

## Organic Temperate Fruits in North and South America: Production, Consumption, and Economic Trends

D. Granatstein<sup>1</sup>, H. Ostenson<sup>2</sup> and E. Kirby<sup>1</sup>

### Abstract

*Temperate fruits account for some 70% of retail organic fruit sales in North American markets. Production in North America is concentrated in the western states, particularly California and Washington, and in similar environments in Chile and Argentina. Consumer demand for organic fruit in North America has grown each year, with sales value up 123% from 2011 to 2015. Berries (especially blueberries) and apples have experienced significant growth in production area to meet the demand. Many food retailers have added organic fruit to their offerings, and are looking for year-round supply to attract and retain organic consumers, who are generally their most profitable customers. Thus, there is more focus on storage and post-harvest management in the industry. Quality expectations for organic fruit by both consumers and retailers are similar to conventional. While most organic fruit production is currently profitable, converting poor performing conventional fruit blocks has not been a successful economic strategy for most growers.*

**Keywords:** Apple, berries, area, consumer demand, economics

### Introduction

Fruits and vegetables are a core component of organic food purchases in North America, accounting for 36% of retail sales in 2016 (OTA 2017). Demand has steadily increased for the past decade or more, and markets are often supply constrained. Production of organic fruits in North and South America is expanding to meet this demand, stimulated by high organic prices and in some cases low conventional prices. This paper will discuss changes in consumer demand for organic temperate fruits and the retail sector in North America, the resulting change in supply, and examples of economic aspects of organic fruit production and marketing.

### Data and Information Sources

Data on consumer trends and the organic fruit market in North America are derived from various industry sources, many of which are proprietary, as well as from experts working in the industry. The Organic Trade Association (2017), Nielsen Fresh, and the Hartman Group (2016) are examples of private companies that research the organic market and consumer. The Center for Sustaining Agriculture and Natural Resources at Washington State University has been compiling and analyzing statistics on the organic sector in the state, and on organic fruits nationally and globally, since 2000 (e.g., Granatstein et al., 2010; Kirby and Granatstein, 2017; Granatstein et al., 2015). Data on area of production are collected directly from certifiers, as well as being gleaned from USDA National Agricultural Statistics Service (NASS) organic surveys (e.g., NASS, 2017). Organic tree fruit volume and price data for Washington State are provided by the Washington State Tree Fruit Association, with some data available from the USDA Agricultural Marketing Service (AMS) and NASS. Industry meetings have been organized regularly to discuss the organic fruit sector, and various

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<sup>1</sup> Center for Sustaining Agriculture and Natural Resources, Washington State University, Wenatchee, WA 98801 USA. Corresponding author email: granats@wsu.edu.

<sup>2</sup> Double O Organic Consulting, Wenatchee, WA, 98801 USA.

companies share their current situation and outlook. All these sources have been used in developing this report.

### Consumer Demand for Organic Fruit

North America accounted for approximately 50% of global organic food sales in 2015 (Willer and Lernoud, 2017). Consumer demand for organic foods in the US continues to grow, with sales value increasing 8% in 2016 over the previous year to reach \$43 billion or just over 5% of all US retail food sales (OTA, 2017). The trend is similar in Canada, a much smaller market, while Mexico lags in consumer participation in organic but is a major supplier of organic tropical fruits.

Organic fruits accounted for 30% of US organic produce sales in 2015, compared with 56% for organic vegetables (OTA, 2016). Berries are the top selling organic fruit, followed by apples and bananas (Table 1). From 2011 to 2015, sales of organic fruit in the US grew by 123%, while organic vegetables were up 92%.

Table 1: Market share of various organic fruits in the US, 2016/17.

Rank	Fruit	Scientific name	% of organic fruit sales
1	Berries	various	36.9
2	Apples	<i>Malus x domestica</i> Borkh.	18.7
3	Bananas	<i>Musa acumunata</i> Colla	14.4
4	Citrus	<i>Citrus</i> spp.	8.5
5	Grapes	<i>Vitis</i> spp.	7.5
6	Avocados	<i>Persea americana</i> Mill.	5.4
7	Stone fruit	<i>Prunus</i> spp.	2.1
8	Pears	<i>Pyrus communis</i> L.	1.8
9	Cherries	<i>Prunus avium</i> L.	1.5

Source: Nielsen Fresh (FCA Universe) – latest 52 weeks ending 10/28/17.

