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EMERGENCE OF U.S. ORGANIC AGRICULTURE: CAN WE COMPETE?

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ABSTRACT---
This compilation of papers for principal papers session PP-03 at the AAEA 1998 Annual Meeting assesses the current status of the organic agriculture industry in the United States. Paper topics address production, market and certification issues faced by the industry, research challenges and emerging conditions shaping domestic and international markets.

-----KEY WORDS-----

production, marketing, industry structure, international trade, certification, organic agriculture

Organic Agricultural Production in the United States: Debates and Directions

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The beginnings of modern organic agriculture are generally attributed to writings in the 1940's of Sir Albert Howard and Lady Eve Balfour, which espoused that the health of plants, soil, livestock and people are interrelated. It followed that farming practices should work in harmony with nature using inputs produced on-farm. Farming techniques adopted by the organic movement outside of the United States included such practices as the use of compost, application of manure, and shallow cultivation to minimize the disruption of soil microorganism activities. It is not surprising that the primary focus was on soil, crop and animal husbandry since petroleum - based inputs were not yet widely used. Organic agriculture was popularized in the United States during the 1940's by J.I. Rodale through the magazine Organic Farming and Gardening. Rodale advocated a fundamental approach to farming based on understanding and working with natural systems rather than attempting to control them.

In the late 1940's and into the 50's, chemical - intensive agriculture successfully boosted agricultural productivity at relatively low cost thus diverting attention away from the organic movement. However, the publication of Rachel Carlson's Silent Spring in 1962, which documented some of the negative consequences associated with agrichemical use, gave rise to environmental consciousness and a renewed focus on organic agriculture.

The organic movement broadened its scope in the 1960's and 1970's to include the relationship between agriculture and resource conservation by emphasizing the limited use of nonrenewable resources. Although organic agriculture continued to encourage the use of on-farm inputs, farming techniques expanded to include the newly coined integrated pest management, biorational pesticides, and pheromone confusion. Advocates of organic agriculture maintained

that their cultural practices offered solutions to the problems caused by the chemical and energy intensive systems that characterized U.S. agriculture. (Youngberg et al.).

By the 1980's growing public concerns with the negative impacts of conventional farming manifested itself in two divergent ways. One way was the proliferation of new terms such as low – input, ecological and sustainable to describe a type of agriculture that was environmentally benign, economically sound and socially just. Ultimately, the term sustainable preempted all other terms, including organic, in public policy arenas related to questions of the environment and resource conservation.

The second manifestation was the successful use of the term 'organic' in the marketplace to differentiate between agricultural products giving the organic industry an economic stature thus far unrealized. This growing success created a need to standardize labeling of organic commodities. Several individual states began to set production standards to distinguish between acceptable and unacceptable farming practices by restricting the use of certain inputs. It is important to realize that these regulations were directed at producer and consumer protection as well as market enhancement and not overtly aimed at deriving any of the perceived environmental, social or health benefits of organic agriculture. Farming practices can be regulated because it is relatively straightforward to ascertain the presence and absence of inputs. In contrast, farming that focuses on natural systems and ecological processes cannot be mandated because it is conceptual and open to interpretation. Therefore, it is not surprising that regulation of organic production manifested itself as a listing of acceptable and unacceptable inputs.

Lampkin (1994) criticized this approach to regulating organic agriculture because it focuses on inputs rather than promoting processes devoted to maintaining ecological harmony.

At one extreme, it creates the potential for organic farming by neglect, while at the other it sanctions the overuse of acceptable off – farm inputs. Others within the organic community see the listing of inputs as an important first step toward standardization (Swezey, personal communication). A third view, embraced in this paper, is that while it is theoretically possible to comply with organic standards without incorporating new approaches to farming, these farms would probably not be economically viable either because of poor performance associated with passive management or high production costs resulting from sole reliance on input substitution.

The federal Organic Foods Production Act of 1990 (OFPA) follows the same basic approach to regulation of organic agriculture found in state laws in that it requires the promulgation of a list of allowable and prohibited materials. Interestingly, proposed standards of the OFPA state that products labeled as organic must be grown following an organic farm plan agreed to by the grower and an accredited certifying agent. Once implemented, the OFPA's certification/organic farm plan requirement provides a mechanism to move organic agriculture beyond 'farming by neglect' and 'input overuse' dilemmas.

In fact, certification agencies have already been working toward this end. For example, California Certified Organic Farmers (CCOF), the largest certifying agency active in California, requires "a long-term program of ecological soil management" in addition to adherence to state law, which prohibits the use of synthetically compounded materials. CCOF standards further state that , "it is not acceptable to simply eliminate the use of synthetic materials and manage by 'benign neglect'. This approach can lead to exhaustion of soil resources, poor quality crops, and ultimate operation failure." (CCOF).

The nature of organic production and marketing as well as regulations unique to organic agriculture mean that organic farmers operate under a set of constraints quite apart from their conventional counterparts. Therefore, it is not surprising that while virtually all commercially produced commodities can also be grown organically, organic agriculture is not simply a proportionately smaller version of conventional agriculture. This paper discusses the current status and direction of organic production in the United States, first in terms of farming practices, and then on a regional and commodity basis.

Organic Production Practices

Successful organic growers integrate management decisions with innovative production strategies and continually experiment on-farm as new information and technologies arise. At the same time, organic farmers accept that complex biological interactions within systems are commonplace rather than extraordinary and acknowledge that many cause and effect relationships are not well understood.

There are a number of similarities, as well as some notable differences, between conventional and organic practices (Klonsky, et. al). Areas of similarity include land preparation, planting operations, cultivation and irrigation. It is important to point out that while slight variations may take place in the number of passes for a cultivation, or in type of planting or seed stock, the actual approach to these operations is essentially the same. Two areas of production in which management approaches differ considerably are that of soil and pest management.

Soil Management

Working with a soil's physical, chemical and biological characteristics constitutes a significant challenge to organic farmers because organic fertilizing materials require some period

of time to decompose and mineralize before nutrients are made available for plant uptake and utilization. The contribution a fertilizing material makes towards supplying crops with essential nutrients depends on numerous factors including soil and climatic conditions and microbial processes.

The lynchpin for soil fertility management in organic farming systems is a cover crop, which is often used in combination with manure or compost. Supplemental fertilizers and soil amendments such as gypsum, mined limestone and fish and kelp products are only employed on an 'as needed' basis.

Cover crops are planted with multiple potential benefits in mind including: the addition of organic matter to the soil, the addition of nitrogen through nitrogen fixation processes, as a habitat to attract and sustain beneficial insects, to suppress weed growth, and to assist in soil erosion control. There are also a number of potential disadvantages associated with cover crop use, including increased the cash costs for planting and cover crop management, potentially higher costs for the rental or purchase of specialized farm equipment, and the attraction of pests such as insects, snails and rodents to the farming operation. In addition, cover crops with tall or vining growth habits may interfere with some irrigation system designs.

Livestock manure and composts are applied to the soil to add organic matter and nutrients, and to stimulate soil microbial diversity and activity (Van Horn). This, in turn, can improve soil physical properties such as structure and aggregate stability, which are important in water relations and for soil erosion control. Compost use has also been shown to suppress some soil-borne pathogens (Van Horn). However, livestock manure or improperly produced and

handled compost may introduce viable weed seeds or pathogens to farming systems. Its considerable bulk and application procedures may also require the purchase or rental of specialized farm equipment, or necessitate contractual arrangements with a custom operator.

