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**DEMANDS FOR LOCAL AND ORGANIC PRODUCE:
A BRIEF REVIEW OF THE LITERATURE**

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A Report of the Kaw Valley Project for Environmentally Identified Products

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ABSTRACT

Environmentally Identified Products (EIPs) refers to food products that are described as organic or sustainable, or were grown using Integrated Pest Management (IPM), or in other respects are viewed as having a relatively less negative impact on the environment than directly competing products. This paper reviews articles investigating the characteristics and preferences of consumers of, and demand for, EIPs in the US. Findings are reported on demographic variables, psychographic variables, willingness to pay, and consumer behavior, both for EIP consumers and non-EIP consumers. Many of the variables such as income and family size that are usually important for determining food demands, do not appear important in determining demand for EIPs. Moreover, the nature of the variables that actually do determine demands for EIPs are poorly understood. Very little research has been done on demands for locally-grown produce. Consumers generally have a favorable attitude towards organic produce, and information and availability are the most important barriers to consumption.

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This report is one of a series of reports on EIPs (Environmentally Identified Products) in the Kaw Valley of Kansas. David Burress is Principal Investigator for the project and edited this report. Helpful editorial comments were received from Thelma Helyar.

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EXECUTIVE SUMMARY

- This study reviews literature on consumer demand for local produce, organic produce, and other Environmentally Identified Products (EIPs).

Consumer behavior

- Sociodemographic characteristics that affect purchases of organic produce include gender, education, income, age, and race. However, the effects tend to be small.
- With the exception of price, traditional economic or demand-theoretic variables such as income, family size, total food expenditure, and expenditures on produce do not seem very important for predicting demand for EIP produce.
- The most typical EIP purchaser is young, white, female, single, and professional.
- Females are more likely to purchase organic produce than males.
- Higher education has a negative effect on purchases of organic produce.
- Income has a negative effect on purchases of organic produce.
- Consumers say they are more likely to buy blemished produce if they know it is organic.
- There have been very few studies of the demand for locally-produced foods in the US. However, local foods tend to be viewed positively by consumers.

Consumer motivation

- Many consumers express concerns about chemicals used in food production and feel that society should have more control over food production and processing.
- EIP consumers are more concerned about pesticides and environmental issues than the general population.
- Many consumers perceive no differences in taste between conventionally-grown produce and organic produce. However, a minority of consumers believe that organic produce tastes better.
- Freshness is the most important reported sensory factor in selecting fresh produce.

- As income increases, so does consumer confidence in the food system.. Also, as age increases, so do positive feelings about the food system.
- A hypothesis explaining why increased education and income have a negative effect on purchases of organic produce is that those with more education and more income have better access to information which leads them to have a higher level of confidence in the food system.

Marketing implications

- Mainstream consumers have a generally positive view of organic produce.
- Retail produce managers are not as enthusiastic about organic produce as are consumers, which may be a factor limiting supply.
- Lack of information about organic produce and limited availability seem to be the biggest limiting factors to EIP consumption.
- Consumers want more information about how the food they purchase has been treated.
- Labels indicating which foods have been organically grown are needed.
- Higher costs and higher prices associated with organic produce have had a negative effect on demand.

1. INTRODUCTION

Environmentally Identified Products (EIPs) are defined as food and other products which have been produced in such a way that their growth, processing, or distribution has a reduced environmental impact compared to conventionally-grown, processed, and distributed products. EIPs may also include products that, independently of their impact on the external environment, are believed to have a healthier impact on the “internal environment” of the body than conventionally-produced products. Some examples of EIPs include organically grown and processed foods, locally-grown and processed foods, foods grown using integrated pest management (IPM), and grass fed beef. In this report we will focus on food products only, omitting other EIPs such as organic cotton clothing, natural health and beauty products, herbal remedies, etc.

This literature review seeks to answer the following questions: Who are EIP consumers? What are the characteristics and preferences of these consumers? How accurate are perceptions about EIP consumers? What is important to consumers when making food purchasing decisions? What are mainstream consumers’ thoughts about EIPs? How much of a premium are consumers willing to pay for EIPs? Comparing across studies we attempt to answer these questions and to indicate which variables should be included in models of demand for EIPs.

A previous review (Beharrell & MacFie, 1991) surveyed international literature on consumer beliefs and attitudes toward food quality and acceptability of organic farming. A major finding was that interest in consumption of organic produce decreases sharply when price premium is above 20% and increases sharply when price premium is below 20%. Our review finds similar results for recent literature, mainly from the US, while covering a broader set of issues.

The literature review is divided into six main sections, which discuss:

- ◆ The conventional economic variables of price and income
- ◆ Sensory variables such as freshness, taste, cosmetic appearance
- ◆ Demographic variables such as education, gender, race, and occupational class
- ◆ Psychographic variables which characterize an individual’s beliefs, concerns, and world view
- ◆ Behavioral correlates of EIP consumers such as environmental activism
- ◆ Marketing issues such as dissemination of information, labeling, and delivery of EIPs to market.

We conclude by summarizing key findings and discussing opportunities for improved marketing of EIPs. A detailed analysis of findings for each variable is given in Appendix 1. Appendix 2 contains notes on the individual studies under review.

2. CONVENTIONAL ECONOMIC VARIABLES

Economic theory categorizes four fundamental factors which affect demand for a commodity as income, price, quality of the commodity, and differences in tastes and preferences. Quality, however, refers not only to the innate characteristics of goods, but also to the *perceptions* consumers have about goods, which are examples of psychographic variables. Family size or household size is often included as a separate variable because it affects the amount of income available per person. This section considers effects on demand for EIPs that depend strictly on income, price, and household size. Later sections consider the dependence of demand on psychographic variables, as well as other factors that are related to, or may help predict, tastes and preferences. We will also consider some variables, such as availability, that are more in the nature of constraints that may prevent consumer purchases from reaching equilibrium with income, prices, and preferences.

Income effects

Contrary to the usual economic theory of demand, income does not seem to contribute important information in predicting who is likely to purchase EIPs. Since EIPs often cost more than conventionally-grown foods, one might expect that consumers with higher incomes would be more likely to purchase them. However, most studies found that income did not differentiate purchasers of EIPs from non-purchasers. Jolly & Dhesi (1989) and Jolly (1991) found that income was not important in explaining differences in food purchasing behavior between buyers and non-buyers of organic poultry and produce. Ott (1990) found that income was not important in explaining shoppers' willingness to pay for Certified Pesticide-Residue-Free (CPRF) produce, and Buzby & Skees (1994) found income had no effect on respondents' willingness to pay for reductions in pesticide exposure.

Goldman & Clancy (1991) found the elasticity of income to be zero for purchasers of organic produce. Park and Lohr (1996) found that the effect of income on organic carrot demand was zero. Govindasamy & Italia (1997a) found an income effect for purchases of produce in general, but they did not find any income effect for purchases of organic produce specifically.

Two studies which did find that income was significant were van Ravenswaay and Hoehn (1991a) and Park and Lohr (1996). Van Ravenswaay and Hoehn (1991a) found a slightly positive income elasticity for pesticide residue-free (PRF) apples of .00042, while Park and Lohr (1996) found the effect of income on demand for organic broccoli and lettuce to be large, positive, and significant.

With the exception of the van Ravensway and Hoehn and the Park and Lohr articles, most studies do not seem to support the notion that purchasers of EIPs have higher incomes than non-purchasers. However, high income is nevertheless *perceived* to be a common characteristic of purchasers of organic produce. Estes *et al.* (1994) asked purchasers of organic produce how they would

characterize other purchasers of organic produce and found that purchasers ranked high disposable income as the second most-typical characteristic of organic produce consumers.

Besides the apparent lack of importance of income, other intermediate demand variables such as total household food expenditures seem to add little predictive information. Goldman and Clancy (1991) looked at the relationship between total food expenditures and purchases of organic produce. If organic produce constitute a fixed share of food expenditures, then they should increase with food expenditures. On the other hand, one might hypothesize that since EIPs tend to be more expensive than conventionally-produced foods, consumption of EIPs would fall as total household food expenditures rise. However, Goldman and Clancy found no relationship between total food expenditures and purchases of organic produce.

Consumer price effects

Organic produce consumption is quite sensitive to price. However, quantity demanded depends more on the price *differential* with respect to conventional foods than on absolute price. Estes *et al.* (1994) found that price is ranked by organic produce consumers as the primary reason for not buying more organic produce. Both organic and non-organic produce consumers view organic produce as expensive, but only non-buyers view it as *too* expensive (Tregear *et al.*, 1994).

Closely tied to the issue of price is the concept of willingness to pay. Willingness to pay refers to the maximum price a consumer would be willing to pay for a particular item. It is commonly measured using self-reports from the consumer rather than actual market data; therefore it is generally viewed as less reliable than price response data. On the other hand, willingness to pay data are more available than direct price response data.

Consumers who say they are willing to pay more for organic produce than conventional produce range from 49 percent of the population (Harris Poll, 1989) to 81 percent (Weaver *et al.*, 1992), and as many as 83 percent of the American public claim to be willing to pay more for foods grown with fewer chemicals (Morris *et al.*, 1993).¹ Weaver *et al.* (1992) found that one quarter of the population would pay up to 5 percent more for pesticide-free produce; 31 percent would pay up to 10 percent more; and 26 percent would pay up to 15 percent more.² It seems that the majority of consumers say they are willing to pay more for organic produce. The quantity consumers are willing to purchase falls as the price premium increases.

¹ Most studies found that willingness to pay a positive price premium for organic or pesticide-free produce was greater than 50 percent. The Hartman Group's findings were the single exception. They found only 13 percent of the population was willing to pay a premium.

² An earlier study (Ott, 1990) found that 57 percent would pay 5 percent more; ten percent would pay ten percent more; 33 percent are unwilling to pay any premium for CPRF produce.

The degree of willingness to pay varies from product to product and from study to study. Jolly *et al* (1989) found a willingness to pay premium for apples, peaches, broccoli, and carrots of 30-40¢ per lb.

Buzby & Skees (1994) found the range on willingness to pay for organic grapefruit of 15-69¢ per lb. During the Alar scare (van Ravenswaay & Hoehn, 1990), willingness to pay to avoid Alar (by substituting from conventionally-grown to organic apples) was 12¢ per lb. Organic baby food commands a premium of 21¢ per jar (Harris, 1997). The amount consumers will pay to avoid chemicals varies widely both in terms of percentages and in monetary values.

Market price effects

A major hindrance to selling organic produce may be that, because organic produce at present tend to have a high wholesale cost differential with respect to conventional produce, retailers tend to keep profit margins low in order to make organic prices attractive when compared to conventional produce. Consequently, they may be unwilling to stock large quantities of organic produce. Produce managers generally believe that organic produce are too expensive. Morgan *et al* (1990) found that non-organic produce sellers who are interested in organic produce cite price as the main barrier to selling organic produce.

