RESEARCH REPORT
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FARMER TO CONSUMER DIRECT MARKETING OF FRUITS AND VEGETABLES IN EAST TEXAS

TEXAS AGRICULTURAL MARKET
RESEARCH & DEVELOPMENT CENTER
in cooperation with the
ECONOMIC and STATISTICS SERVICE
U.S. Department of Agriculture

TEXAS A&M UNIVERSITY • TEXAS AGRICULTURAL EXPERIMENT STATION • TEXAS AGRICULTURAL EXTENSION SERVICE • College Station, Texas

THE TEXAS AGRICULTURAL MARKET RESEARCH AND DEVELOPMENT CENTER

An Education and Research Service
of
The Texas Agricultural Experiment Station
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The Texas Agricultural Extension Service

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Robert E. Branson
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FARMER TO CONSUMER DIRECT MARKETING OF EAST TEXAS FRUITS AND VEGETABLES

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REPORT HIGHLIGHTS

* The purpose of this research was to measure economic benefits of direct farmer to consumer marketing. A conceptual model was developed to test farmer and consumer benefits from this marketing system versus the typical commercial system that involves shipping point packing houses and terminal market wholesalers and retail stores.

* Farmer to consumer direct marketing of fruits and vegetables in East Texas has prevailed for several decades. Sales are made through four outlets--pick-your-own, at-the-farm sales, roadside marketing and at farmers markets.

* Pick-your-own and at-the-farm sales are somewhat limited because many farms are fifty miles or more away from the major population center--the Dallas-Ft. Worth, Texas metroplex, with a population of about 2.5 million persons.

* Roadside sales are almost entirely made from pick-up trucks parked alongside of principal state and some federal highways. Interstate highways designed with limited accesses have reduced opportunities to market to thru-traffic from roadside stands.

* The major direct marketing outlet for East Texas fruit and vegetable farmers is the Dallas Farmers Market. It has 196 sales stalls which are filled to capacity from about May through September. The market operates year-round. It is located on a major thoroughfare at the edge of the downtown central business district and is owned and operated by the City of Dallas.

* Farmers selling at the Dallas Farmers Market typically operate a farm of about 100 acres, of which about 30 acres are devoted to fruits or vegeta-

ble production. The exception is watermelons, averaging about 50 acres per farm. Family labor predominates with some hired labor at peak harvest periods. Several vegetables are grown simultaneously. Different varieties plus some replanting provide maturing products for sale mostly from May through September each year. A few also grow winter vegetables.

* Dealers also sell at the Dallas Farmers Market. They buy wholesale from farmers and retail on the market in stalls along with the farmers. Dealers also operate from commercial supplies of products that complement those grown by East Texas farmers. Dealers sell year round.

* Peddlers are another sales outlet for farmers. Peddlers resell to fruit and vegetable stands and independent food stores in the Dallas-Ft. Worth and North Texas area.

* Returns to East Texas farmers from direct marketing exceeded that available from actual or synthesized commercial marketing systems. Production expenses for some crops were higher than for commercial crops but prices received from direct marketing more than offset the difference. Budgets were developed using the Oklahoma Enterprise Budget Generator, the system applied yearly to major Texas commercial agricultural crops.

* Incomes of farmers from 30 acres of vegetables were estimated at about $39,000 per year over their direct production and marketing expenses. This was a return to their labor, management and to the land they farmed. Therefore, this was a combined return for the total family's labor and to pay for the land involved.

* Results indicate that direct marketing by East Texas farmers is a profitable enterprise but one involving long hours of work because the farmer must both produce and market his own crop.

* Consumers, on an average, obtained savings by shopping at the Dallas

Farmers Market by making at least three purchases of a quarter of a peck each or else one peck of a single product. These sizes offered price advantages over those at food chain stores. Very small purchases--pint, quart or two-quart basket sizes--were usually priced near those at food chain stores. Advantages of the small purchases would be any perceived product quality differences.

* Consumers drove an average one-way distance of 13.6 miles from their homes to the market and spent an average of about 17 dollars per trip on their Farmers Market purchases. These shoppers made an average of 2.6 trips per month to the market. These were special trips for 91 percent of the shoppers and were not attached to trips for other primary purposes. Three out of four shoppers were of the opinion that prices and product quality were better at the Dallas Farmers Market than at their local food stores.

* Shoppers at the Dallas Farmers Market were well educated, 78 percent had a college education, and 75 percent had household incomes of $20,000 or above. Thirty-nine percent had, at some time, lived on a farm. Though shopping for other friends is common, only 7 percent of those interviewed were members of cooperative buying clubs.

* The advisability of one or two smaller additional farmers markets in outer sections of the city that would be accessible to more consumers is recommended for study and consideration. Such markets would possibly operate on a part-time schedule of two or three days per week and would be coordinated with the downtown market. Added opportunities would be provided to other consumers and farmers. Plans have been considered by the City of Dallas for enlarging the present Farmers Market so that it can accommodate more farmers and consumers.

* It is recommended that the Texas A&M University Research and Extension Center at Overton, in East Texas, provide continued educational guidance to farmers interested in direct marketing of fruits and vegetables.

FARMER TO CONSUMER
DIRECT MARKETING OF FRUITS AND VEGETABLES
IN EAST TEXAS

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INTRODUCTION

Marketing of fruits and vegetables direct from farmers to consumers offers potential benefits to both parties. Therefore it continues. The purpose of this research is to identify the systems used in East Texas and to determine actual and perceived benefits for farmers and consumers using this marketing system.

East Texas was selected as the area of study because most fruit and vegetable small scale farming in Texas is located there. Some of these farmers are full-time and others are part-time farmers, though full-time farmers are more typical.

Methods of marketing in Texas assumes any one of four forms. These are:

1. Pick-your-own
2. At-the-farm marketing
3. Roadside sales
4. Farmers markets

Pick-your-own marketing of fruits and vegetables has made entry in Texas but has not flourished because producing farms for the most part are located away from the principal cities. Driving distances mitigate against urbanites making trips to the farms.

At-the-farm marketing occurs mostly for watermelons, peaches and

Table 1. Number of Farmers Using Direct Marketing to Consumers by County and Method of Selling.

District & Counties	Pick-your-own	Roadside Stand	Off-Farm Marketing
		- - - number - - -	
District 4			
Clay County	12	13	9
Cooke County	0	0	2
Denton County	1	3	1
Ellis County	0	1	2
Fannin County	1	0	4
Grayson County	1	2	6
Hunt County	0	0	3
Jack County	1	1	2
Kaufman County	1	2	4
Montague County	0	3	3
Navarro County	2	1	1
Parker County	0	6	0
Tarrant County	0	1	0
SUBTOTAL	19	33	37
District 5			
Camp County	1	5	1
Cass County	2	4	2
Franklin County	0	1	0
Gregg County	0	0	2
Harrison County	2	2	3
Henderson County	0	6	1
Hopkins County	0	3	0
Lamar County	0	8	16
Rains County	5	2	4
Red River County	0	0	4
Smith County	3	8	11
Titus County	1	5	3

Table I continued

District & Counties	Pick-your-own	Roadside Stand	Off-Farm Marketing
Upshur County	0	21	0
Van Zandt County	0	6	0
Wood County	0	2	0
SUBTOTAL	14	73	47
District 9			
Anderson County	3	1	3
Cherokee County	0	6	3
Freestone County	3	7	0
Houston County	0	1	0
Jasper County	0	7	14
Leon County	0	6	0
Madison County	0	1	1
Nacogdoches County	5	1	6
Newton County	0	1	2
Polk County	0	8	0
Rusk County	4	2	6
San Augustine County	0	1	0
San Jacinto County	0	3	1
Shelby County	4	5	1
Tyler County	3	15	12
Walker County	0	1	0
SUBTOTAL	22	66	49
GRAND TOTAL	55	172	133
Percent	15	48	37

The predominant forms of direct marketing are roadside stands and off-farm marketing. But these require further interpretation. Though 48 percent of those covered by a Texas Agricultural Extension Service survey reported selling through roadside stands, (Table 1), what mostly occurs in such instances are sales from a pickup truck temporarily parked at the side of the road. For whatever reason, roadside stands have all but disappeared. Those still around offer assorted products mostly procured from wholesale dealers, not farmers.

Off-farm marketing means mostly sales in farmers markets by farmers themselves or sales to dealers that maintain sales stalls there. A few farmers markets are found in East Texas at such places as Kilgore, Marshall, and Nacogdoches, but these are operated almost exclusively by dealers who take the farmers crops and resell them to consumers visiting these markets. An exception is the Dallas Farmers Market, which we will discuss later in more detail since it is truly a farmers market. Attention now will turn to a more detailed discussion of the production and the marketing systems.

FRUIT AND VEGETABLE PRODUCTION AREAS

Production of fruits and vegetables for direct marketing from farmers to consumers in Texas is primarily concentrated in East Texas. Production areas include most of Texas Agricultural Extension Districts 4, 5 and 9 (Figure 1). Although other direct marketing occurs from scattered pockets in Central Texas, late freezes reduced activity severely during 1980, especially for peaches around Fredericksburg (Gillespie County). Therefore, that portion of the state was excluded from this study.

Fruit and vegetable farmers are found in clusters in East Texas. One is in the Sulpher Springs, Mt. Pleasant, Pittsburg, Gilmer, Mineola, and Grand Saline area, (Figure 2), which basically lies northward, east and

Figure 1. Texas Agricultural Extension Districts

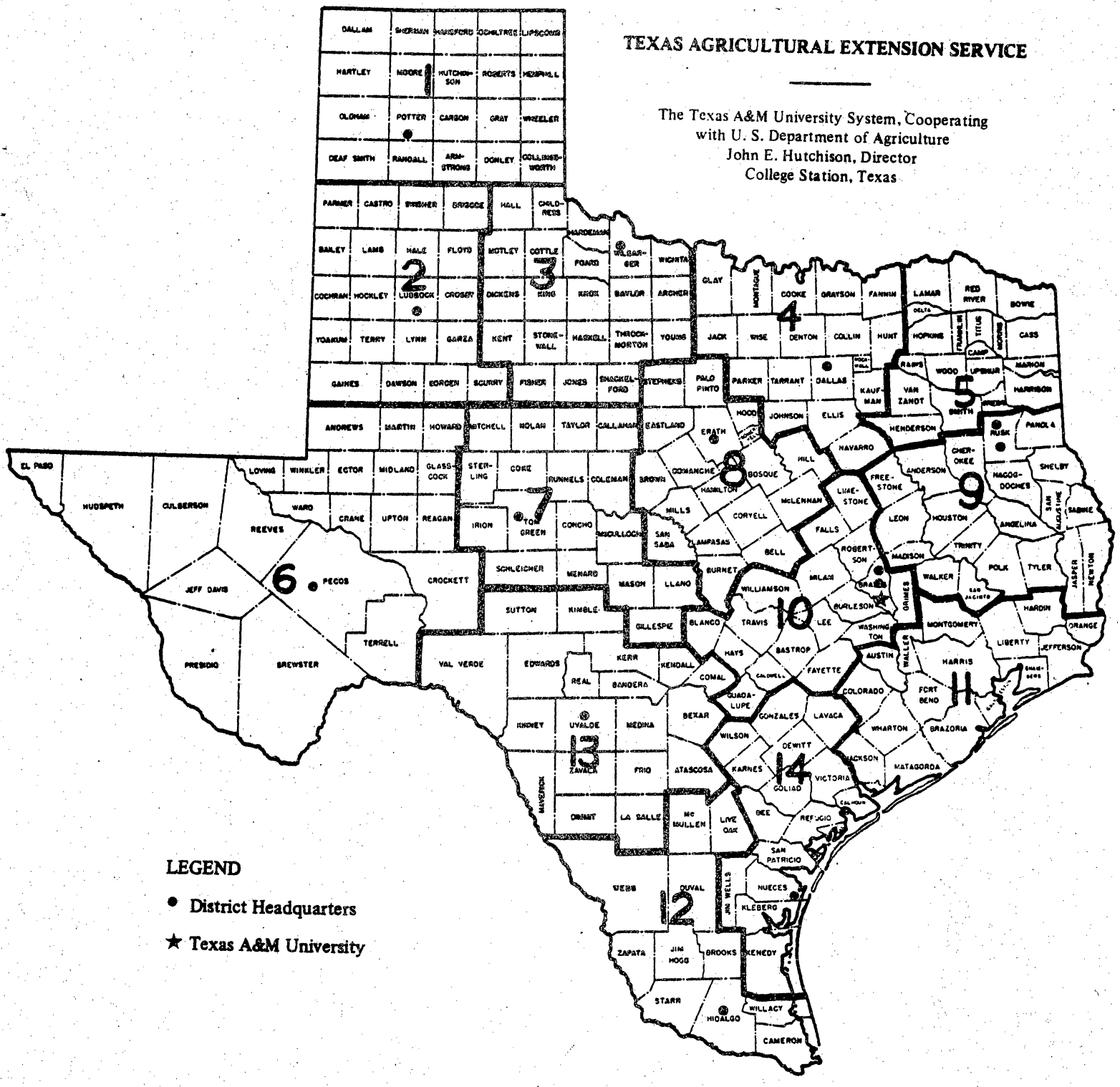
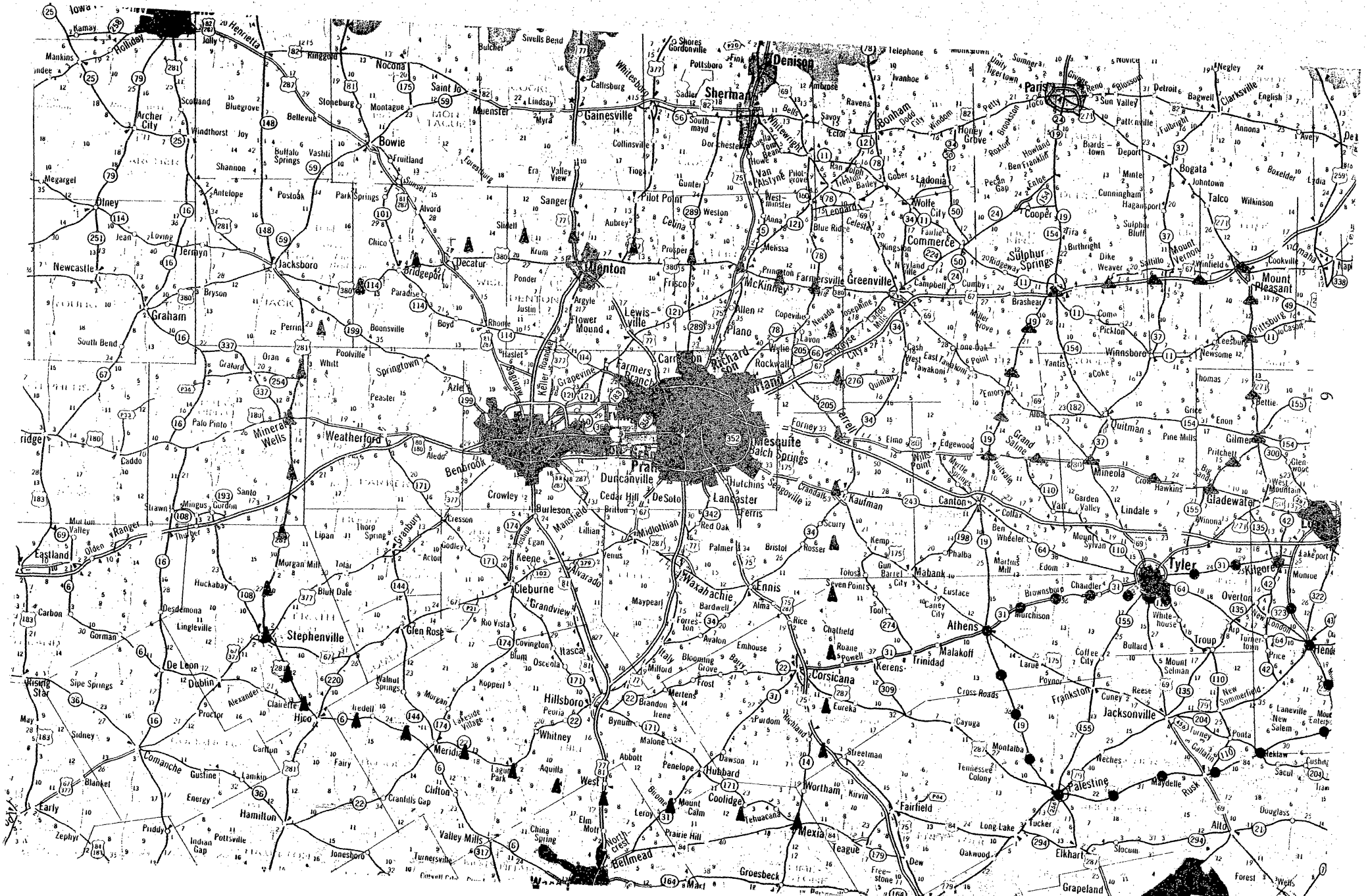


Figure 2. Clustered Areas of Fruit and Vegetable Farmers in East Texas



west of Tyler. Growers around and south of Nacogdoches market in Houston, instead of Dallas. A third cluster is in counties surrounding Dallas-Ft. Worth. It extends southward to Mexia and westward to Stephenville and Mineral Wells.