Pest Management

Practices commonly used by organic growers to manage pests include cover crops, crop rotation and diversification, sequential planting, and water management. These practices often serve multiple purposes including the enhancement of beneficial insect populations as well as disease and weed control. Organic farmers may also take land out of production on a short-term or permanent basis as part of their management strategy. For example, land may be utilized as buffer zones for separation of organic and conventional production, to plant biologically diverse habitats, or left fallow to break pest and disease cycles. However, the substitution of land for other inputs reduces acreage in marketable production.

All pests that are found in conventional farming operations are also found in organic systems. However, many organic growers have observed that pests, particularly diseases and insects, do not pose serious production problems when soil fertility and crop health is carefully managed, and when biological controls are utilized. Biorational pesticides are available to assist in pest control and reduce short-run economic risks when necessary. It is generally recognized that some legally allowed pest control products for organic production are less effective for acute problems than the synthetically formulated prohibited pesticides. This is consistent with the fact that organic agriculture takes a long- term preventative approach that does not rely on 'quick fixes' to manage pests.

Of all aspects of pest management, weed control poses the greatest challenge to organic growers. Multiple control strategies are employed to manage weeds, including mechanical cultivation, hand weeding, flame weeding, animal grazing and water management. Mechanical cultivation and hand weeding remain the most commonly used alternative to the herbicides used in conventional farming enterprises. Many organic crops require multiple mechanical cultivations for weed control each year. This is not only costly in terms of fuel use and labor hours, but may also interfere with the scheduling of other operations. In addition, tillage practices may disrupt decomposition and nutrient cycling activities of micro (e.g., fungi) and macro (e.g., earthworms) soil organisms. The risk of injury to trees and vines may also increase if mechanical cultivations are not properly performed. Hand weeding, though labor intensive and costly, may be the only viable alternative for certain crops and production conditions. Other practices such as flame weeding and animal grazing are methods of weed control for organic crops that are used less often than mechanical and hand cultivation.

Certified Organic Agriculture as a Subsector of US Agriculture

The impending federal law will require that growers grossing over $5,000 be certified by an accredited certifying agent. Approximately 30 states have laws regulating organic agriculture (CAFF), while 13 state and 30 private agencies actively conduct certification services in the United States (OFRF). All of the state and most of the private organizations certify in one state only although there are several that certify broadly. The Organic Crop Improvement Association (OCIA), which certifies both nationally and internationally, certifies in 23 states, more than any

other certifier (OFRF). Certification organizations differ with respect to the certification process, requirements and associated costs.

Nationwide statistics for the number of organic growers, acreage and commodities grown is available only for certified growers. According to a national survey conducted by the Organic Farming Research Foundation (OFRF), there are also a number of growers in organic production who are not certified. Statistics from California shed light on the question of whether statistical information for certified growers provide a reasonable estimate of the size of the entire organic industry on a national scale.

California state law requires organic farmers to register with the state but certification is currently voluntary. In 1994, certified farms represented only 38 percent of registered farms but 82 percent of the registered acreage and 90 percent of sales (Tourte and Klonsky). Virtually all of the high income growers (over $500,000 gross value of sales per year) were certified while over two - thirds of the low income growers (under $10,000 gross value of sales per year) were not. If the California experience holds true for the rest of the country, then the national statistics for certified organic growers is representative of the industry in terms of acreage while underestimating the number of growers.

Certified organic agriculture accounts for less than one percent of farmers and farmland in the United States (Table 1). However, the number of certified organic farms and acres almost doubled between 1991 and 1995 while the number of US farms and acres decreased slightly over the same time period. The average farm size for the organic sector is much smaller than for the entire US; 188 acres compared to 469 acres in 1995. Further, the size of the average certified

organic farm has changed over time increasing by 50 percent between 1991 and 1993 and then decreasing 30 percent by 1995.

The higher proportion of cropland in the organic subsector explains in part the smaller average farm size for certified organic farms compared to all US farms assuming that the average crop operation is smaller than the average livestock operation. Further, the dramatic decrease in the size of the average certified organic farm corresponds to a decreased proportion of rangeland and pasture over the same time period.

This decrease in certified rangeland and pasture indicates significant exit of livestock production from the organic industry. However, it is important to realize that 86 percent of the range and pastureland was located in Colorado, with another seven percent in Montana and Idaho in 1995 (Anton Dunn). Therefore, most of the changes in certified pasture and rangeland undoubtedly took place in the Mountain region. It is entirely possible that the decrease in rangeland and pasture acreage could represent only a few growers dropping their certification.

Certified organic farms are located in all regions of the United States and all but five states, notably Alabama, Alaska, Delaware, Mississippi and Nevada (OFRF). Certified organic farms are highly concentrated in the Pacific and Northeast regions, which represented almost half of the growers but only a third of the acreage in 1995 (Table 2). At the other extreme, the Mountain and Northern Plains regions combined comprise only 15 percent of certified organic growers but 50 percent of the acreage. The regional distribution of farms and acreage for the entire US show important differences. The Pacific and Northeast regions comprise only 14 percent of farms and less than ten percent of cropland. The Mountain and Northern Plains

represent 12 percent of farms and 31 percent of cropland. Interestingly, roughly one – fourth of all US farms and cropland are located in the Corn Belt while only ten percent of certified organic farms and cropland are within this region.

Differences between the organic sector and the entire agricultural sector with respect to commodities grown help explain the regional distribution of farms and acreage described above. Almost three - fourths of organic farms grew vegetable, fruit and nut crops in 1994 (USDA) explaining the high concentration of farms in the Pacific and Northeast regions. Land in produce represented 20 percent of organic certified acreage but only three percent of total US cropland in 1995 (Table 3). Wheat and soybeans are two of the most important crops for organic and total US agriculture and are grown in the same regions (Anton Dunn, 1997). Corn is much less important for organic agriculture than for the whole of US agriculture which explains the relatively small organic acreage in the Corn Belt.

Registered Organic Agriculture as a Subsector of California Agriculture

California state law requires all producers marketing their commodities as organic to register with the California Department of Food and Agriculture Organic Program. The registration system, mandated by the California Organic Foods Act of 1990 (COFA) was implemented in 1992. Registration procedures provide data on organic agriculture that is not available for the rest of the country—most notably for gross sales. In California, certification is separate from registration and is not a requirement of COFA. Therefore, certified organic growers are a subset of registered organic growers.

One important question in organic agriculture is whether organic farms have lower incomes than conventional farms. Sales information from registration forms in California along

with Census of Agriculture statistics make possible comparison of income distribution for organic farms in California, all farms in California and all US farms for 1992. Classifying farms in size groups based on the total value of their annual gross sales reveals that there was a much higher proportion of organic farms with gross sales under $10,000 (64 percent) than for all farms in California (48 percent) or on a national basis (47 percent) (Table 4). At the other end of the spectrum, only two percent of organic farms grossed more than $500,000 compared to nine percent in California and three percent nationwide.

Because of the high concentration of produce farms in California's organic industry, it is perhaps more instructive to limit the comparisons of income distributions to these farms. In point of fact, produce generated 95 percent of the total value of organic production from approximately 80 percent of the registered acreage and 95 percent of growers in 1994 (Tourte and Klonsky).

It turns out that the income distribution for organic produce farms is almost identical to the distribution for all organic farms in California. However, income distributions for produce farms in California and the US show fewer small farms and more large farms than the distributions for all farms. Consequently, when looking only at produce farms the differences between the income distributions of California organic farms and all farms, both for California and the US, are even more dramatic.