Morgan *et al* (1990) argues that organic produce should be marketed as premium products and that retailers are not taking advantage of the premium nature of organic produce in order to keep prices high. Morgan *et al.* finds that 76.6 percent of organic produce sellers use the same or lower markup on organic produce as they do for non-organic produce. Only 23.4 percent use a higher markup on organic produce.

However, part of the reason the majority of retailers use the same or lower markup for organic produce is that demand for organic vegetables has been found to be significantly price-elastic.³ When wholesale costs for broccoli, carrots, and lettuce decrease by 1 percent, demand increases by 1.7, 2.4, and 1.2 percent, respectively (Park & Lohr, 1996). Or, stated conversely, as organic prices rise, quantity demanded falls at an increasingly faster rate, making it difficult to keep prices high.

The organic market is fragmented, as supplies are short in some areas and not in others. For this reason, Franco (1989) found broccoli premiums as high as 100 percent.

³ Price elasticity of demand is a measure of the responsiveness of demand to a change in a good's price. Elastic demand means that the quantity demanded of a good will fall by more than 1% in response to a 1% increase in the good's price, *ceteris paribus*. Conversely, a 1% decrease in the good's price will cause the quantity demanded to increase by more than 1%.

Household size effects

Household size can be correlated with total food expenditures because the larger the household the more food required to feed the household. Because EIPs are relatively expensive one might expect consumption of EIPs to fall (either absolutely, or as a share of food expenditures) as household size rises. Two studies confirmed this hypothesis. Jolly (1991) found that two person households with a household income in excess of \$30,000 had the highest willingness to pay for organic produce. Willingness to pay decreased as household size increased. A survey by the Food Marketing Institute (1997) found that single-person households were more concerned about the availability of organic produce than multiple-person households. However, Jolly & Dhesi (1989) found the effect of household size on demand for organic poultry to be zero.

3. SENSORY VARIABLES

When shoppers compare organic produce with conventionally-grown produce what sensory perceptions matter most? How does the organic item look, smell, and taste, compared to a non-organic fruit or vegetable?⁴ How does sensory appeal affect willingness to pay for the organic food item? How much do considerations of freshness and keeping qualities of organic produce versus conventional produce influence purchasing decisions?

Chemicals used to minimize insect damage and fungi cannot be used on organic fruits and vegetables, so organic fruits and vegetables may not always appear as perfect as a conventionally-grown and treated product (While comparably appearing organic foods are technically feasible, they are costly to produce.) How much do consumers care about differences in appearance? Are organic produce really less cosmetically perfect? If consumers care, will knowledge that cosmetic defects are a result of lack of chemical sprays offset any reduction in demand due to cosmetic defects?

When investigating opinions which influence the purchase of organic produce, it is not only the end-consumer who must be considered but also the wholesaler and the supermarket produce manager. A strong concern among produce managers and a likely obstacle to increasing organic produce availability is the perception by retail produce managers that organic produce is generally lower quality than conventional produce (Jolly & Norris, 1991; Lin *et al.*, 1986; Morgan *et al.*, 1990). However, this perception is changing. In a 1989 survey, 67 percent of produce managers rated organic produce as worse than conventionally-grown produce. In 1991, this percentage fell to 50 percent (Jolly & Norris, 1991). Estes *et al* (1994) found organic produce managers indicate that they desire the highest quality produce available, irrespective of price. While consumers do not seem to view organic produce as inferior in terms of taste, freshness, or nutritional value, half of produce managers view organic produce as inferior to conventional produce for these quality characteristics.

Appearance

Some studies show that consumers have a strong resistance to blemishes. Ott (1990) found that sixty-two percent of consumers would be unwilling to accept any decrease in appearance quality when purchasing organic produce, and 88 percent would be unwilling to accept insect-damage on pesticide-residue-free produce. There is a clear relationship between willingness to accept blemishes and organic purchasing behavior (Goldman & Clancy, 1991). Eighteen percent of shoppers who are concerned about pesticides would be willing to buy blemished produce whereas only 6 percent of

⁴ Waugh (1928) did the first hedonic study of produce. (A “hedonic” regression model is one which places separate dollar values on various attributes of a commodity.) He found that size, appearance, and color were the most important attributes in conventional produce. In Weaver *et al* (1992), flavor was the most important tomato attribute.

shoppers who are unconcerned about pesticides would be willing to buy blemished produce. (Ott, 1990) However, when it is made known that the blemished produce is "organic," consumers are more likely to buy blemished organic produce.⁵

Other studies show the negative effect on consumer demand of blemished produce is only slight (Goldman & Clancy, 1991; Sparling and McKenzie, 1992; Estes *et al.*, 1994; Tregear *et al.*, 1994). A previous review of literature (Beharrell & MacFie, 1991) found that people estimate a food's quality by appearance. As one grower states, "people shop with their eyes." The degree to which blemishes cause people, who would otherwise buy organic produce to choose not to, is ambiguous, but it is important that EIPs be as visually appealing as possible or people are less likely to buy them.

Produce managers who did not handle organic produce rated appearance as a limiting factor much higher than those who handled organic produce. Lin *et al.* (1986) shows that the more organic or pesticide-free produce is preferred, the less appearance is important.⁶

Jolly & Norris (1991) found that eleven out of twelve supermarket chains surveyed rated organic produce appearance as worse than non-organic produce and believed that their customers held the same view. Attitudes by produce wholesalers and retailers may hinder organic produce's availability in conventional food stores.

Anecdotal evidence indicates that, while the appearance of organic produce was inferior to conventional produce in the 1980's, the quality of what is for sale now has improved greatly. In one study, Conklin *et al.* (1991) actually found that organic apples had fewer defects than non-organic apples. In comparing carrots, potatoes, and romaine lettuce produce managers reported the number of defects in organic produce to be higher than in conventional produce, but the number of observations of defects in organic produce and conventional produce were statistically different from zero for carrots only. Produce managers' concerns about organic quality may not reflect the quality of the goods now supplied, but rather their earlier impressions.

Ott (1990) looked at the relationship between consumers' tolerance for cosmetic defects in organic produce and demographic variables. He found that those who were college-educated or had a higher income, were more willing to accept cosmetic defects.

⁵ Van Ravenswaay & Hoehn (1991b) show that 11.9 percent of respondents were willing to accept pest-damaged apples as long as no pesticides were used. This contradicts Ott (1990). Bunn (1990) has similar results as van Ravenswaay & Hoehn for organic orange demand.

⁶ In an ordered Logit Model regression of importance on preference indicator, the t-value for organic produce's appearance was -1.787.

Taste

Taste (meaning flavor, as opposed to preferences in general) is another basic attribute of EIPs that affects food purchasing decisions. Jolly & Dhesi (1989), Jolly & Norris (1991), and Sparling *et al.* (1992) found consumers perceived no difference in taste between conventionally-grown and organic produce. Morgan *et al.* (1990), Estes *et al.* (1994), and The Packer (1996) found that consumers believed that organic produce tastes better than conventional produce. Sparling *et al.* (1992) found that non-organic produce consumers do not view organic produce as tasting better than conventional produce, but organic produce consumers do believe organic produce taste better than conventional. Estes *et al.* (1994) found that survey respondents cite “better taste” as the primary reason for buying organic produce. In only one reviewed study did consumers rate the taste of conventionally-grown produce as superior to organic produce. Consumers seem to prefer organic produce’s taste or do not have taste preferences at all.

Freshness and shelf life

Freshness is another factor that influences consumers’ produce decisions. Consumers rate in-store freshness as the same between conventional and organic produce (Sparling *et al.*, 1992). Retail produce buyers say organic produce tend to have a shorter shelf life than conventional produce and that this characteristic decreases consumers' demand for organic produce. However, the frequency of this response was very weak.⁷ Estes *et al.* (1994) found that the third most frequently mentioned reason for purchasing organic produce is freshness. The Packer (1996) found that 17 percent of organic produce consumers cite increased freshness as a major reason for purchasing organic produce.

A characteristic related to freshness is shelf life, i.e., how long organic fruit and vegetables will keep. Jolly & Norris (1991) and Morgan *et al.* (1990) find the majority of produce managers rate organic produce’s keeping qualities as worse than that of conventionally-grown produce. Sparling *et al.* (1992) finds that consumers see no difference in the keeping quality of organic produce versus conventional produce. Other consumers cited organic produce’s longer shelf life as a reason for purchasing organic produce (Morgan *et al.* 1990). There seems to be no consensus regarding organic produce’s keeping qualities as compared to the keeping qualities of conventionally-grown produce.

⁷ 39/331 responses indicated this view. This is 12 percent. (Estes *et al.*, 1994)

4. DEMOGRAPHIC VARIABLES

Demographic variables often are used as a proxy for tastes and preferences. This assumes that individuals who belong to the same demographic group have similar tastes and preferences. However, in the case of EIP consumers, several traditionally important demographic variables such as education and age seem to add little information in predicting who is likely to purchase EIPs. Important demographic variables that do affect EIP demand include occupational class, gender, marital status, community size, and race.

The typical organic produce consumer is single, white, young, female, and professional. However, there is substantial variation among the demographic variable findings, and demographic variables alone do not appear to be enough to describe organic produce consumers very well. It is interesting that the more traditional variables used in demand models such as income and education seem relatively unimportant in modeling demand for EIPs. In order to accurately identify EIP consumers we will need to consider other types of variables such as psychographic variables which include lifestyle, values, and self image, which will be considered in following chapters.

Occupation

The importance of occupational class was confirmed by Jolly & Dhesi (1989) and Jolly (1991). Both studies found that buyers of organic poultry and organic produce tend to belong to white-collar occupational classes.

Race

Race was also found to be important. Ott (1990) found that whites were willing to pay higher prices for Certified Pesticide-Residue-Free produce than were non-whites. Misra *et al.* (1991) found that whites were less price elastic in their produce purchases than non-whites. This means that as produce prices increased, the quantity of produce purchased by whites declined more slowly than the quantity of produce purchased by non-whites. Since EIPs usually cost more than conventional produce, this finding implies that whites would be more inclined to purchase EIPs than non-whites. However, Buzby & Skees (1994) found no relationship between willingness to pay for reduced exposure to pesticides and race.

Even though current purchasers of organic produce may tend to be white, non-whites are just as willing to pay for reductions in pesticide exposure. There may be differences in perceptions among races about the level risk from exposure to pesticides from conventional produce. There may also be differences among races in the level of awareness or availability of pesticide-residue-free produce.

