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Emerging Issues in the U.S. Organic Industry

Catherine Greene, Carolyn Dimitri, Biing-Hwan Lin,
William McBride, Lydia Oberholtzer, and Travis Smith



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Emerging Issues in the U.S. Organic Industry

**Catherine Greene, Carolyn Dimitri,
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Lydia Oberholtzer, and Travis Smith**

Abstract

Consumer demand for organic products has widened over the last decade. While new producers have emerged to help meet demand, market participants report that a supply squeeze is constraining growth for both individual firms and the organic sector overall. Partly in response to shortages in organic supply, Congress in 2008 included provisions in the Food, Conservation, and Energy Act (2008 Farm Act) that, for the first time, provide financial support to farmers to convert to organic production. This report examines recent economic research on the adoption of organic farming systems, organic production costs and returns, and market conditions to gain a better understanding of the organic supply squeeze and other emerging issues in this rapidly changing industry.

Keywords: organic agriculture, farmers, handlers, consumers, organic production costs, organic supply, marketing organic products, organic label, organic price premiums, local food, organic food imports.

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Summary

Consumer demand for organic food has risen quickly over the past decade, triggered in part by the development and success of USDA's organic regulatory program and label. This rapid growth highlights challenges still to be overcome in the organic sector. As consumer demand for organic products has widened, organic retail sales have spread far beyond the "natural products" market niche in urban areas and college towns and into big-box stores across the country. The 2008 Farm Act includes many new provisions to help domestic producers meet the challenges of organic agriculture and facilitate consumer access to organic food.

What Is the Issue?

Since the late 1990s, U.S. organic production has more than doubled, but the consumer market has grown even faster. Organic food sales have more than quintupled, increasing from \$3.6 billion in 1997 to \$21.1 billion in 2008. More than two-thirds of U.S. consumers buy organic products at least occasionally, and 28 percent buy organic products weekly, according to the Organic Trade Association. This fast-paced growth has led to input and product shortages in organic supply chains, and several new issues—concern about premium-priced product sales in a tight U.S. economy, as well as competition from new environmental labels—are emerging in the organic industry.

What Did the Study Find?

Significant price premiums, fast-paced growth in demand, and fluctuating market conditions have characterized the U.S. organic sector since the beginning of the decade. Early in the decade, demand for organic products outpaced supply, and market participants reported that a supply squeeze was limiting growth in the overall sector. For example, 44 percent of organic handlers reported short supplies of needed ingredients or products in 2004, according to an ERS nationwide survey, and 13 percent were unable to meet market demand for at least one of their organic products that year.

More recently, U.S. organic producers and manufacturers have had to contend with the impact of a weaker U.S. economy on organic food sales. Surveys suggest that many organic consumers may not be particularly sensitive to the price premium paid for organic products. While frequent buyers of organic products may not change their organic purchasing habits even with the current economic slowdown, infrequent buyers may limit their purchases of organic products, and the rate of gain for new organic consumers may decline.

The low organic adoption rate for grain crops continues to be a bottleneck for expansion of the U.S. organic livestock sector, as organic livestock producers struggle to find reliable sources of affordable feed grains. Only 0.2 percent of U.S. corn and soybean crops were grown under certified organic farming systems in 2005, according to ERS estimates.

Organic imports have increased as U.S. demand for organic products has exceeded domestic supply. USDA-accredited groups certified 27,000 producers and handlers worldwide to the U.S. organic standard in 2007, with approximately 16,000 in the United States and 11,000 in over 100 foreign

countries. Organic handlers reported relying primarily on domestic suppliers in 2004, although 38 percent imported some or all of their organic products.

At the retail level, organic produce and milk, the two top organic food sales categories, receive significant price premiums over conventionally grown products. ERS analyzed organic prices for 18 fruits and 19 vegetables using 2005 data on produce purchases, and found that the organic premium as a share of the corresponding conventional price was less than 30 percent for over two-thirds of the items. The premium for only one item—blueberries—exceeded 100 percent. In contrast, organic price premiums for a half-gallon container of milk ranged from 60 percent for private-label organic milk above branded conventional milk in 2006 to 109 percent for branded organic milk above private-label conventional milk.

Organic food costs more to produce and also commands significant price premiums at the farm level. According to recent ERS analysis of national dairy and soybean survey data, total economic costs were significantly higher for organic dairy and soybean operations than for conventional operations. With an average price premium of \$6.69 per hundredweight for organic milk, organic milk producers covered most of the additional costs of organic production in 2005. In 2006, organic soybeans were more profitable than conventional soybeans, mainly because the price premiums paid for organic soybeans compensated for their higher cost of production.

Organic producers also face competition from new labels like the “locally grown” label. USDA organic regulations define organic production as an ecological production system that fosters cycling of resources, promotes ecological balance, and conserves biodiversity, but the regulations do not address where organic farmers and handlers market their products. According to an ERS survey of organic handlers, 24 percent of organic sales in 2004 were made locally (within an hour’s drive of the handlers’ facilities) and another 30 percent were made regionally. Partly in response to organic supply shortages, Congress in 2008 boosted funding for organic research and for a certification cost-share program in the Food, Conservation, and Energy Act. Congress also made conservation practices related to organic production and transition eligible for payments of up to a \$20,000 annual limit, with an \$80,000 cap over a 6-year period, under the Environmental Quality Incentives Program.

How Was the Study Conducted?

The study drew on a range of ERS studies and surveys on organic production and handling, and conducted an extensive literature review to better characterize the U.S. organic sector. One set of studies has analyzed data from certification groups for over a decade to track adoption patterns within the U.S. organic sector. In recent years, ERS has surveyed organic soybean producers and organic dairy producers in USDA’s annual Agricultural Resource Management Survey. ERS has also tracked the characteristics and purchasing patterns of U.S. organic consumers for two major organic food sectors—produce and dairy—using retail food purchase data, which are scanned at home by a nationally representative panel of consumers. Findings are also presented from ERS’s first nationwide survey of practices in the U.S. organic handling sector (organic manufacturers, processors, distributors, and other organic intermediaries), conducted in 2004.

Introduction

Consumer demand for organic food has risen quickly over the past decade, triggered in part by the development and success of USDA's organic regulatory program and label (Kiesel and Villas-Boas, 2007; Molyneaux, 2007; Batte et al., 2007). This rapid growth highlights challenges still to be overcome in the organic sector. As consumer demand for organic products has widened, organic retail sales have spread far beyond the "natural products" market niche in urban areas and college towns and into big-box stores across the country. While new producers have emerged to help meet demand, market participants report that a supply squeeze is constraining firm growth and limiting growth in the overall sector.

In 2008, organic policy at the Federal level moved in new directions. Congress mandated an increase in organic research and certification assistance and created new funding opportunities in conservation, credit, and trade programs. Citing the potential environmental benefits of organic farming, the 2008 Farm Act includes provisions for financial support to farmers converting to organic production through USDA's conservation program, EQIP (Environmental Quality Incentives Program).

Federal activity on organic agriculture began increasing at the beginning of the decade when USDA set national organic standards (see box, "National Organic Standards and Certification"). USDA's Economic Research Service and partner agencies have initiated a number of new organic surveys and studies during the last few years. This report examines recent economic research on organic farming systems, supply chains, price premiums, and market conditions to gain a better understanding of the emerging issues in this rapidly changing industry.

National Organic Standards and Certification

Private organizations, mostly nonprofit, began developing certification standards in the early 1970s as a way to support organic farming and prevent consumer fraud. Some States began offering organic certification services in the late 1980s for similar reasons. The resulting patchwork of standards in the various certification programs, however, caused a variety of market problems.

Congress passed the Organic Foods Production Act of 1990 to establish national standards for organically produced commodities, and USDA promulgated final rules for implementing this legislation in December 2000, with an 18-month transition period. As of October 2002, all agricultural products sold, labeled, or represented as organic need to be in compliance with the regulations. They require that organic growers and handlers (including food processors and distributors) be certified by State or private agencies/organizations under the uniform standards developed by USDA, unless the farmers and handlers sell less than \$5,000 a year in organic agricultural products. Retail food establishments that sell organically produced agricultural products, but do not process them, are also exempt from certification.

The national organic standards address the methods, practices, and substances used in producing and handling crops, livestock, and processed agricultural products. Although specific practices and materials used by organic operations may vary, the standards require every aspect of organic production and handling to comply with the provisions of the Organic Foods Production Act. Organically produced food cannot be produced using genetic engineering, sewage sludge, or ionizing radiation. These standards include a national list of approved synthetic, and prohibited nonsynthetic, substances for use in organic production and handling.