Discussion

The statistics in this paper describe certified organic agriculture as a very small part of total US agriculture. Yet organic agriculture has recently received a tremendous amount of public attention for several reasons. First, there has been dramatic growth in the organic industry corresponding to similar growth in the natural foods industry. Second, there is a perception that organic agriculture contains solutions to issues at the vanguard of American policy related to environmental quality, food safety, the viability of rural communities, and market concentration. Third, the public comment period for the proposed rule of the OFPA, which ended April 30, 1998, elicited an unprecedented 200,000 responses, more than the USDA has every received for any legislation. Still 'in process,' this law will set national standards for organic production when finalized.

Many within the organic community fear that a dilution of current state and private certification agency standards would undermine the integrity of organic production and also pave the way for conventional farmers to easily enter the organic industry. Others view a weakening of current organic standards as an attempt to obfuscate the difference between organic and conventional products thereby dismantling the organic market. However, there are issues beyond market share. Regulations have typically been used to distinguish between safe and unsafe foods. Therefore, organic standards could give consumers the impression that conventionally produced foods are unsafe. In this sense, organic agriculture has broader implications on a nationwide scale than either production or market share expansion.

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Table 1. Certified Organic Agriculture as a subsector of US Agriculture, 1991 – 1995

	US Agriculture[1]					Certified Organic Agriculture[2]				
Year	Number of Farms	Land in Farms	Average Farm Size	Cropland[a]		Number of Farms	Land in Farms	Average Farm Size	Cropland	
	1,000	1,000 acres	Acres/farm	1,000 acres	Percent	Number	Acres	Acres/farm	Acres	Percent
1991	2,117	981,736	464	337,000	(34)	2,753	479,350	174	N/A	N/A
1992	2,108	978,503	464	337,000	(34)	3,587	935,450	261	403,400	(43)
1993	2,083	976,463	469	330,000	(34)	3,536	955,650	270	363,800	(49)
1994	2,065	973,403	471	339,000	(35)	4,060	1,001,450	247	556,750	(56)
1995	2,063	972,253	469	332,000	(34)	4,856	914,800	188	638,500	(70)

a/ Numbers in parentheses are cropland as a percentage of land in farms.
Sources:
1. U.S. Department of Commerce
2. Anton Dunn

Table 2. Regional Distribution of Farms and Acreage for US Agriculture and the Organic Subsector, 1995

Region	U.S. Agriculture			Certified Organic Agriculture	
	1992	1992	1995	1995	1995
	Farms[1]	Cropland[1]	Cropland[2]	Farms[3]	Cropland[4]
			Percent of total		
Appalachia	15	5	6	9	2
Corn Belt	23	27	25	10	11
Delta	5	5	5	1	1
Island	<1	<1	<1	<1	<1
Lake States	11	11	11	10	7
Mountain	5	8	8	9	25
Northeast	7	4	3	17	5
Northern Plains	10	23	24	6	25
Pacific	7	5	4	28	12
South East	6	3	3	4	1
Southern Plains	10	9	10	5	11
Total	100	100	100	100	100

Sources:
1. 1992 Census of Agriculture
2. Statistical Abstract of the United States 1997
3. Organic Farming Research Foundation
4. Anton Dunn

Table 3. Crop Acreage for Selected Crops – US Agriculture and the Organic Subsector, 1995

	United States[1]		Certified Organic[2]	
	1000 acres	% Total	1000 Acres	% Total
Corn	71,826	25	33	6
Wheat	62,712	20	96	18
Hay	59,679	19	84	16
Soybeans	57,347	19	47	9
Cotton	12,783	4	33	6
Barley	6,753	2	17	3
Rice	2,833	1	8	2
Rye	381	<1	3	1
Sunflower	2,486	1	14	3
Vegetables	3,405	1	62	12
Orchards	3,685	2	44	8
Other	24,733	8	36	7
Total Cropland	308,623	100	536	100

Sources:
1. NASS.
2. Anton Dunn

Table 4. Economic Class Distribution of Registered Organic Farms in California, Organic Produce Farms in CA, Produce Farms in CA and the US, All US Farms – 1992

Economic class (Gross Value of Sales)	US Farms[1]		California Farms[2]		California Organic Farms[3]			
					Registered		Certified	
	All Farms	Produce	All Farms	Produce	All Farms	Produce	All Farms	Produce
	Percent of total							
Less than $10,000	47	38	48	33	64	66	41	44
$10,000 - $49,999	26	28	12	15	20	19	30	29
$50,000 - $99,999	10	11	17	23	6	6	11	11
$100,000 - $249,999	11	12	9	12	5	4	9	8
$250,000 – $499,999	4	6	5	6	3	3	5	5
$500,00 or more	3	6	9	11	2	2	4	3
Total	100	100	100	100	100	100	100	100

Sources:
1.1992 Census of Agriculture, United States
2. 1992 Census of Agriculture, California
3. Tourte and Klonsky

Consumer Demand for Organic Foods

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Consumer Demand for Organic Foods

Demand for organic foods in the United States, Europe, and elsewhere is growing rapidly yet market shares remain quite small. In the United States, organic food sales have grown during the 1990's at an annual average of 24 percent with an estimated market share at retail of 1–1.5 percent in 1996 (Raterman). In Denmark, where government subsidies and industry promotion have lowered price premiums for organic products, market share has grown to 3–4% of the retail food market (Michelsen). By contrast, organics account for only 0.3 percent of retail food value in France (FAS). Although reliable estimates for Canada, Japan, and Australia do not exist, organic market shares in these countries appear to be quite small.

The array of organic products now available and the retail channels through which they are sold in the United States have evolved markedly over the last decade. Growth and consolidation of natural foods supermarket chains have led to more retail sales of organic products. Traditional supermarkets have countered in some locales by promoting organic products to compete with natural foods supermarkets. At the same time, the array of organic products has expanded well beyond fresh produce to include baby foods, dairy products, meats, and prepared convenience items.

Consumer Demand Studies

Studies of consumer demand for organic products have relied almost exclusively on self-reporting of purchase behavior and attitudes as elicited through questionnaires or interviews; direct observation of consumer behavior at retail markets is almost nonexistent.[1] This reliance on self-reported behavior appears to result largely from the thin nature of the organic market: with such a small market share at retail and many past purchases occurring in coops, health food stores, and direct markets, scanner data are nonexistent. Retail sales data on individual fresh

produce items were nearly impossible to obtain before the advent of price lookup (PLU) codes and even since then sales data measured by PLU's have not been widely collected by scanner data services.[2]

Weaving a coherent picture of the nature of demand for organic foods in the United States requires comparing highly disparate industry and academic studies (see Table 1).[3] The studies included in Table 1 are not an exhaustive list but they do include most published studies during the last decade which report information regarding demographic and socio-economic characteristics. A striking feature of these studies is that only recently have researchers begun to consider organic products other than fresh produce. As the array of fresh and processed organic items continues to expand at retail, the applicability of past studies focusing on fresh produce becomes more tenuous. Brand loyalty, in-store promotion (Reicks et al.), packaging, and convenience affect consumer purchases of processed products more than most fresh produce items which are minimally processed, packaged, and branded.

The geographic focus of some studies also limits their applicability. Most national studies (Parkwood Associates, Hartman Group, *The Packer*) indicate that consumers in the West display a higher propensity to consume organic products.[4] Natural foods supermarkets have targeted specific urban areas such as Phoenix and Minneapolis as sites with high demand for organic products. The specific geographic focus of many past studies may not track national trends accurately or reveal growing urban markets.

