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Comparison of consumer perceptions and preference toward organic versus conventionally produced foods: A review and update of the literature

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Abstract

Growing interest in organic agriculture has prompted numerous studies that compare various aspects of organic and conventionally produced foods. This paper provides a comprehensive evaluation of empirical studies comparing organic products and conventionally grown alternatives. The emphasis is on key organic consumer demand and marketing issues, including: (1) the implications of an economic definition of organically grown food for consumer demand; (2) attributes that shoppers consider most when comparing organic with conventionally grown products; (3) level and characteristics of consumer knowledge and awareness about organic food; (4) assessment methods and characteristics of organic consumer attitudes and preferences; (5) size of price premium and characteristics of consumers' willingness-to-pay for organic products; and (6) profile of organic consumers. Overall, although there is some knowledge and awareness about organic products, consumers are not consistent in their interpretation of what is organic. Secondly, while consumers typically understand the broad issues about organic foods, many tend not to understand the complexities and niceties of organic farming practices and organic food quality attributes. Uncertainty regarding the true attributes of organic, and skepticism about organic labels, part of which stems from reported cases of (inadvertent) mislabeling, and product misrepresentation, and partly because of nonuniform organic standards and certification procedures, may hold some consumers back from purchasing organic. Thirdly, concern for human health and safety, which is a key factor that influences consumer preference for organic food, is consistent with observed deterioration in human health over time and, therefore, motivates consumers to buy organic food as insurance and/or investment in health. Fourthly, the proportion of consumers who are willing to pay a price premium for organic food decreases with premium level. On the other hand, premiums tend to increase with (combinations of) preferred attributes. In addition, demand tends to depend more on the price differential with respect to conventionally grown products, than on actual price. In contrast to sensitivity of demand to changes in price, income elasticity of demand for organic foods is generally small. Finally, it is important for policy analysts and researchers to note that organic fresh fruits and vegetables currently dominate the organic consumer's food basket. Furthermore, it is not clear whether frequent buyers consider particular organic products (e.g., organic meat) as normal goods, or if consumers consider such products as luxury goods.

Key words: consumer attitudes and preferences, credence good, organic food attributes, price premium, willingness-to-pay

Introduction

Interest in organically produced food is increasing throughout the world in response to concerns about conventional agricultural practices, food safety and human health concerns[1–3], animal welfare considerations[4,5] and concern about the environment[6,7]. These concerns, along with observed organic consumer behavior, led Davies et al.[8]

to identify several categories of organic consumers, namely environmentalists, food phobics, healthy eaters, humanists and welfare enthusiasts, and hedonists. The interest in organic agriculture has prompted numerous studies comparing aspects of organic and conventionally produced foods. Growing interest among stakeholders (such as policy analysts, consumers, etc.) has also prompted a need to not only determine the extent to which there is a scientific basis for claims in support of organic products, but also to consolidate and evaluate the numerous empirical studies and findings. Bourn and Prescott[9], for example, provided an excellent review of several studies comparing selected biophysical and related quality attributes of organic and conventionally produced foods. In an earlier study, Woese and others[10] assessed selected studies using physico-chemical quality attributes for various food groups, including cereals and cereal products, potatoes, vegetables and vegetable products, wines, beers, bread, dairy products, meat and eggs, fruits, and nuts and oil seeds.

The future of organic agriculture will depend, to a large extent, on consumer demand. Thus, a consumer-oriented approach to understanding organic agriculture is important not only in its own right, but also in terms of shifting market dynamics. This could also vary depending on the region of the world. Thus, a clear understanding of consumer attitudes, and the motivations underlying actions in responding to organically grown products is important.

This review complements and extends the work of Bourn and Prescott[9] and Woese and others[10]. We have consolidated and compared numerous empirical studies on consumer preferences for, and attitude towards, organic food, relative to conventionally grown products. The literature review emphasizes important organic consumer demand and marketing issues, including: (1) the implications of an economic definition of organically grown food for consumer demand; (2) attributes that shoppers consider most when comparing organic with conventionally grown products; (3) level and characteristics of consumer knowledge and awareness about organic food; (4) assessment methods and characteristics of organic consumer attitudes and preferences; (5) size of organic price premium and characteristics of consumers' willingness-to-pay for organic products; and (6) profile of organic consumers. Such a comparison across studies, and for various countries, is not only important in its own right, but also provides a better understanding of the economic and noneconomic variables to include in organic consumer demand modeling and estimation. In the following, an economic perspective of organic products as economic goods precedes a comparison of selected consumer decision-making dimensions of organic products.

What is Organic? The Role of Economics

The most common definitions of an organically produced food emphasize the technology or production practices and principles used, and/or the 'organic philosophy'[11–14]. Thus, while some definitions highlight dimensions such as 'biological' or 'natural' production systems[12] and 'green' or 'environmental friendliness'[13], others emphasize the limited use of artificial chemicals in organic production[11], or its general philosophy[14].

Organic food consumers tend to perceive such products as having particular intrinsic (quality and safety) characteristics[15]. In practice, a consumer's decision choice in favor of organic is made by comparing a bundle of (observable and unobservable) characteristics of the good. This notion of a good leads logically to a perspective by economists —first developed by Nelson[16] and Darby and Karni[17]— namely, credence characteristics. As a credence good, information about an organic product is asymmetric[18,19]. That is, consumers may not detect the presence or absence of organic characteristics even after purchase and use. Consumers may only know that the product is organic when they are informed[18].

According to Hansen[19], the characteristics of organic foods that are important to consumers can be grouped into general and commodity-specific attributes. General attributes relate to food safety and human health, environmental effects and farm animal welfare aspects, while commodity-specific attributes include variables such as visual appeal, nutritional value, taste, freshness, etc. In contrast, Caswell[20] identified five broad groups of food quality attributes, namely safety, nutrition, value, package and production process (Table 1). Although consumers may not adequately differentiate between organic and conventional products with respect to their general attributes, they may recognize the unique taste, visual appeal or freshness of particular products. However, sensory characteristics (i.e., product taste, visual appeal and freshness), alone, may not be sufficient in determining whether a product is organic or not. Consequently, quality signals, such as product labels, help transform credence characteristics into search attributes, thereby enabling buyers to more clearly assess product quality.

A key benefit of the quality attributes of food products (see Table 1), is in terms of human health[20]. In connection with this, Grossman[2] applied Lancaster's[21] theory of consumer demand to develop a model of consumer demand for 'good health'. Grossman[2] viewed human health as a commodity (i.e., durable capital stock) that produces an output of healthy time, and which depreciates with age. Thus, one determines one's optimal stock of health capital at any age by comparing the marginal efficiency of such capital with its user cost (in terms of the price of gross investment on improved health). Observed deterioration in human health over time therefore motivates an individual to protect against such depreciation losses by purchasing various types of 'insurance' and/or holding an excess stock of health. An example of such 'insurance' that a consumer may consider purchasing is healthy food. The characteristics of organic food may therefore be an input into the consumer's demand function for 'good health', while the price of organic food becomes the cost of the investment in

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Table 1. Some quality attributes of (organic and conventionally produced) food products (source: Caswell[20]).