Because of the geographic configuration of production, most Eastern and Northeastern Texas direct marketing farmers take their produce to the Dallas Farmers Market. Consequently, the study was pivoted around those farmers selling on the Dallas Farmers Market.

THE DALLAS FARMERS MARKET

The Farmers Market and produce wholesale markets adjoin each other in Dallas. The site is adjoint to the downtown central business district and on a major thoroughfare. Established in 1942, it was expanded and rebuilt in 1948. Because of its long history, some farmers interviewed in this study had been selling on this market for over 30 years. It is owned and operated by the City of Dallas.

This is an open market with overhead roof structure. It has three sections so constructed plus additional uncovered areas. Most consumer transactions are in the covered sections which altogether have 196 stalls.

Farmers have first priority on sales stalls. They must apply at specific times for these spaces which are then assigned on a lot draw basis day to day. Unfilled spaces may be taken, and usually are, by so-called "dealers". A dealer, as noted before, buys from the farmers and, acting as a retailer, competes with the farmers in making sales.

Dealers are liked by farmers because they help make a market for the farmers' produce. When farmers sell to dealers, a customary mark-up is expected by the dealer and this helps the farmers to establish product prices in the market.

Aside from the dealers, truckers bring supplies of other products from the commercial growing areas, such as the Rio Grande Valley, the Winter Garden near Uvalde, Texas and the Texas High Plains. Usually there are other products that supplement the kinds offered by the farmers. Thus the overall variety is enhanced, increasing consumer attraction to the market.

THE RESEARCH OBJECTIVES AND PROCEDURE

This study is part of a series conducted in several states to evaluate producer and consumer benefits from the direct marketing system. Research objectives are consequently formed around that basic purpose.

Four objectives were established for the study:

1. Compare the production and marketing costs for farmers selling direct to consumers versus those selling to what are known as commerical markets.
2. Determine price benefits, if any, received by farmers using direct marketing as compared to those selling through other commerical marketing channels.
3. Evaluate consumer satisfaction and monetary benefits from direct purchasing of fruits and vegetables versus purchases from retail food stores.
4. Assess the future potential for fruit and vegetable direct marketing in Northeast Texas.

Since consumers have been faced with escalating costs of food stemming from a number of reasons, there is national and local interest in evaluating different production-marketing system alternatives.

The Research Procedure

Several field trips were made to the Dallas Farmers Market for several purposes. One was to observe the kinds of fruits and vegetables generally

being sold and the size of units offered. Others were to interview farmers as to the location of their farm, how many years they had come to the Dallas market and how many weeks or months they sold at the market in a typical year.

A selected sample of thirty farmers was developed from these surveys. This list was supplemented by contacts with other growers found through Extension Service County Agents in the East Texas production areas. The purposive sample provided adequate representation of the array of fruits and vegetables normally sold at the market.

Information regarding production and marketing costs were secured from personal face-to-face interviews with farmers. These were supplemented by telephone surveys and consultations with Extension Service and Experiment Station economists and horticulturalists serving the area.

Emphasis was placed on securing data on physical inputs used in fruit and vegetable production. Marketing costs were calculated from a combination of physical input and dollar cost information. On the basis of these, costs were synthesized for the respective vegetable and fruit crops. Only in the case of fruit did farmers produce only one crop. Furthermore, fruit and vegetable production is usually part of a larger enterprise that included grazing land for beef cattle production. Consequently, cost allocations were essential to the development of meaningful results. It was also necessary to obtain a sample of consumers that shopped at the market. (Contacts establishing the consumer sample occurred on Friday and Saturday of a summer weekend in 1979). Approximately 150 shoppers were interviewed. Of that number, slightly more than 100 were included in the final survey which was made by telephone during the summer of 1980. The one year delay of the interviewing allowed a determination of the market's attrition rate among shoppers with at least one year's exposure to the Farmers Market.

Questionnaires for the farmer and the consumer surveys were pretested and revised to insure good communication between interviewers and survey respondents. The producer survey data were entered into computer budget generators developed for Texas crops. Data from the consumers were computerized for analysis implementation.

In order that price comparison data would be sufficiently broad-based, separate one-month surveys of fruit and vegetable prices were conducted. During mid-summer 1979 and 1980, one survey was of retail prices at the Dallas Farmers Market. It was made by an interviewer trained for that task by Dallas USDA-state market news supervisors. Thus, comparable procedures were used by the Market News staff for the adjacent wholesale market prices. Simultaneously, a second retail prices survey was obtained from four of the major food chains serving the Dallas metropolitan area. From these, direct comparisons were possible between prices at all three market levels.

THE THREE BASIC MARKETS FOR TEXAS FRUITS AND VEGETABLES

Direct marketing to consumers, marketing to processors and marketing to production area packers and shippers are the three basic markets for fruits and vegetables. Direct marketing is the oldest of the three. In early American history, farmers took quantities of fruits and vegetables beyond their families' needs to the nearest town and sold them at the town's market square to the local citizenry.

Commercial marketing arose as farmers began to specialize in large-scale fruit and vegetable production. Supplies far exceeded local market demand and therefore were shipped to near and distant major cities. Specialized packing houses developed to grade and pack the produce, make sales and arrange shipment to the markets.

Another marketing alternative was to sell the large supply to processing plants for canning or dehydration. Special quality requirements regarding shape, color and consistency are usually necessary when production is for processors. High yields are essential in order to sell at competitive prices versus other geographic areas. These performance characteristics are generally limited to a few areas, so producers in all states do not have this marketing alternative. In Texas, only a few fruits and vegetables have processing potential. The options readily available to all is to either sell direct to consumers or to go through local commercial packer and shipper marketing channels. A part of this study is to evaluate the advantages and disadvantages of the latter two systems to Texas farmers. Although the differences between direct marketing and commercial marketing systems are self-evident, it is helpful to review the two systems as they presently operate and note the input differences involved.

The Direct Producer to Consumer Marketing System in Texas

Texas farmers engaged in direct marketing typically operate a farm of less than 100 acres. Size limits of the enterprise are controlled by the number of acres the family can manage with its own labor plus some seasonal hired labor at harvest time. The survey found that a medium-sized tractor, about 30 horsepower, is the basic power unit, usually purchased new. The complement of tractor implements may be new or used.

Land is prepared for planting by tractor tillage. Crops, to a considerable degree, are hand cultivated and sprayed because several vegetables are grown at the same time, each needing special attention. Irrigation is rare. Harvesting is by hand, using bushel baskets. The crop is hand graded to the owner's own standards to eliminate obvious culls, but grading is usually not as strict as that observed in commercial packing sheds using USDA grades. Neither are size limitations. Therefore,

the quantity of the crop marketed is judged to be 15 or 25 percent larger than occurs in commercial marketing.

Some East Texas farmers make roadside sales from the farmer's truck. They drive to a nearby highway that offers a good traffic exposure. Roadside stands, which were previously prevalent, have almost vanished. (Figure 3).

At-the-farm marketing, where used, exists primarily for fruits. Pick-your-own operations are increasing but still are not as noticeable as one would expect, despite the numbers reported through Extension Service surveys. Advertising of pick-your-own marketing is in local papers, which makes the information limited in distribution, and harvests are usually for a short period of time.

Farmers markets, the third alternative, are limited in number. Survey indications are that less than five operate in local towns and cities of East Texas. Of these, most are operated by dealers who buy from local farmers and resell to consumers (Figure 4). Consequently, they do not qualify as direct producer to consumer marketing systems. The exception is the Dallas Farmers Market, which draws farmers from a radius of over 150 miles, an indication of its size and importance. The number of Northeast Texas farmers using the various direct marketing alternatives are noted in Table 1. Because of the dominance of the Dallas Farmers Market, we now turn to it.

When harvested, East Texas fruit and vegetables are taken to the Dallas Farmers Market. Supplies are transported from the farm to the Farmers Market in the producer's own pick-up or bobtail truck. Pick-ups are equipped over the truck bed, with permanent camper covers. These covers protect the products during the transit to market, as well as providing sleeping space for the farmer, if needed, at night. The products are carried in bushel baskets. At the Farmers Market the

Figure 3. Roadside Stand, East Texas.

Figure 4. Farmers Market, Longview, Texas.

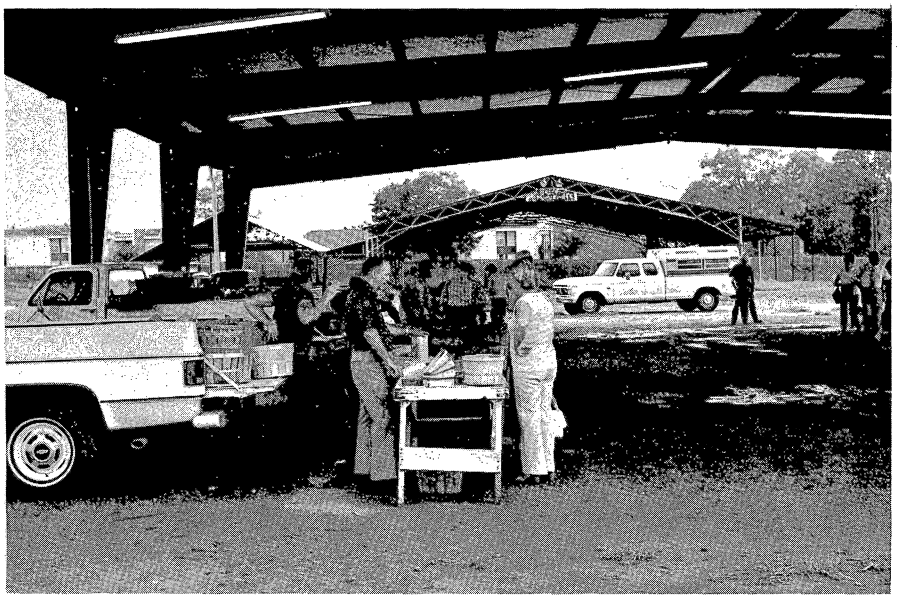
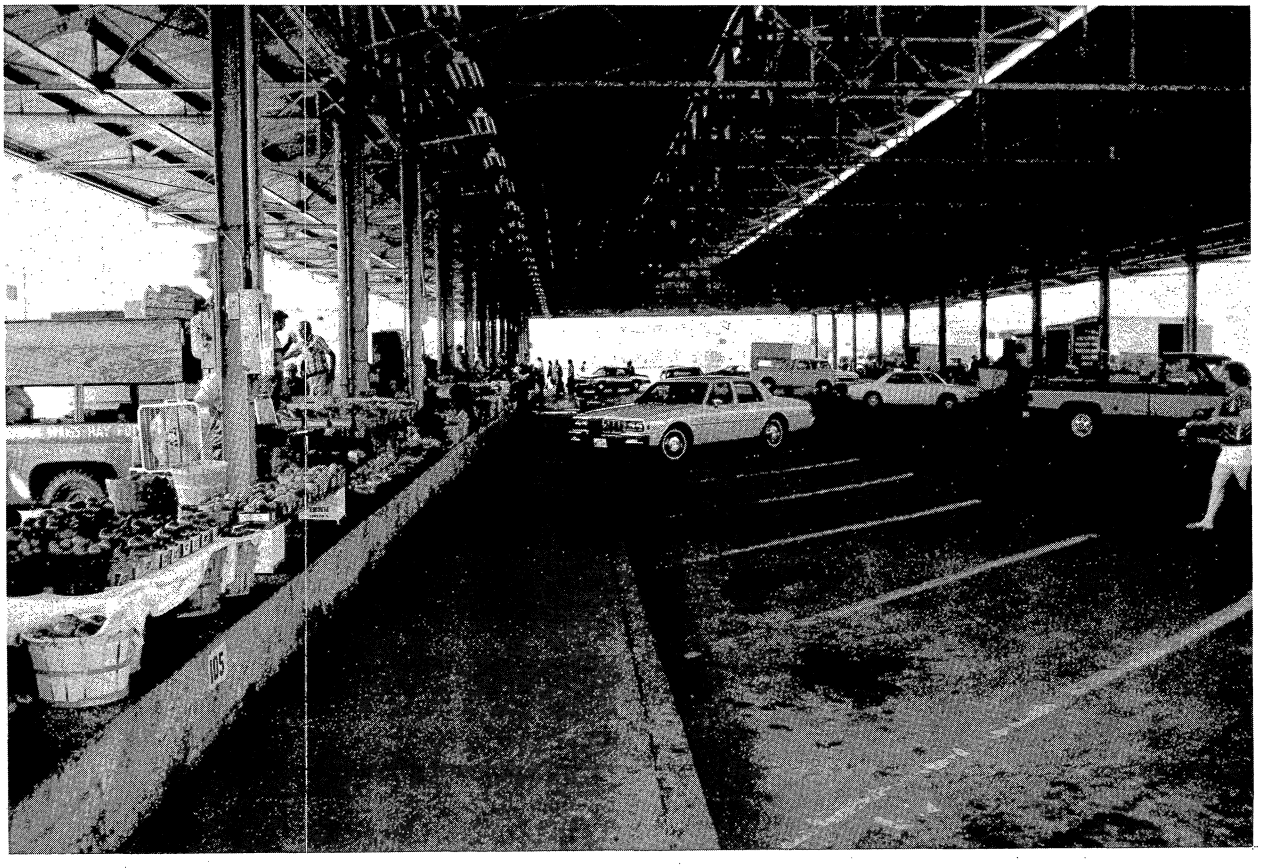


Figure 5. Dallas Farmers Market, Dallas, Texas.



farmer has three outlets for his products: peddlers, dealers and consumers. Like all produce markets, operations begin early. About 4:30 a.m. to 6:30 a.m. is the wholesale market to peddlers and dealers. Retail sales to consumers begin about 7:30 a.m. and continues to 8:00 p.m. in the evening.