USDA organic standards for food handlers require that all nonagricultural ingredients, whether synthetic or nonsynthetic, be included on the national list. Handlers must prevent the commingling of organic with nonorganic products and protect organic products from contact with prohibited substances. In a processed product labeled as “organic,” all agricultural ingredients must be organically produced unless the ingredient(s) is (are) not commercially available in organic form. National Organic Program regulation 7 CFR 205, Section 205.606, specifies which non-organic agricultural products may be considered as commercially unavailable.

The labeling requirements under the national standards apply to raw, fresh, and processed products that contain organic ingredients and are based on the percentage of organic ingredients in a product. Agricultural products labeled “100-percent organic” must contain (excluding water and salt) only organically produced ingredients. Products labeled “organic” must consist of at least 95 percent organically produced ingredients. Products labeled “made with organic ingredients” must contain at least 70 percent organic ingredients. Products with less than 70 percent organic ingredients cannot use the term organic anywhere on the principal display panel but may identify the specific ingredients that are organically produced on the ingredients statement on the information panel. The USDA organic seal—the words “USDA organic” inside a circle—may be used on agricultural products that are “100-percent organic” or “organic.” A civil penalty of up to \$11,000 per violation can be levied on any person who knowingly sells or labels a product as organic that is not produced and handled in accordance with the regulations.

For further information, visit USDA’s Agricultural Marketing Service/National Organic Program website, at www.ams.usda.gov/nop/.

U.S. Market Growth Outpaces Domestic Supply

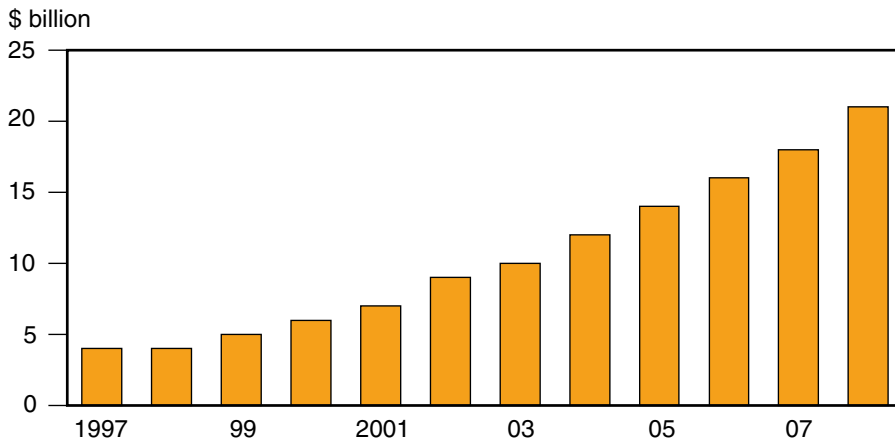
Since the late 1990s, U.S. organic production has more than doubled, but the consumer market has grown even faster. Organic products are now firmly established in the American food culture: once available only in natural product stores, organic foods are now found in mainstream venues like Wal-Mart, Target, and Costco. While organic food sales are rising from a small base and still account for only about 3 percent of total food sales, most Americans now purchase organic products at least occasionally. According to an annual industry survey, 69 percent of U.S. consumers purchased organic products in 2008 (Hartman Group, 2008).

Growing consumer interest in organic food has brought a number of changes to markets and supply chains. Long-time organic retailers, manufacturers, distributors, and farmers face new competition from their conventional food counterparts. For example, large conventional food manufacturers—such as General Mills, Kellogg’s, and Dean Foods—initially gained access to organic markets by acquiring independent, successful organic companies. More recently, conventional food manufacturers have competed head-on with independent organic companies by introducing organic versions of their well-known products, such as Gerber baby food. Conventional supermarkets are introducing “private label” store-brand lines of organic food. And organic food supplies are increasingly being imported from farmers in dozens of other countries that are producing products to meet USDA’s organic standards.

Organic Sales Have Quintupled Since 1997

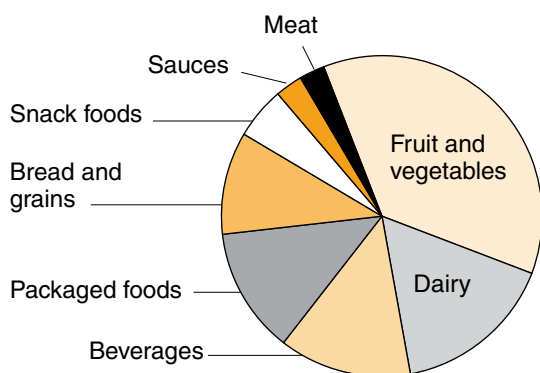
Organic food sales increased from \$3.6 billion in 1997 to \$21.1 billion in 2008 (fig. 1). Sales of organic foods increased annually between 12 and 21 percent during this period (*Nutrition Business Journal*, 2008). Market penetration has also grown steadily; organic food products accounted for over 3 percent of total U.S. food sales in 2008. The top two categories—produce

Figure 1
U.S. organic food sales topped \$21 billion in 2008



Source: *Nutrition Business Journal*.

Figure 2
Fruits, vegetables, and dairy accounted for over half of the \$19 billion organic food market in 2007



Source: *Nutrition Business Journal*.

and dairy products—accounted for over half of organic food sales (fig. 2). These categories are followed by soymilk and other beverages, packaged foods, breads/grains, snack foods, condiments, and meat.

Other organic products (herbal supplements, personal care products, pet food, flowers, linens, and clothing) are growing from a smaller base—\$1.6 billion in sales in 2007—but are forecast to grow even faster than organic food sales through the end of the decade (Organic Trade Association, 2008). The fast-paced growth of organic food and other products has led to complaints of supply shortages throughout the organic supply chain.

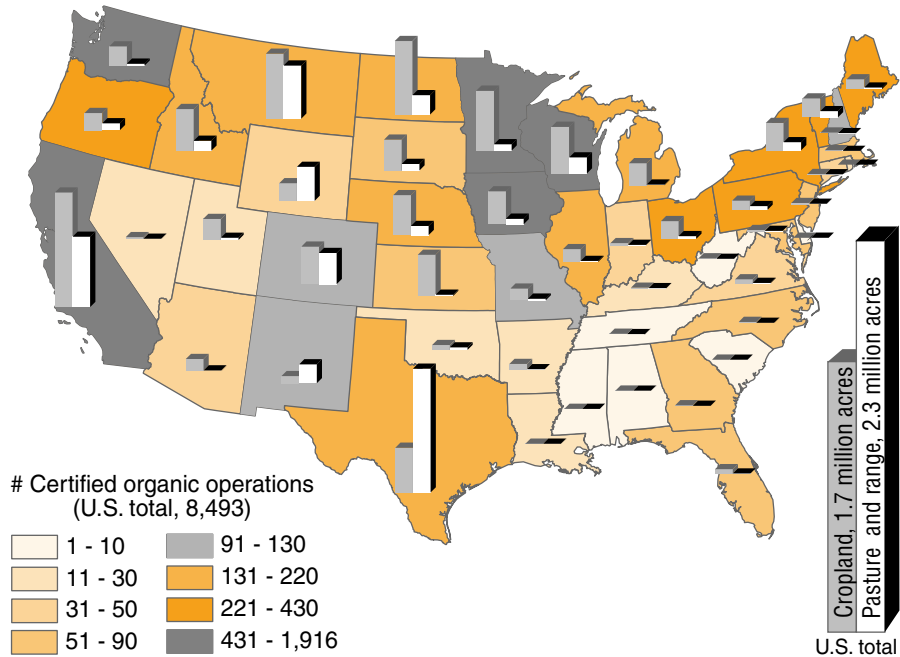
U.S. Organic Acreage Has Doubled Since 1997, But Producers Face Challenges

U.S. certified organic crop acreage more than doubled between 1997 and 2005, and organic production has spread to every State and commodity sector (fig. 3) (USDA-ERS, 2009a). The structure of the U.S. organic production sector differs substantially from the conventional sector: fruits and vegetables account for a much larger percentage of total organic acreage, and organic farms tend to be smaller than conventional farms (Greene and Kremen, 2003; McBride and Greene, 2007). Small-scale organic operations market directly to consumers, as well as to wholesalers, natural food stores, and supermarkets. Many organic production sectors, including fruits, vegetables, dairy, and poultry, are expanding rapidly in the United States. However, the pace of expansion has slowed in some sectors, and organic acreage for some crops—including cotton and soybeans—declined between 2000 and 2005.