Quality attribute	Examples
Food safety attributes	Food-borne pathogens Heavy metals Pesticide residues Food additives Naturally occurring toxins Veterinary residues
Nutrition attributes	Fat Calories Fiber Sodium Vitamins Minerals
Value attributes	Purity Compositional integrity Size Appearance Taste Convenience of preparation
Package attributes	Package materials Labeling Other information provided
Production process attributes	Animal welfare Genetic modification Environmental impact Pesticide use Worker safety

'good health'. The above discussion links food-quality attributes with consumer demand for organic food. This raises questions regarding how organic products compare with conventionally grown alternatives.

Comparison of Organic and Conventionally Grown Produce

Although the attributes associated with organic foods may be difficult to identify by visual inspection alone, most consumers purchase organic products because of a perception that these products have unique (and in some cases superior) attributes compared to conventionally grown alternatives[15]. On the other hand, a major reason why some consumers do not purchase organic food is linked to a perception that such foods are not better than their conventionally grown alternatives[22]. There is therefore continuing interest and debate about whether organically grown products are superior to and/or different from conventionally produced alternatives and, if so, in terms of what characteristics.

Several studies have assessed whether there are differences between organic and conventional foods from the perspective of both the producer (or supply side) and the consumer (or demand side). Supply-side investigations typically focus on yield, producer price and profitability comparisons. In contrast, demand-side studies have investigated the differences in terms of biophysical and chemical characteristics, as well as consumer preferences and (retail) prices. Given that the emphasis of this study is on consumer perceptions and demand, the rest of this section focuses on comparison of demand-side characteristics.

What noneconomic attributes are important to organic shoppers?

What are the key noneconomic attributes that shoppers consider when comparing organic produce with conventionally grown alternatives? Nutritive, sensory and food-safety attributes influence consumer choice between organic and conventionally produced foods[9]. Several studies have therefore compared organic and conventionally produced foods using such attributes. Although shoppers generally link produce quality with its appearance[23], Goldman and Clancy[24] reported a relationship between consumer willingness to accept blemishes and organic produce purchase behavior. In general, appearance tends to be less important among consumers with a high preference for organic and pesticide-free products[25].

Product taste (i.e., flavor), freshness and shelf life are other characteristics that shoppers consider in their purchase decisions. There is contrasting empirical evidence on the role that taste, freshness and storage life play in consumer decisions. For example, some studies reported that consumers perceive no difference in the taste of organic food versus conventionally grown alternatives[26,27], while other studies report a better taste for organic produce[28,29]. The differences and conclusions on taste, freshness and shelf life, where they exist, appear to be linked to the existing (organic versus nonorganic) food-buying habits of the survey respondent[27].

Overall, a review of various comparative studies indicates contrasting conclusions regarding the nutritive value of organic products (see also Bourn and Prescott[9] and Woese and others[10]). For example, several of the studies reported that organic products have lower nitrate content, and higher dry matter and mineral content, compared to conventionally grown alternatives[30–35]. Furthermore, while some studies reported higher vitamin C content in organically grown foods[35,36], others found higher vitamin C levels in conventionally grown produce[31,37], with the contrasting findings attributed in part to factors such as maturity at harvest and storage conditions[9].

Some of the contrasting findings from the various comparative studies have also been attributed to differences in research methods and experimental conditions[9,10]. For example, some studies report that crop variety, soil type, climate, duration of experiment, post-harvest practices and statistical design can all influence the nutritive and sensory characteristics of a product[9,10,32,38]. Thus, it is important for future efforts at comparing organic and conventional production processes and products to control for, or address,

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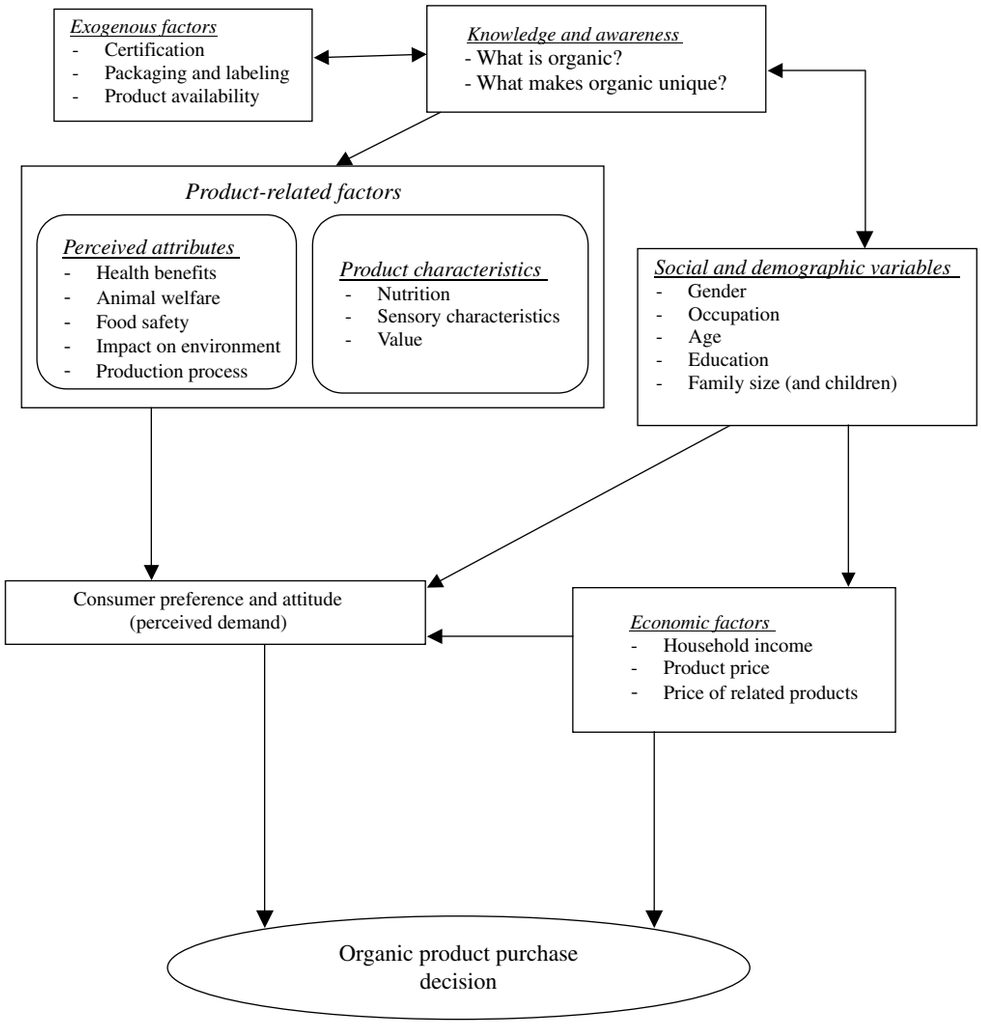

Figure 1. Conceptual framework of factors that affect organic consumer attitudes and purchase decisions.

such methodological and research design issues. There is also no consistent or clear relationship between the various findings and location of the study. Thus, although some researchers suggest that soil type and climate affect nutritive and sensory characteristics of foods, an examination of particular crops within similar regions and/or conditions indicate contrasts in some of the findings[32–34,39].