Many studies have targeted shoppers at specific types of retail venues such as coops (Goldman and Clancy; Thompson and Kidwell), direct markets (Swanson and Lewis), mainstream supermarkets (Baker and Crosbie), and natural foods supermarkets (Thompson and Kidwell; Reicks et al.). Voluntary participation in surveys varies by where consumers were sampled

suggesting that non-response bias differs across studies. Also, to the extent choice of venue is influenced by the propensity to buy organic products, sampling shoppers at specific types of venues results in selectivity bias. Statewide and national surveys using representative samples do not suffer such shortcomings.

Despite the hazards in comparing the studies in Table 1, some similarities and differences regarding the economic and demographic characteristics of consumers favoring organic products are highlighted hereafter.

Price Elasticities. Apparently no studies have employed retail purchase data—cross-sectional, time series, or panel—to estimate own- and cross-price elasticities for organic and conventional foods. Reicks et al. tracked sales of organic foods but report no prices. Eastwood reported sales and prices for various types of carrots including organic but estimated no price elasticities. Given the large size of many organic price premiums (Estes and Smith; Thompson and Kidwell) and the small market share of organic products, estimates of consumers' responsiveness to price changes are urgently needed.

Income. National studies generally suggest that higher income households are more likely to purchase organic products (Parkwood Associates; FMI/*PREVENTION*) but there seem to be significant exceptions. The Hartman Group notes that one segment of its sample, dubbed "True Naturals" (7 percent of the sample), had a higher than average presence of households with income under $25,000 (43 percent vs. a total sample percentage of 36). The *Fresh Trends* survey also alludes to a slightly bimodal pattern in purchase history or future plans to buy organic: the under $25,000 and over $50,000 groups were more likely to have bought organic produce (26 and 30 percent, respectively) than those in groups between $25–50,000 (22–25 percent). A few regional and local studies provide additional insights. Misra et al. found that willingness to pay

(WTP) for pesticide-free produce declined in higher income groups. Baker and Crosbie tend to corroborate the price sensitivity of higher income groups in San Jose, CA. In Tucson, AZ propensity to shop at the natural foods supermarket rose with income, yet higher price differences between organic and conventional produce reduced the likelihood of choosing organics at the natural foods supermarket but not at the food coop (Thompson and Kidwell). Jointly these study results seem to suggest that despite high price premiums for organic foods, higher household incomes do not necessarily indicate higher likelihood of organic purchases. Some consumer segments with relatively lower incomes are apparently more entrenched buyers of organic products and they tend to have shopped for organics at retail outlets other than mainstream supermarkets (Hartman Group).

Store Effects. Consumers' choice of where to shop is apparently influenced by their disposition to buy organic foods. Hence, sampling consumers at particular types of retail venues is liable to result in self-selection by consumers. Hartman Group's study reveals that only 13 percent of the sample had ever shopped at a health food store whereas 41 percent of the "True Naturals" had done so. Reicks et al. found significant differences in the relationship between demographic variables and organic purchase behavior in shoppers at upscale stores but not in those at discount stores.[5] Thompson and Kidwell also encountered significant differences in behavior across stores: organic and conventional price differences were statistically significant in explaining the choice of organic produce at a natural foods supermarket but not at a cooperative. Byrne et al. (1994) determined that jointly demographic variables explain choice of supermarkets offering residue-free produce. These diverse findings suggest that store choice is a critical variable in explaining purchases of organic foods so long as organic products persist in not being regularly available in the majority of mainstream supermarkets.

Age. The Hartman Group found that the consumer segment with the highest propensity to purchase organics, "True Naturals," contained a higher than average proportion of people forty years and over (79 percent in the category vs. 65 percent in the entire sample). Another segment very interested in purchasing organics but with less disposable income (the "Young Recyclers" who account for 10 percent of the sample) displayed a higher than average proportion of consumers under 35 years. The *Fresh Trends* survey tends to corroborate these differences in purchases by age: the highest percentages of consumers having bought organic produce were found in the 18–29 and 40–49 years age brackets whereas the age group least likely to buy is the over 60 bracket. Whether these differences are statistically significant across age groups is not tested in either survey. Age differences were statistically significant in only three of the regional or local studies. Jolly found that purchasers had a lower average age, 40.9 years, than did nonpurchasers of organic produce, 48.6 years. For Georgia consumers, Misra et al. found that those in the 36–60 year bracket were less likely to pay for residue-free produce. Measuring age as a continuous variable, Groff et al. obtained a negative relationship between age and consumers having rated organic produce much better. The joint evidence suggests that the effects of age on organic purchase behavior may be pronounced in certain segments of the population such as with older people in the Hartman Group's "True Naturals" or younger consumers in the "Young Recyclers."

Gender. National surveys suggest only small differences in purchase behavior corresponding to gender (*The Packer*). The Hartman Group does characterize one segment with potential for purchasing organics ("Affluent Healers" who represent 12 percent of the sample) as having a higher than average presence of female heads of household. In one local study females were more concerned about pesticide residues (Baker and Crosbie) while in Delaware they were

more likely to purchase organic produce even if it cost more (Byrne 1991). The limited evidence suggests that gender *per se* contributes little to explaining differences in organic purchase behavior although gender and marital status together may be important in identifying some organic consumers.

Marital Status. The Hartman Group finds that a distinguishing feature of two segments relates to marital status: the "True Naturals" display a high percentage of divorcees while the "Young Recyclers" have a higher proportion of never-married persons. In contrast, the FMI/*PREVENTION*'s "Healthy Eaters" group—the group with the highest percentage of respondents willing to pay more for organic foods—had a higher percentage of married people (66 percent) than in the total population (60 percent). No other national studies reported information about marital status. Only one of the other studies employed information on marital status and the effects of being married were statistically insignificant (Groff et al.). With such sparse evidence, the effects of marital status are difficult to assess but research on single-headed households may be warranted.

Education. The effects of educational attainment on organic purchase behavior have been measured both with continuous variables for years of schooling and with categorical variables. The national evidence suggests positive correlation between education and organic purchases. Higher than average proportions of college graduates are found in the Hartman Group's "True Natural" and "Affluent Healer" segments. FMI/*PREVENTION's* "Healthy Eaters" and "Trusting Nutritional Converts" segments also contain higher than average percentages of college graduates (42 and 37 percent, respectively, vs. 32 percent in the total sample). At Alaskan direct markets, buyers of organic produce tended to be more educated (Swanson and Lewis) but in California there was no statistical difference in education levels between buyers and nonbuyers of organic

produce (Jolly). Frequency of organic purchases was not associated statistically with educational levels among coop patrons in New York (Goldman and Clancy). In the studies distinguishing graduate study from undergraduate study, however, higher educational attainment lowers the probability of choosing organic products (Thompson and Kidwell) or of considering organic produce better (Byrne et al. 1991; Groff et al.). Using a dummy variable for having had either college or post-graduate education, Misra et al. found the presence of college education lowers the likelihood of being willing to pay more for pesticide-free produce. These conflicting results regarding the effects of educational attainment on organic purchase behavior underscore the importance of how education is measured. Post-graduate college education may be associated with a lower propensity to buy organic foods but further investigation at the national level is needed.