Gender

Purchasers of EIPs tend to be women. This may be explained by the fact that women tend to be the primary food shoppers of a household and may be more aware of food issues. Estes *et al.* (1994) found that being female was the second-most common characteristic among purchasers of organic produce. Govindasamy & Italia (1997b) found that women both knew more about integrated pest management (IPM) and were willing to pay more for organic produce. Jolly (1991) found that women were willing to pay more for organic produce than men. Similarly, Buzby & Skees (1994) found that women were willing to pay more for reductions in pesticide exposure than were men.

Marital status

While women have a higher willingness to pay for organic produce than men, both single men and single women have a higher willingness to pay for EIPs than married men and women. Jolly (1991) found that while all consumers expressed a positive willingness to pay for organic produce, single consumers were willing to pay more for organic produce than married consumers.

Community size

Community size is a variable one might expect to be an important factor in determining one's demand for EIPs if it is true that urban consumers have more opportunities to buy EIPs than rural consumers, or if urban consumers have more "sophisticated" tastes. However, the studies under review found that consumers from smaller communities were more likely to purchase organic produce than consumers from larger communities. Jolly & Dhesi (1989) found the average community size for buyers of organic poultry in California to be 37,268, compared to 45,659 for non-buyers. Jolly (1991) found the average community size for buyers of organic produce was 39,400, compared to 44,500 for non-buyers.

Education

Another commonly-held assumption about EIP consumers is that college-educated consumers are more likely to purchase EIPs than non-college-educated. However, the studies reviewed for this paper found no relationship between level of education and purchases of organic produce. Jolly & Dhesi (1989) and Jolly (1991) found that level of education did not explain differences in buying behavior between buyers and non-buyers of organic poultry and organic produce. Misra *et al.* (1991) found the effect of education to be negative when organic produce cost more than conventional produce (i.e., as the level of education rose among consumers, purchases of organic produce went down). Similarly, Buzby & Skees (1994) found that willingness to pay for reductions in pesticide exposure decreased as level of education increased.

The exception to these results was Jolly (1991) who found that among those who purchase organic produce, those with university degrees were willing to pay the most for organic produce. This does not mean that those with less education do not purchase organic produce. It means that among those who purchase organic produce, those with more education (and perhaps higher incomes) are willing to pay more for organic produce than those who have less education (and perhaps lower incomes).

Age

Research results tend to show a negative relationship between age and purchases of EIPs. Van Ravenswaay and Hoehn (1991b) found that age had a negative effect on demand for pesticide residue-free apples (i.e., older consumers demanded fewer pesticide-residue-free apples). Similarly, Buzby & Skees (1994) found that younger consumers were willing to pay more for reductions in pesticide exposure than older consumers. A survey conducted by the Food Marketing Institute found that older consumers were less concerned with the availability of organic produce at their grocery store than younger consumers (Food Marketing Institute, 1997). However, Jolly (1991) found no correlation between age and purchases of organic produce.

5. PSYCHOGRAPHIC VARIABLES

Psychographic variables are variables which characterize an individual's beliefs and concerns. In the context of EIPs, psychographic variables are attitudes and opinions about issues associated with EIPs. All psychographic variables reviewed were important and positively influenced consumers' purchases of organic produce.

Pesticides and consumers' health concerns

Consumers' concern for pesticides has been addressed by a number of studies. Generally, consumers of EIPs are concerned with exposure to pesticides and the effect of pesticides on their health and the health of the environment. All studies reviewed found consumers' concern for pesticides to be important and influential in the purchases of organic produce.

Morris *et al.* (1993) found that more Americans are concerned with the effects of pesticides on their health than are concerned about the effects of secondhand smoke, air pollution, food poisoning, or hormones in meat and milk. Purchasers of organic produce had a greater concern for pesticide residues than did non-buyers (Jolly & Dhesi, 1989; Jolly, 1991). Similarly, organic produce consumers rated protection from pesticide residues in food the second most important reason for supporting organic agriculture out of a list of seven commonly-cited reasons for supporting organic agriculture. (Goldman & Clancy, 1991)

It is known that consumers of organic produce often purchase organic foods to avoid consuming pesticide residues. Ninety-one percent of organic produce purchasers have concerns about the health effects of pesticides used in production of conventional produce (Morris *et al.*, 1993). Sachs *et al.* (1987) find that the number of people with concerns about consuming pesticides used on conventional produce is increasing.

Consumers who held negative perceptions about pesticides had an increased likelihood of purchasing organic produce and an increased willingness to pay for organic produce. Ott (1990) found 50 percent of shoppers were "concerned about pesticides" and were willing to pay more for CPRF (Certified Pesticide-Residue-Free) produce versus 33 percent who were unconcerned. Jolly & Norris (1991) found that eight out of twelve respondents ranked organic produce as better than conventional produce because of fewer chemical residues.

Fifty-two percent of consumers said they are "very concerned" or "extremely concerned" about pesticide residues when selecting produce (Cook, 1992). A large majority of Americans (84%) want the federal government to encourage farmers to reduce their application of chemicals (Morris *et al.*, 1993), and one of the actions supported in a poll conducted by the Public Voice for Food and Health Policy was a reduction in subsidies to farmers who use agricultural chemicals. Ott (1990) found that

67 percent of those surveyed were concerned enough about pesticides that they were willing to pay a premium for CPRF produce. CPRF is viewed by consumers as making food safer.

Bruhn *et al.* (1992) found that 15 percent of consumers who had concerns about pesticides actually purchased organic produce. Similarly, The Packer (1996) reported that twelve percent of buyers bought organic produce for their lack of chemicals. Sparling *et al.* (1992) observed 30 percent of purchasers of organic produce cited concern for pesticide residues as their main reason for making these purchases. In the same study, 21 percent of purchasers of organic produce cited concern for health as their main reason for doing so, which could also mean they had concerns about pesticide residues.

Food scares related to pesticides used on conventional agricultural products have in the past temporarily increased demand for certain organic foods. A widely-cited case is the Alar scare regarding the safety of eating apples treated with the pesticide Alar. Studies done by van Ravenswaay and Hoehn (1990) captured the effects of the Environmental Protection Agency's warning about the possible health hazards of eating apples which had been treated with Alar. Their research showed that this announcement had a significant negative effect on the demand for conventionally-grown apples and increased the demand for organic apples. However, Park and Lohr (1996) show that a food scare which causes an increase in the demand for specific organic fruits or vegetables does not necessarily cause an increase in the demand for other organic fruits or vegetables. This seems to imply that despite consumers concerns about pesticides, consumers have a high level of trust in the overall safety of the food system.

Closely related to consumers' concern for pesticides is their concern for health and the food they buy. Concern for health was found to be important by all studies reviewed, except Jolly & Dhesi (1989). Sparling *et al.* (1992) found that 21 percent of purchasers of organic produce cited concern for health as their main reason for doing so, and 54 percent of UK organic produce consumers bought organic produce out of concern for health (Tregear *et al.*, 1994). The Packer (1996) reported that 16 percent of purchasers of organic produce say they chose organic produce for health reasons.

Organic produce consumers may be thought of as having a general concern for how their food is treated. A study by Jolly *et al.* (1989) looked at consumers' concern for artificial coloring, additives, preservatives, and irradiation. Differences were found between purchasers and non-purchasers of EIPs in their levels of concern for these food treatments. The authors found that buyers of organic produce have a statistically significant higher level of concern for artificial coloring, additives and preservatives, and irradiation, than non-buyers. Jolly (1991) also found that buyers of organic poultry had a statistically significant higher level of concern for all three treatments, as well. People who buy organic produce seem to be people who are concerned about how their food is treated.

Health concerns by and for suppliers

If organic produce consumers are concerned about the effect of pesticides on their own health and the health of the environment, one might hypothesize that they might also be concerned for the health of farm workers who apply pesticides. Tests of this idea produced mild support. In a survey of organic produce consumers, Goldman & Clancy (1991) found that protection of farm workers ranked fourth on a list of seven commonly-cited reasons for supporting organic agriculture. Another study by Sparling *et al.* (1992) found only 3 percent of organic produce consumers purchase organic produce mainly out of concern for farm workers.

Those who handle produce in their work cite concern for health as a reason to sell organic produce. Morgan *et al.* (1990) finds lower health risk is cited by organic produce handlers as the primary reason to sell organic produce. Morgan *et al.* (1990) found 75.8 percent of organic produce sellers and 39.4 percent of non-organic produce sellers rank “lower health risk” as one of the top-three reasons to sell organic produce. Organic produce’s perceived lower health risks as a result of lower pesticide exposures is a strong motivator for handling organic produce. This attitude by handlers could be a positive factor to help increase consumers’ access to organic produce.

Environmental concerns

Environmental concern is a strong motivating factor for consumers who purchase organic produce. Goldman & Clancy (1991) report that when organic produce consumers were asked to list their reasons for purchasing organic produce, environmental concerns accounted for four of the top seven most commonly-cited reasons for supporting organic agriculture. Sparling *et al.* (1992) reports that eleven percent of organic produce purchasers do so mainly out of concern for the environment. Estes *et al.* (1994) found environmental concern was the fourth most often mentioned reason organic produce consumers said they purchased organic produce.

Most organic produce sellers report that customers believe that organic produce is better for the environment than conventional produce. Morgan *et al.* (1990) found that 61.3 percent of organic produce sellers and 52.1 percent of non-organic produce sellers rank “better for the environment” as one of the top-three reasons to sell organic produce. Jolly & Norris (1991) found that 5 out of 12 organic produce managers rank organic produce as better for the environment than conventional produce. Another 5 out of 12 produce managers say organic produce and conventional produce are equally good for the environment. None of the produce managers interviewed believed that organic produce was worse for the environment than conventional produce. Most consumers and produce carriers believe that organic products are good for the environment whether or not they actually participate in the organic market.

Concern for the environment did not prove useful, however, in differentiating buyers and non-buyers of organic produce in one British study. Tregear *et al.* (1994) found that over 90 percent of both

purchasers and non-purchasers of organic produce were concerned about the environment. Of those purchasing organic produce, only nine percent cited concern for the environment as their main reason for doing so.

Nutritional concerns

If produce is grown in healthy soil, the produce should contain sufficient vitamins and minerals. There is no scientific reason to believe that organic fruit and vegetables absorb more vitamins and minerals than those exposed to chemicals (i.e., organic foods are not necessarily more nutritious than conventional vegetables, and vice versa). However, most studies find that respondents believe organic produce is more nutritious than conventional produce. Sparling *et al.* (1992) found most consumers view nutritional benefits of the two types of produce as the same, although 9 percent of retail produce buyers cite organic produce being "more nutritious" as the main reason they believe consumers purchase organic produce. Other studies such as Jolly & Dhesi (1989), Morgan *et al.* (1990) and Estes *et al.* (1994) found that both purchasers of organic produce and non-purchasers of organic produce as well as retail produce buyers believed that organic produce was more nutritious than conventional produce. The perception that organic produce is at least as nutritious, if not more so, than conventionally-grown produce seems to be widely held.

