

World Kiwifruit Review
2016 Edition



Road to Recovery

*A publication of Belrose, Inc.
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FOREWORD

Welcome to the nineteenth edition of the World Kiwifruit Review. The cover of last year's edition, symbolized the industry's efforts to remove the dark skies resulting from the depredations of the bacterial disease, *Pseudomonas syringae* pv *actinidia* (PSA). PSA first struck in 2010, wiped out the original gold kiwifruit (Hort 16A), and threatened many other kiwifruit varieties. This year's cover symbolizes the remarkable turnaround the industry has achieved since then.

While the threat of PSA has not been eliminated, the industry has developed a set of practices to mitigate its effects on existing plantings. Through a combination of the breeding programs by Plant and Food Research in New Zealand, and the serendipity of finding a winning, new golden kiwifruit (Gold 3), Zespri in New Zealand has succeeded in rapidly commercializing a new golden kiwifruit champion. While PSA reduced total world supplies of kiwifruit for several years, it led, not unexpectedly, to higher average prices for the reduced production. While the hardest hit growers suffered heavy economic losses, higher prices helped to mitigate the economic damage to the total world industry.

However, as world kiwifruit supplies resume their traditional growth path, the industry is returning to a more normal situation where the best returns are received when supply approximately equals demand. This means that the industry must again focus on the quality of product supplied, and on matching product flow with the seasonal needs of different markets. The industry must devote more resources to expanding total demand for kiwifruit both in traditional markets, that are growing slowly and crowded with numerous competing fruits, and in new markets, where kiwifruit are less familiar to consumers.

This Review aims to provide information on trends in production, exports, marketing and pricing that individual firms and producing districts can use to match their strategies to changed conditions. Welcome back to the new normal.

Desmond O'Rourke
President, Belrose, Inc.

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Challenges of the Changing Food Environment

The food environment around the world continues to change at unprecedented speed and in unpredictable directions. These changes are creating new challenges for marketers of all food commodities. However, they are presenting special challenges for marketers of niche products, such as kiwifruit.

Some of these changes stemmed from the global recession that began about 2008, and that still lingers in many countries. Others reflect a continuation of long-term changes in competition, technology and societal expectations. The causes are not always easy to separate. However, the implications for food marketers are quite clear.

The first major long-term change in the food retailing sector has been the gradual displacement of millions of mom-and-pop type stores, street markets and mobile vendors by large, standardized, supermarket-style outlets, organized under national or multinational banners. That change continues to advance in every country that has opened its economy to outside influences. Increasing affluence leads consumers to demand a greater variety of products than can be stocked by a traditional, small retailer. In addition, given the faster pace of modern life, consumers have become more time sensitive and want to be able to buy many different products from the same outlet, so called "one stop shopping."

Most "modern" chains have centralized buying offices that place orders for all the owned or franchised outlets, either in the entire chain, or in large geographical divisions. This has meant that a few buyers have gained great influence over the fate of any individual product. They control the products their outlets will stock, the prices suppliers will be paid, and the various quality, service and other requirements placed on suppliers. Local store managers, or produce managers, have little direct input into what items will be stocked, at what prices they will be sold, or how they will be promoted. Modern chains almost always employ a "self-service" format where the shopper collects the desired products from the retail shelves and hauls them around the store. Increasingly, stores are employing self-checkout lanes, so the customer does not need to have any interaction with store employees. This is a significant change from the traditional retail experience where the owner or attendant carried out many of these functions and offered advice and guidance to shoppers.

Prior to the global recession, a few leading chains, such as Walmart, Carrefour, Tesco and Metro, gained market share around the world with superstores that offered one-stop shopping of tens of thousands of food and non-food items for increasingly affluent consumers. They charged relatively low prices for food items so shoppers, on their frequent food buying trips, would also be enticed to buy higher-margin non-food items. Traditional supermarket food chains, that stocked mainly low-margin food items, had difficulty competing against the superstore format. As the number of affluent consumers increased, supermarkets also faced competition from upscale chains, such as Waitrose or Whole Foods, that emphasised natural, organic, exotic and unique foods. These foods could be sold at relatively high prices that generated much higher profit margins than supermarkets could achieve. To survive, many supermarket chains attempted to grow bigger through mergers or acquisitions, leading to even further concentration of buying power in the retail food sector.