Household Size. Household size and, more specifically, the presence and age of children is one of the least investigated demographic characteristics. The only national survey explicitly including presence of children is *Fresh Trends*. Differences in purchases of organic produce vary only slightly given the presence of children 18 years or younger: 25 percent of those with vs. 27 percent of those without children. Household size did not differ among purchasers of organics in Alaska (Swanson and Lewis). Dummy variables for the presence of children had no statistically significant effects in the Delaware studies (Groff et al., Byrne et al. 1994). Willingness to buy organic produce even if it had sensory defects did increase with household size in Georgia (Huang). Thompson and Kidwell found the probability of choosing organic produce increased with the number of children in the household. None of the foregoing studies reported the age of children. Given that the market share of organic baby food is 2.5 percent (Harris), apparently larger than the share of all organic foods in the United States, future studies should pay attention

to the ages of children. The potential for habit formation should be investigated because parents raising babies on organic baby food may buy other organic foods as their children grow.

Conclusions

Although a quarter of U.S. consumers apparently have purchased organic foods (*The Packer,* FMI/*PREVENTION*), organic market share at retail remains quite small. Attitudes, motives, and willingness-to-pay for organic products have been measured but apparently no retail data have been available to estimate own-price, cross-price, and income elasticities. While high retail price premiums for organic foods persist, elasticity estimates appear to be critically important for gauging how the U.S. market for organic food may grow in the future.

Demographic variables such as age, marital status, number and age of children, and educational attainment may be important variables in explaining and predicting consumer demand for organic products. Estimates of habit persistence linked to age and household composition may also be important for measuring the potential growth of organic foods.

Accounting for where foods are purchased is likely to be important in understanding where potential growth in organic foods may occur. The emergence of natural foods supermarkets demonstrates how new types of retail outlets can promote organic products and change consumers' buying habits. Because households buy with varying degrees of frequency at a variety of retail outlets—mainstream and natural foods supermarkets, club stores, health food stores, food coops, gourmet stores, etc.—analysts may want to model the effects of store choice and frequency of visits on organic product choices. Scanner data linked with consumer panels may facilitate this avenue of research.

With over 40 percent of retail food expenditures made on food away from home, another

potentially important area of investigation will be how household decisions to purchase food away from home can affect the demand for organic products. Non-traditional, perhaps proprietary, data sources may be required to estimate the demand for organic foods as a component of the demand for food away from home. If retail data are not readily available, food service purveyors and fresh produce consolidators may be a source of data for indirect measurement of demand for fresh and processed organic foods.

Footnotes

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[1] A.C. Nielsen has announced collaboration with Spence Information Systems to collect scanner data (*SCANTRAC:SPINS Natural Track*) from a statistically representative sample of supermarkets in the United States with about 40 product categories.

[2] Eastwood provides an extensive explanation of PLU's and documents how PLU and scanner data may be used to track fresh produce sales. With the emergence of fresh processed products such as bagged salads, carrots, and other vegetables, bar codes are available for scanning some fresh produce items.

[3] A number of studies of European countries were not included in this review because of space limitations and difficulties in comparing results across countries in which the structure of retail channels varies significantly as do consumer shopping behavior and expenditures on food.

[4] One national study found, however, that 37 percent of consumers in the East purchase organic produce versus 29 percent in the West (FMI/*PREVENTION*).

[5] Statistically significant differences in the effects of age at the upscale stores also differed across stores with intensive point of purchase advertising vs. those without intensive advertising, suggesting that in-store variables affect purchase behavior as well.

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Table 1. Selected Characteristics of Studies of Organic Products.

Survey Year	Organic Products	Geographic Scope	Purpose of Study	Survey Method	Sample Size[1]	Authors
1987	Produce	3 Counties, CA	Distinguish organic buyers vs. nonbuyers	Mail	955 (54%)	Jolly et al.
1988	Produce	Upstate NY	Measure attitudes & purchase behavior.	Randomly handed out in food coop; mail return.	350 (88%)	Goldman & Clancy
1989	Residue-free Produce	Statewide, GA	Explain willingness to pay.	Mail	389 (78%)	Misra et al.; Huang
1990	Produce	Statewide, DE	Explain attitudes & purchase behavior.	Mail	753 (12%)	Byrne et al.; Groff et al.
1992	Apples	San Jose, CA	Identify consumer segments and preferences.	Interviewed entering 2 Safeway stores.	160 (?)	Baker & Crosbie
1992 ?	Produce	4 sites, Alaska	Distinguish organic buyers vs. nonbuyers.	Mail survey of direct market customers.	417 (74%)	Swanson & Lewis
1994	Produce	National	Poll attitudes & willingness to pay.	Telephone	1,000 (?)	Parkwood Research Associates
1994	Produce	Tucson, AZ	Explain choice of organic produce.	Questionnaire in coop & natural food supermarket.	360 (?)	Thompson & Kidwell
1996	14 Organic Food Items	Minneapolis/ St.Paul, MN	Measure impacts of point-of-purchase advertising	Customer-intercept interviews in upscale & discount supermarkets.	400 (?)	Reicks et al.
1996	Earth sustainable/ organics	National	Identify consumer segments & attitudes.	Telephone sample of national panel (250,000).	1,079 (37%)[2]	Hartman Group
1997	Produce & Other	National segments & attitudes.	Identify consumer telephone sample.	Stratified random (?)	1,005	FMI/*PREVENTION*
1997	Produce	National	Poll attitudes & behavior.	Telephone sample of national panel (400,000).	1,000 (?)	*The Packer*

[1] Response rate to survey in parentheses, e.g. 54 percent of 1,769 questionnaires resulted in 955 responses.

[2] 1,879 full or partial responses (65%) were received initially but subsequent cleaning of data reduced the sample size.

Implications of Organic Certification for Market Structure and Trade

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Organic food constitutes a product category that is growing worldwide. One estimate projects growth for "bioproducts" at 5 percent (Bio-Fair), reaching a high of 5 to 10 percent market share in some developed countries by 2000 (UNCTAD). Segger suggests world trade in organic products will reach $100 billion by 2006. Purchasers in both developed and developing countries tend to be urban, well-educated, health and environment conscious consumers (Chander and Tewari; UNCTAD; CCICED).

Certification of organic products serves three functions. First, it assures consumers that a product that is not observably different from nonorganic food was grown, processed and packaged according to rules that limit or ban synthetic inputs and protect the environment. Second, it assures producers that unscrupulous use of the term 'organic' does not defraud them of price premiums and market share that can be earned from certified foods. Third, it makes the market more efficient by reducing information asymmetry along the marketing channel from producer to consumer.

To fulfill these functions, certification must be a credible process. Michaud, Redman and Dalby described the process as setting standards, verifying that standards are followed by inspecting the facility and operating records, and approving the producer or processor. Approval confers the license to display the certifier's label on the product. The label conveys information about the production process to intermediaries and consumers. Organic price premiums will only be paid when label confidence exists. Many certification programs are organized within political boundaries, and a single certifier often dominates a regional or national market.

With expansion of markets, distance and time increase information asymmetry about products. The evolution of multiple labels with differing certification requirements gave rise to

accreditation schemes. While certifiers verify that their standards are met by the producers and processors, accreditors check that minimum requirements are incorporated in the standards certifiers use. Certifiers may promote both economic and social goals in setting and verifying standards; accreditors insure market efficiency and credibility (Michaud, Redman and Dalby). For this reason, accreditors are typically national or transnational (European Union) government entities.

Formal acceptance of a certifier's standards by an accreditor permits free entry into markets overseen by the accreditor. Lack of equivalence of standards across accreditors hinders market access and substantially increase transactions costs. Currently, equivalence is not universal. Even if equivalence is legally recognized, there is no guarantee that consumers will accept foreign labels; however, harmonization of U.S. standards with those in major market is a necessary step toward acceptance.

