RELATIONSHIPS BETWEEN SELECTED PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE TOMATO PRODUCERS AND THE PERCENT OF CROP HARVESTED AT THE VINE RIPE STAGE

This section presents findings regarding selected producer and farm characteristics of 1984 Tennessee tomato producers and their relationships with the percent of the crops harvested at the vine ripe stage. Producers were classified into two groups according to the percent of tomatoes grown at the vine ripe stage. The two groups are: (1) primary, and (2) secondary. Producers who grew vine ripe tomatoes for their primary market harvested over 50 percent of their tomatoes as vine ripers. Producers who grew vine ripe tomatoes for their secondary market harvested 50 percent or under at the vine ripe stage.

The findings in this section were organized and are discussed in two subsections: (1) producer characteristics, and (2) farm characteristics. Findings regarding these characteristics are summarized in Table 5. The number and valid percent of tomato producers are given for each variable, as well as, the chi square test and the level of probability. Total respondents may vary due to missing cases. The independent variables are producer and farm characteristics. The dependent variable is percent of tomatoes harvested at the vine ripe stage.

Producer Characteristics

The three producer characteristics studied were: (1) major source of farm income, (2) employed part-time off the farm, and (3) age of producer. These data were analyzed to determine the relationships between producer characteristics and the percent of tomatoes harvested at the vine ripe stage.

Major source of farm income. Of the 115 producers responding, 63 (55.0 percent) had vegetables as their major source of farm income while 52 producers (45.0 percent) had some other enterprise as their major source of farm income. Almost 64 percent of the tomato producers who had vegetables as their major source of farm income harvested vine ripe tomatoes for their secondary market, compared to 42.3 percent of those who had some other enterprise as their major source of income. These differences are significant at the .05 level of probability. Thus, producers who had vegetables as their major

Table 5. Relationships Between Selected Producer and Farm Characteristics of Tennessee Tomato Producers and the Percent of Crop Harvested at the Vine Ripe Stage

Producer/Farm Characteristics	Percent of Crop Harvested at the Vine Ripe Stage					
	Secondary (50%-Under)		Primary (50%-Over)		Totals*	
	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers	Number of producers	Percent of Producers
PRODUCER CHARACTERISTICS						
Major Source of Farm Income						
Vegetables	40	63.5	23	36.5	63	100
Other	22	42.3	30	57.7	52	100
Chi square test	$\chi^2 = 4.33; \quad p = 0.04$					
Employed Part-Time Off Farm						
No	50	58.8	35	41.2	85	100
Yes	9	36.0	16	64.0	25	100
Chi square test	$\chi^2 = 3.18; \quad p = 0.08$					
Age of Producers						
50-Under	42	56.8	32	43.2	74	100
Over 50	20	48.8	21	51.2	41	100
Chi square test	$\chi^2 = 0.39; \quad p = 0.53$					
FARM CHARACTERISTICS						
Acres Farmed						
100 Acres-Under	42	53.2	37	46.8	79	100
Over 100 Acres	20	55.6	16	44.4	36	100
Chi square test	$\chi^2 < 0.01; \quad p = 0.97$					
Number of Plants Planted						
17,000-Under	35	46.7	40	53.3	75	100
Over 17,000	27	67.5	13	32.5	40	100
Chi square test	$\chi^2 = 3.76; \quad p = 0.05$					
Predominant Variety Grown						
Shipping Variety	44	69.8	19	30.2	63	100
Homegrown Variety	24	13.8	25	86.2	29	100
Chi square test	$\chi^2 = 22.8; \quad p < 0.01$					
Market Time						
Early	43	51.8	40	48.2	83	100
Late	19	59.4	13	40.6	32	100
Chi square test	$\chi^2 = 0.27; \quad p = 0.60$					
Major Market Outlet						
Shipping Market	35	46.7	40	53.3	75	100
Local Market	27	67.5	13	32.5	40	100
Chi square test	$\chi^2 = 3.76; \quad p = 0.05$					

*Total number may vary due to missing cases.

source of farm income were more likely to harvest their vine ripe tomatoes for a secondary market than producers who had some other enterprise as their major source of income. Conversely, producers who had some other enterprise as their major source of farm income were more likely to have harvested vine ripe tomatoes for a primary market than producers who had vegetables as their major source of farm income.

Employed part-time off farm. Of the 110 producers responding, 85 (77.3 percent) were not employed part-time of the farm while 25 producers (22.7 percent) were employed off the farm. Almost 59 percent of the tomato producers who were not employed off the farm harvested vine ripe tomatoes for a secondary market, compared to 36 percent of tomato producers who were employed off the farm. These differences, however, are not significant at the .05 level of probability. Thus, producers who were not employed part-time off the farm were no more or less likely to harvest vine ripe tomatoes for a secondary market than producers who were employed part-time off the farm.

Age of producer. Of the 115 producers responding, 74 producers (64.4 percent) were 50 or under years old while 41 producers (35.6 percent) were over 50 years old. Almost 57 percent of tomato producers of the age 50 or under harvested vine ripe tomatoes for a secondary market, compared to 48.8 percent of tomato producers over 50 years old. These differences were not significant at the .05 level. Thus, producers who were 50 years old or under were no more or less

likely to harvest their vine ripe tomatoes for a secondary market than producers who were over 50 years old.

Farm Characteristics

Five farm characteristics were studied: (1) acres farmed, (2) number of plants planted, (3) predominant variety grown, (4) market time, and (5) major market outlet. The findings regarding the relationships of farm characteristics and the percent of tomatoes harvested at the vine ripe stage are presented in this subsection.

Acres farmed. Of the 115 producers responding, 79 (68.7 percent) farmed 100 acres or less while 36 tomato producers (31.3 percent) farmed over 100 acres. Almost 56 percent of the tomato producers who farmed over 100 acres harvested vine ripe tomatoes for a secondary market, compared to 53.2 percent of tomato producers who farmed 100 acres or under. These differences, however, are not significant at the .05 level of probability. Thus, producers who farmed 100 acres or under were no more or less likely to harvest vine ripe tomatoes for secondary market than producers who farmed over 100 acres.

Number of plants planted. Of the 115 producers responding, 75 (65.2 percent) planted 17,000 plants or under while 40 tomato producers (34.8 percent) planted over 17,000 plants. Almost 68 percent of the producers who planted over 17,000 plants harvested vine ripe tomatoes for a secondary market, compared to 46.7 percent of the tomato producers who planted 17,000 plants or under. These differences were significant at the .05 level of probability. Thus, tomato producers

who planted over 17,000 plants were more likely to harvest vine ripe tomatoes for a secondary market than producers who planted 17,000 plants or under. Conversely, tomato producers who planted 17,000 plants or under were more likely to harvest vine ripe tomatoes for a primary market than tomato producers who planted over 17,000 plants.