While modern economies had gone through numerous recessions in the past, the economic downturn was usually modest, and the rate of recovery rapid. The severity of the 2008 Great Recession caught entire societies by surprise, accompanied as it was by rapid declines in the value of assets, like housing, pensions and investments, widespread unemployment, declining real incomes and a severe contraction of personal and business credit. Those most directly affected were forced to change their shopping and consumption patterns. However, even those not directly affected became more cautious spenders.

The effect on the retail sector was equally dramatic. Major chains had to suddenly pivot from attempting to serve more upscale customers with indulgent products at higher prices, to attempting to meet the demands of more thrifty customers for price discounts on the products they bought. In processed products, there was a decline in demand for more expensive premium brands and an increase in demand for cheaper store brand, or generic, products. In the case of fresh produce, shoppers cut both the quality and price of the items they bought. A few chains, like Aldi and Lidl, that operated minimum frills, limited assortment stores, were best able to capitalize on the surge in the number of thrifty shoppers. Through specialized buying, they were able to offer quality products at discount prices. They were able to attract middle class customers that previously would have felt shopping in discount stores was undignified. The rate of expansion of their market share, begun during the Great Recession, has not yet slowed down.

Shoppers also began to change their traditional pattern of making one major shopping trip about once a week, and topping up as needed with smaller shopping visits. Higher petrol prices at the beginning of the Great Recession led many to curtail trips to larger, suburban stores. Increasing thriftiness led them to do more comparison shopping in nearby outlets and to split their purchases among more outlets in a hunt for better bargains. Other outlets that had offered few food options, such as drug stores, discount stores and dollar (deep discount) stores, began to offer more food items to entice such shoppers into their stores.

In turn, these changes in shoppers' habits altered the balance of power among different types of retail formats. The problem was aggravated by the overcapacity of retail shelf space that had built up during the years of affluence. The pressure on mainstream supermarket chains intensified. Many went bankrupt, or were absorbed by their more profitable counterparts. Even the major multinational chains, like Walmart, Carrefour, Tesco and Metro, were forced to trim their operations in many countries and market areas.

The economic recovery after the Great Recession was both slow and relatively uneven among countries and consumers. In general, higher income consumers had suffered least from the slowdown and saw their asset values and incomes bounce back more rapidly, so they were able to resume their affluent lifestyles. In contrast, the real incomes of most middle and lower-income consumers remained below pre-Recession levels, and their shopping habits continued to be impacted. The result was the development of a "bifurcated" shopping public. Upper income consumers were able to resume their buying of premium foods and luxury non-foods and services. However, the majority of consumers continued to struggle to regain their former purchasing patterns. In turn, this bifurcation benefited upscale stores, like Whole Foods, Trader Joe's and Waitrose, and placed retailers that primarily served the mass of consumers at a competitive disadvantage.

This bifurcation also had an impact on the popularity of different products. Purveyors of luxury goods, such as jewelry, watches and fashion accessories, flourished. Within the food complex, higher income consumers boosted their purchases of more expensive products. For example, sales of higher-priced fresh berries began to outdistance those of all fruits. Within the fruit complex, sales of more expensive, exotic fruits outdistanced those of mainstream fruits.

Within individual fruits, new varieties and strains were sold at premium prices. And, across the entire fruit and berry categories, the demand for organic versions grew more rapidly than their more conventional counterparts, admittedly from a smaller base. In response, many different retail grocery formats increased their selection both of fresh organic fruits and vegetables and of organic processed foods. The kiwifruit sector was able to tap into some of these trends.

However, the need to add new fruits and vegetables, new varieties of current fruits and vegetables, and parallel organic versions of these products, created a new dilemma for retailers. The operators of large superstores and hypermarkets had attempted to cut costs during the Great Recession by limiting the number of items they carried in any product category. Many had also sought to add more small format stores to catch shoppers that wanted to reduce their travel costs. For example, Walmart had expanded the number of its neighborhood stores and its even smaller Walmart Express stores. Tesco had made a huge investment in a new small-format chain, called Fresh and Easy, in the Southwestern United States. Now, they were under pressure to expand their shelf space for premium, local, organic and "natural" products to satisfy new customer demands.

