



5-1987

# Analysis of In-Store Experiments Regarding Sales of Locally Grown Tomatoes

University of Tennessee Agricultural Experiment Station

John R. Brooker

Carol L. Stout

David B. Eastwood

Robert H. Orr

Follow this and additional works at: [http://trace.tennessee.edu/utk\\_agbulletin](http://trace.tennessee.edu/utk_agbulletin)

 Part of the [Agriculture Commons](#)

## Recommended Citation

University of Tennessee Agricultural Experiment Station; Brooker, John R.; Stout, Carol L.; Eastwood, David B.; and Orr, Robert H., "Analysis of In-Store Experiments Regarding Sales of Locally Grown Tomatoes" (1987). *Bulletins*.  
[http://trace.tennessee.edu/utk\\_agbulletin/457](http://trace.tennessee.edu/utk_agbulletin/457)

The publications in this collection represent the historical publishing record of the UT Agricultural Experiment Station and do not necessarily reflect current scientific knowledge or recommendations. Current information about UT Ag Research can be found at the [UT Ag Research website](#).

This Bulletin is brought to you for free and open access by the AgResearch at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Bulletins by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).

AGF-VET MED LIBRARY  
 IIII 28 1989  
 UNIV. OF TENN.

S  
 115  
 .E32  
 No. 654  
 STACKS

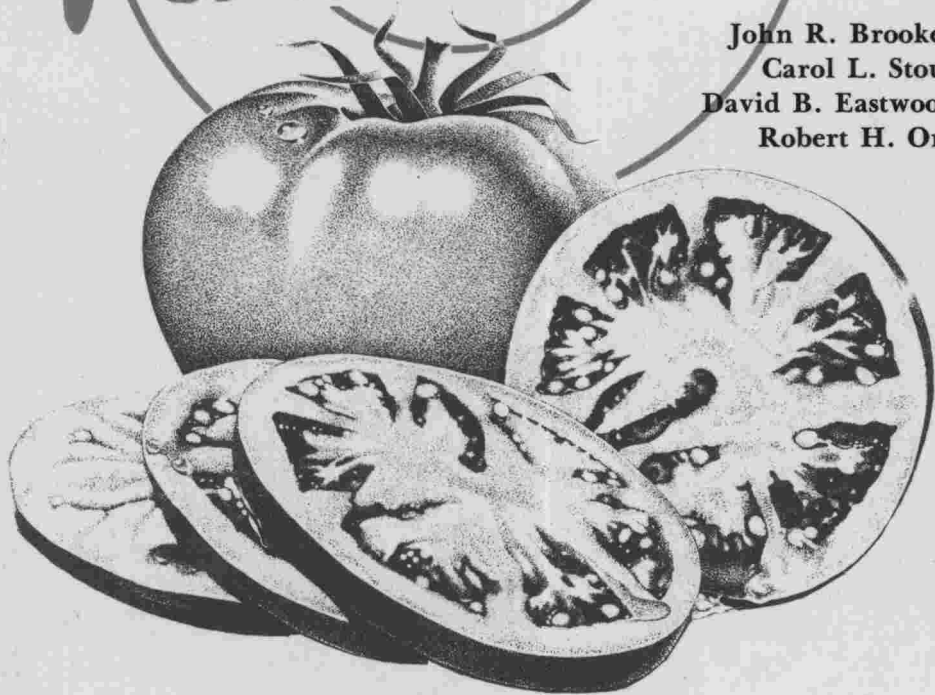
# Analysis of In-store Experiments

## Increasing Sales of Locally Grown Tomatoes

# COUNTRY

# Tennessee

John R. Brooker  
 Carol L. Stout  
 David B. Eastwood  
 Robert H. Orr



# Analysis of In-store Experiments Regarding Sales of Locally Grown Tomatoes

John R. Brooker  
Professor

Carol L. Stout  
Graduate Research Assistant

David B. Eastwood  
Professor

Robert H. Orr  
Associate Professor

Department of Agricultural Economics and Rural Sociology  
The University of Tennessee Institute of Agriculture  
Agricultural Experiment Station  
Knoxville, Tennessee  
Bulletin 654, May 1987

## **Abstract**

Consumers' actual purchasing behaviors in Knoxville, Tennessee, retail chain stores were monitored with respect to the purchase of locally grown tomatoes versus tomatoes from other origins. The locally grown tomatoes were identified by the use of a dime-sized logo attached to each tomato. Consumer response to the logo was positive, but minor. Probit analysis of data obtained from mail-in questionnaires revealed that the tomato consumers' preference for freshness, nutrition, taste, and storage life outweighs their concern for where the product is grown.

## Table of Contents

	<u>Page</u>
Abstract . . . . .	iv
Acknowledgments . . . . .	vii
Introduction . . . . .	1
Objectives . . . . .	3
Procedure . . . . .	3
Consumer Purchases During In-store Experiments . . . . .	5
Sales data analysis . . . . .	5
Estimated equations . . . . .	8
Purchaser Responses from Mail-in Questionnaires . . . . .	9
Probit model . . . . .	14
Estimated equations . . . . .	18
Concluding Remarks . . . . .	20
References . . . . .	21
Appendix: Items on Mail-in Questionnaire . . . . .	24

### List of Tables

1. In-store tomato sales experiments conducted in three Knoxville metropolitan area supermarkets . . . . .	5
2. Bulk tomato sales at three retail chain stores by experiment week, store, origin, and day, Knoxville, Tennessee, 1986 . . . . .	6
3. Weighted average per day bulk tomato sales by experiment and origin, Knoxville, Tennessee, 1986 . . . . .	7
4. Distribution of experiments . . . . .	8
5. Distribution of mail-in questionnaire responses from purchasers of bulk displayed tomatoes by retail store, week, and day of week, Knoxville, Tennessee, 1986 . . . . .	9
6. Socioeconomic information of bulk tomato purchasers at retail chain stores, Knoxville, Tennessee, 1986 . . . . .	11
7. Responses to questions answered by purchasers of bulk tomatoes at retail chain stores regarding their purchase decision, Knoxville, Tennessee, 1986 . . . . .	12
8. Characteristics used by purchasers of tomatoes at retail chain stores to judge tomato quality, Knoxville, Tennessee, 1986 . . . . .	12
9. Tomato purchasers' comparisons of Tennessee-grown tomatoes with those from other origins, Knoxville, Tennessee, 1986 . . . . .	13
10. Comparisons of responses to "Tennessee—Country Fresh" logo based on purchasers' concerns about origin of the tomatoes for sale at retail chain stores, Knoxville, Tennessee, 1986 . . . . .	15
11. Dependent variables hypothesized to be affected by household characteristics of shoppers and by attributes of fresh tomatoes for sale at retail stores . . . . .	16
12. Independent variables hypothesized to affect tomato purchases at retail stores . . . . .	17
13. Results of the probit regressions . . . . .	19

## Acknowledgments

This particular study could not have been conducted without the cooperation and assistance of the Kroger Company and Red Food Stores. Appreciation is extended to Mr. Earl Bass, Head of Merchandising, the Kroger Company, and to Mr. Jesse Lewis, Senior Vice President of Store Operations, Red Food Stores, for permitting the tomato sales experiments to be conducted in their Knoxville area stores. The personnel of each participating retail store also helped with the coordination and monitoring of the in-store experiments. These individuals from Red Food Stores are Mr. Mike Hess, Manager, and Mr. Howard Tinker, Produce Manager, and for the Kroger Company, Mr. Bill Warden and Mr. Charles Pittman, Managers, and Mr. Bill Howard and Mr. Bill Rhea, Produce Managers.