Predominant variety grown. Of the 92 producers responding, 63 (68.5 percent) grew a shipping variety while 29 producers (31.5 percent) grew a homegrown variety. Almost 70 percent of tomato producers who grew a shipping variety harvested vine ripe tomatoes for a secondary market, compared to 13.8 percent of tomato producers who grew a homegrown variety. These differences are significant at the .05 level of probability. Thus, tomato producers who grew a shipping variety were more likely to harvest vine ripe tomatoes for a secondary market than producers who grew a homegrown variety. Conversely, tomato producers who grew a homegrown variety were more likely to harvest vine ripe tomatoes for a primary market than producers who grew a shipping variety.

Market time. Of the 115 producers responding, 83 (72.2 percent) grew for an early market while 32 tomato producers (27.8 percent) grew for a late market. Just over 59 percent of the producers who grew for a late market harvested vine ripe tomatoes for a secondary market, compared to 51.8 percent of the producers who grew for an early market. These differences, however, were not significant

at the .05 level of probability. Thus, producers who grew for a late market were no more or less likely to harvest their tomatoes for a secondary market than producers who grew for an early market.

Major market outlet. Of the 115 producers responding, 75 (62.2 percent) chose a shipping market outlet while 40 producers (34.8 percent) chose a local market outlet. Almost 68 percent of tomato producers who used a local market outlet harvested vine ripe tomatoes for a secondary market, compared to 46.7 percent of tomato producers who used a shipping market outlet. These differences are significant at the .05 level of probability. Thus, producers who used a local market outlet were more likely to harvest vine ripe tomatoes for a secondary market than producers who used a shipping market outlet. Conversely, producers who used a shipping market outlet were more likely to harvest vine ripe tomatoes for a primary market than producers who used a local market outlet.

Table Summary

Among the three producer characteristics studied: (1) major source of farm income, (2) employed part-time off the farm, and (3) age of producer, there was one characteristic that was significantly related to the percent of tomatoes harvested at the vine ripe stage. The major source of farm income was significantly related to the percent of tomatoes harvested at the vine ripe stage. Producers who had vegetables as their major source of farm income were more likely to harvest vine ripe tomatoes for a secondary market than producers

who had some other enterprise as their major source of farm income.

Producer characteristics that were not significantly related to the percent of the crop harvested at the vine ripe stage were employed part-time off the farm and age of producers. Thus, producers who were not employed part-time off the farm and were of the age 50 or under were no more or less likely to harvest their vine ripe tomatoes for a secondary market than producers who were employed part-time off the farm and those who were over 50 years old.

Among five farm characteristics studied: (1) acres farmed, (2) number of plants planted, (3) predominant variety grown, (4) market time, and (5) major market outlet, three characteristics were significantly related to percent of the crop harvested at the vine ripe stage.

The number of plants planted, the predominant variety grown, and the major market outlet were farm characteristics that were significantly related to the percent of the crop harvested at the vine ripe stage.

Producers who planted over 17,000 plants were more likely to harvest their vine ripe tomatoes for a secondary market than producers who planted 17,000 plants or under. Conversely, producers who planted 17,000 plants or under were more likely to harvest their vine ripe tomatoes for their primary market than producers who planted over 17,000 plants.

Producers who grew a shipping variety were more likely to harvest their vine ripe tomatoes for a secondary market than producers who grew a homegrown variety. Conversely, producers who grew a homegrown variety were more likely to harvest vine ripe tomatoes for a primary market than producers who grew a shipping variety.

Producers who used a local market outlet were more likely to harvest their vine ripe tomatoes for a secondary market than producers who used a shipping market outlet. Conversely, producers who used shipping market outlets were more likely to harvest vine ripe tomatoes for their primary market than producers who grew for a local market outlet.

Farm characteristics of acres farmed and market time were not significantly related to percent of tomatoes harvested at the vine ripe stage. Thus, producers who farmed 100 acres or less and those who grew for an early market were no more or less likely to harvest their crop at the vine ripe stage than producers who grew over 100 acres and for a late market.

IV. RELATIONSHIPS BETWEEN SELECTED PRODUCER AND FARM CHARACTERISTICS OF TENNESSEE TOMATO PRODUCERS AND THE PERCENT OF TOMATOES HARVESTED AT MATURE GREEN STAGE

This section presents findings regarding selected producers and farm characteristics of 1984 Tennessee tomato producers and their relationships to the percent of the crop harvested at the mature green

stage. Producers were classified into primary and secondary growers according to the percent of tomatoes harvested at the mature green stage. Producers whose primary market was mature green tomatoes harvested over 50 percent of their tomatoes at the mature green stage. Producers whose secondary market was for mature green tomatoes harvested 50 or under percent of their crop in mature green stage. The findings presented in this section were organized and are discussed in two subsections: (1) producer characteristics, and (2) farm characteristics. Findings regarding these characteristics are summarized in Table 6. The number and valid percent of tomato growers are given for each variable, as well as the chi square value and probability levels. Total numbers that do not add up to 117 are due to missing cases. The independent variables are producer and farm characteristics. The dependent variable is percent of tomatoes harvested at mature green stage.

Producer Characteristics

The three producer characteristics studied are: (1) major source of farm income, (2) employed part-time off farm, and (3) age of producer. The data were analyzed to determine relationships between producer characteristics and the percent of tomatoes harvested at the mature green stage.

Major source of farm income. Of the 117 producers responding, 64 (54.7 percent) had vegetables as their major source of income while 53 (45.3 percent) producers had some other enterprise as their

Table 6. Relationships Between Selected Producer and Farm Characteristics of Tennessee Tomato Producers and the Percent of Crop Harvested at the Mature Green Stage

Producer/Farm Characteristics	Percent of Crop Harvested at the Mature Green Stage					
	Secondary (50%-Under)		Primary (50%-Over)		Totals*	
	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers	Number of Producers	Percent of Producers
PRODUCER CHARACTERISTICS						
Major Source Farm Income						
Vegetables	39	60.9	25	39.1	64	100
Other	36	67.9	17	32.1	53	100
Chi square test	$\chi^2 = 0.35; \quad p = 0.56$					
Employed Part-Time Off Farm						
No	54	62.1	33	37.9	87	100
Yes	18	72.0	7	28.0	25	100
Chi square test	$\chi^2 = 0.46; \quad p = 0.50$					
Age of Producers						
50-Under	43	57.3	32	42.7	75	100
Over 50	32	76.2	10	23.8	42	100
Chi square test	$\chi^2 = 3.38; \quad p = 0.07$					
FARM CHARACTERISTICS						
Acres Farmed						
100 Acres-Under	54	67.5	26	32.5	80	100
Over 100 Acres	21	56.8	16	43.2	37	100
Chi square test	$\chi^2 = 0.85; \quad p = 0.36$					
Number of Plants Planted						
17,000-Under	54	70.1	23	29.9	77	100
Over 17,000	21	52.5	19	47.5	40	100
Chi square test	$\chi^2 = 2.83; \quad p = 0.09$					
Predominant Variety Grown						
Shipping Variety	30	46.9	34	53.1	64	100
Homegrown Variety	28	93.3	2	6.7	30	100
Chi square test	$\chi^2 = 16.74; \quad p < 0.01$					
Market Time						
Early	52	61.9	32	38.1	84	100
Late	23	69.7	10	30.3	33	100
Chi square test	$\chi^2 = 0.33; \quad p = 0.56$					
Major Market Outlet						
Shipping Market	50	65.8	26	34.2	76	100
Local Market	25	61.0	16	39.0	41	100
Chi square test	$\chi^2 = 0.10; \quad p = 0.75$					
Yield Per Acre in Tons						
4.0-Under	33	60.0	22	40.0	55	100
Over 4.0	42	67.7	20	32.3	62	100
Chi square test	$\chi^2 = 0.46; \quad p = 0.50$					

*Total number may vary due to missing cases.

major source of income. Almost 68 percent of tomato producers who had some other enterprise as their major source of farm income harvested mature green tomatoes for a secondary market, compared to 60.7 percent of the tomato producers who had vegetables as their major source of farm income. Those differences, however, are not significant at the .05 level of probability. Thus, producers who had some other enterprise as their major source of farm income were no more or less likely to harvest mature green tomatoes for a secondary market than producers who had vegetables as their major source of farm income.