Furthermore, other studies that investigated a perception that organically grown foods have less chemical and microbial contamination than conventionally produced foods[40–42] also report contrasting conclusions. Thus, it is not clear that, overall, organic foods are safer than conventionally grown foods. Perceptions that organic is associated with less or no chemical residues is also sometimes questioned because of the potential for contamination during processing, and the possibility of mixing organic and conventional products in the food distribution chain. There is also a possibility of organic produce carrying a higher risk of microbial contamination than conventional foods because the increased use of manure (as opposed to chemical fertilizer) in organic agriculture can increase the incidence of contamination from pathogens such as *Salmonella* species and *Escherichia coli*[40]. However, such risks can be reduced with proper management practices[9,43].

Consumer Awareness and Knowledge about Organic Food

The environmental ethic that gained worldwide prominence with Earth Day 1990 placed emphasis on individual responsibility (for personal health) and social action (on environmental quality and animal welfare)[44,45]. Personal responsibilities include making informed consumer choices. This, in turn, requires consumer knowledge and awareness about competing products. Knowledge and awareness have other direct and indirect effects on attitudes toward consumer products, and willingness to pay a price premium (Fig. 1). Because organic products are credence goods, consumers (unlike producers who are aware that their products are organic) may not know whether a product is produced using organic or conventional methods, not even after

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repeated purchase and consumption, unless they are told so[18]. Thus, awareness and knowledge about organic products are critical in the consumer purchase decision. If an individual cannot clearly differentiate between two alternative products, a price premium on the organic product can confuse and/or affect the individual's purchasing decision in favor of the cheaper product.

A review of selected studies on consumer awareness and knowledge about organic foods suggests that while there is a general consumer awareness around the world, consumers (sometimes within the same country) have inconsistent interpretations about what is 'organic'. For example, in a survey of consumers in three California counties, Jolly and co-authors[22] found that respondents associated organic produce with no pesticides, no artificial fertilizer, no growth regulators and residue-free products. Similarly, survey respondents in the UK perceived 'organic farming' to imply absence of chemicals, 'absence of growth hormones' and 'not intensively grown' or 'products grown naturally'[42]. In a more recent study for the UK, respondents described organically produced food as food that is more natural and healthy, compared to conventionally produced food[46]. Furthermore, in the UK study, there was no difference in consumers' understanding of 'organic' among organic and nonorganic food buyers. In other words, both buyers of organic and nonorganic products felt that organic alternatives have no pesticides and/or use no chemical fertilizers, and are natural and healthy. In contrast, Jolly[45] reported a substantial difference in how US buyers and nonbuyers rated organic product quality, compared to conventionally grown products.

Although consumers typically understand the general issues associated with organic farming, many tend not to understand the complexities and niceties of organic farming practices, and the associated quality attributes outlined in Table 1[46]. This hypothesis by Hill and Lynchehaun[46] helps to explain why some studies[47,48] reported confusion and/or inconsistencies with consumers' understanding of the organic concept. Wolf[48], for example, found that US consumers rated the attributes associated with organic lettuce (such as environmental friendliness) as 'somewhat desirable' or 'very desirable', while the 'certified' organic label was rated as only 'slightly desirable' or 'somewhat desirable'.

Hutchins and Greenhalgh[47] also noted some inconsistencies among consumers in the UK, where one-third of respondents reported that they were aware of existing organic labels, yet some of such respondents did not recognize the symbol or logo of the organic food standards regulatory body in the country. Similar observations were reported for consumers in Greece[49]. These observations have led some analysts to assert that, with the emergence of other types of labels in the market (such as 'vegetarian' or 'healthy' alternatives), the confusion will likely intensify[47].

Many organic consumers identify organic products based on the organic labels and/or organic logos attached. Indeed, several studies have found a positive relationship between consumer purchase decisions and organic product labeling[50–53]. Consumers generally perceive an organic label as assurance that the product is organic. More accurately, organic food labels help transform the credence characteristics of such products into search attributes, thereby allowing the consumer to better evaluate quality before deciding to buy the product[20]. Thus, deceptive or inaccurate labeling can convey the wrong signals to prospective buyers.

It is important to note that knowledge and awareness about organic products may not necessarily translate into direct purchase because of barriers that could limit the ability of consumers to transform such knowledge and perceived demand into actual demand. This is partly because many potential organic consumers, especially in Western industrialized countries, are skeptical about organic labels[18]. Furthermore, in regions of the world where the organic agriculture sector is not yet well developed, and the process of organic certification and standardization is not uniform, few truly believe in the organic label[54]. Thus, although informed consumers may want to purchase organic products, skepticism about the true organic attributes may hold them back from doing so.

Consumer knowledge and awareness will continue to be important in the organic food market in two respects. First, there is still a segment of the potential market that is not yet informed about organic foods. For example, in a US study which reported that lack of knowledge and awareness was considered the number one reason why consumers do not buy organic food, 59% of respondents indicated that they never considered organic products because they did not know about them[55]. A second dimension to the knowledge and awareness puzzle is the possibility that those who do not consider organic products may have a general knowledge about them, but do not have enough detailed information to clearly differentiate the unique attributes of organic from conventionally grown alternatives.

In summary, knowledge and awareness about organic products can affect attitudes and perceptions and, ultimately, buying decisions. If the skepticism about organic products stemming, in part, from reported cases of mislabeling and fraud are assuaged, perceptions about the inherent characteristics of organic may translate into increased actual demand.

Characteristics of Organic Consumer Attitudes and Perceptions

Consumer actions regarding organic food stem from attitudes that, in turn, are linked to a complex set of ideas, motivations and experiences. Perceptions about particular attributes of an organic food can influence a buyer's choice because, according to Lancaster[21], consumer demand is linked to the characteristics inherent in economic goods. Studies on consumer perceptions about organic versus conventionally produced foods therefore attempt to determine

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what consumers think is true. By comparison, consumer attitudes are likes and dislikes. That is, the positive or negative orientations toward organic or conventionally grown food. Consumer preference for a particular product is based on attitudes toward available alternatives[56]. Thus, if consumers are asked to indicate their preference for organically versus conventionally produced food, such respondents typically compare their attitudes toward the methods of producing the goods, and/or the product characteristics under consideration, before stating their preferences. Although particular attitudes are often assumed to lead to specific behaviors, the food and nutrition science, and social-psychological, literature provides limited evidence to support this assumption[24,57]. Overall, the scholarly literature suggests that various consumer attitudes work in contrasting ways—for and against purchasing organic products[24].

A general perception that, compared to organic production, conventional production systems tend to have long-term health implications and adverse effects on the environment has led some consumers to shift from conventionally to organically produced alternatives[44]. For example, food scares have spanned several years, including (using the UK as an illustration): typhoid fever in the 1960s; problems of mercury in fish, botulism in tinned salmon and hormone residues in veal and beef in the 1970s; salmonella in the 1980s; bovine spongiform encephalopathy (BSE) and *E. coli* in the 1990s; and foot-and-mouth disease in 2000s[1]. In North America, recent cases of BSE, as reported in northwestern US and western Canada, and avian flu in poultry are still fresh in the memories of most consumers, particularly in the affected areas. Such food scares have not only heightened consumer concerns and perceptions, but also raised questions about consumer confidence with government food regulatory agencies.