Appreciation is also extended to the Knoxville produce wholesaler Mr. Lee Roy Neely of Neely Produce Company, who secured the tomatoes from area growers, sized and repacked them, and delivered them to the retail stores each morning of the in-store experiments. Mr. Jerry Cook, Fruit and Vegetable State Inspector, also helped in this project through rearranging both his personal and work schedules to inspect and certify the tomatoes as U.S. No. 1 before delivery by the wholesaler each morning.

The Tennessee Valley Authority contributed substantially to the financing of this project. Dr. W. Joe Free, TVA Agricultural Economist, has been a consistent supporter of the researchers' fruit and vegetable marketing projects. The support provided by Mr. Joe Gaines, Marketing Division Director, Tennessee Department of Agriculture, is also gratefully recognized.

# Analysis of In-store Experiments Regarding Sales of Locally Grown Tomatoes

## Introduction

Fresh fruit and vegetable marketing on the part of growers in Tennessee can be described as a two-category system comprised of direct market outlets and wholesale market outlets [Brooker 1985]. The various direct market outlets are identified by the growers' use of a selling technique to bypass middlemen with the intent of personally negotiating sales to the final consumer. Wholesale market outlets 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 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 direct-market opportunities is rather strong [Brooker 1985]. 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 [Brooker 1983].

Most of the produce handled by Tennessee fruit and vegetable wholesalers is obtained from major production regions outside of Tennessee [Brooker 1983]. 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 the commercial market and the absence of financial motivation for the wholesaler-retailers to handle locally grown produce [Brooker 1983]. The Tennessee growers who currently sell through commercial markets are able to grade, pack, and ship a suitable product to wholesale buyers, most of whom are headquartered in other states. In other words, most produce packer-shippers and wholesaler's retailers sell and buy produce in trading channels that are heavily influenced by traditional trading partners and patterns [McLaughlin 1983].

Per capita consumption of many fresh produce commodities has increased substantially during the past 15 years. For instance, fresh broccoli consumption in the United States increased from 0.5 pounds in 1970 to 2.6 pounds in 1985 [USDA 1986]. Fresh tomato consumption increased from 10.5 to 13.4 pounds over the same period. On the other hand, fresh cabbage consumption declined from 8.2 pounds per capita in 1970 to 7.6 pounds per capita in 1981, the latest year for which fresh cabbage data are available [USDA 1985]. These three vegetables are highlighted here because they were selected, along with apples and peaches, for study in an earlier phase of this project regarding consumer perceptions and attitudes of locally grown produce [Eastwood, Orr,

Brooker 1986]. Informal discussions with growers, wholesalers, retailers, and Extension personnel indicated these commodities had potential to become important Tennessee-grown produce.

Per capita consumption of fresh apples increased from 16.3 to 17.4 pounds between 1970 and 1985; however, 18.3 pounds were consumed in 1980 [USDA 1986]. Consumption of fresh peaches declined from 5.6 pounds per person in 1970 to 3.8 pounds in 1985. Comparable per capita consumption values for all fresh fruits and vegetables are not available from USDA since several fruits and vegetables were eliminated from their list of reported products in 1981.

Sales of some fresh fruits and vegetables may have increased as the result of several factors, especially concern about nutrition [Harris 1986; Heimbach 1986; and Zind 1986]. While the long-run impact of U.S. consumers' recent interest in fresh produce for balanced nutrition and fiber is uncertain, the short-run impact seems to be a nationwide interest in produce production as an alternative enterprise opportunity for many farmers who are searching for new sources of income [Estes 1985; and Henkes 1987]. Based partially on projections involving a larger number of older people, who consume more vegetables than younger people, and the positive income elasticity for fresh vegetables, the demand for fresh produce in the United States should continue to increase over the next few years [Hamm 1986].

Considering the moderate increase in produce demand anticipated over the next few years and the nationwide interest in expanded produce production, growers in nonmajor production regions are concerned about the availability of adequate markets [Estes 1985]. One market outlet that has been touted by many Tennessee growers as offering some potential for expanded sales of local produce is the Tennessee retail chain stores.<sup>1</sup> Due to the competitive nature of the retail food industry, the cost and revenue of merchandising Tennessee-grown produce will ultimately determine whether the retailers will handle locally grown produce. An unanswered empirical question is the structure of the consumer demand relationship for locally grown produce at retail chain stores. Considerable demand research has been completed regarding consumers' interest in produce at direct market outlets, while little research has been published regarding consumers' interest in locally grown produce at major retail food stores [Brothers and Love 1981; Trotter and Brewer 1977].

The branding of fresh produce by food companies and the promotion of locally produced products by State Departments of Agriculture have accelerated in recent years [*The Packer*, Jan. 24, 1987, and Jan. 31, 1987]. According to *The Packer*, food companies have aggressively campaigned during the 1980's to increase their market share through brand recognition. In a 1986 nationwide household survey, branded produce items were generally rated by consumers to be equivalent to nonbranded items [Zind 1986]. State-level sponsorship of produce promotion has taken numerous forms, from national television and magazine advertisements to within-state promotions that include

---

<sup>1</sup>Growers opinions obtained at marketing-oriented discussion sessions during the 1985 and 1986 annual meetings of the Tennessee Small Fruit and Vegetable Growers Association.



the use of logo stickers. These efforts are designed to enable growers to "brand" their products on the basis of the state in which they are grown, i.e., the origin of the produce. In the same 1986 national household survey, country- or region-of-origin labeling of fresh produce was not identified by consumers as a highly important criterion in selecting produce or a produce market. However, the survey results did reveal that origin ranked above brand name in position of importance.

### Objectives

The general goal of this study was to examine consumers' actual purchasing behaviors when confronted with locally grown produce for sale in retail chain stores. Two specific objectives were to:

1. analyze consumers' actual retail store purchases of locally grown tomatoes when presented with various pricing and labeling situations; and
2. analyze perceptions, attitudes, and socioeconomic characteristics of consumers who purchased locally grown tomatoes during a test period.

### Procedure

Two different techniques were used to obtain primary data from Knox County consumers of fresh tomatoes. First, the actual purchase activity of consumers was monitored in several in-store experiments conducted in three retail food stores. Second, these same consumers were asked to return a mail-in questionnaire. (A copy of the questionnaire is included in the appendix.)

The stores were selected to provide some representation from the lower income households from the inner-city versus the higher income households prevalent in west Knox County [Ambler 1985]. The in-store experiments were conducted in three retail stores—one fairly close to the inner city in north Knoxville and two in west Knox County.<sup>2</sup>

Within each of the participating retail stores, sales experiments were conducted for four days in each of two consecutive weeks of July 1986. The experiment days were Wednesday through Saturday. The initial plan involved four experiments, which are described below. A random assignment of stores and treatments took place. One supermarket was randomly drawn, and the four experiments randomly assigned to each of the four-day periods. Thus, each store had two days for each treatment. Then, the second and third stores were drawn and the sequencing of the experiments assigned to prevent the same experiment from being conducted in more than one store on any day.

On one day of each week in each store the base experiment was conducted. This experiment consisted of two bulk bins of tomatoes that were of similar

---

<sup>2</sup>Initially, a fourth store was to be included which was supposed to represent the central region of Knoxville, but, unfortunately, the planned fourth store was unavailable.

size and appearance. They were separated by avocados and prepackaged tomatoes. For this base experiment there was no information as to tomato origin of either bin, and the price per pound was the same for the tomatoes in both bins. One of the bulk bins contained the tomatoes supplied by the retailer's own organization, unchanged from what they routinely handled before, during, and after the test experiments. The second bulk bin of tomatoes was stocked with locally grown tomatoes delivered to the retailers each morning of the experiment days. These locally grown tomatoes were purchased from Knoxville area growers by a Knoxville wholesaler.<sup>3</sup> The wholesaler packed the tomatoes in 20-pound cartons late each afternoon for delivery the next morning. After packing, the tomatoes were inspected by the state inspector who graded each delivery to certify that the tomatoes satisfied U.S. Department of Agriculture grading standards to be classified as U.S. No. 1. All of the locally grown tomatoes were large or extra large in size. Large tomatoes measure 2 17/32"– 2 28/32" in diameter and extra large tomatoes measure 2 28/32" – 3 15/32" in diameter.