An estimated 55% of US households purchased organic produce during 2015, while 82% purchased some organic food product (OTA, 2016). Consumers differ considerably in their frequency of organic purchases, which has trended higher for the weekly and monthly users (Table 2) (Hartman, 2016). With 44% of consumers being occasional users, there is a large opportunity to increase organic fruit purchases in the future, particularly if the price gap with conventional closes as price is often cited as a barrier to purchase.

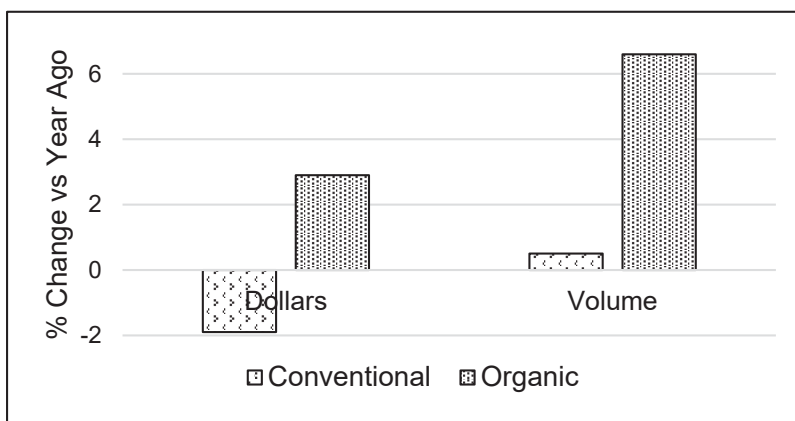
Table 2. Frequency (%) of consumer use of organic products (Hartman, 2016).

	2006	2016
Daily	9	10
Weekly	14	18
Monthly	6	10
Occasional	44	44
Never	27	18

One driver of increased organic produce consumption in North America has been greater availability. Mainstream retailers have seen single digit growth in conventional produce sales, while organic produce has grown by double digits and represents greater dollar value per unit of sales. OTA (2016) estimated organic produce sales channels in the US for 2015 to be \$5.7 billion for mass market food retailers, \$4.7 billion for specialty and natural food stores, and \$2.6 billion for direct market sales. In 2007, less than 60% of mass market retail food stores were selling organic apples, while 99% of stores in 2017 were (S. Lutz, CMI,

pers. comm.). The appeal of organic fruit to retailers is illustrated in Figure 1, with higher growth for organic apples both for sales dollar and volume for the 2016 crop.

A constraint to growth of organic fruit is the limited number of shelf-keeping units (SKUs) in many mainstream retailers. For example, Wal-Mart stores have 24 SKUs for apple. If these are already occupied, then an existing apple choice has to be dropped to introduce a new organic apple option. Costco Wholesale Inc., reportedly the largest seller of organic food in the US, limits its SKUs even more. It has started to substitute certain fruit choices (e.g., apple, blueberry) with organic when supply, quality, and price are all supportive. Costco does not put a conventional and organic option for the same product in their stores. The retailer is considering switching to 100% organic for two to three apple varieties where they can source year-round supply of high quality fruit. Thus, organic growth will come at the expense of conventional sales, and this approach is being considered by other retailers. The most likely losers for apple will be conventional legacy varieties (e.g. Gala, Fuji, MacIntosh, regional varieties) that either can easily be replaced with the organic version or do not deliver the sales or profit that an organic choice might. While growth of supply may be somewhat



linear, it is likely that retail expansion of organic fruit will not be, as retailers will wait and watch the market to ensure that the supply and quality are extremely reliable before committing to an expansion. Supply interruption or disappointing quality are risks most retailers do not want to take (S. Lutz, CMI, pers. comm.).

Figure 1: Apple category sales for US mass market retailers for the 2016/17 marketing year. Source: Nielsen FreshFacts, 52 weeks to Sept. 1, 2017.