The overall adoption level for organic agriculture is still low—only about 0.5 percent of all U.S. cropland and 0.5 percent of all U.S. pasture was certified organic in 2005. Although nearly 5 percent of U.S. vegetable acreage and 2.5 percent of fruit and nut acreage was under organic management in 2005, only 0.2 percent of U.S. corn and soybean crops were grown under certified organic farming systems (fig. 4). Conventional grain producers in the United States associate a wide variety of financial and other risks with organic production (Yeager, 2006; Wolf, 2006).

Figure 3

U.S. certified organic acreage and operations, 2005



Source: USDA Economic Research Service, based on information from USDA-accredited certifiers.

Organic Handlers Cope With Supply Shortfalls

During the early 1990s, organic farmers identified lack of consumer demand as a major marketing problem, and organic farmers frequently sold organic products into conventional markets (OFRF, 1993, OFRF, 1996). While limited demand can still be a problem at times for organic products, limited organic supply has become a bigger issue over the last decade. By the late 1990s, organic handlers—the intermediaries in organic supply chains—faced difficulty procuring large enough quantities of organic products to distribute to retailers, locating organic producers to buy from, and gaining access to shelf space in supermarkets (Dimitri and Richman, 2000).

More recently, long-time organic handlers have reported that the lack of reliable supplies for organic raw materials is a major factor that has constrained business growth (Oliver, 2006; Organic Trade Association, 2006, 2004, 2001). One of the most recurrent themes in a congressional public hearing on organic agriculture, held in April 2007, was the shortage of organic inputs, ingredients, and products (Subcommittee on Horticulture and Organic Agriculture, 2007). According to testimony from the Organic Trade Association (OTA), 52 percent of the organic companies responding to an OTA membership survey reported that “a lack of dependable supply of organic raw materials has restricted their company from generating more sales of organic products” (Wilcox, 2007).

In particular, organic dairy producers and soy food processors face shortages of domestically produced organic feed grains and soybeans (Clarkson, 2007). Quarterly farm-level prices for organic grains and feedstuffs have risen steadily since USDA began tracking prices for these products in January

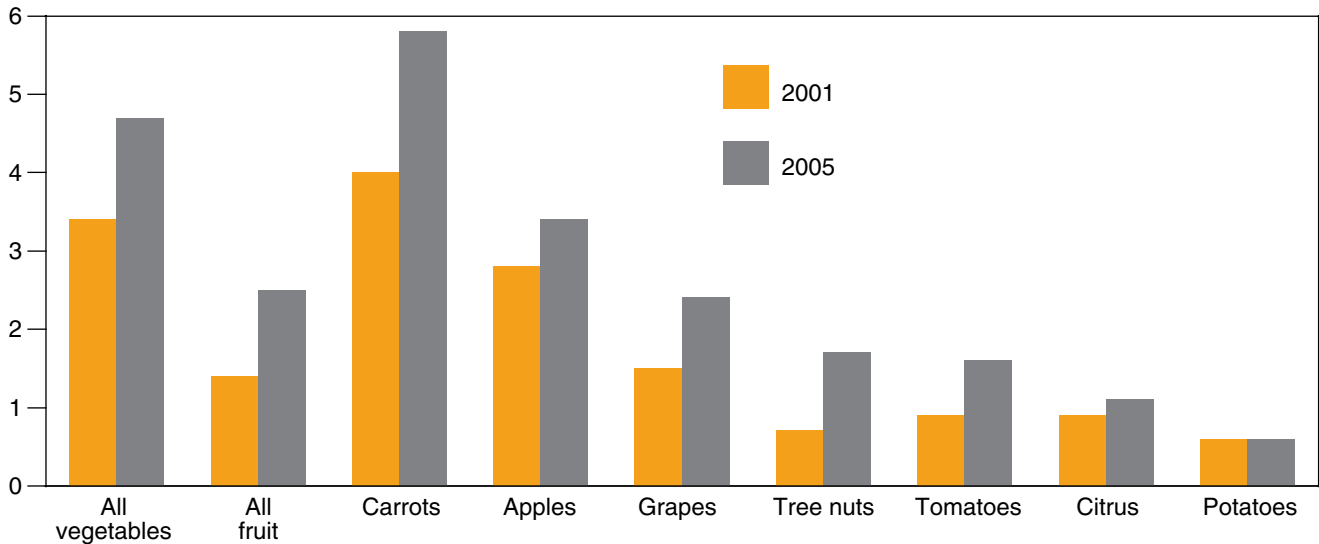
2007—in some cases more than tripling by third-quarter 2008—outpacing conventional grain price increases and reflecting tight organic supplies.

In 2005, ERS surveyed all certified organic handlers in the United States (approximately 2,790 facilities) about their practices in 2004 (Dimitri and Oberholtzer, 2008b). Organic handlers (including brokers, distributors, wholesalers, and manufacturers) must maintain the organic integrity of a product as it moves along the supply chain, but can achieve compliance with the national standards quicker than farmers. Facilities were few in most States, with the Pacific States accounting for 41 percent of the total. In 2004, many organic handlers were small; 48 percent reported \$1 million or less in total gross sales (both organic and conventional products) (fig. 5). Just 3 percent of handlers reported over \$100 million in sales. Most organic handling

Figure 4

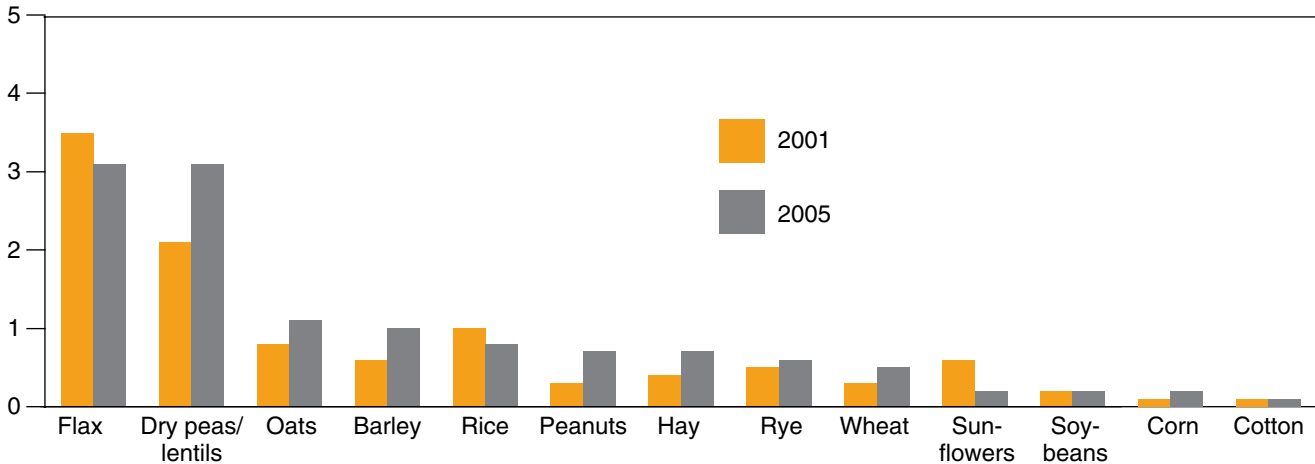
In the U.S., adoption of certified organic systems is highest for fruit and vegetables

Certified organic acres as a percent of total U.S. acres



While certified organic systems are also used for grain crops, adoption is higher for grains with food uses

Certified organic acres as a percent of total U.S. acres



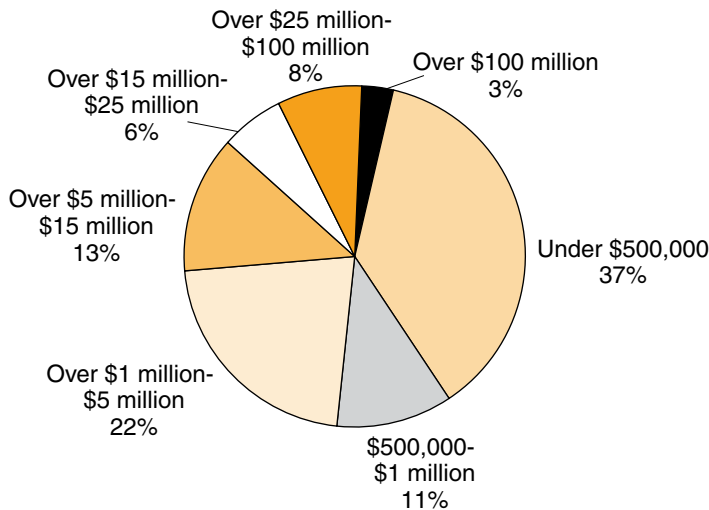
Source: "Data Track the Expansion of International and U.S. Organic Farming," *Amber Waves*, 2007.

firms are mixed operations, handling both organic and conventional products; on average, 34 percent of the sales handled by these firms were organic.