To gather data on the effectiveness of the Tennessee Department of Agriculture's logo sticker alone, one treatment pertained to charging the same price for both products, but the locally grown tomatoes were identified by individual logo stickers placed on each tomato. The stickers were supplied by the Tennessee Department of Agriculture. The dime-sized stickers were white with green lettering that read "Tennessee Country Fresh" (TCF). A larger 8-inch-square logo was also attached to the bulk bin display of locally grown tomatoes. This experiment was conducted once each week in each store.

The experiments during the remaining two days of each week involved using the logo identification stickers and setting the price of the locally grown tomatoes 15 cents, 30 cents, and 50 cents per pound above the retailer's price for the "other" bulk tomatoes. All three retail stores priced their own bulk tomatoes at 89 cents per pound over the entire two-week period of the in-store experiments. A listing of the experiments conducted in each store is presented in Table 1.

Discussion of the results from the in-store sales' experiments and the mail-in questionnaires are presented in the next two sections of this report. Examination of Table 1, recognizing that any supermarket's sales vary by day of the week, leads to the realization that one needs to be very careful when analyzing the results. The distribution of experiments across stores and days of the week is not uniform. Time and cost constraints prevented the use of a sample design in which each treatment was present the same number of times for each store each day. This limits the statistical analyses that could be applied to the sales data.

---

<sup>3</sup>Several of these growers were interviewed to discuss the project and obtain information regarding the cultivars they produced—Celebrity, Floramerchin, Big Seven, and California Jubilee.

**Table 1. In-store tomato sales experiments conducted in three Knoxville metropolitan area supermarkets**

Date	Experiment <sup>a</sup>					
	Store no. 1		Store no. 2		Store no. 3	
	Price	Label	Price	Label	Price	Label
July 7-12:						
Wednesday	Equal	no	30 cents	yes	15 cents	yes
Thursday	Equal	yes	Equal	no	30 cents	yes
Friday	15 cents	yes	Equal	yes	Equal	no
Saturday	30 cents	yes	15 cents	yes	Equal	yes
July 16-19:						
Wednesday	50 cents	yes	30 cents	yes	Equal	yes
Thursday	30 cents	yes	50 cents	yes	Equal	no
Friday	Equal	yes	Equal	no	50 cents	yes
Saturday	Equal	no	Equal	yes	30 cents	yes

<sup>a</sup>Prices of local and "other" tomatoes equal to each other or local tomato prices set 15, 30, or 50 cents per pound above the price of "other" tomatoes. Label refers to use of "Tennessee—Country Fresh" logo.

### Consumer Purchases During In-store Experiments

Bulk tomato sales by week, day, store, and origin are presented in Table 2. The actual volume of sales per day varies considerably. Friday and Saturday have much larger overall volumes than the other two days. Thus, any evaluation of consumers' responses should adjust for this phenomenon. One meaningful comparison is the relative proportion of total sales per day accounted for by the locally grown tomatoes. The average volume per day of all bulk tomatoes sold in all 3 stores was 145 pounds on Wednesday and Thursday, 232 pounds on Friday, and 312 pounds on Saturday. One way of accommodating these considerations is to convert the daily volumes into standard-day equivalents. Saturday is the chosen standard. Sales on the other days were weighted by the reciprocal of the average volume per day relative to Saturday. This weighting procedure permits more meaningful comparisons of sales volumes for different days of the week.

### Sales data analysis

When the prices of the local tomatoes and the "other" tomatoes were equal, with no labeling as to origin, the local tomatoes accounted for 61 percent of the weighted bulk tomato sales (Table 3). The produce managers in the retail stores commented about the outstanding quality of the local tomatoes supplied for these experiments. So just based on the appearance of the large, red tomatoes, the local tomatoes outsold the "other" tomatoes. This supports an earlier study that revealed the three most important criteria consumers use to judge tomato quality are color, blemishes, and feel [Eastwood, Orr, Brook-

**Table 2. Bulk tomato sales at three retail chain stores by experiment week, store, origin, and day, Knoxville, Tennessee, 1986**

Week and store	Origin of tomatoes	Day of week			
		Wednesday	Thursday	Friday	Saturday
-----pounds-----					
July 9-12 Store 1	Local	100	120	200	120
	Other	130	75	125	175
	Total	230	195	325	295
Store 2	Local	110	80	90	240
	Other	45	50	100	155
	Total	155	130	190	395
Store 3	Local	90	130	140	220
	Other	25	50	62	100
	Total	115	180	202	320
July 16-19 Store 1	Local	70	70	240	230
	Other	20	20	35	125
	Total	90	90	275	355
Store 2	Local	60	40	140	180
	Other	50	85	50	50
	Total	110	125	190	230
Store 3	Local	120	100	60	180
	Other	50	50	150	100
	Total	170	150	210	280
Average per day—all tomatoes		145	145	232	312

er 1986]. The local tomatoes supplied to the retail stores on all experiment days were graded and certified as U.S. No. 1 large and extra-large. The "other" bulk tomatoes were also U.S. No. 1 large and extra large. The produce managers in the retail stores said the quality of the local tomatoes supplied for these experiments was more consistent than the local tomatoes they normally handle.

The proportion of total per day bulk tomato sales accounted for by the locally grown tomatoes increased from 61 to 69 percent when the TCF logo was placed on each tomato and when prices were equal for all bulk tomatoes.<sup>4</sup> The presence of the TCF logo increased sales by 8 percent relative to total

<sup>4</sup>Proportion of tomato sales is based on weight. No attempt was made to compare revenues from sales at various prices levels and related profitability because comparable cost values to calculate net returns were not available.

sales; however, this was accomplished without any advertising to inform consumers about the TCF logo and what it represented. These results seem to support the hypothesis that the TCF logo would have a positive effect on sales of locally grown tomatoes.

Setting the price per pound of the locally grown produce 15 cents above the "other" bulk tomatoes, with the TCF logo present, caused the proportion of sales accounted for by the local tomatoes to decline to 65 percent. The proportion of local tomato sales was 64 percent when the local tomato price was set 30 cents above the "other" tomatoes. The impact of raising the local tomato price 15 and 30 cents was negligible in terms of reducing the share of local tomato sales; however, a substantial reaction was obtained when the price was set 50 cents per pound over the "other" tomatoes. The consumers' demand for locally grown tomatoes seems to be quite inelastic over price adjustments up to 30 cents (33 percent) above the "other" tomatoes. Raising the price of local tomatoes 50 cents (56 percent) above the "other" tomatoes resulted in a 26 percent decline in the proportionate share of local tomatoes purchased. An important inference from examination of the in-store sales experiments is that some Knoxville consumers must perceive locally grown tomatoes as a premium product worth a higher price than the "other" tomatoes. An unanswered question is whether this 15 to 30 cents price increase for local tomatoes is adequate to cover the retailer's handling expenses and the wholesaler-repacker's expense of sorting, packing, and grading and still provide an acceptable return to the grower. The local vine-ripened tomatoes have a shorter shelf-life than gassed mature green tomatoes, so there is an extra expense for

**Table 3. Weighted average per day bulk tomato sales by experiment and origin, Knoxville, Tennessee, 1986**

Experiment <sup>a</sup>	Bulk tomatoes sold <sup>b</sup>					
	Local		Other		Total	
	pounds	percent	pounds	percent	pounds	percent
Equal price- no label	201.7	61	128.8	39	330.5	100
Equal price- TCF label	226.9	69	100.2	31	327.1	100
15 cents per pound- TCF label	234.4	65	125.7	35	360.1	100
30 cents per pound- TCF label	182.9	64	105.1	36	288.0	100
50 cents per pound- TCF label	106.0	43	142.7	57	248.7	100

<sup>a</sup>See Table 1 for details of the experiments. The base price was 89 cents per pound.