Key findings from selected studies on consumers' attitudes and perceptions about organic foods[57–69] are summarized in Table 2. Overall, most studies report that consumers purchase organic foods because of a perception that such products are safer, healthier and more environmentally friendly than conventionally produced alternatives. Some studies reported health and food safety as the number one quality attribute considered by organic produce buyers[3,24], followed by concern for the environment[1,28], suggesting that such consumers might rank private or personal benefits higher than the social benefits of organic agriculture.

Given that most of the studies relate to particular geographical areas and conditions, the extent to which the findings from such studies can be generalized is limited. Location-specific studies are sometimes criticized for representative sample problems: respondents sampled are typically limited to a particular location(s) or food store(s). Several of the studies are also very general in nature; i.e., without reference to specific organic products or groups of products and, therefore, do not allow for drawing useful conclusions about differences among particular products. A review of the available studies also showed little consistency across countries, in terms of consumer perceptions about organic product attributes.

The findings from some studies provide useful (background) information for future consumer and policy research. For example, Werner and Alvensleben[62] found that in Germany, organic fresh fruits and vegetables constitute a greater proportion of the consumers' food basket. By comparison, the most frequently purchased organic foods in a study in three California counties, in decreasing order of magnitude, were fruits, vegetables, chicken, eggs, and beef and pork products[22]. According to Hay[57], Canadians tended to buy more organic fruits and vegetables than any other category of organic products. Similarly, O'Donovan and McCarthy[63] found that vegetables were the most popular organic food group purchased in Ireland, where 53% of respondents reported consuming organic vegetables, compared to 45% for organic fruits.

Importance of factors that influence consumer preference

As noted earlier, consumer preference for organic food is based on a general perception that organic products have more desirable characteristics than conventionally grown alternatives. Apart from health, food safety and environmental considerations, several other product characteristics, such as nutritive value, taste, freshness, appearance, color and other sensory characteristics, influence consumer preferences[9].

Several studies have investigated the effect of organic quality attributes and other characteristics on consumer preferences[3,26,45,48,57,61,64–67]. These studies differ in several respects, making comparison across studies difficult. For example, there is inconsistency in defining the concept of quality. Thus, while some studies examined quality in terms of both sensory and nutritive characteristics, others differentiate sensory characteristics from nutritive attributes. Different studies may therefore convey different notions of quality to the various survey respondents.

Overall, the empirical evidence supports a hypothesis that product quality characteristics affect consumers' preferences for organic food, with the most important being: (1) nutritive value; (2) economic value; (3) freshness; (4) flavor or taste; (5) ripeness and (6) general appearance (especially of fruits and vegetables). Wolf[48], for example, reported that respondents in California rated fresh-tasting and fresh-looking grapes as the most desirable attributes. Other North American surveys that ranked taste as the most important quality characteristic influencing consumer demand include The Packer[68] and Demeritt[55]. The Packer[68] reported that 87% of US respondents identified taste as the primary factor considered in the purchase of fresh produce. In contrast, studies for other parts of the world[14,22,64] reported that consumers ranked nutritional value and freshness higher than taste and other related quality characteristics. This suggests that relative ranking of the attributes

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Table 2. Summary of key findings from selected studies on organic consumer attitudes and preferred quality attributes.

Author(s)	Major conclusions
North America[1]	
Jolly et al.[22]	Food safety and nutritive value were rated as very important factors among 80% of respondents
Goldman and Clancy[24]	Consumers who usually buy organic food tended to be more concerned about food safety than price
Wolf[48]	Attributes that were 'very desirable' or 'extremely desirable' to organic consumers included: freshness, fresh-tasting, appearance, seedless, economic value or price, healthiness, high in nutritive value, free of insects and free of pesticides
Demeritt[55]	Respondents rated health/nutrition (66% of respondents), taste (38%), food safety (30%), environment (26%), product availability (16%), price (16%), appearance (12%) and family (11%) as factors that influenced organic choices
Hay[57]	Consumers of organic food appreciate the quality of the organic food and perceived them to be better in taste, quality, health and nutritive value
Baker and Crosbie[59]	Extent of product damage was the most important criterion used in assessing consumer food safety and preference
The Packer[61]	Taste was the most important food quality attribute that affected consumer's preference. 65% of respondents were concerned about chemical residues on fresh produce
Buzby and Skees[64]	The most important factors consumers used in judging food health and safety were fat levels, contamination and absence of pesticide residue. Freshness and nutritive value were the most important factors considered in organic-buying behavior
Huang[66]	Organic consumers were more concerned about pesticide residues and nutritive value, and less so with environmental stewardship
The Packer[68]	Appearance was the primary product attribute considered when shopping, usually followed by color and price
Western Europe	
Schifferstein and Oude-Ophuis[3]	Food quality (i.e. appearance), absence of chemicals, environmental friendliness, and taste were the most important factors that affect organic food demand
Grunert and Juhl[6]	Positive attitude towards environmental issues were found to be positively correlated with buying organic, and frequency of organic food purchases
Wandel and Bugge[7]	Majority of respondents ranked freshness first, followed by taste, and then nutritive value
Davies et al.[8]	The most commonly reported considerations for choosing organic produce were concern for the environment, and then health reasons. Availability and price were the main factors influencing actual purchase of organic produce
Torjusen et al.[14]	62% of respondents indicated they buy organic because it is perceived to be more healthy, while 67% purchase organic because of environmental considerations. Aspects of food that were more important to 70% of the consumers relate to quality characteristics
Ekelund[58]	The primary motivation for buying organic was for health reasons (i.e., absence of contaminants and chemicals)
Hutchins and Greenhalgh[47]	93% of respondents reported buying organic produce because of health reasons and/or because it is better for children. Less than 30% preferred organic because it is better for the environment
Øystein et al.[50]	Half of Norwegian respondents reported that organic food is more healthy, compared to 48% from France
Hack[60]	The primary reasons for buying organic products were linked to human health and environment considerations
Werner and Alvensleben[62]	Young people in Hanover, Germany tend to buy organic food (i.e., bakery products and cereals) more frequently, and less so for fruits and vegetables
O'Donovan and McCarthy[63]	Food safety was most important for meat consumers. Organic meat buyers believed the meat to be superior in terms of quality, safety, labeling, production methods and value
Kyriakopoulos and Oude-Ophuis[67]	Food quality is more important than price
Sandalidou et al.[69]	Health concerns were the most important factor influencing the purchase of organic olive oil. Important olive oil quality attributes considered were color, taste and flavor
Rest of the world	
Wang et al.[54]	About 76% believed that organic foods are safer than conventional alternatives, while 9% of respondents believed that foods labeled organic were truly organic
Aguirre[65]	100% of organic consumers indicated they buy organic because of health concerns, compared to 95% for environmental concerns

[1] North America refers to USA and Canada only.