Employed part-time off farm. Of the 112 producers responding, 87 (77.7 percent) were not employed part-time off the farm while 25 producers (22.3 percent) were employed part-time off the farm. Seventy two percent of tomato producers who were employed part-time off the farm harvested mature green tomatoes for a secondary market, compared to 62.1 percent of the tomato producers who were not employed part-time off the farm. These differences were not significant at the .05 level of probability. Thus, producers who were not employed part-time off the farm were no more or less likely to harvest mature green tomatoes as a secondary market than those producers who were employed part-time off the farm.

Age of producer. Of the 117 producers responding, 75 (64.1 percent) were of the age of 50 or under while 42 producers (35.9 percent) were over 50 years old. Just over 76 percent of the tomato

producers who were over 50 years of age harvested mature green tomatoes as a secondary market, compared to 57.3 percent of those who were 50 years old and under. These differences, however, were not significant at the .05 level of probability. Thus, producers who were 50 or under were no more or less likely to harvest mature green tomatoes for a secondary market than producers over 50 years old.

Farm Characteristics

Six farm characteristics were studied: (1) acres farmed, (2) number of plants planted, (3) predominant variety grown, (4) market time, (5) major market outlet, and (6) yield per acre in tons. The findings regarding the relationships between farm characteristics and percent of the crop harvested at the mature green stage were examined in this subsection.

Acres farmed. Of the 117 producers responding, 80 (68.4 percent) farmed 100 acres or under while 37 producers (31.6 percent) farmed over 100 acres. Almost 68 percent of tomato producers who farmed 100 or under acres harvested mature green tomatoes as a secondary market, compared to 56.8 percent of tomato producers who farmed over 100 acres. These differences, however, are not significant at the .05 level of probability. Thus, producers who farmed 100 acres or under were no more or less likely to harvest mature green tomatoes as a secondary market than producers who farmed over 100 acres.

Number of plants planted. Of the 117 producers responding, 77 (65.8 percent) planted 17,000 plants or under while 40 producers (34.2 percent) planted over 17,000 plants. Just over 70 percent of tomato producers who planted 17,000 plants or under harvested mature green tomatoes for a secondary market, compared to 52.5 percent of tomato producers who planted over 17,000 plants. These differences, however, are not significant at the .05 level of probability. Thus, producers who planted 17,000 plants or under were no more or less likely to harvest mature green tomatoes for their secondary market than producers who grew over 17,000 plants.

Predominant variety grown. Of the 94 producers responding, 64 (53.8 percent) grew a shipping variety of tomatoes while 30 producers (40.2 percent) grew a homegrown variety. Just over 93 percent of tomato producers who grew a homegrown variety harvested mature green tomatoes for a secondary market, compared to 46.9 percent of tomato producers who grew a shipping variety. These differences are significant at the .05 level of probability. Thus, producers who grew a homegrown variety were more likely to harvest mature green tomatoes for a secondary market than producers who grew a shipping variety. Conversely, producers who grew a shipping variety were more likely to harvest mature green tomatoes for a primary market than producers who grew a homegrown variety.

Market time. Of the 117 producers responding, 84 (71.8 percent) grew their tomatoes for an early market while 33 producers (28.2

percent) grew their tomatoes for a late market. Almost 70 percent of tomato producers who grew for a late market harvested mature green tomatoes for a secondary market, compared to 61.9 percent who grew for an early market. These differences are not significant at the .05 level of probability. Thus, producers who grew for an early market were no more or less likely to harvest mature green tomatoes for a secondary market than producers who grew for a late market.

Major market outlet. Of the 117 producers responding, 76 (65.0 percent) used a shipping market outlet. Some 41 tomato producers (35.0 percent) used a local market outlet. Almost 66 percent of tomato producers who used a shipping market outlet harvested mature green tomatoes for their secondary market, compared to 61 percent of tomato producers who used a local market outlet. These differences, however, were not significant at the .05 level of probability. Thus, producers who used a shipping market outlet were no more or less likely to harvest mature green tomatoes for a secondary market than the producers who used a local market outlet.

Yield per acre in tons. Of the 117 producers responding, 55 (47.0 percent) had yields of 4.0 tons per acre or under while 62 producers (53.0 percent) had yields over 4.0 tons per acre. Almost 68 percent of the producers who had yields over 4.0 tons per acre harvested mature green tomatoes for a secondary market, compared to 60.0 percent who had yields of 4.0 tons per acre or under. These differences, however, were not significant at the .05 level of

probability. Thus, producers whose yields were 4.0 tons per acre or under were no more or less likely to harvest mature green tomatoes for a secondary market than producers whose yields were over 4.0 tons per acre.

Table Summary

Among three producer characteristics studied (i.e., source of farm income, employed part-time off the farm, and age of producer), none was significantly related to percent of tomatoes harvested at the mature green stage. Thus, producers who had vegetables as their major source of farm income, were not employed part-time off the farm, and were of the age 50 or under were no more likely to harvest mature green tomatoes for a secondary market than producers who had some other enterprise as their major source of farm income, did work part-time off the farm, or who were over 50 years old.

Among the six farm characteristics studied (i.e., acres farmed, number of plants planted, predominant variety grown, market time, major market outlet, and yield per acre in tons), one characteristic was significantly related to percent of the crop harvested at the mature green stage.

The predominant variety grown was the farm characteristic that was significantly related to percent harvested at mature green stage. Producers who grew a homegrown variety were more likely to harvest mature green tomatoes for a secondary market than producers who grew a shipping variety. Conversely, producers who grew a shipping variety

were more likely to harvest mature green tomatoes for their primary market than producers who grew a homegrown variety.

None of the other five farm characteristics (i.e., acres farmed, number of plants planted, market time, major market outlet, and yield per acre in tons) was significantly related to the percent of tomatoes harvested at the mature green stage. Thus, producers who farmed 100 or under acres, planted 17,000 plants or under, grew for an early market, used a shipping market outlet, and had yields of 4.0 tons per acre or under were no more or less likely to harvest their mature green tomatoes for a secondary market than producers who farmed over 100 acres, planted over 17,000 plants, grew for a late market, used a local market outlet, or who had yields over 4.0 tons per acre.