While expanding sales at mainstream retailers will be critical to moving the much larger organic apple volume, there are opportunities with smaller regional grocers, health food stores, and specialty shops. Organically Grown Cooperative is a major organic produce wholesale distributor serving the western US states. It had organic apple sales increase by 40% in the last five years. Growth was not even across variety, with Braeburn and Jonagold down 20%, Pinova and Cameo flat, while the number of specialty varieties increased to 66 from a total of 15 in 2006. Consumer interest in local, seasonal availability, unique taste, and a 'story' supports this diversity in the face of commoditization of Gala and Fuji organic apple varieties in mainstream retail, and unique offerings can be important to small store or chain success.

Organically Grown Cooperative reports that growth has slowed for organic Bartlett and Anjou pears, while increasing for red pears (doubling over past five years). Organic cherry sales increased 140% over 15 years and growth is slowing there as well, up 1-2% per year recently. There is unmet demand for white flesh nectarines and red flesh plums.

The trend for increasing organic produce consumption, including organic fruit, relates to greater awareness of the connection between diet and health in North America (Hartman, 2016). Fresh food is considered unprocessed, free of additives or unknown ingredients, and a contributor of fiber and antioxidants, all of which benefit health. Organic brings the added health attribute of perceived lack of potentially harmful pesticide residues. The 'local food'

trend is as compelling as organic to many consumers and explains the tremendous growth of produce sales through farmers' markets and community supported agriculture schemes, but spills over to retail stores, particularly during the winter season in many regions of North America.

While organic consumers are well represented in all generations, the Millennials are now considered as the most important driver of growth. They have adopted the 'foodie culture', in which fresh ingredients are central, organic is an important health and environmental attribute, and organic is preferred for products they use in large quantities. Purchases for children lean more heavily towards organic, and as this generation enters into child-rearing years their organic participation is expected to increase. Consumers are less likely to choose organic for highly processed, indulgent, or convenience or price driven products. Only a small part of the population can be characterized as a core organic consumer who tries to eat all food organic (Table 2). Most consumers go through an unconscious decision process for organic food that varies with the product. The decision for a banana versus an apple may be different, with the assumption that any pesticide residues on a conventional banana will be removed with the peel, while an organic apple makes it 'safer' to eat unpeeled, and the skin provides important nutritional components.

Demand for processed products containing organic fruit has also increased in North America. Recent food trends such as breakfast smoothies (using frozen fruit) or pre-sliced apples for snacks have opened new markets beyond the more traditional juice and puree uses. These are typically overrepresented by organic due to the health-conscious consumer buying them. In addition, there is a steady launch of new products using fruit as an ingredient. In 2017, there were over 1,000 new organic food products launched that use fruit as an ingredient (T. Fortier, pers. comm.). Apple, strawberry, or blueberry were the fruit ingredient for nearly 300 of these.

Fresh fruit consumption in North America is gradually rising, driven by both population growth and increased per capita use for certain fruits. For apples, the shipped volume of fresh organic fruit from Washington State for the 2016 crop totalled 196,727 MT (estimated to be 93% of US volume) out of a 2.34 million MT total US consumption. This amounts to an 8.4% organic share. The Organic Trade Association, as well as a number of fruit marketers, have speculated that organic apple sales could reach 20% of total US sales. Thus, it appears very plausible to market a greatly increased supply of organic fruit, relying on the increased interest of mainstream retailers to carry it and likely modest price decreases to spur demand among the lighter users of organic currently. However, these consumers generally expect a high quality product similar to what they see conventionally. Low quality fresh organic fruit will have a much smaller appeal.

### **Area and Production of Temperate Organic Fruits**

Accurate annual statistics on the organic sector in North and South America are not consistently available. Annual data for California and Washington State are among the most reliable and detailed, and these two states accounted for over 90% of the production of all organic temperate fruits except for blueberry in 2016 (NASS, 2017). Based on USDA data, the growth in certified area of organic apples, grapes, and berries (2006-2015) is depicted in Figure 2. The area of pear and cherry has moderately increased, the area of peach has nearly doubled, and the area of plum has declined by 20%. Blueberry and strawberry accounted for most of the growth in organic berry acreage (Figure 3). There were reports of depressed prices for organic blueberries in 2016 and 2017, particularly for frozen product, due to the rapid expansion of production in the US and abroad.