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that consumers prefer varies depending on the actual product[69], and across regions (partly due to cultural and other factors that are difficult to control for in surveys). What seems clear, and consistent across studies, is that consumers across all regions tend to prefer locally grown organic produce, compared to shipments from other places.

In addition, it appears that among existing organic consumers, preference for organically grown foods tends to be influenced more by product quality and other inherent product characteristics, than by price premium[6]. On the other hand, several studies reported that price premium, lack of knowledge and product availability were the major reasons preventing nonbuyers from purchasing organic food[50,55,63–70]. Demeritt[55], for example, reported that the most important reason why US consumers did not purchase organic food was lack of knowledge or awareness. About 59% of those who did not purchase organic products indicated they never really considered organic, while 39% indicated that price was the main inhibiting factor. Another 16% reported that they did not purchase organic food because of limited availability. Some studies for the UK[63,70] also cited product availability and price as key factors that hamper consumer demand for organic foods. For example, Davis et al.[8] reported that two-thirds of nonbuyers of organic food in Ireland indicated they would buy organic if it was easily available. By comparison, O'Donovan and McCarthy[63] reported that among Irish respondents who did not purchase organic food, 43% indicated that it was too expensive, 28% cited lack of availability, while 29% were just not interested.

Price and Willingness-to-pay for Organic Products

The willingness-to-pay (WTP) for particular food attributes is linked to an observation that consumers make trade-offs for improved attributes in products[2]. A WTP also reflects an observation that individual preferences are unique[71]. Given that yields are generally lower for organic production than for conventional production, consumer willingness-to-pay a price premium for organic products is an important determinant of organic farm profitability and long-term financial sustainability. Magnitude of the price mark-up can also provide useful information about the value consumers place on particular product attributes. A price premium on organic produce can signal differences in product attributes and characteristics and, therefore, is an important search attribute for hedonists. In addition, as indicated earlier, environmentalists may be willing to pay price premiums to support local organic producers. Yet, long-term time-series on organic market price data are limited. Thus, although important insights can be gained from the early studies on price mark-ups for organic products, caution should be exercised in drawing definite conclusions from analysis using such limited time-series data.

Several studies in North America suggest that groups of consumers are willing to pay price premiums for organic products[24,45,48,57–59]. Similar results have been found for the European Union (EU), and other regions of the world[7,62,63]. The key findings from selected studies, including details of premium levels consumers are willing to pay[72–75], are summarized in Table 3, for general and specific organic foods. Jolly[74], for example, found that US consumers were willing to pay a 37% price premium for organic products. By comparison, Goldman and Clancy[24] reported that a third of respondents in a New York survey were willing to pay a 100% price premium for a residue-free product. In the EU, Ekelund[58] reported that about 55% of respondents in Sweden were willing to pay 25% above a regular, conventionally grown product price, with another 26% of organic buyers willing to pay 50% more. A study of consumers in the UK also reported that buyers were willing to pay a price premium of up to 30%[47].

The findings from the literature allow us to make several conclusions. First, consumers tend to be willing to pay higher price premiums for organic products with a shorter shelf life, such as fruits and vegetables, compared to cereals. For example, Millock and others[72] reported that 59% of respondents in Denmark were willing to pay a price premium of 32% for organic milk, 41% of respondents indicated a WTP 40% extra for organic potatoes, 51% were willing to pay a price premium of 23% for organic rye bread, and 41% indicated they would pay 19% extra for minced organic meat.

Secondly, the proportion of respondents willing to pay a price premium decreases as the premium level increases. In addition, premiums tend to increase with (combinations of) preferred attributes. Thirdly, what is not clear, and is in need of investigation, is whether frequent buyers consider particular organic products (e.g., organic meat) as normal goods, or if such consumers consider them as luxury goods. Fourthly, based on the studies reviewed, there are no clear differences or patterns across countries, and comparisons are complicated by differences in study methods. For example, a number of studies investigated generic, as opposed to, specific organic products.

Overall, most consumers are not willing to pay a price premium above 10–20%. In other words, demand for organically grown food declines sharply with premiums above 20%[73]. Yet analysis of specific organic food markets for selected countries[76] suggests that there are substantially high actual price mark-ups. Turco[76] reported organic price premiums ranging from 10% to as high as 100%, depending on the country (Table 4). For example, organic price premiums for different types of products in Italy ranged from 35 to 100%. By comparison, price premiums reported in Turkey ranged from 43% for pickled vine leaf, to as high as 468% for mixed dried fruits[77], while premiums in Canada ranged from 14% for apples, to 174% for pork chops[76].

Price elasticity of demand for organic products is a related aspect of consumer willingness-to-pay. Organic produce retailers tend to be quite sensitive to consumers' price elasticity of demand, partly because premium level negatively affects consumer demand and purchases.

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Table 3. Summary of key findings from selected studies on consumer willingness-to-pay a price premium for organic products.

Author	Key findings
North America[1]	
Goldman and Clancy[24]	Respondents at a food cooperative indicated a WTP a 100% price premium for organic foods in general
Wolf[48]	30% of respondents reported a WTP a 50% price premium for organic grapes
Hay[57]	Consumers indicated a WTP a price premium of not more than 25% for organic products in general
Buzby and Skees[64]	Majority of respondents reported a WTP between 15 and 69 cents above the 50 cents a unit for grapefruit for reduced pesticide residue. Another 5% of consumers indicated they would pay more than double the price of regular fresh grapefruit for a safer one
Jolly[74]	Consumers indicated a WTP a 37% premium for organic horticultural products
Ott[75]	66% of respondents were willing to pay a 10–15% price premium for pesticide-free fresh produce
Western Europe	
Wandel and Bugge[7]	70% of respondents reported a WTP an extra 5% for organic fruits, vegetables, potatoes and meat. Only 10% of respondents were willing to pay a 25% price premium for the same products
Ekelund[58]	55% of respondents indicated a WTP a 25% price premium, with another 26% willing to pay a 50% premium for organic vegetables
Hutchins and Greenhagh[47]	Consumers reported a WTP a 30% price premium, especially for organic cereals, fruits and vegetables
Werner and Alvensleben[62]	About 93% of frequent buyers of organic food were willing to pay a price premium of 29%. By comparison, 69% of occasional buyers were willing to pay a price premium of 27%, and 21% of nonbuyers reported they were willing to buy in the future at a premium of 27%
O'Donovan and McCarthy[63]	About 70% of consumers were not willing to pay more than 10% price premium for organic meat
Millock et al.[72]	51% of respondents indicated a WTP a 23% price premium for rye bread; 59% were willing to pay 32% extra for organic milk; 41% were willing to pay 40% premium for organic potato; and 41% were willing to pay 19% premium for organic minced meat
Soler et al.[73]	70% of respondents indicated a WTP a price premium for organic virgin olive oil
Rest of the world	
Wang et al.[54]	About 80% of respondents indicated a WTP a price premium of 5% or more, and 50% of these were willing to pay a price premium of 5–10%
Aguirre[65]	The majority of respondents reported a WTP at least 10% more for organic products

[1] North America refers to USA and Canada only.
WTP, willingness-to-pay.