CHAPTER V

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

This chapter summarizes the major findings of this study. The chapter is divided into five sections relating to the purpose and objectives, methods of investigation, major findings, implications and recommendations, and recommendations for further study.

I. PURPOSE AND SPECIFIC OBJECTIVES

Purpose

The purpose of this study was to assist Extension agents in establishing or developing a tomato market outlet in their area by describing 1984 Tennessee tomato producers, their farming characteristics, their marketing practices, and the number and types of contacts with Extension.

Specific Objectives

The specific objectives of this study were:

1. To describe Tennessee tomato producers as to producer and farm operation characteristics, certain chemical usages, market outlet chosen, and their contact with Extension in 1984.
2. To determine the relationships between the number and types of contacts Tennessee tomato producers had with Extension and the number of plants planted and whether producers were growing shipping or homegrown varieties.

3. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the type of market outlet chosen.

4. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and type of variety grown.

5. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the percent of tomatoes harvested at the vine ripe stage.

6. To determine the relationships between selected producer and farm characteristics of Tennessee tomato producers and the percent of tomatoes harvested at the mature green stage.

II. METHOD OF INVESTIGATION

A total of 117 commercial tomato producers who grew at least one-half acre of tomatoes in 1984 were surveyed by personal interviews conducted by the Extension agents in the following 10 Tennessee counties: Gibson, Lauderdale, Shelby, Hamilton, Rhea, Grundy, Claiborne, Cocke, Grainger, and Jefferson. Individuals surveyed were identified by using the "nth" number technique. Names were taken from the updated county Extension mailing list of commercial tomato producers. The survey instrument used to survey the group was developed by the state specialist staff at the University of Tennessee.

Following the completion of the survey by the Extension agents in December 1984, data were processed for computer analysis.

Computations were made using the Tennessee Computing Center facilities. The chi square test was used to determine the strength of the relationship and the .05 probability level was used to determine whether or not observed relationships would be considered significant.

III. SUMMARY OF MAJOR FINDINGS

Major findings are summarized in this section. Findings were organized according to specific objectives of the study and are presented below in six subsections.

Producer, Farm, and Chemical Usage Characteristics of Tennessee Tomato Producers and the Number and Type of Contacts Made With Extension

In this subsection findings are summarized regarding the producer, farm, chemical usage, and market characteristics of Tennessee commercial tomato producers. Major source of farm income, employed full-time off farm, employed part-time off farm, and age of producers were four characteristics used to describe tomato producers.

A slight majority of tomato producers had vegetables as their major source of farm income, about 70 percent were not employed full time, and 77.7 percent were not employed part-time off the farm. Just over 64 percent were 50 or under years old.

Acres farmed, number of plants planted, yield per acre, predominant variety grown, type of plant, plant container, market time, percent of the crop harvested at mature green stage, percent of the crop harvested at vine ripe stage, and type of market outlet

were farm characteristics of Tennessee commercial tomato producers. Producers were small as indicated by just over 68 percent who farmed 100 acres or under and 65.8 percent who planted 17,000 plants or under. A slight majority of producers yielded over 4.0 tons, grew a shipping variety, and raised their own tomato transplants. Just over 68 percent used container grown plants. The mean yield was 10.0 tons per acre, whereas, the median yield was 4.0 tons and the mode was zero yield.

Producers were described as to their chemical usage. Variables used to describe chemical usage included fertilizer use, pounds of nitrogen, potash and phosphate used at planting, fertilizer and lime applied by soil test, pounds of nitrogen applied as sidedressing, plant size when sidedressed, foliar fungicide first applied, soil tested for nematode, and use of disease resistant varieties.

The majority of producers (59.8 percent) used 60 pounds or less of nitrogen, and almost 96 percent used 240 pounds or less of potash and phosphate at planting. Over 60 percent of producers applied fertilizer and lime by soil test. Nitrogen applied at sidedressing was evenly divided with 49.6 percent using 30 pounds or less and 50.4 percent using 31 pounds or more. On the average, producers used 45 pounds of nitrogen as a sidedressing.

Just over 68.0 percent applied a nitrogen sidedressing to plants after fruit set. A strong majority of just under 95 percent applied their first foliar fungicide before disease appeared. Almost 92 percent did not soil test for nematodes, and just over 65 percent did use a disease resistant variety.

Producers also were characterized according to methods used to contact Extension agents. The methods were: (1) all types of Extension meetings, (2) tomato Extension meetings, (3) number of visits to Extension office, (4) number of telephone calls to Extension office, and (5) number of farm visits received from Extension during the past 12 months.

Almost 86 percent did receive one or more total Extension contacts. Only 14.5 percent of the commercial tomato producers in Tennessee did not have any type of personal contact with Extension agents through meetings, office visits, telephone calls or farm visits during 1984. On the average each producer had 11.4 contacts with Extension that year. Just over 58 percent had attended an Extension meeting of some type in the past 12 months. Just under 54 percent attended one or more tomato Extension meeting during the past 12 months and just over 52 percent of producers received a farm visit by an Extension agent. Almost 74 percent of producers telephoned the Extension office and almost 77 percent of producers received a farm visit in the past 12 months from an Extension agent.

Relationships Between Types of Contacts Tennessee
Tomato Producers Had With Extension and Numbers of
Plants Planted and Predominant Variety Grown

Findings are presented in this subsection concerning four contact methods tomato producers had with Extension and their relationship with two farm characteristics which were the number of tomato

plants planted, and predominant variety grown. The four contact methods studied included: (1) farm visits, (2) tomato meetings attended, (3) visits to office, and (4) telephone to office.

Among the four contact methods, only one was significantly related to number of plants planted. Producers who grew more tomato plants (over 17,000) were more likely to attend a tomato meeting than producers who grew fewer numbers of tomato plants. However, producers who grew more tomato plants (over 17,000) were no more likely to receive a farm visit, visit the office, or telephone the Extension office than producers who grew fewer tomato plants.

The predominant variety grown was analyzed as to producer contact with Extension agents. Producers were classified as to growing either a shipping variety or a homegrown variety. Among the four Extension contact methods that were studied, two were significantly related to the predominant variety grown. Tennessee tomato producers who grew a homegrown variety were more likely to receive a farm visit and telephone calls by an Extension agent than tomato producers who grew a shipping variety. However, tomato producers who grew a shipping variety were no more or less likely to visit the Extension office or attend a tomato meeting than tomato producers who grew a homegrown variety.

Relationships Between Selected Producers and Farm Characteristics of Tomato Producers and Type of Variety Grown

Findings are presented in this subsection concerning three producer characteristics and seven farm characteristics as they

relate to the type of variety grown by tomato producers. Tennessee commercial tomato producers were classified as growing either a shipping or homegrown variety.