Sales to peddlers on a wholesale basis by farmers at the Farmers Market involve exchanging bushel baskets. Thus, container costs are minimized. Bushel basket sales are also made to dealers who sell on the Farmers Market in competition with the farmers. Farmers say that dealers serve two purposes. Dealers provide an additional market outlet if farmers have more supplies than they can conveniently market themselves at the farmers stalls. Secondly, the wholesale price to the dealers tends to set the overall retail price level at the market.

Design of the Dallas market buildings allows consumers to drive through the covered market. Customers park at a walkway in front of the sales stands. When inside parking spaces are full, other outside parking is available (Figure 5). Consumers shop the market year round.

For retailing, farmers display produce to consumers throughout the day, seven days a week, in an array of basket sizes, including a fourth of a peck, half peck, half bushel and bushel. Consumer purchases are usually placed in paper sacks and the display baskets are reloaded. As noted previously the market has 196 sales stalls.

These foregoing direct marketing systems are in sharp contrast to the commercial systems in Texas.

Commercial Production-Marketing System

Texas has three significant commercial fruit and vegetable production-marketing areas. The Lower Rio Grande Valley, the leading one in production volume, ships in the fall, winter and early spring months. The Winter Garden, the next in time sequence of crops, markets in the early

and late spring. The High Plains supplies are harvested in late summer and early fall. These areas are noted on the accompanying map, (Figure 6).

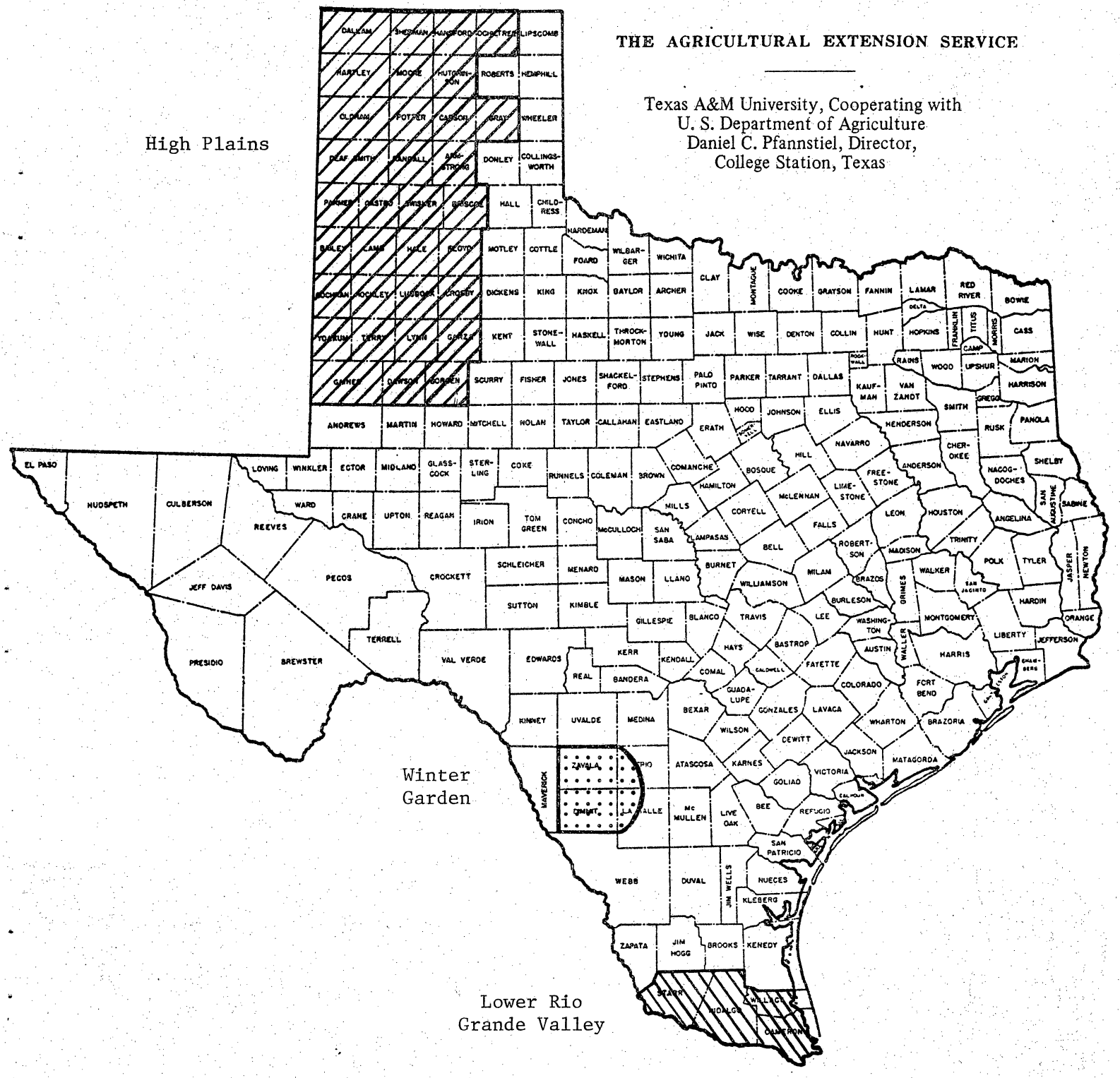
Commercial fruit and vegetable production in Texas is generally a large scale enterprise. The principal exceptions are the small, 15 to 30 acre Rio Grande Valley groves of citrus, which are held under absentee ownership. Even these are managed and harvested by grove care organizations that perform their services for thousands of acres. Vegetable production within the three major commercial areas averages about 1,000 acres per family unit and ranges much higher than that. In the Rio Grande Valley, acreage is double-cropped with both fall, early winter and late winter-spring production, so units are equivalent to 2,000 acres per farm.

Land tillage, planting and cultivation in Texas commercial areas are with large-scale equipment. Insecticides and fungicides are mostly applied by airplane overfly. Harvesting is by large commercial labor crews that follow crops northward. The crop moves directly to packing sheds where washing, grading and sizing occur on continuously operating equipment. USDA standards and size tolerances are followed. Fruits and vegetables may be packed by hand or machine, or a combination of these, into standard size commercial containers. Sales are made to food chain buyers or to wholesalers in terminal receiving markets. Some sales are arranged by terminal market brokers.

Need to control size, quality and time of harvest caused vertical integration to occur. Grower-shippers predominate some of which operate in Mexico as well.

Shipments are mostly via commercial truck lines since railroad use, once dominant, has nearly disappeared. Given the large number of purchased inputs into the commercial system, one would assume that a direct marketing system from producer to consumer would operate at lower cost

Figure 6. Principal Commercial Vegetable Production Areas in Texas



and benefit both parties. For example, the commercial system must purchase new containers for every shipment. Special washing, grading and packing equipment, labor and supplies are purchased. Sales force or brokerage fees and shipping charges are incurred. However, these commercial production-marketing operations, though more intensive and expensive than for a small scale direct marketing farmer, have a compensating factor. These costs are spread over a large volume of product, which results in the commercial system being highly cost efficient.

Both direct and commercial marketing, however, have a place in our economy. Periodic research provides an opportunity to evaluate the role each serves and how each may be improved. Attention is now turned to the general status of direct marketing research when this project began.

GENERAL STATUS OF DIRECT MARKETING RESEARCH

Before initiating this project, approximately twenty-five other direct marketing studies were reviewed to determine their findings, the phases of the production-marketing system covered, and the methodology employed. Most of the research represented partial system analyses, or micro studies, of particular phases of the production-marketing systems. Few presented a full producer-consumer benefits and cost analysis. Such a situation doubtless led the U.S. Congress to call for such studies. The present study endeavors to approach a total systems analysis.

The Conceptual Model

The theoretical concept of direct marketing assumes the following basic relationships:

1. The price received by farmers in direct sales to consumers is more than the price available from the commercial buyers at the local area shipping points.

$$\therefore P_{fm} > P_{fm} \qquad (1)$$

where

P_{fm} = price at the farmers market

P_{fsp} = farmer's price at the nearest commercial shipping point.

2. The price the consumer pays is less than the retail price at the retail store.

$$\therefore P_{fm} < P_{rs} \quad (2)$$

where

P_{rs} = retail price at the food store

3. From the above we have the following simplified relationships:

$$P_{fsp} < P_{fm} < P_{rs} \quad (3)$$

A view of pricing from the marketing system vantage point provides other relationships.

4. Price at the retail store is derived as follows:

$$P_{fsp} + HGP_c + WD_c + RS_c = P_{rs} \quad (4)$$

where

HGP_c = harvesting, grading and packing cost for commercial marketing at the shipping point.

WD_c = wholesale dealers' cost including transportation from the shipping point and his markup.

RS_c = retail store's marketing mark-up over its buying price.

5. Price at the farmers market is derived from:

$$P_{wm} + FS_c = P_{fm} \quad (5)$$

where

P_{wm} = wholesale market price at nearest major city with market news quotation

FS_c = farmer's selling cost or markup at the farmers market.

This equation assumes that direct marketing farmers base their wholesale prices on commercial wholesale market prices, which was true for East Texas. However, the price at the wholesale market evolves from

the first three elements of equation (4) and therefore the farmers market retail price becomes:

$$\bar{P}_{fsp} + \bar{HGP}_c + \bar{WD}_c + \bar{FS}_c = P_{fm} \qquad (6)$$

Equation (6) differs from the farmers market price that is popularly assumed by economists. The usual assumption is that the farmers market price is the cost of production for the product plus the farmer's own harvesting and grading expenses, transportation costs to the market, and marketing expenses at the market, plus a price incentive markup. The price incentive is some dimension sufficient to induce to sell on the farmers market rather than to other outlets. How much such a farmer's premium or mark-up should be would require separate research for its determination. Nonetheless, the resulting equation is

$$\bar{FPC}_{Dm} + \bar{FTMC} + \bar{FS}_e = P_{fm} \qquad (7)$$

$\bar{FPC}_{Dm}$ = farmer's production cost for products to the Dallas Market

$\bar{FTMC}$ = farmer's total marketing cost when using the Dallas market

$\bar{FS}_c$ = price (profit) incentive necessary to keep the farmer in direct marketing

However, this is not the pricing model used by East Texas farmers engaged in direct sales to consumers at the Dallas Farmers Market. Instead, these farmers key their prices to the wholesale market news price quotes for Dallas. The same prevails for pricing at local area farmers markets in East Texas.

From the consumers' side, the cost of products bought at farmers markets must have added to it the marginal cost of the trip to the facility over and above the cost of going to the neighborhood food store.

$$P_{fm} + T_{mc} = P_c \quad (8)$$

where

T_{mc} = marginal cost of driving to farmers market over and above comparable cost to local store.

P_c = total price paid by the consumer shopping at the farmers market.

The general assumption usually is that the price at the farmers market including marginal driving costs is less than the price at the retail store.

$$P_{fm} < P_{rs} \quad (9)$$

From the foregoing, we have a set of relationships that can be tested in the present research.

Conceptual Views of Farmers' Costs and Returns

Budgets for Northeast Texas fruit and vegetable production have been prepared from three conceptual vantage points. The first is the costs and returns associated with direct marketing on the Dallas Farmers Market. The second is costs and returns estimates determined for Texas commercial fruit and vegetable production areas. The third is a synthesized estimate of costs and returns assuming that the Northeast Texas farmers had commercial shipping points available to them. Presently, only watermelons and sweet potatoes continually move through a commercial marketing system in East Texas. On occasion tomatoes have.

Seven crops important among farmers engaged in direct marketing were selected as representative ones: tomatoes, watermelons, green pinto beans, squash, okra, southern peas and peaches.

Production and Marketing Cost Data Methods

The Texas Agricultural Extension Service prepares computerized budgets for major Texas agricultural crops. The foremat is the budget generator system developed at Oklahoma State University. Equipment and other fixed costs are allocated on a per acre basis by the number of individual farming

operations within land preparation, planting, cultivationg, irrigating, chemical application and harvesting stages. Direct costs of fuel, supplies, and repairs are similarly applied.

Through the field survey, information was obtained as to the tractor and machinery complement normally used by the typical East Texas fruit and vegetable farmer. These were depreciated at accepted standard rates tied to hours of operation and an equipment-life base. Current 1980 prices were used for equipment as well as for direct variable costs such as seed, fertilizer and other chemicals used in crop production.

Marketing costs were also based upon late 1980 and early 1981 pricing. Truck prices and maintenance plus fuel, oil and tire costs were translated into per mile costs of operation over a three to four year truck life and about 100,000 miles of driving. The average distance traveled to the Dallas Farmers Market by farmers is about 160 miles round trip. Costs of sales: stall rental, meals plus a motel room for one day in three were included. The number of paper sacks used to market that portion of the crop sold retail was determined, as was the replacement cost of bushel baskets, considering that the equivalent of one set of about 100 baskets is worn out in the harvesting and marketing re-using process each year. The number of days required to market a crop were calculated based upon the individual crop yields and typical truck load capacity.

The foregoing estimates somewhat overstate the average marketing costs because some farmers often stay with their supplies and sleep in their trucks rather than going to motels. Instead of eating at restaurants, some bring food supplies with them. It was considered advisable, however to overstate marketing costs rather risk too low a calculation.

Prices the farmers received for the fruits and vegetables sold direct retail to consumers and wholesale to peddlers and dealers were those prevailing on the Dallas Farmers Market during the four weeks in July 1979 and 1980. Prices were obtained by procedures outlined earlier in this report. With the pricing and costing methods described, we can now move to the individual crop budget estimates.

ESTIMATED COSTS AND RETURNS PER ACRE
FOR DIRECT MARKETING OPERATIONS
UTILIZING THE DALLAS FARMERS MARKET

Based upon information gathered from (a) detailed interviews with 35 producers engaged in direct marketing and (b) numerous consultations with agriculture extension personnel, representative budgets were constructed for the seven most important fruit and vegetable crops grown in East Texas for direct marketing. Included were six vegetable crops: tomatoes, watermelons, southern peas, pinto beans, yellow squash, and okra. The only fruit crop included was peaches. While other vegetables are grown in this region (e.g. bell peppers, cantaloupes, cucumbers, greens, irish potatoes, sweet corn, sweet potatoes, etc.), sufficient reliable budget information was not available. The same is true for plums, which are traditionally associated with peach production, but acreage has declined sharply in recent years.