Scope of International Markets

The United States is by far the largest single-country market for organic products, with $4.5 billion in sales projected for 1997 (Retzloff). The 1997 organic food market in the European Union (EU) is estimated to be worth $4.5 billion, and that of Japan $1.7 billion (Segger; Seki). Annual growth rates of 25 to 30 percent have been experienced in the EU (Segger) and in the United States (Retzloff) for over five years. Based on these figures, Segger projects the EU market will reach $58 billion and the U.S. market $47 billion by 2006. The Japanese market for organic foods is projected at $2.6 billion by 2000 (Mergentime).

Table 1 shows the extent of selected organic markets outside the United States. The list is necessarily incomplete, since few governments keep statistics on sales of organic foods. Even

with industry and USDA Foreign Agricultural Service (FAS) estimates, it is difficult to develop an exact picture of the entire world situation.

Markets for U.S. exports include direct consumption and re-export of raw commodities. In addition, because set percentages of organic ingredients are required for certified processed foods, U.S. commodities may be components for foods processed in foreign countries that are then consumed or exported elsewhere.

The main markets for U.S. organics include high income countries in Northern Europe and Australasia, Canada and China, which has an elite group of high income consumers who favor organics. Many developed and developing countries that produce and consume organic foods were excluded from Table 1 due to their small size, low income, or emphasis on value-added export and tourism markets. Some developing countries such as Mexico and Singapore have nascent health food markets, in which organics may play a role.

Within Europe, Germany, France, the United Kingdom and the Netherlands have the largest organic retail sales. Denmark, Sweden and Switzerland have small populations, but organic food is a relatively large share of total food sales. Both these countries aim to increase domestic organic production, in Sweden's case to 10 percent of acreage and in Denmark's to 100 percent (UNCTAD). Consumer commitment to organics is strong throughout the EU, with 20 to 38 percent regularly or occasionally purchasing organic foods. Retail price premiums in Europe average from 10 to 50 percent above conventional products.

Less information is available about Australia and Canada, where organics currently compose 0.5 to 1 percent of the retail market. Both countries are active in exporting organics, Australia to Asia and Canada to the United States and Europe. Domestic consumption of organic

products is relatively low. Ahmed suggests the Australian market could grow to $571 million by 2000, while LaFond projects the value of Canadian organics to reach $145 million by 2006. Price premiums of 10 to 30 percent are typical. Yet, with 20 to 30 percent annual sales increases in the United States, EU and Japan projected for the next five years, Australia and Canada will focus on exports.

Among Asian countries, Japan ($1.7 billion) and China ($1.2 billion) offer large retail markets. Table 1 lists two sets of figures for Japan due to large discrepancies in estimates. Price premiums in these countries other are similar to those in the EU, ranging from 10 to 50 percent. Market participation rates are also similar, between 27 percent and 36 percent. Interest in organic foods in Hong Kong and Taiwan is expected to increase as Chinese awareness of the market develops. Premiums in Taiwan, Hong Kong and Singapore range from 200 to 500 percent, due to limited domestic production.

Two factors affect interpretation of these statistics. First, Japan and China have successive categories of organic or ecological food, some of which permit chemical use on certified food. Second, domestic organic distribution in Asia is heavily dependent on direct farm to consumer sales, typically through memberships. Thus, the extent of the organic market open to import competition may be more limited than suggested by the figures for these countries.

These data are only a sample of the countries who are developing organic markets. A review of the USDA FAS Trade Leads from November 1995 through May 1998 reveals market offers for a range of organic products. In this period, there were more than 50 postings for juice, pulses, frozen and fresh fruit and grain from over a dozen different countries. The Republic of Korea, which has an organic market valued at $120 million and increasing at 30 to 40 percent per

year (UNCTAD), posted several of these. The market figures presented highlight the importance of obtaining equivalence to access organic markets.

Equivalence and Market Access

Most organic certification programs began as grass-roots movements (Gadhia and Gadhia; Michaud, Redman and Dalby). International accreditation and certification standards co-evolved with market expansion. There are now both governmental and nongovernmental certifiers and accreditors, but only governmental accreditors currently have legal standing to appeal trade problems before the World Trade Organization (WTO) (Vaupel and Commins).

The structure of certification and accreditation is evocative of market development. In Germany, which is the largest EU market, there are 50 independent control bodies and eight farmers' association that certify organic production (Bio-Fair). Each German Länder (state) has authority to grant import licenses and accredit certifiers (Vaupel and Commins). Each certifier sets its own standards and label, subject to the EU requirements designated by Council Rule (CR) 2092/91 and amendments, and to state regulations. Contrast this with Denmark, which has one control organization operated by the national government, and consequently one major label (Borgen). More labels may be perceived to mean more choice for consumers and producers, although they also may generate more confusion.

Other countries are less formal in their certification and accreditation. Australia has voluntary national standards for domestic production, which are mandatory for imports destined for re-exportation (Vaupel and Commins). Taiwan has a trial program for domestic producers, with no requirements for imports (Perng). China's and Japan's standards are state-supported, but

certification lags requests and confusion arises from the permitting of chemical use under organic designations (CCICED; Ahmed).

Organic trade is operating at multiple levels of standards. Within the legal system that is overseen by the WTO, national standards are required to adjudicate disputes, since only nations have standing before the WTO. The WTO refers to the Codex Alimentarius (Codex) and, increasingly, to the International Organization of Standardization (ISO) for the international principles that govern all national regulations (Vaupel and Commins). Codex has draft guidelines that require governments to set national standards and accredit certification programs, but is examining whether other means of proving equivalence in a trade dispute might be acceptable.

Governments are usually not motivated to adopt national standards until domestic and international commerce in organics become great enough to justify regulation for consumer and producer protection. In Europe, many national standards evolved prior to CR 2092/91 or were modified later to cover areas not regulated by the EU such as livestock and wild products production. For many countries, particularly in the developing world, international market opportunities have outdistanced domestic market growth (UNCTAD). While organic production is expanding only for export and very small domestic markets, it is uneconomic to set domestic controls.

Independent accrediting and certifying bodies have filled this void. The International Federal of Organic Agriculture Movements (IFOAM), representing over 500 organizations in more than 100 countries, including 140 certification entities, is the most widely recognized of these (Vaupel and Commins, UNCTAD, Gadhia and Gadhia). The size and geographical extent of membership has enabled IFOAM to influence development of national standards in Brazil,

China, Egypt, and Argentina (UNCTAD). Accreditation through IFOAM does not automatically confer equivalence with national standards for import purposes. However, in recognition of the harmonizing role played by the IFOAM certification criteria and accreditation service, several EU national authorities use these standards for granting import licenses (Vaupel and Commins).

Equivalence is granted only between accreditors who have legal standing in trade matters. The EU importation requirements probably will have the greatest impact on U.S. organic trade initially. Whether the foreign importer is from an approved or a non-approved country, an EU-based certified importer must be used, and a transaction certificate stipulating the type of equivalence must be filed (Michaud, Redman and Dalby). Statutory approval, which is permanent, is granted only to countries who apply to the EU for approval of their organic standards and accreditation, a process that takes about three years. As of March 1997, five countries had been approved (Vaupel and Commins). A recent amendment to CR 2092/91 permits member states to request statutory approval for third country certifiers .