6. BEHAVIORAL CORRELATES OF EIP CONSUMERS

Consumption of EIPs may often be part of a life-style that emphasizes proactivity and personal action, with reference both to one's own well being, and also the well-being of others.

Tregear *et al.* (1994) found that 75 percent of people who buy organic produce said they participated in environmental activities compared to 43 percent of those who did not buy organic produce. Tregear *et al.* (1994) also found that store produce managers typified organic food buyers as "environmental advocates."

On issues of food avoidance, Tregear *et al.* (1994) found no correlation between purchases of organic produce and avoidance of specific foods on ethical grounds (such as avoiding purchasing grapes grown in ways that might harm migrant farm workers). Seven percent of both organic and non-organic shoppers avoided foods for various ethical reasons. It seems that while "ethical consumers" are not necessarily EIP consumers, environmentally-minded consumers are often EIP consumers.⁸

Responses to pesticide fears are varied: 29.8 percent of consumers grow their own fruit and vegetables (which also reflects a demand for local produce); 23 percent avoid imported produce; 11 percent buy pesticide-free produce; and 10.7 percent buy organic produce (van Ravenswaay & Hoehn, 1991a). Other studies show that 43 percent of consumers changed their buying habits to avoid pesticides and 86 percent look for food at the supermarket that is grown with fewer chemicals. When responding to pesticide fears, 41 percent buy more organic produce; 22 percent buy less produce; 28 percent avoid produce receiving media attention; and 5 percent grow their own vegetables (Weaver *et al.*, 1992). If pesticide fears are increasing (Sachs *et al.*, 1987) then organic produce demand will also increase.

⁸ It is interesting to note that while environmental activism is falling, demand for organic foods has been growing rapidly (Food Marketing Institute, 1995; Sachs *et al.*, 1987).

7. MARKETING AND CONSUMPTION BARRIERS

Dissemination of information about organic products, labeling, and delivery to market are all aspects of marketing. The organic produce market is under-developed in these areas. In effect, the market for EIPs is in disequilibrium, because of extrinsic limits on information or availability.

Information effects

Information motivates organic produce demand. After the EPA Alar report there was a stampede for organic food. Other food safety scares that the media makes public have immediate effects on demand. Zellner & Degner (1989) found that in Des Moines, Iowa, where regional information was available, willingness to pay was higher than in other cities without this information. Morris *et al.* (1993) found that when respondents were given Food and Drug Administration (FDA) and EPA findings on pesticide residues on food, over 90 percent of Americans supported dramatic reductions in agrochemical use, and 85 percent would favor politicians who promote stricter laws for pesticide use. Not only has it been shown that consumers will, at least temporarily, switch from conventionally-grown to organically-grown foods when the government publishes information regarding agrochemical threats, but they also want action by their politicians.

Do people who spend more time making food purchasing decisions by reading food advertisements buy more organic produce? Govindasamy & Italia (1997b) find that reading food advertisements and reading food safety articles are inversely related. Those who read food advertisements are not concerned with food safety. Those who primarily read food safety articles are more concerned about risk and are more willing to pay a premium for organic produce, than those who read primarily food advertisements.

People want more disclosure and better access to information. Eighty-six percent of those surveyed want to know the amount of chemicals used on their food (Morris *et al.*, 1993). A large majority would like signs in supermarkets to state chemical use for each produce item and would like labeling laws requiring agrochemical disclosure.

Information gaps include not only uncertainty about the amount of chemicals used on food but also the validity to organic claims. Produce marketers and consumers both realize that the lack of information about organic produce is a deterrent to its demand. Weaver *et al.* (1992) show that of those who have not changed their buying habits due to pesticide concerns, 22 percent say lack of information is the cause. Buyers rank lack of information as the second reason why consumers do not purchase more organic produce. Information gaps hinder consumer demand for organic produce.

The role of labeling

Labeling is a specific technology for imparting information. Credible labeling generally requires some degree of government intervention.

The USDA is in the process of reviewing standards for uniform labeling. Currently many different agencies with different criteria support organic labels. Some organic goods carry no labels, which confuses produce consumers and buyers. The majority of Americans want tough labeling laws covering pesticide and chemical use on food (Morris *et al.*, 1993). Seventy-five percent of produce managers find the lack of standards and grading a problem in carrying organic produce, which ranks third among their list of problems in carrying organic produce (Jolly & Norris, 1991, and Morgan *et al.*, 1990). Nearly all consumers want labeling for pesticide use (Buzby & Skees, 1994). Van Ravenswaay & Hoehn (1991a) found that labels concerning pesticide testing on apples raised demand by 6.12 or 11.7 lb. per family, depending on what type of label the apples had. Accurate labeling also translated into more willingness to pay. Consumers want information on the products they are purchasing. Both consumers and produce managers want better consistency. Consumer information and labeling should improve when the U.S. Department of Agriculture (USDA) begins its certification program.

Availability effects

Perhaps the biggest hindrance to increasing market share for organic produce is lack of availability. Organic goods are simply not widely available in stores. Yet, 84 percent of respondents say they prefer organic produce when it is available (Huang, 1991), and 81 percent of organic produce handlers agree organic produce is under supplied (Morgan *et al.*, 1990). Other studies echo this sentiment (The Packer, 1996 ; Jolly & Norris, 1991;, Morgan *et al.*, 1990; Sparling *et al.*, 1992). A 1996 survey by the Food Marketing Institute showed that 70 percent of those surveyed shopped at a store that sells organic produce but felt supplies were limited (Food Marketing Institute, 1997).

8. CONCLUSION

Mainstream consumers tend to have a generally-positive view of organic produce. However, produce buyers and produce managers tend to view organic produce more negatively than consumers. This view may contribute to the problem of availability since these are the people responsible for bringing organic produce to the retail marketplace.

Price generally has a negative effect on quantity of organic produce demanded. Most stores do not charge a higher mark-up for organic produce; rather, the premium most often comes from the producer or wholesaler. By definition, those currently purchasing organic produce are willing to pay this premium. While most shoppers are willing to pay more for organic produce, demand quickly decreases as the price premium for organic produce increases. (As low as 10 percent may be the threshold price premium.) Certification of produce as pesticide-residue-free or organic seems to raise willingness to pay for organically grown produce.

So who are consumers of EIPs? Results from these studies indicate the demographic traits of organic buyers are quite interesting and are perhaps different from what one might expect. One might expect that those with higher incomes and more affluent lifestyles, who could devote more resources to buying the best quality products, would be prime organic shoppers. One might expect that those who were better educated would be more likely to have strong health and environmental concerns and to demand more organic produce. One might expect that families with children would demand more produce grown in “healthier” ways. Survey evidence strongly suggest that these ideas are wrong. Income and education are not necessarily related to organic produce demand in the U.S. market. These studies suggest that single, professional, white females are one group of organic shoppers. Also, people who hold strong health or environmental concerns are likely to be organic shoppers. Organic produce consumers are represented across income and educational levels.

Purchasing of organic produce is closely related to health and environmental concerns, leading to the idea that values and personal interests play a role in making one an organic shopper.

Major obstacles to the organic market appear to be:

- Availability: most people shop in only one market, a supermarket. Supermarkets may carry some organic produce, but usually not a wide variety of organic produce.
- Higher grower prices than conventional produce: higher grower prices for organic produce decreases consumer demand and stores’ interest in stocking organic produce.
- Lack of uniform labeling and certification: this problem is now being addressed at the federal level.

- Attitudes of produce handlers that do not correspond to shoppers' views: this situation is a function of information and experience and should improve with uniform labeling movement and wider availability of organic produce.

People say that they are willing to buy organic produce, even at a higher price. Broadening the market and introducing economies of scale into production, thereby lowering costs to produce, will reduce price. More than price, a broad market base is needed. People report that their supermarkets carry some organic produce, but how much of a choice are they given when choosing produce? Most stores do not have distribution channels for organic and local produce comparable to those that exist for conventional produce, and most people cannot purchase organic produce unless they shop at a specialty or health food store.

APPENDIX 1: Summary of Findings

Table 1.1
Demographic Variables

Key:

- + = Positive effect on purchases of organic produce
 - = Negative effect on purchases of organic produce
 0 = No effect on purchases of organic produce

Education

Jolly & Dhesi (1989)	0	Level of education not significant as an explanatory variable to explain differences in buying behavior between buyers and non-buyers of organic poultry.
Misra <i>et al.</i> (1991)	-	College-educated consumers were more price-elastic.
Jolly (1991)	0	Level of education not significant as an explanatory variable to explain differences in buying behavior between buyers and non-buyers of organic produce.
Jolly (1991)	+	Those with college and graduate degrees are willing to pay the most for organic produce. There is no trend with education or income of percentage who are willing to pay a positive premium for organic produce.
Buzby & Skees (1994)	-	Willingness to pay for reductions in pesticide exposure levels decreased as education increased.

Occupation

Jolly & Dhesi (1989)	+	Buyers of organic poultry belong to more white-collar occupational classes than non-buyers do.
Jolly (1991)	+	Buyers of organic produce are more likely to be in service or white-collar occupations. (Possible explanation: these individuals may be less under the influence of primary consumer reference groups and thus more free to be innovative consumers.)
Jolly (1991)	0	Blue-collar workers are willing to pay 39.1% more for organic produce; white-collar workers are willing to pay 38.6% more for organic produce.