Since budgets were constructed using the budget generator system, these budgets may be compared directly with commercial budgets based upon the same procedures. Budgets reflect that the small acreages used by East Texas fruit and vegetable farmers cause the machinery and equipment operations costs to be higher per acre than for the typical Texas commercial vegetable farms. Usually, harvesting costs are higher because of hand harvesting of the East Texas crops. Direct marketing expenses may or may not exceed costs incurred in commercial sales to country buyers. Such added expenses must be balanced against the higher prices obtained from direct marketing sales to consumers.

Although the Dallas Farmers Market is the focal point of direct farmer-to-consumer fruit and vegetable sales in East Texas, its viability is partly supported by wholesale sales. Farmers typically sell a significant portion

of their crop at the Dallas Farmers Market to wholesalers, dealers, and peddlers. For the seven crops analyzed, estimates from farmers' reports as to the percentages sold direct versus wholesale at the Dallas Farmers Market are noted in Table 2.

Table 2. Estimated Percentages of Selected Commodities Sold Direct Versus Wholesale at the Dallas Farmers Market, 1980.

Crop	Direct Sales	Wholesale
	- - - Percent - - -	
Tomatoes	60	40
Watermelons	15	85
Yellow Squash	30	70
Pinto Beans	60	40
Southern Peas	55	45
Okra	50	50
Peaches	50	50

Individual vegetable farmers involved in direct marketing usually raise four to seven different commodities per growing season. Planting dates by vegetable and variety is staggered in order to permit harvesting over a five to six month period--generally May through September. Budgets must be interpreted in terms of net returns to land, family labor and management. The farmer and his family devote long hours to the marketing phase as well as those incurred in producing and harvesting the crops, though some hired labor may be used for harvesting.

Budgets are keyed to a combined average of 30 acres under cultivation for all crops except watermelons and peaches. The latter are based on 100 acres and 20 acres respectively. Each crop budget is summarized in the following subsections. More detailed budget data are provided in Appendix A.

Tomatoes

Tomatoes yield an average of about 100 cwt. per acre and provide estimated gross sales of $3,430. About 60 percent of the tomatoes were sold retail at a price of 41.5 cents per pound. The remaining 40 percent were sold wholesale at 28.5 cents per pound (Table 3). Wholesale sales accounted for 33 percent and retail sales 67 percent of the value of the total crop.

Production and marketing costs amounted to $1,652 per acre. Of that total, production variable costs were 27 percent and fixed costs 4 percent. Harvest costs required 46 percent of the total, and marketing costs, 22 percent (Table 3).

Per acre returns to land, labor and management from direct marketing of tomatoes amounted to approximately $1,778 (Table 3). Returns from ten acres, about the maximum a single family can manage and harvest with some hired labor, provide a net return of about $17,780 annually. Returns from a representative mix of crops will be considered at a later point.

Table 3. Estimated Costs and Returns per Acre for Tomatoes, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	2,290.80	66.8
Wholesale	1,140.00	33.2
TOTAL	3,430.80	100.0
COSTS		
Preharvest	446.34	27.0
Harvest	766.48	46.4
Production Overhead	75.30	4.6
Marketing	364.40	22.0
TOTAL	1,652.52	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	1,778.28	

Watermelons

Estimated gross returns from watermelons were $1,415 per acre. Fifteen percent of the crop is retailed, producing 18.6 percent of the sales revenue. The 85 percent going wholesale provides 81.4 percent of the gross returns (Table 4). The wholesale price at which the melons can be sold at the Dallas Farmers Market is above that for watermelons sold at the farm. Whereas Farmers Market wholesale price was 9 cents per pound (Appendix Table 4), the comparable farm level wholesale price at the same time was no more than 6 cents per pound. Price differences are not always this favorable.

Production and marketing costs amount to $807 per acre. About 25 percent goes for production operations. Slightly more than 24 percent is spent for harvest, and over half (51 percent) represents marketing costs (Table 4). Returns are about $60,000 from 100 acres.

Table 4. Estimated Costs and Returns per Acre for Watermelons, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	262.60	18.6
Wholesale	1,152.00	81.4
TOTAL	1,414.60	100.0
COSTS		
Preharvest	118.74	14.7
Harvest	199.12	24.7
Production Overhead	77.91	9.7
Marketing	411.00	50.9
TOTAL	806.77	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	607.83	

Southern Peas

Gross sales from an acre of southern peas sold as fresh peas brought $1,415.75, with aroung two thirds of the sales volume coming from direct sales and the other third from wholesale transactions (Table 5). Farmers bring small shelling machines at the Farmers Market and sell the peas freshly shelled if consumers desire.

Production and marketing costs total $588 per acre. Production expenses represent 27 percent of the outgo. Almost half (46 percent) goes for harvest costs. Marketing takes 27 percent (Table 5).

Returns per acre are estimated to be $828.09 (Table 5). Therefore, ten acres would generate net returns of almost $8,300 per year.

Table 5. Estimated Costs and Returns per Acre for Southern Peas, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	967.75	68.4
Wholesale	448.00	31.6
TOTAL	1,415.75	100.0
COSTS		
Preharvest	101.32	17.2
Harvest	272.35	46.4
Production Overhead	56.66	9.6
Marketing	157.33	26.8
TOTAL	587.66	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	828.09	

Pinto Beans

Pinto beans sold on the Dallas Farmers Market are fresh green beans, not hulled nor dried. A special consumer demand segment for these beans has been built over the years. Crop receipts amount to $1,417 per acre (Table 6). The 60 percent sold retail generates almost 80 percent of the total revenue, with the remainder coming from wholesale transactions.

Production and marketing costs for green pinto beans total $368 per acre. Costs are divided among production, 38 percent, harvesting 21 percent, and marketing 41 percent (Table 6).

Net returns to land, labor (excluding harvest labor) and management are $1,050 per acre (Table 6). Consequently, ten acres of pinto beans would yeild about $10,500. Here, as for other budgets, product sale prices are representative of 1979-1980 levels.

Table 6. Estimated Costs and Returns per Acre for Pinto Beans, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	1,125.00	79.4
Wholesale	292.60	20.6
TOTAL	1,417.60	100.0
COSTS		
Preharvest	94.84	25.8
Harvest	78.31	21.3
Production Overhead	44.78	12.2
Marketing	149.81	40.7
TOTAL	367.74	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	1,049.86	

Yellow Squash

Squash is another favorite vegetable of farmers and shoppers at the Dallas market. Income from this crop equals $4,376 per acre, with the 30 percent sold direct bringing in almost 60 percent of that. Wholesale business accounts for the remainder (Table 7). Fresh squash is a specialty commodity, and for that reason the number of acres which can be grown and marketed in this manner is somewhat limited. Part of the reason is that good yields depend on daily harvesting.

Squash production and marketing costs totaled $1,270 per acre, with 80 percent due to harvesting and marketing expenses (Table 7). Returns over costs were $3,106 per acre. Assuming that a producer could successfully manage 5 acres of squash, the estimated returns would be $15,533 annually.

Table 7. Estimated Costs and Returns per Acre for Yellow Squash, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	2,014.20	46.0
Wholesale	2,362.50	54.0
TOTAL	4,376.70	100.0
COSTS		
Preharvest	188.67	14.9
Harvest	503.78	39.7
Production Overhead	51.13	4.0
Marketing	526.58	41.4
TOTAL	1,270.16	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	3,106.54	

Okra

Fresh okra is another of the specialty vegetables in East Texas. A farmer can seldom direct market more than one acre of this crop because, like squash, the full yield potential cannot be realized without continuous harvesting.

Okra brings gross sales of $4,344 per acre. Over two-thirds of this amount comes from direct sales on the Farmers Market. Per acre costs are about $1,206 with over 88 percent accounted for by harvesting and marketing costs. The resulting returns to land, labor and management are $3,137 per acre (Table 8).

Table 8. Estimated Costs and Returns per Acre for Okra, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	2,944.00	67.8
Wholesale	1,400.00	32.2
TOTAL	4,344.00	100.0
COSTS		
Preharvest	92.55	7.7
Harvest	598.28	49.6
Production Overhead	43.98	3.6
Marketing	471.65	39.1
TOTAL	1,206.46	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	3,137.54	

Peaches

Texas peach orchards require intensive management and care. Trees require pruning during the dormant period and numerous sprays must be applied before and during the growing season to ward off tree and fruit diseases and/or insect infestations. It is not uncommon for a novice producer to experience early orchard deterioration leading to complete orchard abandonment after only one or two years of production. Under good management, production is successful. Five production areas have developed in Texas, two of which are in the Northeast.

Peach sales on the Dallas Farmers Market are divided equally between direct retail marketing and wholesale peddlers, dealers and other distributors. Income totals $5,577 per acre and expenses $878 including allowance for cost of orchard establishment. Marketing cost equals $616. Left is a return of $4,082 per acre to land, labor and management over and above production and harvesting costs (Table 9).

Table 9. Estimated Costs and Returns per Acre for Peaches, Direct Marketing, East Texas, 1980

Item	Dollars	Percent
SALES		
Direct	3,477.60	62.4
Wholesale	2,100.00	37.6
TOTAL	5,577.60	100.0
COSTS		
Preharvest	284.61	19.0
Harvest	322.47	21.6
Production Overhead	271.06	18.1
Marketing	616.50	41.3
TOTAL	1,494.64	100.0
RETURNS TO LAND, LABOR AND MANAGEMENT	4,082.96	

ANALYSIS FOR A DIVERSIFIED VEGETABLE FARM

A typical direct marketing operation is helpful to illustrate the per acre costs and returns for a representative diversified vegetable farm. The average farm has about 30 acres under cultivation. As an example, let 10 acres be in tomatoes, 8 acres in each of southern peas and pinto beans, 3 acres in squash, and 1 acre in okra.

Average per acre costs and returns for the farm are shown in Table 10. Total sales are $75,228, with nearly two-thirds arising from direct sales. Production costs are $8,442, harvesting is $12,567 and marketing $8,137. Vegetable farming obviously is not a minor investment. A 30 acre farm can yield an annual revenue of $46,000 to land, labor and management. If the operating family provided a third to their harvest labor requirements, about $2,700 would be added for a total return of nearly $49,000. Crop failure, though, must be taken into consideration.

Impacts of Allowance from Crop Failures

Vegetable crop failures do occur in Northeast Texas, mostly because of drought. Irrigation is not prevalent for vegetables, however, trickle irrigation is being introduced. Peach crop failures are the result of unusually low or high temperatures.

The six vegetables in our farm example are likely to experience a complete crop failure one year in eight. For peaches, the rate is one in fifteen years.

When complete crop failure occurs, the farmer usually has experienced all of the preharvest production costs. Avoided are expenses of harvesting and marketing a crop. Revenues and returns per acre per year should be adjusted for failure rates and costs. The total impact upon our representative 30 acre vegetable farm is to reduce average yearly returns from a net of $46,000 to one of $39,000 per year (Table 10).

Table 10. Costs and Returns from a Representative Direct Marketing Vegetable Farm, East Texas, 1980

Item	CROP					
	Tomatoes	Peas	Beans	Squash	Okra	TOTAL
Acres:	10	8	8	3	1	30
	- - - DOLLARS - - -					
Gross Receipts	34,308	12,112	11,336	13,128	4,344	75,228
Direct Sales	22,908	7,732	9,000	6,042	2,944	48,626
Costs						
Preharvest						
Variable	4,460	808	752	564	92	6,676
Fixed	750	448	352	153	43	1,746
SUBTOTAL	5,210	1,256	1,104	717	135	8,422
Harvest	7,660	2,176	624	1,509	598	12,567
Marketing	3,640	1,256	1,192	1,578	471	8,137
TOTAL COSTS	16,520	4,688	2,920	3,804	1,204	29,136
Net Returns	17,788	7,424	8,416	9,324	3,140	46,092
Adjustment for crop failure, one year in eight						39,277

Peach or watermelon producers seldom engage in vegetable production. Therefore, they are a separate enterprise. A typical peach orchard is 20 acres and watermelons is 100 acres. Costs and returns from these are presented in Table 11. After adjustment for crop failure incidence, returns for peaches are about $75,000 and for watermelons $50,000 per year.

Table 11. Costs and Returns of Watermelons and Peaches, Direct Marketing, East Texas, 1980

Item:	Crop	
	Watermelons	Peaches
Acres:	100	20
	- - - Dollars - - -	
Gross Receipts	141,400	111,540
Direct Sales	26,200	69,540
Costs		
Preharvest		
Variable	11,800	5,680
Fixed	7,700	5,420
Sub Total	19,500	11,100
Harvest	19,900	6,440
Marketing	41,100	12,320
Total Costs	80,500	29,860
Net Returns	60,900	81,680
Adjustment for Crop Failure Rate[1/]	50,850	75,494

1/ Peaches are one year in fifteen; watermelons one in eight.

RETURNS TO FARMERS FROM DIRECT VERSUS COMMERCIAL MARKETING SYSTEMS

A key objective of this research was to measure the comparative advantage, if any, to farmers of direct marketing versus marketing through commercial packing sheds and dealers. Two alternatives were available to make this comparison. The first was to compare results with budgets for commercial marketing of the same crop in other geographic areas of the state where shipping point marketing is practiced. The second was to synthesize a commercial marketing budget for Northeast Texas. Results of both are noted in Table 12. Budgets from which these comparisons are drawn appear in the Appendix.

Data on commercial indirect marketing was not available for squash and okra. For the other listed crops, large revenue advantages existed for direct marketing. The return from direct marketing exceeds the shipping point wholesale alternative by five times for tomatoes, four to six times for peaches, two times for watermelons and ten times or better for peas and beans sold in the dried form.

Table 12. Net Returns From Different Marketing Systems, Texas, 1980

Crop	Direct Marketing East Texas 1/	Commercial Marketing Other Texas Areas 1/	Synthesized Shipping Point Marketing East Texas 1/
		- - - Dollars Per Acre - - -	
Tomatoes	1,778	518	382
Squash	3,106	2/	2/
Pinto Beans	1,049	93 3/	2/
Southern Peas	828	49 3/	49 3/
Okra	3,137	2/	2/
Watermelons	607	379	303
Peaches	4,082	982	683

1/ Does not include allowance for crop failure
2/ No commercial production of this crop in Texas
3/ Dried peas or beans

Comparisons also show that marketing costs at the packing sheds are equal to, or larger than, the total costs for direct marketing. This is because of the grading and packing and commercial shipping containers costs at commercial packing houses (Table 13).

Table 13. Total Direct Marketing Costs Compared with Shipping Point Level Marketing Costs, Northeast Texas Fruits and Vegetables, 1980.

Crop	DIRECT MARKETING		SHIPPING POINT WHOLESALE MARKET
	Marketing Cost	Harvest and Marketing Cost	Harvest and Marketing Cost
	- - - Dollars per cwt - - -		
Tomatoes	3.83	12.12	12.93
Peaches	5.13	8.15	5.29
Squash	4.02	7.85	-0-
Okra	6.12	13.88	-0-
Pinto Beans			
-- Green	5.16	8.44	-0-
-- Dry	-0-	-0-	5.00
Watermelons	2.77	4.12	-0-
Southern Peas			
-- Green	3.37	13.44	-0-
-- Dry	-0-	-0-	2.50

Efforts to develop wholesale shippers and packing shed facilities in Northeast Texas so far have failed, except for sweet potatoes and roses as noted previously. A vegetable marketing cooperative formed around 1960 and independent dealers who tried to establish marketing facilities all have failed. Successful coordination of varieties, quality control and harvesting by growers was not achievable. In the 1950's, however, East Texas was a major producer and shipper of green wrap tomatoes. A number of packing sheds operated.

