OVERCOMING BARRIERS TO THE NATIONAL PRODUCE MARKET:

THE GEORGIA CASE

by

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(Under the Direction of James E. Epperson)

ABSTRACT

The purpose of this study was to examine factors contributing to the development of the produce industry in Georgia and to find ways for producers to overcome barriers to entry into the national fresh fruit and vegetable market. A survey of produce growers in Georgia was conducted in 2003-2004. Information obtained from the respondents included economic and operational characteristics of grower enterprises. Additional information was ascertained about factors limiting production, expected operational changes, and marketing practices. Grower tendencies are revealed through cross tabulation of survey responses with sales from produce and refined through econometric analysis. Factors found important in overcoming barriers to national market entry stem from the degree of specialization and sophistication of producers.

INDEX WORDS: Produce, Marketing opportunities, Fresh fruits and vegetables, Georgia

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B.S.A., University of Georgia, 2001

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2004

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DEDICATION

This thesis is dedicated to my father, Dr. Robert M. McPherson. Thank you for always being there for advice and supporting me in all I do. I think one person with a Ph.D. in the family will have to be enough for now, but who knows what will happen down the road.

ACKNOWLEDGEMENTS

I am indebted to everyone who helped me throughout the process of my graduate-school work. Foremost, I would like to thank Dr. James E. Epperson for all of his support and time spent on this project. Thank you for constantly checking on my progress. Also, thanks go to my committee members, Dr. Esendugue G. Fonsah and Dr. Forrest E. Stegelin, for their helpful reviews and comments. I would not have gotten through this process without your help.

I would like to thank everyone in Conner Hall for there hospitality. Special thanks go to Joanne Norris for helping out with my never-ending questions. Ever since I arrived at Conner Hall in 1998 I would always come to you if I needed anything and you always made time for me.

Last but certainly not least, I would like to thank my family for their undying love and support. I know I can count on all of you in times of need. Thanks especially for the encouragement you gave me throughout all of my college years. I love you all and I am always here for each of you.

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Introduction

Prior to the twentieth century, fresh fruits and vegetables grown in the United States lacked a centralized market for distribution. Those that grew produce would sell to the "locals" so to speak. With an insufficient transportation system or lack thereof, coupled with the perishability of the commodities involved, it was impractical for fresh produce to be sold anywhere but directly to the consumer and local store owners (Free).

The early part of the twentieth century brought with it major changes and innovations in agriculture. With improved transportation and methods to reduce spoilage of perishable commodities came a shift from the decentralized systems of old to newer central production and marketing centers (Free).

Meanwhile, new market outlets where produce was brought together on a wholesale level began to spring up in large metropolitan areas (Epperson and McHugh). This marked the establishment of a common meeting place for supply and demand for the fresh fruit and vegetable market. The wholesale sector in the fresh produce industry began to flourish through these centralized meeting sites. The wholesalers of old performed many of the same functions performed today, such as receiving, storing, and distributing produce across the country (Epperson and McHugh). Large retailers required great volume with standardized quality and shipments received in a timely and efficient manner. Marketing and distribution innovations led to the development of large production areas in the United States specializing in certain commodities (Free).

After central markets were firmly established, large buyers began to bypass them to reduce costs. Instead of purchasing produce at centralized markets, large buyers began to seek out large growers to supply their needs. Buyers began to purchase produce directly from the field, and in turn, shipped to centralized warehouses for distribution throughout the country (Epperson and McHugh). Moving produce directly, without going through the older established central markets, allowed the buyer to increase efficiency and decrease costs. Kohls and Uhl stressed that this also allowed for improved market flow, better inventory control, and a standardized commodity that could easily be mass merchandized. Large companies with powerful procurement arms operating in key production areas and shipping throughout the United States and beyond led to difficulties in market access by growers not in the major production areas. Growers not connected to the supply chains of large companies were left with limited market outlets (Epperson and McHugh).

Mainstream production in the Southeast centered in Florida while Georgia was one of the many areas largely excluded. However, in the early 1970's produce production began moving north from Florida into South Georgia (Epperson and Tyan; Epperson and Lei). Several factors have been linked to the growth of the produce industry in Georgia. A major factor has been urban encroachment resulting in the loss of vast areas of agricultural land in Florida (Lockette; Reynolds). As with North Florida, South Georgia has a mild climate suitable for growing produce, but unlike Florida, is sparsely populated (Epperson and Tyan; Epperson and Lei). Another factor boosting growth has been the tremendous increase in demand for produce in the United States and beyond, which largely parallels the release and promotion of dietary guidelines by the USDA (Epperson and Tyan; Epperson and McHugh; Epperson and Lei). U.S. per capita consumption of fresh fruits and vegetables increased over 28 percent from 1975 to 2001 (USDA,

ERS). Growth in fresh fruit and vegetable consumption was unmatched by any other major food group over this time period (Cook). The increased popularity of pre-cut vegetables and the growth in the type of vegetables stocked helped to contribute to this expansion in vegetable consumption (Estes and Smith).

For common agricultural commodities such as row crops and livestock, a producer can easily sell all that he/she can produce. The marketing of produce, which involves highly perishable commodities, is a completely different matter. Consumers in the United States, for the most part, demand the very best in produce. Therefore, restaurants and retail chains demand top quality produce from suppliers. Huge volumes are also demanded on a timely basis. Producers who can deliver under this kind of unforgiving pressure are truly exceptional. Failure is not an option. For this reason, brokers, wholesalers, and retail chain buyers cannot afford to deal with a producer unless he/she can deliver. Otherwise, their positions as intermediaries in the vast national produce marketing system would be in jeopardy (Epperson and McHugh; Ellerman and Law; Solverson and Ellerman; Free et al.; Mathia, Bateman, and Law).

Because of these unremitting demands of the national produce marketing system, it would seem difficult for a small or prospective producer of fruits and vegetables to find a market intermediary willing to take a chance on him/her. Thus, a simultaneity problem exists regarding the national produce market – growers must be able to produce top quality commodities in sufficient volume without fail while intermediaries simultaneously must be willing to broker or buy the same, a tremendously improbable scenario for small or prospectus producers. Producers can conceivably prepare for entry into the national market through the practice of growing produce and marketing through direct outlets such as farmers' markets, roadside stands, and pick-your-own operations. Unfortunately, volume potential through direct outlets is limited, and

there is no real test for meeting quality requirements for this venue. Even with a great deal of experience producing and marketing through direct outlets, the odds of a national produce market intermediary dealing with such a grower are not high (Epperson and McHugh; Ellerman and Law; Solverson and Ellerman; Free et al.; Mathia, Bateman, and Law)..

Though the simultaneity barrier is real, a sufficient number of producers have managed to form relationships with market intermediaries such that national demands are met on a continuous basis. When new producers are needed, somehow those who are able to deliver are found. Clearly then, there are inroads to the national market for producers willing and able to meet the challenge. An important driving force of this thesis is to identify potential inroads for effective penetration of the simultaneity barrier to the national produce market.

Objectives

This study began as a collaborative effort on the part of the USDA and four states: Georgia, Kentucky, North Carolina, and Tennessee. The focus here is on the results of the Fruit and Vegetable Marketing Survey sent to produce growers in Georgia. The purpose of this study is to examine factors contributing to the development of the produce market in Georgia and to find ways to overcome the simultaneity barrier to entering the national fresh fruit and vegetable market. Specific objectives of this study were to: 1) ascertain the characteristics of those producing fruits and vegetables in Georgia, 2) examine produce production and marketing strategies, and 3) use the information in objectives 1 and 2 to develop a profile of large versus small produce growers in order to identify possible inroads to the national produce market. The ultimate goal of this study is to observe the simultaneity problem among producers and identify ways of overcoming it.

Procedure

The three specific objectives of this study are carried out in a step-wise fashion. First, the characteristics of those involved in the study are obtained from the survey results. Next, an examination of production and marketing strategies are carried out in two ways. A tabular analysis of the survey data is conducted including cross tabulation of each question with sales from produce. Tabulation of the data is followed by econometric analysis. Important variables are identified and impacts gauged with respect to production and marketing strategies of those involved in the study. Profiles of large versus small produce growers should emerge with identifiable inroads to the national produce market. The study culminates with a summary, conclusions, and implications.

Literature Review

Several studies have been published regarding the economic potential of fruit and vegetable production. Some of these served in the development of the questionnaire for the research (Free et al.; Mathia, Bateman, and Law; Mizelle 1979a).

Direct marketing (farmers' markets, pick-your-own, roadside stands) has been a topic of intensive study. Ashley, as well as Klauer, published guidelines for marketing produce through pick-your-own operations. The pros and cons of pick-your-own versus farmers' markets have been studied (Adrian and Vitelli). Consumer loyalties to local farmers' markets have been examined (Eastwood, Brooker, and Gray). In 2002, Bachmann published a guide to help those interested in organizing or participating in a farmers' market. The guide addresses effective selling methods, setting up markets, and receiving federal assistance. These direct marketing publications are useful in providing insights on marketing limited quantities of produce but fall short regarding insights on high volume sales.

Several studies dealing with the potential of gaining market share in the fresh produce market have been conducted. In 1982, Ellermen and Law presented findings from a study conducted in Louisiana. The study dealt with market interactions among growers, terminal wholesalers, and brokers. Terminal wholesalers are large wholesalers located in metropolitan areas. The study concluded that potential existed for marketing produce to independent and/or chain store wholesalers. The broker aspect of the study was inconclusive. Volume requirements were found to be the greatest barrier to using wholesalers.

Wholesalers demand high volume and quality standards which is a major issue when dealing with new suppliers. One study dealt with the factors influencing purchasing activities by retailers at the wholesale level (Solverson and Ellerman). Quality, volume, and price were found to be major factors. In a recent study of wholesalers and distributors in Georgia, quality, price, and reliable supply were shown to be the most important factors influencing purchasing decisions of such intermediaries (Wolfe, Fonsah, and Ferland).

Mizelle (1983) proffered a suggestion for overcoming barriers to entry. Producers were challenged to target sales to wholesalers and through brokers during the appropriate market window for a given produce item – when intermediaries had great needs to fill orders for such items.

In recent years, large discount stores like Wal-Mart and Target have expanded to include groceries and fresh fruits and vegetables. Several studies have examined the effects of these discount stores on produce market intermediaries. Kaufman et al. examined the consolidation of growers, packers, wholesalers, and chain stores due to the increased market share gained by discount stores. The changing business relationships with suppliers have also been examined for grocers and discount stores. As produce sales in discount stores increased, grocers were forced

to adjust their business relationships with suppliers, particularly with respect to stocking, rotating, and reordering perishables (Estes). Large discount stores have continued to make rapid produce market expansion, and have been forced to forge closer business relationships with their suppliers (Carmen, Sexton, and Cook). McLaughlin et al. reported that these shippers are being pressured to increase the scale of their operation due to the market expansion. Calvin et al. found that in many cases these consolidated retailers are demanding higher volumes which smaller shippers may not be able to match.

The local marketing of produce to retailers has also been examined. Free et al. found that chain-store wholesalers did not deal with local producers because of quality and grading issues.

A study by Epperson and Tyan examined the potential for capturing U. S. fresh fruit and vegetable market share. It showed the potential for increased market share in late spring in Georgia. In a study on sweet potatoes, low production levels and a short growing season were found to be the main reasons for underdeveloped markets in the Southeast (Mathia, Bateman, and Law). The development of efficient markets for greater volume was found to be impeded by the lack of capability of producers to meet the requirements for national market entry (Mathia, Bateman, and Law).

A study by Wolfe, Fonsah, and Ferland examined the practices of fresh fruit and vegetable wholesalers in Georgia. This study showed that wholesalers in Georgia purchased a significant amount of fresh produce from outside the state. However, the bulk of southern fruits and vegetables such as peaches, butter/lima beans, and spinach were purchased from Georgia – an encouraging sign for Georgia growers.

These studies point out the major barriers facing perspective fresh produce growers. Quality and quantity requirements were often cited (Ellerman and Law; Solverson and Ellerman;

Wolfe, Fonsah, and Ferland). Also, requirements for storage, transportation, and packaging were found important in several of these studies (Ellerman and Law; Free et al.; Mathia, Bateman, and Law; Solverson and Ellerman).

The focus of this study is from the grower perspective. The challenge is to ascertain the important factors that explain or are associated with level of produce sales. With a firm handle on such factors, the goal is to develop a strategy, or strategies, for penetrating the simultaneity barrier to the national produce market.

Organization

The next chapter is devoted to the economic theory relevant to this study, with specific definitions and sources of barriers to entry into the produce industry. Chapter III presents the survey results in tabular form with a focus on barriers to market entry. Chapter IV presents an econometric analysis of the data using ordinary least squares. Finally, the last chapter includes the summary, conclusions, and implications of this study.

Chapter II

Microeconomic Theory

Microeconomic theory provides a means of comparing the relationship between established sellers and potential entrants to an industry. These comparisons are drawn through examining the market structures and characteristics of those involved. Several different types of market structures have been identified. These market structures have predominantly been classified according to three characteristics (Bain 1968). These characteristics are 1) the degree of seller concentration—whether there are many, few, or one seller, and what their sizes are, 2) the extent of product differentiation—whether the products of competing sellers are identical or are differentiated, 3) the condition of entry to the industry—represented by the advantage established firms have over new entrant firms (Bain 1968).

An important determinant of market behavior is the condition of entry to an industry. It measures the height of the barriers to entry to an industry, or the disadvantages that new sellers face if they choose to compete in the industry. Therefore, the influence of the condition to entry on market behavior is rather different than that for the other two characteristics given. Seller concentration and product differentiation among established sellers influences the market relationship among sellers. However, the condition to entry to an industry determines the relationships among established sellers and potential sellers, and thus the strength of competition by new entrants (Bain 1968).

Sources of Barriers to Entry

Barriers to entry have been described in many ways. In 1956, Bain released the first comprehensive book on entry barriers. In this book, the definition of an entry barrier was given as an advantage of established sellers which is reflected by these sellers being able to raise prices above competitive levels without attracting new firms to enter the market (Bain 1956). A barrier to entry has also been defined as a factor that makes entry unprofitable while permitting established firms to set prices above marginal cost, and in turn earn a monopoly profit (Ferguson). Furthermore, Gilbert defined an entry barrier as a rent that is derived from incumbency, and Carlton and Perloff said that a barrier to entry is anything that prevents an entrepreneur from immediately creating a new firm in a market.

Several sources of entry barriers exist; three types are thought of as most prevalent: 1) product differentiation advantages of established over potential entrant firms, 2) absolute cost advantages of established over potential entrant firms, and 3) economies of scale of existing firms (Bain 1968; Porter 1998a).

Established firms may have an advantage over potential firms due to product differentiation, a buyer's preference for the products of established firms. Porter (1998c) said that product differentiation means that established firms have brand identification and customer loyalties which stem from past advertising, customer service, product differences, or simply being first into the industry. Potential entrants may not be able to receive as high a selling price, relative to average costs, as established firms (Bain 1968). Entrants must offer a similar product at a lower price in order to overcome consumer loyalties. Though, with this lower price, the entrant would operate at a loss or lower profit than the established firms (Jackson). Entering firms may choose to spend additional resources on product promotion. From lower prices and

additional costs comes reduced revenue which creates a wall allowing existing firms to increase selling prices above average costs (Howe 1978).

According to Bain (1968), differentiation for established firms seems to take place for three reasons. First, established firms may be able to increase price above minimum average costs, and in turn potential entrants would only be able to charge a lower price that does not cover average costs. Second, in order to lock in a favorable price, the entrant would have to spend additional money on sales promotion, and once again have average costs greater than price. Finally, even if these factors did not occur, the entrant may be unable, at comparable prices, to secure a large enough market share to be able to support an economically large production and distribution system. Not having available economies of scale, the firm may once again have average costs above selling price, even though established firms receive prices in excess of minimum average costs (Bain 1968).

An example of "pure" product differentiation is used to clarify this barrier further, figure 2.1. The advantage is "pure" in that no economies of scale or absolute cost differences are present among existing and potential firms (Bain 1968). In this case, the long-run average cost curves of established and potential firms are identical, AC. These curves are also horizontal, showing no change in average cost with a change in scale of operation. The demand curve for established firms, which reflects the long-run association among sales volume and price charged, is $D_s D'_s$. If a product differentiation advantage exists, the established firm can set a price above minimum average cost, causing potential entrants to be unable to sell their output profitability. The product differentiation advantage returns a maximum entry-forestalling price of P_e. Entry-forestalling refers to the selection of a price, which, while above the competitive floor, is not high enough to make the market attractive to the most likely potential entrants (Mueller). When

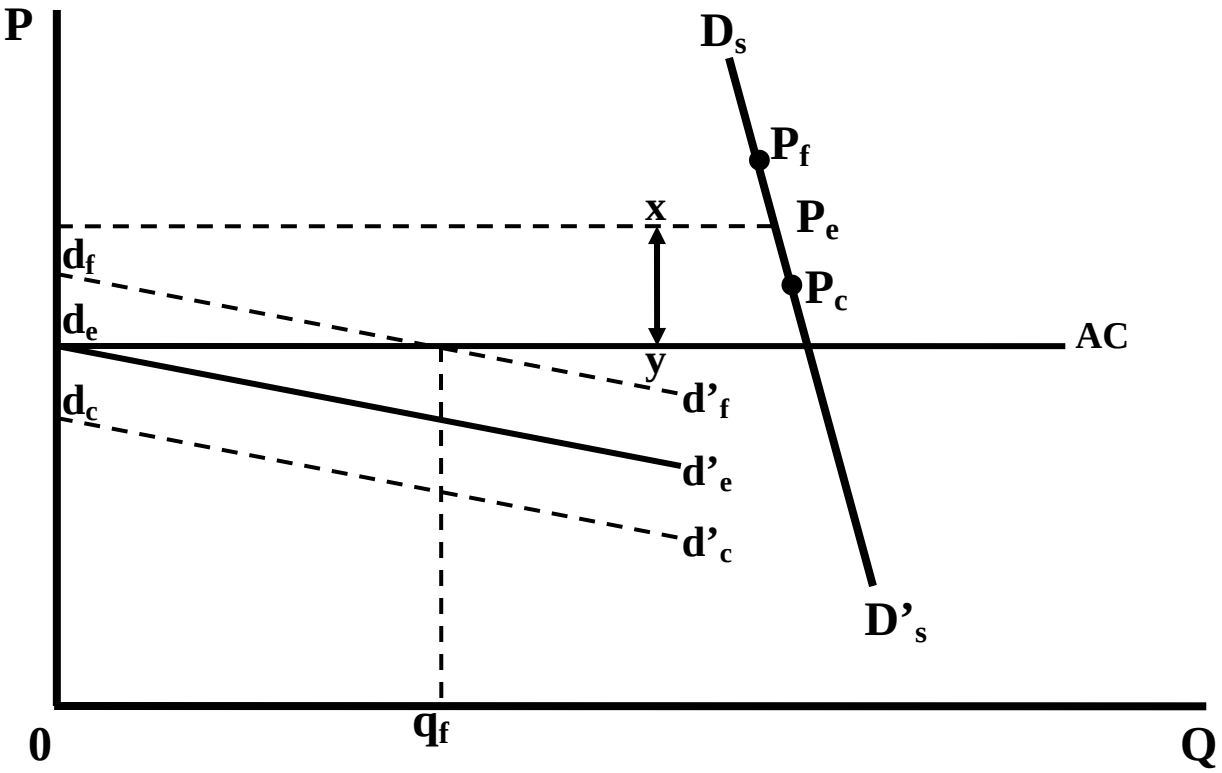

Figure 2.1 "Pure" product differentiation advantage

P_e is charged by the established firm, the demand curve for potential entrants' output will be at d_e d'_e. This shows that even at the smallest output possible the potential entrant could not have a price above average cost. The price P_e is the highest price that will forestall all entry (Bain 1968). If a higher price (P_f) were charged by existing firms, the demand curve for potential entrants' output would be at d_f d'_f. On this demand curve, profit would be seen at outputs between zero and q_f. If a lower price (P_c) were charged by existing firms, the demand curve for potential entrants' output would be at d_c d'_c, resulting in firms not entering the market. The extent of the product differentiation advantage is measured by the excess of P_e over AC, or the distance xy (Bain 1968).