Demand tends to depend more on the price differential with respect to conventionally grown products than on absolute price[23]. In general, although both buyers and nonbuyers consider organic as expensive, nonbuyers perceive organic price as too expensive[6]. Some econometric studies have reported high negative price responses to organic food demand[40,70,73]. In an analysis of the organic produce market in Denmark, Wier et al.[78] found a high own-price elasticity of demand (i.e., sensitivity of demand to a change in the price of the same, as opposed to a related, product) for dairy products (−2.3). Results from econometric testing of the frozen organic pea market in the US also support the high negative price/quantity relationship[78]. The relatively high own-price elasticities suggest that consumers are quite sensitive to organic product price changes, compared to those of conventionally grown alternatives.

Who is the Organic Consumer?

Studies that have investigated the profile of organic consumers have examined how socio-economic and demographic factors influence willingness-to-pay for organic products[49,57,59,62,66,74]. In contrast to the findings on price elasticity, income elasticity of demand for organic produce is generally small and not statistically significant[79] or zero[24], although there are exceptions to this general finding[80]. Most studies report that income is not a significant variable in explaining differences in the purchasing behavior of buyers and nonbuyers of organic products[45]. Further insight on the effect of income on organic food demand is highlighted in studies in Canada which suggest a positive correlation between income and willingness to buy a product, up to a given level of income, beyond which further increases in income do not lead to a corresponding increase in willingness to purchase organic food[47,58].

Most buyers of organic foods tend to be women[63,64,70], partly because they are usually the primary grocery shoppers in most households and, consequently, tend to be more informed about nutrition and food safety than men[79]. On the other hand, Wandel and Bugge[7] suggest that men were more willing to pay a higher price premium for organic products than women. Attempts at explaining the relationships in the various findings are complicated by interlinked economic (e.g., household income levels), demographic (e.g., number of young children in family) and other variables (e.g., knowledge of organic).

Most studies suggest a negative relationship between age and organic buying behavior. An exception is Jolly[45], who

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Table 4. Comparison of price premiums for organic foods, selected countries (source: Turco[76]).

Market	Price premium over comparable conventional food (%)
Australia	20–40
Austria	25–30
Denmark	20–30
France	25–30
Italy	35–100
Germany	20–50
Netherlands	15–20
Sweden	20–40
Switzerland	10–40
United Kingdom	30–50
Japan	10–20
United States	10–30

found no correlation between age and organic buying behavior. Studies reporting that younger consumers are more likely to purchase organic products attributed this to their (i.e., younger consumer) preference for chemical-free products and interest in environmental quality[57,64]. Hay[57], for example, reported that younger Canadians tended to have a higher preference for chemical-free products and tended to prefer organic products, compared to older consumers who tended to be less concerned with complete elimination of chemicals. In contrast, Bhaskaran and Hardley's[81] hypothesis that older consumers (i.e., more than 55 years) tend to make preventive health decisions, partly because of perceived health vulnerability and an awareness that they are generally at higher health risk than younger individuals, is consistent with the findings of Jolly[45]. Many individuals with higher educational achievements tend also to have higher incomes. Therefore, without controlling for this, it is not clear whether such a correlation makes one of the two variables redundant in studies that examined the relationship between level of education attained and organic buying behavior.

Summary and Conclusions

A growing interest in organic agriculture has prompted numerous studies comparing aspects of organic and conventional agriculture. This study consolidated and reviewed numerous studies involving various products and several (developed and developing) countries. A consumer-based approach to understanding organic agriculture, involving such a comprehensive evaluation, is useful not only in helping to better understand changing organic market dynamics, but also for organic consumer demand modeling and estimation, and market analysis.

Our human conception of consumer decision making and behavior towards organically grown products is consistent with an economic notion that consumers demand the characteristics inherent in such products. The quality characteristics of organic food constitute inputs into a consumer's demand function for improved (human) health and overall well-being. The price premium on organic food can be viewed as the cost of investment in human health. Product prices also provide signals about the inherent quality characteristics of a product, as well as reflecting the value of inputs used to produce the product.

Although the literature suggests some consumer knowledge and awareness, consumers (sometimes within the same country) are not consistent in their interpretation of what is organic. Some skepticism about the true attributes of organic and organic labels, part of which stems from reported cases of mislabeling and product misrepresentation, and partly because of nonuniform organic standards and certification procedures, may hold some consumers back from purchasing organic.

Human health, food safety and environmental stewardship, along with several other product characteristics (such as nutritive value, taste, freshness, appearance and other sensory characteristics) influence consumer preferences. Eliciting consumer preference for organic (versus conventionally grown) products is typically based on a comparison of consumer attitudes toward the production systems used and (perceived and actual) product characteristics. Consumer preference for organic food is based on a general perception that such organic foods have more desirable characteristics than conventionally grown alternatives. Overall, there is no consensus regarding the relative importance of the organic food quality attributes (such as human health, food risk and safety, and environmental considerations) that affect consumer attitudes and perceptions. In addition, across all regions of the world, consumers tend to prefer locally grown produce to shipments from other areas.

A willingness to pay a price premium for organic products is important for farm financial sustainability. Yet, long-term time-series price data for the organic sector are limited. Thus, while important insights can be gained from studies on willingness to pay price premiums, caution should be exercised in drawing definite conclusions from studies using such limited data. In general, the proportion of respondents willing to pay a price premium decreases as the premium increases, while premiums tend to increase with (combinations of) preferred attributes. The literature does not provide a clear pattern about the levels of price premiums various groups of consumers are willing to pay, nor which group(s) of products attract high mark-ups. Own-price elasticity of demand is relatively higher for organic products, partly because organic products tend to vary widely in appearance and are limited in supply during particular seasons. In addition, demand for organic products tends to depend more on the price differential relative to conventionally grown alternatives, than on actual price. In contrast to the effect of price on organic product demand, income elasticity of demand for organic products is small. The effects of socio-economic and demographic

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variables on organic consumer preferences and purchase behavior are complicated by inherent correlations among particular variables (e.g., education and income levels) and, therefore, need to be controlled for to provide a better understanding of causal relationships.

Fresh fruits and vegetables tend to dominate the current market food basket of the organic consumer. On the other hand, based on the studies reviewed, it is not clear whether frequent buyers consider organic products (such as organic meat) as normal goods, or if buyers consider such food products as luxury goods. Empirical evidence of the relationship between particular organic foods and consumer income will not only help to better understand how consumers really perceive the quality and safety attributes of organic products compared to their conventional alternatives, but will also have implications for organic product demand as average income levels increase (with economic growth).