A comparison between farmers' direct marketing costs versus the costs of shipping point packers and dealers, terminal market wholesalers and retailers is beyond the scope of this study. To do so, shipping-point marketing costs, transportation costs to market cities, as well as wholesale and retail mark-ups at those cities would be required. An indirect, but somewhat limited, efficiency measure of the two systems is obtained by comparing retail prices for direct marketed produce versus that in retail stores, the subject of the following section.

RETAIL PRICES FROM DIRECT AND COMMERCIAL MARKETING

Part of the assumed model, for direct versus commercial marketing, is that retail prices consumers pay farmers are lower than those paid at retail supermarkets. In order to test this hypothesis, prices were collected for a four-week period during July in 1979 and 1980.

Retail prices were collected weekly on the Dallas Farmers Market by a special field reporter trained by USDA Market News staff personnel. Simultaneously, several Dallas food chains provided their weekend retail prices for a specified list of fruits and vegetables. Wholesale prices were obtained from the daily Fresh Fruit and Vegetable Market News reports for Dallas by averaging the Monday, Wednesday and Friday quotations. Eleven products were included. In the early stage of the research, it was not known for which products production budgets would be satisfactorily developed. Consequently, more products were priced than are included in the farm budgets. Nonetheless, the prices prevailing in the three markets provide an insight into pricing practices.

Prices indicated at the Farmers Market were calculated as a simple average of the quotations on each container size. These, in turn, were weighted by the number of quotations per container size observed on the

market. The procedure gives more weight to the small size containers, which were more prevalent among the displays because these sizes were more commonly sold to consumers. Though Farmers Market and the retail chain stores prices deviate from one another, the simple average across commodities on the Farmers Market was 55 cents while that at the retail store was 54 cents (Table 14). This is contrary to the apriori expectation that prices would generally be lower at the Farmers Market. However, it is not necessarily contrary to the price model equation number 5, which keys the Farmers Market prices to wholesale prices prevailing for outside supplies of commercial produce shipped into the Dallas Market, and farmers interviewed definitely reported setting prices that way. The association between prices at the three markets was tested by means of correlation of prices across the commodities listed in Table 14. The close relationships are evident from the statistical results, using the regression and correlation formula:

$$\sqrt{xy} = \frac{S_{xy}}{S_x S_y} = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \Sigma y^2}}$$

Price Pairings	Correlation Coefficient	Equations
Farmers market retail price versus chain store retail price	98.4	$Y = -12.48 + 1.24x$ (17.03)
Farmers market retail price versus wholesale market price	93.0	$Y = -8.08 + 2.17x$ (7.98)
Retail chain store price versus wholesale market price	91.8	$Y = 5.28 + 1.69x$ (6.90)

Less correlation between retail and wholesale prices is to be expected because of the normally greater percentage price changes at the wholesale versus retail levels.

Table 14. Prices of Selected Fruits and Vegetables, Indicated Markets, Dallas, Texas, July 1979 and 1980

Item and Year	Wholesale 1/	Farmers Market 2/	Retail Store 3/
	- - - cents per pound - - -		
Bell Peppers			
1979	35	73	69
1980	35	73	76
Cantaloupes			
1979	19	22	26
1980	21	21	35
Chili Peppers			
1979	52	125	99
1980	69	123	114
Cucumbers			
1979	21	48	51
1980	21	50	56
Okra			
1979	25	78	73
1980	45	82	83
Peaches			
1979	33	65	58
1980	30	77	59
Peas			
1979	35	68	52
1980	38	67	69
Plums			
1979	26	34	36
1980	46	51	56
Squash			
1979	23	56	59
1980	28	52	58
Sweet Corn			
1979	13	13	22
1980	12	16	25
Watermelon			
1979	8	12	11
1980	10	15	19
Average	30	55	54

1/ Farm Market News reports, Dallas Market.
2/ Average is weighted by number of each container size displayed which farmers reported reflected sales frequency by size.
3/ Weekend price at sample of retail food chain stores, Dallas.

Individual product prices deviate at the retail store and Farmers Market for two reasons. Sizes and grades of product available from the two marketing systems often are not comparable. In some cases, the Farmers Market offers a fresher, more mature-flavored product than that shipped commercially through wholesalers to retail stores. Contrarily, the products' eye appeal and size uniformity are frequently better in retail stores.

Also, it is erroneous to conclude that all Texas direct marketing prices are generally comparable to those at retail stores. Off-the-truck roadside sales may offer farmers somewhat less opportunity to relate to wholesale and retail market pricing. Even so, Texas farmers interviewed related their pricing to price levels available from market news sources.

Furthermore, average prices presented in Table 14 are weighted toward prices of typically purchased small quantities. Some shoppers buy in larger volume and obtain the better prices. This is especially true when shoppers buy for cooperative groups.

Average expenditures per customer trip were $17. The estimated sampling error of the average is less than one dollar. Prices, on the average, of one quart to half peck quantities permitted the purchase of about 20 pounds per trip, usually divided among several items (Table 15).

Indicated thereby is a practice of comparatively small purchases per item. But this introduces the findings of the consumer survey.

Table 15. Average Prices of Fruits and Vegetables by Size of Purchase, Dallas Farmers' Market, 1980

Product	Wholesale Market	Retail Store	Dallas Farmers' Market Retail Price					
Approximate Pounds:			Pint 0.6	Quart 1.1	¼ Peck 2.2	½ Peck 4.3	Peck 8.75	Average[1/]
			- - - cents per pound - - -					
Bell Peppers	35	76	--	80	77	59	44	65
Chili Peppers	69	114	--	115	133	80	69[3/]	99
Okra	45	83	90	91	78	61	59	76
Peaches	30	59	--	89	68	61	49	67
Pinto Beans, Green[2/]	35[3/]	73[3/]	--	100	71	69	59[3/]	80
Southern Peas	38	69	--	100	71	67	61	75
Squash	28	58	62	64	58	43	37	53
Item Average	40	76	--	91	79	63	54	72
Index				100	87	69	59	--

1/ Simple average of prices by container size

2/ 1979 prices

3/ Estimated

THE CONSUMER SURVEY

Consumers' views regarding buying direct from farmers at the Dallas Farmers Market were obtained from a sample of shoppers intercepted while shopping during a July weekend in 1979. A sample of 150 shoppers was obtained for a telephone survey. Interviews were completed with 104 shoppers. The general findings follow.

Shopper Profile

Nearly four out of five of the customers either had some college or a college degree (Table 16). This observation concurs with the findings of previous Market Center studies that show educated shoppers to be more alert in efforts to save money. For example, their readership of newspaper food ad specials exceeds that among lower income individuals. In the Dallas Farmers Market, direct marketing seems to benefit more middle and upper income households than low income consumers. Forty-six percent of the shoppers reported household incomes of $30,000 or more. Most were middle-aged and bought for households of four or more persons.

Contrarily, the hypothesis that long-time Dallas residents used the market more than recent ones was not supported by the study findings. Good newspaper publicity frequently given to the Dallas Farmers Market apparently generated shopping interest among newer as well as older city residents.

Purchases for Multiple Households, and Joint Shopping Trips

The Dallas Farmers Market is located within the inner city business district, so it must be reached through downtown traffic. However, it is located on one of the major freeways serving the downtown business district. Given these circumstances, there was some likelihood that customers were shopping for friends or neighboring households as well. Furthermore, shopping might be part of a larger single outing shopping itinerary.

Table 16. Profile of Persons Patronizing Dallas Farmers Market, Summer, 1980.

Profile Item	Percentage of Shoppers	Sampling Error 1/
Age	Percent	Percent Points ±
20-29	11	5.1
30-39	42	8.0
40-49	13	5.4
50-59	19	6.3
60+	15	5.8
	100	
Education		
Grade School	3	2.8
Junior High	2	2.3
High School	17	6.1
College	78	6.7
	100	
Household income, year		
Under 10,000	9	4.6
10,000 - 19,999	16	5.9
20,000 - 29,999	29	7.3
30,000 - 39,999	21	6.6
40,000+	25	7.0
	100	
Racial group		
White	83	6.1
Black	12	5.3
Mexican-American	3	2.8
Other	2	2.3
	100	
Household Size		
One	3	2.8
Two	32	7.5
Three	15	5.8
Four	34	7.7
Five	14	5.6
Six or more	2	2.3
	100	
Length of Dallas residence		
Less than a year	2	2.3
1-9	25	7.0
10-19	20	6.5
20-29	17	6.1
30-39	23	6.8
40+	13	5.4
	100	
Ever lived on a farm		
Yes	39	7.9
No	61	7.9
	100	

N=104

1/ at 90 percent probability level for two tail distribution

Rising gasoline costs during 1979 and 1980 would contribute to interest in such economic considerations. Also, Texas Agricultural Extension Service education programs had emphasized the possibility of savings from group buying or "consumer club" shopping at farmers markets.

The consumer survey revealed that 39 percent buy for others as well as for themselves (Table 17), and 91 percent said the trip was a specially planned one. Thus "drop-in" shopping or shopping as a part of a larger itinerary accounted for 9 percent of the Farmers Market business volume. That is opposite to expectations since one would surmise that the Market would be used mostly by persons working in the downtown business district. The survey indicated that only 23 percent of the shoppers worked in the inner city (Table 17).

Distance Driven to Farmers Market

Inasmuch as most shoppers buying at the Dallas Farmers Market drive there as a special trip, the distance driven is an indicator of the shopping cost. About two-thirds of the shoppers drove 10 miles or more to the Market; and the average distance for all shoppers was 13.4 miles (Table 18). Among the few going directly from work, the average was between six and seven miles, which means that most were not working in the central business district.

Higher automobile fuel costs caused nearly a fourth of the shoppers to reduce their Market shopping frequency, but the other three-fourths were maintaining their shopping schedules as before. Shopping trips were made more useful by including buying for others during the market visits according to 88 percent of the shoppers surveyed.

Table 17. Incidence of Shopping for Others or Multi-purpose Trips When Visiting the Farmers Market, Summer, 1980

Response Item	Percent	Sampling Error
		Percent Points ±
Buy for own use only	61	7.9
Buy for others and self	39	7.9
	100	
Do you work in or near downtown Dallas?		
Yes	23	6.8
No	77	6.8
	100	
Do you make a special trip to the market?		
Yes	91	4.6
No	9	4.6
	100	
Is it a regular shopping trip or special outing?		
Regular trip	51	8.1
Special outing	49	8.1
	100	
Trip only to market or other errands included?		
Only to market	68	7.5
Include other errands	32	7.5
	100	
N = 104		

1/ At 90 percent probability level for two tail distribution.

Table 18. Customer Transportation Distance to Patronize Farmers at Dallas Farmers Market and Effect of Increased Fuel Costs

Item	Miles	Frequency		Average	Standard Error
	x	f	fx	Miles	Miles
Number of miles from home to the market:					
0-4	2	11	22		
5-9	7	26	182		
10-14	12	18	216		
15-19	17	14	238		
20-24	22	12	264		
25+	30	10	300		
		91	1022	13.4	0.88
Number of miles from work to market: (where applicable)					
0-4	2	5	10		
5-9	7	2	14		
10-25	18	2	16		
		9	40		
		100		6.6	2.2

Effect of increased fuel prices:	Percent	Sampling Error
Go same frequency	76	± 6.9
Go less often	24	± 6.9
	100	
Buy more for others:		
Yes	88	± 5.3
No	12	± 5.3
	100	

Frequency of Shopping at Farmers Market and Shopping Purpose

Shopping frequency was about equally divided among the options of once a month, two to three times a month, and three to four times per month (Table 19). The average was 2.6 trips per month. About half were buying for present or immediate use only. Another fourth were buying for present use plus freezing. Few, about 10 percent, were buying for freezing or canning alone (Table 19). Emphasis upon current use is associated with the small quantity purchases.

Table 19. Frequency of Trips to Dallas Farmers Market, Summer 1980

Item	Percent of Shoppers	Sampling[1/] Error
Shopping trips per month	Percent	Percent Points ±
12	2	2.3
8	1	1.6
3-4	32	7.5
2-3	36	7.8
1	29	7.3
Average 2.6	100	
Standard Error 0.17		
Purpose of trip		
For present needs only	47	8.1
For freezing only	9	4.6
For canning only	1	1.6
For present and freezing	23	6.8
For present and canning	6	3.8
For all uses	14	5.6
	100	

[1/] At 90 percent sampling error for two tail distribution.

Satisfaction with Product Quality and Prices

Approximately three-fourths of the consumers buying from farmers at the Dallas market expressed the view that both quality and prices of the products were better than those found in local retail stores (Table 20). Most of the remainder consider both prices and quality about equal. The degree of agreement about the price-quality relationship is even more significant considering that the questions were asked separately with intervening buffer questions. In addition to farmers, "dealers" also sell on the Dallas Farmers Market. Dealers buy from farmers, or truck in other commercial supplies to the market; the latter usually are from outside areas and complement those brought in by farmers. Dealers, by buying from the farmers, assist in marketing the farmers' supplies. Farmers hold what they believe can be sold during their stay, and they sell the balance to peddlers and to dealers at the market. Consequently, shoppers' comments about quality and prices are influenced somewhat by marketing practices of the dealers.

Shoppers were asked if they purchased from farmers or dealers. About a fourth were unaware of the difference. Of those who knew, buying from farmers led dealers by about two to one (Table 21). Northeast Texas farmers appearing on the Dallas Farmers Market usually make it a standard part of their marketing program as they usually are there each year. Consequently, it is not surprising that 23 percent of the shoppers interviewed bought from a favorite farmer. Also, most dealers there make a career out of selling at the Market. Twelve percent of the shoppers patronized a favorite dealer (Table 21).

Amount of Purchases per Trip

Expenditures per purchase for individuals shopping for themselves, according to shoppers' estimates, ranged from less than $4 to as high as $55 and averaged $17 per shopping trip. Co-op group purchases ranged between $70 and $130 (Table 20).

Table 20. Farmers Market Shoppers' Expenditures and Opinions of Prices and Quality of Fruits and Vegetables, Dallas, Summer 1980

Item	Percent of Shoppers	Sampling Error 1/
		Percent Points ±
Opinions of prices versus those at retail stores		
Lower	75	7.0
Same	18	6.2
Higher	7	4.1
	100	
Opinions of quality versus that at retail stores		
Better	78	6.7
Same	18	6.2
Lower	4	3.2
	100	
Average amount spent per trip		
Individuals		
$ 0-4	1	1.6
5-9	21	6.6
10-14	23	6.8
15-19	12	5.3
20-24	21	6.6
25-55	15	5.8
	93	
Average expenditures = $17 Standard error $0.98		
Co-op groups: $70-130	7	4.1
	100	

1/ At 90 percent probability for two tail distribution.