Not surprisingly, these smaller format stores failed to take off, and both Walmart and Tesco have severely pruned those experiments. However, they gradually increased the supplies of organic, natural or exotic foods in their major formats. In turn, that provided new competition for upscale chains like Whole Foods whose business model depended on dominating those product categories. In response, Whole Foods planned to develop a new chain, called "365", which would offer such products at lower prices that would attract more mass shoppers. It is not clear that this gamble will pay off.

The upshot of all this turmoil is that more and more fruit and vegetable products, claiming different attributes, or featuring new brands or packaging, are competing against traditional bulk commodities for shelf space that is static in many outlets, and declining in others. Keeping a standard product, like green kiwifruit, on the produce shelves for twelve months a year will be increasingly challenging. Winning shelf space for line extensions, such as gold or red kiwifruit, is likely to become even more challenging as many other fruits and vegetables attempt similar line extensions.

Producers, packers, marketers, wholesalers and retailers of fresh produce items all face a similar dilemma, how to service the upscale end of the market, where margins and profits are higher, while continuing to satisfy the mass market for standard items. Increasingly, retailers have been using their vast data bases on consumers and products, drawn from scanner data, loyalty programs, in-store tracking devices, mobile phones, and other sources, to determine which items will receive valuable shelf space, and for how long. For every product, they can now measure the foot traffic it generates, its direct contribution to produce gross margins, and its indirect contribution in terms of the sales of related items that it drives. It is a big advantage for a product if it can show that consumers who buy it spend more overall in any shopping visit. And, many produce items are already making such claims.

Fresh kiwifruit faces a particular challenge because of the nature of supplies. While the green Hayward kiwifruit is the one most likely to be stocked, it can be supplied by both Northern Hemisphere and Southern Hemisphere countries with various levels of overlap from year to year. Even within hemispheres, a number of different suppliers may be competing for shelf space in any period. The kiwifruit industry has also developed a number of varieties that are aimed at the premium price market. Using their enhanced analytical capabilities, retailers can now use objective measures to decide how much shelf space to allocate to fresh kiwifruit overall at any time, how much of that shelf space to allocate to different varieties, from what countries or continents those supplies will come, and when kiwifruit from any supplier will begin to be stocked, and when it will be replaced by another supplier.

The retailer's goal is to optimize use of the scarce shelf space for specific sales or profit targets. The scarcer the space, for example in very small outlets, the more important such optimization by the retailer will become. While each kiwifruit variety, and each kiwifruit supplier, is competing with all other kiwifruit varieties and suppliers, they are also competing with every other produce item with a claim to occupy the same shelf space. In the future, the habits or personal allegiances of retail buyers will become less important in ordering decisions. In turn, the objective evidence of what any individual item can do to meet the retailer's sales or profit targets will become more important.

Fortunately, that objective evidence does not need to be static. There are many actions that kiwifruit marketers can take to make their products more attractive to consumers and more effective in meeting retailer sales and profit targets. First is to identify who the core consumers might be for any specific kiwifruit product. Second, determine what are the positive and negative attributes of these existing products for core consumers. Third, improve the quality and appearance of the product, and otherwise make it more appealing to core consumers through improved packaging, merchandising and promotion. Finally, once a strong body of core consumers is identified, the goal should be to gradually broaden the appeal of the product beyond that core group. The surest way to win the support of retailers for a product is to demonstrate its potential for future growth.

Many in the kiwifruit industry are already taking similar actions to enhance their prospects with retailers and consumers. However, the bar for success will continue to rise as more produce items compete for shelf space, as that shelf space is either static or shrinking, and as produce items become a more important factor in retailer survival.

Many of these issues will be explored further in subsequent chapters of the World Kiwifruit Review - 2016. For the convenience of readers, the Review is divided into seven main chapters:

- I. Production of Kiwifruit.
- II. Trade in Fresh Kiwifruit.
- III. Consumption of Fresh Kiwifruit.
- IV. Prices of Fresh Kiwifruit.
- V. Analyzing Demand for Fresh Kiwifruit.
- VI. Marketing Initiatives.
- VII. Strategic Issues.

Each chapter looks at past trends, and looks forward to emerging trends that have the potential affect the future welfare of the global kiwifruit industry. International, national, regional and local forces for change are examined. Every effort has been made to ensure the accuracy of the data provided, to present it in an easily-readable form, and to note inconsistencies. We hope that the resulting document will help key executives in the kiwifruit industry cope better with the challenges that lie ahead.