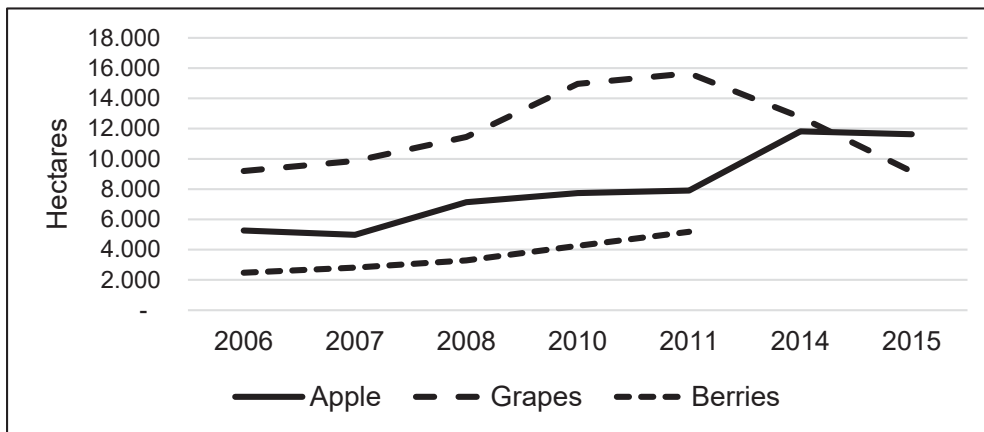


Figure 2: Area of several certified organic fruits in the US. (Source: USDA-ERS, 2015)

The area of organic apple appears to have grown more in recent years than other organic fruits, driven by new area in Washington State (Kirby and Granatstein, 2017). Certified area expanded 13% and 33% in 2016 and 2017, respectively, over the previous year. By 2018, 4,190 ha of additional area will have been certified since 2015. Total area is projected to reach 10,600 ha in 2020, an 88% increase in five years. Packed volume of fruit grew 34% in 2016 and 21% in 2017 over the previous year, and is expected to grow another 29% in 2018. By 2020, volume might reach 330,000 MT, 128% increase over 2015. Average yields have been increasing (up 50% from 2008-2015) along with area due to much of the new orchard being in high-density, high yield systems.

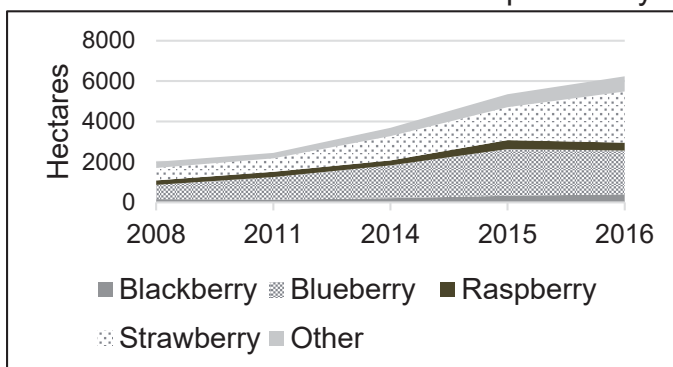


Figure 3: Area of certified organic berries in the US. (Source: NASS, 2017)

The most recent US organic survey contains estimates of production volume and value for many organic fruits (NASS, 2017). Temperate organic fruit had an estimated farm gate value of over \$1.1 billion in 2016, with apples (327.4 million), strawberries (\$241.6 million) and grapes (\$218.4 million) as the most valuable crops. About 73% of the 236,900 MT of organic apple production went to the fresh market.

Data for Canada in 2014 showed the following areas of certified fruit: tree fruit, 907 ha; berries, 3,438 ha; grapes, 448 ha. Total organic fruit and nut acreage increased to 18,039 ha in 2015, including wild harvested berries (COTA, 2017). Estimates for Mexico in 2014 were: apple, pear, peach, plum, <50 ha each; blackberry, 310 ha; strawberry, 252 ha; blueberry, 72 ha; raspberry, 47 ha; grapes, 4,290 ha (Willer and Lernaud, 2017).