Established firms sometimes possess an absolute cost advantage over potential entrants. This cost advantage exists when established firms have lower average costs than potential firms at all output levels (Bain 1956; Porter 1998b). Existing firms with this advantage can reap exceptional profits without having competitors enter the market.

Several determinants of the potential for such a cost advantage have been identified. Control of advanced production techniques by patents or other methods have been linked to cost benefits for established firms (Bain 1968; Porter 1998b). A concept that has been considered comparable to this idea is the notion that with increased experience on the job, lower production costs can occur (Lieberman). Also, factors of production, such as natural resources and raw materials, may be owned or controlled by established firms, so that entrant firms might be entirely denied access to these materials or be forced to purchase them from established firms at premium prices (Bain 1968; Porter 1998b).

Figure 2.2 depicts "pure" absolute cost barriers. Once again, this advantage is described as "pure" in that no scale economies or differentiation exists. The long-run average cost curve

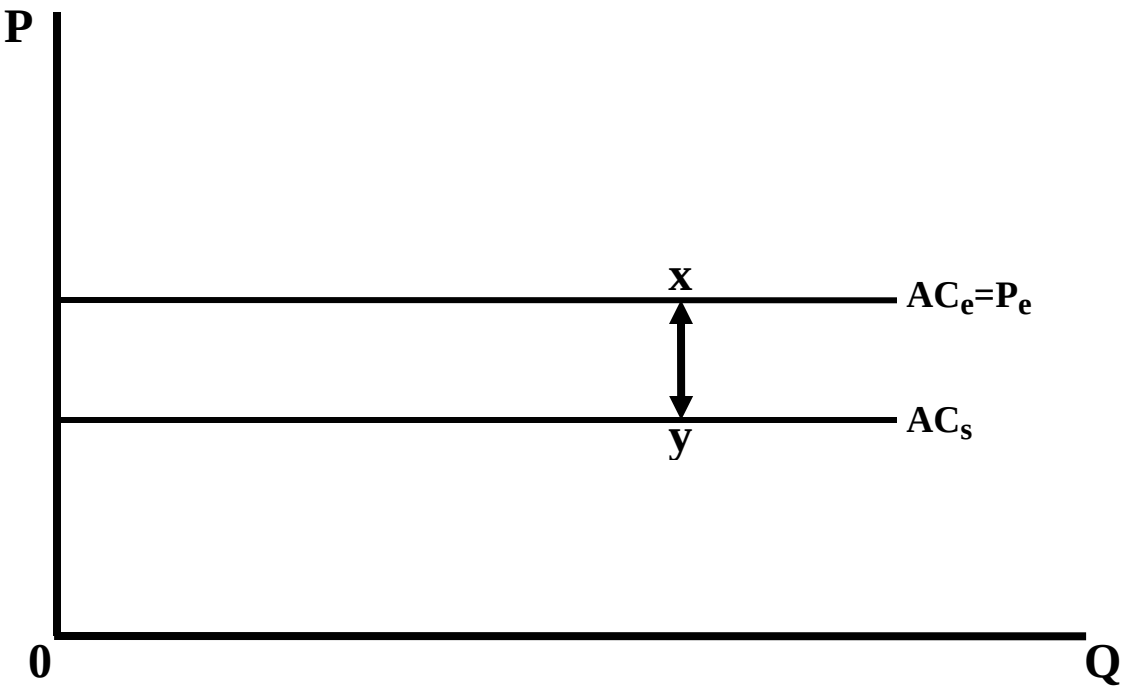

Figure 2.2 "Pure" absolute cost advantage

of established firms is AC_s and that of potential firms is AC_e. The higher level of AC_e reflects the absolute cost disadvantage of the potential entrant at any rate of output. The established firm can set price as high as (but no higher than) AC_e, since the entrant would find production unprofitable at that price but profitable at higher prices. The maximum entry-forestalling price is therefore P_e (equal to AC_e), and the extent of the absolute cost advantage is the distance xy (Bain 1968).

Economies of scale by existing firms account for the third source of barriers to entry for potential competitors. When economies of scale exist, long-run average costs decline as output expands (Jackson). The sources of economies of scale are wide-ranging. Because firms that produce at a greater quantity of output per period use a greater quantity of inputs per period, it is possible that the firm is able to buy inputs at a lower price than companies that produce on a smaller scale (Jackson). Basically, as output increases, costs tend to increase at a decreasing rate. The rate at which average costs decline depends on the level of operations, with the lowest output at which full economies are achieved being known as the point of minimum optimal scale (Howe 1978).

Figure 2.3 shows that economies of scale represent a barrier to potential firms as established firms may be able to set entry-forestalling prices above minimum average costs (Bain 1968). The long-run average cost curve for all firms in the industry is represented by AC. The potential entrants' demand curve is shown as D_{e1} D'_{e1}. This demand curve is established with the assumptions that the entrant and established firms always charge identical prices, and that the entrant's expected market share is inadequate to operate profitably at minimum optimal scale (Bain 1968). The demand curve for established firms is given as D_{e2} D'_{e2}. Both of these curves in combination with the long-run average cost curve, reflects the average cost per unit for a given

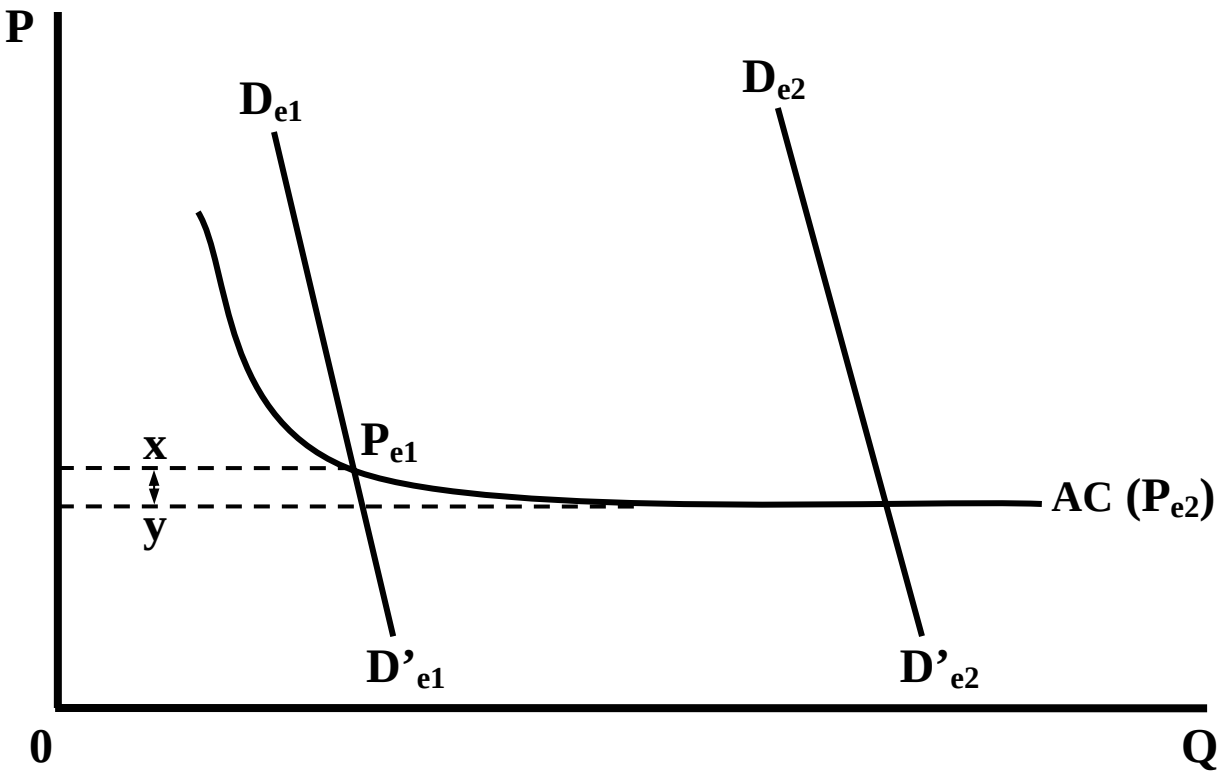

Figure 2.3 "Pure" economies of scale advantage

level of output. If the expected market share of the potential entrant is represented by D_{e1} D'_{e1}, and the entrant firm expects market price to be maintained after entry, then the established firms can set a maximum entry-forestalling price of P_{e1}, which is above minimum average costs. If the potential entrant firm expects a price after entry of P_{e1} or lower, it cannot operate at a profit with the market share shown by D_{e1} D'_{e1}, and will not enter. The extent of the scale-economies barrier to entry is the distance xy (Bain 1968).

Theoretically, when barriers to entry exist, established firms may reap benefits by raising price to some extent. In the fresh fruit and vegetable industry this typically is not the case. Prices for commodities such as fresh produce are discovered competitively. Even the most established producing firm in the industry is normally a price taker and thus does not have the advantage of being able to set prices (Kohls and Uhl).

The general hypothesis of this study is that barriers to entry into the national fresh fruit and vegetable industry do exist. The hypothesis in this thesis examines the barriers to entry set forth by Bain and Porter. These barriers include product differentiation, absolute cost, and economies of scale advantages of established firms over potential entrants.

Product Differentiation Advantage

Established firms benefit by the level of product differentiation existing in the industry. In the fresh fruit and vegetable industry, product differentiation may exist as well. Porter (1998b) said that product differentiation means that established firms have brand identification and customer loyalties which stem from past advertising, customer service, product differences, or simply being first into the industry. With that said, Bain (1968) articulated that such preferences for established brand names and company reputations have an entry-impeding effect.

With the potential for product differentiation to exist in the fresh fruit and vegetable market, it is a hypothesis of this study that several factors influence the extent of differentiation among sellers in the produce industry. Characteristics such as quality considerations, maturity and color are among those factors that may influence differentiation (Ellerman and Law; Mizelle 1979a). Packaging requirements like sizing, sorting, cleaning, and labeling could be additional factors that may also show influence (Free). Opinions about the quality of the product offered are formed through the company reputation as well as the reliability of the product offered (Porter 1998b). Buyer preferences for the output of one seller over another may include consistency in service and dependability in delivery (Mizelle 1979b).

Absolute Cost Advantage

Absolute cost advantages possessed by established firms over potential entrants may exist in the fresh produce industry. Established firms may have a cost advantage not replicable by potential entrants no matter their size and economies of scale (Porter 1998b). Several critical advantages of established firms are hypothesized to be the most pertinent factors to establishing a cost advantage in the produce industry. These factors include, but are not limited to, proprietary product technology, favorable access to raw materials, favorable locations, government subsidies, and the learning or experience curve (Porter 1998b). Bain (1968) reasoned that such factors allow established firms to produce and distribute more efficiently at any scale of operation than that of potential entrants.

By analyzing the findings of previous economists like Bain and Porter, it is a hypothesis of this thesis that established firms have superior techniques and business expertise that lead to increased efficiency, and in turn, lead to an absolute cost advantage over potential entrant firms.

Economies of Scale Advantage

Economies of scale that lead to a barrier to entry for potential firms may exist in the fresh fruit and vegetable industry. Economies of scale refer to the declines in unit costs of a product as the volume per period increases (Bain 1968; Jackson; Porter 1998b). These economies of scale force entrants to either come in at large scale and risk strong reaction from existing firms, or come in at small scale and accept a cost disadvantage (Porter 1998b). Bain (1968) gave three reasons for a scale economy advantage: 1) specialization of labor, 2) specialization of machinery and equipment that are only available in very large sizes, and 3) specialization of management. Due to these factors, an established firm is able to have lower average costs than potential entrants (Jackson).

In the fresh fruit and vegetable industry, those firms that are able to produce in mass quantity have a likely edge over their competitors. Mizelle (1979a) stated that the fruit and vegetable industry demands that large volumes of commodities be harvested, graded, packed, and delivered in short periods of time. With this in mind, it is a hypothesis of this study that extensive capital requirements may be needed in order to produce sufficient volumes of produce to meet the requirements of brokers and wholesalers. This capital requirement may be in the form of equipment for packing, packaging, storing, and cooling fresh produce (Bateman and Schmidt; Ellerman and Law; Howe 1979; Jackson). Another important aspect in realizing economies of scale may be the talents of the managerial staff in organizing the production and marketing activities of the firm for meeting the requirements of buyers at the national level.

Chapter III

Georgia Fruit and Vegetable Marketing Survey

A survey of fruit and vegetable growers in Georgia was conducted in 2003-2004. Those participating in the study were listed in the 2003 Georgia Fruit and Vegetable Directory obtained from the Georgia Department of Agriculture or were identified by county Extension offices. Total enumeration of commercial produce growers in Georgia was attempted.

The survey entitled, "Georgia Fruit and Vegetable Marketing Survey," was distributed by mail and followed up by phone and personal interviews. A total of 300 surveys were distributed with 67 completed, for a response rate of 22 percent. Information obtained from the respondents included economic and operational characteristics of grower enterprises. Additional information was ascertained about factors limiting production, expected operational changes, and marketing practices. Respondents were not identified by name or company.

This chapter examines the opportunities and adversities encountered by Georgia's produce growers. The purpose here is to analyze possible market barriers to entry to the national fruit and vegetable distribution system. Determination of such barriers should provide information to help Georgia producers in gaining a greater share of the national produce market.

Results from the survey (Appendix A) are summarized in the accompanying tables. All tables that include data for produce sales are based on 65 respondents as two respondents did not report sales.

The counties of origin of survey participants are shown in Table 3.1. Grady County had the highest number of respondents with 19, or just over 28 percent of the total. Tift and Turner

Table 3.1. Number of Producers Participating in the 2003-2004 Georgia Fruit and Vegetable Marketing Survey by County of Origin

County	Frequency
Grady	19(28.36%)
Tift	6(8.95%)
Turner	6(8.95%)
Berrien	4(5.97%)
Brooks	3(4.48%)
Cook	3(4.48%)
Mitchell	3(4.48%)
Other[a]	23(34.33%)
Total	67(100.00%)

Source: Results from Question No. 1 of Fruit and Vegetable Marketing Survey.
[a] Four counties had two responses each, 15 counties had one response each. Counties with two responses: Colquitt, Decatur, Tattnall, and Union. Counties with one response: Barrow, Bulloch, Clinch, Coffee, Crawford, Crisp, Dooley, Evans, Fulton, Irwin, Lowndes, Pike, Rabun, Toombs, and Worth.

were next with six each, followed by Berrien with four, and Brooks, Cook, and Mitchell with three each. Four Georgia counties had two responses each and 15 had one response.

Table 3.2 shows the age distribution of growers. Just over 78 percent of the respondents were above 40 years of age, with the highest proportion in the 41-50 age category. Nearly 42 percent were over 50 years of age. Table 3.3 shows the ages of respondents by level of sales from produce. For sales below $100,000, there was a higher concentration of growers that were under 41 years of age. For the categories of $100,000 and above in sales, only four respondents were under 41 years of age.

Experience in the produce industry was also thought to be important. Producers were asked how many years they had been commercially growing produce. As shown in Table 3.4, the most common response was over 10 years.

Cross tabulation of experience with sales from produce should shed additional light on the producer profile. Table 3.5 reveals that the majority of each sales category is comprised of growers with over 10 years of experience. Further inspection shows that for growers reporting under $20,000 in sales, eight of them had six or less years of experience. This encompasses three growers with less than three years of experience and five of the 11 growers with three to six years of experience. This pattern of experience becomes even more evident when looking at the top two sales classes. In the two classes with over one-quarter of a million dollars in sales from produce annually, 14 of the 17 respondents had over 10 years of experience.

Produce is not the only commodity group grown by those that answered the survey. Almost 80 percent of those surveyed grew row crops such as corn, soybeans, and peanuts (Table 3.6). Nearly 36 percent had livestock enterprises and 21 percent grew tobacco. Table 3.7 does

Table 3.2. Number of Respondents by Age Category

Age	Frequency
Under 30	4(5.97%)
31-40	11(16.42%)
41-50	24(35.82%)
51-60	19(28.36%)
Over 60	9(13.43%)
Total	67(100.00%)

Source: Results from Question No. 2 of Fruit and Vegetable Marketing Survey.

Table 3.3. Number of Respondents by Age Category by Sales From Produce

	Sales From Produce					
Age	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Under 30	2(10.53%)	0(0.00%)	1(50.00%)	0(0.00%)	0(0.00%)	1(9.09%)
31-40	4(21.05%)	3(27.28%)	1(50.00%)	1(6.25%)	1(16.67%)	1(9.09%)
41-50	7(36.84%)	2(18.18%)	0(0.00%)	5(31.25%)	3(50.00%)	6(54.55%)
51-60	5(26.32%)	4(36.36%)	0(0.00%)	6(37.50%)	2(33.33%)	2(18.18%)
Over 60	1(5.26%)	2(18.18%)	0(0.00%)	4(25.00%)	0(0.00%)	1(9.09%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 2 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.4. Number of Respondents by Years of Experience Growing Produce

Number of Years	Frequency
Less than 3	3(4.48%)
3-6	11(16.42%)
7-10	8(11.94%)
Over 10	45(67.16%)
Total	67(100.00%)

Source: Results from Question No. 3 of Fruit and Vegetable Marketing Survey.

Table 3.5. Number of Respondents by Years of Experience Growing Produce by Sales From Produce

	Sales From Produce					
Number of Years	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Less than 3	3(15.79%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
3-6	5(26.32%)	2(18.18%)	0(0.00%)	3(18.75%)	1(16.67%)	0(0.00%)
7-10	1(5.26%)	1(9.09%)	1(50.00%)	3(18.75%)	0(0.00%)	2(18.18%)
Over 10	10(52.63%)	8(72.73%)	1(50.00%)	10(62.50%)	5(83.33%)	9(81.82%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 3 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.6. Number of Respondents Indicating Other Activities by Type of Enterprise

Other Enterprise	Frequency
Row crops	53(79.10%)
Livestock	24(35.82%)
Tobacco	14(20.90%)
Entertainment farming	3(4.48%)
Ornamentals	3(4.48%)
Timber	1(1.49%)

Source: Results from Question No. 4 of Fruit and Vegetable Marketing Survey.
Note: Respondents could have more than one enterprise unrelated to produce.
Percentage calculations are based on number of respondents, n=67.

Table 3.7. Number of Respondents Indicating Other Activities by Type of Enterprise by Sales From Produce

	Sales From Produce					
Other Enterprise	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Livestock	7(36.84%)	3(27.27%)	0(0.00%)	8(50.00%)	4(66.67%)	1(9.09%)
Tobacco	1(5.26%)	3(27.27%)	0(0.00%)	4(25.00%)	1(16.67%)	4(36.36%)
Row Crops	14(73.68%)	9(81.82%)	2(100.00%)	13(81.25%)	6(100.00%)	7(63.64%)
Ornamentals	0(0.00%)	2(18.18%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Entertainment Farming	0(0.00%)	1(9.09%)	1(50.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Timber	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 4 and 32 of Fruit and Vegetable Marketing Survey.
Note: Respondents could have more than one enterprise unrelated to produce. Percentages are based on number of respondents by sales category, n=65.

not reveal any clear pattern between non-produce enterprises and sales from produce. A variety of farm enterprises seem to be important regardless of level of sales from produce.

