

Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences

Final Report

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TABLE OF CONTENTS

Acknowledgements	i
Executive Summary	iii
1. Introduction.....	1
2. What is Organic? The Role of Economics	3
3. Comparison of Organic and Conventionally-Produced Food	9
3.1 PRODUCTION, PRODUCER PRICE, AND PROFITABILITY COMPARISON	9
3.2 NUTRITIVE, SENSORY AND FOOD SAFETY COMPARISON	14
4. Consumer Awareness and Knowledge about Organic Food	17
5. Consumer Attitudes and Perceptions.....	22
6. Consumer Preference for Organic Food.....	28
7. Willingness-To- Pay for Organic Products.....	30
8. Summary and Conclusions.....	37
9. References.....	<u>40</u>

EXECUTIVE SUMMARY

RESEARCH QUESTION AND OBJECTIVES

Growing interest in organic agriculture has prompted numerous studies that compare various aspects of organic and conventionally-produced foods. This report 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.

APPLIED QUESTIONS

How knowledgeable and informed are consumers about organic products? Overall, although there is some knowledge and awareness about organic products, consumers are not consistent in their interpretation of what is organic. Second, 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 stem 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.

What is the single most important factor that drives demand for organic products? 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.

What are the key economic issues and considerations that affect organic product purchase? 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.

Issues of relevance to policy analysts: It is important for policy analyst and researchers to note that organic fresh fruits and vegetables currently dominate the organic consumers' 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.

Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences

1. 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 (e.g., Gregory, 2000; Grossman, 1972; Schifferstein and Oude Ophuis, 1998), animal welfare considerations (e.g., Harper and Makatouni, 2002; Hughes, 1995) and concern about the environment (e.g., Grunert and Juhl, 1995; Tregear *et al.*, 1994; Wandel and Bugge, 1997; Wilkins, and Hillers, 1994). These concerns, along with observed organic consumer behaviour has led, in part, to emergence of various groups of organic consumers, namely environmentalists, food phobics, healthy eaters, humanists, welfare enthusiasts, and hedonists (Davies *et. al.*, 1995) (Table 1). The interest in organic agriculture has prompted numerous studies comparing aspects of organic and conventionally-produced foods. Stakeholder interest 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 (2002), for example, provided an excellent review of several studies comparing selected biophysical and related quality attributes of organic and conventionally produced foods. Woese *et al.* (1997) evaluated selected studies based on the 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.

Table 1: Categories of organic consumers, and relationship with consumer behaviour

Organic consumer groups*	Key characteristics
Environmentalists	Concerned about environmental quality
Food phobics	Concerned about chemical residues in food
Healthy eaters	Consumers who, for various (medical or other) reasons, follow particular diet sets
Humanists (and welfare enthusiasts)	Concerned with 'factory farming' methods
Hedonists	Believe that a price premium on a product signals a better product

*It is important to note that various degrees of overlap can exist among the categories.

Source: Modified from Davies *et al.* (1995)

The future of organic agriculture will, to a large extent, depend 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 response to shifting market dynamics. From a marketing perspective, it is important to understand our (human) conception of consumer decision-making regarding organically produced foods, and how consumption can be promoted. Product development and marketing strategies are also affected by consumer beliefs, attitudes and responses. This could 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 is concerned with our (human) conception of consumer decision-making for organically produced foods, based on a microeconomic perspective. In this regard, this review compliments and extends the work of Woese *et al.* (1997) and Bourn and Prescott (2002). We

have consolidated and compared numerous empirical analyses 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: (i) the implications of an economic definition of organically grown food for consumer demand; (ii) attributes that shoppers consider most when comparing organic with conventionally grown products; (iii) level and characteristics of consumer knowledge and awareness about organic food; (iv) assessment methods and characteristics of organic consumer attitudes and preferences; (v) size of organic price premium and characteristics of consumers' willingness-to-pay for organic products; and (vi) 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. An economic perspective of organic products as economic goods precedes a comparison of selected consumer decision-making dimensions of organic products.

2. 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' (e.g., Bourn and Prescott, 2002; FAO, 1999; Klosky and Tourte, 1998; Goldman and Hylton, 1972). Thus, while some definitions highlight dimensions such as 'biological' or 'natural production systems' (e.g., Klosky and Tourte, 1998) and 'green' or 'environmental friendliness' (e.g., Goldman and Hylton, 1972), others emphasize the limited use of artificial chemicals in organic production (e.g., FAO, 1999), or its general philosophy (e.g., Torjusen, Nyberg and Wandel, 1999).

Vindigni *et al.* (2002) put it more poignantly when the authors argued that the term organic often refers to a “process claim” and not a “product claim”.

In contrast to conventional crop production, organic livestock farming is defined using general guidelines, first outlined by a private organization in 1924 (Sundrum, 2001), and further developed by the International Federation of Organic Agriculture Movements (IFOAM) (IFOAM, 1996). Critics question the uniqueness of organic livestock production on the grounds of the self-developed guidelines and goals. Specifically, do the principles of organic animal husbandry allow for a better (and different) production than conventional principles? Probably because of this skepticism among some scientists, there is a dearth of published studies comparing the two broad livestock production systems (Sundrum, 2001).

Although the above perspectives on organically produced foods are useful in many ways, they provide limited relevance in our conception of consumer decision-making, and hence in understanding consumer preferences for and attitude towards organic foods. Despite the process claim, organic food consumers tend to perceive such products as having particular intrinsic (quality and safety) characteristics (Vindigni *et al.*, 2002). In reality, a consumer’s decision choice in favour 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 (1970) and Darby and Karni (1973), namely: credence characteristics.

Organically produced foods are consistent with economic goods that have attributes that cannot be revealed by inspection or ordinary use alone. In practice, organic product attributes are not easily assessed by the consumer. Several economic studies have thus analyzed organic products as credence goods (e.g., Andersen and Philipsen, 1998; Nelson, 1970; Darbi and Karni, 1973; Hansen, 2001; Giannakas, 2002). The credence characteristics of a good are qualities

which are difficult or, in some cases, impossible to detect, but which nevertheless play an important role for the buyer (Andersen and Philipsen, 1998). According to Andersen and Philipsen (1998), a credence good is one for which a buyer's decision choice is dominated by perceptions about the product's credence characteristics. The credence characteristics and quality aspects of organic products are important because a consumer may not necessarily associate 'organic' with the production process, but with the quality attributes of the product (see, Table 2).

As a credence good, information about an organic product is asymmetric (Nelson, 1970; Darbi and Karni, 1973, Hansen, 2001; Giannakas, 2002). 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 (Giannakas, 2002). According to Hansen (2001), the characteristics of organic foods that may enter the utility function of the consumer 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 (2000) identified five broad food quality attributes, namely safety, nutrition, value, package, and production process (Table 2). 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.

Table 2. Some quality attributes of (organic and conventionally produced) food products

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

Source: Caswell (2000).