Chile and Argentina are the main producers of temperate organic fruits in South America. SENASA (2017) reported 2202 ha of organic apples and 2072 ha of organic pears for 2016, primarily in the Rio Negro Valley of Patagonia. The largest exports were fresh pear (26,717 MT) and apple (18,064 MT), with much smaller amounts of fresh blueberry and plum. A number of processed organic fruit products were exported as well. A little over half the fruit exports went to the EU, and most of the balance to the US. There are some exports to Brazil where the organic law allows fruit with 18 months of transition to be sold as organic. In 2017,

Chile had some 3,000 ha of certified organic temperate tree fruits and 6,000 ha of organic berries. Apple (2,105 ha), blueberry (3,233 ha), and raspberry (1,263 ha) were the top three crops by area (SAG, 2017). Some 16,750 MT of organic blueberries (60% frozen, 40% fresh) were exported to North America, EU, and Asia, with 85% going to the US. About 21,000 MT of fresh organic apples were exported, with 75% going to the US, and some exports to other Latin American countries. Additional exports of processed apples and other organic fruits occurred, along with significant volumes of organic wine.

A number of factors account for the successful large increase in organic apple production in the US (mostly in Washington State). These include: organic production levels reaching a level where there is meaningful profit opportunity for large ag supply companies who are providing more products and services to organic growers; a global call to reduce pesticide residues on food and in the environment, with significant lowering of pesticide maximum residue levels via regulation; a continuous chain of knowledge expansion by growers, by extension services, by ag support companies with new biocontrol approaches, and by growers 'tribal knowledge'. For example, the organic compliant materials listed with the Organic Materials Review Institute (OMRI) grew from 13 pages in 2000 to 200 pages in 2017. Certis USA, a provider of bio-based crop protection materials, had 9 products listed in 2000, 19 listed in 2011, and 32 listed in 2017. Organic apple production can generally match conventional production for yield and quality but with the market advantage of grown organically. New fruit storage technologies using Ultra Low Oxygen (ULO), storage atmosphere gas ratios, storage disorder predictive protocols (e.g., scald), and ozone systems are increasing the ability to storage organic fruit with quality competitive with conventional storage protocols which use synthetic materials like MCP-1. For organic apples, this new technology allows for storing and marketing fruit for nearly a year, and helps fruit packers determine which fruit rooms to pack and market first. The result is lower storage loss, higher quality fruit on store shelves, maintaining self-space in stores, and greatly expanding the organic presence and purchase levels.

## **Economics**

High prices for most organic fruits have induced growers to enter or expand their production (Kirby and Granatstein, 2017). Organic apple premiums in Washington State were 86% at the shipping point in 2016, or an average of \$1.12 per kg. A comparison of cost of production and profit for conventional and organic 'Gala' apple in 2014, assuming only a 45% organic price premium, found that organic net return was \$19,500 higher per ha, or a 270% greater profit (Galinato and Gallardo, 2015a, b). Organic apple prices steadily climbed from 2007 to 2015 despite the strong growth in fruit volume (Fig. 4). That trends appears to have ended in the last two years. Organic pear prices were 55% higher (\$0.14/kg) than conventional in Washington in 2016, and organic cherry prices were 62% higher in 2017 (\$0.52/kg). Organic cherry prices rose on average 14% from 2004 to 2017, while conventional prices rose 11%.