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References

1 Gregory, N.G. 2000. Consumer concerns about food. Outlook on Agriculture 29(4):251–257.
2 Grossman, M. 1972. On the concept of health capital and the demand for health. Journal of Political Economy 80(2):223–255.
3 Schifferstein, H.N.J. and Oude-Ophuis, P.A.M. 1998. Health-related determinants of organic food consumption in the Netherlands. Food Quality and Preference 9(3):119–133.
4 Harper, G.C. and Makatouni, A. 2002. Consumer perception of organic food production and farm animal welfare. British Food Journal 104(3/4/5):287–299.
5 Hughes, D. 1995. Animal welfare: the consumer and the food industry. British Food Journal 97(10):3–7.
6 Grunert, S.C. and Juhl, H.J. 1995. Values, environmental attitudes and buying of organic foods. Journal of Economic Psychology 16(1):63–72.
7 Wandel, M. and Bugge, A. 1997. Environmental concerns in consumer evaluation of food quality. Food Quality and Preferences 8(1):19–26.
8 Davies, A., Titterington, A.J., and Cochrane, C. 1995. Who buys organic food? A profile of the purchasers of organic in Northern Ireland. British Food Journal 97(10):17–23.
9 Bourn, D. and Prescott, J. 2002. A comparison of the nutritional value, sensory qualities and food safety of organically and conventionally produced foods. Critical Reviews in Food Science and Nutrition 42(1):1–34.
10 Woese, K., Lange, D., Boess, C., and Bogl, K.W. 1997. A comparison of organically and conventionally grown foods—results of a review of the relevant literature. Journal of Science Food and Agriculture 74:281–293.
11 Food and Agricultural Organization. 1999. Organic agriculture [online]. Available at Web site http://www.fao.org/unfao/bodies/COAG/COAG15/X0075E.htm#P78_976 (verified 30 November 2004). Proceedings of the Fifteenth Session of the Committee on Agriculture, Food and Agricultural Organization of the United Nations, Rome.
12 Klonsky, K. and Tourte, L. 1998. Organic agricultural production in the United States: Debates and directions. American Journal of Agricultural Economics 80(5):1119–1124.
13 Goldman, M.C. and Hylton, W. 1972. The Basic Book of Organically Grown Foods. Rodale Press, Emaus, PA.
14 Torjusen, H., Nyberg, A., and Wandel, M. 1999. Organic food: consumers' perceptions and dietary choices [online]. Available at Web site http://www.sifo.no/english/publications/environment/1999–05.htm (verified 30 November 2004). SIFO-Report No. 5–1999. Oslo, Norway.
15 Vindigni, G., Janssen, M.A., and Jager, W. 2002. Organic food consumption: A multi-theoretical framework of consumer decision making. British Food Journal 104(8):624–642.
16 Nelson, P. 1970. Information and consumer behavior. Journal of Political Economy 78(2):311–329.
17 Darby, M.R. and Karni, E. 1973. Free competition and the optimal amount of fraud. Journal of Law and Economics 16:67–88.
18 Giannakas, K. 2002. Information asymmetries and consumption decisions in organic food product markets. Canadian Journal of Agricultural Economics 50:35–50.
19 Hansen, L.G. 2001. Modeling demand for organic products—Implications for the questionnaire [online]. Available at Web site http://www.akf.dk/organicfoods/papers/wp4-lgh.pdf (verified 30 August 2004). Working Paper #4. AKF, Danish Institute of Local Government Studies, Copenhagen, Denmark.
20 Caswell, J.A. 2000. Valuing the benefits and costs of improved food safety and nutrition. Australian Journal of Agricultural and Resource Economics 42(4):409–424.
21 Lancaster, K.J. 1991. Modern Consumer Theory. Edward Elgar, England.
22 Jolly, D.A., Schutz, G.H., Diaz-Knauf, K.V., and Johal, J. 1989. Organic foods: Consumer attitudes and use. Food Technology 43(11):60–65.
23 Beharrell, B. and MacFie, J.H. 1991. Consumer attitudes to organic foods. British Food Journal 93(2):25–30.
24 Goldman, B.J. and Clancy, K.L. 1991. A survey of organic produce purchases and related attitudes of food cooperative shoppers. American Journal of Alternative Agriculture 6(2):89–96.
25 Lin, B.H., Payson, S., and Wertz, J. 1986. Opinions of professional buyers toward organic produce: a case study of Mid-Atlantic market for fresh tomatoes. Agribusiness 12(1):89–97.
26 Jolly, D.A. and Norris, K. 1991. Marketing prospects for organic and pesticide-free produce. American Journal of Alternative Agriculture 6(4):174–179.
27 Sparling, E., Wilken, K., and McKenzie, J. 1992. Marketing fresh produce in Colorado supermarkets. Report to Colorado Department of Agriculture and USDA Federate State Marketing Improvement Program, Fort Collins, Colorado, USA.
28 Estes, E.A., Herrera, J.E., and Bender, M. 1994. Organic produce sales within North Carolina: a survey of buyer options. Department of Agricultural and Resource Economics, North Carolina State University, Raleigh, NC.
29 The Parker. 1996. Fresh Trends—A 1996 Profile of the Fresh Produce Consumer. Vance Publishing, Overland Park, KS.