Organic products compete with conventional alternatives in the market. Although many organic products command a higher price compared to their conventional alternatives, some consumers continue to substitute organic for conventional products. This and other related observations led Lancaster (1966) to argue that the traditional theory of consumer demand is inadequate in explaining why consumers will buy, for example, organic products instead of conventional-grown alternatives. The traditional theory is silent about the intrinsic characteristics of a commodity. Neither does it provide insight on how product quality variations affect consumer perceptions and decision-making behaviour. It also provides limited explanation of

how demand changes when one or more of the characteristics of a good change or how a new good introduced into the market fits into the preference pattern of consumers over existing goods (Lancaster, 1966; Lancaster, 1971; Lancaster, 1991). Intrinsic characteristics are what differentiate organic products from their conventionally-produced alternatives. According to Lancaster (1971), the omission of information about the inherent characteristics of consumer goods in traditional consumer theory renders the theory incapable of handling some important aspects of consumer demand in today's world.

Given the above limitations of the traditional theory of the consumer, an alternative approach to consumer behaviour was proposed by Lancaster (1966). Lancaster's (1966) approach to consumer theory assumes that consumption is an activity in which goods, singly or in combination, are inputs, which generate output in terms of a collection of characteristics (Lancaster 1966). In addition, different goods can generate similar characteristics. For example, environmentally benign production effects can be achieved by buying (i.e., supporting production of) organic carrots or organic milk (Hansen 2001). Lancaster (1966) further assumed that consumer satisfaction (or utility) and preference ordering rank a collection of product characteristics, and only indirectly ranks a collection of goods through the characteristics they possess. In other words, a consumer is seen as buying characteristics, because they are what the consumer values. A consumer buys particular goods as inputs that will generate the characteristics he/she values. These issues have relevance in organic product purchase decisions because they are more consistent with such product purchase behaviour compared to parallel assumptions under traditional consumer theory which posit that utility helps to rank goods directly and that individuals possess utility functions in commodity space.

Lancaster's (1966) model also addresses how the characteristics of goods can be substituted when relative prices change. A price premium paid for the characteristics of organic foods suggests that consumers place a higher value on such attributes compared to conventionally-produced alternatives. According to Lancaster (1966), a good which does not possess all the characteristics a consumer desires cannot be a dominant good no matter how low its price, while a good that has characteristics not possessed by any other good cannot be inefficient no matter how high the price.

A key benefit of the quality attributes of food products (see Table 2) is in terms of human health (Caswell, 2001). In connection with this, Grossman (1972) applied Lancaster's (1966) theory of consumer demand to develop a model of consumer demand for "good health". Grossman (1972) viewed human health as a commodity - 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 oneself 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 "good health". The above discussion suggests a possible link between food quality attributes and consumer demand for organic food. This raises questions regarding how organic produce compares with conventionally grown alternatives.

3. Comparison of Organic and Conventionally-Produced Food

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 (Vindigni et. al, 2002). On the other hand, a major reason why some consumers do not purchase organic foods is linked to a perception that such foods are not better than their conventionally produced alternatives (Jolly *et al.*, 1989). There is, thus, a continuing debate about whether organically produced 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 evaluations have generally focused on yield, producer price, and profitability comparisons. In contrast, demand-side studies have investigated the differences in terms of biophysical and chemical (e.g., nutritive, sensory, and food safety) characteristics, as well as consumer preferences and retail prices. An assessment of key findings from various studies is provided in this section.

3.1 Production, Producer Price, and Profitability Comparison

A supply side assessment of the differences between organic and conventional products is important especially for environmentalists and humanists (see Table 1), or for consumers who have an “external orientation” (see Gunter and Furnham, 1992) and tend to respond to the social benefits or impacts of increased organic production. Such consumers believe that conventional production systems can generate off-site effects, with negative impacts on society. Other consumers choose to reward producers who such consumers perceive to be using, for example,

environmentally friendly production methods (Davis, 1994). Increases in the supply of organic products will, *ceteris paribus*, lower price premiums, thereby affecting consumer demand and profitability of the organic industry.

Most economic comparisons of the performance of organic versus conventional production systems focus on marketable outputs (e.g., yield) or other related quality attributes, at a given time period. In general, comparisons over several years are limited. Results of single period comparisons should therefore be interpreted with caution since, by its nature, the (biophysical) performance of organic agriculture needs to be based on whole farm analysis (e.g., involving all crops in a rotation) rather than a single enterprise for a given year.

Overall, organic production systems generate lower yields compared to conventionally grown alternatives. The literature also suggests that output from organic production systems tend to vary depending on the phase in converting to organic production (FAO, 2002). Some studies report yield loss after switching from conventional to organic production, with the extent of the yield loss depending on factors such as the (previous) management regime (under conventional production), inherent biological characteristics of the land, and experience of the farmer (FAO, 1999). For example, in a study for Denmark, Halberg and Kristensen (1997) reported organic crop yields that were 20 to 30% lower than conventionally-grown crops, and attributed this primarily to lower soil nitrogen, weed pressure, and pest and disease problems. Studies for other regions in Europe reported cereal yields of 60-70% of conventional production, 20-50% lower for organic vegetables, and 75% lower for potatoes (Conolly, 2002).

In a study for Canada, Entz *et al.* (1998) reported that crop yields on organic farms were about 50-70% of those from comparable conventional farms. A more recent survey by Statistics Canada covering 11,000 fruit and vegetable farmers over a two-year period (2000-2001) across

the country reported that most organic fruit and vegetables have lower yields compared to conventional alternatives (Table 3). For example, raspberries and strawberries had an average yield of 90% of conventional yields, whereas organic asparagus and lettuce farmers reported an average yield that was 55% lower than that of conventional crops (Parsons, 2002). In contrast,

Table 3: Comparison of produce grown using organic versus conventional methods, Canada, 2000-2001

	Organic Yield Difference (%)	Organic price premium (%)
<i>a) Vegetables</i>		
Asparagus	-55	0.5
Beans	-12	18
Beets	-56	229
Broccoli	-44	59
Sweet Corn	52	5
Cabbage	-37	97
Carrots	-40	236
Cauliflower	-55	26
Garlic	-8	11
Lettuce	-52	33
Dry Onions	-63	159
Pumpkins	-44	9
Turnips	-6	7
Squash/Zucchini	-27	14
Tomatoes	-23	66
<i>b) Fruits</i>		
Apples	-21	73
Blueberries	38	41
Cranberries	30	112
Nectarines	-48	37
Peaches	-30	5
Pears	22	62
Raspberries	-9	-16
Strawberries	-9	-1

Source: Parsons (2002)

the survey found that average yield for organic blueberries, cranberries and pears were higher than conventionally grown alternatives. Organic blueberries generated yield that was 38% higher than that of conventionally-grown blueberries, on average. Parson (2002) attributed the higher organic yields to prudent management of weeds, pests and diseases. In addition, Parson (2002) noted that the small acreages typically managed by organic producers allow for more intensive

monitoring of crops, resulting in implementation of management measures in a more timely fashion, thereby reducing yield losses.

In contrast, other studies have reported that yields from organic agriculture can be competitive after switching, especially when the previous production system used low-input management regimes (FAO 2003; ITC/KIOF, 1998). The FAO (2003) reported experiences of organic production in limited resource areas such as Northern Potosí (Bolivia), Wardha (India) and Kitale (Kenya) which suggest that yields can be increased several times over those obtained using traditional cropping systems.