Table 21. Kind of Seller from Whom Purchases Were Made, Dallas Farmers Market, 1980

Item	Percent	Sampling Error[1/]
Person bought from:		Percent Points ±
Farmer	43	8.0
Dealer	1	1.6
Both	28	7.3
Not aware of difference	28	7.3
	100	
Have a favorite farmer to buy from	23	6.8
Have a favorite dealer to buy from	12	5.3

[1/] At 90 percent probability for two tail distribution.

MARKETING MARK-UPS FOR DIRECT FARMER TO CONSUMER SALES

Another direct marketing perspective concerns retail marketing mark-up percentages over wholesale prices. Mark-ups were calculated from the data in Table 14 and are noted in Table 22. The variations in Farmers Market retail price mark-ups, where they are lower, usually reflect a less appealing quality product compared to other shipped-in commercial supplies. A reverse situation prevailed for peaches and chili peppers. On the average, the retail store mark-up was slightly more than that used by farmers (Table 22).

Again, the more relevant comparisons apply when mark-ups by size of purchase are considered. Retail price mark-ups fall from a level of 131%

Table 22. Markup Over Wholesale Prices of Selected Fruits and Vegetables, Dallas, Texas, Average of 1979 and 1980

Product	Dallas Farmers' Market	Retail
	- - - Percent - - -	
Bell Peppers	109	107
Cantaloupes	8	53
Chili Peppers	105	76
Cucumbers	133	155
Okra	129	123
Peaches	125	86
Peas	85	66
Plums	18	28
Squash	112	129
Sweet Corn	16	88
Watermelon	50	67
AVERAGE	81	89

of wholesale prices for the small purchases (quart equivalent) to only 59% above wholesale prices for the half-peck size of purchase (Table 23). The retail store mark-ups for the above items (listed in Table 22) averaged 98%. Therefore, consumer purchases of one half to one peck quantities from farmers at the Farmers Market were made at appreciable savings over what would have been paid at the food chain store. For very small quantity purchases (quart basket equivalents), the reverse was true.

Table 23. Price Markup Over Wholesale Prices of Average Prices of Fruits and Vegetables by Size of Purchase, Dallas Farmers Market, 1980

Product	Retail Store	Dallas Farmers Market			
		Quart	1/4 Peck	1/2 Peck	Peck
		- - - Percent - - -			
Squash	129	129	107	54	32
Okra	123	102	73	36	31
Peaches	86	197	127	103	63
Bell Peppers	107	129	120	69	26
Chili Peppers	76	67	93	16	-0-
Peas	66	163	87	76	61
AVERAGE	98	131	101	59	43

Gains to consumers from buying direct from farmers are more clearly evident from a further inspection of costs and gains. Distance driven to a supermarket generally ranges from 1 to 3 miles, or an average of about 2 miles. The marginal cost of driving the average of 11 miles to the Dallas Farmers Market is calculated by the following:

$SC_{FM} = TC_{FM} - TC_{RS}$

SC_{FM} = Marginal or added cost of a trip to the Farmers Market

TC_{FM} = Total cost of a trip to the Farmers Market

TC_{RS} = Total cost of a trip to the local food supermarket

Based upon a gasoline cost of $1.25 per gallon, and 15 miles per gallon of gas for city driving, the resulting values are:

SC_{FM} = $2.23 - $0.33 = $1.90

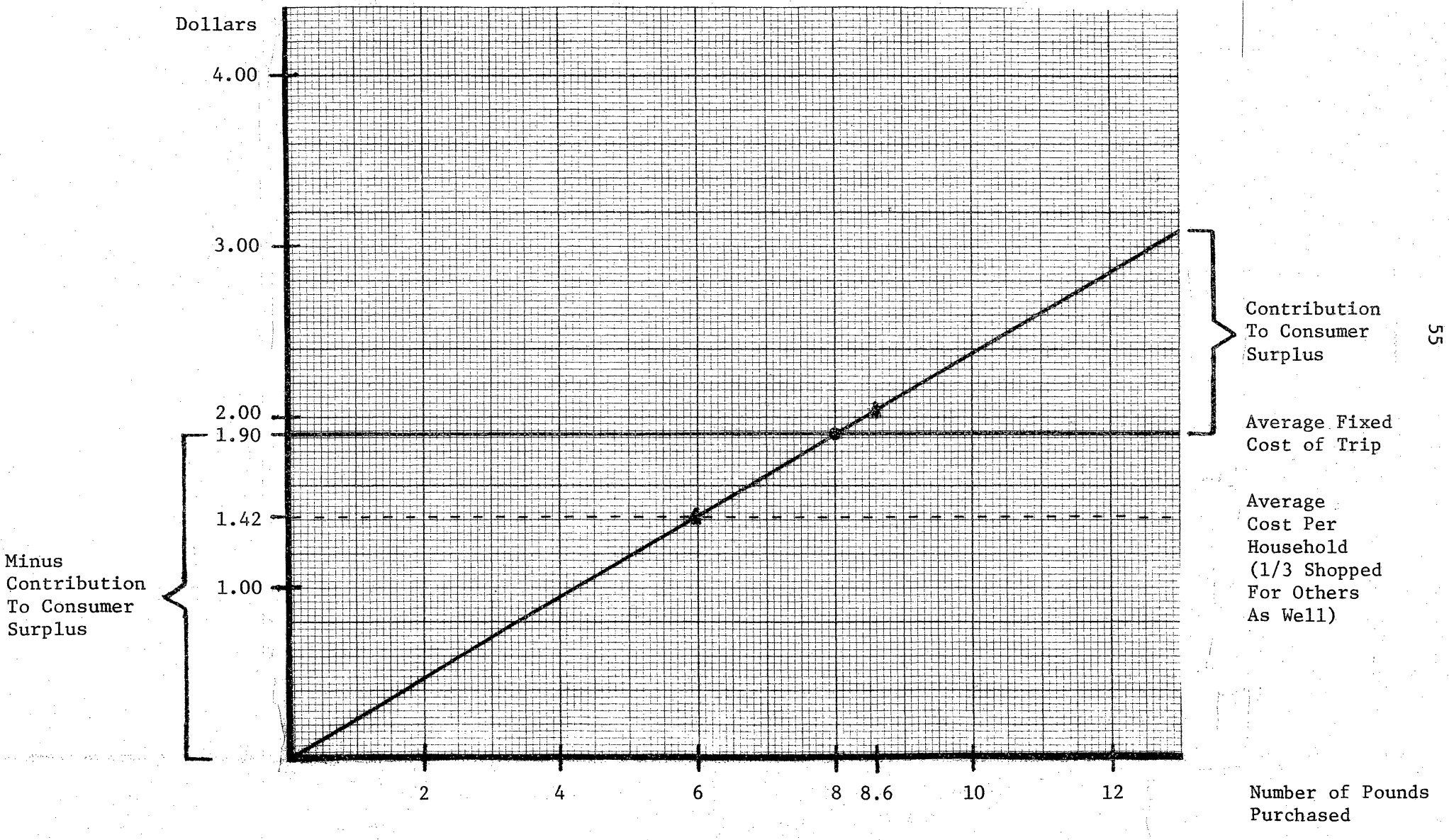
According to calculations appearing in Table 24, a purchase of a half peck of three products or one peck of one product was necessary to overcome the trip cost calculated on fuel expense alone. Prices calculated are an average over representative products on the market. Figure 7 illustrates the quantity of purchases point where consumer surpluses begin, on the average, from shopping at the Farmers Market. Although the break-even intercept is at 8 pounds, from a practical view it occurs at 8.6 pounds, the one peck weight of a typical product. The purchases of several half pecks also result in price savings that exceed driving costs of going to the market. Psychic income from differences in actual or perceived quality also must be considered, but that measurement is not attempted.

Table 24. Consumer Savings from Buying Direct from Farmers at Dallas Farmers Market

Quantity Purchased	Average Pounds Per Container	Retail Store		Direct Purchase Farmers Market		Consumer Saving
		¢/lb [1/]	Cost	¢/lb [1/]	Cost	
Quart	1.3	.76	.99	.91	1.18	-.19
1/4 Peck	2.5	.76	1.90	.79	1.98	-.08
1/2 Peck	4.7	.76	3.57	.63	2.96	.61
Peck	8.6	.76	6.54	.54	4.64	1.90
1/2 Bushel	17.2	.76	13.07	.46	7.91	5.16

[1/] Estimated using representative list of fruit and vegetable products as noted in Table 15.

Figure 7. Relationship Between Consumer Surplus Position and Quantity Purchased Direct From Farmers at Farmers Market, Dallas, Texas, July, 1980



Shoppers in about a third of the trips were shopping for other households as well. Assuming only one additional household, that reduces the cost of the average trip per household to around $1.42. At that cost, breakeven between cost and price savings appears nearly possible with the purchase of only a half-a-peck quantity per household represented in the average trip. The equilibrium is about a six pound purchase and the half peck averages 4.7 pounds for the products considered in the analysis.

SUMMARY AND CONCLUSIONS

Results of costs and returns budgets indicate that Northeast Texas fruit and vegetable farmers do profit more from direct marketing than they would from wholesale markets if they were available in East Texas. Northeast Texas farmers are without the option of shipping point wholesale markets except for watermelons and dried peas or beans. Direct comparisons of markets, therefore, had to be made with those in other areas of the state. On the basis of that comparison, results favored direct farmer-to-consumer marketing for all products for which budgets were calculated: tomatoes, squash, okra, green Southern peas, green pinto beans, peaches and watermelon.

The typical East Texas farm enterprise size for direct marketing farmers is about 100 acres. Of that, approximately 30 acres are devoted to fruit and/or vegetable production. Fruit and vegetable growers frequently have several beef cattle that graze on the remaining farm acreage which is in pasture land. That portion is upgraded with coastal bermuda grass for higher productivity. Some farmers also have part-time, off-farm employment, or other family members do. Medium size tractors, about 30 horsepower, are the basic power unit plus a complement of tractor implements. Family labor is supplemented partly during the harvest seasons.

Produce is graded on the farm according to the farmer's standards. The produce is transported to the Dallas Farmers Market in pick-up trucks. Products are packed in open bushel baskets which are reused throughout the season. Varied size display baskets, ranging in size from one quart and one-fourth peck up to bushel sizes, are used for retail displays at the market. Consumers' purchases are placed in paper sacks following their purchase. Therefore, display baskets also are reused during the year.

Farmers net returns were two to three times more for direct marketed commodities, where direct comparisons could be made with commercial shipping points in Texas. If the only other alternative is to sell to canners or freezers, the income advantage of direct marketing is even larger.

Net returns from a typical 30 acre vegetable enterprise were estimated to be about $46,000 per year, and $39,000 when adjusted for crop failure incidence. These figures represent the return to the farm family for their own labor and management and to the land involved. Land prices in 1980 were about $575 per acre excluding buildings. Considering the large number of hours involved in producing fruits and vegetables and marketing them on the Farmers Market, that return is considered to be reasonable. Returns from peaches are very attractive at around $4,000 per acre, not allowing for crop failure. For that reason, peach production, according to county extension agents, is increasing.

Consumer benefits from direct marketing, according to the survey, were of two kinds. One, and perhaps the foremost, is the perceived high value of the produce because it is "farm fresh". Price advantages also existed in the view of the consumers. On a simple average per pound basis, however, for the typically small purchases of a fourth to half a peck, prices were equal to or somewhat lower than those in the Dallas area food chain stores. Shoppers buying one peck or larger quantities achieved considerable savings.

Most consumers made special trips to the Farmers Market rather than it being part of a multi-stop shopping tour. The impact of higher gasoline prices caused shoppers to increase buying for other friends or neighbors, or form shopping clubs in which members take turns going to the market.

The average travel distance to and from the market was about 26.8 miles. At gasoline prices of about $1.25 per gallon and car mileage of 16 miles per gallon, the fuel cost per trip would be $2.23. The marginal cost over a 4 mile round trip to the local food supermarket was estimated to be $1.90. With that expense, purchase quantities for vegetables had to be in the range of a half-peck to one peck, and usually the latter, to obtain prices per pound savings that would justify the expense of the trip. Therefore, a consumer surplus arises when a peck (eight to ten pounds) or more of a single item or two or more items in the 1/2 peck (about four to five pounds) size are purchased per average shopping trip. Psychic income from real or perceived superior quality must be recognized, but is not measured in this study. Farmers Market shoppers obviously perceive a saving to be involved in view of the fact that a considerable proportion have shopped at this market for a number of years.

On the basis of the research findings, it is suggested that renewed attention be given to the advantages that farmers markets offer to both producers and consumers. However, only a limited segment of the population are using these market facilities. The question arises as to whether several area markets would be viable in large metropolitan markets rather than one market. Farmers could go to the central market for wholesale sales and then to area markets for retail marketing to consumers or vice versa.

APPENDIX

Table 1. OKRA
DIRECT MARKETING AT DALLAS FARMERS' MARKET
ESTIMATEE COSTS AND RETURNS PER ACRE
BUDGET TO LAND, LABOR AND MANAGEMENT[a]

	Quantity[c]	Unit	$/Unit	Value
GROSS RECEIPTS				
Okra sold direct	36.8[b]	cwt.	80.00	2,944.00
Okra sold wholesale	40.0	cwt.	35.00	1,400.00
TOTAL PROJECTED RETURNS				$4,344.00
PREHARVEST COSTS				
Seed	6.0	lb.	4.00	24.00
Nitrogen	54.0	lb.	0.26	14.04
Phosphorous	54.0	lb.	0.27	14.58
Potassium	54.0	lb.	0.15	8.10
Fuel & Lube: Tractor		acre		21.74
Equipment		acre		1.19
Repairs: Tractor		acre		3.97
Equipment		acre		2.17
Operating capital	18.39	dol.	0.15	2.76
SUBTOTAL				$ 92.55
HARVEST COSTS				
Labor: Hand harvesting	162.0	hour	3.50	567.00
Machinery	0.63	hour	3.50	2.19
Bushel baskets	25.0	each		26.25
Fuel & lube for equipment		acre		1.98
Repairs for equipment		acre		0.86
SUBTOTAL				$ 598.28
TOTAL VARIABLE PRODUCTION COSTS				$ 690.83
FIXED PRODUCTION COSTS				
Tractor		acre		25.94
Equipment		acre		18.04
SUBTOTAL				$ 43.98
TOTAL PRODUCTION COSTS				$ 734.81
MARKETING COSTS				
Transportation	1,072.0	mile	0.30	321.60
Meals & lodging	6.7	day	13.00	87.10
Stall rental fees	6.7	day	7.50	50.25
Display baskets	5.0	each	0.70	3.50
Sacks	920.0	each	0.01	9.20
SUBTOTAL				$ 471.65
TOTAL PRODUCTION & MARKETING COSTS				$1,206.46
NET PROJECTED RETURNS				$3,137.54
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$2,728.29

[a] Machinery complements and technical coefficients are based on a 30 acre vegetable farm.

[b] Allows 8 percent for loss and shrinkage.