When the respondents were asked if they were interested in expanding produce production, the replies were almost equally divided. Nearly 51 percent wanted to expand production, while the other 49 percent were not interested in expansion. When viewed with respect to level of sales from produce, no clear pattern emerged (Table 3.8). However, it should be noted that about 68 percent of the respondents on the low end of the sales distribution were not interested in expanding produce production.

Many sources of information can be used to gain know-how on starting production of a new crop. The survey in this study contained a question for the purpose of gaining insight into the way growers acquire information for growing a new commodity. Specifically, 10 common sources of information were listed in the survey and the growers were to circle all that applied. Figure 3.1 shows that, the preferred source of information was the local Extension Service. Other growers and buyers were also very common resources. These results can also be seen in Table B.1, Appendix B.

Table 3.9 shows the categories of information sources by produce sales levels. As shown, larger produce growers tend to have a stronger relationship with buyers as a source of information. One intriguing response was the number of growers using information from the State Department of Agriculture. Over one-third of the respondents in the two largest sales classes reported using the State Department of Agriculture as a source of information, while only about 10 percent of those in the $50,000 and under sales classes used growing information from this agency. Grower organizations were also found to be important to smaller produce growers for new crop information.

Table 3.8. Number of Respondents Interested in Expanding Produce Production by Sales From Produce

	Sales From Produce					
Expansion	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	6(31.58%)	7(63.64%)	2(100.00%)	8(50.00%)	1(16.67%)	8(72.73%)
No	13(68.42%)	4(36.36%)	0(0.00%)	8(50.00%)	5(83.33%)	3(27.27%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 5 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

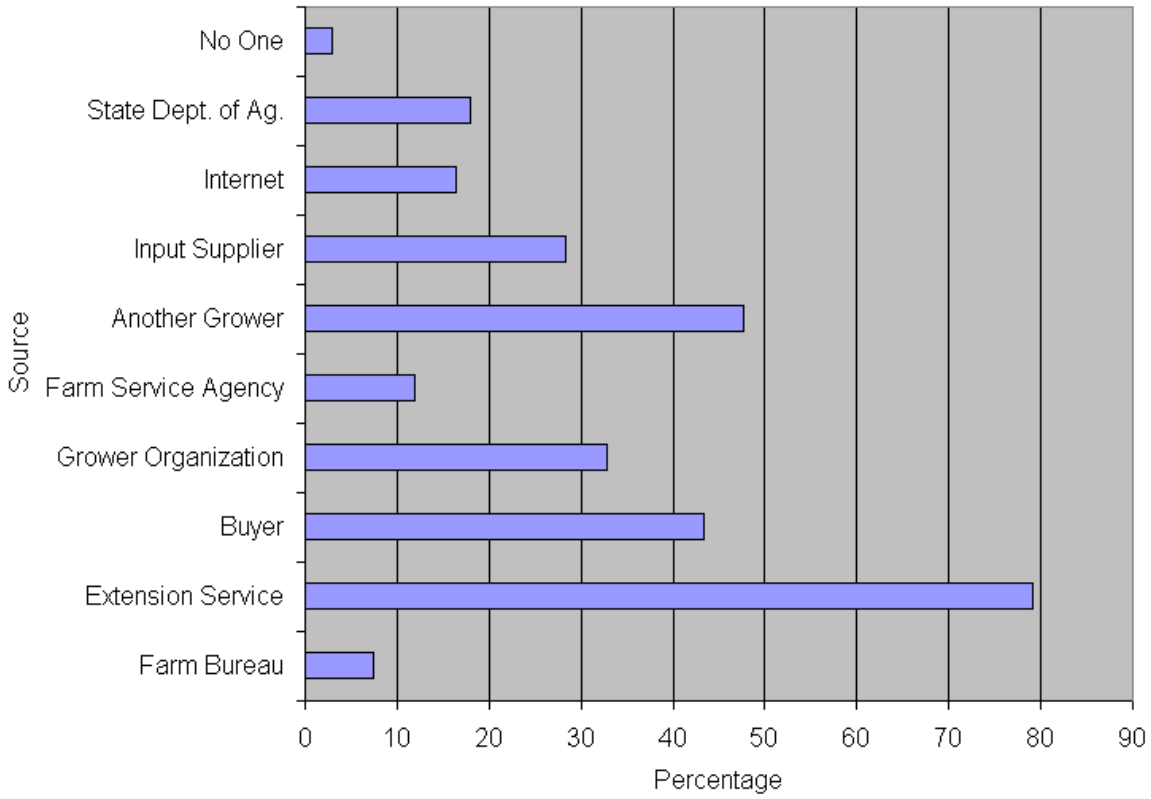

Figure 3.1 Percentage of respondents by sources of information for growing a new crop

Table 3.9. Number of Responses by Sources of Information for Growing a New Crop by Sales From Produce

	Sales From Produce					
Information Sources	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Farm Bureau	1(5.26%)	1(9.09%)	0(0.00%)	2(12.50%)	1(16.67%)	0(0.00%)
Another grower	8(42.11%)	6(54.55%)	2(100.00%)	8(50.00%)	2(33.33%)	5(45.45%)
Extension Service	16(84.21%)	8(72.73%)	1(50.00%)	14(87.50%)	4(7.84%)	8(72.73%)
Input supplier	4(21.05%)	2(18.18%)	0(0.00%)	8(50.00%)	2(33.33%)	3(27.27%)
Buyer	6(31.58%)	4(36.36%)	1(50.00%)	4(25.00%)	3(50.00%)	9(81.82%)
Internet	2(10.53%)	2(18.18%)	0(0.00%)	3(18.75%)	0(0.00%)	3(27.27%)
Grower organization	8(42.11%)	7(63.64%)	0(0.00%)	4(25.00%)	2(33.33%)	0(0.00%)
State Dept. of Ag.	2(10.53%)	1(9.09%)	0(0.00%)	3(18.75%)	2(33.33%)	4(36.36%)
Farm Service Agency	3(15.79%)	2(18.18%)	0(0.00%)	1(6.25%)	1(16.67%)	1(9.09%)
No one	1(5.26%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 6 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

A diverse array of fruit and vegetable commodities were grown by the Georgia farmers participating in this survey (Table 3.10). Cucumbers led with over 2,000 acres in production. The bulk of these were grown on five farms each having over 250 acres of cucumbers planted. Onions were second with just over 1,500 acres. Of the onion acreage, 1,200 were grown on a single farm. A number of other commodities involved several hundred acres. None of the commodities listed in Table 3.10 were grown organically.

The acreage for each crop was cross tabulated with sales from produce (Table 3.11). When examining the two lowest sales classes, under $20,000 and $20,000-$49,999, it can be seen that several crops accounted for a significant amount of production. Watermelon production totaled about 152 acres, or just over 80 percent of the total. Just over 44 percent of the total acreage of sweet corn and okra, or 113 and 16 acres, respectively, were also produced on these farms.

The largest sales category ($500,000 +) accounted for over 80 percent, or almost 10,000 acres, of total fruit and vegetable production. The production of several crops stood out among these larger farms, with well over 90 percent of the total production accounted for by this category. Peach production on these largest farms accounted for nearly 99 percent of the total, or 900 acres. Also, 95 percent of onions (1,500 acres), nearly 94 percent of cabbage (1,085 acres), and 93 percent of the bell pepper were grown by respondents in this category (Table 3.11).

Only a few growers anticipated expanding production of produce in the coming year (Table 3.12). Watermelons and blackberries were at the top of the list with 75 and 55 acres, respectively. Apparently, respondents did not see much growth potential for the produce market.

Several questions in the survey pertained to rankings of specific factors. To analyze the responses, a method depicted in Hogg and Craig (pp. 293-301) was used. A numeric example is

Table 3.10. Total Acreage Grown by Respondents by Commodity

Commodity	Acres	Commodity	Acres
Beans, Snap	673.00	Potatoes, White	9.60
Broccoli	6.00	Pumpkins	40.50
Cabbage	1,182.00	Squash, Summer	777.10
Cantaloupe	512.50	Squash, Winter	28.00
Carrots	301.00	Sweet Potatoes	0.50
Chinese Cabbage	2.00	Tomatoes	914.00
Cauliflower	62.00	Turnips	61.50
Corn, Sweet	256.00	Watermelons	188.50
Corn, Ornamental	1.00	Other Vegetables	592.10
Cucumbers	2,057.50	Apples	40.00
Eggplant	297.50	Blackberries	34.00
Greens	1,049.10	Grapes	1.00
Leaf Lettuce/Romaine	45.00	Peaches	913.50
Okra	81.00	Pears	20.00
Onions	1,580.00	Strawberries	28.00
Pepper, Bell	1,427.25	Other Fruit	1.00
Pepper, Jalapeno	65.75		

Source: Results from Question No. 7a of Fruit and Vegetable Marketing Survey.

Table 3.11. Total Acreage Grown by Respondents by Commodity by Sales From Produce

	Sales From Produce						
Commodity	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more	Total
Beans, Snap	27.00(5.07%)	28.00(5.25%)	200.00(37.52%)	43.00(8.07%)	50.00(9.38%)	185.00(34.71%)	533.00(100.00%)
Broccoli	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	6.00(100.00%)	6.00(100.00%)
Cabbage	8.00(0.69%)	15.00(1.30%)	0.00(0.00%)	34.00(2.93%)	15.00(1.30%)	1,085.00(93.78%)	1,157.00(100.0%)
Cantaloupes	16.00(3.12%)	56.50(11.02%)	0.00(0.00%)	5.00(0.98%)	10.00(1.95%)	425.00(82.93%)	512.50(100.00%)
Carrots	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	1.00(0.33%)	0.00(0.00%)	300.00(99.67%)	301.00(100.00%)
Cauliflower	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	12.00(19.35%)	0.00(0.00%)	50.00(80.65%)	62.00(100.00%)
Corn, Sweet	64.00(25.00%)	49.00(19.14%)	0.00(0.00%)	43.00(16.80%)	0.00(0.00%)	100.00(39.06%)	256.00(10.00%)
Corn, Ornamental	0.00(0.00%)	1.00(100.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	1.00(100.00%)
Cucumbers	15.00(0.73%)	0.50(0.02%)	0.00(0.00%)	17.00(0.83%)	250.00(12.15%)	1,775.00(86.27%)	2,057.50(100.00%)
Eggplant	0.00(0.00%)	0.50(0.18%)	0.00(0.00%)	0.00(0.00%)	10.00(3.63%)	265.00(96.19%)	275.50(100.00%)
Greens	1.00(0.13%)	0.00(0.00%)	0.00(0.00%)	21.10(2.74%)	0.00(0.00%)	747.00(97.13%)	769.10(100.00%)
Leaf Lettuce/Romaine	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	45.00(100.00%)	45.00(100.0%)
Okra	10.00(27.78%)	6.00(16.67%)	0.00(0.00%)	19.00(52.78%)	0.00(0.00%)	1.00(2.77%)	36.00(100.00%)
Onions	0.00(0.00%)	0.00(0.00%)	80.00(5.06%)	0.00(0.00%)	0.00(0.00%)	1,500.00(94.94%)	1,580.00(100.00%)
Pepper, Bell	35.00(2.55%)	24.25(1.77%)	0.00(0.00%)	13.00(0.94%)	30.00(2.19%)	1,270.00(92.55%)	1,372.25(100.00%)
Pepper, Jalapeno	0.00(0.00%)	1.25(2.42%)	0.00(0.00%)	0.00(0.00%)	10.00(19.32%)	40.50(78.26%)	51.75(100.00%)
Potatoes, White	0.00(0.00%)	2.50(26.04%)	0.00(0.00%)	0.10(1.04%)	0.00(0.00%)	7.00(72.92%)	9.60(100.00%)
Pumpkins	0.00(0.00%)	10.50(25.93%)	0.00(0.00%)	5.00(12.34%)	0.00(0.00%)	25.00(61.73%)	40.50(100.00%)
Squash, Summer	31.00(4.38%)	36.00(5.09%)	0.00(0.00%)	21.10(2.99%)	31.00(4.38%)	588.00(83.16%)	707.10(100.00%)
Squash, Winter	0.00(0.00%)	5.00(17.86%)	0.00(0.00%)	1.00(3.57%)	0.00(0.00%)	22.00(78.57%)	28.00(100.00%)
Sweet Potatoes	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.50(100.00%)	0.00(0.00%)	0.00(0.00%)	0.50(100.00%)
Tomatoes	0.00(0.00%)	49.00(6.11%)	0.00(0.00%)	35.00(4.37%)	195.00(24.31%)	523.00(65.21%)	802.00(100.00%)
Turnips	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.50(2.33%)	0.00(0.00%)	21.00(97.67%)	21.50(100.00%)
Watermelons	71.00(37.67%)	80.50(42.71%)	0.00(0.00%)	32.00(16.98%)	5.00(2.64%)	0.00(0.00%)	188.50(100.00%)
Other Vegetables	5.00(0.84%)	41.00(6.92%)	206.00(34.79%)	115.10(19.44%)	210.00(35.47%)	15.00(2.54%)	592.10(100.00%)
Apples	0.00(0.00%)	10.00(25.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	30.00(75.00%)	40.00(100.00%)
Blackberries	0.00(0.00%)	2.00(5.88%)	0.00(0.00%)	2.00(5.88%)	15.00(44.12%)	15.00(44.12%)	34.00(100.00%)
Grapes	1.00(100.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	1.00(100.00%)
Peaches	13.00(1.42%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.50(0.06%)	900.00(98.52%)	913.50(100.00%)
Pears	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	20.00(100.00%)	20.00(100.00%)
Strawberries	0.00(0.00%)	4.00(14.29%)	0.00(0.00%)	1.00(3.57%)	3.00(10.71%)	20.00(71.43%)	28.00(100.00%)
Other Berries	0.30(100.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.00(0.00%)	0.30(100.00%)
Other Fruit	0.00(0.00%)	0.50(50.00%)	0.00(0.00%)	0.00(0.00%)	0.50(50.00%)	0.00(0.00%)	1.00(100.00%)
Total	297.30(2.39%)	423.00(3.40%)	486.00(3.90%)	428.00(3.44%)	835.00(6.71%)	9,980.50(80.16%)	12,449.80(100.00%)

Source: Results from Questions No. 10 and 33 of Fruit and Vegetable Marketing Survey.

Table 3.12. Number of Responses for Expected Expansion of Produce Production

Commodity	No. of Responses	Anticipated Acreage
Watermelons	3.00	75.00
Blackberries	2.00	55.00
Other vegetables	2.00	92.00
Tomatoes	2.00	8.00
Cantaloupe	1.00	20.00
Cucumbers	1.00	2.00
Hot pepper	1.00	2.00
Okra	1.00	7.00
Strawberries	1.00	2.00
Sweet corn	1.00	4.00

Source: Results from Question No. 7c of Fruit and Vegetable Marketing Survey.

used to illustrate this method. Assume there are two factors to rank where three is high and one is low. Factor A receives 12 responses with a rank of three, two responses with a rank of two, and three responses with a rank of one, while factor B receives four responses with a rank of three, 12 responses with a rank of two, and one response with a rank of one. All responses with a rank of three are multiplied by three, all with a rank of two are multiplied by two, and all with a rank of one are multiplied by one. Then, all the points for factor A are added (43), all the points for factor B are added (37), and these two sums are added together yielding the total number of possible points (80). The points for each factor are divided by the total number of possible points, resulting in a percentage for each factor indicating which is more important, e.g., factor A, (43/80)*100=53.75 percent, and factor B, (37/80)*100=46.25 percent.

Expanding a produce operation can prove difficult. Many factors influence a grower's ability to expand. Several of these can be seen in Table 3.13. Prices received were professed as the most limiting factor to produce operation expansion, followed closely by harvest labor availability, market outlets, weather, and labor management.

Table 3.14 allows examination of these factors in relation to sales from produce. On the smaller operations (under $20,000) prices, weather, and market outlets were identified as the most limiting factors for production expansion. On farms having sales from $20,000 to $49,999, the most limiting factors were harvest labor, prices, and weather. On farms with sales of $50,000 to $99,999, both price and credit availability were tied as the most limiting factors while market outlets and harvest labor tied for third. On the larger farms ($100,000-$249,999) prices, weather, and harvest labor were the most limiting, while market outlets, prices, and harvest labor were the most limiting on farms with sales between $250,000 and $499,999. On the largest farms

Table 3.13. Factors Most Limiting to Expansion of Produce Operation

Factor	Frequency (%)
Prices received	9.08
Harvest labor availability	8.58
Market outlets	8.45
Weather	8.24
Labor management	7.79
Land	6.38
Disease control	6.34
Credit availability	6.21
Irrigation	6.17
Transportation	6.17
Equipment	5.63
Labor housing	5.59
Cooling	5.59
Pest control	4.97
Other	4.81
Total	100.00

Source: Results from Question No. 8 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

Table 3.14. Factors Most Limiting to Expansion of Produce Operation by Sales From Produce

	Sales From Produce					
Factor	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Land	6.17%	6.25%	6.41%	5.76%	4.85%	8.37%
Labor management	7.49%	5.05%	6.41%	7.90%	6.31%	6.81%
Harvest labor availability	8.22%	10.82%	8.97%	8.55%	8.25%	9.42%
Credit availability	5.43%	5.53%	10.26%	5.59%	5.34%	8.64%
Equipment	6.17%	6.01%	5.13%	5.59%	5.83%	4.45%
Pest control	4.55%	4.33%	3.85%	5.59%	5.34%	5.50%
Prices received	10.43%	9.85%	10.26%	9.38%	10.68%	9.42%
Market outlets	8.96%	7.45%	8.97%	8.06%	10.68%	7.33%
Weather	9.10%	8.17%	7.68%	8.55%	7.28%	7.33%
Irrigation	7.20%	6.49%	3.85%	5.92%	4.85%	5.24%
Disease control	6.46%	6.49%	5.13%	5.92%	4.37%	6.81%
Transportation	6.75%	7.21%	5.13%	6.25%	6.31%	4.19%
Cooling	4.41%	5.53%	5.13%	6.74%	6.31%	5.76%
Labor housing	3.37%	5.77%	6.41%	5.92%	7.77%	7.07%
Other	5.29%	5.05%	6.41%	4.28%	5.83%	3.66%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Results from Questions No. 8 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

($500,000 +) prices, harvest labor, and credit availability were the top three limiting factors to expanding production of fruits and vegetables.

Across the board, prices, market outlets, weather, and harvest labor availability appear to be the primary factors limiting expansion. However, for the larger operations, land, labor housing, and credit rationing seem to be just as important as limiting factors (Table 3.14).

The Hogg and Craig method (pp. 293-301) was also used to evaluate the usefulness of sources of information used in the produce operation (Table 3.15). The farmers surveyed indicated almost 25 percent of the time that the most useful source of information was area Extension agents. This was followed by input suppliers with over 18 percent, University research branch stations with 17.6 percent, and marketing programs of the State Department of Agriculture with 15.8 percent (Table 3.15). Table 3.16 shows a cross tabulation of these sources with sales from produce. As can be seen, University information sources, input suppliers, and programs of the State Department of Agriculture, for the most part, remained important across the board.

The producer was asked about participation in certain activities thought to be linked to productive and efficient operations. All activities received a response level in excess of 40 percent, with trade shows, grower organizations, new varieties, and market news publications receiving response levels in excess of 60 percent (Table 3.17). Table 3.18 shows these activities with respect to sales from produce. The results show that as sales increased, participation rates for attending trade shows, trying new varieties, and practicing integrated pest management (IPM) increased markedly.