Yield comparisons, alone, provide a limited perspective on organic versus conventional production systems. Financial viability (as opposed to biophysical output) is more consistent with the decision choice issues farm managers face. As with yield comparisons, there are limited studies comparing the long-term profitability of organic versus conventional production systems. Profitability depends not only on output level, but also on product price.

The link between product prices and product attributes or characteristics (in the context of Lancaster, 1966) was articulated in a seminal paper by Rosen (1974). Rosen (1974) argued that consumers value goods based on their utility-generating attributes, and that consumers assess product characteristics when making a purchase decision. Furthermore, the observed market price for food products is an aggregate of the implicit prices for the constituent product characteristics. Thus, product prices not only provide signals about the inherent quality characteristics of a product, but also reflect the value of inputs used in the production of such agricultural goods.

Cue utilization theory (Olsen, 1972) also posits that consumers assess the quality of a product using either direct indicators (e.g., physical attributes) or indirect indicators (e.g.,

product price). Given that most direct indicators associated with credence goods are not often observable to the organic consumer, indirect cues or indicators (e.g., price) are used to signal product quality and, therefore, are used by consumers when processing information about potential purchases.

In general, lower organic yields are compensated for by relatively higher producer prices. Thus, farm gate prices are important determinants of organic farm profitability. On the other hand, price premiums tend to negatively affect organic consumer purchases (Misra *et al.* 1991). Average price premiums vary from country to country (La Via and Nucifora, 2002), and according to product (see, Table 3). In the EU, for example, the average producer price premium for organic cereals was 102% in 2000; and ranged from 30% in Greece to as high as 281% in Luxemburg. In addition, nine out of 15 EU countries reported price premiums to farmers in excess of the EU average (Hamm *et al.*, 2002). Similar price premiums to organic producers exist in the US. For example, Bertramsen and Dobbs (2001) reported that, in 2000, US price premiums for organic corn, wheat and Oats were, respectively 89%, 103% and 71% above conventionally-grown alternatives. Table 3 also indicates that organic price premiums in Canada were as high as 236% for carrots, and 229% for beets (Parson, 2002). By comparison, the data shows that the price of organic raspberries (strawberries) was 16% (1%) lower than their conventional alternatives. Overall, however, Canadian farmers receive a price premium for organic products, as in other countries.

Organic price premiums also seem to have increased over time. In the US, for example, producer price premiums for organic corn, spring wheat and oats increased by 154%, 91% and 103% respectively between 1995 and 2000 (Bertramsen and Dobbs, 2001). However, as the sector grows, and organic consumer demand increases, prices will likely decline.

3.2 Nutritive, Sensory and Food Safety Comparison

Nutritive, sensory and food safety attributes influence consumer choice between organic versus conventionally produced foods (Bourn and Prescott, 2002). Several studies have therefore compared organic and conventionally produced foods using such attributes. There are several noneconomic attributes that shoppers consider when comparing organic produce with conventionally grown alternatives. Although shoppers generally link produce quality with its appearance (Beharrell and MacFie, 1991), Goldman and Clancy (1991) reported a relationship between consumer willingness to accept blemishes and organic produce purchase behaviour. In general, appearance tends to be less important among consumers with a high preference for organic and pesticide-free products (Lin et. al., 1986). Product taste (i.e. flavour), 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 (Jolly and Norris, 1991; Sparling et. al., 1992), while other studies report a better taste for organic produce (Estes et. al., 1994; The Parker, 1996). 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 (Sparling et. al., 1992).

Most studies used various research methods, with a substantial number of them investigating the impacts of different types and levels of fertilizer rates on nutritive, sensory and food safety characteristics (e.g., Schuphan, 1994; Srikumar and Ockerman, 1991; Peavy and Greig, 1992; Warman and Havard, 1998). Other studies analyzed the nutritive and chemical content of organic and conventional foods purchased from retail stores (e.g., Smith, 1993;

Wolfson and Shearer, 1981). Some studies for the livestock sector compared alternative animal feeding trials. Taken together, the studies involve several food and food product groups for various countries.

Overall, a review of the comparative studies (e.g., Brant and Beeson, 1950; Maga *et al.*, 1976; Schuts and Lorenz, 1976; Hansen, 1981; Muller and Hippe, 1987; Oude Ophius, 1988; Stopes *et al.*, 1988; Wolff, 1991; Basker, 1992; Pimpini *et al.*, 1992; DeEll and Prange, 1993; Conklin and Thompson, 1993; Smith, 1993; Poretta, 1994; Letourneau *et al.*, 1996; Cayuela *et al.*, 1997), indicate contrasting conclusions (also see Woese *et al.*, 1997; and Bourn and Prescott, 2002). Several of the studies reported that organic products have lower nitrate content, and higher dry matter and mineral content compared to conventionally grown alternatives (e.g., Warman and Havard, 1998; Mader *et al.*, 1993; Smith, 1993; Peavy and Greig, 1992; Srikumar and Ockerman, 1991; Muller and Hippe, 1987; Wolfson and Shearer, 1981; Schuphan, 1974). Furthermore, while some studies reported higher vitamin C content in organically grown foods (e.g., Petterson, 1997; Schuphan, 1974), others found higher vitamic C levels in conventionally grown produce (e.g., Clarke and Merrow 1979; and Hansen 1981), with the contrasting findings attributed to factors such as maturity at harvest and storage conditions (Bourn and Prescott, 2002).

Some of the contrasting findings from the various comparative studies have been attributed to differences in research methods and experimental conditions (Woese *et al.*, 1997; Bourn and Prescott, 2002). For example, some studies reported that crop variety, soil type, climate, duration of experiment, post-harvest practices and statistical design can all influence conclusions on the nutritive and sensory characteristics of a product (see, for example, El Gindy *et al.*, 1957; Muller and Hippe, 1987; Hornick, 1992; Woese *et al.*, 1997; Heaton, 2002; Bourn

and Prescott, 2002). Thus, it is important for future efforts at comparing organic with conventional production processes and products to control for or address 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 (and across) similar regions and/or conditions indicate contrasts in some of the findings (see, for example, Letourneau *et al.*, 1996; Pimpini *et al.*, 1992, Meier-Ploeger *et al.*, 1989; Muller and Hippe, 1987).

Furthermore, other studies that investigated the perception that organically grown foods have less chemical and microbial contamination than conventionally produced foods (e.g., Slanina, 1995; Tauxe *et al.*, 1997; Acker *et al.*, 1998; Avery, 1998; Schmidt, 1999; Lo and Mathew, 2002) also showed contrasting conclusions. Thus, it is not clear that, overall, organic foods are safer than conventional foods. Perceptions that organic is associated with less or no chemical residues, for example, is 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 *E. coli* (Tauxe *et al.*, 1997). However, such risks can be reduced with proper management practices (Wang *et al.*, 1996; Hussein, 2000; Gagliardi and Karn, 2000).