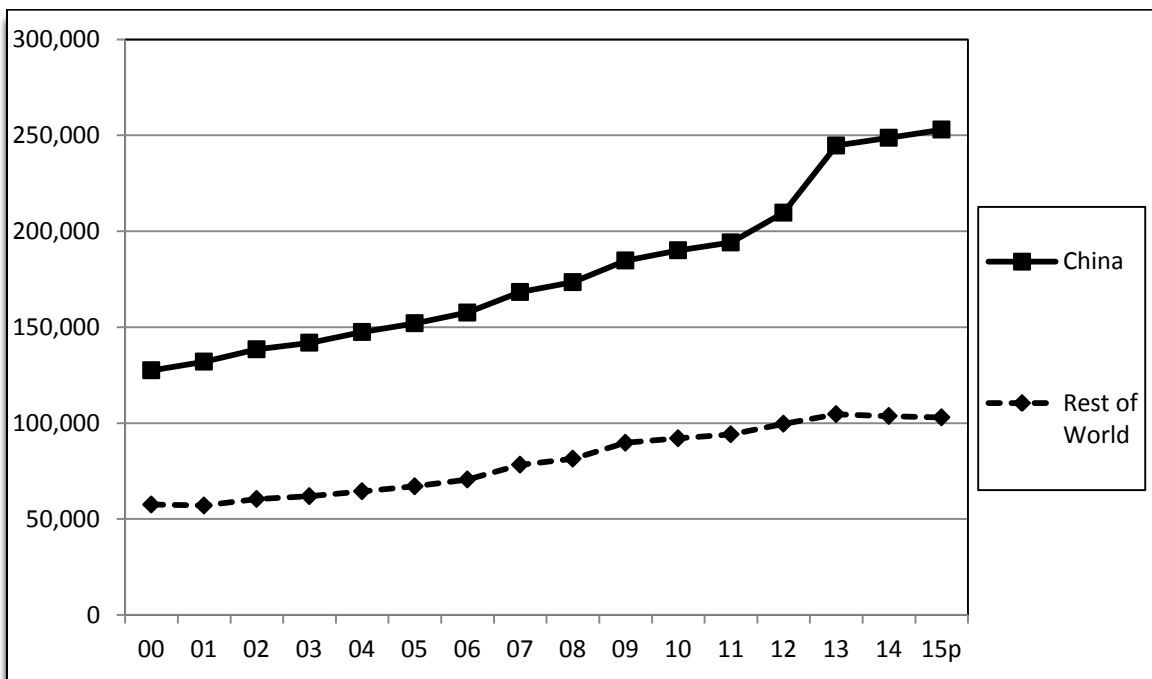
I. Production of Kiwifruit

Production Surprises on Upside

The statistics on the factors affecting the supply of kiwifruit in different countries around the world are often contradictory, late and subject to revisions. The most comprehensive source of information is the FAOSTAT database published online by the United Nations Food and Agriculture Organization. However, even the FAO must rely on statistics submitted by individual countries, some of whom are suspected of doctoring data for political purposes.

The best available data suggest that the area of kiwifruit harvested in the rest of the world excluding China stopped growing between 2013 and 2015 as producing countries adjusted to the impact of PSA. However, higher prices due to the resulting smaller crops have encouraged new or replacement plantings in both major and minor producing countries. The area harvested in China is reported to have continued its long upward trend, and now substantially exceeds that in the rest of the world. While the exact numbers for China are difficult to verify, there is little doubt about the upward trend.