Several market outlets are possible for produce (Table 3.19). The respondents were asked the breakdown in percentage terms of their produce sales by each outlet. An overall

Table 3.15. Most Useful Information Sources for Produce Operation

Source	Frequency (%)
University Extension/Area agents	24.34
Input suppliers	18.35
University research branch station	17.59
State Dept. of Ag. Marketing programs	15.80
State Dept. of Ag. Regulatory programs	11.96
Farm Credit Service	11.96
Total	100.00

Source: Results from Question No. 9 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

Table 3.16. Most Useful Information Sources for Produce Operation by Sales From Produce

Source	Sales From Produce					
	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
University research branch station	17.03%	18.23%	22.58%	17.58%	19.82%	16.17%
University Extension/Area agents	24.46%	23.64%	25.82%	24.54%	17.92%	22.22%
State Dept. of Ag. marketing programs	16.72%	15.27%	12.90%	14.29%	16.98%	18.18%
State Dept. of Ag. regulatory programs	11.76%	12.32%	12.90%	12.45%	12.26%	12.12%
Farm Credit Service	12.69%	11.82%	12.90%	13.19%	9.44%	11.11%
Input suppliers	17.34%	18.72%	12.90%	17.95%	23.58%	20.20%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Results from Questions No. 9 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

Table 3.17. Number of Responses by Farm Related Activity

Activity	Frequency
Attend trade shows	45(67.16%)
Try new varieties	44(65.67%)
Participate in grower organizations	41(61.19%)
Receive market news publications	41(61.19%)
Attend field days	30(44.78%)
Practice IPM[a]	27(40.30%)

Source: Results from Question No. 10 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.
[a] IPM - Integrated Pest Management

Table 3.18. Number of Responses by Farm Related Activity by Sales From Produce

	Sales From Produce					
Activity	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Attend trade shows	11(57.89%)	6(54.55%)	2(100.00%)	11(68.75%)	3(50.00%)	10(90.91%)
Participate in grower organizations	9(47.37%)	7(63.64%)	2(100.00%)	11(68.75%)	4(66.67%)	6(54.55%)
Try new varieties	8(42.11%)	6(54.55%)	2(100.00%)	11(68.75%)	6(100.00%)	10(90.91%)
Receive market news publications	8(42.11%)	8(72.72%)	1(50.00%)	8(50.00%)	5(83.33%)	10(90.91%)
Attend field days	6(31.58%)	6(54.55%)	1(50.00%)	7(43.75%)	4(66.67%)	5(45.45%)
Practice IPM[a]	5(26.32%)	3(27.27%)	0(0.00%)	5(31.25%)	4(66.67%)	8(72.72%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 10 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.
[a] IPM - Integrated Pest Management

Table 3.19. Average Percentage of Produce Sales by Outlet for all Respondents

Outlet	Percentage
Direct markets	43.41
Wholesale (non-cooperative) market	21.78
Direct to retailers	10.01
Shipper/packer	9.04
Processor	7.01
Cooperative/marketing association	5.17
Community supported agriculture[a]	2.47
Direct to local restaurants	1.06
Internet	0.03
Auctions	0.02
Total	100.00

Source: Results from Question No. 11 of Fruit and Vegetable Marketing Survey.
Note: All answers were added together and an average was computed. Percentage calculations are based on number of respondents, n=63.
[a] Community supported agriculture offers members a share, or subscription, in the produce of participating farms. Members pay an annual fee and in return receive a mixed box of produce throughout the growing season.

average was computed for each outlet. The sample size for this question was 63 because four respondents either answered the question incorrectly or not at all. Direct markets were the most common outlet with nearly 44 percent. Direct markets include outlets such as farmers' markets, roadside stands, and pick-your-own operations where the commodity is sold directly to the consumer. The wholesale market was the second most common outlet with 22 percent. Sales direct to retailers were next with 10 percent. Retailers include outlets such as supermarkets and grocery stores.

In Table 3.20 these market outlets are viewed in conjunction with sales from produce. In the under $20,000 class, two-thirds of all sales were to direct-market outlets. This is reasonable since these outlets have traditionally been used by small volume producers as a convenient way to sell produce (Stegelin, Strang, and Weckman). As sales from produce increased, a pattern became evident. Sales to the direct market had an inverse relationship with sales class: as sales increased, the percentage of sales to the direct market decreased. For the largest growers ($500,000 +) only 10.5 percent of total sales were to the direct market, while 37 and 29 percent went directly to retail chains and wholesale markets, respectively.

A number of barriers exist that influence the ability of growers to sell produce to the wholesale market. A survey question specifically asked, "If you only direct market, what do you feel are the barriers to shifting completely to wholesaling?" Only the 16 respondents that sold 100 percent of their produce through direct markets were eligible to answer this question. The frequencies of barriers to shifting to the wholesale market are shown in Table 3.21. Insufficient volume had the most response with 13 out of 16 respondents or just over 81 percent. Next was the perceived lower price received from wholesalers, with 12 out of 16 respondents or 75 percent, followed by access to wholesalers with nine out of 16 respondents or just over 56

Table 3.20. Average Percentage of Produce Sales by Outlet for all Respondents by Sales From Produce

	Sales From Produce					
Outlet	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Direct markets	65.58%	49.00%	17.50%	45.31%	29.17%	10.50%
Direct to retailers	4.71%	4.00%	37.50%	3.44%	1.67%	37.10%
Cooperative/marketing association	7.65%	7.00%	0.00%	7.81%	0.00%	0.00%
Wholesale (non-cooperative) market	13.82%	30.00%	20.00%	19.06%	15.00%	29.20%
Processor	5.88%	0.50%	5.00%	7.50%	30.83%	2.20%
Direct to local restaurants	0.00%	0.50%	0.00%	1.88%	3.33%	1.10%
Internet	0.00%	0.00%	0.00%	0.00%	0.00%	0.20%
Shipper/packer	1.77%	9.00%	10.00%	12.50%	20.00%	11.00%
Community supported agriculture[a]	0.53%	0.00%	10.00%	2.50%	0.00%	8.70%
Auctions	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Results from Questions No. 11 and 32 of Fruit and Vegetable Marketing Survey.
[a] Community supported agriculture offers members a share, or subscription, in the produce of participating farms. Members pay an annual fee and in return receive a mixed box of produce throughout the growing season.

Table 3.21. Number of Responses by Barriers to Shifting Completely to Wholesaler

Barrier	Frequency
Volume too small	13(81.25%)
Lower price	12(75.00%)
Access to wholesalers	9(56.25%)
Shipper/packer fees too high	7(43.75%)
High brokerage fees	7(43.75%)
Grading and packaging requirements	6(37.5%)
Time delay in receiving payment	6(37.5%)
Cooling requirements	2(12.5%)

Source: Results from Question No. 12 of Fruit and Vegetable Marketing Survey.
Note: Only those growers that had 100% of sales to direct markets were eligible to answer. Multiple responses were possible, n=16.

percent, and excessive brokerage and shipper/packer fees with seven out of 16 or nearly 44 percent each.

In Table 3.22 these results are cross-tabulated with sales from produce. Of the 16 growers eligible to answer this question, 10 listed their sales from produce as being under $20,000. This was expected, as direct markets are more commonly used by smaller producers (Stegelin, Strang, and Weckman). One response each came from the $20,000 to $49,999 and $250,000 to $499,999 categories. Four responses came from the $100,000 to $249,999 class. As expected, the largest category ($500,000 +) had no respondents that sold all produce through a direct-market outlet. Such producers use the more sophisticated outlets to the national distribution system.

Occasionally, farmers use various services to aid in employment practices. A couple of questions in the survey dealt with whether the respondents used a service to find workers for hire. The overwhelming response was no, with over 83 percent not using such a service. Table 3.23 shows the responses by produce sales level. Producers in the under $20,000 sales class had the lowest response level with only one out of 19 growers using a hiring service. The highest sales class ($500,000 +) had the highest response level with 36 percent using such a service.

With computers and the internet becoming more commonplace in everyday life, farming operations are becoming more dependent on this technology. As evident in Table 3.24, almost eight of every 10 of those surveyed owned a computer. Only two sales categories had response levels of less than 80 percent for owning a computer (Table 3.25). Even in these two cases, over two-thirds of the respondents owned a computer.

Of the 53 respondents having a computer, only one did not have internet access (Table 3.24). The internet can be used for many purposes, including finding information, buying inputs,

Table 3.22. Number of Responses by Barriers to Shifting Completely to Wholesaler by Sales From Produce

	Sales From Produce					
Barrier	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Lower price	5(50.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Access to wholesalers	1(10.00%)	0(0.00%)	0(0.00%)	1(25.00%)	0(0.00%)	0(0.00%)
Volume too small	5(50.00%)	0(0.00%)	0(0.00%)	2(50.00%)	1(100.00%)	0(0.00%)
Cooling requirements	1(10.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Grading and packaging requirements	1(10.00%)	1(100.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Shipper/packer fees too high	1(10.00%)	1(100.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
High brokerage fees	0(0.00%)	0(0.00%)	0(0.00%)	1(25.00%)	0(0.00%)	0(0.00%)
Respondents	10	1	0	4	1	0

Source: Results from Questions No. 12 and 32 of Fruit and Vegetable Marketing Survey.
Note: Only those growers that had 100% of sales to direct markets were eligible to answer. Multiple responses were possible, n=16.

Table 3.23. Number of Respondents Using a Service to Find Workers for Hire by Sales From Produce

	Sales From Produce					
Workers for Hire Service	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	1(5.26%)	2(18.18%)	0(0.00%)	3(18.75%)	1(16.67%)	4(36.36%)
No	18(94.74%)	9(81.82%)	2(100.00%)	13(81.25%)	5(83.33%)	7(63.64%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 13 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.24. Number of Respondents Having a Computer and Internet Access

Factor	Frequency
Computer	53(79.10%)[a]
Internet Access	52(98.11%)[b]

Source: Results from Questions No. 14 and 15 of Fruit and Vegetable Marketing Survey.

[a] Percentage based on number of respondents, n=67.

[b] Percentage based on number of respondents that have a computer, n=53.

Table 3.25. Number of Respondents by Computer Ownership by Sales From Produce

	Sales From Produce					
Own Computer	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	13(68.42%)	9(81.82%)	2(100.00%)	11(68.75%)	5(83.33%)	11(100.00%)
No	6(31.58%)	2(18.18%)	0(0.00%)	5(31.25%)	1(16.67%)	0(0.00%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 14 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

and selling commodities. Clearly, the most common use of the internet was for finding information (Table 3.26). Almost 85 percent of respondents used the internet for this purpose. Some 21 percent used the internet for buying inputs, and just over 19 percent sold produce on-line. In Table 3.27 one can see that using the internet for finding information is consistent across the board. Further, no pattern seems to exist between the level of sales from produce and the use of the internet for sales of produce and buying inputs. Use of the internet does not appear to differ by size of operation. The internet seems to be an avenue open to all, regardless of size.

Changes expected in farming operations in the coming year were addressed (Table 3.28). The majority of the respondents indicated that no changes were expected to be made. Some 19 growers, or just over 28 percent, responded that they expected a decrease in direct marketing. There were 16 growers, or nearly 24 percent, who expected a decrease in value-added processing. Examples of value-added products include Vidalia onion relish and salad dressings, peach hot sauce and salsa, and blueberry balsamic vinegar. Wholesale/broker marketing was expected to increase the most with nearly a 13.5 percent response level.

Table 3.29 shows the responses regarding expected decreases in selected farm operations in the next year by sales from produce. Only responses for decreases are included here because so few growers indicated an expected increase in operations. As sales increased, the percentage of respondents expecting a decrease in direct marketing tended to increase. Just over 36 percent with $500,000 or more in sales expected a decrease in direct marketing, as opposed to only 10.5 percent for the under $20,000 category. The smallest sales level (under $20,000) had three out of 19 respondents (nearly 16 percent) expecting to decrease value-added operations in the coming year. The response was even more noticeable in three of the five larger sales categories.

Table 3.26. Number of Responses by Various Uses of the Internet

Use	Frequency
Finding information	44(84.62%)
Buying inputs	11(21.15%)
Selling	10(19.23%)

Source: Results from Question No. 16 of Fruit and Vegetable Marketing Survey.
Note: Only those answering "yes" to question 15 (internet access) were eligible to answer, n=52. Multiple responses were possible.

Table 3.27. Number of Responses by Various Uses of the Internet by Sales From Produce

	Sales From Produce					
Use	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Selling	3(23.08%)	3(37.50%)	0(0.00%)	0(0.00%)	2(40.00%)	2(18.18%)
Buying inputs	3(23.08%)	0(0.00%)	0(0.00%)	2(18.18%)	2(40.00%)	4(36.36%)
Finding Information	11(84.62%)	8(100.00%)	2(100.00%)	8(72.73%)	3(60.00%)	10(90.91%)
Respondents	13	8	2	11	5	11

Source: Results from Questions No. 16 and 32 of Fruit and Vegetable Marketing Survey.
Note: Only those answering "yes" to question 15 (internet access) were eligible to answer, n=50. Multiple responses were possible.

Table 3.28. Number of Responses by Expected Change in Farming Operation

	Frequency		
Operation	Increase	Stay the Same	Decrease
Direct marketing	2(2.99%)	46(68.66%)	19(28.36%)
Wholesale/broker marketing	9(13.43%)	52(77.61%)	6(8.96%)
Value-added/processing[a]	1(1.49%)	50(74.63%)	16(23.88%)
Participation in cooperatives	2(2.99%)	59(88.06%)	6(8.96%)
Use of irrigation	2(2.99%)	56(83.58%)	9(13.43%)
Branding	1(1.49%)	62(92.54%)	4(5.97%)
Traceback (tracking from retail to field)	1(1.49%)	62(92.54%)	4(5.97%)
Crops	1(1.49%)	59(88.06%)	7(10.45%)
On-farm cooling	1(1.49%)	58(86.57%)	8(11.94%)
On-farm packing/grading	1(1.49%)	60(89.55%)	6(8.96%)

Source: Results from Question No. 17 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.
[a] Value-added is the process of converting agricultural outputs into products of greater value, e.g., relish and salad dressings from Vidalia onions, cider, hot sauce, and salsa from peaches, and balsamic vinegar and preserves from blueberries.

Table 3.29. Number of Responses by Expected Decrease in Selected Farm Operations by Sales From Produce

	Sales From Produce					
Operation	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Direct marketing	2(10.53%)	3(27.27%)	0(0.00%)	7(43.75%)	3(50.00%)	4(36.36%)
Wholesale/broker marketing	1(5.26%)	1(9.09%)	0(0.00%)	1(6.25%)	1(16.67%)	2(18.18%)
Value-added/processing[a]	3(15.79%)	4(36.36%)	0(0.00%)	5(31.25%)	0(0.00%)	4(36.36%)
Participation in cooperatives	1(5.26%)	2(18.18%)	0(0.00%)	3(18.75%)	0(0.00%)	0(0.00%)
Use of irrigation	3(15.79%)	1(9.09%)	0(0.00%)	1(6.25%)	1(16.67%)	2(18.18%)
Branding	0(0.00%)	0(0.00%)	0(0.00%)	2(12.50%)	0(0.00%)	2(18.18%)
Traceback	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	4(36.36%)
Crops	1(5.26%)	2(18.18%)	0(0.00%)	2(12.50%)	2(33.33%)	0(0.00%)
On-farm cooling	2(10.53%)	1(9.09%)	0(0.00%)	2(12.50%)	1(16.67%)	2(18.18%)
On-farm packing/grading	0(0.00%)	1(9.09%)	0(0.00%)	1(6.25%)	2(33.33%)	2(18.18%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 17 and 32 of Fruit and Vegetable Marketing Survey.

Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

[a] Value-added is the process of converting agricultural outputs into products of greater value, e.g. Vidalia onions – relish and salad dressing; peaches – cider, hot sauce, and salsa; blueberries – balsamic vinegar and preserves.

The next question in the survey pertained to the relevant factors in deciding what to grow (Table 3.30). Of the eight factors, experience was the overwhelming top response (nearly 80 percent) by survey participants. Profit potential and production expertise were next with 39 responses or just over 58 percent each. Market access and price followed with nearly 54 percent and 45 percent, respectively. Examination of important factors in deciding what to grow in conjunction with sales from produce revealed some unexpected findings (Table 3.31). In the under $20,000 group, only five of 19 respondents, approximately 26 percent, answered that market access was a factor in deciding what to grow, which is different than expected. In the past, small volume growers have faced serious market barriers to entry. Apparently, when deciding what to grow, little consideration is given to breaking into the national distribution system via wholesale/broker marketing or direct sales to retail chains. Small producers, for the most part, seem to be focused on direct marketing – a marketing outlet rather easily accessed but limited in sales potential.

Another interesting factor was perceived risk. From this perspective the largest sales class stood out from the rest. Nearly 64 percent of respondents in this category indicated that risk was a deciding factor. No other sales class had a response level of more than 27 percent. Large producers likely have more to lose than small producers, and thus have a greater incentive to consider the risk factor (Table 3.31).

During the process of considering the production of a new crop, an important concern is marketing. Table 3.32 gives several potential sources of information on marketing produce. The most frequently indicated source was a broker/wholesaler with over 71 percent of those surveyed responding accordingly. Some 48 percent denoted the Extension Service as a

Table 3.30. Number of Responses by Factor Used in Deciding What to Grow

Factor	Frequency
Experience	53(79.10%)
Profit potential	39(58.21%)
Production expertise	39(58.21%)
Market access	36(53.73%)
Price	30(44.78%)
Labor timing/availability	28(41.79%)
Risk	16(23.88%)
Equipment needs	16(23.88%)

Source: Results from Question No. 18 of Fruit and Vegetable Marketing Survey.

Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.

Table 3.31. Number of Responses by Factor Used in Deciding What to Grow by Sales From Produce

	Sales From Produce					
Factor	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Experience	13(68.42%)	8(72.72%)	2(100.00%)	14(87.50%)	6(100.00%)	8(72.72%)
Production expertise	9(47.37%)	7(63.64%)	2(100.00%)	11(68.75%)	4(66.67%)	5(45.45%)
Market access	5(26.32%)	7(63.64%)	2(100.00%)	9(56.25%)	4(66.67%)	8(72.72%)
Labor timing/availability	7(36.84%)	4(36.36%)	1(50.00%)	7(43.75%)	3(50.00%)	5(45.45%)
Risk	2(10.53%)	3(27.27%)	0(0.00%)	3(18.75%)	1(16.67%)	7(63.64%)
Price	4(21.05%)	6(54.55%)	1(50.00%)	9(56.25%)	3(50.00%)	6(54.55%)
Profit potential	10(52.63%)	8(72.72%)	1(50.00%)	10(62.50%)	2(33.33%)	7(63.64%)
Equipment needs	5(26.32%)	1(9.09%)	1(50.00%)	2(12.50%)	3(50.00%)	3(27.27%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 18 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

Table 3.32. Number of Responses by Potential Source of Marketing Information for a New Crop

Source	Frequency
Broker/wholesaler	48(71.64%)
Extension Service	32(47.76%)
Another grower	25(37.31%)
Grower organization	19(28.36%)
Cooperative	8(11.94%)
State Department of Ag.	7(10.45%)
Input Supplier	7(10.45%)
No One	4(5.97%)
Farm Bureau	2(2.99%)

Source: Results from Question No. 19 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.

source of marketing information. Over 37 percent identified another grower as a source, and over 28 percent indicated a grower organization as a source of marketing information. Note that the responses here do not indicate actual usage of these sources of marketing information. The responses simply indicate perceived value of such sources.