<sup>b</sup>Weighted Saturday equivalent of bulk tomato sales per retail chain store.

more frequent, smaller deliveries to a retail store, and in the long run these costs must be covered by the retail price. Less frequent deliveries to a retail store may result in lost sales due to spoilage and/or lost sales due to attempts to sell overripe tomatoes.

### Estimated equations

The nature of the data gathered from the trials made it difficult to estimate a sales relationship using regression analysis. Two related problems were involved. One was the sample size due to the constraints of the amount of time, the number of stores, and the expenses involved. This limited number of times each experiment could be implemented (see Table 4) was compounded further by the effect of the day of the week. The second problem was the multicollinearity between the presence of local tomatoes and the use of the TCF logo. Of the 24 local sales observations, 18 were associated with the presence of the logo. Regression analyses suggested the presence of multicollinearity, and it was not possible to disentangle the two effects.

Several functional forms were estimated. These involved the use of dummy variables to allow for changes in the intercept and interactions among the price and local and TCF dummy variables. In addition, separate regressions were estimated for local and other tomatoes. No significant relationships consistent with economic theory were found.

The absence of interpretable estimated equations has two implications. One is that the data limitations, outlined above, do not permit the estimation of hypothesized relationships. The other is that since the logo only had a marginal effect on sales, the label by itself does not have a statistically significant impact. This latter implications suggests that mere use of the label would only have a small effect on tomato sales. Within this perspective, effective use of the logo to increase sales may require a promotional campaign regarding the purpose of the logo sticker, i.e., relating it to attributes associated with vine-ripe harvesting.

**Table 4. Distribution of experiments**

Experiment	Number of trials
Equal price - no label	6
Equal price - TCF label	6
15 cents per pound - TCF label	3
30 cents per pound - TCF label	6
50 cents per pound - TCF label	3
Total	24

## Purchaser Responses from Mail-in Questionnaires

A total of 1,167 questionnaires was distributed to bulk tomato purchasers in the retail food stores during the experiment days that the TCF logo was used. Usable questionnaires were returned by 242 of these purchasers. The low percentage of questionnaires that were returned may reflect the situation in which many were thrown away as groceries were unpacked at home. This discarding is considered to be randomly distributed across households, so no significant response bias was felt to be present. Questionnaires were numbered to identify the store, week, and day. There are two parts of the questionnaires. One focused on tomato evaluations, and the other gathered socioeconomic information.

As shown in Table 5, more than twice as many questionnaires were received from store number 1 than from store number 2 or 3. This may be partially due to the procedure used for distributing the questionnaires. In store number 1, the questionnaires were handed to each bulk tomato purchaser by a graduate research assistant, while in store numbers 2 and 3 the questionnaires were handed to purchasers by the store's own personnel.

The number of responses by day of week was closely correlated with the volumes sold (Table 5). Responses for the first week of the experiment were

**Table 5. Distribution of mail-in questionnaire responses from purchasers of bulk displayed tomatoes by retail store, week, and day of week, Knoxville, Tennessee, 1986**

Item	Purchasers	
	number	percent
Retail chain store where purchase was made:		
Number 1	133	55
Number 2	58	24
Number 3	51	21
Total	242	100
Experiment week when purchase was made:		
Week 1, July 9-12	161	67
Week 2, July 16-19	81	33
Total	242	100
Day of week purchase was made:		
Wednesday	41	17
Thursday	47	19
Friday	65	27
Saturday	89	37
Total	242	100

almost exactly twice that for the second week, 161 and 81, respectively. No attempt was made to discover the number or frequency of shopping trips of fresh tomato purchasers, but this smaller number for the second week may reflect the number of repeat shoppers who completed a questionnaire received the first week, but discarded the second questionnaire received during a shopping trip the second week. The distribution of responses follows the volume of tomato purchases by day of the week and by store. Only 5 percent of the questionnaire respondents were under 25 years of age, while 30 percent reported to be from 25 to 34 and 25 percent from 35 to 44 (Table 6). For all households combined, 66 percent were 19 years of age and over, 18 percent between 11 and 18, and 16 percent 10 and under.

One third of the respondents reported annual household incomes of \$50,000 or more. Another third reported household incomes of \$30,000 to \$49,999. Seven percent of households had less than \$10,000 income.

One-half of the purchasers were college graduates, and another 24 percent reported attending 1-3 years of college. Only five percent did not graduate from high school. Three-fourths of the responding purchasers were female.

These respondent characteristics reflect the location of store 1, which is situated in an affluent part of Knox County. The graduate assistant distributed the survey instrument in this store and combined with the store's large volume of sales caused the predominance of returned questionnaires to come from this area. Relative to Knox County, this sample has a larger average household size (2.85 versus 2.6 in the 1980 census), is more highly educated (95 percent of the respondents had completed high school versus 64.4 percent for the 1980 census), and the median income is higher as reflected in the respondent households having a median income in the \$30,000 range whereas the 1980 census figure is \$18,055 [U.S. Bureau of the Census 1984]. Consequently, the results presented here should be interpreted within this context.

Purchasers of bulk display tomatoes were asked if they care where tomatoes were grown when they are considering a purchase. Among the 238 respondents who answered this question, 65 percent reported yes, they do care (Table 7). While this is close to two-thirds of the respondents, it is lower than might have been expected, since 92 percent of the respondents reported purchasing the TCF tomatoes. Even though 92 percent purchased the TCF tomatoes, just 61 percent reported being influenced in their purchase decisions by the TCF logo. One possible inference from the responses to these three questions is that while slightly less than two-thirds of the respondents care where tomatoes are grown and were influenced by the TCF logo, an additional 27 to 31 percent of the respondents must have purchased the locally grown tomatoes because they appeared to be of higher quality than the "other" tomatoes.

Most of the respondents, 93 percent, reported that they were pleased with the quality of the tomatoes they purchased.

When asked if they would shop at a particular store in the future if TCF produce were available, 64 percent of the responding purchasers indicated they



**Table 6. Socioeconomic information of bulk tomato purchasers at retail chain stores, Knoxville, Tennessee, 1986**

Item	Purchasers	
	number <sup>a</sup>	percent
Age of the purchaser:		
Less than 25	11	5
25 to 34	71	30
35 to 44	59	25
45 to 54	45	19
55 to 64	25	11
65 and over	24	10
Total	235	100
Age category of total household: <sup>b</sup>		
Proportion of household 10 and under	—	16
Proportion of household 11-18	—	18
Proportion of household 19 and over	—	66
Total		100
Size of household:		
One	32	14
Two	78	34
Three	47	20
Four	53	23
Five	14	6
Six	5	2
Seven	3	1
Total	230	100
Income for total household:		
Less than \$10,000	16	7
\$10,000 to \$19,999	31	13
\$20,000 to \$29,999	31	13
\$30,000 to \$39,999	55	24
\$40,000 to \$49,999	21	9
\$50,000 and over	79	34
Total	233	100
Education of the purchaser:		
Less than 9th grade	4	2
9-11th grade	7	3
High school graduate	52	22
1-3 years of college	55	24
College graduate	113	49
Total	231	100
Sex of purchaser:		
Male	55	24
Female	179	76
Total	234	100

<sup>a</sup>Number of purchasers responding to particular questions varies.

<sup>b</sup>Average proportion values for all responding households.

Source: Mail-in questionnaires from 242 purchasers of bulk display tomatoes.