Among the three producer characteristics, only one was significantly related to type of variety grown. Producers who had vegetables as their major source of farm income were more likely to raise a shipping variety than a producer who had some other enterprise as their major source of farm income. Conversely, tomato producers who had some other enterprise as their major source of farm income were more likely to plant a homegrown variety than a shipping variety. The two producer characteristics that were not significantly related to type of variety grown were employed off the farm and age of producer. Thus, producers who were employed off the farm and were of the age of 50 or under were no more or less likely to grow a shipping variety than producers who were not employed off the farm or those who were over 50 years old.

Among the seven farm characteristics, five were significantly related to type of variety grown.

1. Producers who planted fewer plants (17,000-under) were more likely to grow a homegrown variety than producers who planted over 17,000 plants. Conversely, producers who planted over 17,000 plants were more likely to grow a shipping variety than producers who grew fewer plants.

2. Producers who harvested mature green tomatoes for their primary market were more likely to grow a shipping variety than producers who harvested mature green tomatoes for a secondary market.

Conversely, producers who harvested mature green tomatoes for a secondary market were more likely to grow a homegrown variety than producers who harvested mature green tomatoes for a primary market.

3. Producers who harvested vine ripe tomatoes for a secondary market were more likely to use a shipping variety than producers who harvested vine ripe tomatoes for their primary market. Conversely, producers who harvested vine ripe tomatoes for their primary market were more likely to use a homegrown variety of tomatoes than producers who harvested vine ripe tomatoes for a secondary market.

4. Producers who hired the majority of their labor were more likely to grow a shipping variety than producers who hired less than half of their labor. Conversely, producers who hired less than half of their labor were more likely to use a homegrown variety than producers who hired the majority of their labor.

5. Producers who used a shipping market outlet were more likely to use a shipping variety than producers who grew a homegrown variety. Conversely, producers who used a local market outlet were more likely to use a homegrown variety than producers who grew a shipping variety.

Acres farmed and market time were not significantly related to type of variety grown. Thus, producers who grew 100 acres or under and those who grew tomatoes for an early market were no more or less likely than producers who grew over 100 acres or those who grew for a late market to choose a shipping variety.

Relationships Between Selected Producer and Farm
Characteristics of Tennessee Tomato Producers
and the Type of Market Outlet Chosen

Findings were presented in this subsection concerning three producer characteristics and seven farm characteristics as they relate to the type of market outlet chosen.

Among the three producer characteristics, none was significantly related to market outlet chosen. Producers who had vegetables as their major source of farm income, were employed part-time off the farm, were of the age of 50 or under were no more likely to chose a shipping variety than producers who had some other enterprise as their major source of farm income, were employed part-time off the farm or those who were over 50 years old.

Among the seven farm characteristics, two were significantly related to market outlet chosen. Producers who grew a shipping variety were more likely to use a shipping market outlet than producers who grew a homegrown variety. Conversely, producers who grew a homegrown market were more likely to use a local market outlet than producers who grew a shipping variety.

Producers who harvested vine ripe tomatoes for their primary market were more likely to chose a shipping market outlet than producers who harvested vine ripe tomatoes for a secondary market. Conversely, producers who harvested vine ripe tomatoes for a secondary market were more likely to use a local market outlet than producers who harvested vine ripe tomatoes for a primary market.

Farm characteristics of acres farmed, number of plants planted, percent of the crop harvested at mature green stage, percent of the crop harvested at the ripe stage, and yield per acre in tons were not significantly related to market outlet chosen. Producers who farmed 100 acres or under, planted fewer plants, harvested mature green tomatoes for a secondary market, harvested 10 percent or under of their tomatoes at the vine ripe stage, and yielded 4.0 tons per acre or under were no more or less likely to choose a shipping market outlet than producers who farmed over 100 acres, planted more plants, harvested mature green tomatoes for their primary market, harvested over 10 percent of their tomatoes at the ripe stage or those who yielded over 4.0 tons per acre.

Relationships Between Selected Producer and Farm
Characteristics of Tennessee Tomato Producers and
the Percent of the Crop Harvested at the Vine
Ripe Stage

Findings are summarized in this subsection concerning three producer characteristics and seven farm characteristics as they relate to the percent of the crop harvested at the vine ripe stage.

Among the three producer characteristics, only one was significantly related to the percent of the crop harvested at the vine ripe stage. Producers who had vegetables as their major source of farm income were more likely to harvest vine ripe tomatoes for a secondary market than producers who had some other enterprise as their major source of farm income.

Producers who were not employed part-time off the farm and were of the age of 50 or under were no more or less likely to harvest vine ripe tomatoes for a secondary market than producers who were employed part-time off the farm or those who were over 50 years old.

Among five farm characteristics of acres farmed, number of plants planted, predominant variety grown, market time, and major market outlet, three characteristics were significantly related to the percent of the crop harvested at the vine ripe stage. The three characteristics were:

1. Producers who planted more plants (over 17,000) were more likely to harvest their vine ripe tomatoes for a secondary market than producers who planted fewer tomato plants. Conversely, producers who planted fewer tomato plants (17,000 or less) were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew more tomato plants.

2. Producers who grew a shipping variety were more likely to harvest their vine ripe tomatoes for a secondary market than producers who grew a homegrown variety. Conversely, producers who grew a homegrown variety were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew a shipping variety.

3. Producers who used a local market outlet were more likely to harvest their vine ripe tomatoes for a secondary market than producers who used a shipping market outlet. Conversely, producers who used a shipping market outlet were more likely to harvest their vine ripe tomatoes for their primary market than producers who grew for a local market.

Producers who farmed under 100 acres and grew for an early market were no more or less likely to harvest their tomatoes at the vine ripe stage than producers who grew over 100 acres or those who grew tomatoes for a late market.

Relationships Between Selected Producer and Farm

Characteristics of Tennessee Tomato Producers

and the Percent of the Crop Harvested at the

Mature Green Stage

None of the three producer characteristics was significantly related to the percent of tomato crop harvested at the mature green stage. Therefore, producers whose major source of farm income was vegetables were not employed part-time off the farm and were 50 or under years old were no more or less likely to have mature green tomatoes as their primary market than were producers whose major source of income was not vegetables, those employed part-time off farm or those over 50 years of age.

Among the six farm characteristics studied only one was significantly related to the percent of tomatoes harvested at the mature green stage. Producers who grew a homegrown variety were more likely to harvest mature green tomatoes for a secondary market than producers who grew a shipping variety of tomatoes. Conversely, producers who grew a shipping variety were more likely to harvest mature green tomatoes for a primary market than producers who grew a homegrown variety.

Producers who farmed 100 acres or under, grew fewer tomato plants, raised tomatoes for an early market, used a shipping market outlet, and yielded 4.0 tons per acre or under were no more or less likely to harvest mature green tomatoes for a secondary market than producers who farmed over 100 acres, grew more plants, raised tomatoes for a late market, used a local market outlet or those who yielded over 4.0 tons per acre.

IV. FINDINGS, DISCUSSION, AND IMPLICATIONS

With the possibility of improving the marketing situation through the establishment of these regional food distribution centers, the Cooperative Extension Service will need to identify, target, and train producers who are interested in raising vegetables.