[c] Based on a total yield of 80 cwt with 50% marketed direct and 50% marketed wholesale

Table 2. PEACHES
DIRECT MARKETING AT DALLAS FARMERS' MARKET
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND, LABOR AND MANAGEMENT[a/]

	Quantity[e/]	Unit	$/Unit	Value
GROSS RECEIPTS				
Peaches Sold Direct	55.20[b/]	cwt.	63.00	3,477.60
Peaches Sold Wholesale	60.00	cwt.	35.00	2,100.00
TOTAL PROJECTED RETURNS				$5,577.60
PREHARVEST COSTS				
Peach OMT oil	1.00	appl	3.60	3.60
Nitrogen	48.00	lb.	0.22	10.56
Phosphate	48.00	lb.	0.27	12.96
Potash	48.00	lb.	0.11	5.28
Peach herbicide	1.66	lb.	3.00	4.98
Pink bud yr.	1.00	appl	12.90	12.90
Shuck split	1.00	appl	12.94	12.94
Petal fall	1.00	appl	14.66	14.66
First cover	1.00	appl	8.66	8.66
Second cover	1.00	appl	9.04	9.04
Third cover	1.00	appl	7.73	7.73
Fourth cover	1.00	appl	8.66	8.66
Fifth cover	1.00	appl	9.04	9.04
Peach bore	2.00	appl	2.93	5.86
Sixth cover	1.00	appl	7.73	7.73
Seventh cover	1.00	appl	8.66	8.66
Pre-harvest	1.00	appl	12.54	12.54
Cover crop	28.00	lb.	0.14	3.92
Bacterial spot	1.00	appl	3.20	3.20
Custom drill	1.00	acre	4.00	4.00
Irrigation water	18.00	acin		
Fuel & lube: Tractor		acre		15.08
Equipment		acre		16.56
Irrigation		acre		34.56
Repairs: Tractor		acre		3.77
Equipment		acre		22.68
Irrigation		acre		14.40
Operating capital	81.85	acre	0.13	10.64
SUBTOTAL				$ 284.61
HARVEST COSTS				
Peach containers	25.00	crtns	1.05	26.25
Labor	60.00	hour	3.50	210.00
Miscellaneous expense	3.00	acre	25.00	75.00
Bushel baskets	10.00	each	1.05	10.50
Repairs for equipment		acre		0.72
SUBTOTAL				$ 322.47
TOTAL VARIABLE PRODUCTION COSTS				$ 607.08
FIXED COSTS				
Depreciation, interest & taxes				
Tractor		acre		22.96
Equipment		acre		44.40
Irrigation		acre		103.32
Prorated grove establishment	1,115.35	dol.	0.09	100.38
SUBTOTAL				$ 271.06

DIRECT MARKETING
PEACHES (continued)

	Quantity	Unit	$/Unit	Value
TOTAL PRODUCTION COSTS				$ 878.14
MARKETING COSTS				
Transportation	1,120.0	mile	0.30	336.00
Meals and lodging	7.0	day	13.00	70.00
Stall rental fees	7.0	day	7.50	52.50
½ bushel cartons c/	250.0	each	0.48	120.00
½ bushel cartons d/	50.0	each	0.48	24.00
display baskets	5.0	each	0.70	3.50
sacks	600.0	each	0.0175	10.50
SUBTOTAL				$ 616.50
TOTAL PRODUCTION AND MARKETING COSTS				$1,494.64
NET PROJECTED RETURNS				$4,082.96
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 15 years				$3,775.72

a/ Machinery complement and technical coefficients are based on a 15 acre peach grove.

b/ Allows 8 percent for loss and shrinkage.

c/ Number of containers required for wholesale sales.

d/ Number of containers required for re-use in direct sales since final sales are usually placed in paper sacks for the consumer.

e/ Based on a total yield of 120 cwt with 50% going direct and 50% going wholesale.

Table 3. PEACHES
COMMERCIAL TEXAS PRODUCTION-MARKETING AREA[a/]
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Peaches	120.00	cwt.	20.00	$ 2500.00
TOTAL PROJECTED RETURNS				$ 2500.00
PREHARVEST COSTS				
Peach DMT Oil	1.00	appl	3.60	3.60
Nitrogen	48.00	lb.	0.22	10.56
Phosphate	48.00	lb.	0.27	12.96
Potash	48.00	lb.	0.11	5.28
Peach Herbicide	1.66	lb.	3.00	4.98
Pink bud yr.	1.00	appl	12.90	12.90
Shuck split	1.00	appl	12.94	12.94
Petal Fall	1.00	appl	14.66	14.66
First Cover	1.00	appl	8.66	8.66
Second Cover	1.00	appl	9.04	9.04
Third Cover	1.00	appl	7.73	7.73
Forth Cover	1.00	appl	8.66	8.66
Fifth Cover	1.00	appl	9.04	9.04
Peach Bore	2.00	appl	2.93	5.86
Sixth Cover	1.00	appl	7.73	7.73
Seventh Cover	1.00	appl	8.66	8.66
Pre-harvest	1.00	appl	12.54	12.54
Cover Crop	28.00	lb.	0.14	3.92
Bacterial Spot	1.00	appl	3.20	3.20
Custom Drill	1.00	acre	4.00	4.00
Irrigation Water	18.00	acin		
Fuel & lube: Tractor		acre		15.08
Equipment		acre		16.56
Irrigation		acre		34.56
Repairs: Tractor		acre		3.77
Equipment		acre		22.68
Irrigation		acre		14.40
Labor: Machinery	13.20	hour	4.00	52.80
Irrigation	1.80	hour	4.00	7.20
Other	66.50	hour	4.00	266.00
Operating Capital	81.85	dol.	0.13	10.64
SUBTOTAL				$ 610.61
HARVEST COSTS [1/]				
Peach containers	500.00	crtn	0.48	240.00
Harvesting labor	60.00	hour	4.00	240.00
Marketing cost	1.00	acre	80.00	80.00
Miscellaneous expense	3.00	acre	25.00	75.00
Repairs: Tractor		acre		0.00
Equipment		acre		0.72
SUBTOTAL				$ 635.72

1/ Peaches are usually field packed. Therefore, there is no packing shed expense.

COMMERCIAL PEACHES (continued)

	Quantity	Unit	$/Unit	Value
TOTAL VARIABLE PRODUCTION COSTS				$1,246.33
FIXED COSTS				
Tractor		acre		22.96
Equipment		acre		44.47
Irrigation				103.32
Prorated establishment	1,115.35	acre		100.38
SUBTOTAL				$ 271.13
TOTAL PROJECTED COSTS				$1,517.46
NET PROJECTED RETURNS				$ 982.54
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 15 years				$ 858.25

[a/] Texas Cross Timbers Region

Table 4. PEACHES
SYNTHESIZED COMMERCIAL MARKETING--EAST TEXAS
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Peaches	120.00	cwt.	18.00[a/]	2,160.00
TOTAL PROJECTED RETURNS				$2,160.00
PREHARVEST				
Peach DMT Oil	1.00	appl	3.60	3.60
Nitrogen	48.00	lb.	0.22	10.56
Phosphate	48.00	lb.	0.27	12.96
Potash	48.00	lb.	0.11	5.28
Peach herbicide	1.66	lb.	3.00	4.98
Pink bud yr.	1.00	appl	12.90	12.90
Shuck split	1.00	appl	12.94	12.94
Petal fall	1.00	appl	14.66	14.66
First cover	1.00	appl	8.66	8.66
Second cover	1.00	appl	9.04	9.04
Third cover	1.00	appl	7.73	7.73
Fourth cover	1.00	appl	8.66	8.66
Fifth cover	1.00	appl	9.04	9.04
Peach bore	2.00	appl	2.93	5.86
Sixth cover	1.00	appl	7.73	7.73
Seventh cover	1.00	appl	8.66	8.66
Pre-harvest	1.00	appl	12.54	12.54
Cover crop	28.00	lb.	0.14	3.92
Bacterial spot	1.00	appl	3.20	3.20
Custom drill	1.00	acre	4.00	4.00
Irrigation water	18.00	acin		
Fuel & lube: Tractor		acre		15.08
Equipment		acre		16.56
Irrigation		acre		34.56
Repairs: Tractor		acre		3.77
Equipment		acre		22.68
Irrigation		acre		14.40
Labor: Machinery	13.20	hour	3.50	46.20
Irrigation	1.80	hour	3.50	6.30
Other	66.50	hour	3.50	232.75
Operating capital	81.85	dol.	0.13	10.64
SUBTOTAL				$ 569.86
HARVEST COSTS				
Peach containers	500.00	crtn	0.48	240.00
Harvesting labor	60.00	hour	4.00	240.00
Marketing cost	1.00	acre	80.00	80.00
Miscellaneous expense	3.00	acre	25.00	75.00
Repairs: Tractor		acre		0.00
Equipment		acre		0.72
SUBTOTAL				$ 635.72

[a/] 5-year average (1975-79) shipping point price. (From Ag Statistics)

Synthesized Budget
Peaches (continued)

	Quantity	Unit	$/Unit	Value
TOTAL VARIABLE PRODUCTION COSTS				$1,205.58
FIXED COSTS				
Tractor		acre		22.96
Equipment		acre		44.47
Irrigation				103.32
Prorated establishment		acre		100.38
SUBTOTAL				$ 271.13
TOTAL PROJECTED COSTS				$1,476.71
NET PROJECTED RETURNS				$ 683.29
NET RETURNS ADJUSTED FOR CROP FAILURE				$ 577.28

Table 5. MATURE GREEN PINTO BEANS, DIRECT MARKETING, ESTIMATED COSTS AND RETURNS PER ACRE BUDGET TO LAND, LABOR AND MANAGEMENT[a/]

	Quantity[c/]	Unit	$/Unit	Value
GROSS RECEIPTS				
Pinto beans sold direct	15.00[b/]	cwt.	75.00	1,125.00
Pinto beans sold wholesale	7.70	cwt.	38.00	292.60
TOTAL PROJECTED RETURNS				$1,417.60
PREHARVEST COSTS				
Seed	25.00	lb.	1.04	26.00
Nitrogen	30.00	lb.	0.26	7.80
Phosphorous	60.00	lb.	0.27	16.20
Potassium	60.00	lb.	0.15	9.00
Herbicide	1.20	pint	3.87	4.64
Fuel & lube: Tractor		acre		21.52
Equipment		acre		1.19
Repairs: Tractor		acre		3.93
Equipment		acre		1.92
Operating capital	17.58	dol.	0.15	2.64
SUBTOTAL				$ 94.84
HARVEST COSTS				
Labor: Hand harvesting	12.00	hour	3.50	42.00
Machinery	1.25	hour	3.50	4.37
Bushel baskets	25.00	each	1.05	26.25
Fuel & lube for equipment		acre		3.97
Repairs for equipment		acre		1.72
SUBTOTAL				$ 78.31
TOTAL VARIABLE PRODUCTION COSTS				$ 173.15
FIXED PRODUCTION COSTS				
Tractor		acre		25.67
Equipment		acre		19.11
SUBTOTAL				$ 44.78
TOTAL PRODUCTION COSTS				$ 217.93
MARKETING COSTS				
Transportation	332.80	mile	0.30	100.00
Meals & lodging	2.08	day	13.00	27.04
Stall rental fees	2.08	day	7.50	15.60
Display baskets	5.00	each	0.70	3.50
Sacks	367.50	each	0.01	3.67
SUBTOTAL				$ 149.81
TOTAL PRODUCTION & MARKETING COSTS				$ 367.74
NET PROJECTED RETURNS				$1,049.86
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$ 897.85

[a/] Machinery complements and technical coefficients are based on a 30 acre vegetable farm.

[b/] Allows 8 percent for loss and shrinkage.

[c/] Based on a total yield of 25 cwt with 60% marketed direct and 40% marketed wholesale

Table 6. PINTO BEANS
COMMERCIAL TEXAS PRODUCTION-MARKETING AREA[a/]
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Pinto Beans	12.00	cwt.	19.00	228.00
TOTAL PROJECTED RETURNS				$ 228.00
PREHARVEST COSTS				
Seed	20.00	lb.	0.25	5.00
Nitrogen	40.00	lb.	0.21	8.40
Phosphate	60.00	lb.	0.20	12.00
Herbicide	1.00	acre	3.20	3.20
Insect. & fungi.	1.00	acre	10.00	10.00
Fuel & lube: Tractor		acre		6.24
Equipment		acre		3.01
Repairs: Tractor		acre		2.07
Equipment		acre		0.55
Labor: Machinery	1.19	hour	4.50	5.37
Operating Capital	19.70	dol.	0.12	2.36
SUBTOTAL				$ 58.20
HARVEST COSTS				
Harvest & haul	12.00	cwt.	5.00	60.00
SUBTOTAL				$ 60.00
TOTAL VARIABLE PRODUCTION COSTS				$ 118.20
FIXED PRODUCTION COSTS				
Depreciation, Interest, Taxes & Insurance: Tractor		acre		6.67
Equipment		acre		10.00
SUBTOTAL				$ 16.67
TOTAL PROJECTED COSTS				$ 134.90
NET PROJECTED RETURNS				$ 93.10
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 10 years				$ 76.31

[a/] Based on a 1500-3000 acre vegetable farm in West Texas with irrigation costs removed to comply with conditions in East Texas.

Table 7. SOUTHERN PEAS, DIRECT MARKETING, ESTIMATED COSTS AND RETURNS PER ACRE BUDGET TO LAND, LABOR AND MANAGEMENT[a/]

	Quantity[c/]	Unit	$/Unit	Value
GROSS RECEIPTS				
Southern peas sold direct	14.4[b/]	cwt.	67.00	967.75
Southern peas sold wholesale	12.8	cwt.	35.00	448.00
TOTAL PROJECTED RETURNS				$1,415.75
PREHARVEST COSTS				
Seed	20.0	lb.	0.85	17.00
Nitrogen	30.0	lb.	0.26	7.80
Phosphorous	60.0	lb.	0.27	16.20
Potassium	60.0	lb.	0.15	9.00
Insecticide	3.0	pint	2.75	8.25
Herbicide	1.2	pint	3.87	4.64
Fuel & lube: Tractor		acre		26.61
Equipment		acre		1.19
Repairs: Tractor		acre		4.87
Equipment		acre		2.61
Operating Capital	21.01	dol.	0.15	3.15
SUBTOTAL				$ 101.32
HARVEST COSTS				
Labor: Hand harvesting	66.0	hour	3.50	231.00
Machinery	1.88	hour	3.50	6.58
Bushel baskets	25.00	each	1.05	26.25
Fuel & lube for equipment		acre		5.95
Repairs for equipment		acre		2.57
SUBTOTAL				$ 272.35
TOTAL VARIABLE PRODUCTION COSTS				$ 373.67
FIXED PRODUCTION COSTS				
Tractor		acre		31.75
Equipment		acre		24.91
SUBTOTAL				$ 56.66
TOTAL PRODUCTION COSTS				$ 430.33
MARKETING COSTS				
Transportation	372.80	mile	0.30	111.84
Meals & lodging	2.33	day	13.00	20.97
Stall rental fee	2.33	day	7.50	17.48
Display baskets	5.00	each	0.70	3.50
Sacks	354.00	each	0.01	3.54
SUBTOTAL				$ 157.33
TOTAL PRODUCTION & MARKETING COSTS				$ 587.66
NET PROJECTED RETURNS				$ 828.09
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$ 696.54

[a/] Machinery complement and technical coefficients are based on a 30 acre vegetable farm.