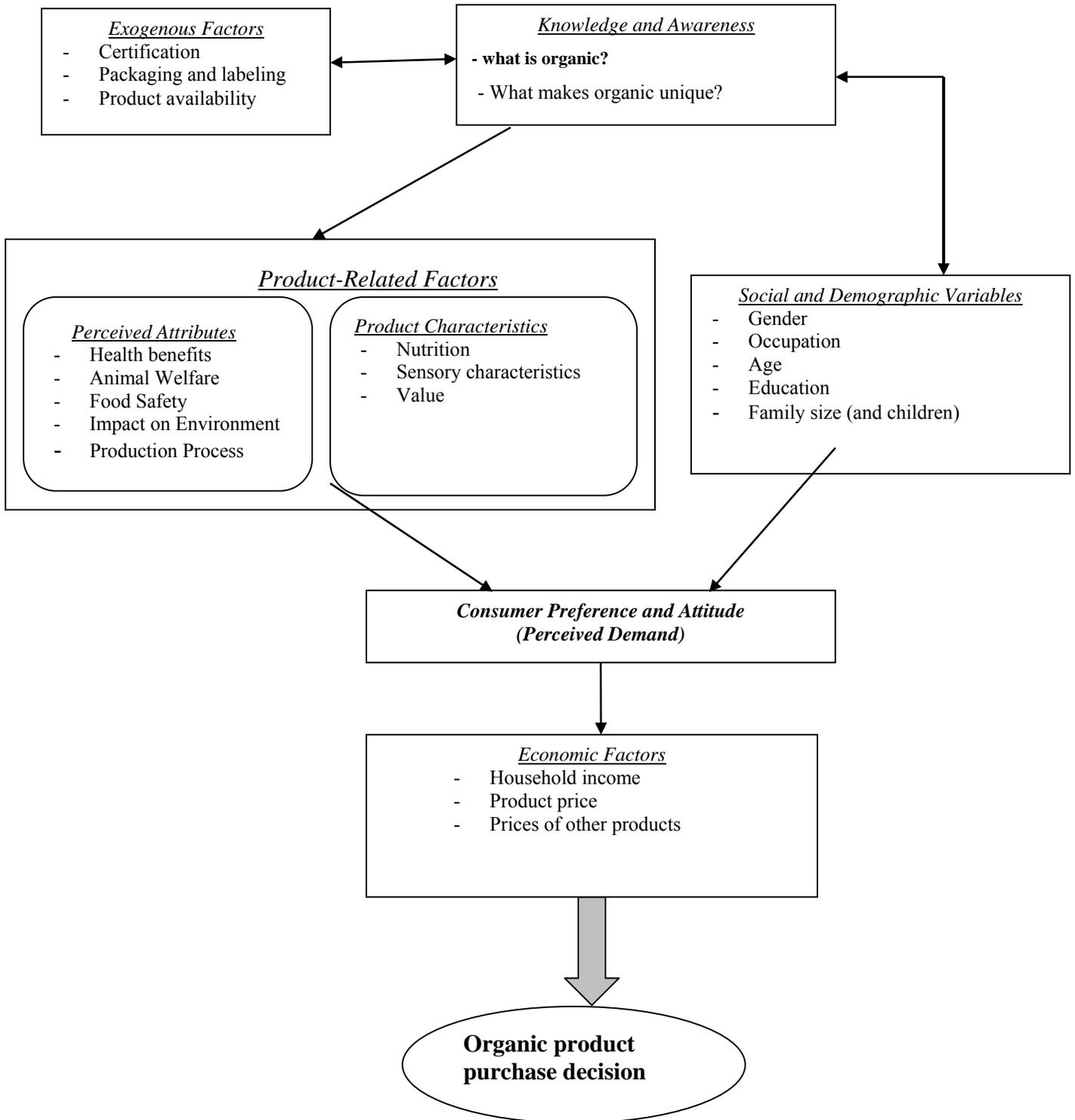
4. Consumer Awareness and Knowledge about Organic Food

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) (MacEachern 1990; Jolly, 1991). 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 the willingness to pay a price premium (Figure 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 repeated purchase and consumption, unless they are told so (Giannakas, 2002). Thus, awareness and knowledge about organically produced foods are critical in the consumer purchase decisions. 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 favour of the cheaper product.

Most studies on consumer knowledge about organic products reflect a conceptual belief that is true and justified. Consequently, studies typically use measurement methods that essentially rely on correctness to answers on survey questionnaire (Hunt, 2003). Correct (or incorrect) responses imply that the respondent has knowledge (or does not have knowledge) about organic foods and products. Hunt (2003) has noted some limitations associated with such a narrow definition of consumer knowledge, and proposed a wider definition and measurement that captures other important, but often neglected, dimensions of knowledge.

Figure 1. Framework of factors which affect organic consumer attitudes and purchase decisions



Studies that investigated the level of consumer awareness and knowledge about organic foods include Jolly *et al.* (1989), Ekelund (1990), Akgüngör *et al.* (1997), Hutchins and Greenhalgh (1997), Wang *et al.* (1997), Compagnoni *et al.* (2000), Environics (2001), Øystein *et al.* (2001), Kenanoğlu and Karahan (2002), Cunningham (2002), Demeritt (2002), Hill and Lynchehaun (2002). A critical review of these studies suggests that, overall, there is some consumer awareness about organic foods around the world. This awareness is high especially in Western Europe, where the organic market is relatively well developed, compared to other regions of the world. Consumer awareness of organic products in North America compares reasonably well with that of Western Europe.

Although there is general consumer awareness around the world, the literature also suggests that consumers have inconsistent interpretations about what is ‘organic’. For example, in a survey of consumers in three California counties, Jolly *et al.* (1989) 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’ (Hutchins and Greenhalgh, 1997). In a more recent study for the UK, respondents described organically produced food as one that is more natural and healthy, compared to conventional food (Hill and Lynchehaun, 2002). Furthermore, there was no difference in the UK consumers’ understanding of “organic” among organic and non-organic food buyers. In other words, both buyers of organic and non-organic products felt that organic alternatives have no pesticides and/or use no chemical fertilizers, and are natural and healthy. In contrast, Jolly (1991) 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 2 (Hill and Lynchehaun, 2002). This hypothesis by Hill and Lynchehaun (2002) helps to explain why some studies (e.g., Hutchins and Greenhalgh, 1997; Wolf, 2002), reported confusion and/or inconsistencies with consumers' understanding of the organic concept. Wolf (2002), for example, found that U.S. 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 (1997) also noted some confusion 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 (Fotopoulos and Krystallis, 2002). With the emergence of other types of labels in the market (such as "vegetarian" or "healthy" alternatives), the confusion will likely intensify (Hutchins and Greenhalgh, 1997).

Many organic consumers identify organic products based on the organic logos and/or labels attached to the product. Indeed, several studies (e.g., Chang and Kinnucan, 1991; Mathios, 1998; Kim *et al.*, 1999; Wessels *et al.*, 1999; Øystein *et al.*, 2002) have found a positive relationship between consumer purchase decisions and organic product labeling. 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 (Caswell, 2000). 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 (Giannakas 2002; Tregear *et al.*, 1994); stemming from reported cases of mislabeling (e.g., Landay, 1996), and misrepresentation of conventionally produced food as organic (e.g., Groves, 1998). Furthermore, in regions of the world where the organic agriculture sector is not well developed, and the process of organic certification and standardization is not uniform, few truly believe in the organic label (Wang *et al.*, 1997). 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 knowledge and awareness was considered the number one reason why consumers do not buy organic food, 59% respondents indicated that they never considered organic products because they did not know about them (Demeritt, 2002). 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 about the product 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 appeal and inherent characteristics of organic may translate into actual demand.