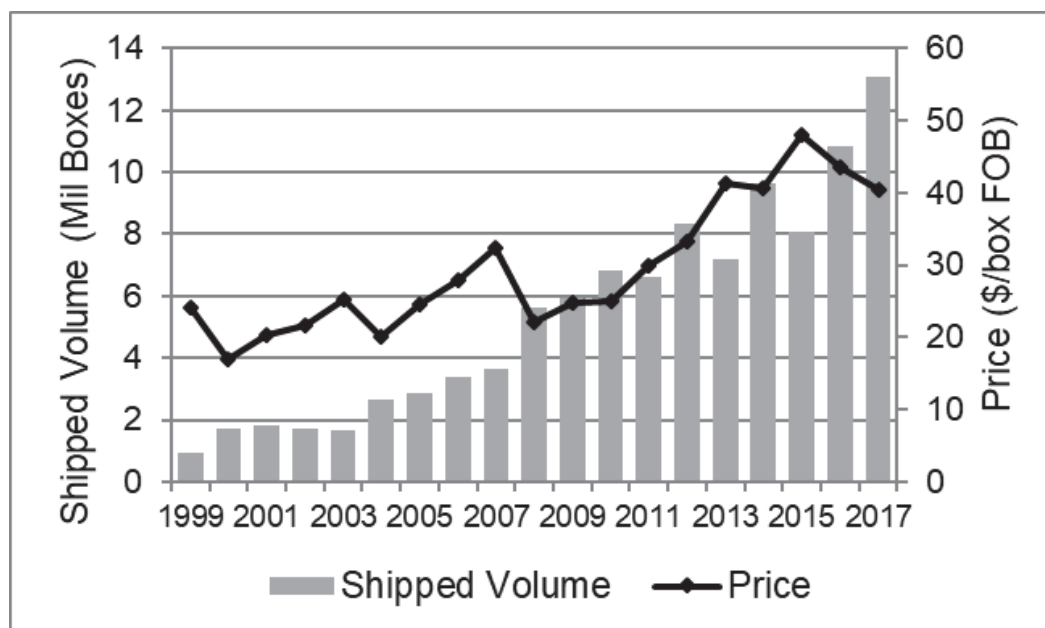


Figure 4: Shipped volume and prices of organic apples, Washington State, 1999-2017. Volume is in million boxes, 1 box=18 kg. Price is in US\$ per box, at the shipping point with the cost of shipping not included. Data for 2017 are estimates.

A recent estimate of cost of production (USDA-FAS, 2017) for conventional apple in Argentina put total cost as \$0.30-0.35/kg with labor accounting for 60% of this. Older orchards predominate in the area and require more labor. Prices to growers have been around \$0.25/kg, thus there is significant economic distress in the tree fruit industry. No data on organic costs and prices were available, but this situation is inducing more organic production. The same situation has existed in Chile, where older varieties and strains are not profitable in export markets, and switching these to organic may not solve those problems. However, more modern plantings have entered organic production and fruit is being successfully shipped to the US, particularly during spring and summer when US supplies may run out.

Fresh organic blueberries from Washington and Oregon sold for a minimum of \$4.51/kg FOB in 2014, a 52% premium over conventional. Comparable prices for 2015, 2016, and 2017 were \$5.19, \$4.97, and \$5.17, respectively. A cost of production study done for organic blueberries in eastern Washington (Galinato et al., 2016), the dominant production region in the state, estimated the total cost in Year 6 (maturity) to be \$98,573/ha. With yields of 23.6 MT/ha, 85% sold fresh, and a fresh price of \$4.51/kg, the operation earned a profit of \$19,737/ha. Harvest costs accounted for 37% of variable costs, most of it labor. Farm labor costs are rapidly rising in western US states due to labor shortages, high costs for the H2A agricultural visa program, increasing minimum wages, and other regulatory changes. Research on mechanical harvesting for fresh blueberries is in progress in order to help address this looming challenge.

No other recent cost of production studies are available for organic fruit in North and South America. Several older studies are reviewed in Granatstein et al. (2015). Most of the trends occurring in conventional fruit production are found in organic as well – higher labor costs and labor shortages; the push for mechanization; a focus on fruit quality to meet high market standards; higher yields; more emphasis on post-harvest handling and storage to extend shipping and shelf life or the market season. In recent years, most North American organic fruit was absorbed by North American markets. As supplies of fruits such as apples and blueberries have rapidly expanded, there is more interest in export opportunities. South

America remains export oriented with minimal domestic demand at this time. Factors such as currency exchange rates, trade rules, and phytosanitary restrictions will influence how much North American organic fruit is exported, while imports from South America are likely to grow.

## Conclusions

Consumer demand for organic temperate fruit has continued to expand over the last decade as health-conscious diets become more widely adopted and consumers associate organic fruit with this choice. The US, the largest market for organic foods in the world, utilizes most of the organic temperate fruit produced in North America, along with imports from South America. High prices have made organic fruit production as or more profitable than conventional and induced additional production area to become certified to help meet demand. Consumption and the production needed to supply it are predicted to continue growing for the foreseeable future.

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