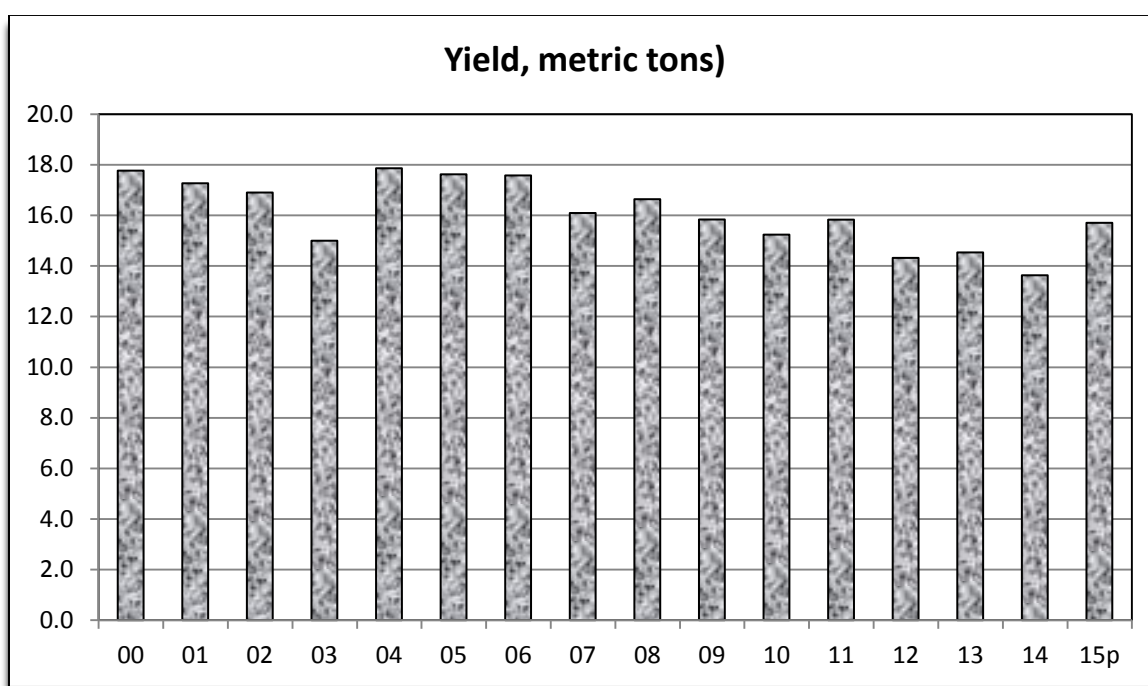
World: Area Harvested of Kiwifruit, 2000-2015



Average Yields Rebounding

UN,FAO data for kiwifruit producing countries, excluding China, indicated that average yields per harvested hectare were on a steady downward trend between 2006 and 2014. One factor in that decline was an increased percentage of younger plantings as the kiwifruit industry prepared to expand production to meet increased demand. An additional factor after 2012 was the effect of PSA, which caused many orchards to be removed and reduced yields on surviving orchards that severely pruned diseased orchards.

World, excluding China: Estimated Average Kiwifruit Yields, 2000-2015 (metric tons per hectare)