5. 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. Beliefs and perceptions are highly subjective notions (Fishbein and Ajzein, 1975), because they reflect opinions about the objective state of the world. Although in reality such perceptions may or may not be true, the individual who holds the perception thinks that it is true. Given Lancaster's (1966) notion that consumers demand bundles of product characteristics, perceptions about particular (desirable) characteristics of organic food can influence a buyer's choice. Studies on consumer perceptions about organic versus conventionally produced foods therefore attempt to determine 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. Weisberg *et al.* (1996) argued that consumer preference for a particular product is based on attitudes toward available alternatives. Thus, if consumers are asked to indicate their preference regarding 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 behaviours, the food and nutrition science and social-psychological literature provide limited

evidence to support this assumption (Goldman and Clancy, 1991; Sims, 1980). Overall, the scholarly literature suggests that various consumer attitudes work in contrasting ways - for and against purchasing organic products (see, for example, Goldman and Clancy, 1991).

A general perception that conventional agricultural systems, compared to organic production, tend to have long-term health implications and adverse effects on the environment has led some consumers to shift from conventional to organically produced alternatives (MacEachern, 1990). Food scares have spanned several years, including (using 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; BSE and *E. coli* in the 1990s; and foot and mouth disease in 2000s (Gregory, 2000). In North America, recent incidence of BSE, with reported case in northwestern US and western Canada, and avian flu in poultry are still fresh in the memories of most consumers. Such food scares have not only heightened consumer concerns, but also raised questions about consumer confidence with government food regulatory agencies.

Several consumer studies have been undertaken in North America and Europe to assess consumer perceptions about organic foods (e.g., Hay, 1989; Ott, 1990; Huang *et al*, 1990, Huang *et al*, 1993; Misra *et al*, 1991; Jolly *et al*, 1989; Jolly, 1991; Goldman and Clancy, 1991; Ekelund, 1990; Baker and Crosbie, 1993; Swanson and Lewis, 1993; Groff *et al*, 1993; Sylvander, 1993; Buzby and Kees, 1994; Byrne *et al*, 1994; Fricke and von-Alvensleben, 1997; Hack, 1997; Hutchins and Greenlagh, 1997; The Packer, 1998; Thompson and Kidwell, 1998; Øystein *et al*, 2001, O'Donovan and McCarthy, 2002; Jolly, 2001; The Packer, 2001; Demeritt, 2002; Wolf, 2002; Cunningham, 2002). The key findings from selected studies on consumers' attitudes and preferences about organic foods are summarized in Table 4. Most of these studies

concluded that consumers purchase organic foods because of a perception that such products are safer, healthier, and more environmental friendly than conventionally produced alternatives. Some studies reported health and food safety as the number one quality attribute considered by organic product buyers. Concern for the environment was less important compared to food safety and health concerns, suggesting that such consumers might rank private or personal benefits higher than the social benefits of organic agriculture.

Consumer concerns with food safety is highlighted in a study comparing interest in organic products across four European countries (Germany, Denmark, Britain and France) between 1993 and 1995 (Wier and Calverley, 2002). The study found that German consumers were the most interested in organic food, followed by Danish, British and then French consumers. Wier and Calverley (2002) further reported that German consumers were also the most concerned about food safety among the four countries studied, followed by Danish and then British consumers, consistent with the previous conclusion.

Food safety concerns and perceptions about organic attributes are not limited to North America and Europe alone. Studies from other regions of the world highlight the effect of quality attributes on consumer preference for organic foods. Wang *et al.* (1997), for example, reported that 76% of survey respondents from China believed that organic food is safer than conventional alternatives, and actually preferred organic to conventional food. In Costa Rica, consumers of organic food reported health concerns as the number one reason for purchasing organic, followed by environmental concerns (Aguirre, 2001).

Table 4: Summary of key findings from selected studies on organic consumer attitudes and preferred quality attributes

Author(s)	Major Conclusions
<i>North America</i>	
Baker and Crosbie (1993)	The most important factor determining consumer food safety preference was extent of product damage.
Buzby and Skees (1994)	The main health and safety concerns were linked to fat levels, food poisoning and pesticides. Freshness and nutritional attributes were the most important considerations in purchasing organic.
Byrne <i>et al.</i> (1994)	Older buyers, female and married consumers were more likely to choose stores offering pesticide-free products.
Cunningham (2002)	Canadian consumers rank taste (93%), nutrition and health (89%), ease of preparation (68%), preparation time (66%), and price (62) as key considerations. Sixty percent of buyers were females.
Demeritt (2002)	Respondents rated health/nutrition (66%), taste (38%), food safety (30%), environment (26%), availability (16%), price (16%), appearance (12%) and family (11%) as factors that influenced organic choices.
Goldman and Clancy (1991)	Consumers who usually buy organic food were more concerned about food safety than price.
Groff <i>et al.</i> (1993)	Key factors affecting consumer preferences were freshness, healthiness, flavor, nutrition, safety, appearance, price, environmental effect, certification, where it is grown, and brand.
Hay (1989)	Consumers of organic food appreciate the quality of the organic food and perceived them to be better in taste, quality, health and nutrition.
Huang <i>et al.</i> (1993)	Psychographic characteristics were more important to organic consumers than socio-economic factors.
Huang (1996)	Organic consumers were more concerned about pesticide residues and nutritional values, and less so with environmental stewardship.
Jolly <i>et al.</i> (1989)	Food safety and nutrition were rated as very important for 75-80% of respondents.
Swanson and Lewis (1993)	Organic food buyers were more concerned with pesticides residues, additives and preservatives than non-buyers.
The Packer (2001)	Sixty-five percent of respondents were concerned about chemical residues on fresh produce. Taste was the main food quality attribute that affected consumer's preference.
Veeman and Adamovicz (2000)	Cosumers rated fat and pesticide residues as the most important factors affecting health.
Wilkins and Hillers (1994)	Concern for pesticide residues is a significant factor affecting preference for organic food.
Wolf (2002)	Attributes that are very desirable or extremely desirable to consumers included fresh looking, fresh tasting, high quality, seedless, good value, reasonably priced, healthy for me, high in nutrition, looks sweet, free of insects, sale priced, and free of pesticides.