Extension personnel will need to recognize and identify the type of marketing outlet that has the most potential for their locality in order to assist producers in increasing their income.

Extension also needs to address the problem of low yields, although most producers are following the majority of recommended practices, if increased volume is to be obtained.

Among the producer characteristics of major source of farm income, employed full-time off the farm, employed part-time off the farm, and age of producer, there were several interesting findings presented in the frequency tables.

First, although the majority of vegetables producers said vegetables were their major source of farm income, there was a sizable

number of producers who said that their major source of farm income came from some other enterprise. Thus, a large number of producers must view the potential income from tomatoes as being something profitable, or at least something they are willing to try. This could be important to change agents who want to promote a more active fruit and vegetable industry by involving new producers.

Secondly, three-fourths of tomato producers were full-time farmers, but part-time farmers were an important segment, roughly 20 to 30 percent, of the producer population. Considering the high number of part-time tomato producers and the high labor involvement of growing tomatoes, findings indicate that producers view tomatoes as having high income potential. Extension agents must target the special scheduling needs of part-time farmers through special educational efforts. Producers who fail will often persuade other producers not to grow tomatoes, despite Extension agents promotional efforts. Therefore, Extension agents should make every effort to see that part-time farmers, as well as full-time farmers, succeed in their endeavors.

Thirdly, the majority of all Tennessee farmers are above 50 years old. Tomato producers break this age trend with three-fourths of them being under 50 years of age. Perhaps younger farmers are more willing to take risk and try minor crops such as tomatoes than older more established farmers. Educational efforts could be directed towards promoting tomatoes as an enterprise that requires less financial investment and thus be more attractive to younger farmers who have less financial resources at their disposal.

Among the six farm characteristics of acres farmed, number of plants planted, yield per acre in tons, predominant variety grown, type of plant grown, and plant container used, there were several interesting findings presented in the frequency tables.

First, the big majority of tomato producers have very small acreage, as indicated by the acres they farmed and total number of plants planted. The small number of plants and acres certainly explain why Tennessee is not producing high volumes of vegetables and has had trouble attracting large wholesalers who are more interested in purchasing high volume of tomatoes and other vegetables. The implication for change agents involved in the industry is to find ways to either pool the produce, or perhaps find ways to increase profitability so producers will become larger.

Secondly, the average yields were very low. A full third of producers said that they did not harvest any tomatoes. Several explanations could be given. Market prices may have been too low to justify harvesting their tomatoes, a natural disaster may have occurred, or producers did not have the managerial capacity to successfully raise a crop to harvest. Tomatoes are indeed a very risky crop because you are not guaranteed a price, nor are they an easy crop to raise. Extension agents must make every effort to help growers target a good economic window, develop market outlets to channel their product, and encourage more technology to lower risks of growing the crop.

A third finding that is very interesting is the number of commercial tomato producers who are raising homegrown varieties to sell to both local and shipping markets. Some producers are striving to carve out their own niche in the tomato market by producing a flavorful homegrown tasting product that will attract consumers. Extension should be aware of alternative specialty markets that use different techniques of production and marketing. For example, tomato growers in Grainger County prefer to market tomatoes in bushel baskets because they feel that consumers associate bushel baskets with flavorful, homegrown, vine ripen taste in tomatoes. Influencing these growers to conform to a standard 20-25 pound cardboard box would not be appropriate application of the adoption of technology for Extension agents to pursue.

Among other findings, the majority of producers are growing their own plants in their own plant containers. When you grow your own plants, you can have more control over the time you enter the market. Thus, producers who can influence the time they enter the market have the potential of achieving higher sales returns.

In terms of chemical usage, the majority of tomato producers followed the recommended practices. Nitrogen was the only element of fertilizer that was applied at planting and at the time of side-dressing above the University of Tennessee's recommended fertilizer rates. An overwhelming majority of producers did not apply potash or phosphate above the recommended fertilizer rates, although most of the producers did not soil test. In fact, the producers who did

soil test were the ones who tended to use above the recommended nitrogen rates. This tends to indicate that producers do not feel that the nitrogen levels recommended by soil test were sufficient for the crop. Extension agents must use field demonstrations to show that nitrogen levels recommended by soil test are optimum for achieving the highest yields. Because many growers are using drip irrigation there is a need to update our nitrogen recommendations to include liquid formulations of nitrogen.

Among the findings concerning the marketing characteristics of tomato producers in Tennessee, the majority were choosing to market on an early market in a shipping market outlet. There were slightly more producers who harvested vine ripe tomatoes for their primary market than producers who harvested mature green tomatoes for their primary market. If high volume wholesale marketing is a goal for Tennessee, producers will have to adopt production practices that will produce higher volume of sellable product, whether for the vine ripe or mature green markets.

Among the findings regarding the number and type of contacts producers had with Extension, the majority of producers were contacting Extension during the year by attending a meeting, visiting the office, calling the office, or receiving a farm visit from an Extension agent. Tomatoes are such an intensive crop in terms of time, management, and skill that producers need all the educational assistance that they can receive to be successful. Extension agents who wish to develop a tomato industry in their county must be willing

to become very actively involved with producers and be able to provide timely, accurate advice for their production problems.

The relationships between type and number of contacts producers had with Extension as it related to their size and their choice of predominant variety grown was examined. Basically, size of operation did not affect the number of contacts with Extension with the exception of tomato meetings attended. Larger producers (over 17,000 plants) did attend more meetings than smaller producers.

Predominant variety grown was significantly related to the number and types of contacts with Extension. Producers who grew homegrown varieties were more likely to receive one or more farm visits, or to make one or more telephone calls to the Extension office than producers who grew a shipping variety. Extension is currently serving the needs of the average producer who is small and grows a homegrown variety, and for a local market outlet. Extension must take a proactive stance and not only contact shipping variety producers, but encourage others to become shipping variety producers if high volume wholesale markets are desired.

Factors significantly influencing the major market outlet chosen was not significantly related to any producer characteristic. Some have suggested that farmers no longer "market their produce", and have lost any type of control that could be exercised or influenced by producer characteristics. It is suggested that volume buyers have all the choices in whom they will allow to "sell" to them.

Among the farm characteristics that were significantly related to the market outlet chosen were predominant variety and percent harvested

at the vine ripe stage. Perhaps this indicates that variety and the degree of ripeness at which producers harvested their tomatoes were the most important decisions to make when choosing a market outlet.

Logically, the majority of producers used a shipping variety for shipping market outlet, and a homegrown variety for a local market outlet. But, half of homegrown variety producers used a shipping market outlet and approximately one-fifth of shipping variety producers used a local market outlet. Again there is strong evidence that a segment of the tomato market is going to a specialty market known for its homegrown taste in tomatoes. Again Extension must be aware of the specialty markets as they exist and not destroy product identification through the introduction of innovation such as hard tomatoes.

Producers who grow tomatoes generally chose to harvest their tomatoes at a maturity level, as indicated by the percent of coloration a tomato has developed, but regardless of the aim of the producers to harvest at a certain point of maturity, there will be other maturity grades mixed in with a producers primary choice of harvest. The question becomes what can producers do with these tomatoes that are harvested at some other maturity level. Producers must have alternative markets for these secondary products or consider losing potential income and reducing overall marketable yields.