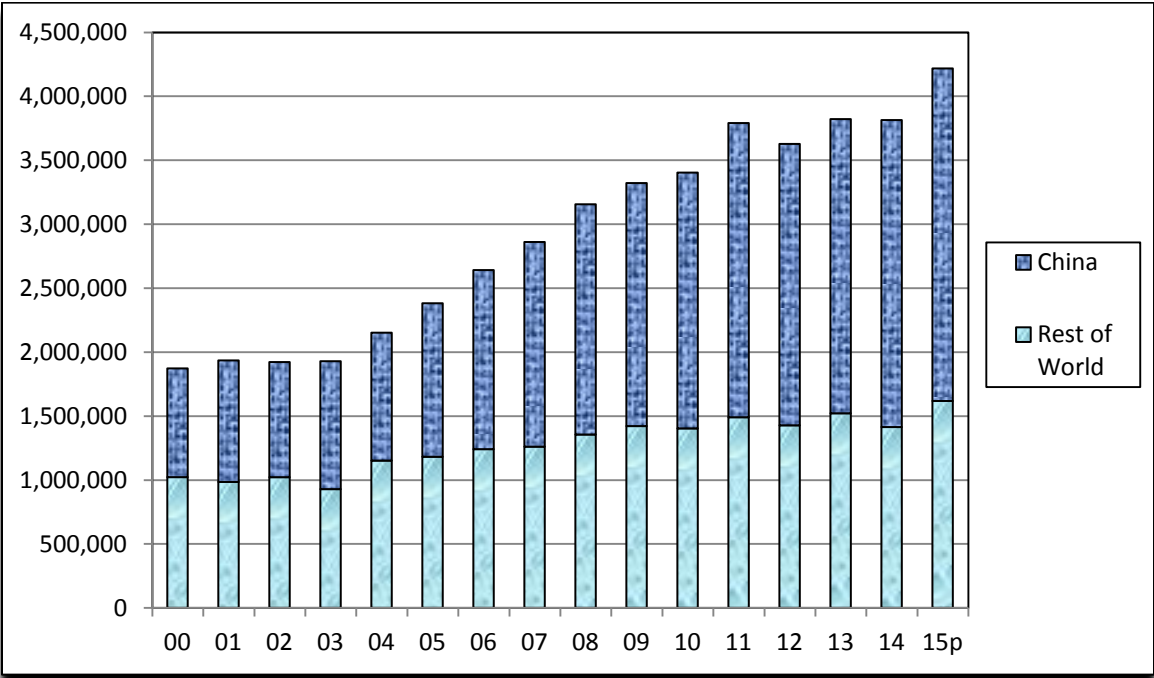


Preliminary estimates suggest that average yields bounced back in 2015 as producers learned how to control PSA more effectively, and as the area planted to newer, higher-yielding golden kiwifruit came nearer to full bearing. However, weather can also play a factor in yields in any given year, so it will require additional years of evidence before one can conclude that a major turnaround in average yields has taken place.

World Kiwifruit Production Revised Upwards

The data reported in this section includes major upward revisions from those included in previous editions of the World Kiwifruit Review. The major reason for this change is upward revisions in the estimates of kiwifruit production in China. For example, estimates of world kiwifruit production outside China in 2014 have been raised by 100,000 metric tons (about 7 percent). In contrast, estimates of Chinese kiwifruit production in 2014 have been raised by 600,000 metric tons (over 33 percent). This suggests that world production of kiwifruit topped 4 million metric tons for the first time in 2015, largely due to expansion of production in China.

World: Production of Kiwifruit, 2000-2015
(1,000 metric tons)



However, production in the rest of the world is what primarily influences the price that other countries receive for their kiwifruit. Almost all of China's production is still consumed domestically. As long as that situation continues, increases in Chinese production will have little influence on other world markets where fresh kiwifruit are traded.

Kiwifruit's Role, Modest but Rising

Despite its long-term growth trends, the kiwifruit's share of the world fruit complex remains very small. The table below shows per capita production of major fruit categories for the three-year periods, 1991-93, 2001-03 and 2011-13. It was drawn from the most recent FAOSTAT data. In 2011-13, per capita production of all major fruits and melons exceeded 111 kilograms for the first time, a continuation of the long upward trend in per capita production of all fruits and melons. Per capita production of kiwifruit accounted for less than half a kilogram, less than 0.4 percent of the total. This is an indication of the average share of produce shelf space that kiwifruit can expect in a modern retail store.

World: Per Capita Supplies of Major Fruit Groups and of Melons, 1991-93, 2001-03 and 2011-13

| Fruit Category | 1991-93 (kg) | 2001-03 (kg) | 2011-13 (kg) | 01-03 v 91-93 (% change) | 11-13 v 01-03 (% change) |
|-------------------|-----------------|-----------------|-----------------|-----------------------------|-----------------------------|
| Apples | 8.11 | 9.12 | 11.03 | + 12.5 | + 20.9 |
| Other Deciduous | 6.20 | 7.90 | 9.89 | + 27.4 | + 25.2 |
| Total Deciduous | 14.31 | 17.02 | 20.92 | + 18.9 | + 22.9 |
| Total Grapes | 10.52 | 9.93 | 10.16 | - 5.6 | + 2.3 |
| Total Kiwifruit | 0.16 | 0.31 | 0.42 | + 93.8 | + 35.5 |
| Oranges | 9.87 | 9.65 | 9.96 | - 2.2 | + 3.2 |
| Other Citrus | 5.62 | 7.25 | 8.89 | + 29.0 | + 22.6 |
| Total Citrus | 15.49 | 16.90 | 18.85 | + 9.1 | + 11.5 |
| Bananas | 9.30 | 10.95 | 15.00 | + 17.7 | + 37.0 |
| Other Tropical | 14.64 | 16.81 | 20.48 | + 14.8 | + 21.8 |
| Total Tropical | 23.94 | 27.76 | 35.48 | + 16.0 | + 27.8 |
| Other Fresh Fruit | 2.98 | 3.86 | 4.58 | + 29.5 | + 18.7 |
| Total Berries | 0.83 | 1.17 | 1.50 | + 41.0 | + 28.2 |
| TOTAL FRUIT | 68.23 | 76.95 | 91.90 | + 12.8 | + 19.4 |
| Total Melons | 9.32 | 17.22 | 19.25 | + 84.8 | + 11.8 |

Most major fruits and fruit categories have participated in the growth of the entire fruit and melon sector. Both all fruits and all melons had double-digit percentage increases in per capita production in the last two decades. Melons had a spectacular increase of almost 85 percent between 1991-93 and 2001-03, followed by a more modest increase in the latest decade. In contrast, the rate of growth of per capita production of all fruits speeded up substantially in the more recent decade.