Income

Jolly & Dhesi (1989)	-	Average incomes of buyers of organic poultry are lower than that of non-buyers by \$4000 per year (suggesting that lifestyles, values and concerns may have key roles to play in the organic food purchasing decision). (statistically significant at the .01 level).
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Ott (1990)	0	Not significant in explaining shoppers' willingness to pay more for CPRF produce.
Goldman & Clancy (1991)	0	Income elasticity found to be zero among buyers of organic produce.
Jolly (1991)	0	Level of household income not significant as an explanatory variable to explain differences in buying behavior between buyers and non-buyers of organic produce.
Jolly (1991)	+	Willingness to pay for organic produce increases with income.
Jolly (1991)	0	Trend between age and WTP were completely unpredictable. Under 40-year-olds were most willing to pay for organic produce when income was between \$30-49K. Those between 40-59 years, were most willing to pay for organic produce when incomes were less than \$30,000. Those over 60, seemed willing to pay more for organic produce when income was over \$50,000, but low and high incomes tied for over-70's.
van Ravenswaay & Hoehn (1991b)	+	.00042 income elasticity. Statistically different from zero at 95% for pesticide-free apples. In the regressions, income's absolute value of its coefficient was the smallest, but was significant. All were +.
Buzby & Skees (1994)	0	Income had no apparent effect on whether respondents would pay more for increased reductions in pesticide exposure.
Estes <i>et al.</i> (1994)	+	Buyers ranked <i>high disposable income</i> as 2 nd (tied with <i>women</i>) on the list of characteristics typical of the main consumers of organic produce. Being <i>young professional</i> , ranked 4 th after environmental advocate, high disposable income, and women.
Park & Lohr (1996)	+	Effect of income on organic broccoli and lettuce demand was relatively large, positive and significant.
Park & Lohr (1996)	0	Effect of income on organic carrot demand was not significant.
Age (Older)		
Jolly & Dhesi (1989)	0	Mean age for buyers of organic poultry is 40 vs. 46 for non-buyers (statistically significant at the .01 level)
Jolly (1991)	0	The mean age of buyers was 40.9 vs. 48.6 for non-buyers.
Jolly (1991)	0	Those willing to pay the most were those in their 40's. There is no age trend (it bounced back and forth between cohorts).
Misra <i>et al.</i> (1991)	+	Those over-60 were less price-elastic than those 36-60.
van Ravenswaay & Hoehn (1991a)	-	All models had a negative coefficient for age.
Buzby & Skees (1994)	-	Younger respondents were willing to pay more than older respondents for reductions in pesticide exposure.
Estes <i>et al.</i> (1994)	+	Weaker characteristic of the <i>main consumer of organic produce</i> when characterized by buyers.
Food Marketing Institute (1997)	-	22% of respondents said that availability of organic produce in stores was "very important." This concern decreased with age. 46% said it is "very important" to sell "green" goods.

Total food expenditures
 Goldman & Clancy (1991) 0 Organic buyers' purchases of organic produce were not related to total food expenditures.

Larger-Sized Community
 Jolly & Dhesi (1989) - Average community size of buyers of organic poultry was 37,268 vs. 45,659 for non-buyers (statistically significant at the .01 level).
 Jolly (1991) - The mean size of community for buyers was 39,400 vs. 44,500 for non-buyers (statistically significant at the .01 level).
 Jolly (1991) - The more rural the community the more people are willing to pay for organic produce.

Larger-Sized Household
 Jolly & Dhesi (1989) 0 Household size was not important as an explanatory variable between buyers and non-buyers of organic poultry.
 Jolly (1991) - Willingness to pay for organic produce differs with income. Two-person household have the highest willingness to pay when income is more than \$30,000. Single households have the highest for less than \$30K income.
 Buzby & Skees (1994) 0 Household size had no apparent effect on whether respondents would pay more for increased reductions in pesticide exposure.
 Food Marketing Institute (1997) - Single-person households were more concerned about the availability of organic produce than multiple-person households.

Race (White)
 Ott (1990) + 69% of whites versus 54% of non-whites were willing to pay higher prices for CPRF produce. Non-whites averaged less family income than whites, but income was not significant in explaining shoppers' willingness to pay more.
 Misra *et al.* (1991) + Whites were less price elastic than non-whites.
 Buzby & Skees (1994) 0 Race had no apparent effect on whether respondents would pay more for increased reductions in pesticide exposure.

Gender (Female)
 Jolly (1991) + Women are more willing to pay for organic produce than men.
 Buzby & Skees (1994) + Female respondents would pay more than male respondents for increased reductions in pesticide exposure.
 Estes *et al.* (1994) + From a list of possible characteristics of the *main consumers of organic produce*, being a woman tied 2nd with high disposable income (both followed *being an environmental advocate*).

Jolly (1991)

+

Marital Status

Marriage makes couples less likely to pay more for organic produce. Singles with less than \$30,000 income are willing to pay 44% more. Singles with incomes \$50,000+ are willing to pay 46.1% more for organic produce, but those between \$30-50K incomes are willing to pay only 37% more for organic produce. Among married couples, WTP increases in income, but never exceeds 37.6%.

Table 1.2
Psychographic Variables

Concern for pesticide residues		
Jolly & Dhesi (1989)	+	Buyers of organic produce have a higher concern for pesticide residues than non-buyers.
Ott (1990)	+	79% of shoppers who were “concerned” about pesticides were willing to pay more for CPRF produce vs. 52% who were “unconcerned.”
Goldman & Clancy (1991)	+	Shoppers at a New York state organic food co-op rated “protection of consumers from pesticide residues in food” second out of a list of seven commonly-cited reasons for supporting organic agriculture (rated 2.3 on a scale of 1 (least important) to 4 (most important)).
Jolly (1991)	+	Buyers rated “concern for pesticide residues” 4.37 vs. non-buyers’ 3.92 on a scale of 1(not concerned) to 5 (very concerned); significant difference at the .01 level.
Jolly & Norris (1991)	+	8 out of 12 respondents ranked organic produce as better than conventional produce for chemical residues.
Bruhn <i>et al.</i> (1992)	+	15% of consumers with pesticide concerns actually purchased organic produce.
Sparling <i>et al.</i> (1992)	+	30% of purchasers of organic produce cited concern for pesticide residues as their main reason for doing so. This was the most often-cited reason among purchasers for purchasing organic produce. The second most often-cited reason was concern for health (21%), which could possibly be capturing additional concern for residues.
<u>The Packer</u> (1996)	+	12% of buyers bought organic produce for its lack of chemicals.

Sachs *et al.* (1987) (p.99)

“Pesticides may be perceived as having a negative impact on the environment and human health at some time in the future, but theory also has a specific utility: the ability to promote the short-term welfare of humans. Pesticides have been credited with keeping food prices low and the food supply abundant and dependable. They have eradicated some insect pests and insect-borne diseases and are responsible for the high degree of visual perfection in fruits and vegetables that consumers have come to expect in the supermarkets. It may be that concerns for health and the environment, although real, are tempered by the perceived benefits of pesticides.”

Concern for artificial coloring		
Jolly <i>et al.</i> (1989)	+	Buyers of organic produce had a statistically significant higher level of concern for artificial coloring than non-buyers (significant at the .01 level).
Jolly (1991)	+	Buyers of organic poultry had a statistically significant higher level of concern for artificial coloring than non-buyers (significant at the .01 level).

Concern for additives and preservatives

Jolly <i>et al.</i> (1989)	+	Buyers of organic produce had a statistically significant higher level of concern for additives and preservatives than non-buyers (significant at the .01 level).
Jolly (1991)	+	Buyers of organic poultry had a statistically significant higher level of concern for additives and preservatives than non-buyers (significant at the .01 level).

Concern for irradiation

Jolly <i>et al.</i> (1989)	+	Buyers of organic produce had a statistically significant higher level of concern for irradiation than non-buyers (significant at the .01 level).
Jolly (1991)	+	Buyers of organic poultry had a statistically significant higher level of concern for irradiation than non-buyers (significant at the .01 level).

Concern for environment

Goldman & Clancy (1991)	+	On a scale of 1 (least important) to 4 (most important), shoppers at a New York state organic food co-op included concerns for the environment as 4 items in a list of the top 7 most often-cited reasons for supporting organic agriculture: <u>Rank Score</u> 1 st 3.0 Protection of wildlife and water supplies from pesticide contamination. 2 nd 2.3 Protection of drinking water supplies from fertilizer contamination. 4 th 2.2 Conservation of non-renewable natural resources. 6 th 2.0 Preservation of the balance of nature on the farm.
Jolly & Norris (1991)	+	7 out of 12 organic produce managers ranked organic produce as environmentally better than conventional produce, 5 out of 12 said they were about the same.
Jolly & Norris (1991)	+	10 out of 12 organic produce sellers said that customers felt organic produce were environmentally better than conventional produce.
Morgan <i>et al.</i> (1990)	+	61.3% of organic produce sellers and 52.1% of non-organic produce sellers rank <i>better for the environment</i> as one of "top three reasons to sell organic produce."
Sparling <i>et al.</i> (1992)	+	11% of organic produce purchasers indicated concern for environment as their main reason for purchasing organic produce. This was the third most often-cited reason for doing so.
Tregear <i>et al.</i> (1994)	0	Concern for environment did not prove useful in differentiating between buyers and non-buyers of organic produce as over 90 percent of both groups were concerned about the environment.
Tregear <i>et al.</i> (1994)	0	Only 9% of those buying organic produce indicated concern for the environment as a reason for doing so.

Concern for health of farm workers		
Goldman & Clancy (1991)	+	On a scale of 1 (least important) to 4 (most important), shoppers at a New York state organic food co-op rated 7 often-cited reasons for supporting organic agriculture: <u>Rank Score</u> 4 th 2.2 Protection of farm workers from pesticide exposure.
Sparling <i>et al.</i> (1992)	0	Only 3% of organic produce purchasers indicated concern for the health of farm workers as their main reason for purchasing organic produce.
Concern for personal health		
Jolly & Dhesi (1989)	0	No significant difference between buyers and non-buyers of organic produce.
Morgan <i>et al.</i> (1990)	+	Lower health risk was cited by handlers of organic produce as the #1 reason for selling organic produce.
Morgan <i>et al.</i> (1990)	+	75.8% (#1) of organic produce sellers and 39.4% (#3) of non-organic produce sellers rank <i>lowers health risk</i> as one of "top three reasons to sell organic produce."
Sparling <i>et al.</i> (1992)	+	21% of organic produce purchasers indicated concern for health as their main reason for purchasing organic produce.
Tregear <i>et al.</i> (1994)	+	65% of UK consumers who buy organic do so out of concern for health.
The Packer (1996)	+	16% say they chose organic produce for health reasons.
van Ravenswaay & Hoehn (1990)	+	Willingness to pay for Alar-free apples increased with people's concern about Alar. The EPA Alar announcement dummy variable had a significant and negative effect on demand for conventional apples.