According to the survey findings, 13 percent of all handlers were unable to meet market demand (that is, they experienced critical shortages for at least one of their organic products) during 2004 (Dimitri and Oberholtzer, 2008a). The share of handlers unable to meet market demand varied by the product sold and was highest for milk (fig. 6). These product shortages are mirrored by handlers' difficulties procuring ingredients: 44 percent of handlers found needed ingredients or products in short supply during 2004. The main products and ingredients handlers found in limited supply were coffee, soybeans, milk, seeds (includes seeds for planting), corn, and nuts.

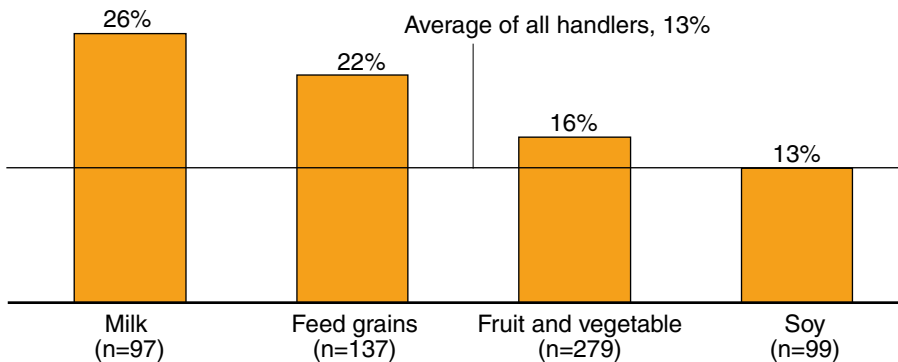
Organic handlers are using a number of mechanisms to cope with shortfalls, such as developing relationships with new or less experienced suppliers, being flexible on shipment size, and providing technical advice (fig. 7).

Figure 5
Share of organic handlers by size of company sales in 2004*



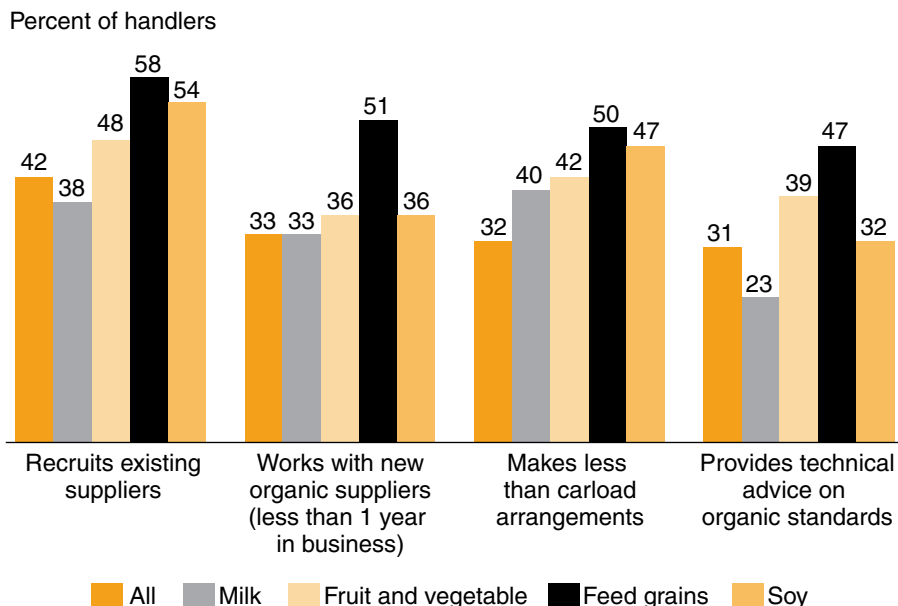
*Includes handlers' gross sales of both organic and conventional products.
 Source: 2004 Nationwide Handler Survey, Economic Research Service, USDA.

Figure 6
Percent of handlers with critical shortage, by main product sold



Source: 2004 Nationwide Handler Survey, Economic Research Service, USDA.

Figure 7
Handlers work with their suppliers in many ways, 2004



Source: 2004 Nationwide Handler Survey, Economic Research Service, USDA.

Handlers willing to work with suppliers new to the organic industry have access to a wider range of supply. Feedgrain handlers are the most willing to work with suppliers new to the sector and, along with soy handlers, are the most flexible about accepting smaller shipments of organic supplies.

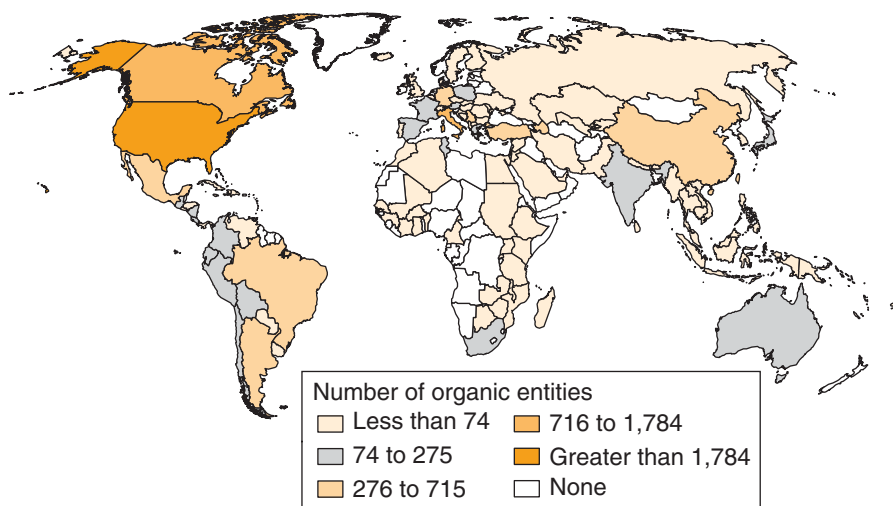
The Search for Organic Supply Goes Global

The U.S. National Organic Program (NOP) streamlined the certification process for international as well as domestic trade when it was implemented in 2002. Organic farmers and handlers anywhere in the world are permitted to export organic products to the United States if they meet NOP standards, along with other regulatory standards, and are certified by a public or private organic certification body with USDA accreditation. In 2007, USDA-accredited groups certified 27,000 producers and handlers worldwide to the U.S. organic standard, with approximately 16,000 in the United States and 11,000 in over 100 foreign countries (fig. 8). Farmers and handlers certified to NOP standards are most numerous in Canada, Italy, Turkey, China, and Mexico, which together accounted for half the total foreign organic farmers/handlers in 2007.

The United States does not have updated, consistent data on organic trade because organic product codes have not yet been added to the U.S. and international harmonized system of trade codes. A USDA report estimated that the value of U.S. organic imports in 2002 was \$1.0-\$1.5 billion and the value of U.S. organic exports was \$125-\$250 million (USDA-FAS, 2005). Organic imports have increased substantially since 2002, and include fresh fruits and vegetables, products not grown in the United States (such as coffee, tea, cocoa, and tropical produce), and raw ingredients, including soybeans.

Imports have increased as growth in organic demand has exceeded domestic supply. Organic farming is often labor intensive, and developing countries

Figure 8
**Number of certified organic entities (farmers and handlers)
 by country, 2007**



Source: USDA National Organic Program.

with lower farm labor costs may have a competitive advantage for some organic products. While USDA’s survey of organic distributors, processors, and other handlers indicated that they relied primarily on domestic suppliers, 38 percent imported some or all of their organic products in 2004 (Dimitri and Oberholtzer, 2008a).

Despite the rapid growth of the organic sector and entry of larger organic farms over the last decade, the smallest U.S. organic farms have maintained a stable share of the organic sector (Grow and Greene, 2009). Small-scale farmers producing a wide variety of horticultural products—and increasingly livestock products—for sale in direct markets have likely seen the least impact from competition with more distant suppliers. Organic consumers at farmers’ markets, independent restaurants, small food shops, and other direct markets are explicitly seeking locally grown organic products. However, some fruit and vegetable growers who marketed to natural foods grocery stores during the 1990s have reported losing some of their markets to imports and to larger domestic producers as these stores have expanded beyond their original markets (Hanson et al., 2004).