No single fruit category lost ground in the most recent decade, while only total grapes and oranges lost ground in the 1991-93 to 2001-03 decade. Production of grapes has been affected by the many restrictions that have been imposed on wine consumption in an effort to reduce road accidents and prevent alcoholism. Oranges have faced increasing competition from other, novel citrus fruits. All three major fruit categories, deciduous, citrus and tropical, enjoyed faster growth in the most recent decade, as did the three leading individual fruits, apples, oranges and bananas. Berries enjoyed the fastest rate of growth of per capita production over the entire two decades, a growth of over 80 percent. However, they still represented less than 1.4 percent of the total volume produced.

Of the individual items listed, kiwifruit had the fastest growth in per capita production over the two decades, a growth of over 162 percent. That share is likely to continue to grow in the next decade as the industry puts the PSA epidemic behind it and continues to become more concentrated in large, well-financed production, packing and marketing units, and integrated operations.

At the same time, per capita production of competing fruits, berries and melons is likely to continue its growth. As farmers in different countries become better capitalized they will continue to move from production of extensive, low-revenue crops like grain, and into intensive, high-revenue crops like tree fruits, berries and melons. Particularly where irrigation is made available through public schemes, regional, national and international development agencies have grasped the many advantages of promoting such intensive crops. They can generate dramatically increased revenue for the individual producers and for the entire irrigation system. This increases the demand for expensive inputs like fertilizers and chemicals, and for sophisticated marketing. Intensive crops can also boost rural development by providing the raw materials for fruit processing industries, which, in turn, create jobs in rural communities.

On the demand side, medical authorities and nutritionists have long advocated the inclusion of more fruits, nuts and vegetables in normal diets. As societies become better educated and more affluent, they become more receptive to such messages. They become more concerned about improving personal health and fitness, slowing the aging process, and warding off diseases that accompany aging, such as diabetes, cancer, heart disease and Alzheimer's. Consumers tend to see fresh fruits as expensive compared to other sources of nutrition. However, as they become more affluent, cost considerations become less of an obstacle to increased per capita consumption. A bigger obstacle is competition from the numerous manufactured snacks and beverages that are very successful in tweaking formulations, packaging and promotion to increase demand. Most fresh fruits, including kiwifruit, lack the resources to compete head on against these snacks and beverages.

Another major influence on demand is that as incomes rise, consumers seek more diverse taste experiences, both between fruit categories, and within fruit categories. In the developed world, which is mostly in the temperate zones, this has triggered demand for tropical and exotic fruits that cannot be grown domestically. In the developing world, much of which lies in tropical or semi-tropical zones, it has triggered demand for temperate fruits like apples and pears. As incomes rise, demand for more expensive fruits like kiwifruit and sweet cherries also rises. In both developed and developing countries, the expansion of the modern retailing sector has stimulated demand for twelve month supplies of fresh fruits and berries. Off-season supplies have become increasingly important in meeting those needs.

Other social trends have increased the diversity of fruits that are both available and demanded in many local stores. Most developed countries now have large bodies of immigrants from their former colonies or from neighboring countries that have brought with them their own cooking and eating patterns and their own preferences in fruits. Many developing countries have large expatriate communities, attached to foreign banks, financial services, international organizations or consultancies, that seek familiar foods. In total, the expansion of international business and tourism has exposed many travellers to fruits not normally available in their home countries. Celebrity chefs and food experts on radio, television, the internet, and in print, take the lead in extolling the merits of new fruits and showing how they can best be prepared or consumed.