Table 1.3
Behavioral Variables

Take action on environmental issues		
Estes <i>et al.</i> (1994)	+	4 th reason given by buyers for why shoppers want organic produce (followed taste, nutrition, and freshness).
Estes <i>et al.</i> (1994)	+	Buyers said the most typical organic produce consumer was the <i>environmental advocate</i> .
Tregear <i>et al.</i> (1994)	+	75% of buyers of organic produce vs. 43 percent of non-buyers undertook activities out of concern for "green issues."
Avoid/Purchase specific food purchases on ethical grounds		
Tregear <i>et al.</i> (1994)	0	Only 7% of buyers and non-buyers alike avoided specific food purchases on ethical grounds.
Avoid/Purchase specific food purchases on health grounds		
van Ravenswaay & Hoehn (1990)	+	The EPA Alar announcement dummy variable had a significant and negative effect on demand for conventional apples.
Conklin <i>et al.</i> (1991)	+	About half of all respondents reported altering their food purchasing habits because of food safety concerns: 8% said they avoided conventionally-grown produce and 8% reduced produce purchases, 4% bought pesticide-free produce.
Morgan <i>et al.</i> (1990)	+	53.2% (#3) of organic produce sellers and 66.2% (#1) of non-organic produce sellers rank <i>Customers want Organic Produce</i> as one of the "top three reasons to sell organic produce."
van Ravenswaay & Hoehn (1991b)	+	To avoid pesticide residues, 29.8% of respondents grow their own produce; 23% avoid imported produce; 11.1% buy food tested for pesticide residues; 10.7% buy organic food.
Bruhn <i>et al.</i> (1992)	+	Of consumers who volunteered pesticide concerns (48%), 15% changed their purchasing behavior by buying organic produce vs. 2% who did not volunteer pesticide concerns.
Weaver <i>et al.</i> (1992)	+	43% changed their purchasing behavior due to pesticide concerns. 41% now buy more organic; 22% buy less produce; 28% buy produce cited in the media; 5% grow their own produce.
Estes <i>et al.</i> (1994)	+	5 th reason that buyers give for why shoppers buy organic produce (follows taste, nutrition, freshness, and environmentalism).
Tregear <i>et al.</i> (1994)	0	Approximately 60 percent of both purchasers and non-purchasers of organic produce avoided specific food purchases on health grounds.
<u>The Packer</u> (1996)	+	16% say they chose organic produce for health reasons.
Park & Lohr (1996)	0	The NutriClean program and the Alar scare had small and insignificant coefficients for demand for organic carrots, broccoli, and lettuce.

Table 1.4
Consumer Attitudes Toward Organic produce

Acceptance of insect damage and cosmetic defects		
Lin <i>et al.</i> (1986)	-	Scale is from 0-3.5 to indicate degree of limitation of factor on organic and PRF markets: Handlers gave a rating of slightly more than 1.5. Nonhandlers rated appearance as a limiting factor with 2.5. In ordered Logit Model regression of importance on preference indicator, appearance's t-value is -1.787, i.e., factor is less important as organic/PRF produce is more preferred.
Bunn (1990)	0	Respondents were less likely to purchase oranges that were blemished unless the blemishes were due to lack of pesticide use.
Ott (1990)	-	61.5% of respondents were unwilling to accept any decline in cosmetic quality when purchasing CPRF produce.
Ott (1990)	-	88.4% of respondents were unwilling to accept insect damage on CPRF produce.
Goldman & Clancy (1991)	0	Effect of blemishes on buyers' purchases of organic produce negative, but only slight. Clear positive relationship between acceptance of insect damage and surface blemishes and purchases of organic produce.
Jolly & Norris (1991)	-	11 out of 12 chains which carry organic produce rate their appearance as worse than conventional produce. Perceived customer attitudes is the same.
van Ravenswaay & Hoehn (1991b)	-	11.9% of respondents were willing to accept pest-damaged apples as long as there were no pesticide residues.
Sparling <i>et al.</i> (1992)	0	Only 3 percent of non-buyers of organic produce cited appearance as a reason for not buying organic produce.
Sparling <i>et al.</i> (1992)	0	About half of all respondents rated appearance of organic and conventional produce the same.
Estes <i>et al.</i> (1994)	+	A lesser reason (ranked 6 th) given by buyers for why shoppers want organic produce.
Estes <i>et al.</i> (1994)	-	Weakest reason given by buyers for why shoppers do not buy more organic produce. Frequency = 29 out of 331.
Estes <i>et al.</i> (1994)	-	Weakest reason among all reasons given by buyers for why consumers do not buy more organic produce.
Tregear <i>et al.</i> (1994)	0	3 percent of U.K. respondents cited appearance as a reason for not purchasing organic produce.

Acceptance of insect damage and cosmetic defects

Education		
Ott (1990)	+	College-educated more willing to accept cosmetic defects and insect damage than non-college-educated.
Income		
Ott (1990)	+	As income level rose, respondents' willingness to accept cosmetic defects increased.

		Gender (Female)
Ott (1990)	-	48% of men vs. 34% of women were willing to accept cosmetic defects when purchasing organic produce.
		Concern for pesticides
Ott (1990)	+	18% of shoppers who expressed “concern” for pesticide use were willing to accept insect damage on CPRF produce vs. 6% who were unconcerned.
		Taste
Jolly & Dhesi (1989)	0	No significant difference in ranking of the importance of flavor when selecting produce between buyers and non-buyers of organic produce.
Morgan <i>et al.</i> (1990)	+	Better taste was given as one of the top three reasons to sell organic produce by about 10% of handlers and non-handlers of organic produce.
Jolly & Norris (1991)	0	11 out of 12 organic produce managers thought organic produce and conventional produce were about the same for flavor.
Morgan <i>et al.</i> (1990)	+	#8 & #9 reason for experienced and inexperienced organic produce sellers, respectively to sell organic produce: <i>tastes better</i> .
Sparling <i>et al.</i> (1992)	+	Taste was the third most often-cited reason for buying organic produce by purchasers of organic produce (17 %).
Sparling <i>et al.</i> (1992)	0	About half of all respondents rated the flavor of organic and conventional produce the same.
Estes <i>et al.</i> (1994)	+	#1 reason given by buyers for why shoppers want organic produce.
The Packer (1996)	+	15% of those purchasing organic produce cited taste as a reason.
		Freshness
Sparling <i>et al.</i> (1992)	0	About half of all respondents rated the in-store freshness of organic and conventional produce the same.
Estes <i>et al.</i> (1994)	+	#3 reason that buyers gave for why their customers want organic produce. (This was #1 reason buyers want local produce.)
Estes <i>et al.</i> (1994)	-	<i>Shorter shelf life</i> was a weak reason given by buyers for why consumers do not buy more organic produce. Frequency was 39 out of 331.
The Packer (1996)	+	17% of those purchasing organic produce cited freshness as a reason.
		Keeping qualities
Jolly & Norris (1991)	-	9 out of 12 organic produce managers rated shelf life as worse than conventional produce's.

Morgan <i>et al.</i> (1990)	+	#9 reason for selling organic produce: <i>organic produce has a longer shelf life</i> . Organic produce sellers gave this a lower rating than non-organic produce sellers.
Sparling <i>et al.</i> (1992)	0	About half of all respondents rated the keeping qualities of organic and conventional produce the same.
Nutritional value		
Jolly & Dhesi (1989)	+	Buyers of organic produce have a higher concern for nutritional value than non-buyers.
Morgan <i>et al.</i> (1990)	+	About 45% of handlers, and about 25% of nonhandlers, ranked <i>more nutritious</i> in the top three reasons to sell organic produce.
Morgan <i>et al.</i> (1990)	+	#4 reason for organic produce sellers to sell organic produce: <i>more nutritious</i> . Organic produce sellers rated this higher than non-organic produce sellers.
Sparling <i>et al.</i> (1992)	0	Only 9% of buyers of organic produce cited nutritional value as their main reason for purchasing organic produce.
Sparling <i>et al.</i> (1992)	0	About half of all respondents rated the nutritional value of organic and conventional produce the same.
Estes <i>et al.</i> (1994)	+	#2 reason (after taste) by buyers for why shoppers want organic produce.
General Quality		
Lin <i>et al.</i> (1986)	-	Scale is from 0-3.5 to indicate degree of limitation of factor on organic and PRF markets: Handlers gave a rating of just under 1.5; Nonhandlers rated <i>organic quality</i> as 3. In ordered Logit Model regression of importance on preference indicator, <i>consistency of quality</i> had a t-value of -3.112, i.e., factor is less important as organic/PRF is more preferred..
Morgan <i>et al.</i> (1990)	-	About 40% of organic produce handlers gave <i>poor quality</i> as a <i>top three problem with selling organic produce</i> . A little over 50% of nonhandlers gave this as a <i>top three</i> problem.
Jolly & Norris (1991)	-	In the 1989 survey, 66.6% rated organic produce as worse than conventional. In the 1991 survey, 50% rated organic produce as worse than conventional.
Jolly & Norris (1991)	-	11 out of 12 organic produce managers found <i>poor quality</i> to be a problem (#2 problem) with selling organic produce.
Morgan <i>et al.</i> (1990)	-	More nonsellers than sellers of organic produce rank <i>poor quality</i> as one of top three problems with selling organic produce (sellers=33.9%, nonsellers=51.5%)
van Ravenswaay & Hoehn (1991a)	+	One unit improvement in apple quality increases quantity of apples demanded by 11.3 lb. per household per year.
Estes <i>et al.</i> (1994)	+	The highest quality, irrespective of price, is the characteristic most desired by organic produce buyers.

Certified Pesticide-Residue-Free

Cook (1992)	+	52% rated this characteristic “extremely” or “very” important when selecting produce.
Ott (1990)	+	67% were willing to pay premium for CPRF produce.
Ott (1990)	+	79% of shoppers who were “concerned” about pesticides were willing to pay more for CPRF produce vs. 52% who were “unconcerned.”
Ott (1990)	+	57% of respondents were willing to pay 5% more for CPRF produce. 10% of respondents were willing to pay 10% more for CPRF produce (33% were unwilling to pay more for CPRF produce).
Misra <i>et al.</i> (1991)	+	46% willing to pay more for produce tested and certified as pesticide-free, 26% unwilling, and 29% unsure. Premium % with positive willingness to pay: 0-5% 54% 6-10% 33% 11-15% 6% 16-20% 7% 20+% 1%
van Ravenswaay & Hoehn (1991)b	+	To obtain certified pesticide-free apples, WTP= 37.5¢; <i>No detectable residues</i> , WTP = 23.6¢; <i>No residues above federal limits</i> WTP = 23.6¢. Probability (purchase apple, with a <i>no residues</i> label, with 39¢ premium) = .858. Probability (purchase apple, with a <i>no residues</i> label, with \$1.49 premium) =.4532.
Bruhn <i>et al.</i> (1992)	+	9% of those with pesticide concerns bought certified pesticide-free produce.
<u>The Packer</u> (1996)	+	12% chose organic produce for lack of chemicals.