Table 4 (continued)

Author(s)	Major conclusions
<i>Western Europe</i>	
Davies <i>et al.</i> (1995)	The most common reasons for choosing organic produce was concern for the environment and health issues. Availability and price were the main factors influencing actual purchase.
Ekelund (1990)	The motivation for buying organic was the absence of contaminants or health reasons.
Fricke and Von Alvensleben (1997)	Organic food buyers were more health conscious, and did not trust conventional food.
Grunert and Juhl (1995)	Positive attitudes towards environmental issues were found to be positively correlated to the buying of organic foods and the frequency of purchases.
Hack (1993)	The main reasons for buying organic products were linked to human health and environment considerations.
Hansen and Sørensen (1993)	Organic product attributes were more important for organic than non-organic consumer.
Hutchins and Greenhalgh (1997)	93% of respondents reported buying organic produce because of health reasons and/or because it is better for children. Less than 30% reported it is better for the environment.
Kyriakopoulos <i>et al.</i> (1997)	Food quality is more important than price.
Makatouni (2002)	Preference for organic is influenced mainly by health values, with the environment and animal welfare as other attributes.
O'Donovan and McCarthy (2002)	Food safety was most important for consumers of meat. Purchasers of organic meat also believed it is superior in terms of quality, safety, labeling, production methods and value.
Øystein <i>et al.</i> (2001)	50% of Norwegian respondents reported that organic food is healthier, compared to 48% of respondents from France.
Sandalidou <i>et al.</i> (2002)	Health is the main reason for purchase of organic olive, followed by quality characteristics such as colour, taste and flavour.
Schifferstein and Oude-Ophuis (1997)	Food quality, absence of chemicals, environmental friendliness and a better taste were the most important factors that affect organic food demand
Sylvander (1993)	Consumers ranked, in order of importance, health, taste, nutrition and environment as the main reasons for purchasing organic products.
Torjusen <i>et al.</i> (1999)	62% of respondents reported they buy organic because it is healthier, while 67% indicated they purchase organic because of environmental considerations. However, aspects of food that were more important to 70% of the consumers were quality characteristics.
Treagear, Dent and McGregor (1994)	45% buy organic because of health concerns, and 9% indicated that they buy organic because of environmental concerns. Among non-buyers, cost (i.e., price premium) was the main reason for not buying organic.
Von Alvensleben and Altman (1987)	Further growth in the demand for organic food is expected.
Wandel and Bugge (1996)	Majority of respondents ranked freshness first, followed by taste and nutritional value.

Table 4 (continued)

Author	Major Conclusions
<i>Rest of the World</i>	
Akgüngör, Abay and Miran (1997)	Food safety was ranked as the most important factor by 99% of respondents
Aguirre (2001)	100% of organic consumers indicated they buy organic because of health concerns, compared to 95% for environmental concerns.
Mahesh <i>et al</i> (1997)	Organic vegetables were preferred because of freshness, taste and perceived nutritional value
Wang <i>et al</i> (1997)	About 76% believed that organic foods are safer than conventional alternatives, while 9% of respondents believed that foods labeled organic were truly organic.

¹ North America refers to USA and Canada only.

The geographic focus of most of the studies limits their generalization. Location-specific studies may be criticized for representative sample problems because respondents sampled are typically limited to a particular location(s) or food store(s). Several of the studies are also very general in nature, 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 available studies also showed little consistency across countries, in terms of consumer perceptions about organic product attributes.

However, the findings from some studies provide useful (background) information for future consumer and policy research. For example, Werner and Alvensleben (1984) found that, in Germany, organic fresh fruits and vegetables made up a greater proportion of the consumers' food basket. By comparison, Jolly *et al.* (1989) reported in a study in three California counties that the most frequently purchased organic foods, in decreasing order of magnitude, were fruits, vegetables, chicken, eggs, and beef and pork products. According to Hay (1989), Canadians tended to buy more organic fruits and vegetables than any other category of organic products. Similarly, O'Donovan and McCarthy (2002) also found that vegetables were the most popular

types of organic food purchased in Ireland, where 53% of respondents reported consuming organic vegetables, compared to 45% for organic fruits.

6. Consumer Preference for Organic Food

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, colour and other sensory characteristics influence consumer preferences (Bourn and Prescott, 2002).

Studies that investigated the effect of organic quality attributes and other characteristics on consumer preferences include Jolly *et al.*, 1989; Hay, 1989; Ekelund, 1990; Jolly, 1991; Jolly and Norris, 1991; Sylvander, 1993; Buzby and Skees, 1994; Huang, 1996; Kyriakopoulos *et al.*, 1997; Schifferstein and Oude-Ophuis, 1998; Akgüngör *et al.*, 1997; Mahesh *et al.*, 1997; Land, 1998; Torjusen *et al.*, 1999; The Packer, 2001; Meatnews, 2001; Loureiro *et al.*, 2001; Aguirre, 2001; Demeritt, 2002; Wolf, 2002; and Cunningham, 2002. These studies differ in several respects, making comparisons 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. Thus, different studies may have conveyed different notions of quality to the various survey respondents.

In general, the empirical evidence supports the hypothesis that product quality characteristics affect consumers' preferences for organic food; with the most important including nutritional value, economic value, freshness, flavour or taste, ripeness, and general appearance

(especially of fruits and vegetables). Wolf (2002), for example, reported that respondents in California rated fresh-tasting and fresh-looking grapes as the most desirable attribute. Other North American surveys that ranked taste as the most important quality characteristic influencing consumer demand include The Packer (2002), Cunningham (2002), and Demeritt (2002). The Packer (2002) reported that 87% of US respondents identified taste as the primary factor considered in the purchase of fresh produce. Cunningham (2002) also reported that 93% of Canadian respondents prefer food products with good taste. In contrast, studies for other parts of the world (e.g., Jolly *et al.*, 1989; Buzby and Skees, 1994; Torjusen *et al.*, 1999) reported that consumers ranked nutritional value and freshness higher than taste and other related quality characteristics. While most studies reviewed for North America tended to suggest that consumers rank taste and related sensory characteristics as more important than food safety and environmental concerns, studies in the other regions (such as the EU) tended to place health and food safety, and environmental concerns at the top of the preference ranking (see, for example, Sylvander, 1993; Shifferstein and Oude Ophuis, 1997; Akgüngör *et al.*, 1997; Aguirre, 2001; Sandalidou *et al.*, 2002). What seems clear, and consistent across studies, is that consumers in all regions tend to prefer locally grown organic produce, compared to shipments from other places.

In addition, organic product purchase decisions tend to be influenced more by product quality and other inherent characteristics, than by price premium. On the other hand, several studies (e.g., Sylverstone, 1993; Buzby and Skees, 1994; Davies *et al.*, 1995; Roddy *et al.*, 1996; Latacz-Lohman and Foster, 1997, Worner and Meier-Ploeger, 1999; Øystein *et al.*, 2001; Demeritt, 2002; O'Donovan and McCarthy, 2002) reported that price premium, lack of knowledge and product availability were the major reasons preventing non-buyers from purchasing organic food. Demeritt (2002), 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 they did not purchase organic foods because of limited availability. Davies *et al.* (1995) and O'Donovan and McCarthy (2002) also reported product availability and price as key inhibitors to consumers' demand for organic foods in Ireland. According to Davis (1995), two-thirds of non-buyers of organic food in Ireland reported they would buy organic if it was easily available. By comparison, O'Donovan and McCarthy (2002) reported that among Irish respondents who did not purchase organic food, 43% indicated it was too expensive, 28% cited lack of availability, while 29% were just not interested.