U.S. organic grain and oilseed producers also face international market competition. U.S. organic cotton producers began losing market share in the 1990s to countries with lower labor, input, and technology costs (Greene and Kremen, 2003). U.S. organic soybean production started declining several years ago despite increasing demand for organic feed grains and consumer products such as soymilk. U.S. feed grain distributors and soy product manufacturers report sourcing organic soybeans from other countries.

Organic Food Costs More To Produce

USDA surveyed organic milk producers in 2005, organic soybean producers in 2006, and organic apple producers in 2007 as part of USDA’s annual

survey of farm and ranch operators—the Agricultural Resource Management Survey (ARMS)—and will survey organic wheat producers in 2009. These surveys sample organic producers at much higher rates than their occurrence in the population in order to develop sufficient data for a comparison of practices and costs on conventional and organic farms. ERS has completed analysis of organic dairy and soybean production costs and returns.

Organic Dairy Costs and Returns. Organic dairy emerged as a fast growing sector in the late 1990s, and certified organic milk accounted for over 3 percent of U.S. sales of fluid milk products in 2008 (USDA-AMS, 2008). Organic milk producers usually begin as operators of conventional dairies before undergoing what can be a challenging and costly transition process. Conventional dairy producers need to adjust their approach to dairy herd management during the transition to comply with USDA organic standards.

The primary difference in the production practices used by organic versus conventional dairies is in the feeding system (McBride and Greene, 2007). In 2005, more than 60 percent of organic operations reported using pasture-based feeding that provides more than half of seasonal forage (during the grazing months) from pasture, compared to just 18 percent of other operations (table 1). The growth hormone rbST is not available to organic producers, but was used by 17 percent of conventional operations, who also were much more likely to utilize regular veterinary services and a nutritionist. The use of these practices likely contributed to the significantly higher production per cow on conventional versus organic operations. Organic operations averaged about 13,600 pounds of milk per cow in 2005, versus nearly 19,000 pounds on conventional operations.

Measuring Production Costs

ERS computes three levels of production costs for a farm operation. **Operating costs** include costs for feed; veterinary and medical services; bedding and litter; marketing; custom services; fuel, lubrication, and electricity; repairs; hired labor; other costs; and operating interest. **Capital ownership costs** include the annualized cost of maintaining the capital investment (economic depreciation and interest) in the operation, and costs for non-real estate property taxes and insurance. **Total economic costs** are the sum of operating and capital ownership costs, plus opportunity costs for unpaid labor and land, and allocated costs for general farm overhead items.

Total operating costs is an indicator of the relative success of farm operations in terms of their ability to meet short-term financial obligations. The sum of operating and capital ownership costs provides an indicator of whether operations can replace capital assets as needed and thus stay in business over time. Other costs are primarily opportunity costs of owned resources (land and labor) that may or may not influence production decisions.

For organic farm operations, the estimated costs of transitioning to certified organic production are also included in total economic costs. A farm operation must be managed organically for 3 years prior to receiving organic certification and organic price premiums. The higher organic production costs during this period can be considered as the investment necessary to earn higher organic prices over the expected life of the operation.

Costs of production for organic and conventional dairy systems were examined to determine whether organic milk price premiums make organic systems competitive with conventional systems. Average operating and capital costs for organic dairies, including an estimate of the additional costs incurred during transition, were an estimated \$6.38 per cwt of milk higher than for conventional dairies in 2005. With an average price premium of \$6.69 per cwt for organic milk, organic milk producers, on average, covered the additional operating and capital costs of organic production in 2005. This suggests that there may be an economic incentive for small existing dairies (which often have above-average production costs) to transition to organic production.

Table 1

Characteristics and practices of conventional and organic dairy operations, U.S., 2005¹

Item	Type of dairy operation		t-stat
	Conventional	Organic	
Milk cows (per farm)	156	82	1.20
Milk production (lbs per cow)	18,983	13,601	2.63
Region (percent of farms/cows)			
Northeast (ME, NY, PA, VT)	26/17	41/26	1.25/2.55
Upper Midwest (MI, MN, WI)	39/25	43/34	0.13/2.36
Corn Belt (IL, IN, IA, MO, OH)	15/10	8/8	1.18/0.71
Southeast (FL, GA, KY, TN, VA)	6/6	0/0	na
Southwest (AZ, NM, TX)	2/10	0/0	na
West (CA, ID, OR, WA)	11/32	7/32	0.90/0.03
Region (milk cows per farm)			
Northeast (ME, NY, PA, VT)	104	52	0.74
Upper Midwest (MI, MN, WI)	98	64	0.34
Corn Belt (IL, IN, IA, MO, OH)	108	75	0.46
Southeast (FL, GA, KY, TN, VA)	152	0	na
Southwest (AZ, NM, TX)	781	0	na
West (CA, ID, OR, WA)	431	381	0.16
Farm operator			
Off-farm occupation (percent of farms)	2	4	0.24
Education (percent of farms)			
Less than high school	18	26	0.75
Completed high school/some college	66	54	1.38
Graduated from college	16	20	0.59
Age (years)	51	49	0.66
In dairy business (years)	23	21	1.03
Selling certified organic milk (years)	na	5	na
Transition to certified organic (years)	na	2.5	na
Exit dairy business (percent of farms)			
5 years or less	25	16	1.27
10 years or less	51	33	1.99
20 or more years	30	47	2.05
Production practices (percent of farms)			
Pasture based feeding	18	63	6.42
rbST	17	0	na
Regular veterinary services	69	38	3.69
Nutritionist	72	45	3.38
Number of observations	1,462	325	

¹ Statistical significance in test of equality of means is indicated by t-statistics greater than 1.96 and 1.65 at the 5 and 10 percent levels, respectively. na = not applicable.

Source: 2005 Agricultural Resource Management Survey.

Most organic dairies are small operations, with returns that compare favorably with those of small conventional operations. However, at their scale of operation, potential returns to operator labor and management are limited. When the opportunity cost of unpaid labor is included, the average total economic cost of organic milk production was higher than the organic milk price premium in 2005. This suggests that although there may be an economic incentive for small dairies that have already committed much of the fixed investment in milk production to consider becoming organic, the economic incentive for startup organic dairies (which don't have any sunk costs that can be ignored) may be limited. Also, market conditions for organic milk have changed substantially since 2005, with falling milk prices and higher input costs, and many existing organic dairies are currently showing losses (USDA-ERS, 2009b).

Organic Soybean Costs and Returns. Organic soybean acreage in the United States has been stagnant since the early 2000s, despite the fast-growing market for organic soymilk and feed grains, and large price premiums for organic soybeans. Since multidisciplinary research results suggest that growing organic soybeans can be more profitable than growing conventional soybeans, the lack of growth in domestic soybean production relates to a variety of other factors. According to Lynn Clarkson—president of the largest organic grain supply company in the United States—grain supplies are tight despite high demand and price premiums for many reasons: the 3-year lag due to the organic transition period requirement, fewer organic marketing outlets, the need for onfarm storage, the lack of third-party contractors for organic pest and nutrient management, heavy managerial requirements, fear of criticism from neighbors, unknown risks, lack of government infrastructure support, and subsidies for ethanol that increase demand for conventional grain supplies (Clarkson, 2007). Also, as the number of organic soybean producers has increased worldwide, U.S. producers have faced increased competition for the domestic market, as well as for the Japanese organic soybean market, which was a major purchaser of U.S. organic soybeans in the late 1990s and early 2000s.

Research comparing organic and conventional soybean production with long-term experimental trials—using the same seed variety, soil and other conditions—shows that organic cropping systems generate yields and economic returns equal to or greater than those of conventional systems and sometimes much greater returns (Pimentel et al., 2005; Delate et al., 2003; Mahoney et al., 2004; Smith et al., 2004; Hanson et al., 1997). ARMS soybean survey results reflect the commercial setting and the “human factor”—that valuable system of local knowledge and expertise that every farmer acquires through onfarm experience and experiments that plays an especially crucial role in organic farming.

ERS analysis of the 2006 ARMS data from Midwest and Corn Belt States indicates that organic soybean production is conducted on smaller operations than conventional production and that production practices are different (McBride and Greene, 2008). Nearly all conventional producers used genetically modified herbicide-tolerant seed (feed grade) in 2006, while most organic producers used a food-grade seed (table 2). Most conventional farmers used a 3-year rotation of continuous row crops, whereas organic producers more often rotated soybeans with small grains and hay crops. Despite

their smaller size, organic soybean farmers are less likely to report off-farm employment as their major occupation, reflecting higher labor requirements with organic farming.