Table 1.5
Price and Price-Related Characteristics

		Price
Jolly & Norris (1991)	-	9 out of 12 thought that high prices were a problem with carrying organic produce. (#3 ranked in top three problems with carrying organic produce.)
Morgan <i>et al.</i> (1990)	+	76.6% of organic produce sellers use same/lower markup for organic produce: 53.2%=same, 23.4%=lower markup. Only 23.4% use higher markup.
Morgan <i>et al.</i> (1990)	-	Non-organic, but interested, sellers of organic produce ranked <i>too expensive</i> as the #1 problem with selling organic produce.
Morgan <i>et al.</i> (1990)	+	80.6% of organic produce sellers and 72.7% of non-organic produce sellers ranked <i>too expensive</i> as one of top three problems with selling organic.
Sparling <i>et al.</i> (1992)	-	Price was the second most often-cited reason for not buying organic produce among non-buyers (34%).
Estes <i>et al.</i> (1994)	-	Higher price ranked 1 st among buyers' reasons why consumers do not buy more organic produce.
Tregear <i>et al.</i> (1994)	-	Both buyers and non-buyers of organic produce perceived organic produce as being expensive. Among non-buyers of organic produce, price was cited most often as the reason for not purchasing organic produce. 32% of those who do not buy organic produce have a price concern.
The Packer (1996)	-	The second mentioned reason for not purchasing organic produce was price (28%). 46% of all respondents say they seek good prices when choosing produce.
Govindasamy & Italia (1997a)	0	Dummy variable for those who frequently purchase organic produce was not useful in predicting which consumers are sensitive to price.

Price Elasticity of Demand

		Good	Elasticity
Park & Lohr (1996)	Broccoli		1.7% increase when wholesale cost drops 1%.
Park & Lohr (1996)	Carrot		2.4% increase when wholesale cost drops 1%.
Park & Lohr (1996)	Carrot		1.2% when wholesale cost drops 1%.
Park & Lohr (1996)	Carrot		0.4% increase when margin between organic and conventional wholesale price increases 1%.
Park & Lohr (1996)	Broccoli		0.2% increase when margin between organic and conventional wholesale price increases 1%.
Park & Lohr (1996)	Carrot		0.8% decrease, when conventional farm price increases.

Park & Lohr (1996)	Broccoli	0.3% decrease, when conventional farm price increases.
Park & Lohr (1996)	Lettuce	0.2% decrease, when conventional farm price increases.
Willingness to pay		
Jolly <i>et al.</i> (1989)		WTP for organic produce: Apples, peaches, broccoli, and carrots: 30¢ per lb.; Chicken: 80¢ per lb.; Pork, beef, eggs: 90¢ per lb.
Morgan <i>et al.</i> (1990)		On average, experienced organic produce handlers thought customers would pay about 30% more – non-handlers thought about 20% more.
Ott (1990)		57% of respondents were willing to pay 5% more for CPRF produce. 10% of respondents were willing to pay 10% more for CPRF produce. (33% were unwilling to pay more for CPRF produce.)
Ott (1990)		69% of whites versus 54% of non-whites were willing to pay higher prices for CPRF produce. Non-whites averaged less family income than whites, but income was not significant in explaining shoppers' willingness to pay more.
Ott (1990)		79% of shoppers who were “concerned” about pesticides were willing to pay more for CPRF produce vs. 52% who were “unconcerned.”
Ott (1990)		67% were willing to pay a premium for CPRF produce.
Ott (1990)		79% of shoppers who were “concerned” about pesticides were willing to pay more for CPRF produce vs. 52% who were “unconcerned.”
van Ravenswaay & Hoehn (1990)		WTP to avoid Alar = \$1.26 per capita, or \$.12/lb.
Conklin <i>et al.</i> (1991)		Organic characteristic is the primary determinant of price paid for produce. Willing to pay premium for organic.
Jolly (1991)		Those with college and graduate degrees are willing to pay the most for organic produce, more than those less educated. There is no trend with education, income, and WTP.
Jolly (1991)		WTP is higher among women than men; higher among smaller households; higher in income; higher the less urban the location.
Misra <i>et al.</i> (1991)		As concern for pesticide residue increases, so does willingness to pay.
Morgan <i>et al.</i> (1990)	+	Cite: Harris Poll (1989) 49% of Americans would pay more for organic produce.
Morgan <i>et al.</i> (1990)	+	Cite: Franco (1989) Premiums on organic broccoli frequently exceeded 100%. Market is fragmented (premia are not consistent).
Weaver <i>et al.</i> (1992)		81 % of respondents had a positive WTP for pesticide-free produce: 25% up to 5% more; 31% up to 10% more;

Buzby & Skees (1994)	26% up to 15% more. Consumers were willing to pay an average of 15 to 69 cents above the 50-cent purchase price for grapefruit for a lower risk of exposure to pesticide residues.
Buzby & Skees (1994)	Younger respondents were willing to pay more for increased reductions in pesticide exposure than older respondents.
Buzby & Skees (1994)	Less highly educated respondents were willing to pay more for increased reductions in pesticide exposure than more educated respondents.
Buzby & Skees (1994)	Income, race, and household size had no apparent effect on whether respondents would pay more for increased reductions in pesticide exposure.
Buzby & Skees (1994)	Female respondents were willing to pay more for increased reductions in pesticide exposure than male respondents.
The Hartman Group (1996)	13% of the population is willing to pay a premium for organic foods.
Harris (1997)	Average WTP premium for organic baby food is \$.21/jar.

Table 1.6
Other Factors Influencing the Purchase of EIPs

Information		
Zellner & Degner (1989)	+	Exposure to info (Des Moines dummy) increased all models' WTP.
Weaver <i>et al.</i> (1992)	-	Lack of info given (22%) for why habits haven't changed due to pesticide concerns.
Estes <i>et al.</i> (1994)	-	Lack of information ranked 2 nd among buyers reasons for why consumers do not buy more organic produce.

Goldman & Clancy (1991)

“A greater consumer understanding of the costs and benefits of food production systems might increase markets for organic produce because educated consumers tend to make food choices that not only enhance their own health but also contribute to the protection of natural resources.”

The Hartman Group (1996)

“Given consumers' limited knowledge about environmental issues, it is difficult for them to make the linkage between various farming techniques and a personal benefit.”

Labeling		
Jolly & Norris (1991)	-	9 out of 12 organic produce managers found a lack of standards/grading as a problem in carrying organic produce. (Ranked as #3 among top three problems.)
Morgan <i>et al.</i> (1990)	-	More organic produce sellers ranked this as one of top three problems with selling organic (50% vs. 33.3% for handlers).
van Ravenswaay & Hoehn (1991a)	+	Labels indicating that apples met federal standards for pesticide residues increased quantity demanded by 11.7 lbs. per household. Label indicating no detectable residues further increased quantity demanded by 6.12 lb. per household Ave. premium per lb. for apples with labels indicating compliance with federal standards for residues was 23.6¢/lb. WTP premium for apples certified pesticide-free was 37.5¢/lb. @ 79¢/lb. for apples: Prob(purchase no label apple)=.59; Prob(fed label)=.69; Prob(no pesticide)=.74. @\$1.49/lb for apples: Prob(purchase no label apple)=.30; Prob(fed label)=.40; Prob(no pesticide)=.45.
Buzby & Skees (1994)	+	90% of respondents felt that all produce should be clearly labeled with information on pesticide use.

Availability

Morgan <i>et al.</i> (1990)	-	81% of handlers thought supplies were lacking. 74% of non-handlers said that organic produce lack “sufficient supply.”
Huang (1991)	-	84% of respondents prefer to buy organic produce when it is available 44% prefer to buy organic even when it costs extra.
Jolly & Norris (1991)	-	All organic managers said that supplies <i>are not always available when needed</i> . This was #1 out of top three difficulties in carrying organic produce.
Morgan <i>et al.</i> (1990)	-	80.6% of organic produce sellers gave <i>lack of sufficient supply</i> as a top three important problem with selling organic produce. 74.2% of non-organic produce sellers ranked this problem in this category.
Morgan <i>et al.</i> (1990)	-	Organic produce sellers (69.9%) rank <i>lacks sufficient supply</i> as the #1 problem with selling organic produce (vs. 52.3% nonsellers).
Sparling <i>et al.</i> (1992)	-	Lack of availability was the most often-cited reason among non-purchasers for not purchasing organic produce (41%). Twelve percent cited “not aware,” possibly reflecting lack of availability in their store.
The Packer (1996)	-	Those not purchasing organic produce gave lack of availability as the first reason (35%).
Food Marketing Institute (1997)	0	Those wishing their store sold more organic produce is 2%. 70% say their store carries organic foods in 1997.

APPENDIX 2: Notes on Reviewed Studies

Basker (1992)

Samples of organically and conventionally-grown fruits and vegetables were compared using taste panels of consumers. There were 32-66 assessors per variety. There was a total of 460 assessments of 29 samples for a total of 1600 responses. Responses were then tested for significance and those that were significant were used to predict hedonically people's preferences. The study took place in Israel and all produce was locally-produced.

Bruhn *et al.* (1992)

479 interviews were conducted in 14 cities in CA. The markets were selected randomly.

Bunn (1990)

229 shoppers in northern and southern CA were surveyed at 12 stores. Respondents evaluated photographs of oranges with varying degrees of cosmetic imperfection. Respondents were asked willingness to buy with and without information about pesticide residues.

Buzby and Skees (1994)

A national telephone survey was followed by a mail questionnaire of 3,228 primary food purchasers who purchased fresh grapefruit for their households in the past year. The telephone survey provided the initial sample with a response rate of 65 percent. Of the 2,197 who were willing to participate in the follow-up mail questionnaire, 1,671 responded for a response rate of 76 percent. Respondents were similar in profile to the U.S. population in income, race, and education, but there were more women than men (which was expected because women are more likely to be the primary food shoppers).

Byrne *et al.* (1994)

A mail survey of 9,000 randomly-selected households was conducted on the Delmarva Peninsula (Delaware, Eastern Shore of Maryland, and two counties in Virginia). The response rate was 10.9%. Individual demographic variables were not significant in determining whether the individual would be concerned about pesticide residues, but psychographic classification was significant. Consumers who were concerned to very concerned about pesticide residues were 37% more likely to shop at a supermarket with higher-priced pesticide-residue-free produce. Consumers who rated price to be important in their food purchasing decision were 15% less likely to shop at a supermarket with higher priced pesticide-residue-free produce. People who rated healthfulness as important to very important

in their food purchasing decisions were 17% more likely to shop at a supermarket with higher priced pesticide-residue-free produce. Flavor and freshness were not significant factors in determining the likelihood of shopping at a supermarket with higher priced pesticide-residue-free produce. Over 23% of the sample consumers had probabilities less than 50% of shopping at supermarkets offering higher-priced produce.

Conklin *et al.* (1991)

The authors surveyed AZ retail outlets for 12 weeks in 1991.

Conklin (1993)

This study used the same data as above, but a full 18 weeks of data were used.