7. 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 associated with consuming particular products (Grossman, 1972). A WTP also reflects an observation that individual preferences are unique (Kuchler and Golan, 1999). 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. The magnitude of the price mark-up is also important because it helps in assessing 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 (see Table 1). In addition, environmentalists may be willing to pay

price premiums to support local organic producers. Studies on consumer willingness-to-pay for organic products are therefore important for the organic agriculture sector.

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 (see, Hay, 1989; Ott, 1991; Jolly, 1991; Goldman and Glancy, 1991; Huang *et al*, 1993; Baker and Crosby, 1993; Buzby and Skees, 1994; Bailey, 1996; Harley, 1997; Cunningham, 2002; Wolf, 2002). Similar results have been found for the EU, and other regions of the world (e.g., Werner and von Avensleben, 1984; Ekelund, 1990; Hansen and Sørensen, 1993; Roddy *et al*, 1994; Wandel and Bugge, 1996; Hutchins and Greenhalgh, 1997; O'Donovan and McCarthy, 2002; Millock *et al*, 2002; Canavari *et al*, 2002; Soler *et al*, 2002; Kenanoğlu and Karahan, 2002).

The key findings from selected studies, including details of the premiums consumers are willing to pay are summarized in Table 5, for general products and for specific organic foods. Jolly (1991), for example, found that consumers were willing to pay a 37% price premium for organic products in the US. By comparison, Goldman and Glancy (1991) reported that a third of respondents in a New York survey were willing to pay a 100% price premium for a residue free product. Ekelund (1990) found 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. Hutchins and Greenlagh (1997) also found that consumers in the UK were willing to pay a price premium of up to 30%. Consumers were willing to pay higher price premiums for organic products with a shorter shelf life, such as fruits and vegetables, compared

Table 5: Summary of Key Findings from Selected Studies on Consumer Willingness-to-Pay a Price Premium for Organic Products

Author	Key Findings
North America¹	
Buzby and Skees (1994)	Majority of respondents were willing to pay between 15 and 69 cents above the 50 cents purchase price of grapefruit for a lower pesticide residue. 5% of respondents indicated they would pay more than double the price of a regular fresh grapefruit for a safer one.
Cunningham (2002)	68% of consumers willing to pay a 10% price premium for organic products in general
Goldman and Clancy (1991)	Respondents at food cooperative were willing to pay a 100% price premium for organic foods in general.
Harris (1997)	Consumers paid 21% price premium for organic baby foods.
Hay (1989)	Consumers willing to pay a price premium of not more than 25% for organic products.
Jolly (1991)	Consumers were willing to pay a 37% price premium for organic horticultural products.
Misra, Huang, and Ott (1997)	33% of respondents willing to pay 6-10% price premium, 6% willing to pay 11-15% price premium, and another 7% willing to pay 20% price premium for fresh organic produce.
Ott (1991)	66% of respondents willing to pay 10-15% price premium for pesticide free fresh produce.
Wolf (2002)	30% of respondents willing to pay 50% price premium for organic grapes.
Western Europe	
Canavari <i>et al</i> (2002)	85% of respondents willing to pay a price premium for organic apples
Ekelund (1990)	55% of respondents willing to pay 25% price premium, and another 26% willing to pay 50% price premium for organic vegetables.
Hutchins and Greenlagh (1997)	Consumers willing to pay 30% price premium, especially for organic cereals, fruits and vegetables.
Millock <i>et al</i> (2002)	51% of respondents willing to pay 23% price premium for rye bread, 59% were willing to pay 32% extra for organic milk, 41% willing to pay 40% premium for organic potato, and 41% willing to pay 19% premium for organic minced meat.
O'Donovan and McCarthy (2002)	About 70% of consumers were not willing to pay more than 10% extra for organic meat.
Solar <i>et al</i> (2002)	70% willing to pay a price premium for organic virgin olive oil.
Wendel and Bugge (1996)	70% of respondents willing to pay an extra 5% for organic fruits, vegetables, potatoes and meat. Only 10% of respondents willing to pay 25% price premium for the same products.
Werner and von Alvensleben (1984)	About 93% of frequent buyers of organic food were willing to pay a price premium of 29%. By comparison, about 69% of occasional buyers were willing to pay a price premium of 27%, and 21% of non-buyers said they are willing to buy in the future at a price premium of 27%.
Rest of the World	
Aguirre (2001)	A substantial proportion of respondents were willing to pay at least 10% more for organic products.
Wang <i>et al</i> (1997)	About 80% of respondents were willing to pay a price premium of 5% or more, and 50% of these were willing to pay a price premium of 5-10%.

¹North America refers to US and Canada only

to cereals. For example, Millock *et al.* (2002) reported that 59% of respondents in Denmark were willing to pay a price premium of 32% for organic milk, 41% of respondents would pay 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.

In general, the proportion of respondents willing to pay a price premium decreases as the premium increases, consistent with the law of demand. In addition, premiums tend to increase with (combinations of) preferred attributes. However, what is not clear, and 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. 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, most of the studies involved organic products in general. On the other hand, among the few studies that examined specific organic products (e.g., Baker and Crosbie, 1993; Hansen and Sørensen, 1993; Buzby and Skees, 1994; Hitchins and Greenhalgh, 1997; Kenanoğlu and Karahan, 2002; Millock *et al.*, 2002; Wolf, 2002), there is no clear pattern in the levels of price premiums the various groups of consumers were willing to pay. In other words, there is no clear evidence in terms of which organic products attract higher price premiums.

Overall, most consumers are not willing to pay a price premium higher than 10-20%. Yet analysis of specific organic food markets across countries suggests substantially higher actual price mark-ups. For example, Turco (2002) reported organic price premiums ranging from 10% to as high as 100% depending on the country (Table 6). For example, organic price premiums for different types of products in Italy ranged from 35-100%. By comparison, price premiums in Turkey, ranged from 43% for pickled vine leaf, to as high as 468% for mixed dried fruits

(Kenanoğlu and Karahan, 2002). In Canada, premiums ranged from 14% for apples, to a high of 174% for pork chops (Organic Agricultural Centre of Canada, 2003).

Table 6: Price Premiums for Organic Foods

Country	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

Source: Turco (2002)

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 price premiums negatively affect consumer purchases. Some econometric studies have reported high negative price responses to organic food demand (e.g., Hansen and Sørensen, 1993; Lengyel, 2000; Wier *et al.*, 2001; Wolf, 2002). In an econometric analysis of the organic market in Denmark, Wier *et al.* (2001) found a highly elastic own price elasticity of demand (-2.27) for dairy products. Results from econometric testing of the frozen organic pea market in the US also support the high negative own-price/quantity relationship (Lengyel, 2000). The relatively high own price elasticities suggest that consumers are quite sensitive to organic product price changes, compared to conventionally-grown alternatives.