**Table 7. Responses to questions answered by purchasers of bulk tomatoes at retail chain stores regarding their purchase decision, Knoxville, Tennessee, 1986**

Question	Purchasers		
	number	percent	
Care where tomatoes are grown when considering purchase:	Yes	155	65
	No	83	35
	Total	238	100
Purchased "Tennessee—Country Fresh" (TCF) tomatoes:	Yes	215	92
	No	18	8
	Total	233	100
Influenced in purchasing decision by the TCF logo:	Yes	143	61
	No	91	39
	Total	234	100
Pleased with quality of tomatoes purchased:	Yes	217	93
	No	17	7
	Total	234	100
Shop at a particular store in the future if TCF produce available:	Yes	143	64
	No	81	36
	Total	224	100

Source: Mail-in questionnaires from 242 purchasers of bulk display tomatoes.

**Table 8. Characteristics used by purchasers of tomatoes at retail chain stores to judge tomato quality, Knoxville, Tennessee, 1986**

Item	Tomato purchasers	
	number	percent <sup>a</sup>
Color	224	94
Feel	192	80
Blemishes	165	69
Taste	151	63
Size	107	45
Origin	90	38
Shape	88	37
Price	76	32
Smell	70	29
Packaging	18	8

<sup>a</sup>Percentages based on 239 responses to this question.

Source: Mail-in questionnaires from 242 purchasers of bulk display tomatoes.

would shop at that store. This provides some indication, although not conclusive evidence, that retailers using locally grown produce as featured items may be able to attract some shoppers to their stores. An unanswered empirical question for the retailers is whether the increased patronage and/or sales would justify the additional expense of advertising and handling local produce.

Factors related to quality considerations were assessed by asking the purchasers to select from ten listed measures of quality those they used to judge tomatoes purchased at retail chain stores (Table 8). Color was selected most frequently (94 percent of the respondents). The next three criteria selected in descending order were feel, blemishes, and taste, 80, 69, and 63 percent, respectively. Origin of the tomatoes was indicated as an important quality criterion by 38 percent of the respondents. This is somewhat inconsistent with the 65 percent who answered yes when asked if they care where tomatoes were grown when considering a purchase. One explanation may be that the respondents misunderstood what was meant by the word origin when listed randomly with the nine other quality criteria in the list. Another possible interpretation of the inconsistent response is that respondents may have shown a preference for local tomatoes because they thought the researchers wanted them to answer in this manner. The most plausible interpretation could be that for some respondents origin may be an unimportant criteria relative to those listed in the survey, but when asked about origin separately, it may be a factor *ceteris paribus*.

The purchasers responding to the mail-in questionnaire were also asked to compare Tennessee-grown tomatoes with those tomatoes supplied from "other" production regions. The six items they were asked to compare are taste, freshness, appearance, storage life, nutrition, and price. Taste received the largest number of responses in the "better" category, 68 percent (Table 9). A close second and third were freshness and appearance with 67 and 61 percent, respectively, reporting that Tennessee tomatoes were "better" than the tomatoes from

**Table 9. Tomato purchasers' comparisons of Tennessee-grown tomatoes with those from other origins, Knoxville, Tennessee, 1986**

Item	Tennessee versus "other" tomatoes			
	Worse	Same	Better	Do not know
	-----percent <sup>a</sup> -----			
Taste	3	16	68	13
Freshness	1	18	67	14
Appearance	2	25	61	12
Storage life	3	33	19	45
Nutrition	0	26	19	55
Price	27	30	12	31

<sup>a</sup>Percentages based on 231 responses to this question.

Source: Mail-in questionnaires from 242 purchasers of bulk display tomatoes.

other origins. With respect to the "worse" category, the only item with a substantial percentage was price, with 28 percent. This reflects the effect of the various experiments in which the locally grown tomatoes were for sale at higher prices even though both were U.S. No. 1 grade. As might be expected, three-fourths of the respondents "did not know" or felt that nutrition was "the same" between Tennessee and "other" tomatoes.

A more in-depth examination of the respondents' answers to questions about origin of tomatoes purchased is possible with two-way comparisons of answers. The purchasers responding to the mail-in questionnaire were divided into two groups based on a yes or no answer to the question regarding concern about where tomatoes available for purchase are grown. Cross classifying this question with the yes or no response to the question about purchasing TCF labeled tomatoes revealed a statistically significant relationship ( $\chi^2 = 22.13$  between the responses to these two questions (Table 10). In other words, there is a strong relationship between those "who care" where tomatoes they purchase are grown and those who purchase TCF labeled tomatoes.

The relationship between those purchasers "who care" and those who were "influenced" in their purchase decision by the TCF logo was also highly significant.<sup>5</sup> One possible interpretation of this finding could be that the TCF logo does provide effective information to at least one segment of the shopping public. More research is required to be able to estimate the potential impact of such market segmentation for Tennessee produce growers and other industry participants.

The cross tabulation of those "who care" and those who would "shop at a particular store because TCF produce is available" revealed a significant relationship.<sup>6</sup> One possible inference here is that the use of the TCF logo, or a similar method to inform consumers, could be used to satisfy those shoppers who have a desire to purchase locally grown produce.

### **Probit model**

Previous research has identified socioeconomic variables that are determinants of consumers' perceptions of locally grown fresh produce and determinants of consumer demand for fresh produce (Eastwood, Orr, and Brooker 1986). A consumer's ability to buy is fixed by prices and income. In a two-week period prices of all other goods are assumed constant, and the relative price of tomatoes was all that changed. Thus, a consumer's income was the primary determinant of the ability to buy. Buse (1986) and Campbell (1984) found that income effects vary by income category and by product, and these results are consistent with those of Eastwood, Orr, and Brooker in analyzing perceptions of locally grown fresh produce.

Household characteristics other than income have also been found to affect fresh produce consumption. Several researchers found educational attainment to be a determinant (Adrian and Daniel 1976; Searce and Jensen 1979)

<sup>5</sup>Statistically significant at the .01 level.

<sup>6</sup>Statistically significant at the .01 level.

Table 10. Comparisons of responses to "Tennessee—Country Fresh" logo based on purchasers' concerns about origin of the tomatoes for sale at retail chain stores, Knoxville, Tennessee, 1986

		Care where tomatoes are grown:						Total Percent
Item		Yes			No			
		Actual	Expected	Percent	Actual	Expected	Percent	
Purchased the TCF labeled tomatoes:	Yes	152	143	66	62	71	27	93
	No	3	12	1	15	6	6	7
	Total	155	155	67	77	77	33	100
		Chi-square = 22.13			Significant at .01 level			
Influenced in purchase decision by TCF logo:	Yes	121	93	52	21	49	9	61
	No	32	60	14	59	31	25	39
	Total	153	153	66	80	80	34	100
		Chi-square = 61.6			Significant at .01 level			
Pleased with quality of tomatoes purchased:	Yes	144	140	63	69	73	30	93
	No	7	11	3	10	6	4	7
	Total	151	151	66	79	79	34	100
		Chi-square = 4.88			Significant at .05 level			
Shop at a particular store because TCF produce available:	Yes	107	92	48	34	48	15	63
	No	38	53	17	42	28	19	36
	Total	145	145	65	76	76	34	99 <sup>b</sup>
		Chi-square = 18.23			Significant at .01 level			

<sup>a</sup>Percentages based on number of responses to each cross tabulation.

<sup>b</sup>Does not equal 100 due to rounding error.

Source: Mail-in questionnaires from 242 purchasers of bulk display tomatoes.

as well as perceptions of local produce (Eastwood, Orr, and Brooker 1986). The age of the respondent also affects consumption (Smallwood and Blaylock 1985; Buse 1986; and Campbell 1984) and perceptions of fresh produce (Eastwood, Orr, and Brooker 1986). Older shoppers tend to be more experienced and likely to be aware of differences in tomatoes based upon where they are grown. Two types of household occupational status are assumed to have effects. A dual working household is considered to have less time for shopping around and home processing such as canning tomatoes, whereas the presence of a homemaker suggests more of these activities.