Table 3.33 provides a cross tabulation of marketing information sources for a new crop by sales from produce. As expected, response levels were greater for the broker/wholesaler source, ranging from almost 53 percent for the under $20,000 class, to over 72 percent for all other classes. The Extension Service was also perceived to be an important source of marketing information, with response levels of 50 percent or above for all sales classes except the largest. Other sources of marketing information perceived to be important for the under $20,000 sales class were other growers and grower organizations with response levels of almost 37 percent and over 47 percent, respectively. Other growers were also considered important as sources of information for larger producers ($100,000-$499,999) with response levels of 50 percent and higher.

Respondents were asked to rate the importance of several factors when contemplating growing a new crop. The Hogg and Craig method (pp. 293-301) was again used to compile the results. Table 3.34 shows that the buyer-seller relationship was the most important factor when considering a new crop, followed closely by market location and meeting buyer standards.

Table 3.35 shows that the most important factors for smaller produce growers when considering a new crop were market location and transportation, which are important considerations for direct marketing and movement of produce from the field to a packing operation. Transitioning from smaller to larger producers, these factors became less important, while factors such as buyer-seller relationships, meeting buyer standards, and grading became

Table 3.33. Number of Responses by Potential Source of Marketing Information for a New Crop by Sales From Produce

	Sales From Produce					
Source	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Farm Bureau	1(5.26%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Another grower	7(36.84%)	3(27.27%)	2(100.00%)	9(56.25%)	3(50.00%)	1(9.09%)
Extension Service	10(52.63%)	6(54.55%)	1(50.00%)	9(56.25%)	4(66.67%)	2(18.18%)
Input supplier	1(5.26%)	2(18.18%)	0(0.00%)	1(6.25%)	2(33.33%)	1(9.09%)
Broker/wholesaler	10(52.63%)	8(72.72%)	2(100.00%)	13(81.25%)	4(66.67%)	9(81.81%)
Grower organization	9(47.37%)	4(36.36%)	0(0.00%)	3(18.75%)	2(33.33%)	1(9.09%)
State Dept. of Ag.	1(5.26%)	0(0.00%)	0(0.00%)	3(18.75%)	0(0.00%)	3(27.27%)
Cooperative	2(10.53%)	3(27.27%)	0(0.00%)	2(12.50%)	1(16.67%)	0(0.00%)
No one	3(15.79%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 19 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

Table 3.34. Most Important Factors When Considering a New Produce Crop

Factor	Frequency (%)
Buyer-seller relationship	10.91
Market location	10.53
Meeting buyer standards	10.49
Volume requirements	9.98
Grading	9.56
Transportation	9.48
Broker/packer fees	9.18
Cooling	8.85
Contracting	8.68
Insurance	8.00
Other	4.34
Total	100.00

Source: Results from Question No. 20 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

Table 3.35. Most Important Factors When Considering a New Produce Crop by Sales From Produce

	Sales From Produce					
Factor	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Contracting	8.34	10.19	9.23	9.18	7.88	7.58
Broker/packer fees	9.15	9.95	10.77	8.85	9.96	7.58
Market location	11.24	12.09	10.77	10.31	9.96	8.99
Grading	8.67	8.77	7.69	10.15	9.54	10.39
Cooling	9.47	6.87	7.69	9.18	9.13	10.11
Volume requirements	9.47	11.14	9.23	9.66	9.96	9.27
Buyer-seller relationship	9.79	10.19	12.31	11.59	9.54	12.92
Transportation	10.59	10.66	9.23	8.21	10.37	8.43
Meeting buyer standards	9.63	9.95	9.23	10.79	10.79	11.80
Insurance	8.67	7.35	7.69	7.41	8.71	8.71
Other	4.98	2.84	6.16	4.67	4.16	4.22
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Results from Questions No. 20 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages were calculated using the method of Hogg and Craig (pp. 293-301).

more important. Such factors are of paramount importance for accessing the national distribution system via selling to wholesalers, through brokers, and to retail chains.

Whether or not a respondent was a grower-shipper and/or packed produce was addressed in the survey. Figure 3.2 shows that over 41 percent of the respondents considered themselves grower-shippers while over 72 percent packed produce for shipment or direct marketing.

When considering the grower-shipper question by sales class, substantial disparity was evident in the proportion of grower-shippers (Table 3.36). In the $500,000 and above class, over 90 percent of those surveyed considered themselves grower-shippers. However, in the under $20,000 class only one out of 19 considered themselves a grower-shipper. These results were expected because grower-shippers are typically larger, more complex operations tied into the national distribution system.

Over 72 percent of the respondents indicated packing produce which can be construed as anything from simply placing produce items in containers for transport to local markets to grading and packing for shipment to the national market (Figure 3.2). At the low end of the sales range, over 52 percent of those surveyed responded that they did not pack produce (Table 3.37). This was as expected as smaller producers using direct marketing outlets are typically able to forego the grading and packing operation.

Marketing through a broker or to a wholesaler is a doorway to the vast national produce distribution system. Some 35 of the respondents were identified as not using brokers or wholesalers. These respondents were asked why they did not or could not use these intermediaries as market outlets (Table 3.38). Of the 35 eligible, only 13 responded to this question. The top three reasons cited were the level of fees (about 77 percent of respondents), volume requirements (over 46 percent), and payment practices (about 38.5 percent). Fees were

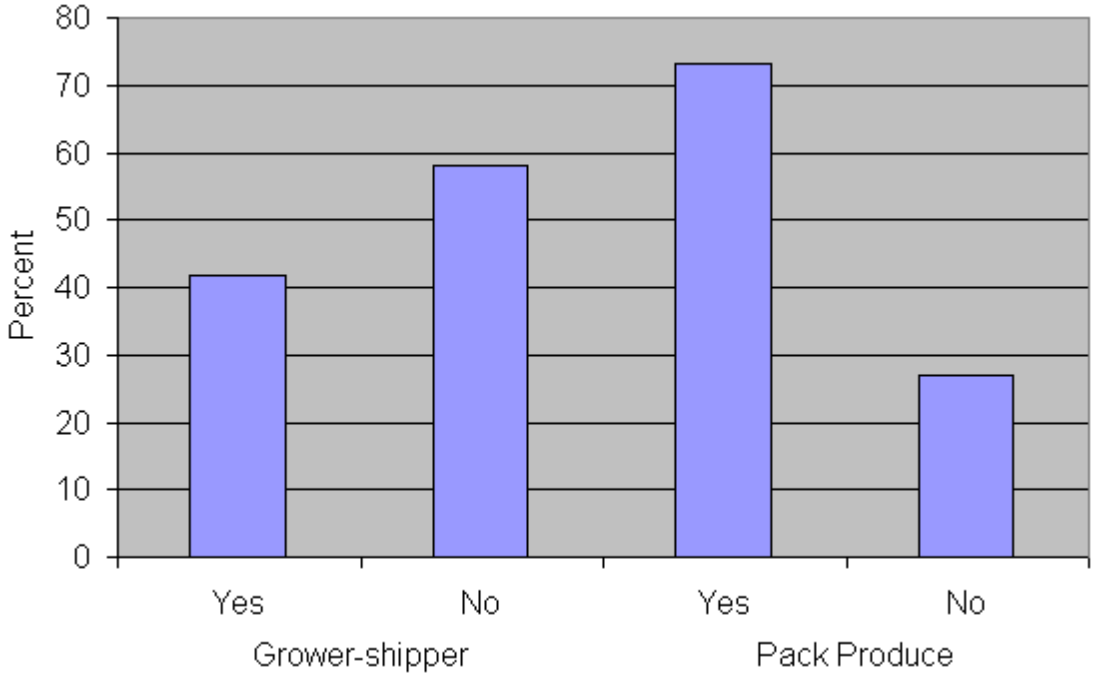

Figure 3.2 Percentage of respondents who are grower/shippers and/or pack produce

Table 3.36. Number of Respondents Who Are Grower-Shippers by Sales From Produce

	Sales From Produce					
Grower-Shipper	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	1(5.26%)	6(54.55%)	2(100.00%)	5(31.25%)	3(50.00%)	10(90.91%)
No	18(94.74%)	5(45.45%)	0(0.00%)	11(68.75%)	3(50.00%)	1(9.09%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 21 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.37. Number of Respondents Who Pack Produce by Sales From Produce

	Sales From Produce					
Pack Produce	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	9(47.37%)	7(63.64%)	2(100.00%)	12(75.00%)	6(100.00%)	11(100.00%)
No	10(52.63%)	4(36.36%)	0(0.00%)	4(25.00%)	0(0.00%)	0(0.00%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 22 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.38. Number of Responses by Reason for Not Using a Broker or Wholesaler

Reason	Frequency
Fees	10(76.92%)
Volume requirements	6(46.15%)
Payment practices	5(38.46%)
Broker availability	2(15.39%)
Grading	2(15.39%)
Precooling	1(7.69%)

Source: Results from Question No. 23 of Fruit and Vegetable Marketing Survey.
Note: Only respondents who did not use a broker or wholesaler to sell produce were eligible to answer, n=13. Each respondent was asked to choose two reasons.

found to be prohibitive across the spectrum of sales classes (Table 3.39). Large well established producers can bypass high brokerage fees by selling directly to retail chains while small producers cannot. Volume requirements were found to be prohibitive for the smaller producers, as was expected. Payment practices were found to be problematic to some degree across virtually all sales classes. Payment practices can vary widely, sometimes involving payment delays substantially longer than a month. In some cases, truckload lots of produce can be rejected at the destination because of quality disputes resulting in a total loss plus shipping charges to the producer.

One of the questions in the survey was designed to determine the extent of outsourcing of produce marketing activities. Possible activities for outsourcing were selling, grading, packing, and cooling. As can be seen in Table 3.40, outsourcing was fairly negligible except perhaps for the selling activity with a response level of almost 24 percent of those surveyed. Table 3.41 shows that most of the outsourcing of the selling function was by producers in the $500,000 or more sales class – over 63 percent of the largest producers outsourced the selling activity.

Outsourcing of the selling function could occur in different ways. Some growers may use brokerage firms to sell their produce. Other growers may be tied to packing operations by various forms of ownership or through alliances by agreement where the packing operation may have employees or owners who sell produce to wholesalers and/or retail chains. Other packing operations may outsource the selling activity to a brokerage firm. Put simply, outsourcing of the selling function in the produce business may occur in a variety of ways.

The breadth of the different types of post-harvest equipment used in a produce operation is an indicator of the marketing sophistication of the grower. Table 3.42 shows the frequency distribution of survey responses by type of post-harvest equipment employed. The 10 different

Table 3.39. Number of Responses by Reason for Not Using a Broker or Wholesaler by Sales From Produce

	Sales From Produce					
Reason	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Volume requirements	6(75.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Fees	6(75.00%)	1(100.00%)	1(100.00%)	1(50.00%)	1(100.00%)	0(0.00%)
Grading	1(12.50%)	1(100.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Precooling	1(12.50%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Payment practices	2(25.00%)	0(0.00%)	1(100.00%)	2(100.00%)	1(100.00%)	0(0.00%)
Broker availability	0(0.00%)	0(0.00%)	0(0.00%)	1(50.00%)	0(0.00%)	0(0.00%)
Respondents	8	1	1	2	1	0

Source: Results from Questions No. 23 and 32 of Fruit and Vegetable Marketing Survey.
Note: Only respondents who did not use a broker or wholesaler to sell produce were eligible to answer. Each respondent was asked to choose two reasons, n=13.

Table 3.40. Number of Respondents Who Outsource Marketing Activities by Type of Activity

Activity	Frequency
Sell	16(23.88%)
Grade	6(8.96%)
Pack	6(8.96%)
Cool	2(2.99%)

Source: Results from Question No. 24 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67.

Table 3.41. Number of Respondents Who Outsource Marketing Activities by Type of Activity by Sales From Produce

	Sales From Produce					
Payment Activity	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Grade	2(10.53%)	2(18.18%)	0(0.00%)	0(0.00%)	1(16.67%)	1(9.09%)
Pack	2(10.53%)	2(18.18%)	0(0.00%)	0(0.00%)	1(16.67%)	1(9.09%)
Cool	0(0.00%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	1(9.09%)
Sell	1(5.26%)	4(36.36%)	0(0.00%)	3(18.75%)	1(16.67%)	7(63.64%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 24 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.42. Number of Responses by Type of Post-harvest Equipment Used

Equipment	Frequency
Boxes	38(56.72%)
Sorting tables	34(50.75%)
Washing equipment	29(43.28%)
On-farm processing	20(29.85%)
Holding coolers	18(26.87%)
Precoolers/Quick-coolers	18(26.87%)
Sizers	14(20.90%)
Retail Packing	14(20.90%)
PLU labels	11(16.42%)
Branding	8(11.94%)

Source: Results from Question No. 25 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.

types of post-harvest equipment were arrayed in descending order according to response level, ranging from the use of packing boxes to branding. The top three types of post-harvest equipment used were boxes, sorting tables, and washing equipment with about 57 percent, 51 percent, and 43 percent of the responses, respectively. For the under $20,000 sales class, the most common responses were for boxes and sorting tables with about 37 percent and 32 percent of the responses, respectively (Table 3.43). In general, the response level for the use of almost all types of post-harvest equipment increased with higher levels of sales, as expected. On-farm processing aside, response levels ranged from about 45 percent for branding to 100 percent for boxes for the highest sales class. The response level for on-farm processing was highest in the middle sales classes, ranging from 36 percent to 100 percent. Common examples of processed products are salad dressings made from Vidalia onions and hot sauces made from peaches.

Those surveyed were asked about the commodities they thought would have increasing and decreasing market opportunities. Responses were nil for decreasing market opportunities over the next five years. There were a few responses for increasing market opportunities (Table 3.44). Berries were believed to have the most potential for increasing market opportunities. Other berries, excluding strawberries, had nine responses followed by strawberries with seven responses. The other vegetables category received five responses, followed by snap beans, summer squash, and tomatoes with four responses each.

Table 3.45 shows market opportunity responses by sales from produce. No clear pattern emerged. There seems to be no clear pattern regarding increased market opportunities across sales class for any one commodity. The commodities that appear to have received the widest interest across sales class were berries – strawberries and other berries such as blueberries and raspberries.

Table 3.43. Number of Responses by Type of Post-harvest Equipment Used by Sales From Produce

	Sales From Produce					
Equipment	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Sorting Tables	6(31.57%)	6(54.55%)	2(100.00%)	8(50.00%)	4(66.67%)	7(63.64%)
Boxes	7(36.84%)	8(72.73%)	2(100.00%)	6(37.50%)	3(50.00%)	11(100.00%)
Sizers	0(0.00%)	1(9.09%)	1(50.00%)	1(6.25%)	2(33.33%)	9(81.82%)
Precoolers/Quick-coolers	0(0.00%)	2(18.18%)	1(50.00%)	4(25.00%)	4(66.67%)	7(63.64%)
Branding	0(0.00%)	1(9.09%)	1(50.00%)	0(0.00%)	1(16.67%)	5(45.45%)
On-farm processing	3(15.79%)	4(36.36%)	2(100.00%)	6(37.50%)	3(50.00%)	2(18.18%)
Washing equipment	4(21.05%)	5(45.45%)	1(50.00%)	7(43.75%)	2(33.33%)	10(90.91%)
PLU labels	0(0.00%)	1(9.09%)	1(50.00%)	0(0.00%)	1(16.67%)	8(72.73%)
Retail packing	1(5.26%)	3(27.27%)	1(50.00%)	1(6.25%)	1(16.67%)	7(63.64%)
Holding coolers	1(5.26%)	2(18.18%)	1(50.00%)	2(12.50%)	2(33.33%)	10(90.91%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 25 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

Table 3.44. Number of Responses by Commodity for Expected Increase in Market Opportunities Over the Next Five Years

Commodity	Frequency
Other berries[a]	9(13.43%)
Strawberries	7(10.45%)
Other vegetables	5(7.46%)
Snap beans	4(5.97%)
Summer squash	4(5.97%)
Tomatoes	4(5.97%)
Peaches	3(4.48%)
Hot pepper	2(2.99%)
Watermelons	2(2.99%)
Cabbage	1(1.49%)
Carrots	1(1.49%)
Cauliflower	1(1.49%)
Cucumbers	1(1.49%)
Okra	1(1.49%)
Sweet Corn	1(1.49%)

Source: Results from Question No. 26 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.
[a] For example, blackberries, blueberries and raspberries.

Table 3.45. Number of Responses by Commodity for Expected Increase in Market Opportunities Over the Next Five Years by Sales From Produce

	Sales From Produce					
Commodity	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Blackberries	1(5.26%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Cabbage	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Carrots	0(0.00%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Cauliflower	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Cucumbers	0(0.00%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Hot pepper	0(0.00%)	1(9.09%)	0(0.00%)	0(0.00%)	0(0.00%)	1(9.09%)
Okra	0(0.00%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Other Berries[a]	3(15.79%)	1(9.09%)	0(0.00%)	3(18.75%)	1(16.67%)	0(0.00%)
Other vegetables	0(0.00%)	0(0.00%)	1(50.00%)	2(12.50%)	1(16.67%)	1(9.09%)
Peaches	1(5.26%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	1(9.09%)
Snap beans	2(10.53%)	0(0.00%)	0(0.00%)	2(12.50%)	0(0.00%)	0(0.00%)
Strawberries	1(5.26%)	1(9.09%)	0(0.00%)	3(18.75%)	0(0.00%)	2(18.18%)
Summer squash	0(0.00%)	0(0.00%)	1(50.00%)	2(12.50%)	0(0.00%)	1(9.09%)
Sweet corn	0(0.00%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Tomatoes	1(5.26%)	0(0.00%)	0(0.00%)	3(18.75%)	0(0.00%)	0(0.00%)
Watermelons	1(5.26%)	0(0.00%)	0(0.00%)	1(6.25%)	0(0.00%)	0(0.00%)
Respondents	19	11	2	16	6	11

Source: Results from Questions No. 26 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.
[a] For example, blueberries and raspberries.

In the situation where a food-borne illness or some other catastrophic event may occur via shipments of produce, traceback becomes important in tracking the source of commodities in question. Traceback is the tracking of a commodity or product from the consumer to the production site or field of origin. Accurate records are the key to efficient traceback. Traceback can be a complex process that encompasses numerous product transfers, inspections, and quality controls as outlined by Fonsah. The extra time and personnel involved with traceback can have a major impact on a farming operation. Thus, a question was asked in the survey to inquire about producer impressions regarding the impact of traceback on their operations over the next few years. Just over 61 percent of the respondents thought that traceback would not impact their operation in the coming years.

In Table 3.46, the responses regarding the impact of traceback are cross-tabulated with sales from produce. Response to the impact of traceback appears to be related to sales class. About 89 percent of those in the under $20,000 sales class did not think that traceback would impact their operations. At the other end of the spectrum, almost 64 percent indicated they were expecting an impact. Apparently, the smaller producers using direct marketing feel that traceback will not apply to them. On the other hand, the larger producers who market through the national produce distribution system appear to be concerned that those they largely supply, wholesalers and retail chains, will be forced to adopt traceback sometime in the near future. If traceback is forced on the produce industry, it will be costly. Wholesalers and retail chains will pass as much of this added cost as possible to grower-shippers through lower prices paid. Further, grower-shippers will have to add costly labor and capital equipment for traceback compliance. Thus, the likely impact of traceback on grower-shippers will be twofold: higher operating costs and lower produce prices.

Table 3.46. Number of Respondents Expecting an Impact from Traceback Over The Next Few Years by Sales From Produce

	Sales From Produce					
Impact	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	2(10.53%)	5(45.45%)	1(50.00%)	6(37.50%)	4(66.67%)	7(63.64%)
No	17(89.47%)	6(54.55%)	1(50.00%)	10(62.50%)	2(33.33%)	4(36.36%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 28 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Traceback is the tracking of commodities from the consumer to the production site or field of origin.