Average soybean operating costs per acre were not significantly different between conventional and organic producers, but total operating and capital ownership costs and total economic costs were higher for organic soybean production. Conventional producers had higher chemical costs, while organic

Table 2

Characteristics and practices of conventional and organic soybean farms, Corn Belt and Midwest, 2006¹

Item	Type of farm		t-stat
	Conventional	Organic	
Farm characteristic:			
Harvested soybean acres (per farm)	272	117	7.42
Farm acres operated (per farm)	748	478	4.41
Farm operator			
Off-farm occupation (percent of farms)	26	16	3.18
Age (years)	55	54	1.28
More than 65 years (percent of farms)	24	14	2.97
Education (percent of farms)			
Less than high school	5	18	1.73
Completed high school	46	24	3.86
Attended college	50	57	1.07
MI, MN, or WI (percent of farms)	24	51	3.23
Soybean production practice:			
Seed (percent of farms)			
GM herbicide tolerant	97	0	na
Organic clear hilum	0	68	na
Organic other food grade	0	15	na
Organic non-food grade	0	13	na
Other seed	3	5	1.52
Planted in conventional rows	60	92	11.54
Crop rotation (percent of farms)			
Monoculture	4	1	2.58
Continuous row crop	79	19	12.15
Row crops and small grains	4	24	3.13
Idle year	9	40	3.76
Meadow crop	4	17	3.04
Field operation (percent of farms)			
Moldboard plow	5	36	4.53
No-till planter	50	6	14.89
Row cultivator	3	65	9.28
Other practices (percent of farms)			
Irrigation	5	3	1.52
Applied commercial fertilizer	32	7	10.57
Applied manure or compost	7	28	3.08
Soybean yield and price:			
Yield (bushels per planted acre)	47	31	8.63
Price received (dollars per bushel)	5.48	14.64	27.24
Number of observations	1,425	237	

¹ Statistical significance in test of equality of means is indicated by t-statistics greater than 1.96 and 1.65 at the 5 and 10 percent levels, respectively. na = not applicable.

Source: 2006 Agricultural Resource Management Survey

producers substituted field operations for chemicals and had higher fuel, repair, and hired labor costs. They also used more unpaid labor. Average organic soybean yield was lower than that of conventional producers (31 versus 47 bushels per acre), partly because food-grade soybeans produce lower yield than feed-grade soybeans. Average costs for producing organic soybeans were as much as \$6.20 per bushel higher than conventional production in 2006, after accounting for the influence of other factors on production costs, including organic transition costs (McBride and Greene, 2007). The average price premium for organic soybeans was \$9.16 per bushel in 2006, suggesting that organic soybean producers, on average, were sufficiently compensated in 2006 for the additional costs of organic production.

Organic soybeans were more profitable in 2006 than conventional soybeans mainly because of the significant price premiums paid for organic soybeans. However, prices for conventional soybeans increased dramatically in 2007, reducing the organic price premiums from the 2006 level. The yield and cost relationship shown in the ARMS data suggests that when conventional soybean prices are high, organic systems lose their appeal, leading to slower adoption, and even declines in acres planted to organic soybeans.

Organic Agriculture Provides Ecosystem Services

USDA's national regulatory program explicitly defines organic agriculture as an ecological production system, established "to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity" (USDA AMS, 2000). In setting soil fertility and crop nutrient management practice standards, USDA requires organic producers to use practices that maintain or improve the physical, chemical, and biological condition of soil and minimize soil erosion. In setting standards for organic livestock, USDA specifies that producers must accommodate an animal's natural nutritional and behavioral requirements, ensuring that dairy cows and other ruminants, for example, have access to pasture. USDA's organic livestock standards also incorporate requirements for living conditions, feed rations, and health care practices suitable to the needs of the particular species.

Environmental benefits that can be attributed to organic production systems include the following:

- **Reduced pesticide residues in water and food.** Organic production systems virtually eliminate synthetic pesticide use, and reducing pesticide use has been an ongoing U.S. public health goal as scientists continue to document its unintentional effects on nontarget species, including humans.
- **Reduced nutrient pollution; improved soil tilth, soil organic matter, and productivity; and lower energy use.** A number of studies have documented these environmental improvements in comparing organic farming systems with conventional systems (USDA Study Team on Organic Farming, 1980; Smolik et al., 1993; Reganold et al., 2001; Mäder et al., 2002; Marriott and Wander, 2006).

- **Carbon sequestration.** Soils in organic farming systems (which use cover crops, crop rotation, fallowing, and animal and green manures) may also sequester as much carbon as soils under other carbon sequestration strategies and could help reduce carbon levels in the atmosphere (Lal et al., 1998; Drinkwater et al., 1998, International Trade Centre-United Nations/World Trade Organization and FiBL, 2007).
- **Enhanced biodiversity.** A number of studies have found that organic farming practices enhance the biodiversity found in organic fields compared with conventional fields (Mäder et al., 2002; Altieri, 1999) and improve biodiversity in field margins (Soil Association, 2000).

Despite the potential for organic agriculture to improve the environmental performance of U.S. agriculture, the national standard is having only a modest impact on environmental externalities caused by conventional production methods because the organic adoption rate is so low.

Higher Food Prices and Local Food Labels

A weaker U.S. economy and higher food prices, along with new competition from food marketed as “locally grown,” have not yet had a major impact on the organic marketplace, but are emerging issues. Retailers passed on higher commodity and energy costs to consumers in the form of higher retail prices in 2008, but lower commodity/energy costs and weaker world economies will likely pull inflation down in 2009 (Leibtag, 2008). Data on retail prices for organic food products are incomplete because the U.S. Bureau of Labor Statistics does not differentiate between organic and non-organic items in the Consumer Price Index. Recent ERS studies show significant retail price premiums for organic produce and milk—the two top organic food sales categories—compared with their conventional counterparts (see box on organic price premiums).

While overall prices for food have increased since 2007, findings from a new national study by the Hartman Group indicate that the percentage of consumers purchasing organic products has remained stable since 2006 (Hills, 2008). Industry analysts suggest that many organic consumers may not be particularly sensitive to price increases for organic products (*Nutrition Business Journal*, 2008).

Organic food purchasing patterns often stand apart from other types of food purchases. Studies by the Economic Research Service and others do not tie high household income to organic purchases, despite relatively high price premiums for organic products. The Hartman Group characterizes organic consumers not as shoppers arriving at a food market in search of the lowest-priced products, but rather as shoppers who want to accomplish tasks on specific shopping occasions by engaging in a compelling set of experiences: “procuring dinner, relaxation, an afternoon workout snack, indulging one’s child, the monthly stock-up trip, and so forth” (Hartman Group, 2007). While frequent consumers of organic products may not change their organic purchasing habits even with the economic slowdown, infrequent buyers may purchase fewer organic products, and the growth rate for consumers new to organic foods may decline. A nationwide survey of food shoppers in 2007 found that consumers who had purchased organic foods but no longer did so cited its expense as the major reason (Food Marketing Institute and *Prevention*, 2008).

“Locally Grown” Label: Complement or Competition?

Agricultural production and food transport both impose environmental costs, and organic production and local distribution can lower these costs (Pretty et al., 2005). Although the requirements for the organic label and for local labels target these different aspects of agriculture—the organic label addresses how food is produced and local labels address where it is produced and distributed—they are often described as competing labels in popular literature.

A recent national survey of U.S. consumers who shop at “natural food” stores posed the following question (*Natural Foods Merchandiser*, 2008): “If you were purchasing a particular ingredient for a recipe and you had a choice of

either a local product or a non-local organic one, which would you choose, assuming equivalent price and quality?" In this head-to-head comparison, 35 percent of respondents chose local and 22 percent chose organic (41 percent chose both equally). Other researchers have reported similar findings on consumer preferences for local over organic food (Leopold Center for Sustainable Agriculture and Iowa State University Business Analysis Laboratory, 2003), and willingness to pay higher premiums for local (Loureiro and Hine, 2001).

The ERS nationwide survey of U.S. organic handlers found that 24 percent of organic sales in 2004 were made locally—within an hour's drive of the handlers' facilities—30 percent were made regionally, and 39 percent were made nationally. A small proportion of domestic organic sales (7 percent) was exported in 2004 (Dimitri and Oberholtzer, 2008b).

Although most retail chains that initiate local programs usually purchase local products from a multistate region, most consumers consider local products as being produced much closer to home—in their State, within 100 miles of their community (*Natural Foods Merchandiser*, 2008). Consumers may also have other misperceptions, such as the belief that local production is environmentally responsible, even though local labels are not typically associated with production standards. According to recent census of agriculture results, approximately 136,000 farmers reported selling agricultural products directly to consumers, while only about 20,000 farmers reported producing organic products (USDA – NASS, 2009).