The majority of all producers (64 percent) did not harvest primarily mature green tomatoes, but in the course of the harvest,

producers did pick enough green tomatoes that had to be sold through a secondary source. Of those producers who marketed their mature green tomatoes through a secondary market, almost 67 percent did so by choosing a shipping market outlet. Again surprisingly, a full third of producers who harvest mature green tomatoes as a secondary market sold through local marketing outlets. This is important even though the percent of the crop is not significantly related to the type of market outlet chosen. The implication for Extension is to develop both types of market outlets so producers can sell all of their crops. The goal for Extension becomes very complex and difficult because production and markets must be developed together and in coordination with each other.

Another interesting observation concerns the percent of the crop harvested at the ripe stage. A ripe tomato is one whose surface has reached over 50 percent coloration. A commercial tomato producer cannot harvest primarily at the ripe stage because the shelf life of the tomato would be very short and buyers would sustain heavy losses. Growers do find, however, that small percentages of their crop is at this ripe stage.

The data indicates that almost three-fourths of commercial tomato producers do a good job in limiting the percent of ripens harvested, but again a sizable segment (27 percent) did indicate that over 10 percent of their crop was harvested at the ripe stage. These ripe tomatoes were equally marketed through shipping and local market outlets. Seventy percent of producers who did have a small

percentage of their crop harvested as ripe could continue to market their product through a shipping market outlet. This is probably due to a certain tolerance level established by buyers on the shipping market outlet. The implication is for Extension agents to stress harvesting and marketing their crop on a timely basis so as to limit the number and percent of the tomatoes going to the ripe stage.

Although yields were not significantly related to market outlet chosen, both groups (i.e., shipping and local outlets) had their share of producers who had low yields. The implication for Extension is to discover why these yields are low so they can encourage producers to take corrective measures. The problem may include production problems or the problem may be the result of low prices or limited access to market outlets.

Among other findings, the percent of the crop harvested at the vine ripe stage was significantly related to a number of producer and farm characteristics. Producers who were not primarily vegetable producers did harvest the majority of their crop in the vine ripe stage. Producers who were primarily vegetable producers harvested only 40 percent of their crop in the vine ripe stage. This suggests that growers whose major source of income was from vegetables chose to harvest their crop at some other point of maturity other than vine ripe.

Thirty four percent of all tomato producers harvested their crop at the vine ripe stage primarily for a shipping market outlet and

11 percent of all tomato producers harvested their crop at the vine ripe stage for local market outlets. The implication for Extension agents would be to watch this production trend and observe which market outlet offers the best market opportunity for potential growers in their area.

Among all tomato producers, only 21 percent grew primarily for the mature green market and had vegetables as their major source of farm income. The limited number of tomato producers who are growing mature green tomatoes suggest that either the market is limited in the quantities it will accept or grower considers tomatoes harvested at some other maturity level as being more lucrative or more market accessible. Extension needs to explore and access requirements for entering the green market and advise producers accordingly.

Some producers feel that large acreage is needed to produce and market mature green tomatoes, although there is not a significant relationship between percent of the crop harvested at the mature green stage and number of plants planted. The data indicated that 19 out of 42 tomato producers who were primarily mature green growers planted over 17,000 plants compared to 23 producers who were primary mature green growers who grew under 17,000 plants. This means that a fairly large percent of mature green producers were small producers that found access to the market. Extension needs to explore specifically why and how these small tomato producers grew mature green tomatoes because this market that has

traditionally been for the larger producers. Extension agents that are interested in tomato production may find their small producers interested in pursuing growing and selling in the mature green market.

V. RECOMMENDATIONS FOR FURTHER STUDY

If vegetables are going to grow as an industry in Tennessee, marketing and production needs must be improved through further studies of the factors that affect them.

Further studies to determine factors affecting marketing practices used by tomato producers in specific tomato producing regions or counties would be useful.

Studies could be conducted to determine why tomato yields are so low. This could help Extension agents to direct their educational efforts towards increasing yields.

Pricing, marketing opportunities, market windows, linkage with other areas, and speciality markets could also be studied.

As communication methods continue to develop, such as a computer link between farmers and the Extension office, studies indicating effective means to influence vegetable producers would also be useful.

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AEE INFO-14

TENNESSEE AGRICULTURAL EXTENSION SERVICE



1984 COMMERCIAL TOMATO PRODUCTION SURVEY
(See Instructions on Last Page)

Card No. 1
(1)

County Name _____

Respondent No. 0 0
(2) (3)

Co. TEMIS No. (4) (5) (6)

A. Production Information *

(7-11) _____ How many plants were planted this year (1984)?

(12-13) _____ What was the predominant variety grown? (1 = Floradade; 2 = Floriamerica; 3 = Walter; 4 = Mt. Pride; 5 = Better Boy; 6 = Bradley; 7 = Sunny; 8 = Supersonic; 10 = Jet Star; 11 = Royal Flush; 12 = Other; 99 = don't know)

Plant Production (Publication #737)

(14) _____ What type of plants were used? (1 = home grown; 2 = purchased-certified plants; 3 = purchased-non-certified plants)

(15) _____ Were plants container grown or bare-root? (1 = container-grown; 2 = bare-root)

Field Fertilization (Publication #737)

(16-18) _____ At planting time, how many pounds of nitrogen (N) were applied?

(19-21) _____ At planting time, how many pounds of potash (K₂O) were applied?

(22-24) _____ At planting time, how many pounds of phosphate (P₂O₅) were applied?

(25) _____ Was fertilizer applied according to soil test? (1 = no; 2 = yes)

(26) _____ Was lime applied according to soil test? (1 = no; 2 = yes)

(27) _____ Was fertilizer banded or broadcast? (1 = banded; 2 = broadcast)

(28-30) _____ How many pounds of nitrogen (N) were applied as sidedressing?

(31) _____ How many times was nitrogen applied as sidedressing?

(32) _____ What was the plant size when nitrogen was applied as sidedressing? (1 = at first bloom; 2 = 12" tall; 3 = first fruits were about one inch in diameter; 9 = none applied as sidedressing)

Weed Control (Publication #452)

(33) _____ What was the primary weed control method used? (1 = cultivation; 2 = herbicides; 3 = herbicides plus cultivation; 9 = other)

(34) _____ How many times was cultivation done?

(35) _____ What was the primary herbicide used? (1 = Treflan; 2 = Diphenamid; 3 = Sencor or Lexone; 4 = Dacthal; 5 = Tillam; 6 = Devrinol; 9 = none applied)

(36-37) _____ What percent (%) of crop loss was due to weeds?