Eight types of produce were studied: tomato, potato, sweet pepper, carrot, leaf and iceberg lettuce, and apples and grapes (these six vegetables represent 90% of fresh vegetable consumption).

Five stores were surveyed: chain supermarkets, a specialty grocer, and a local co-op. Three out of five stores carried organic produce, giving 90 nonorganic observations and 54 organic observations.

Cook (1992)

Consumer focus groups conducted in 1990 in Davis, CA, Sacramento, CA, Berkeley, CA, Chicago, IL, Washington, D.C., and Bangor, ME were used to collect consumer data on factors indicated by consumers as influencing produce purchases. No information was given as to the size of focus groups or how the participants were selected.

Estes *et al.* (1994)

Thirteen North Carolina supermarket operations and three organic wholesalers were interviewed. Respondents were asked to evaluate aspects of the market and to provide suggestions for ways that growers could improve the market.

Food Marketing Institute (1995)

2,204 telephone interviews were conducted in 1995. Two survey versions were used.

Food Marketing Institute (1997)

2,029 telephone interviews were conducted in 1997. Two survey versions were used.

Goldman & Clancy (1991)

A 1988 survey of shoppers was conducted at a food cooperative in New York state. The survey was given to shoppers as they checked out, and they were asked to return the survey by mail in a pre-addressed, stamped envelope. Three hundred fifty shoppers responded for a response rate of 87.5 percent. Organically-grown produce at this co-op was from 25 percent to over 100 percent more expensive than conventionally-grown produce. Cooperative shoppers differ from the general population in that they prefer nutrient-dense foods and are more interested in the political aspects of food production. Questions about the importance of general appearance (size, shape, color, and freshness) in the purchase of fresh fruits and vegetables were included in the survey but did not form a reliable scale. Produce appearance may affect organic produce purchases to some extent, but the influence does not seem to be large for most consumers. Acceptance of insects and surface blemishes on produce was very positively related to organic produce purchases, and a clear relationship was seen between specific attributes of produce appearance and respondents' stated willingness to purchase residue-free produce. A greater consumer understanding of the costs and benefits of food production systems might increase markets for organic produce because educated consumers tend to make food choices that not only enhance their own health but also contribute to the protection of natural resources.

Huang (1991)

This article provides a general overview of how people view food risk.

Jolly & Dhesi (1989)

A four-wave mailing received 54% response -- 946 completed responses. The study sought to define differences between buyers and non-buyers of organic produce. Jolly & Dhesi found no strong economic, attitudinal, or demographic differences between the groups.

Jolly *et al.* (1989)

A mailing survey produced 1769 completed questionnaires (54% response rate). The data used for this paper covers Sept-Oct, 1989. Attitudes towards organic produce and pesticides were queried.

Jolly (1991)

A mail survey of 1950 randomly-selected California households was conducted in Marin, Sacramento, and San Diego counties in September and October 1987. Fifty-four percent of the 1769 deliverable questionnaires were completed and returned. No statistically significant monotonic trend differences over time were detected, indicating non-responder bias was not a significant issue.

Jolly & Norris (1991)

In Fall, 1989 and Winter, 1991 surveys were sent to chain, retail outlets in California. Produce and marketing managers were surveyed to learn of their perceptions and their customers' perceptions of organic produce. Of 37 chains surveyed, 16 returned usable survey forms (50% response rate.) Sixteen respondents represent 1405 stores.

Lane & Bruhn (1992)

The authors argue that consumers are concerned with finding the item at the store, prices of the item, prices of substitutes, prices of complements, attributes of the product (quality, size, freshness, how long it will last, and the perceived safety of the food). Consumers will not change their behavior toward purchasing conventional produce out of concern for food safety unless their level of cognitive dissonance is great enough to induce them to change. People will justify their habits either by debunking the negative evidence, playing down the importance of the issue, overemphasizing other kinds of dangers to life, or seek out social support. People also use denial and rationalization (dissonance) to cope with risk. This explains why even though consumers report a high level of concern for food safety, there is usually a low level of change in purchasing behavior in response to food safety issues. Consumers accept the relative safety of conventionally-grown produce.

Lin *et al.* (1986)

Three SMSA's (DC, Baltimore, & Richmond) were used. Thirty firms were used and both conjoint and opinion surveys were completed. Tomato buyers were surveyed and then separated into two groups: 16 who bought organic produce and 14 who did not. Respondents were asked to list 17 constraints on the organic market, which fell into 4 categories: produce characteristics; supply costs; demand; operational logistics. As the buyers' preference for organic tomatoes increased, the importance of shelf life, discard rate, quality consistency, and appearance, as constraints on the organic market, decreased. Logit model estimated the importance of a factor for preference of organic over conventional produce. Conjoint analysis noted differences between buyers and non-buyers of organic produce. The conjoint analysis included 480 observations (16 ratings from 30 respondents).

Misra *et al.* (1991)

The authors' Georgia data includes surveys from 1989 of 389 households (67% response rate). Of these 168 had no blank answers on their survey forms and were used in regression models. This survey found demographic statistics for price-premium elasticity: Whites are less elastic than non-whites. Those 60+ years of age are less elastic than those 36-60 years of age. College-educated are more elastic.

Morgan et al. (1990)

This 1989 survey of New Jersey wholesalers and retailers of produce looked at both those who did and did not carry organic produce. A mail survey of 552 firms was conducted in NJ, where respondents were asked to give experience in selling organic produce. A total of 201 usable responses were received. Sixty-four respondents had handled organic produce, and 137 had not handled organic produce. Only those interested in handling organic produce were included in the analysis of the group of handlers who had not sold organic produce previously.

Produce type	% premium of organic wholesale over LA terminal market price:
Beans, Kentucky	62
Beets	18
Bok choy	65
Broccoli	49
Cabbage	37
Carrots	88
Cauliflower	104
Celery	34
Corn	125
Cucumbers	55
Eggplant, Globe	183
Kale	158
Lettuce, Iceberg	36
Onion, yellow	97
Peppers, Green Bell	89
Potato, Russet (70-80 ct)	36
Radish	9
Squash, Zucchini	176
Tomato, assorted	84

Morgan et al. (1990)

Authors break down reasons to sell organic by type of retail outlet. Organic-selling supermarkets, natural food stores, and wholesalers all give *Expands Selection* as the #1 reason. Organic-selling farm markets gave #1 reason as *Better for the Environment*. Conventional supermarkets gave #1 reason as *Expands Selection*; conventional natural food stores and processors said, *Customer Demand*; conventional wholesalers said, *Better for Environment*; conventional farms said *Competitive Tool*.

Ott (1990)

Shoppers were interviewed from nine different supermarkets in Atlanta in areas with varying levels of family income and education as they approached store entrances, with 315 respondents.

The Packer (1990)

Sixty percent of survey respondents reported that they had made no noticeable changes in their purchasing patterns despite high levels of concerns about residues, but 24 percent had, in fact, changed their purchasing patterns to reflect those concerns.

Park & Lohr (1996)

A mailing in Fall, 1989 received a 54% response rate from 1769 questionnaires sent out. Those of non-European descent (nonwhite) and younger population were under-represented, while women were over-represented. The authors estimated an econometric model of supply and demand of broccoli, carrots, and romaine. The objective was to ascertain whether it is demand or supply variables more at play in the organic produce market. The data came from the Organic Market News and Information Service (OMNIS) and the USDA. Supply variables considered were conventional farm price, seasonal effects, and weather. Demand effects (by wholesalers) included wholesale cost, NutriClean Program, personal income, Alar episode, and wholesale price margin. NutriClean and Alar were not found significant for any product. For carrots and broccoli only demand factors were significant. Both supply and demand affect romaine. (So increasing wholesale demand would increase equilibrium output for all three and increasing supply would increase romaine's equilibrium output.)

***Retail World* (1994)**

Twenty-two store attributes were ranked by shoppers: 99% of respondents desire quality produce. In saying why shoppers switched stores, 39% wanted lower prices, 25% wanted variety, 5% wanted better quality produce.

Sachs *et al.* (1987)

Bealer and Willits in 1968 documented public concerns about pesticides using a phone survey of Pennsylvanians. Sachs *et al.* duplicated the survey with a similar population using the same questions in 1984. 605 people responsible for doing the food shopping for the house were interviewed. Attitudes had changed considerably. The greatest concern in both periods was for wildlife. The 1984 sample was as concerned for safety of farmers and consumers as it was for the welfare of wildlife.

Tregear *et al.* (1994)

A nationwide mail survey was conducted with 150 randomly-selected supermarkets and 112 randomly-selected wholefood shops throughout the UK which were known to carry organic food. The response rate was 53 percent from supermarkets and 67 percent from wholefood shops. An additional telephone survey of 242 randomly-selected people in the Edinburgh and Lothian district was conducted with a response rate of 63 percent.

van Ravenswaay & Hoehn (1990)

Demand was estimated for fresh apples for the NYC-Newark SMSA from 1980-89 Regression analysis done with the usual demographic variables and also price of substitute and dummies for articles in the press on Alar.

van Ravenswaay & Hoehn 91-13 (1991a)

Contingent valuation WTP was estimated for reduced pesticide residues. Respondents were asked using pictures of apples, with varying degrees of cosmetic damage, the quantity they would buy at different prices. A Tobit model was used. The data set used was the same as in van Ravenswaay & Hoehn (1991).

van Ravenswaay & Hoehn 91-18 (1991b)

A 2,200 household sample was purchased from Survey Samples, Inc. Mail surveys were sent to these households and 906 were returned – 48% response rate. 681 questionnaires were used. The study looked at willingness to pay for Certified Pesticide-Residue-Free apples.

Waugh (1928)

First hedonic approach to vegetable characteristics. Examined tomatoes, hot house cucumbers, and asparagus. Used sales lots for each to estimate characteristics explaining price received by growers as a way of explaining market value of attributes for consumers.

Weaver *et al.* (1992)

Face-to-face surveys were conducted at three retail outlets in State College, PA during November 1990. Five hundred sixty interviews were completed.

Zellner & Degner (1989)

This study looked at demand for chicken and people's willingness to pay for "safe" chicken that has been made safe, not through organic techniques. Surveys were conducted by telephone in Spokane, Orlando, Des Moines, and Tucson in 1988. Five hundred eighty six surveys were completed. Three forms of a questionnaire were used. Respondents were asked to evaluate chicken that had been made safer through cleaner facilities, or chemical washing, or irradiation. Respondents were assured that each process was safe and quality would be unaffected. Results showed that neither chemical nor irradiation were acceptable unless prices were reduced. Consumers are willing to pay to reduce health risk through cleaner facilities and more care in processing.

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