The EU states independently authorize imports from non-approved countries. The EU-based importer verifies the certification system used for the product and documents consistency in its application, and the national control authority determines equivalence on a case-by-case basis (Michaud, Redman and Dalby). Since the determination is subject to national standards and the transaction does not permit direct negotiation by the exporter, costs of importation can vary widely and exporters need to be selective in choosing a point of entry. The Netherlands, which accounted for 28 percent of the 459 organic import authorizations issued in 1995 is a gateway country to organic markets in the EU (Harst-Collaris and Scandurra).

Vaupel and Commins report that more recently, emphasis has shifted away from the specific product's equivalence and toward the certifier's equivalence. This improves the competitive situation for international accreditors and certifiers such as IFOAM as familiarity from repeated transactions will reduce the need for strict scrutiny, and thus reduce costs.

Nongovernmental certification of a final product containing or composed of imported ingredients may entail additional requirements for which equivalence must be proven. In these cases, equivalence may be established by re-certification and certification transference (Vaupel and Commins). Re-certification is granted on a case-by-case basis according to a comparison of the inspection and certification documents of the imported product with the domestic certifier's standards. Transference occurs when the end-product certifier approves the certifier of the exported product, similar to an accreditation. IFOAM criteria are routinely used as the basis for transference.

Issues for the United States

The United States is likely to attempt to establish reciprocal third-country approval with the EU and other countries once national organic standards are implemented here. The U.S. standards as originally proposed were consistent with CR 2092/91 and Codex (Schmidt and Haccius). Changes in the interim prompted over 225,000 responses during the public comment period by U.S. farmers, processors, agricultural interests and consumers objecting to portions that are incompatible with EU and IFOAM standards. Aspects in the latest proposed regulations such confined animal feeding could block reciprocal approval as these contradict most other proposed and existing country standards. While trade would still be possible via transference, re-

certification and import authorizations, the additional cost could be substantial, not to mention consumer avoidance of organic products certified under USDA standards.

This raises the question of how new innovations will be introduced to organic farming systems without violating standards, or more to the point, how standards can evolve to take account of new innovations. Given the complexity of motivations for producing and purchasing organic products, changes to standards necessarily must involve public input about what is acceptable. In this regard, consumers tend to rely more on producers than on scientists to form their opinions. Scientists must realize that organic status of innovations will continue to be defined by producers and consumers, and codified by certifying and accrediting organizations.

Consumers tend to choose a single label that for them signifies the attributes they are purchasing when they "buy organic," even when more than one label is available (Vaupel and Commins; Michaud, Redman and Dalby; Alvensleben; Ekelund and Fröman). Getting access to an international market is only the first step in gaining market share. The United States should provide export promotion support for organic products to help generate confidence in U.S. labels.

Care should be taken during the drafting of the national organic standards that U.S. products are not disadvantaged by lower requirements. Inconsistencies with the standards of major trading partners should be eliminated from the final rules. In an increasingly competitive global market for organics, the United States must insure that its organic food products are held to the highest quality requirements to win market share.

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Table 1. Organic Markets Outside the United States[1]

Country	Approximate Retail Value (US$)	Year[2]	Organic Share of Total Food Sales	Import Share of Organic Sales	Average Retail Price Premium	Source
Austria	$270 million	1997	2.5%	30%	20-30%	PSC; Krucsay
Belgium	$ 75 million	1997	1.0%	50%	20%	PSC; Bio-Fair
Denmark	$190 million	1997	< 3.0%	25%	15-40%	PSC; Bio-Fair
France	$508 million	1996	0.4%	10%	25-35%	GIRA EuroConsulting
Germany	$ 1.6 billion	1997	1.5%	60%	30%	PSC; Achilles
Netherlands	$230 million	1997	1.5%	60%	15-20%	PSC; Harst-Collaris
Sweden	$200 million	1997	2.0%	30%	15-50%	PSC; U.S. Embassy
Switzerland	$190 million	1996	5.0%	n.a.	n.a.	Wyler
United Kingdom	$445 million	1997	2.0%	70%	0-30%	PSC; McCrea
Canada	$ 68 million	1995	1.0%	80%	30%	Myles; Bio-Fair; Christie
Australia	$ 59 million[3]	1995	< 0.5%	n.a.	10-20%	Hudson; Conacher & Conacher
China[4]	$ 1.2 billion	1995	6.0%[3]	0%	30%	CCICED; Wang et al.
Hong Kong[4]	n.a.	1996	0.5%[5]	n.a.	50-300%	Yuen
Japan[4]	$500 million[6] 1997	1994 n.a.	1.0%[3, 6] n.a.	1%[6] 20-30%	13-40%[6] Seki	JETRO; Sidiropoulos Putland
billion						$ 1.7
Taiwan[4]	n.a.	1998	1-3%[5]	n.a.	200-300%	Perng

[1] "n.a." means data are not available.
[2] Year given is for retail value data, if available. If not, year given is for organic share data.
[3] Based on production, not retail sales.
[4] In this country, organic includes "low chemical."
[5] Share of sales in the largest supermarket chain in the country selling both organic and conventional foods.
[6] Fresh produce sales only.

Emergence of U.S. Organic Agriculture - Can We Compete: Discussion

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Emergence of U.S. Organic Agriculture - Can We Compete: Discussion

Barry Krissoff[1]

The theme of this session is the expansion and market competitiveness of organic agriculture. Since there is no single definition in economics or agriculture of the terms competitiveness or organics, let me start by offering some definitions. The National Organic Standards Board defines organic agriculture as an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. The focus of the definition is on ecologically compatible production systems, not on the product itself, or allowable (or non-allowable) specific inputs.

In contrast, a discussion on markets and competitiveness focus on the product itself. In an introductory economics textbook, competitiveness is defined as striving among a number of rivals in a contest aimed at purchasing or selling a particular product (Bronfenbrenner *et al*). Firms producing organic products compete with each other for a share of the organics market but the arena for the "contest" is much more centered on organic relative to other natural and conventional foods and fibers. Organic product sales are estimated to be $3.5 billion in 1996, which is approximately a 30 percent share of the natural food market (Hartman and New Hope). With the 1990s income growth of middle class consumers in industrialized economies, and to a lesser extent, the rise of middle class consumers in developing economies, the demand for goods possessing various quality attributes, often based on production systems, has grown rapidly. Consumers, through the marketplace, have expressed demand for food products that reflect

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perceived healthful, nutritious, and safety attributes, and quality assurances. Food grown using alternative agricultural practices - little or no chemical use or organically produced - are often preferred by consumers.

The issues addressed by the Thompson, and Klonsky and Tourte papers center on understanding consumer demand, and grower practices and supply of organic products. The marketing process from farm level to retail conveys information not only about prices but also about the transmission of credible but unobservable production practice attributes to the consumer. As the distance between the farmer and the consumer widens, as is often the case in marketing goods within industrialized countries and across country borders, the level of credence becomes more difficult to establish. In the third paper of this session, Lohr emphasizes the development of standards and certification aimed at improving the credence factor, and thus, facilitating the marketing and international trade of organic products.