30 Wolfson, J.L. and Shearer, G. 1981. Amino acid composition of grain protein of maize grown with and without pesticides and standard commercial fertilizers. Agronomy Journal 73:611–613.
31 Hansen, H. 1981. Comparison of chemical composition and taste of biodynamically and conventionally grown vegetables. Plant Foods Human Nutrition 30:203–211.
32 Muller, K. and Hippe, J. 1987. Influence of differences in nutrition on important quality characteristics of some agricultural crops. Plant and Soil 100:35–45.
33 Pimpini, F., Giardini, L., Borin, M., and Gianquinto, G. 1992. Effects of poultry manure and mineral fertilizers on the quality of crops. Journal of Agricultural Science 118:215–221.
34 Letourneau, D.K., Drinkwater, L.E., and Shennan, C. 1996. Effects of soil management on crop nitrogen and insect damage in organic versus conventional tomato fields. Agriculture, Ecosystems and Environment 57:179–187.
35 Schuphan, W. 1974. Nutritional value of crops as influenced by organic and inorganic fertilizer treatments. Plant Foods for Human Nutrition 23:333–358.
36 Petterson, B.D. 1977. A comparison between conventional and bio-dynamic farming systems as indicated by yield and quality. BioDynamics 124:19–27.
37 Clarke, R.P. and Merrow, S.B. 1979. Nutrient composition of tomatoes homegrown under different cultural procedures. Ecology of Food and Nutrition 8:37–46.
38 Hornick, S.B. 1992. Factors affecting the nutritional quality of crops. American Journal of Alternative Agriculture 7:63–68.
39 Meier-Ploeger, A., Duden, R., and Vogtmann, H. 1989. Quality of food plants grown with compost form biogenic waste. Agriculture, Ecosystems and Environment 27:483–491.
40 Tauxe, R., Kruse, H., Hedberg, C., Potter, M., Madden, J., and Wachsmuth, K. 1997. Microbial hazards and emerging issues associated with produce. A preliminary report to the National Advisory Committee on Microbiologic Criteria for Foods. Journal of Food Protection 60:1400–1408.
41 Schmidt, C.W. 1999. Safe food: an all-consuming issue. Environmental Health Perspectives 107:A144–A149.
42 Lo, M. and Mathews, D. 2002. Results of routing testing of organic food for agrochemical residues. In J. Powell (ed.). UK Organic Research 2002: Proceedings of the COR Conference, 26–28 March, Aberystwyth, UK. p. 61–64.
43 Hussein, H.S. 2000. On-farm factors can decrease risk of *E. coli* contamination. Feedstuffs 13:18–23.
44 MacEachern, D. 1990. Save Our Planet—750 Everyday Ways You Can Help Clean Up the Earth. Dell Publishing Company, New York.
45 Jolly, D.A. 1991. Determinants of organic horticultural products consumption based on a sample of California consumers. Acta Horticulturae 295:141–148.
46 Hill, H. and Lynchehaun, F. 2002. Organic milk: Attitudes and consumption patterns. British Food Journal 104(7):526–542.
47 Hutchins, R.K. and Greenhalgh, L.A. 1997. Organic confusion: Sustaining competitive advantage. British Food Journal 99(9):336–338.
48 Wolf, M.M. 2002. An analysis of the impact of price on consumer interest in organic grapes and a profile of organic purchasers. Paper presented at the American Agricultural Economics Association Annual Meeting, Long Beach, California, 28–31 July.
49 Fotopoulos, C. and Krystallis, A. 2002. Organic product avoidance: Reasons for rejection and potential buyers' identification in a countryside survey. British Food Journal 104(3/4/5):233–260.
50 Øystein, S., Persillet, V., and Sylvander, B. 2001. The consumers' faithfulness and competence in regard to organic products: Comparison between France and Norway. Paper Presented at the 2002 IFOAM Conference, Vancouver, Canada.
51 Chang, H. and Kinnucan, H.W. 1991. Advertising, information and product quality: the case of butter. American Journal of Agricultural Economics 73:1195–1203.
52 Mathios, A.D. 1998. The importance of nutrition labeling and health claim regulation on product choice: An analysis of the cooking oils market. Agricultural and Resource Economics Review 27:159–168.
53 Wessells, C.R., Johnston, R.J., and Donath, H. 1999. Assessing consumer preference for eco-labeled seafood: The influence of species, certifier and household attributes. American Journal of Agricultural Economics 81: 1084–1089.
54 Wang, Q., Halbrendt, C., and Webb, S. 1997. Consumer demand for organic food in China: Evidence from survey data. In W. Lockertz (ed.). Agricultural Production and Nutrition. Conference Proceedings, Boston, MA, 19–21 March. Tufts University, Boston, MA. p. 187–194.
55 Demeritt, L. 2002. All Things Organic 2002: A Look at the Organic Consumer. The Hartman Group, Bellevue, WA.
56 Fishbein, M. and Ajzen, I. 1975. Belief, Attitude, Intention, and Behaviour: An Introduction to Theory and Research. J. Wiley & Sons, New York.
57 Hay, J. 1989. The consumer's perspective on organic food. Canadian Institute of Food Science Technology Journal 22(2):95–99.
58 Ekelund, L. 1990. Vegetable consumption and consumer attitudes towards organically grown vegetables—the case of Sweden. Acta Horticulturae 259:163–172.
59 Baker, G.A. and Crosbie, P.J. 1993. Measuring food safety preferences: identifying consumer segments. Journal of Agricultural and Resource Economics 18:277–287.
60 Hack, M.D. 1993. Organically grown products: Perception, preferences and motives of Dutch consumers. Acta Horticulturae 340:247–253.
61 The Packer. 2001. Fresh Trends 2001: Understanding consumers and produce. [online]. Available at Web site: http://www.pma.com (verified July 2004). Produce Marketing Association Fresh Summit 2000 Workshop Summary.
62 Werner, J. and Alvensleben, R.V. 1984. Consumer attitudes towards organic food in Germany. Acta Horticulturae 155:221–227.
63 O'Donovan, P. and McCarthy, M. 2002. Irish consumer preference for organic meat. British Food Journal 104(3/4/5): 353–370.
64 Buzby, J.C. and Skees, J. 1994. Consumers want reduced exposure to pesticides in food. Food Review 17(2):19–22.
65 Aguirre, G.J.A. 2001. Marketing and consumption of organic products in Costa Rica. Working Paper No.5. The School for Field Studies, Centre for Sustainable Development, Atenas, Costa Rica.
66 Huang, C.L. 1996. Consumer preferences and attitudes towards organically grown produce. European Review of Agricultural Economics 23(3–4):331–342.
67 Kyriakopoulos, K. and Oude-Ophuis, A.M. 1997. A pre-purchase model of consumer choice of biological foodstuff.

Journal of International Food and Agribusiness Marketing 8:37–53.
68 The Packer. 2002. Fresh trends 2002: Key findings of Packer's fresh trends report. [online]. Available at Web site http://www.bountyfresh.com/fresh_report4.htm (verified July 2004).
69 Sandalidou, E., Baourakis, G., and Siskos, Y. 2002. Customers' perspectives on the quality of organic olive oil in Greece: A satisfaction evaluation approach. British Food Journal 104(3/4/5):391–406.
70 Roddy, G., Cowan, C., and Hutchinson, G. 1996. Consumer attitudes and behaviour to organic foods in Ireland. Journal of International Consumer Marketing 9(2):1–19.
71 Bailey, W.C. 1996. Comparative study of the willingness to pay for organic and irradiated meat products—An experimental design. NE-165 Working Paper Series, WP-48. Food Marketing Policy Center, University of Connecticut.
72 Millock, K., Hansen, L.G., Wier, M., and Andersen, L.M. 2002. Willingness to pay for organic foods: A comparison between survey data and panel data from Denmark. [online]. Available at: http://www.akf.dk/organicfoods/conference/willingness.pdf (verified 6 December 2004). Proceedings of the Conference on Consumer Demand for Organic Foods, Denmark.
73 Soler, F., Gil, J.M., and Sanchez, M. 2002. Consumers' acceptability of organic food in Spain: Results from an experimental auction market. British Food Journal 104(8): 670–687.
74 Jolly, D.A. 1991. Differences between buyers and non-buyers of organic produce and willingness to pay organic price premiums. Journal of Agribusiness 9(1):97–111.
75 Ott, S.L. 1990. Supermarket shoppers' pesticide concerns and willingness to purchase certified pesticide residue-free fresh produce. Agribusiness 6(6):593–602.
76 Turco, G. 2002. Organic food - an opportunity at who's expense? [online]. Available at www.rabobank.com/repository/far/farpublications.pdf (verified 6 December 2004). Industry Note, Food and Agribusiness Research. Rabobank International, Sydney, Australia.
77 Kenanoğlu, Z. and Karahan, Ö. 2002. Policy implementations for organic agriculture in Turkey. British Food Journal 104(3/4/5):300–318.
78 Wier, M., Hansen, L.G., and Smed, S. 2001. Explaining demand for organic foods. Paper presented at the 11th Annual EAERE Conference, Southampton, England.
79 Van Ravenswaay, E. and Hoehn, J.P. 1991. Contingent valuation and food safety: the case of pesticide residues in food. Staff paper No. 91–13. Department of Agricultural Economics, Michigan State University, East Lansing, MI.
80 Menghi, A. 1997. Consumer response to ecological milk in Sweden. Swedish Agricultural University, Uppsala, Sweden.
81 Bhaskaran, S. and Hardley, F. 2002. Buyer beliefs, attitudes and behaviour: foods with therapeutic claims. Journal of Consumer Marketing 19(7):591–606.