Organic and local labels are not necessarily competitive. Many long-time participants in the organic market perceive organic and local agriculture as “two sides of the same coin” (Lipson, 2008). Some organic certifying entities, both State and private, already certify producers and processors to a number of other standards—including food safety standards and international organic standards that incorporate a social justice component. A product might easily carry both an organic label, denoting the ecologically based production system used, and a locally grown logo, denoting the number of miles to deliver the product to the consumer.

As the number of farmers' markets in the United States continues to grow, many market managers report strong unmet demand for organic vendors (Kremen et al., 2004). A variety of local-organic food initiatives are emerging in response to the unmet needs for local and organic products in farmers' markets, supermarkets, and institutional settings. Legislation to support local agriculture has been proposed in a number of States in recent years. For example, Illinois passed legislation in 2007 designed to make Illinois the Midwest leader in local and organic food and fiber production, creating a task force to develop strategies to increase local, organic buying programs for public institutions and supporting farmers in transition to organic production (Illinois General Assembly, 2007). A county in Iowa has enacted policies to rebate 100 percent of real property taxes to farmers who convert to organic production and to support local and organic food purchases in county institutional settings. At the Federal level, USDA's Agricultural Marketing Service administers several grant programs that have helped a number of local-organic initiatives in different parts of the country.

Private groups have started local and organic food projects in a few public schools, and a few marketing cooperatives have emerged to market products that are local and organic. One private-sector example is the Appalachian Sustainable Development organic food marketing cooperative in southwest Virginia, which now includes 60 farmers, mostly former tobacco producers, growing and selling certified organic produce to nearly 600 supermarkets in the region (Flaccavento, 2008).

Organic Price Premiums Vary Across Commodities

Surveys provide valuable information about consumer interest in organic products, while analysis of consumer purchases indicates what people buy and how much they pay. Using data on food purchases from a representative sample of U.S. households across the Nation, ERS researchers have completed several studies on consumer purchases of organic produce and milk. These indicate that organic price premiums at the retail level varied by product and location in the mid-2000s, and generally showed higher premiums for milk than for fruits and vegetables.

- ERS analyzed organic prices for 18 fruits and 19 vegetables using 2005 data on produce purchases (Lin et al., 2008), and found that the organic premium as a percent of the corresponding conventional price was under 30 percent for over two-thirds of the items. Organic premiums for vegetables vary somewhat more than for fruits, and the premium for only one item—blueberries (not shown)—exceeded 100 percent.
- The price for organic milk over conventional milk ranged from 72 percent above the conventional price in Western States to 126 percent above the conventional price in the East, based on ERS analysis of milk purchases in 2004 (Dimitri and Venezia, 2007). The national average price pre-

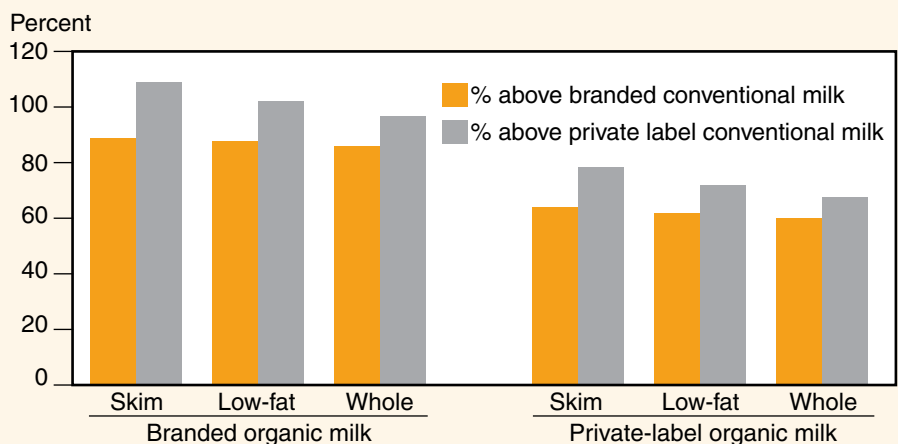
mium for organic milk was 98 percent above the conventional price in 2004.

- Organic milk prices vary by fat content, container size, and branding, based on ERS analysis of milk purchases in 2006 (Smith et al., forthcoming). Organic price premiums for a half-gallon container of milk ranged from 60 percent for private-label organic milk above branded conventional milk, to 109 percent for branded organic milk above private-label conventional milk. Branded organic milk commanded higher premiums than private-label organic milk. In contrast with conventional milk prices,

organic milk prices were estimated to increase as the fat content declined.

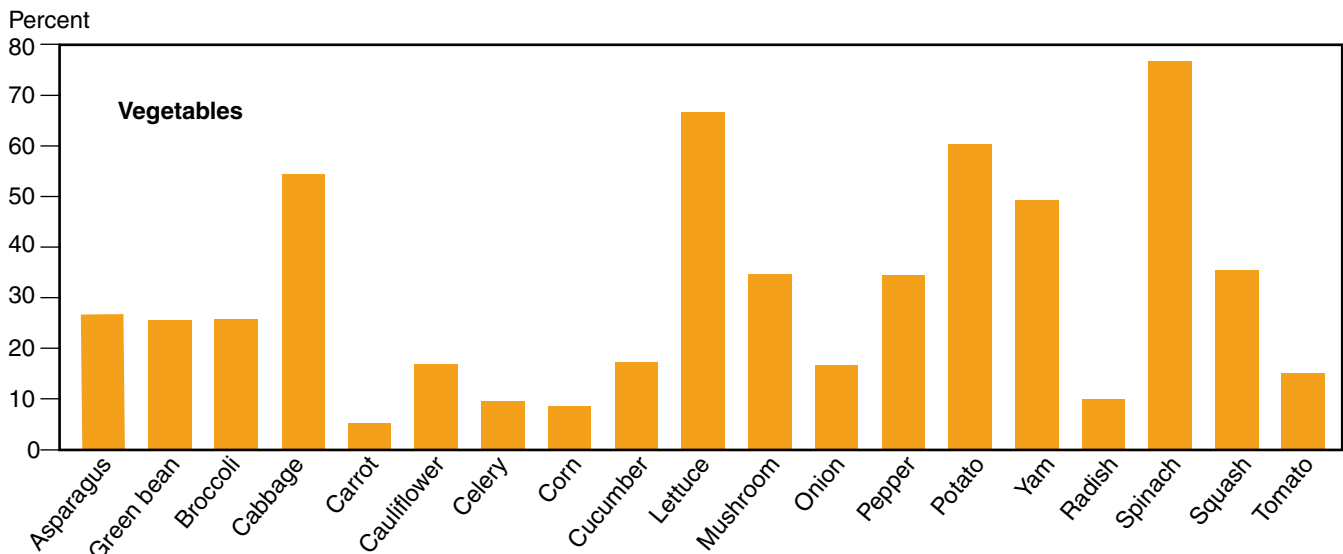
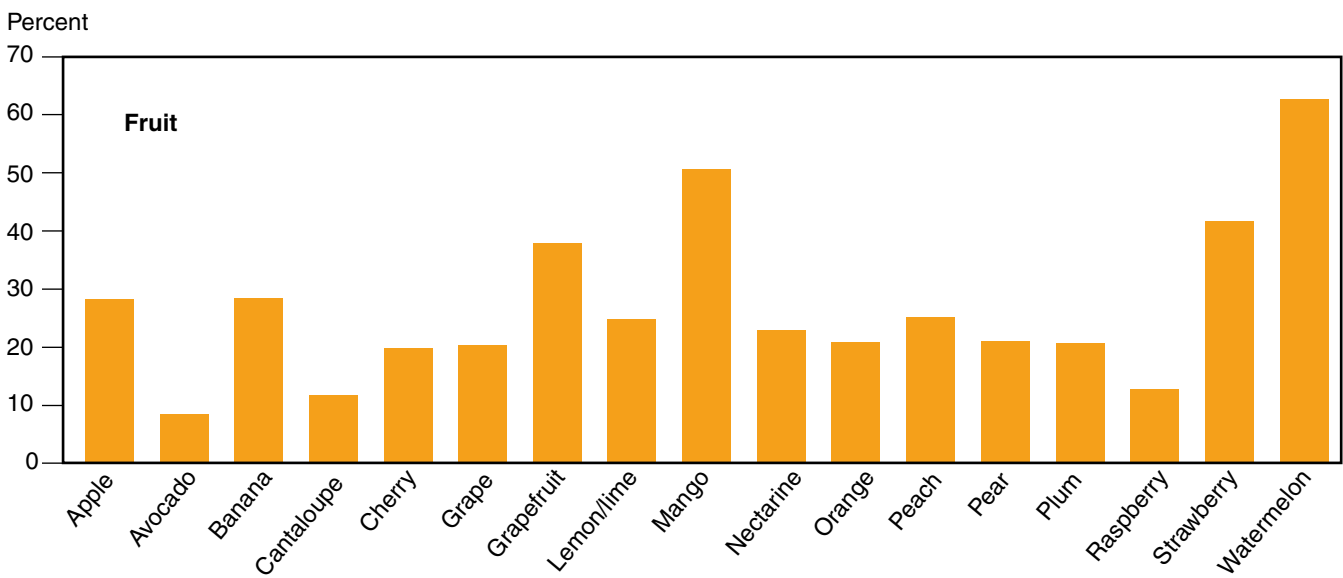
ERS also examined the characteristics of organic produce consumers, using a representative sample of U.S. households, and found that Asians and African-Americans tend to purchase organic produce more often than Whites and Hispanics (Stevens-Garmon et al., 2007). Households residing in the West spent more on organic produce, per capita, than those in other regions. This study did not find any consistent positive association between household income and expenditures on organic produce.