The questionnaire, described earlier in this bulletin, contains the three questions that can be considered dependent variables in consumer decision making, as well as a section on background information used to gather the socioeconomic data on respondent households. Table 11 presents the three dimensions of consumer behavior examined as dependent variables and how they were measured. Variables reported in other consumer research, as noted in the preceding section, suggested the socioeconomic information to be included as independent variables, and Table 12 presents these variables and their measurement.

Each of the dimensions of decision making is measured qualitatively. This necessitates the use of a qualitative dependent variable regression model to estimate the effects of the hypothesized independent variables on the probabilities of observing the yes/no responses. Logit and probit regressions are the two most popular models, and with respect to the present research problem, choosing between them is arbitrary (Hanushek and Jackson 1977). The probit specification as developed by McKelvey and Zavoina (1975) is used here.

An overview of the probit model is found in Eastwood, Orr, and Brooker (1986), and interested readers are referred to it for more information. Positive (negative) significant coefficients imply that as the value of the respective independent variable increases, the probability of observing higher (lower) valued

**Table 11. Dependent variables hypothesized to be affected by household characteristics of shoppers and by attributes of fresh tomatoes for sale at retail stores**

Variable	Definition <sup>a</sup>
CARE	Do you care where fresh tomatoes are grown? (Yes = 2, No = 1)
STICKER	Did the "Tennessee-Country Fresh" sticker affect your purchase decision? (Yes = 2, No = 1)
SHOP	Would you shop at a particular supermarket if you knew beforehand that the store featured "Tennessee-Country Fresh" produce? (Yes = 2, No = 1)

<sup>a</sup>See Table 7 for response frequencies.

**Table 12. Independent variables hypothesized to affect tomato purchases at retail stores**

Variable	Measurement <sup>a</sup>
<b>Attribute comparisons: how do "Tennessee-Country Fresh" tomatoes compare to other fresh tomatoes in terms of:</b>	
Freshness	= 1 if better; = 0 otherwise
Taste	= 1 if better; = 0 otherwise
Appearance	= 1 if better; = 0 otherwise
Storage life	= 1 if better; = 0 otherwise
Price	= 1 if better; = 0 otherwise
Nutrition	= 1 if better; = 0 otherwise
Both work	= 1 if both spouses in the household are employed; = 0 otherwise
Homemaker	= 1 if one person in the household is a homemaker; = 0 otherwise
<b>Educational attainment:</b>	
ED1	= 1 if 8th grade or less; = 0 otherwise (omitted category)
ED2	= 1 if 9th-11th grade; = 0 otherwise
ED3	= 1 if high school graduate; = 0 otherwise
ED4	= 1 if 1-3 years of college; = 0 otherwise
ED5	= 1 if college graduate; = 0 otherwise
<b>Total household income:</b>	
INC1	= 1 if \$0-\$9,999; = 0 otherwise (omitted category)
INC2	= 1 if \$10,000-\$19,999; = 0 otherwise
INC3	= 1 if \$20,000-\$29,999; = 0 otherwise
INC4	= 1 if \$30,000-\$39,999; = 0 otherwise
INC5	= 1 if \$40,000-\$49,999; = 0 otherwise
INC6	= 1 if \$50,000 or more
<b>Age of the respondent:</b>	
AGER1	= 1 if under 25; = 0 otherwise (omitted category)
AGER2	= 1 if 25-34; = 0 otherwise
AGER3	= 1 if 35-44; = 0 otherwise
AGER4	= 1 if 45-54; = 0 otherwise
AGER5	= 1 if 55-64; = 0 otherwise
AGER6	= 1 if 65 or over; = 0 otherwise

<sup>a</sup>See Tables 6 and 9 for response frequencies.

dependent variable categories increases. Probit models are estimated via maximum likelihood techniques, and estimates are asymptotically unbiased and efficient for samples having at least 100 degrees of freedom. Independent variables can be categorical or continuous, and dummy variables are used in a manner analogous to ordinary least squares.

Initial probit regressions were calculated for each dependent variable, and copies of these regressions are available from the authors. The previous research, noted above, has shown varied impacts within each category of independent variables. Therefore, categories that had insignificant coefficients were deleted and new regressions computed. It is recognized that this process may introduce a pretest bias, but this is felt to be small based upon the existing literature and use of the following procedure. A variable with an insignificant coefficient was omitted if the remaining coefficients and standard errors did not display pronounced changes and the log likelihood and chi square values did not exhibit large changes.

### Estimated equations

Table 13 presents the estimated probit equations based upon the steps outlined above. Measures of overall fit associated with each dimension of decision making lead to inferences of significant overall relationships. The chi square statistics are significant, the  $R^2$ -like values are relatively high for cross-section data, and the percents correctly predicted are larger than the frequencies of occurrence associated with the dependent variables.

Significant determinants of the care-where-grown responses fall into two groups: comparative attributes and age distribution of the respondent. All of the comparative criteria variables have significant coefficients. Respondents who consider local tomatoes to have "better" freshness, taste, storage life, and nutrition are more likely to care where tomatoes are grown, whereas those who consider local tomatoes "better" in appearance and price are less likely to care. These results suggest the visual appearance of local tomatoes does not lead to consumers caring about where they are grown. Similarly, price alone does not seem to be a reason for caring where tomatoes are grown. These results are consistent with consumers continuing to buy comparable-grade local tomatoes at higher prices during the in-store experiments. Older respondents, *ceteris paribus*, are more likely to care where tomatoes are grown. This is assumed to reflect their greater interest in food preparation and/or having purchased local tomatoes in previous time periods when local ones were all that were available.

Comparative criteria are significant determinants of the TCF logo affecting purchase decisions. Respondents who consider local tomatoes as "better" with respect to freshness, taste, storage life, and nutrition were influenced by the logo. The appearance rating led to respondents not being affected by the logo. Consumers who were high school graduates or who had incomes above the lowest category indicated they were not affected by the TCF logo. These shoppers use other criteria than the presence of the logo in purchase decisions.



Table 13. Results of the probit regressions

Independent variables <sup>a</sup>	Dependent variables <sup>b</sup>		
	CARE	STICKER	SHOP
Constant	-.507* (-2.99) <sup>c</sup>	-.269 (-.74)	-.647* (-2.11)
Freshness	.509* (1.78)	.528* (1.84)	.656* (3.16)
Taste	1.008* (3.27)	.839* (2.69)	
Appearance	-.433* (-1.80)	-.440* (-1.87)	
Storage life	.674* (2.11)	1.190* (3.42)	
Price	-.680* (-1.94)		
Nutrition	.720* (2.06)	.488 (1.51)	.771* (2.49)
Both work			.506* (2.09)
Homemaker			1.070* (3.90)
ED3		-.461* (-1.76)	
INC2		-1.394* (-2.66)	1.193* (3.30)
INC3		-1.345* (2.62)	.678* (2.01)
INC4		-1.214* (-2.44)	
INC5		-1.168* (-2.02)	.898* (2.36)
INC6		-1.315* (-2.58)	.893* (3.50)
AGER2		.815* (1.71)	-.868* (-2.98)
AGER3		1.210* (2.45)	-.832* (-2.73)
AGER4		1.065* (2.07)	-.690* (-2.16)
AGER5	.672* (1.78)	1.722* (2.91)	
AGER6	.767* (1.94)	.938* (1.88)	
Log likelihood	-115.16	-118.45	-114.84
Chi square	77.49	75.83	63.47
R <sup>2</sup> -like <sup>d</sup>	.43	.50	.41
Percent correctly predicted	.77	.72	.77

\*Significant at .05 level.