Growth in Consumer Demand

Thompson's paper provides a useful overview of studies on consumer demand for organic food. Arguably, his most crucial point is that much of our knowledge is based on self-reporting of consumer attitudes and behavior elicited through questionnaires and surveys. The difficulties in collecting actual sales data are the thinness in the market and the numerous type of outlets at which consumers purchase their food baskets - new, upscale, high-quality and natural-oriented supermarkets, mainstream supermarkets, small health food stores or cooperatives, and farmers' markets. Approximately 65 percent of organic food may be purchased through direct sales, but shelf space for organic and natural products have increased in supermarkets (Natural Food Merchandiser). As organic food sales increase in supermarkets, scanner data will become

more available, particularly for processed foods. Anton Dunn indicates that food product manufacturing is the fastest growing segment of the market. Spence Information Services (SPINS) and A.C. Nielsen have prepared a commercially sold report on actual organic purchases of 12 processed product categories, which includes, among others: cold cereals; chips, pretzels, and snacks; frozen desserts; frozen entrees, pizzas, and convenience foods; and cookies and snack bars. Sales information on organic fresh products are more limited since fresh produce, meats, and poultry are either not scanned or labeled as organic. As Thompson suggests, the advent of price lookup (PLU) codes for fresh produce may mitigate this shortcoming in future years. Fresh organic produce has the number 9 as a prefix in PLU codes.

Thompson compares and contrasts different studies with respect to their findings on economic and demographic characteristics. As he indicates, there are a limited number of national studies aimed at discerning price and income parameters; clearly estimates for own and cross price elasticities with respect to conventional products and across alternative natural products are critical for understanding potential growth of organic markets. Moreover, having limited information on whether organic products are more likely to be purchased at higher income levels is a limiting factor in the sector's ability to market. Thompson also reviews the demographic characteristics which the literature has addressed, namely: age, gender, marital status, education, and household size. The findings over a range of regional and national studies - which often focus on different products, geographic regions, and retail outlets - suggest younger age groups, higher levels of education (college), and families with a larger number of children are more likely to buy organics, but there is often mixed evidence. Again, having socioeconomic (income strata),

geographic (east vs west, urban vs rural), and demographic cross sectional and time series data on actual sales across different marketing venues would provide a much stronger basis for analysis.

One public policy issue may be critical in influencing consumer demand for organic products. Are consumers attaining the environmental and food safety attributes that they associate with organic products? Consumer surveys indicate that consumers prefer organically produced food because of taste, appearance, and personal health reasons and because they prefer food without pesticide residues (Fresh Trends). Some consumers may also be concerned about general health and environmental issues: farm worker safety, soil and water quality, and wildlife habitat. With the 1990s expansion in organic markets, revealed preference suggests that many consumers perceive they are receiving these attributes. Further solidification and expansion of the domestic market may require greater transparency and assurances of the attributes.

Production and Market Structure

The paper by Klonsky and Tourte (KT) focuses on comparing organic and conventional agricultural production practices and discusses how widespread adoption has occurred both geographically and across commodities. Early in the paper, KT suggest that a long-term approach with innovative production strategies and recognition of the complex biological interactions is a necessary condition for an organic grower to be economically viable. Soil and pest management strategies are areas in which management approaches differ significantly from conventional growers. Based on information from the U.S. Department of Commerce and Anton Dunn, KT indicate that the average U.S. farm size is 469 acres compared to 188 acres for the average certified organic farm. Labor intensities in organic operated systems may partly explain the difference in size.

Having time series information on the distribution of farm size and crops grown would be helpful in understanding the structure of the organic industry. Are we seeing market behavior developing where smaller farms sell primarily fresh produce to local grocery stores, restaurants, and consumers; and large scale operations, which are more likely to pay fees for certification, selling to distributors and processors competing at the national and international level? KT are able to provide more detailed data from California. Farms that are certified as organic, not just registered, are larger in terms of acres and sales, and seem to be more interested in certification because of marketing requirements of handlers and processors. Smaller growers often choose not to certify because of costly certification fees and administrative costs, and because they may market directly.

Growth in organic sales may be very dependent on the ability of the industry to bring to market a consistent supply of diverse food products and marketed by large scale supermarkets. Price premia may decline as economies of scale are attained in marketing and distribution. Increasing farm, agribusiness, and food marketing investments in alternatively produced products suggest a responsiveness to the growing interest in organic foods. New food retailing chains, such as Whole Foods, are expanding across the nation, and conventional retailers are adding more natural foods product lines. Many large-scale mergers and buyouts are occurring in the natural foods industry, including Whole Foods merging with Fresh Fields ($135 million); H.J. Heinz Company purchasing Earth's Best, Inc., an organic baby food producer; and Trefoil Partners II, purchasing a controlling interest in Cascadian Farms, a Seattle-based company (Murphy). At the same time farmers' markets and internet sales are growing and public/private partnerships to develop wholesale markets for small farmers are being created to encourage development in rural

areas. In addition, farmers are individually or cooperatively custom-growing specialty fruits and vegetables for urban centers (Sugarman). Thus, a parallel development of small scale farms marketing directly to consumers through farmers' markets, mail order, and other direct outlets and indirectly through cooperatives and local supermarket outlets may be able to compete with large scale farming, distribution, and marketing operations. More systematic study of the emerging patterns is necessary to sort out the implications for the organic industry itself and for other alternative food and fiber production systems and markets as they develop and grow.

Organic Standards and Marketing

The Lohr paper addresses the relationship between market behavior and organic standards and certification. She carefully explains how accreditors, mostly government entities, establish standards to foster market efficiency and credibility and how certifiers of the standards provide assurances to producers, processors, and consumers that the standards are maintained regardless of whether producers and consumers have direct contact. Lohr also surveys the expansion of organic agriculture in foreign markets.

One of the critical market issues is harmonization of organic standards through either a single standard or an acceptance of equivalency across standards. The economics of harmonization suggest that welfare effects are ambiguous. A single standard can reduce the cost of obtaining information; it can protect consumers from fraudulent assertions and mislabeled products. Growers could also be protected from other growers or handlers making fraudulent claims and processors will have low cost verification of the authenticity of organic product inputs (Vandeman and Hayden). Retail outlets including supermarkets, health food stores, and

restaurants can sell a myriad of organic products with greater assurance behind a uniform organic standard.

However, establishing a single standard or equivalency of standards across states or nations is made difficult because of diverse characteristics developed by organic farmers. U.S. Department of Agriculture's Agricultural Marketing Service has received 220,000 comments on a proposed national standard, many of which have been critical of allowing genetically engineered foods, sewage sludge as fertilizer, and irradiation to kill bacteria, among other issues. Secretary of Agriculture Glickman quickly responded by indicating that major changes will be made to the proposed standards. Some organizations also would like the standards to be more exclusive with respect to specific materials, open space requirements, antibiotic use, and feeds allowed for livestock, and have alternative approaches to developing an organic management plan. Others would like to see organic standards favor small farms, rural community goals, and "fair" trade. Having multiple standards allows producers and consumers to capture welfare gains from these different organic characteristics, but it creates costlier production and marketing expenditures, additional certification fees, and may generate confusion among consumers. How consumer purchases of organic foods and fibers may change at the margin with a national standard and equivalency of international standards remains to be determined.

In summary, the expansion in consumer expenditures for organic foods has been quite extraordinary. The three papers in this session surveyed consumer demand for organic foods, reviewed the practices and management approaches taken by organic growers, and examined the development of organic food markets within the United States and abroad. Several demand and supply side factors appear to be critical for future growth of the industry. Continued demand

increases are contingent on consumers preferring food which is perceived to be healthier and produced in an environmentally friendly way. Consumer responsiveness to changes in price premia, disposable income, and well accepted standards are key factors. On the production side, research, education, and extension will help ensure a consistent supply to the market, lower grower costs, and reduce price premia. Finally, expansion both domestically and internationally will be dependent on the evolution in market structure and performance, particularly with respect to economies of scale.

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