Several other issues exist in the produce industry that may increase the cost of production. Respondents were asked if they had implemented product liability insurance, organic labeling, product lookup (PLU) coding, or integrated pest management (IPM). PLU coding is the system used in grocery stores for product identification. The PLU label is a small sticker with a four or five digit code on individual produce items. The PLU code is entered at checkout for the price per unit. IPM involves the integration of different pest management strategies in produce production in order to control pests in an economically prudent and environmentally sound manner.

Table 3.47 shows the number of respondents using each of these practices. There was no response for organic labeling as none of the respondents grew organic crops. Product liability insurance was most frequently used with a response level of 34 percent. IPM was next with 19 percent, followed by nearly 15 percent for PLU coding.

Table 3.48 shows the responses to these operational practices with respect to sales from produce. Viewed from this perspective, a pattern emerged for two practices – product liability insurance and PLU coding. Clearly, these practices were associated with larger firms. Only about 16 percent of the respondents in the under $20,000 sales class had product liability insurance, while those in the $500,000 or more class had a response level of almost 82 percent. None of the respondents in the under $20,000 class had incorporated placement of PLU code stickers, while almost 73 percent of those in the $500,000 or more class had already implemented placement of PLU code stickers on individual produce items. No clear pattern emerged for IPM usage except that those in the under $20,000 sales class appear to be the least likely to use IPM – only one out of 19 respondents.

Table 3.47. Number of Responses by Implementation of Certain Farm Practices

Farm Practice	Frequency
Product liability insurance	23(34.33%)
IPM[a]	13(19.40%)
PLU coding[b]	10(14.93%)
Organic labeling	0(0.00%)

Source: Results from Question No. 29 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.

[a]IPM - Integrated Pest Management.

[b]PLU coding - Product lookup coding.

Table 3.48. Number of Responses by Implementation of Certain Farm Practices by Sales From Produce

	Sales From Produce					
Farm Practice	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Product liability insurance	3(15.79%)	4(36.36%)	1(50.00%)	3(18.75%)	3(50.00%)	9(81.82%)
PLU coding[a]	0(0.00%)	1(9.09%)	1(50.00%)	0(0.00%)	0(0.00%)	8(72.73%)
Organic labeling	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
IPM[b]	1(5.26%)	3(27.27%)	1(50.00%)	3(18.75%)	1(16.67%)	4(36.36%)
Respondents	19	11	2	16	6	11

Source: Results from Question No. 29 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65. Multiple responses were possible.

[a]PLU coding - Product lookup coding.

[b]IPM - Integrated Pest Management.

Respondents were asked if they forward contracted the sale of produce. The majority of those surveyed did not. The practice of forward contracting does not seem to be related to size of operation (Table 3.49).

All respondents participating in the survey were involved in multiple farming enterprises. Frequency of respondents by sales categories are presented in Table 3.50 for the produce enterprise as well as for all farming enterprises combined. The sales range for produce is curtailed at $500,000 or more, while that for all farming enterprises extends to $1,000,000 or more.

The mode or most common sales category for produce was under $20,000 with 19 respondents. The median or middle of the produce sales distribution was $100,000-$249,999. The mode and median were equal and much higher for the sales distribution for all farming enterprises combined at $500,000-$749,999. Some 18 respondents were in this category.

The correlation between sales from produce and sales from all farming enterprises combined was fairly high and positive (0.63). This is an indication that larger farmers, in general, are more likely to be able to engage the resources, knowledge, and networking to access the national produce marketing system.

Respondents were asked to approximate the percentage of their total household income (before taxes) that came from farming. Reportedly, about two-thirds of the total household income of those surveyed came from farming.

Summary

The 2003-2004 Georgia fruit and vegetable grower survey encompassed 67 respondents, for the most part, from South Georgia, the center of produce production in Georgia. Some 65 respondents provided information on sales from produce.

Table 3.49. Number of Respondents Who Contract the Sale of Fresh Produce by Sales From Produce

	Sales From Produce					
Contracting	Under $20,000	$20,000-$49,999	$50,000-$99,999	$100,000-$249,999	$250,000-$499,999	$500,000 or more
Yes	3(15.79%)	5(45.45%)	0(0.00%)	4(25.00%)	2(33.33%)	4(36.36%)
No	16(84.21%)	6(54.55%)	2(100.00%)	12(75.00%)	4(66.67%)	7(63.64%)
Total	19(100.00%)	11(100.00%)	2(100.00%)	16(100.00%)	6(100.00%)	11(100.00%)

Source: Results from Questions No. 30 and 32 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents by sales category, n=65.

Table 3.50. Number of Respondents by Sales Category by Produce Enterprise and by all Farming Enterprises

Sales Category	Produce Enterprise	All Farming Enterprises
Under $20,000	19(29.23%)	7(10.77%)
$20,000-$49,999	11(16.92%)	4(6.15%)
$50,000-$99,999	2(3.08%)	7(10.77%)
$100,000-$249,999	16(24.62%)	4(6.15%)
$250,000-$499,999	6(9.23%)	11(16.92%)
$500,000 or more	11(16.92%)	N/A
$500,000-$749,999	N/A	19(29.23%)
$750,000-$999,999	N/A	8(12.31%)
$1,000,000 or more	N/A	5(7.70%)
Total	65(100.00%)	65(100.00%)

Source: Results from Questions No. 32 and 33 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=65.

Nearly 42 percent of respondents were over 50 years of age. For sales below $100,000, there was a higher concentration of growers under 41 years of age. For the categories of $100,000 and above in sales, only four respondents were under 41 years of age.

Most producers had over 10 years of experience commercially growing produce. Generally, larger producers were found to have more experience than smaller ones.

Almost 80 percent of those surveyed grew row crops such as corn, soybeans, and peanuts. Nearly 36 percent had livestock enterprises and 21 percent grew tobacco. No clear pattern between non-produce enterprises and sales from produce emerged.

Overall, the respondents were almost equally divided on whether or not to expand produce production. However, just over two-thirds of the smaller respondents were not interested in expanding produce production.

The preferred source of information on growing a new crop was the local Extension Service. Other growers and buyers were also very common resources. Smaller growers relied on grower organizations more than larger growers. Larger growers seemed to have a stronger relationship with buyers as a source of information. Over one-third of the larger producers also used information from the State Department of Agriculture, while only about 10 percent of the smaller producers used this source.

A diverse array of fruits and vegetables were grown by the respondents. The largest sales category accounted for over 80 percent, or almost 10,000 acres, of total fruit and vegetable production. However, for the two lowest sales classes, watermelon production was found to be uniquely important, accounting for just over 80 percent of total acreage.

Prices received were reportedly the most limiting factor to the expansion of produce operations. For small farms the important limiting factors were harvest labor, prices, and

weather. For large farms prices, harvest labor, and credit availability were the top three limiting factors.

Across the board, prices, market outlets, weather, and harvest-labor availability appear to be the primary factors limiting expansion. However, for the larger operations, land, labor housing, and credit rationing seem to be just as important.

Producers were asked about participation in certain activities thought to be linked to productive and efficient operations. Trade shows, grower organizations, new varieties, and market news publications all had response levels in excess of 60 percent. The results show that as sales increased, participation rates for attending trade shows, trying new varieties, and practicing integrated pest management (IPM) increased markedly.

Direct markets (farmers markets, roadside stands, and pick-your-own) were the most common outlets for produce as indicated by nearly 44 percent of the respondents. In the under $20,000 class, two-thirds of all sales were to direct-market outlets. This was expected since these outlets in the past have been used by small volume producers as a convenient way to sell produce. For the largest growers only 10.5 percent of produce sales were to direct markets, while 37 percent went directly to retailers.

The use of a hiring service to secure workers was used mostly by the larger producers. The highest sales class ($500,000 +) had the highest response level at 36 percent.

Almost eight of every 10 of those surveyed owned a computer. Use of the internet does not appear to differ by size of operation.

As sales increased, the percentage of respondents expecting a decrease in direct marketing increased as well. Just over 36 percent with $500,000 or more in sales expected a decrease in direct marketing, as opposed to only 10.5 percent for the under $20,000 category.

Experience was the overwhelming top factor in deciding what to grow. In the under $20,000 group, about 26 percent answered that market access was a factor in deciding what to grow, reflecting a direct-marketing orientation. Small producers, for the most part, seem to have a local, direct-marketing orientation, which encompasses outlets rather easily accessed but limited in sales potential.

The largest sales class stood out with nearly 64 percent of respondents in this category indicating that risk was a deciding factor in what to grow. No more than 27 percent of the respondents in any other sales class indicated that risk was a consideration. Large producers likely have more to lose than small producers, and thus have a greater incentive to consider the risk factor.

The most frequently indicated potential source of marketing information was a broker/wholesaler with over 71 percent of those surveyed responding accordingly. Responses for the broker/wholesaler ranged from almost 53 percent for the lowest sales class to over 72 percent for the others.

When contemplating growing a new crop, the most important factors for smaller produce growers were market location and transportation. Transitioning from smaller to larger operations, these factors became less important, while factors such as buyer-seller relationships, meeting buyer standards, and grading became more important. Such factors are of paramount importance for accessing the national distribution system via selling to wholesalers, through brokers, and to retail chains.

In the $500,000 and above sales class, over 90 percent of those surveyed considered themselves grower-shippers. However, in the under $20,000 class only one out of 19 considered

themselves a grower-shipper. These results were expected because grower-shippers are typically larger, more complex operations tied into the national distribution system.

Over 72 percent of the respondents indicated packing produce which can be construed as anything from simply placing produce items in containers for transport to local markets to grading and packing for shipment to the national market. At the low end of the sales range, over 52 percent of those surveyed responded that they did not pack produce. This was as expected as smaller producers using direct marketing outlets are largely able to forego the grading and packing operation.

Outsourcing of marketing activities such as selling, grading, packing, and cooling was not found to be prevalent. Most of the outsourcing of the selling function was by producers in the $500,000 or more sales class.

The top three types of post-harvest equipment used were boxes, sorting tables, and washing equipment. In general, responses increased for the use of almost all types of post-harvest equipment with higher levels of sales.

When asked about increasing and decreasing market opportunities for produce over the next five years, responses were somewhat limited. In fact, responses for a decrease were nil. Berries, as a general category, were believed to have the most potential for increased market opportunities.

In the situation where a food-borne illness or some other catastrophic event occurs via produce shipments, traceback may become important in tracking the source of the commodities in question. About 89 percent of those in the under $20,000 sales class did not think that traceback would impact their operations. At the other end of the sales spectrum, almost 64 percent indicated they were expecting an impact. Larger producers who market through the

national produce distribution system appear to be concerned that those they largely supply, wholesalers and retail chains, will be forced to adopt traceback in the near future. The likely impact of traceback on grower-shippers will be twofold: higher operating costs and lower prices received for produce.

The survey dealt with certain costly practices of sophisticated producers. Respondents were asked if they had implemented product liability insurance, product lookup (PLU) coding, and integrated pest management (IPM). Only about 16 percent of the respondents in the under $20,000 sales class had product liability insurance, while almost 82 percent of those in the $500,000 or more class had the insurance. None of the respondents in the under $20,000 class had incorporated placement of PLU code stickers, while almost 73 percent of those in the $500,000 or more class had already done so. Clearly, these practices are associated with larger firms.

All respondents participating in the survey were involved in multiple farming enterprises. The mode or most common sales category for produce was under $20,000. The median or middle of the produce sales distribution was $100,000-$249,999. The mode and median for the sales distribution for all farming enterprises combined were equal and much higher at $500,000-$749,999. The correlation between sales from produce and sales from all farming enterprises combined was fairly high and positive. This is an indication that larger operations, in general, are more likely to be able to engage resources, knowledge, and networking to access the national produce marketing system.

Chapter IV

Econometric Analysis

The previous chapter revealed grower tendencies through cross tabulation of survey responses with sales from produce. The insight gained is further refined in this chapter through econometric analysis. The analysis shows the importance of operational and marketing practices as they relate to sales from produce either in a positive or negative way. Perhaps just as important, the analysis allows the elimination from consideration numerous practices not found to be related to sales from produce. The remaining practices, found to be important, shed light on the differentiating factors for successful entry into the national produce marketing system.

Model Specification

A multiple linear regression model was used to conduct the analysis. The statistical model is given as

$$(1) \qquad Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n,$$

where α is the intercept, β_n are the regression coefficients, X_n represent the explanatory (independent) variables, and Y represents the dependent variable.

Variable Specification

The dependent variable used in the analysis was sales from produce, SALES. Numerical values were assigned for each sales category as follows, 1=under $20,000, 2=$20,000-$49,999, 3=$50,000-$99,999, 4=$100,000-$249,999, 5=$250,000-$499,999, and 6=$500,000 or more. Because of the great number of potential explanatory variables (over 170), a preliminary investigation was conducted to narrow the scope of independent variables to a manageable level.

Determination of the final model draws heavily from the findings of the tabular analysis in the previous chapter. Thus, the final model includes variables thought to be important from the tabular analysis as well as other variables found to be potentially important in preliminary regression analysis – a total of 17 independent variables. The initial variable set can be seen in Appendix C, while the final set is presented in Table 4.1.

From the tabular analysis, several variables were expected to have a positive relationship with sales from produce. One of these variables was years of experience growing produce commercially (YEAREXPR) which seemed to increase as the level of sales increased.

Many sources of information can be accessed to gain information on the production of a new crop. One source, the State Department of Agriculture (GADEPTAG), was included in the model. Tabular analysis indicated that this source of information seemed to be used more by larger producers, about one-third using the source, than by smaller producers who used this source about 10 percent of the time. The State Department of Agriculture has a strong produce marketing arm with facilities and personnel throughout the state for farmers' markets as well as facilities strategically located for brokers and wholesalers.

Preliminary analysis indicated the potential importance of summer squash (SMSQUASH) as a differentiating factor. Of the acreage of summer squash, over 83 percent was grown on farms with more than $500,000 in produce sales. Thus, it was expected that this variable would have a positive coefficient.

Respondents were asked about their participation in certain activities thought to be linked to productive operations. From tabular analysis, those who tried new varieties (NEWVAR) appeared to have more sales from produce than those not using new varieties. Therefore, it was expected that this variable would have a positive coefficient.

Table 4.1. Explanatory Variables Included in Model

Variable	Explanation
YEAREXPR	Years experience growing produce commercially (1=less than 3, 2=3-6, 3=7-10, 4=over 10)
GADEPTAG	Use State Department of Agriculture for information on growing (1=yes, 0=no)
FSA	Ask Farm Service Agency, USDA, for information on growing (1=yes, 0=no)
SMSQUASH	Summer squash acreage
WTRMELON	Watermelon acreage
PEST	Pest control limits expansion (1=not limiting … 5=very limiting)
NEWVAR	Try new varieties (1=yes, 0=no)
DRCTMKT	Percentage of produce sales through direct market
HIRESRVC	Use labor hiring service (1=yes, 0=no)
RISK	Risk is deciding factor in growing a commodity (1=yes, 0=no)
BWMKINFO	Broker/wholesaler as potential marketing information source (1=yes, 0=no)
NOMKINFO	No one as potential marketing information source (1=yes, 0=no)
MKTLOC	Market location important when considering a new crop (1=not important … 5=very important)
BSREL	Buyer-seller relationships important when considering a new crop (1=not important … 5=very important)
PACKPRDC	Pack produce (1=yes, 0=no)
USEBKR	Pay someone else to sell produce (1=yes, 0=no)
TRACEBAC	Believe traceback will impact operation in next few years (1=yes, 0=no)

Hiring services are commonly available in the produce industry for the purpose of contracting hand labor. The usage of such services was less than expected. However, through tabular analysis, it was shown that hiring services were used more by operations with the highest level of sales from produce. Only five percent of the respondents in the under $20,000 class as opposed to 36 percent of the respondents in the $500,000 or more class used hiring services. Because of the ostensible pattern, use of hiring services (HIRESRVC) was included in the model.

Relevant factors for deciding what to produce were examined. Risk (RISK) emerged in the tabular analysis as potentially important and was included in the model. Respondents in the largest sales class ($500,000 or more) seem to put more emphasis on this factor. Large producers likely have more to lose than small producers, and thus have greater incentive to consider the risk factor.

During the process of considering the production of a new crop, an important concern is how to market it. Respondents were asked about potential sources of marketing information. The most frequently indicated source was brokers/wholesalers. Tabular analysis showed that as sales level increased, responses for broker/wholesaler (BWMKINFO) did as well, thus indicating a positive relationship.

Also regarding the consideration of a new crop, respondents were asked to rate the importance of several factors. One promising differentiating factor, buyer-seller relationships (BSREL), had the highest level of responses in the largest sales class ($500,000 or more) and, thus, appears to be positively related.

Many fruit and vegetable growers pack their own produce. Packing produce can be construed as simply putting produce into containers for transport to direct-market outlets or

putting produce into labeled and branded cartons for shipment to wholesalers and retail chains. Though over 72 percent of all respondents indicated packing produce, in the lowest sales class only 47 percent did so. Thus, packing produce (PACKPRDC) is expected to have a positive relationship with sales from produce.

One of the questions in the survey was designed to determine the extent of outsourcing of produce marketing activities. Possible activities for outsourcing were selling, grading, packing, and cooling. Outsourcing appeared to be fairly negligible except for the selling activity. Almost 24 percent of the respondents indicated outsourcing the selling activity. For the largest sales class, the outsourcing of sales (USEBKR) jumped to over 63 percent. Thus, the outsourcing of sales is expected to be positively related to sales from produce.

The final variable expected to have a positive relationship with produce sales dealt with the issue of traceback. Traceback, the ability to track a commodity or product from the consumer back to the production site or field of origin, seems to be a concern mostly by larger producers. When asked if traceback (TRACEBAC) would likely impact their operation in the next few years, smaller growers responded "no" more often than larger growers. Perhaps small producers, more oriented towards the much less formal direct-market outlets, see little concern from the potential advent of traceback which requires a formal supply-chain system in order to be operational.

From tabular analysis, watermelons (WTRMELON) seemed to be grown mostly by smaller producers. The lowest two sales classes (under $20,000 and $20,000-$49,999) accounted for almost 80 percent of all watermelon acreage. Thus, it appears this variable will have a negative coefficient.

With several market outlets possibly being used to sell produce, respondents were asked to give, in percentage terms, level of sales through each outlet. The most commonly used outlet was direct marketing (farmers' market, roadside stand, and pick-your-own). Tabular analysis revealed a pattern for direct-market sales (DRCTMKT). In the smallest sales category (under $20,000) about two-thirds of all sales were through direct-market outlets. This percentage fell drastically as sales increased, with only about 10 percent of all sales from the largest category ($500,000 or more) going through this outlet. Thus, a negative relationship is expected between the percentage of direct-market sales and level of sales from produce.

The final variable expected to have a negative relationship with sales from produce is market location (MKTLOC) as an important factor when considering a new crop. When examined by sales category, the response level regarding the importance of market location was higher in the lowest sales category. An emphasis on market location is an indicator of a focus on direct or local marketing. Market location, as shown in the first chapter, is moot when producing for the national market.

Preliminary regression analysis revealed three variables, not found in the tabular analysis, which appear to be associated with sales from produce. One shows a positive relationship: pest control as a limiting factor on production expansion (PEST). Two show negative relationships: seek growing information from the Farm Service Agency (FSA) of the USDA and seek no information on marketing produce (NOMKINFO).

Pest control is critical in order to grow quality produce which is a primary concern of larger growers who supply produce for the national market. Thus, a positive relationship between production limits because of pest control (PEST) and sales from produce is plausible.