<sup>a</sup>See Table 12 for definitions.

<sup>b</sup>See Table 11 for definitions.

<sup>c</sup>Asymptotic t value.

<sup>d</sup>Ratio of the explained variance to the total variance.

The third evaluation is that of store patronage being affected by the availability of local produce. Results indicate that consumers who consider local tomatoes to have "better" freshness and nutrition are more prone to shop at stores where local produce is available. Dual working and homemaker households are more likely to patronize such supermarkets as are most income groups relative to the lowest with the exception of the fourth. Respondents in the 25-54 age group are less likely to be influenced by the availability of local produce.

### **Concluding Remarks**

The in-store tomato sales experiments revealed a favorable consumer response to locally grown tomatoes. Knoxville consumers shopping at the three retail stores participating in this project demonstrated a positive purchasing response towards the locally grown tomatoes on the basis of quality alone (U.S. No. 1 Extra Large and Large). Statistical analysis of the sales data revealed that the newly developed TCF logo did not create a significant increase in sales of local tomatoes. An important implication from this finding is that the retail shoppers may need to be informed as to what the logo represents. Wholesalers, retailers, and others working with the Tennessee fruit and vegetable industry could work together to educate Tennessee consumers as to the purpose or meaning of the TCF logo.

While 92 percent of the respondents to the mail-in questionnaire reported purchasing the TCF tomatoes, only 61 percent reported the TCF logo influenced their purchase decision. Evidently, many of the local tomato purchasers did so because of the physical attributes of the local tomatoes, not because they were persuaded to buy a Tennessee-produced product. Among the quality attributes examined, consumers ranked color, feel, and blemishes as the three most important. Therefore, it seems apparent that the advertisement and use of a logo to identify locally produced products cannot be expected to overcome a deficiency in overall quality. An unanswered empirical question at this point is whether the marginal increase in sales is adequate to cover the added expense to develop and use the TCF logo.

The relationship between those purchasers who reported that they care where the product is grown and their being influenced to shop at a retail store that featured TCF produce was statistically significant. One possible inference from this relationship is that the TCF logo does provide effective information for some retail shoppers. Another unanswered empirical question is the economic impact on local growers from this type of market segmentation by retailers.

Comparative attributes seem to have major effects on purchase decisions of caring where tomatoes are grown, whether the TCF logo affected sales, and whether consumers would be influenced to shop at supermarkets that provided local produce. Freshness and nutrition have significant positive effects, followed by taste and storage life. Poor appearance and price have negative effects. Purchase decisions seem to be affected in lesser and more varied ways by socioeconomic characteristics of the household.

Based on the results of the data analyzed in this report, a reasonable marketing strategy could be to build upon consumers' attribute comparisons of local versus "other" tomatoes. Emphasis should be given to freshness, nutrition, taste, and storage life. Previous research has shown that consumers need information about these attributes, and the present results indicate that providing this needed information could have positive results. Use of the TCF logo is a way of reminding consumers about these desirable properties. Such promotional activities should be directed at broad socioeconomic groups of households.

The reader should also recognize that the results show the use of the TCF logo alone is not enough to cause consumers to purchase the labeled product. The logo could be involved in an overall commodity and/or industry-wide promotional program. Further use of the logo on other produce products could build upon the positive comparative attribute criteria (freshness, nutrition, taste, and storage life) after they have been established for Tennessee tomatoes. Other Tennessee-grown products can be selectively added building upon freshness, nutrition, taste, and storage recognition associated with TCF tomatoes. Throughout a promotional program, adequate control must be taken to ensure that only top quality commodities are involved with the logo, as this is the only viable way to build consumer confidence in the TCF logo. Additional research of the Tennessee logo is needed to determine consumer's perceptions and attitudes toward "branding" of Tennessee produce.

### References

- Adrian, John L., and Raymond Daniel. "Impacts of Socioeconomic Factors on Consumption of Selected Food Nutrients in the United States," *American Journal of Agricultural Economics* 58(1976):31-8.
- Aldrich, John H., and Forrest D. Nelson. "Linear Probability, Logit and Probit Models," Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-045, Sage Publications, Beverly Hills, 1984.
- Ambler, Susan H. *Poverty in Knoxville and Knox County*. Knoxville: The Knoxville-Knox County Community Action Committee, April 1985.
- Brooker, John R. *Purchasing Practices of Wholesale Produce Handlers in Tennessee*, Research Report No. 83-03, Department of Agricultural Economics and Rural Sociology, University of Tennessee Agricultural Experiment Station, Knoxville, March 1983.
- \_\_\_\_\_. *An Assessment of the Structure of Fruit and Vegetable Marketing in Tennessee*, Research Report 85-04, Department of Agricultural Economics and Rural Sociology, University of Tennessee Agricultural Experiment Station, Knoxville, April 1985.
- Brothers, Jane R., and Harold G. Love. "State Oriented In-Store Merchandising Techniques," *Journal of Food Distribution Research*, Vol. XII, No. 1, Food Distribution Research Society, February 1981.
- Buse, Rueben C. "What Is America Eating and What Is Happening to Meat Consumption?," The Demand for Red Meat Symposium sponsored by the Board of Agriculture, National Research Council, October 20, 1986.

- Campbell, Paul. "Profile of the Fresh Consumer," *The Packer: Focus 1984-85*, Vol. XCI, No. 54, Vance Publishing Corporation, Overland Park, Kansas, December 1984.
- Capps, Oral, Jr. "Changes in Domestic Demand for Food: Impacts on Southern Agriculture," *Southern Journal of Agricultural Economics* 18(1986):25-36.
- Eastwood, David B., Robert H. Orr, and John R. Brooker. *Consumer Stated Preferences for Fresh Fruits and Vegetables*, Research Report 86-06, Department of Agricultural Economics and Rural Sociology, University of Tennessee Agricultural Experiment Station, Knoxville, April 1986.
- Estes, Edmund. "Alternative Cash Crops: How Big Is The Market," *Analyzing the Potential for Alternative Fruit and Vegetable Crop Production Seminar*, Seminar sponsored by S-178 Technical Committee and Farm Foundation, New Orleans, Louisiana, November 4, 1985.
- Hamm, Shannon Reid. "1987 Outlook for Vegetables," Session No. 13, Annual Agricultural Outlook Conference, United States Department of Agriculture, Washington, DC, December 3, 1986.
- Hanushek, Eric A., and John E. Jackson. *Statistical Methods for Social Scientists*. Academic Press, New York, 1977.
- Harris, Suzanne S. "U.S.D.A.'s Continuing Survey Looks at Diets in 1985 and 1986," Session No. 25, Annual Agricultural Outlook Conference, United States Department of Agriculture, Washington, DC, December 3, 1986.
- Heimbach, James. "Changing Public Beliefs About Diet and Health," Food and Drug Administration, Washington, DC, excerpts from presentation as reported in *The Packer*, Vance Publishing Corporation, Overland Park, Kansas, December 6, 1986.
- Henkes, Rollie. "Light, Lean, and Natural," *The Furrow*, Southern Edition, John Deere Co., Moline, Illinois, January-February 1987.
- McKelvey, Richard D., and William Zavoina. "A Statistical Model for the Analysis of Ordinal Level Dependent Variables," *Journal of Mathematical Sociology* 4(1975):103-20.
- McLaughlin, Edward W. *Buying and Selling Practices in the Fresh Fruit and Vegetable Industry*, Ph.D. Dissertation, Michigan State University, Ann Arbor, 1983.
- Nelson, Glenn, and Tom H. Robinson. "Retail and Wholesale Demand and Marketing Order Policy for Fresh Navel Oranges," *American Journal of Agricultural Economics* Vol. 60, No. 3, August 1978.
- Searce, W. K., and R. B. Jensen. "Food Stamp Program Effects on Availability of Food Nutrients for Low Income Families in the Southern Region of the U.S.," *Southern Journal of Agricultural Economics* 11(1979):113-20.
- Smallwood, David M., and James R. Blaylock. *Food Spending in American Households 1980-81*, USDA, ERS Bulletin 731, 1985.
- The Packer, "Neighboring States Follow Different Paths to Season's Promotion Efforts," *The Packer*, Vance Publishing Corporation, Overland Park, Kansas, January 24, 1987.