Disease Control (Publication #716)

(38) _____ What was the primary foliar fungicide used? (1 = fixed-copper; 2 = Maneb; 3 = Mancozeb; 4 = Bravo; 5 = Dyrene; 6 = Polyram; 7 = Ridomil MZ-58; 8 = Zineb; 9 = none used)

(39) _____ When was the first foliar fungicide applied? (1 = soon after plants were established; 2 = when disease first appeared; 9 = none applied)

*Coding Instructions:

1. Fill each blank with a number.

2. Right justify all entries.

3. Use a nine (9) in each blank when a question does not apply.

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2

- (40-41) _____ How many times were fungicides applied in the field?
- (42) _____ Which fumigants or nematicides were applied to the soil for nematode and/or disease control? (1 = Methyl bromide; 2 = Vorlex; 3 = Telone; 4 = Soil-brom; 5 = Dasanit; 6 = Vapam; 7 = Ridomil; 9 = none applied)
- (43) _____ Was a soil sample tested for nematodes? (1 = no; 2 = yes)
- (44) _____ Were root knot nematodes present in your field? (1 = no; 2 = yes)
- (45) _____ What was the major disease problem? (1 = early blight; 2 = late blight; 3 = blossom-end rot; 4 = Fusarium wilt; 5 = Verticillium wilt; 6 = Gray mold; 7 = bacterial diseases; 8 = Nematodes; 9 = no major disease problem - had less than one (1) percent (%) loss)
- (46-47) _____ What percent (%) of crop loss was due to disease and/or nematode damage?
- (48) _____ Did you use disease resistant varieties? (1 = no; 2 = yes)

Insect Control (E.C. #817)

- (49) _____ How many different insecticides were used?
- (50-51) _____ Which foliar insecticide was used most frequently? (1 = Dia-Zinon; 2 = Cygon; 3 = Thiodan; 4 = Guthion; 5 = Sevin; 6 = Dipel; 7 = Lannate or Nudrin; 9 = Pydrim; 99 = none used)
- (52-53) _____ How many times did you spray for insects?
- (54) _____ Was a preplant granular insecticide used? (1 = no; 2 = yes)
- (55) _____ What was the most serious insect problem encountered this year? (1 = Aphids; 2 = Cutworms; 3 = Fruitworms; 4 = Hornworms; 5 = Loopers; 6 = Colorado potato beetles; 7 = other; 9 = no insect problem)
- (56-57) _____ What percent (%) of crop loss was due to insects?
- (58-59) _____ What percentage (%) of tomato acreage was scouted?
- (60) _____ Were economic threshold levels used to determine when insecticides were to be applied? (1 = no; 2 = yes)

8. Harvesting and Marketing

Harvesting

- (61) _____ What was your major source of labor for harvest? (1 = only family labor used; 2 = pick-your-own labor; 3 = locally hired labor; 4 = migrant labor; 5 = other)
- What percents of the crop were harvested at the following stages:
- (62-64) _____ a. Percent harvested at mature green stage?
- (65-67) _____ b. Percent harvested at breaker stage?
- (68-70) _____ c. Percent harvested at pink stage?
- (71-73) _____ d. Percent harvested at ripe stage?
- (74-75) _____ What percent (%) of labor used was hired?

Marketing

- (76) _____ Were tomatoes grown for the early or late markets? (1 = early; 2 = late; 3 = both early and late)
- (77) _____ What was the major market outlet? (1 = packing shed; 2 = wholesalers or retailers; 3 = grocery stores; 4 = farmer's market; 5 = pick-your-own; 6 = cooperative; 7 = truckers in field; 8 = other)

3

(78-79) _____ What was your yield per acre in tons?

Card No. 2
(1)County No. _____
(4) (5) (6)Respondent No. 0 0
(2) (3)C. Extension Contacts

Over the past 12 months, approximately how many contacts did you have with Extension agents through: (Note: Agent and/or producer may estimate)

- (7-8) _____ Extension meetings of all types?
 (9) _____ Extension meetings on tomato production and marketing?
 (10-11) _____ Visits made to the Extension office?
 (12-13) _____ Telephone calls made to Extension office?
 (14-15) _____ Farm visits by Extension agents?

D. Farm and Personal Information

- (16) _____ What is your major source of farm income? (1 = vegetables; 2 = fruit; 3 = row crops; 4 = livestock; 5 = dairy; 6 = other)
 (17) _____ How many acres do you farm? (1 = under 100 acres; 2 = 101-300 acres; 3 = 301-500 acres; 4 = over 500 acres)
 (18) _____ During the past 12-months, were you ever employed full time off the farm? (1 = no; 2 = yes)
 (19) _____ During the past 12-months were you ever employed part time off the farm? (1 = no; 2 = yes)
 (20) _____ Age of farmer - agent may estimate. (1 = under 30; 2 = 31-50; 3 = 51-60; 4 = over 60)

E. General Instructions for 1984 Tomato Survey

1. Date Due: December, 1984.
2. Disposition: Mail completed survey forms to the Associate District Supervisor Agricultural Program, for forwarding to Agricultural Extension Education.
3. Counties to be surveyed:
 District I: Gibson, Lauderdale and Shelby
 District II: Davidson, Williamson
 District III: Bledsoe, Hamilton, Rhea, and Grundy
 District V: Claiborne, Cocke, Grainger, Jefferson, Knox, Unicoi, Washington
 Other Counties: Other counties with one or more producers growing at least 1/2 acre of tomatoes as a cash crop also may want to do the survey.
4. Population: Commercial tomato producers who grew at least 1/2 acre of tomatoes for sale in 1984.
5. Sample Size:
 - a. Counties with from one to 15 producers, survey all of them.
 - b. Counties with from 16 to 25 producers, survey 15.
 - c. Counties with from 26 to 50 producers, survey 20.
 - d. Counties with from 51 to 100 producers, survey 25.
 - e. Counties with over 100 producers, survey 30.
6. Sampling Procedure:
 - a. Use a list of all tomato producers who grew at least 1/2 acres in 1984.
 - b. Use the Nth number technique to identify those producers who will be interviewed. Select two or three other producers to serve as alternates.

VITA

Sharon E. Rice was born in Middlesboro, Kentucky on October 20, to Mr. and Mrs. Edward A. Rice. She attended West End Elementary School and Middlesboro Junior High School before moving to Claiborne County in 1968. She graduated from Powell Valley High School as Salutatorian in 1976.

Sharon received her Bachelor of Science degree from The University of Tennessee, Knoxville, College of Agriculture in 1979, graduating with honors. She majored in Plant and Soil Science.

Following graduation she was employed at the University of Tennessee under Dr. Fred Allen, Professor of Plant and Soil Science with research responsibilities in soybean breeding. In 1980 she began employment with the Agricultural Extension Service as a Program Assistant in Claiborne County and in 1983 moved to Cocke County to become an Assistant Agricultural Extension Agent with responsibilities in Tomato Pest Management.

She is a member of Tennessee Association of Agricultural Agents and Specialist, the Tennessee Alumni Association, West End Baptist Church, Heartseay Garden Club, D.A.R., Alpha Zeta Fraternity, and Beta Sigma Sorority. She was named "Girl of the Year" by Beta Sigma Phi in 1988. She received the Outstanding Young Agent Award in 1989 and the Achievement Award in 1990 from the Tennessee Association of Agricultural Agents and Specialists.