[b/] Allows 8 percent for loss and shrinkage.

[c/] Based on a total yield of 28 cwt with 55% marketed direct and 45% marketed wholesale

Table 8. SOUTHERN PEAS
COMMERCIAL TEXAS PRODUCTION-MARKETING AREA[a/]
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Southern Peas	8.00	cwt.	18.00	144.00
TOTAL PROJECTED RETURNS				$ 144.00
PREHARVEST COSTS				
Nitrogen	20.00	lb.	0.26	5.20
Phosphate	40.00	lb.	0.27	10.80
Potash	40.00	lb.	0.13	5.20
Seed	30.00	lb.	0.38	11.40
Fuel & lube: Tractor		acre		4.26
Equipment		acre		1.32
Repairs: Tractor		acre		0.89
Equipment		acre		1.94
Labor: Machinery	2.59	hour	4.25	11.01
Operating Capital	12.03	dol.	0.14	1.68
SUBTOTAL				$ 53.71
HARVEST COSTS				
Custom Combine	1.00	acre	18.00	18.00
Custom Haul	8.00	cwt.	0.30	2.40
SUBTOTAL				$ 20.40
TOTAL VARIABLE PRODUCTION COSTS				$ 74.11
FIXED COSTS				
Deprec. Interest, Taxes & Insurance: Tractor		acre		14.76
Equipment		acre		5.33
SUBTOTAL				$ 20.09
TOTAL PROJECTED COSTS				$ 94.20
NET PROJECTED RETURNS				$ 49.80
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years.				$ 34.35

[a/] Based on 100-200 acres per farm in Northeast Texas Region of which about half is under cultivation.

Table 9. SQUASH
DIRECT MARKETING AT DALLAS FARMERS' MARKET
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND, LABOR AND MANAGEMENT[a]

	Quantity[c]	Unit	$/Unit	Value
GROSS RECEIPTS				
Squash sold direct	37.3[b]	cwt.	54.00	2,014.20
Squash sold wholesale	94.5	cwt.	25.00	2,362.50
TOTAL PROJECTED RETURNS				$4,376.70
PREHARVEST COSTS				
Seed	4.0	lb.	7.00	28.00
Nitrogen	50.0	lb.	0.26	13.00
Phosphorous	100.0	lb.	0.27	27.00
Potassium	100.0	lb.	0.15	15.00
Insecticide	3.75	lb.	3.00	11.25
Fungicide	6.00	lb.	9.44	56.64
Fuel & lube: Tractor		acre		24.81
Equipment		acre		1.59
Repairs: Tractor		acre		4.54
Equipment		acre		2.72
Operating capital	27.50	dol.	0.15	4.12
SUBTOTAL				$ 188.67
HARVEST COSTS				
Labor: Hand harvesting	135.0	hour	3.50	472.50
Machinery	0.63	hour	3.50	2.19
Bushel baskets	25.0	each	1.05	26.25
Fuel & lube for equipment		acre		1.98
Repairs for equipment		acre		0.86
SUBTOTAL				$ 503.78
TOTAL VARIABLE PRODUCTION COSTS				$ 692.45
FIXED PRODUCTION COSTS				
Tractor		acre		29.60
Equipment		acre		21.53
SUBTOTAL				$ 51.13
TOTAL PRODUCTION COSTS				$ 743.58
MARKETING COSTS				
Transportation	1,200.0	mile	0.30	360.00
Meals & lodging	7.5	day	13.00	97.50
Stall rental fees	7.5	day	7.50	56.25
Display baskets	5.0	each	0.70	3.50
Sacks	933.0	each	0.01	9.33
SUBTOTAL				$ 526.58
TOTAL PRODUCTION & MARKETING COSTS				$1,270.16
NET PROJECTED RETURNS				$3,106.54
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$2,688.25

[a] Machinery complements and technical coefficients are based on a 30 acre vegetable farm.

[b] Allows 8 percent for loss and shrinkage.

[c] Based on a total yield of 135 cwt with 30% marketed direct and 70% marketed wholesale

Table 10. TOMATOES
DIRECT MARKETING AT DALLAS FARMERS' MARKET
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND, LABOR AND MANAGEMENT[a]

	Quantity[c]	Unit	$/Unit	Value
GROSS RECEIPTS				
Tomatoes sold direct	55.2[b]	cwt.	41.50	2,290.80
Tomatoes sold wholesale	40.0	cwt.	28.50	1,140.00
TOTAL PROJECTED RETURNS				$3,430.80
PREHARVEST COSTS				
Tomato plants	3,000.0	plant	0.085	255.00
Nitrogen	60.0	lb.	0.26	15.60
Phosphorous	120.0	lb.	0.27	32.40
Potassium	120.0	lb.	0.15	18.00
Insecticide	15.0	lb.	3.00	45.00
Fuel & lube: Tractor		acre		30.33
Equipment		acre		11.90
Repairs: Tractor		acre		5.55
Equipment		acre		7.65
Operating Capital	166.1	dol.	0.15	24.91
SUBTOTAL				$ 446.34
HARVEST COSTS				
Labor: Hand harvesting	200.0	hour	3.50	700.00
Machinery	5.0	hour	3.50	17.50
Bushel baskets	25.0	each	1.05	26.25
Fuel & lube for equipment		acre		15.87
Repairs for equipment		acre		6.86
SUBTOTAL				$ 766.48
TOTAL VARIABLE PRODUCTION COSTS				$1,212.82
FIXED PRODUCTION COSTS				
Tractor		acre		36.20
Equipment		acre		39.10
SUBTOTAL				$ 75.30
TOTAL PRODUCTION COSTS				$1,288.12
MARKETING COSTS				
Transportation	800.0	mile	0.30	240.00
Meals & lodging	5.0	day	13.00	65.00
Stall rental fees	5.0	day	7.50	37.50
Display baskets	5.0	each	0.70	3.50
Sacks	1,840.0	each	0.01	18.40
SUBTOTAL				$ 364.40
TOTAL PRODUCTION & MARKETING COSTS				$1,652.52
NET PROJECTED RETURNS				$1,778.28
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$1,490.79

[a] Machinery complement and technical coefficients are based on a 30 acre vegetable farm.

[b] Allows 8 percent for loss and shrinkage.

[c] Based on total yield of 100 cwt per acre with 60 percent going to direct marketing and 40 percent going to wholesale

Table 11. TOMATOES
COMMERCIAL TEXAS PRODUCTION-MARKETING AREA[a/]
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Tomatoes	66.00	cwt.	20.00	1,320.00
TOTAL PROJECTED RETURNS				$1,320.00
PREHARVEST COSTS				
Seed	2.00	lb.	20.00	40.00
Nitrogen	60.00	lb.	0.31	18.60
Phosphate	80.00	lb.	0.26	20.80
Herbicide	1.00	acre	14.83	14.83
Insecticide	8.00	appl	4.53	36.24
Fungicide	5.00	appl	3.33	16.65
Pesticide	9.00	appl	3.00	27.00
Fuel & lube: Tractor		acre		19.61
Equipment		acre		2.76
Repairs: Tractor		acre		4.45
Equipment		acre		5.90
Labor: Machinery	4.77	hour	4.50	21.48
Other	10.00	hour	3.50	35.00
Operating Capital	92.26	dol.	0.13	11.99
SUBTOTAL				$ 275.30
HARVEST COSTS				
Harvest	165.00	crtn	1.10	181.50
Pack & count	165.00	crtn	3.77	247.50
Market	165.00	crtn	.30	49.50
Folfeed	1.00	acre	.90	0.90
SUBTOTAL				$ 479.40
TOTAL VARIABLE PRODUCTION COSTS				$ 754.70
FIXED COSTS				
Tractor		acre		31.73
Equipment		acre		15.12
SUBTOTAL				$ 46.85
TOTAL PROJECTED COSTS				$ 801.55
NET PROJECTED RETURNS				$ 518.45
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 7 years				$ 398.36

[a/] Based on 1,000 acres per farm. Acres are usually double-cropped.

Tomatoes are sold in 40 pound cartons.

Table 12. TOMATOES
SYNTHESIZED COMMERCIAL PRODUCTION--EAST TEXAS
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit[a/]	Value
GROSS RECEIPTS				
Tomatoes	100.0	cwt.	23.5	$2,350.00
TOTAL PROJECTED RETURNS				$2,350.00
PREHARVEST COSTS				
Tomato plants	3,000.0	plant	0.085	255.00
Nitrogen	60.0	lb.	0.26	15.60
Phosphorous	120.0	lb.	0.27	32.40
Potassium	120.0	lb.	0.15	18.00
Insecticide	15.0	lb.	3.00	45.00
Fuel & lube: Tractor		acre		30.33
Equipment		acre		11.90
Repairs: Tractor		acre		5.55
Equipment		acre		7.65
Labor: Machinery	13.87	hour	3.50	48.54
Other	30.0	hour	3.50	105.00
Operating Capital	166.1	dol.	0.15	24.01
SUBTOTAL				$ 598.98
HARVEST COSTS				
Harvest	250.0	crtn	1.10	275.00
Pack & count	250.0	crtn	3.77	942.50
Market	250.0	crtn	0.30	75.00
Folfeed	1.0	acre	0.90	.90
SUBTOTAL				$1,293.40
TOTAL VARIABLE PRODUCTION COSTS				
FIXED COSTS				
Tractor		acre		36.20
Equipment		acre		39.10
SUBTOTAL				$ 75.30
TOTAL PROJECTED COSTS				$1,967.68
NET PROJECTED RETURNS				$ 382.32
NET RETURNS ADJUSTED FOR CROP FAILURE:	1 in 8 years			$ 250.25

[a/] 1979-80 average shipping point price

Table 13. WATERMELONS
DIRECT MARKETING AT DALLAS FARMERS' MARKET
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND, LABOR AND MANAGEMENT[a]

	Quantity[c]	Unit	$/Unit	Value
GROSS RECEIPTS				
Watermelons sold direct	20.2[b]	cwt.	13.00	262.60
Watermelons sold wholesale	128.00	cwt.	9.00	1,152,00
TOTAL PROJECTED RETURNS				$1,414.60
PREHARVEST COSTS				
Seed	1.5	lb.	6.00	9.00
Nitrogen	50.0	lb.	0.26	13.00
Phosphorous	100.0	lb.	0.27	27.00
Potassium	50.0	lb.	0.15	7.50
Insecticide	6.0	lb.	3.00	18.00
Fuel & lube: Tractor		acre		22.04
Equipment		acre		3.66
Repairs: Tractor		acre		4.53
Equipment		acre		3.43
Operating capital	70.54	dol.	0.15	10.58
SUBTOTAL				$ 118.74
HARVEST COSTS				
Labor: Hand harvesting	150.0	cwt.	1.25	187.50
Machinery	1.25	hour	3.50	4.37
Fuel & lube for equipment		acre		4.63
Repairs for equipment		acre		2.62
SUBTOTAL				$ 199.12
TOTAL VARIABLE PRODUCTION COSTS				$ 317.86
FIXED PRODUCTION COSTS				
Tractor		acre		39.28
Equipment		acre		38.63
SUBTOTAL				$ 77.91
TOTAL PRODUCTION COSTS				$ 395.77
MARKETING COSTS				
Transportation	960.0	mile	0.30	288.00
Meals & lodging	6.0	day	13.00	78.00
Stall rental fees	6.0	day	7.50	45.00
SUBTOTAL				$ 411.00
TOTAL PRODUCTION & MARKETING COSTS				$ 806.77
NET PROJECTED RETURNS				$ 607.83
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$ 507.27

[a] Machinery complements and technical coefficients are based on a 100 acre watermelon farm.

[b] Allows 8 percent for loss and shrinkage

[c] Based on a total yield of 150 cwt with 15% marketed direct and 85% marketed wholesale

Table 14. WATERMELONS
COMMERCIAL TEXAS PRODUCTION-MARKETING AREA[a/]
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit	Value
GROSS RECEIPTS				
Watermelon	125.00	cwt.	6.00	750.00
TOTAL PROJECTED RETURNS				$ 750.00
PREHARVEST COSTS				
Seed	4.00	lb.	6.00	24.00
Nitrogen	40.00	lb.	0.31	12.40
Phosphate	40.00	lb.	0.26	10.40
Potash	20.00	lb.	0.20	4.00
Insecticide	2.00	appl	5.62	11.24
Fungicide	2.00	appl	4.66	9.32
Pesticide	2.00	acre	3.00	6.00
Herbicide	1.00	crtn	5.42	5.42
Hand Labor	5.00	hour	3.35	16.75
Fuel & lube: Tractor		acre		5.59
Equipment		acre		1.15
Repairs : Tractor		acre		0.88
Equipment		acre		2.85
Labor: Machinery	2.33	hour	4.50	10.48
Operating Capital	25.84	dol.	0.13	3.36
SUBTOTAL		acre		$ 123.84
HARVEST COSTS				
Harvest & sell	125.00	cwt.	1.80	225.00
SUBTOTAL		acre		$ 225.00
TOTAL VARIABLE PRODUCTION COSTS				$ 348.84
FIXED PRODUCTION COSTS				
Deprec., interest, taxes & insur.				
Tractor		acre		14.11
Equipment		acre		7.65
SUBTOTAL		acre		$ 21.76
TOTAL PROJECTED COSTS		acre		$ 370.60
NET PROJECTED RETURNS		acre		$ 379.40
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 5 years		acre		$ 274.40

[a/] Based on 1,000 acres per farm. Acres are usually double-cropped.

Table 15. WATERMELONS
SYNTHESIZED COMMERCIAL MARKETING--EAST TEXAS
ESTIMATED COSTS AND RETURNS PER ACRE
BUDGET TO LAND AND MANAGEMENT

	Quantity	Unit	$/Unit[a/]	Value
GROSS RECEIPTS				
Watermelons	150.0	cwt.	5.50	825.00
TOTAL PROJECTED RETURNS				$ 825.00
PREHARVEST COSTS				
Seed	1.5	lb.	6.00	9.00
Nitrogen	50.0	lb.	0.26	13.00
Phosphorous	100.0	lb.	0.27	27.00
Potassium	50.0	lb.	0.15	7.50
Insecticide	6.0	lb.	3.00	18.00
Fuel & lube: Tractor		acre		22.04
Equipment		acre		3.66
Repairs: Tractor		acre		4.53
Equipment		acre		3.43
Labor: Machinery	7.28	hour	3.50	25.46
Other	8.5	hour	3.50	29.75
Operating capital	70.54	dol.	0.15	10.58
SUBTOTAL				$ 173.95
HARVEST COSTS				
Harvest & sell	150.00	cwt.	1.80	270.00
SUBTOTAL				$ 270.00
TOTAL VARIABLE PRODUCTION COSTS				$ 443.95
FIXED PRODUCTION COSTS				
Tractor		acre		39.28
Equipment		acre		38.63
SUBTOTAL				$ 77.91
TOTAL PRODUCTION COSTS				$ 521.86
NET PROJECTED RETURNS				$ 303.14
NET RETURNS ADJUSTED FOR CROP FAILURE: 1 in 8 years				$ 233.77

[a/] 1979-80 average shipping point price