- \_\_\_\_\_. "Assessing State of the Trade," *The Packer*, Vance Publishing Corporation, Overland Park, Kansas, January 31, 1987.
- Trotter, C. E. and T. A. Brewer. *Consumer Reactions to Fresh Apples Marketed in Allentown - Bethlehem, Pennsylvania, 1974-75*, Bulletin 816, Pennsylvania State University, Agricultural Experiment Station, University Park, December 1977.
- United States Bureau of the Census, *City and Data Book, 1983*, Vol. 1, Geographic Area Series, Part 42, Tennessee: State and County Data, U.S. Department of Commerce, Washington, DC, 1984.
- United States Department of Agriculture, *Farmline*, Vol. VII, No. 9, Economic Research Service, Washington, DC, September 1986.
- \_\_\_\_\_. *Food Consumption, Prices, and Expenditures 1964-84*, Economic Research Service Bulletin 736, Washington, DC, December 1985.
- Zind, Tom, ed. "Fresh Trends 1987," *The Packer: Focus 1986-87*, Vol. XCIII, No. 54, Vance Publishing Corporation, Overland Park, Kansas, 1986.
- \_\_\_\_\_. "Produce Capturing Large Slice of Dietary Pie," *The Packer*, Vance Publishing Corporation, Overland Park, Kansas, January 10, 1987.

### Appendix: Items on Mail-in Questionnaire

1. Do you care where fresh tomatoes have been grown when you consider purchasing them? \_\_\_\_\_ Yes \_\_\_\_\_ No
2. Did you buy "Tennessee Country Fresh" tomatoes?  
\_\_\_\_\_ Yes \_\_\_\_\_ No
3. Did the "Tennessee Country Fresh" sticker affect your purchase decision?  
\_\_\_\_\_ Yes \_\_\_\_\_ No
4. If you did not purchase the "Tennessee Country Fresh" tomatoes, why didn't you? \_\_\_\_\_  
\_\_\_\_\_
5. Circle the items you use to judge fresh tomato quality?  

Price	Smell	Color	Size	Packaging
Feel	Taste	Blemishes	Shape	Origin
6. Were you pleased with the overall quality of the tomatoes you purchased?  
\_\_\_\_\_ Yes \_\_\_\_\_ No  
  
If no, what was wrong \_\_\_\_\_  
\_\_\_\_\_
7. Would you shop at a particular supermarket if you knew beforehand that store featured "Tennessee Country Fresh" produce?  
\_\_\_\_\_ Yes \_\_\_\_\_ No
8. How do "Tennessee Country Fresh" tomatoes compare to other fresh tomatoes in terms of: (circle your response)

Freshness	Taste	Appearance	Storage life	Price	Nutrition
Worse	Worse	Worse	Worse	Worse	Worse
Same	Same	Same	Same	Same	Same
Better	Better	Better	Better	Better	Better
Do not know	Do not know	Do not know	Do not know	Do not know	Do not know

#### Background Information

Occupation of purchaser \_\_\_\_\_

Sex of purchaser: \_\_\_\_\_ male \_\_\_\_\_ female

Spouse's occupation \_\_\_\_\_

Race: \_\_\_\_\_ Black \_\_\_\_\_ Asian \_\_\_\_\_ White \_\_\_\_\_ Hispanic

Age of purchaser: \_\_\_\_\_ Under 25 \_\_\_\_\_ 35-44 \_\_\_\_\_ 55-64  
\_\_\_\_\_ 25-34 \_\_\_\_\_ 45-54 \_\_\_\_\_ 65 and over

Number of people in your home, including yourself \_\_\_\_\_

Of those who live here, how many are:

10 and under \_\_\_\_\_ 11 through 18 \_\_\_\_\_ 19 and over \_\_\_\_\_

Formal education of purchaser:

\_\_\_\_\_ 8th grade or less \_\_\_\_\_ high school graduate \_\_\_\_\_ college graduate  
\_\_\_\_\_ 9-11th grade \_\_\_\_\_ 1-3 years of college

Income category for total household:

\_\_\_\_\_ Less than \$10,000 \_\_\_\_\_ \$20,000-\$29,999 \_\_\_\_\_ \$40,000-\$49,999  
\_\_\_\_\_ \$10,000-\$19,999 \_\_\_\_\_ \$30,000-\$39,999 \_\_\_\_\_ \$50,000 or more



**SAES**

The University of Tennessee  
Agricultural Experiment Station  
joins in commemorating the

Hatch Act Centennial  
1887-1987

100 years of research contributions  
by cooperating State  
Agricultural Experiment Stations



THE UNIVERSITY OF TENNESSEE  
AGRICULTURAL EXPERIMENT STATION  
KNOXVILLE, TENNESSEE 37916  
E11-0415-00-018-87

**Agriculture Committee, Board of Trustees**

- Edward J. Boling, President of the University;  
James F. Harrison, Chairman;  
A. C. Clark, Commissioner of Agriculture, Vice Chairman;  
Jack J. Craddock; Amon Carter Evans; R. B. Hailey;  
William M. Johnson; Ben S. Kimbrough;  
Turner O. Lashlee; William Sansom;  
W. W. Armistead, Vice President for Agriculture

**STATION OFFICERS**

**Administration**

- Edward J. Boling, President  
W. W. Armistead, Vice President for Agriculture  
B. H. Pentecost, Assistant Vice President  
D. M. Gossett, Dean  
J. I. Sewell, Associate Dean  
T. H. Klindt, Assistant Dean  
O. Clinton Shelby, Director of Business Affairs  
Michael Keel, Director of Services  
William L. Sanders, Statistician

**Department Heads**

- J. A. Martin, Agricultural Economics and Rural Sociology  
D. H. Luttrell, Agricultural Engineering  
D. O. Richardson, Animal Science  
V. M. Nordquist, Acting, Child and Family Studies  
Bonnie P. Riechert, Communications  
Carroll J. Southards, Entomology and Plant Pathology  
Hugh O. Jaynes, Food Technology and Science  
George T. Weaver, Forestry, Wildlife and Fisheries  
Betty R. Carruth, Nutrition and Food Sciences  
G. D. Crater, Ornamental Horticulture and Landscape Design  
John E. Foss, Plant and Soil Science  
Jacqueline O. DeJonge, Textiles, Merchandising and Design

**BRANCH STATIONS**

- Ames Plantation, Grand Junction, James M. Anderson, Superintendent  
Dairy Experiment Station, Lewisburg, J. R. Owen, Superintendent  
Forestry Experiment Station: Locations at Oak Ridge, Tullahoma,  
and Wartburg, Richard M. Evans, Superintendent  
Highland Rim Experiment Station, Springfield, D. O. Onks, Superintendent  
Knoxville Experiment Station, Knoxville, John Hodges III, Superintendent  
Martin Experiment Station, Martin, H. A. Henderson, Superintendent  
Middle Tennessee Experiment Station, Spring Hill, J. W. High, Jr., Superintendent  
Milan Experiment Station, Milan, John F. Bradley, Superintendent  
Plateau Experiment Station, Crossville, R. D. Freeland, Superintendent  
Tobacco Experiment Station, Greeneville, Philip P. Hunter, Superintendent  
West Tennessee Experiment Station, Jackson, James F. Brown, Superintendent