The Farm Service Agency of the USDA has programs designed to help producers who grow row crops subject to farm subsidies, who suffer production disasters, or who need a lender of last resort (USDA, FSA). When looking for alternative enterprises, it is natural to seek information from the office with which the producer has established contacts. When such producers start alternative enterprises such as in fruits and vegetables, the scale of operation tends to be small. For this reason, the negative relationship between the Farm Service Agency as a source of production information (FSA) and sales from produce appears consistent.

A grower in the produce business who seeks no market information is operating without full information. Thus, the reason for the negative relationship between seeking no information (NOMKINFO) and sales from produce is obvious.

Results

Ordinary least squares was used to estimate the model. Simple statistics for the variables, including mean, standard deviation, and minimum and maximum values, can be seen in Table 4.2. The parameter estimates, standard errors, t values, and significance levels for the model are presented in Table 4.3.

Variables with coefficients found significant at the $\alpha = 0.05$ level or better include years experience growing produce (YEAREXPR), using the State Department of Agriculture (GADEPTAG) as well as the Farm Service Agency (FSA) for growing information, summer squash acreage (SMSQUASH) as well as watermelon acreage (WTRMELON), pest control (PEST) as an expansion limitation, "no one" (NOMKINFO) as well as a broker/wholesaler (BWMKINFO) for marketing information, buyer-seller relationships (BSREL) and market location (MKTLOC) for new crop considerations, and packing produce (PACKPRDC). The coefficients for YEAREXPR, GADEPTAG, SMSQUASH, PEST, BWMKINFO, BSREL, and

Table 4.2. Simple Statistics for the Variables Included in Model

Variable	Mean	Standard Deviation	Minimum	Maximum
YEAREXPR	3.4000	0.9321	1.0	4.0
GADEPTAG	0.1846	0.3910	0.0	1.0
FSA	0.1231	0.3311	0.0	1.0
SMSQUASH	10.8785	41.1159	0.0	275.0
WTRMELON	2.9000	6.1156	0.0	26.0
PEST	1.8154	1.0442	1.0	5.0
NEWVAR	0.6615	0.4769	0.0	1.0
DRCTMKT	42.6613	40.3472	0.0	100.0
HIRESRVC	0.1692	0.3779	0.0	1.0
RISK	0.2462	0.4341	0.0	1.0
BWMKINFO	0.7071	0.4584	0.0	1.0
NOMKINFO	0.0615	0.2422	0.0	1.0
MKTLOC	3.8154	1.1844	1.0	5.0
BSREL	3.8923	1.1057	1.0	5.0
PACKPRDC	0.7231	0.4510	0.0	1.0
USEBKR	0.2462	0.4341	0.0	1.0
TRACEBAC	0.3846	0.4903	0.0	1.0
SALES	3.1846	1.8699	1.0	6.0

Table 4.3. Model Parameter Estimates, Standard Errors, T Values, and Significance Levels

Variable	Parameter Estimate	Standard Error	t Value	Pr > I t I	
INTERCEPT	-1.1943	0.9088	-1.31	0.1952	
YEAREXPR	0.5980	0.1503	3.98	0.0002	**
GADEPTAG	0.8367	0.2793	3.00	0.0044	**
FSA	-0.8713	0.2559	-3.40	0.0014	**
SMSQUASH	0.0056	0.0020	2.74	0.0086	**
WTRMELON	-0.0565	0.0214	-2.63	0.0114	*
PEST	0.4062	0.1084	3.75	0.0005	**
NEWVAR	0.4547	0.3637	1.25	0.2174	
DRCTMKT	-0.0011	0.0034	-0.32	0.7536	
HIRESRVC	-0.1617	0.2662	-0.61	0.5464	
RISK	0.3501	0.2908	1.20	0.2348	
BWMKINFO	0.5893	0.2838	2.08	0.0434	*
NOMKINFO	-1.6650	0.4529	-3.68	0.0006	**
MKTLOC	-0.5158	0.0789	-6.54	0.0000	**
BSREL	0.4662	0.1022	4.56	0.0000	**
PACKPRDC	1.2590	0.2911	4.33	0.0001	**
USEBKR	0.4346	0.3025	1.44	0.1574	
TRACEBAC	0.4418	0.3580	1.23	0.2234	

R-Square	0.7683
F-Value	9.17
N	65

Note: *, ** indicates significance at the 5 percent and 1 percent levels, respectively.

PACKPRDC were positive, while the coefficients for FSA, WTRMELON, NOMKINFO, and MKTLOC were negative.

When analyzing a model to see how well it fits the data, "goodness of fit," the R-square is an important metric. The R-square, or coefficient of determination, is the proportion of variation in the dependent variable that is explained by the variation in the independent variables (Goldberger; Greene). Values of R-square can be between zero and one, with a value of one explaining 100 percent of the variation. The R-square value of 0.7683 (Table 4.3) obtained from model estimation provides evidence that the model fits the cross-section data well.

Another important measure of the power of the model is the F value. The F value is the ratio of the model mean square to the error mean square. In other words, the F value is used to determine if the model as a whole is statistically significant. The null hypothesis for this test is that the model has no predictive capability, that is, all population regression coefficients are zero simultaneously (Goldberger; Greene). A large F value and corresponding small p value, allows rejection of the null hypothesis. The F value of the model (9.17) and corresponding p value (<.0001) show that the null hypothesis can be rejected and thus the model has statistically significant predictive capability.

Heteroskedasticity must be addressed when using cross-sectional data (Greene). Heteroskedasticity is present in ordinary least squares when the variances of the error terms are not constant (Greene). When heteroskedasticity is present, the estimator is still unbiased and consistent but is inefficient and provides incorrect standard errors. Since the standard errors are incorrect, the t-values associated with each variable are incorrect as well. In order to account for the possible effects of heteroskedasticity, White's heteroskedasticity-consistent matrix was employed to correct the estimates for any unknown form of heteroskedasticity (White).

Discussion of Results

As expected from tabular analysis, the coefficient for experience growing produce (YEAREXPR) was significant and positive at the 0.01 level. Thus, experience appears to be extremely important for higher sales from produce. Apparently, at some point, with increasing experience, a transition is possible from a direct market orientation with limited volume potential to a national market focus via market intermediaries and chain-store buyers. The reward of national market entry would appear to go to the tenacious.

From examination of sources of information on starting production of a new crop, the coefficient for the State Department of Agriculture (GADEPTAG) was found to be positive and significant at the 0.01 level. Larger producers were the main users of this source of information. The State Department of Agriculture is a major player in the produce industry in the state.

As expected from tabular analysis, the coefficient for use of the Farm Service Agency (FSA) of the USDA for gathering information on growing produce was found to be negative and significant at the 0.01 level. FSA programs are geared toward smaller farmers. When small producers consider alternative enterprises such as fruits and vegetables, it seems natural that they would seek information from established contacts such as FSA personnel.

The coefficient for summer squash (SMSQUASH) was positive and significant at the 0.01 level. Summer squash is very delicate and must be handled with great care during harvest. It has a short shelf life and requires sophisticated packing. Summer squash can be stored for only three to four days at 45° to 50° F and 90 percent humidity (Boyhan, Granberry, and Kelley). Because of the resources required to grow and pack delicate produce items like summer squash, such commodities are chiefly in the domain of larger more specialized producers.

The coefficient for watermelon production (WTRMELON) was negative and significant at the 0.05 level, as expected based on tabular analysis. Watermelons are a convenient crop for small scale producers. Watermelons are a robust fruit and thus are relatively easy to manage. They are typically harvested by the truckload and either taken directly to market or loaded into a larger truck, e.g., tractor-trailer, for shipment. Watermelons can be stored for two to three weeks if kept between 50° to 60° F and 85 to 90 percent humidity (Sargent).

The coefficient for pest control (PEST) as a constraint to production expansion was found to be positive and significant at the 0.01 level. Pest control is expensive and of critical importance in the production of unblemished produce for the national market. Thus, the pest control constraint would tend to be more important to larger producers.

Regarding sources potentially used for information on marketing, the coefficient for broker/wholesaler (BWMKINFO) was found positive and significant at the 0.05 level, as expected. Those indicating a broker/wholesaler for information on marketing tended to be larger producers who characteristically have business relationships with brokers and wholesalers.

As expected from tabular analysis, the coefficient for growers who seek no help for marketing information (NOMKINFO) was negative and significant at the 0.01 level. Thus, those operating without marketing information tend to be the smaller producers. Larger producers seem to at least use one or more sources to obtain marketing information.

Among the potentially relevant factors when considering a new crop, market location (MKTLOC) was found to be important. The coefficient for market location was negative and significant at the 0.01 level. In tabular analysis, respondents in the lowest two sales classes indicated that market location was the most important factor when considering a new crop.

Large scale producers are connected to market intermediaries, shipping nationally and beyond. Thus, market location is more important to smaller operations using direct-market outlets.

The coefficient for the importance of buyer-seller relationships when considering a new crop (BSREL) was found to be positive and significant at the 0.01 level, as expected. In tabular analysis, buyer-seller relationships were shown to be most important when considering growing a new crop. This was especially true for larger producers. Producing the desired produce item in sufficient volume with excellent timing is extremely important to national market intermediaries.

The coefficient for those that pack produce (PACKPRDC) was found to be positive and significant at the 0.01 level, as expected. In tabular analysis, this aspect was shown to be positively skewed to larger operations, with just under half of the respondents in the smallest class (under $20,000) and 100 percent of those in the largest class ($500,000 or more) packing produce. Packing produce for the national market requires capital and labor for assembly-line operations. Packing shed operations are expensive and complex and thus limited to the larger producers. Smaller producers place produce in containers or truckload lots for transport to local farmers' markets, roadside stands, or packing sheds.

Many variables in this study were found to be unimportant and were not included in the final model. This serves to show that fresh produce operations have many factors in common regardless of size of operation. The factors shown to differ by level of produce sales seem to be due to specialization differences which are linked to scale of operation. Also, a difference of opinion occurs when considering useful information sources and the importance of relationships with various marketing agents. These distinctive views are shaped by the differing perspectives of small and large scale producers.

The next chapter summarizes the findings of this study and provides conclusions and implications.

Chapter V

Summary, Conclusions, and Implications

Summary

The purpose of this study was to examine factors contributing to the development of the produce industry in Georgia and to find ways for producers to overcome the simultaneity barrier to entering the national fresh fruit and vegetable market.

The 2003-2004 Georgia fruit and vegetable grower survey encompassed 67 respondents, for the most part, from South Georgia, the center of produce production in Georgia. Some 65 respondents provided information on sales from produce. A tabular analysis was conducted from the survey responses.

Nearly 42 percent of respondents were over 50 years of age. For produce sales below $100,000, there was a higher concentration of growers under 41 years of age. For the categories of $100,000 and above in sales, only four respondents were under 41 years of age.

Most producers had over 10 years of experience commercially growing produce. Generally, larger producers were found to have more experience than smaller ones.

The preferred source of information on growing a new crop was the local Extension Service. Other growers and buyers were also common resources. Smaller growers relied on grower organizations more than larger growers. Larger growers seemed to have stronger relationships with buyers as a source of information.

A diverse array of fruits and vegetables were grown by the respondents. The largest sales category accounted for over 80 percent, or almost 10,000 acres, of total fruit and vegetable

production. However, for the two lowest sales classes, watermelon production was found to be uniquely important, accounting for just over 80 percent of total acreage.

Several market outlets are possible for produce. Direct markets (farmers markets, roadside stands, and pick-your-own) were the most common outlets as indicated by nearly 44 percent of the respondents. In the under $20,000 class, two-thirds of all sales were to direct-market outlets – a convenient way to sell produce. For the largest growers only 10.5 percent of produce sales were to direct markets, while 37 percent went directly to retail chains.

As sales increased, the percentage of respondents expecting a decrease in direct marketing increased as well. This was much more pronounced for the smaller operations.

Regarding relevant factors in deciding what to grow, experience was the overwhelming top response. Over one-quarter of the smallest producers answered that market access was a factor in deciding what to grow, reflecting an easy access, direct-marketing orientation with limited sales potential.

When contemplating growing a new crop, the most important factors for smaller produce growers were market location and transportation. Transitioning from smaller to larger producers, these factors became less important, while factors such as buyer-seller relationships, meeting buyer standards, and grading became more important. Such factors are of paramount importance for accessing the national distribution system via selling to wholesalers, through brokers, and to retail chains.

Though over 72 percent of the overall respondents indicated packing produce, at the low end of the sales range over half responded that they did not pack produce. This was as expected as smaller producers using direct marketing outlets are largely able to forego the grading and

packing operation. The overall response level for packing was high because packing could be as simple as placing produce in containers for transport to direct markets.

Outsourcing of marketing activities such as selling, grading, packing, and cooling was not found to be prevalent. Most of the outsourcing of the selling function was by producers in the $500,000 or more sales class.

The mode or most common sales category for produce growers was under $20,000. The median or middle of the produce sales distribution was $100,000-$249,999. The mode and median for the sales distribution for all farming enterprises combined were equal and much higher at $500,000-$749,999.

The correlation between sales from produce and sales from all farming enterprises combined was fairly high and positive. This is an indication that larger operations, in general, are more likely to be able to engage the resources, knowledge, and networking to access the national produce marketing system.

An econometric model was used largely to refine the results of the tabular analysis by measuring the importance of producer characteristics and operational and marketing practices as they relate to sales from produce. Perhaps just as important, the analysis made possible the elimination of numerous factors not found to be related to sales from produce. The remaining characteristics and practices, shown to be important, shed light on the differentiating factors for successful entry into the national produce marketing system. Ordinary least squares was used to estimate the model where the dependent variable was total sales from produce.

The coefficients for several variables were found to be significant and positive with respect to produce sales. These variables included years experience growing produce (YEAREXPR), using the Georgia Department of Agriculture (GADEPTAG) for growing

information, summer squash acreage (SMSQUASH), pest control (PEST) as a constraint to production expansion, broker/wholesaler as marketing information source (BWMKINFO), the importance of buyer-seller relationships (BSREL) for new crop considerations, and operations that pack produce (PACKPRDC).

The coefficients of four variables were found to be significant and negative with respect to produce sales. These variables included using the Farm Service Agency (FSA) of the USDA for growing information, watermelon acreage (WTRMELON), using "no one" for marketing information (NOMKINFO), and the importance of market location (MKTLOC) for new crop considerations.

Experience growing produce (YEAREXPR) appears to be extremely important for higher sales from produce. Apparently, at some point, with increasing experience, a transition is possible from a direct-market orientation with limited volume potential to a national market focus via market intermediaries and chain-store buyers – the reward for tenacity.

Larger producers were the main users of the Georgia Department of Agriculture (GADEPTAG) as a source of growing information. Larger producers tend to participate in produce grower meetings where the Department of Agriculture has a large presence. Networking with personnel from the Department of Agriculture leads to contacts with market intermediaries with growing specifications for the national market.

Farm Service Agency (FSA) programs are geared toward smaller producers. When small producers consider alternative enterprises such as fruits and vegetables, it seems natural that they would seek information from established contacts such as FSA personnel.

Summer squash (SMSQUASH) requires great care in growing and post-harvest handling due to its delicate nature. Summer squash is representative of the kinds of delicate produce grown by sophisticated producers with national distribution connections.

Watermelon production (WTRMELON) is indicative of the kinds of crops that are convenient for small scale producers. Watermelons can be easily transported in truckload lots, without costly packing, to direct-market outlets.

Pest control (PEST) is expensive and of critical importance in the production of unblemished produce for the national market. Thus, the pest control constraint would tend to be more important to larger producers.

Those that identified a broker/wholesaler as a source of marketing information (BWMKINFO) tended to be larger producers who characteristically have business relationships with these national market intermediaries.

Producers who seek no marketing information (NOMKINFO) operate without full information and tended to have less produce sales. Larger producers used one or more sources to obtain marketing information.

Large-scale producers are connected to market intermediaries, shipping nationally and beyond. Thus, market location (MKTLOC) is more important to smaller operations using direct-market outlets.

Buyer-seller relationships (BSREL) for new crop considerations were more important to larger operations. Producing the desired commodity in sufficient volume with excellent timing is extremely important to national market intermediaries.

Packing produce (PACKPRDC) for the national market requires capital and labor for assembly-line operations. Thus, packing sheds are expensive and complex, and typically limited to larger operations.

Many variables in this study were found to be extraneous and were not included in the final model. This serves to show that fresh produce operations have many factors in common regardless of size of operation. The factors shown to differ by level of produce sales seem to be due to the degree of specialization in the produce operation.

Conclusions and Implications

All of the grower and operational characteristics found to be important with respect to level of sales from produce can be traced to degree of specialization in the produce operation. The degree of specialization goes hand in hand with level of sophistication in production, post-harvest handling, quality control, and marketing.

The two produce items found important in the final model, summer squash and watermelons, are representative of the stark differences in sophistication between small and large produce operations. Large volumes of a delicate commodity like summer squash require highly specialized production and postharvest handling methods, while commodities like watermelons require less intensive management, can be transported in bulk, and have a relatively long shelf life. Typically only the larger operations are equipped to produce and handle commodities requiring sophistication and specialization.

Another major difference between small and large operators pertained to information sources. Brokers and wholesalers were found to be important sources of marketing information especially to larger producers. Clearly, established contacts with national market intermediaries are highly advantageous.

Surprisingly, there were producers, all of whom had small operations, who did not seek marketing information. Certainly, it is difficult to be competitive without full information.

Small volume producers, for the most part, use direct-market outlets. The majority of these smaller producers harvest and transport produce directly to the local farmers' market or roadside stand for sale. Small producers seem unable or unwilling to risk venturing beyond familiar local environs – a huge step to be sure.

The finding that the Georgia Department of Agriculture was an important source of growing information for large produce growers may, indeed, indicate an effectual avenue for a breakthrough for small, but enterprising producers. The Department of Agriculture typically has a large presence at produce grower meetings and conferences which are widely attended by large producers. Moreover, the Department of Agriculture provides facilities to market intermediaries at strategic locations in the state. Thus, the opportunities for networking at grower meetings and conferences with large producers and Department of Agriculture personnel who have contacts with market intermediaries are limited only by personal initiative. In order to gain entry to the national market, producers must learn highly specialized and sophisticated production and postharvest handling methods and must come in contact with market intermediaries and chain buyers. Indications are that grower meetings and conferences are fertile grounds for establishing inroads to the national market and beyond.

In carrying out this study it became apparent that produce operations, regardless of size, have much in common. The major differences were seen in terms of degree of specialization and sophistication. In order to overcome barriers to entry to the national market, producers must be willing to avail themselves of all of the production, postharvest handling, and marketing information provided by all stakeholders such as grower associations and relevant university and

government outreach services. Taking advantage of every opportunity to network with large producers and officials in contact with market intermediaries is an extremely important part of this process.

In summary, the profile of a successful grower who produces for the national fruit and vegetable market includes the following: has many years of experience; uses growing information and networks via the State Department of Agriculture, largely at grower meetings and conferences; grows produce requiring specialized and sophisticated production and postharvest handling methods; uses state-of-the-art pest management techniques which are more difficult to manage with expansion; values marketing information from market intermediaries; prizes buyer-seller relationships when considering a new crop; and grades and packs for the national market.

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Appendices

Appendix A

Georgia Fruit and Vegetable Marketing Survey

1) What county is your farming operation based? _____

2) What is your age?

___ Under 30

___ 31-40

___ 41-50

___ 51-60

___ Over 60 years

3) How many years have you been growing produce commercially?

___ Less than 3 ___ 3-6 ___ 7-10 ___ Over 10

4) What else did you raise on your farm in 2002? (Circle all that apply)

Livestock Tobacco Row Crops

Other, please list _____

_____

5) Are you interested in expanding your produce production?