Price premiums: Half gallon of organic milk, 2006



Note: Estimated premiums reflect the percent above average half-gallon conventional milk prices within each fat content category for private-label (store brand) and branded categories.
Source: Nielsen Homescan, 2006.

Organic price premium as percent of conventional price, 2005



Source: Nielsen Homescan 2005.

New Directions in U.S. Organic Policy

Until recently, Federal organic policy was oriented toward using market support mechanisms to facilitate the growth in the U.S. organic sector. In the Food, Conservation, and Energy Act of 2008 (2008 Farm Act), U.S. Federal organic policy changed course with provisions that provide financial support to farmers to convert to organic production. Under the Organic Transition Support provision in the Environmental Quality Incentives Program, conservation practices related to organic production and the transition to organic production are eligible for payments, subject to a \$20,000 annual limit and an \$80,000 cap over a 6-year period to persons or legal entities.

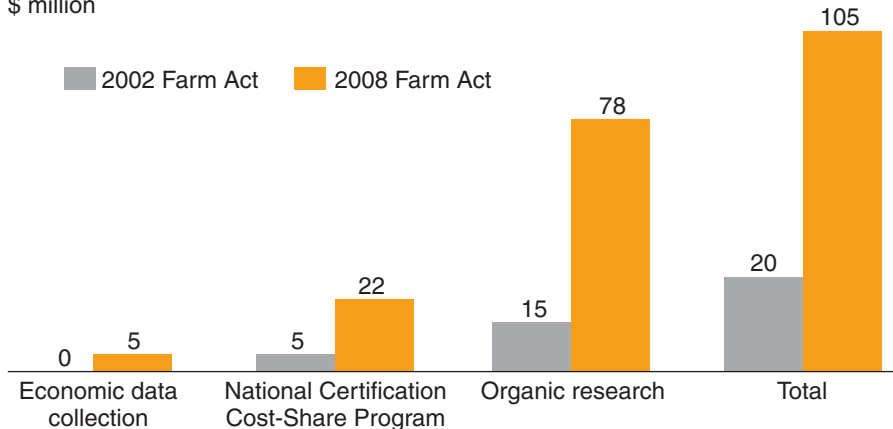
The 2008 Farm Act also increased mandatory funds for a national certification cost-share program and a data initiative and boosted mandatory organic research funds five-fold from levels mandated in the 2002 Act, specifying two new research priorities (fig. 9). One is to study the conservation and environmental outcomes of organic practices. Although experimental trials have found enhanced soil fertility, higher biodiversity, lower energy use, and increased retention of carbon and nitrogen in organic plots compared with conventional plots, this funding will support more comprehensive research. The potential of organic farming to capture atmospheric carbon and store it in the soil was specifically mentioned in the conference report of the 2008 Farm Act as an example of organic research that needs support.

The other new priority of the organic research initiative is to develop new and improved seed varieties for use in organic production systems. Interest in organic seed variety development was heightened after USDA banned the use of seeds treated with fungicides and the use of genetically modified organism seeds, when national organic standards were implemented in October 2002 (Sooby et al., 2007).

The 2008 Farm Act includes a number of other provisions to facilitate growth in the U.S. organic sector, including technical assistance on organic

Figure 9
Government spending on organic agriculture is up five-fold from 2002

\$ million



Source: Office of Budget and Policy Analysis budget summary data (2002) and Congressional Budget Office (2008).

conservation practices; the inclusion of organic commodities in a cost-share funding program to expand export markets for U.S. agricultural products; a provision to give priority to qualified beginning and socially disadvantaged producers, owners, or tenants who use the loans to convert to sustainable or organic agricultural production systems; funding to expand data collection on organic production and marketing; support for USDA's regulatory program; and a provision to contract for studies of improvement in organic production insurance coverage.

About the Data

Since the late 1990s, USDA's Economic Research Service has initiated a number of studies to better understand and characterize the U.S. organic sector.

U.S. certified organic acreage and livestock—ERS has produced reports based on data from State and private certification groups since the late 1990s to calculate the extent of certified organic farmland acreage and livestock in the United States. Estimates currently show the change in U.S. organic acreage and livestock numbers from 1997 to 2005, by State, for over 40 commodities. Nearly 50 USDA-accredited organic certifiers were operating in the U.S. in 2005, and provided the estimates.

U.S. certified organic handler practices—ERS conducted the first nationwide survey of practices in the U.S. organic handling sector in 2004. Organic manufacturers, processors, distributors, and other organic intermediaries were surveyed about their procurement and contracting of organic products and ingredients. Data are available on 9 commodity groups, such as fruits and nuts, and 45 commodities. The procurement data include information from 1,038 facilities; the contracts data include information from 686 facilities that use contracts.

Characteristics of U.S. organic consumers—ERS has conducted several studies of organic produce consumers using Nielsen Homescan data, which are retail scanner data scanned at home by a nationally representative panel of consumers. These studies used samples of Nielsen Homescan data for the early and mid-2000s containing more than 8,000 households purchasing produce; households reported their purchases of produce sold as random weight or with the Uniform Product Code (UPC) at retail outlets for home consumption. These data were used to determine the socio-demographic characteristics of organic consumers, what they buy, how much they spend, and the price premiums they pay for organic produce. The ERS organic milk study used the full Homescan panel of 41,000 households in 2004, and drew data from the households that bought milk—38,375 households.

Organic production costs and returns—USDA's 2005 Agricultural Resource Management Survey (ARMS) included a subsample of organic dairies and collected detailed information about the production practices and costs on dairy farms in 24 States representing over 90 percent of national milk production. In 2006, information about the production practices and costs of soybean growers in 19 States (representing over 97 percent of U.S. planted soybean acres) was collected. A set of estimates is now available from these surveys that presents costs and returns by region and size of operation for all dairy and soybean producers, and for conventional and organic producers. Estimates for regions and producer size groups with sufficient sample for statistical reliability are also available. ERS also has research on organic agriculture under way using data from the 2007 ARMS survey (which included a subsample of organic apple producers) and will survey organic wheat producers as part of the 2009 ARMS survey.

Conclusions

The organic industry has experienced growing pains since publication of the “USDA organic” label and standards in 2000, which strengthened consumer demand for organic products. Adoption of organic production systems has been uneven across production sectors and regions in the United States, and supply shortages have emerged in some organic food sectors. New public investments in organic research, technical assistance, and support for organic farmers and handlers were included in the 2008 Farm Act. This public investment complements ongoing private efforts to expand organic supply and procure organic products closer to the point of sale. Technical assistance on organic production and financial incentives for organic transition are aimed at providing the tools to help expand the domestic organic grain supply—which in turn supports the fast-growing milk, meat, and poultry sectors—and facilitate organic production in U.S. regions where adoption has been slow. Most American consumers now buy organic products at least occasionally, and could benefit from wider accessibility and enhanced product selection.

Significant price premiums exist for fresh organic produce and organic milk, the two top organic food sales categories, compared with conventional products, reflecting short supply and higher organic production costs. Even if price premiums for organic products can be maintained, the public-goods nature of environmental services, such as biodiversity and water quality, implies that prices do not reflect the true social value of these services. Public investment in organic agriculture facilitates wider access to organic food for consumers and helps farmers capture high-value markets and boost farm income, as well as conserve nonrenewable natural resources and protect U.S. soil and water.

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