Other studies have investigated how socio-economic and demographic factors influence willingness-to-pay for organic products (e.g., Werner and von Alvensleben, 1984; Hay, 1989; Jolly, 1991; Goldman and Clancy, 1991; Misra *et al.*, 1991; Groff *et al.*, 1993; Byrne *et al.*,

1994; Baker and Crosbie, 1993; Wilkins and Hillers, 1994; Buzby and Skees, 1994; Davies *et al.*, 1995; Huang, 1996; Wandel and Bugge, 1996; Govindasamy and Italia, 1997; Menghi, 1997; Thompson and Kidwell, 1998; Torjusen *et al.*, 1999; Cunningham, 2002; Demeritt, 2002; Wolf 2002; Sandalidou *et al.*, 2002; Fotopoulos and Krystallis, 2002; Hill and Lynchehaun, 2002; O'Donovan and McCarthy, 2002). Although some studies reported that women are more likely to purchase organic food more regularly than men (e.g., Groff *et al.*, 1993; Buzby and Skees, 1994; Byrne *et al.*, 1994; Davies *et al.*, 1995; Govindasamy and Italia, 1997; Menghi, 1997; O'Donovan and McCarthy, 2002), this may be partly because women are usually the primary grocery shoppers in most households, and consequently are more informed about nutrition and food safety. Other studies (e.g., Wendel and Bugge, 1996) suggest that men were more willing to pay a higher price premium for organic products than women. It is difficult to explain the contrasting findings without controlling for various economic (e.g., household income levels), demographic (e.g., number of young children in family), and other (e.g., knowledge of organic) variables.

Studies which reported that younger consumers are more likely to purchase organic products attributed this to their preference for chemical free products and interest in environmental quality (e.g., Hay, 1989; Buzby and Skees, 1991). Hay (1989), for example, reported that younger Canadians tended to have higher preference for chemical free products and therefore showed a higher preference for organic products, whereas older Canadians were less concerned about the complete elimination of chemicals. In general, younger consumers tend to have a lower purchasing power than older consumers. Thus, among young consumers, willingness to pay may not necessarily translate into actual demand for a product. Bhaskaran and Hardley (2002) hypothesized that older consumers (i.e., more than 55 years) tend to make

preventative health decisions, partly because of perceived health vulnerability and an awareness that they are generally at higher health risk than younger individuals.

In contrast to the findings on price elasticity, income elasticity for organic produce is generally small and not statistically significant (Van Ravenswaay and Hoehn, 1991) or zero (Goldman and Clancy, 1991), although there are exceptions to this general finding. Several studies (in Europe) report a positive correlation between the likelihood of purchasing organic products and paying a premium, and income (e.g., Werner and von Alvensleben, 1984; Menghi, 1997; Davies *et al.*, 1995; Torjusen *et al.*, 1999; Hill and Lynchechaun, 2002; Fotopoulos and Krystallis, 2002; O'Donovan and McCarthy, 2002; Sandalidou *et al.*, 2002). Most studies report that income is not a significant variable in explaining differences in the purchasing behaviour of buyers and non-buyers of organic products (Jolly, 1991). Further, studies in Canada reported a positive relationship between income and willingness to buy a product, up to a given level of income, beyond which any additional increases in income do not lead to increases in a willingness to purchase organic food (e.g., Hay, 1989; Cunningham, 2002). In contrast, some studies in the US reported that income had no significant influence on willingness to pay for organic products (e.g., Jolly *et al.*, 1991; Goldman and Clancy, 1991; Buzby and Skees, 1994; Wilkins and Hillers, 1994; Wolf, 2002).

As with income, studies in the US found a negative relationship between education and willingness to pay (e.g., Misra *et al.*, 1991; Groff *et al.*, 1993; Buzby and Skees, 1994; Byrne *et al.*, 1994; Wilkins and Hillers, 1994; Thompson and Kidwell, 1998), while other studies in Europe and Canada found a positive correlation between higher education levels and increasing likelihood of purchasing organic products (e.g., Hay, 1989; Wendel and Bugge, 1996; Menghi, 1997; Cunningham, 2002; O'Donovan and McCarthy, 2002; Sandalidou, 2002). Many

individuals with higher educational achievements tend to also have higher incomes. Therefore, without controlling for this, it is not clear whether such a correlation makes one of the two variables redundant in such analysis.

8. Summary and Conclusions

A growing interest in organic agriculture has prompted numerous studies comparing aspects of organic versus conventional agriculture. A consumer-based approach to understanding organic agriculture is important not only in its own right, but also in terms of responses to changes in market dynamics. This study consolidated and reviewed the available literature, to provide an understanding of consumer preferences and attitudes toward organically-grown foods. We argue that a human conception of consumer decision making and behaviour towards organically-grown products is consistent with Lancaster's (1966, 1971, 19991) 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 the 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.

Reported differences between output from organic versus conventional production depends on many factors such as management skills, size of the operation, stage during the transition to organic agriculture, and management regime of the previous farming system. Some studies involving low-input agriculture have reported higher output from organic production compared to conventional production. However, in general, organic production systems generate lower yields compared to conventional systems, but this tends to be compensated for by higher

producer and retail prices, making price premiums a critical factor for organic sector profitability.

Most studies on consumer knowledge about organic agriculture reflect a conceptual belief that is true and justified, and tend to use research methods that rely on correctness to answers to survey questions. Correct (incorrect) responses imply knowledge and awareness (lack of knowledge) about organic foods and products. This notion of consumer knowledge and awareness has some limitations, and does not capture some important aspects of knowledge. 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 non-uniform organic standards and certification, may hold some consumers back from purchasing organic.

Beliefs and perceptions about organic are highly subjective notions that reflect opinions about the objective state of the world. Such perceptions may or may not be true, yet the consumers who hold them think they are true. Consumer preferences are based on attitudes toward alternative products. Consequently, eliciting consumer preference for organically-grown (versus conventional) products is based on comparison of consumer attitudes toward the production systems used and, more importantly, the perceived and actual product characteristics. The literature suggests that, overall, various consumer attitudes work in contrasting ways; for and against purchasing organic products. The focus of most studies to particular locations limits their generalization. There is no consistent ranking of the food quality attributes (such as human health, food risk and safety, and environmental considerations) that affect consumer attitudes and perceptions.

Consumer preference for organic food is based on a general perception that organic has more desirable characteristics than conventionally-grown alternatives. 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. Some of the studies reviewed differ in several respects, making drawing definite conclusions difficult. For example, some studies examined product quality in terms of both sensory and nutritive characteristics, while others differentiate sensory characteristics from nutritive attributes. Different studies may therefore convey different notions of quality to various survey respondents. Overall, across all regions of the world, consumers tend to prefer locally grown produce to shipments from other areas.

Consumer willingness-to-pay for organic versus conventionally-grown foods reflect not only an observation that individuals make trade-offs between attributes associated with consuming alternative products, but also an observation that individual consumer preferences are unique. Given that yields from organic production are generally lower than under conventional production, a willingness to pay a price premium for organic products is important for financial sustainability of the sector. Yet, 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 such limited data. In general, the proportion of respondents willing to pay a price premium decreases as the premium increases, as expected. The literature does not provide a clear pattern about the levels of price premiums various groups of consumers are willing to pay, nor about which group(s) of products attract higher mark-ups. Own-price elasticity of demand is relatively higher for organic products

partly because organic products tend to have a wider range in appearance, and limited availability during particular seasons.

9. References

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