Yes No

6) If you were to start production of a new crop, what sources of information for **growing** the commodity would you use? (Circle all that apply)

Farm Bureau	Another grower	Extension Service
Input supplier	Buyer	Internet
State Dept. of Ag.	Grower organization	Farm Service Agency
No one		

7a) In terms of acreage, what types of produce did you grow in 2002?

VEGETABLES	ACRES		ACRES
Asparagus		Pepper, Jalapeno	
Beans, Snap		Potatoes, White	
Beets		Pumpkins	
Broccoli		Squash, Summer	
Cabbage		Squash, Winter	
Cantaloupe		Sweet Potatoes	
Carrots		Tomatoes	
Chinese Cabbage		Tomatoes (Greenhouse)	
Chicory, Endive		Turnips	
Cauliflower		Watermelons	
Corn, Sweet		Herbs	
Corn, Ornamental		Other Vegetables	
Cucumbers			
Eggplant		FRUITS	
Greens		Apples	
Leaf Lettuce & Romaine		Blackberries	
Lettuce (Greenhouse)		Grapes	
Okra		Peaches	
Onions		Pears	
Parsley		Strawberries	
Pepper, Bell		Other Berries	
Pepper, Pimento		Other Fruit	

7b) If any of the above were grown organically, please circle the acreage.

7c) Please list any crops you plan to expand in the upcoming growing season along with anticipated acreage.

_____

_____

_____

8) For each factor listed below, please indicate the extent to which you feel it is a factor that limits your ability to expand your produce operation.

	Not Limiting				Very Limiting
Land	1	2	3	4	5
Labor management	1	2	3	4	5
Harvest labor availability	1	2	3	4	5
Credit availability	1	2	3	4	5
Equipment	1	2	3	4	5
Pest control	1	2	3	4	5
Prices received	1	2	3	4	5
Market outlets	1	2	3	4	5
Weather	1	2	3	4	5
Irrigation	1	2	3	4	5
Disease control	1	2	3	4	5
Transportation	1	2	3	4	5
Cooling	1	2	3	4	5
Labor housing	1	2	3	4	5
Other	1	2	3	4	5

9) In your opinion, how useful are the following in your produce operation? (There are no right answers; we are just interested in your opinion.)

	Not Useful				Very Useful
University research branch station	1	2	3	4	5
University Extension/Area agents	1	2	3	4	5
State Dept. of Ag. marketing programs	1	2	3	4	5
State Dept. of Ag. regulatory programs	1	2	3	4	5
Farm Credit Service	1	2	3	4	5
Input suppliers	1	2	3	4	5

10) Do you …? (Circle all that apply)

Attend trade shows	Participate in grower organizations
Try new varieties	Receive market news publications
Attend field days	Practice integrated pest management

11) About what percentage of your produce sales goes to:

Direct markets (farmers' markets, u-pick, etc.)	___%
Direct to retail market (grocery, green grocer, etc.)	___%
Cooperative/marketing association	___%
Wholesale (non-cooperative) market	___%
Processor	___%
Direct to local restaurants	___%
Internet	___%
Shipper/packer (sell via another grocer)	___%
Community supported agriculture	___%
Auctions	___%
	_____
Total	100%

12) If you only direct market, what do you feel are the barriers to shifting completely to a wholesaler? (Please circle all that apply.)

Fees charged by shipper/packer too high	Volume too small
Access to wholesalers	Cooling requirements
Time delay in receiving payment	High brokerage fees
Grading and packaging requirements	Lower price

13) Do you use a service to find workers for hire? Yes No

14) Do you have a computer? Yes No

15) Do you have internet access? Yes No

16) If your answer was "Yes" to question 15, how do you use the internet? (Circle all that apply)

Selling Buying inputs Finding information

17) Do you expect any changes in your operation in the next year related to each of the following? (Please check each item.)

	Increase	Stay the Same	Decrease
Organic production			
Direct marketing			
Wholesale/broker marketing			
Value-added/processing			
Participation in cooperatives			
Use of irrigation			
Branding			
Traceback (tracking from retail to field)			
Change crops			
On-farm cooling			
On-farm packing/grading			

18) How do you decide what produce to grow? (Circle all that apply)

Experience	Production expertise	Labor timing/availability
Market access	Profit potential	Equipment needs
Price	Risk	

19) If you considered production of another crop, who would you ask about **marketing** the commodity (Circle all that apply)

Farm Bureau	Extension Service	Another grower
Input supplier	Grower organization	Broker/wholesaler
State Dept. of Ag.	Cooperative	No one

20) When considering a new crop, how important is each of the following in your decision making.

	Not Important				Very Important
Contracting	1	2	3	4	5
Broker/packer fees	1	2	3	4	5
Market location	1	2	3	4	5
Grading	1	2	3	4	5
Cooling	1	2	3	4	5
Volume requirements	1	2	3	4	5
Buyer-seller relationships	1	2	3	4	5
Transportation	1	2	3	4	5
Meeting buyer standards	1	2	3	4	5
Insurance	1	2	3	4	5
Other_____	1	2	3	4	5

21) Are you a grower-shipper? Yes No

22) Do you pack your own produce? Yes No

23) If you do **not** use a broker or wholesaler to sell any of your produce, which **TWO** of the following are the most important factors in your **not** using them? (Circle two)

Volume requirements Fees Grading

Broker availability Precooling Payment practices

Packing

24) Do you pay someone else to do any of the following with your produce? (Circle all that apply)

Grade Pack Cool Sell

25) Please circle any of the following you use on the farm.

Sorting tables Boxes Sizers

Precoolers/Quick-coolers Branding Holding coolers

On-farm processing Washing equipment PLU labels

Retail packing

26) For growers in this area, what produce commodities do you expect to **increase** in market opportunities over the next five years?

Fruit: _____

Vegetables: _____

27) For growers in this area, what produce commodities do you expect to **decrease** in market opportunities over the next five years?

Fruit: _____

Vegetables: _____

28) Do you believe traceback (the tracking of products from the consumer to the grower-shipper) will impact your operation over the next few years? Yes No

29) Have you implemented any of the following? (Circle all that apply)

Product Liability Insurance PLU coding

IPM Organic labeling

30) In 2002, did you contract the sale of any of your produce for the fresh market?

Yes No

31) If you have transitioned from direct marketing to wholesaling, how did that occur?

_____

_____

_____

32) What were your approximate total sales from **produce** in 2002?

___Under $ 20,000 ___$100,000 to $249,999

___$20,000 to $49,999 ___$250,000 to $499,999

___$50,000 to $99,999 ___$500,000 or more

33) What were your approximate total sales from **farming** in 2002?

___Under $20,000 ___$250,000 to $499,999

___$20,000 to $49,999 ___$500,000 to $749,999

___$50,000 to $99,999 ___$750,000 to $999,999

___$100,000 to $249,999 ___$1,000,000 or more

34) What percent of your approximate total household income (before taxes) in 2002 was from farming? _____

Appendix B

Table B.1. Number of Responses by Sources of Information for Growing a New Crop

Information Sources	Frequency
Extension Service	53(79.10%)
Another grower	32(47.76%)
Buyer	29(43.28%)
Grower organization	22(32.84%)
Input supplier	19(28.36%)
State Dept. of Ag.	12(17.91%)
Internet	11(16.42%)
Farm Service Agency	8(11.94%)
Farm Bureau	5(7.46%)
No one	2(2.99%)

Source: Results from Question No. 6 of Fruit and Vegetable Marketing Survey.
Note: Percentages are based on number of respondents, n=67. Multiple responses were possible.

Appendix C

Initial Explanatory Variable Set

Variable Name	Explanation
AGE	Age of survey respondent (1=under 30, 2=31-40, 3=41-50, 4=51-60, 5=over 60)
APPLE	Apple acreage
BELLPEP	Bell pepper acreage
BERRYEX	Expect expansion in berry production (1=yes, 0=no)
BERYINCR	Expect increase in opportunities of Berries (strawberry, blueberry, blackberry) in next five years (1=yes, 0=no)
BLKBERRY	Blackberry acreage
BLURIDGE	Operation located in Blueridge region of Georgia (1=yes, 0=no)
BROCCOLI	Broccoli acreage
BROCINCR	Expect increase in opportunities of broccoli (1=yes, 0=no)
CABBAGE	Cabbage acreage
CABBINCR	Expect increase in opportunities of cabbage (1=yes, 0=no)
CANTALPE	Cantaloupe acreage
CANTINCR	Expect increase in opportunities of cantaloupe (1=yes, 0=no)
CANTLEX	Expect expansion in cantaloupe production (1=yes, 0=no)
CAROTINC	Expect increase in opportunities of carrot (1=yes, 0=no)
CARROT	Carrot acreage
CAULIFLW	Cauliflower acreage
CAULINCR	Expect increase in opportunities of cauliflower (1=yes, 0=no)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
COMPUTER	Have a computer (1=yes, 0=no)
CPLAIN	Operation located in Coastal Plain region of Georgia (1=yes, 0=no)
CUCINCR	Expect increase in opportunities of cucumber (1=yes, 0=no)
CUCUM	Cucumber acreage
CUCUMEX	Expect expansion in cucumber production (1=yes, 0=no)
EGGPLT	Eggplant acreage
EXPAND	Interested in expanding produce production (1=yes, 0=no)
GRAPE	Grape acreage
GREENS	Greens acreage
GRWSHIPR	Are a grower-shipper (1=yes, 0=no)
HIRESRVC	Use labor hiring service (1=yes, 0=no)
JALPEP	Jalapeno pepper acreage
LIVESTOK	Raise livestock (1=yes, 0=no)
OKRA	Okra acreage
OKRAEX	Expect expansion in okra production (1=yes, 0=no)
OKRAINCR	Expect increase in opportunities of okra (1=yes, 0=no)
ONION	Onion acreage
ORCORN	Ornamental corn acreage
OTHBERRY	Other berries acreage
OTHENTER	Have other enterprises on farm (1=yes, 0=no)
OTHFRUIT	Other fruit acreage

Initial Explanatory Variable Set Continued

Variable Name	Explanation
OTHRVEGE	Other vegetable acreage
OTHVEGEX	Expect expansion in other vegetable production (1=yes, 0=no)
OTVEGINC	Expect increase in opportunities of other vegetables (1=yes, 0=no)
PACKPRDC	Pack produce (1=yes, 0=no)
PEACH	Peach acreage
PEAR	Pear acreage
PECHINCR	Expect increase in opportunities of peach (1=yes, 0=no)
PIEDMONT	Operation located in Piedmont region of Georgia (1=yes, 0=no)
POTATO	Potato acreage
PUMKINCR	Expect increase in opportunities of pumpkin (1=yes, 0=no)
PUMPKIN	Pumpkin acreage
Q6A	Ask Farm Bureau for information on growing (1=yes, 0=no)
Q6B	Ask another grower for information on growing (1=yes, 0=no)
Q6C	Ask Extension agent for information on growing (1=yes, 0=no)
Q6D	Ask input supplier for information on growing (1=yes, 0=no)
Q6E	Ask buyer for information on growing (1=yes, 0=no)
Q6F	Use the internet for information on growing (1=yes, 0=no)
Q6G	Ask grower organization for information on growing (1=yes, 0=no)
FSA	Ask farm service agency for information on growing (1=yes, 0=no)
GADEPTAG	Ask State Dept. of Agriculture for information on growing (1=yes, 0=no)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q6J	Ask no one for information on growing (1=yes, 0=no)
Q8A	Land limiting to expansion (1=not limiting … 5=very limiting)
Q8B	Labor management limiting to expansion (1=not limiting … 5=very limiting)
Q8C	Labor availability limiting to expansion (1=not limiting … 5=very limiting)
Q8D	Credit availability limiting to expansion (1=not limiting … 5=very limiting)
Q8E	Equipment limiting to expansion (1=not limiting … 5=very limiting)
PEST	Pest control limiting to expansion (1=not limiting … 5=very limiting)
Q8G	Prices received limiting to expansion (1=not limiting … 5=very limiting)
Q8H	Market outlets limiting to expansion (1=not limiting … 5=very limiting)
Q8I	Weather limiting to expansion (1=not limiting … 5=very limiting)
Q8J	Irrigation limiting to expansion (1=not limiting … 5=very limiting)
Q8K	Disease control limiting to expansion (1=not limiting … 5=very limiting)
Q8L	Transportation limiting to expansion (1=not limiting … 5=very limiting)
Q8M	Cooling limiting to expansion (1=not limiting … 5=very limiting)
Q8N	Labor housing limiting to expansion (1=not limiting … 5=very limiting)
Q9A	University research branch station useful in produce operation (1=not useful … 5=very useful)
Q9B	Area Extension agents useful in produce operation (1=not useful … 5=very useful)
Q9C	State Dept. of Ag. marketing programs useful in produce operation (1=not useful … 5=very useful)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q9D	State Dept. of Ag. regulatory programs useful in produce operation (1=not useful … 5=very useful)
Q9E	Farm Credit Service useful in produce operation (1=not useful … 5=very useful)
Q9F	Input suppliers useful in produce operation (1=not useful … 5=very useful)
Q10A	Attend trade shows (1=yes, 0=no)
Q10B	Participate in grower organizations (1=yes, 0=no)
NEWVAR	Try new varieties (1=yes, 0=no)
Q10D	Receive market news publications (1=yes, 0=no)
Q10E	Attend field days (1=yes, 0=no)
Q10F	Practice integrated pest management (1=yes, 0=no)
DRCTMKT	Percentage of produce sales through direct market
Q11B	Percentage of produce sales direct to retail market
Q11C	Percentage of produce sales through cooperative/marketing association
Q11D	Percentage of produce sales through wholesale market
Q11E	Percentage of produce sales through processor
Q11F	Percentage of produce sales direct to local restaurants
Q11G	Percentage of produce sales through the internet

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q11H	Percentage of produce sales through shipper/packer
Q11I	Percentage of produce sales through community supported agriculture
Q11J	Percentage of produce sales through auctions
Q12A	Lower price barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12B	Access problems barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12C	Small volume barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12D	Cooling requirements barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12E	Grading requirements barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12F	Payment delay barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12G	Fees charged by shipper/packer barrier to shifting completely to wholesaler (1=yes, 0=no)
Q12H	High brokerage fees barrier to shifting completely to wholesaler (1=yes, 0=no)
Q16A	Use internet for selling (1=yes, 0=no)
Q16B	Use internet for buying inputs (1=yes, 0=no)
Q16C	Use internet for finding information (1=yes, 0=no)
Q17BDECR	Expect decrease in direct marketing in next year (1=yes, 0=no)
Q17CDECR	Expect decrease in wholesale/broker marketing in next year (1=yes, 0=no)
Q17DDECR	Expect decrease in value-added/processing in next year (1=yes, 0=no)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q17EDECR	Expect decrease in participation in cooperatives in next year (1=yes, 0=no)
Q17FDECR	Expect decrease in use of irrigation in next year (1=yes, 0=no)
Q17GDECR	Expect decrease in branding in next year (1=yes, 0=no)
Q17HDECR	Expect decrease in traceback in next year (1=yes, 0=no)
Q17IDECR	Expect decrease in changing crops in next year (1=yes, 0=no)
Q17JDECR	Expect decrease in on-farm cooling in next year (1=yes, 0=no)
Q17KDECR	Expect decrease in on-farm packing/grading in next year (1=yes, 0=no)
Q18A	Experience is deciding factor in growing a commodity (1=yes, 0=no)
Q18B	Production expertise is deciding factor in growing a commodity (1=yes, 0=no)
BWMKINFO	Broker/wholesaler as potential marketing information source (1=yes, 0=no)
Q19F	Grower organization as potential marketing information source (1=yes, 0=no)
Q19G	State Dept. of Agriculture as potential marketing information source (1=yes, 0=no)
Q19H	Co-op as potential marketing information source (1=yes, 0=no)
NOMKINFO	No one as potential marketing information source (1=yes, 0=no)
Q20A	Contracting important when considering a new crop (1=not important … 5=very important)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q20B	Broker/packer fees important when considering a new crop (1=not important … 5=very important)
BSREL	Market location important when considering a new crop (1=not important…5=very important
Q20D	Grading important when considering a new crop (1=not important … 5=very important)
Q20E	Cooling important when considering a new crop (1=not important … 5=very important)
Q20F	Volume requirements important when considering a new crop (1=not important … 5=very important)
Q20G	Buyer-seller relationships important when considering a new crop (1=not important … 5=very important)
Q20H	Transportation important when considering a new crop (1=not important … 5=very important)
Q20I	Meeting Buyer Standards important when considering a new crop (1=not important … 5=very important)
Q20J	Insurance important when considering a new crop (1=not important … 5=very important)
Q23A	Volume requirements reason for not using broker/wholesaler (1=yes, 0=no)
Q23B	Fees reason for not using broker/wholesaler (1=yes, 0=no)
Q23C	Packing reason for not using broker/wholesaler (1=yes, 0=no)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
Q23D	Grading reason for not using broker/wholesaler (1=yes, 0=no)
Q23E	Precooling reason for not using broker/wholesaler (1=yes, 0=no)
Q23F	Payment practices reason for not using broker/wholesaler (1=yes, 0=no)
Q23G	Broker availability reason for not using broker/wholesaler (1=yes, 0=no)
Q24A	Pay someone else to grade produce (1=yes, 0=no)
Q24B	Pay someone else to pack produce (1=yes, 0=no)
Q24C	Pay someone else to cool produce (1=yes, 0=no)
USEBKR	Pay someone else to sell produce (1=yes, 0=no)
Q25A	Use sorting tables (1=yes, 0=no)
Q25H	Use washing equipment (1=yes, 0=no)
Q25I	Use PLU labels (1=yes, 0=no)
Q25J	Use retail packing (1=yes, 0=no)
Q25K	Use holding coolers (1=yes, 0=no)
TRACEBAC	Believe Traceback will impact operation in next few years (1=yes, 0=no)
Q29A	Have product liability insurance (1=yes, 0=no)
Q29B	Use PLU coding (1=yes, 0=no)
Q29D	Use IPM (1=yes, 0=no)
Q30	Contract the sale of produce (1=yes, 0=no)
Q33	Approximate total sales from farming (1=under $20,000, 2=$250,000-$499,999, 3=$20,000-$49,999, 4=$500,000-$749,999, 5=$50,000-$99,999, 6=$750,000-$999,999, 7=$100,000-$249,999, 8=$1,000,000 or more)

Initial Explanatory Variable Set Continued

Variable Name	Explanation
ROMAINE	Romaine lettuce acreage
ROWCROPS	Grow row crops (1=yes, 0=no)
SALES	Approximate total sales from produce (1=under $20,000, 2=$100,000-$249,999, 3=$20,000-$49,999, 4=$250,000-$499,999, 5=$50,000-$99,999, 6=$500,000 or more)
SNAPBEAN	Snap bean acreage
SWCORNEX	Expect expansion in sweet corn production (1=yes, 0=no)
SWTPOTAT	Sweet potato acreage
TOBACCO	Grow tobacco (1=yes, 0=no)
TOMAINCR	Expect increase in opportunities for tomato (1=yes, 0=no)
TOMATEX	Expect expansion in tomato production (1=yes, 0=no)
TOMATO	Tomato acreage
TURNIP	Turnip acreage
WATMINCR	Expect increase in opportunities for watermelons (1=yes, 0=no)
WNSQUASH	Winter squash acreage
WTRMELEX	Expect expansion in watermelon production (1=yes, 0=no)
WTRMELON	Watermelon acreage
WWWACESS	Have internet access (1=yes, 0=no)
YEAREXPR	Years experience growing produce commercially (1=less than 3, 2=3-6, 3=7-10, 4=over 10)