None of these trends are a guarantee that kiwifruit will be a particular beneficiary. A number of other trends are changing the competitive arena for all fruits. One is the increasing time pressure in which consumers operate, and their increasing mobility. In urban societies, consumers spend more time travelling to work, school, shopping, recreation or leisure activities. This means that they have less time for eating set meals with other members of their households. Many eating occasions involve snacking during other activities, whether at home, at work, in a car, or in public transportation. This means that preference is given to fruits that require little preparation, incur little mess while eating, and require little waste disposal. This favors bite-size fruits, like blueberries or seedless grapes, that can be eaten whole while leaving minimum residues, in preference to fruits like apples, oranges or peaches that can make a mess while eating or leave substantial waste for disposal. In the case of kiwifruit, a spoon or other utensil may be needed for eating, and juicy spills are commonplace. Pre-prepared packs, like those used for sliced apples, have not yet been perfected.

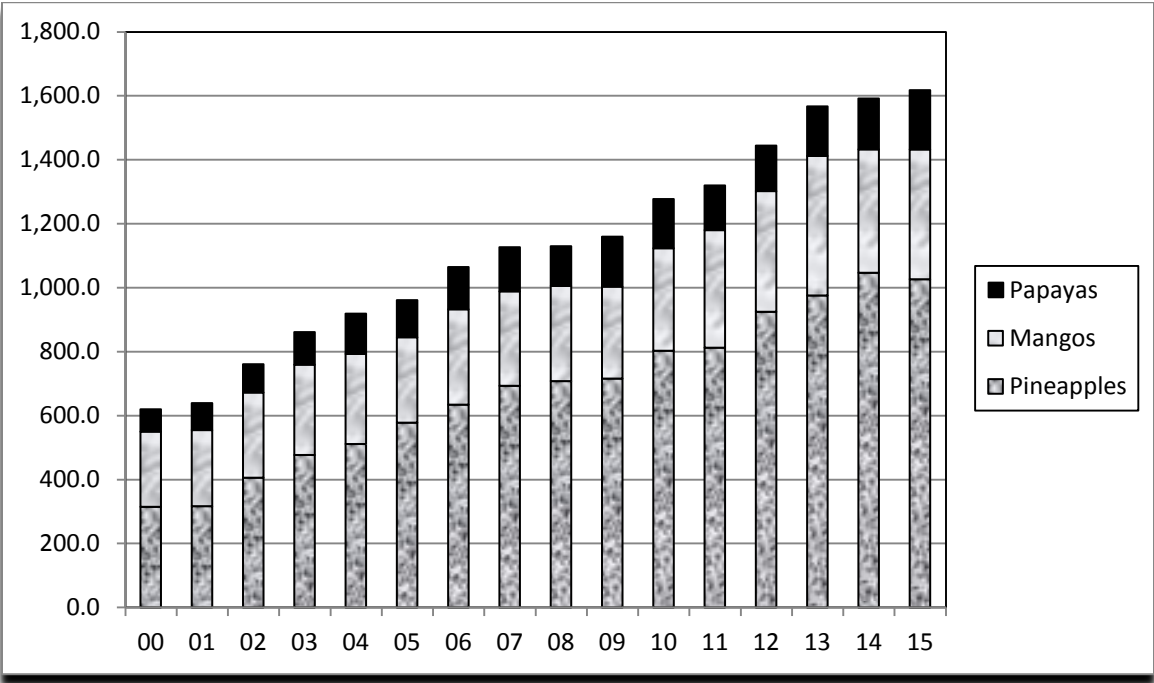
Another powerful trend is promotion of fruits or vegetables that can be dubbed "super foods." These foods are so called because they claim to deliver large health or nutritional benefits in very small quantities. In many ways, they compete in the same consumer space as vitamin pills, with the advantage that they are natural products. They include items like blueberries, Acai berries, pomegranate juice, salmon and kale. The list is long and varied.

The main requirement for establishing an item as a super food appears to be the persuasiveness of the food guru who is promoting it, and the believability of the claims that are being made. Once a claim for a super food has become widely voiced in the public arena without being challenged, the bandwagon effect kicks in. Influential food experts in the media pass on the message to demonstrate that they are abreast of the latest trends. Few of these claims have been subjected to rigorous scientific testing, so it is difficult for the average consumer to separate claims that are valid from those that are bogus.

The kiwifruit has many attributes that would entitle it to be considered a super food. However, it is not as easily consumed as a blueberry, or as exotic as an Acai berry, so it has not been able to assert its entitlement with most consumers.

The next three charts show the growing acceptance of three major tropical fruits, fresh pineapples, fresh mangos and fresh papayas, in three major markets, the United States, the EU-28 and China. They show the volume of imports of these three fruits for the calendar years between 2000 and 2015.

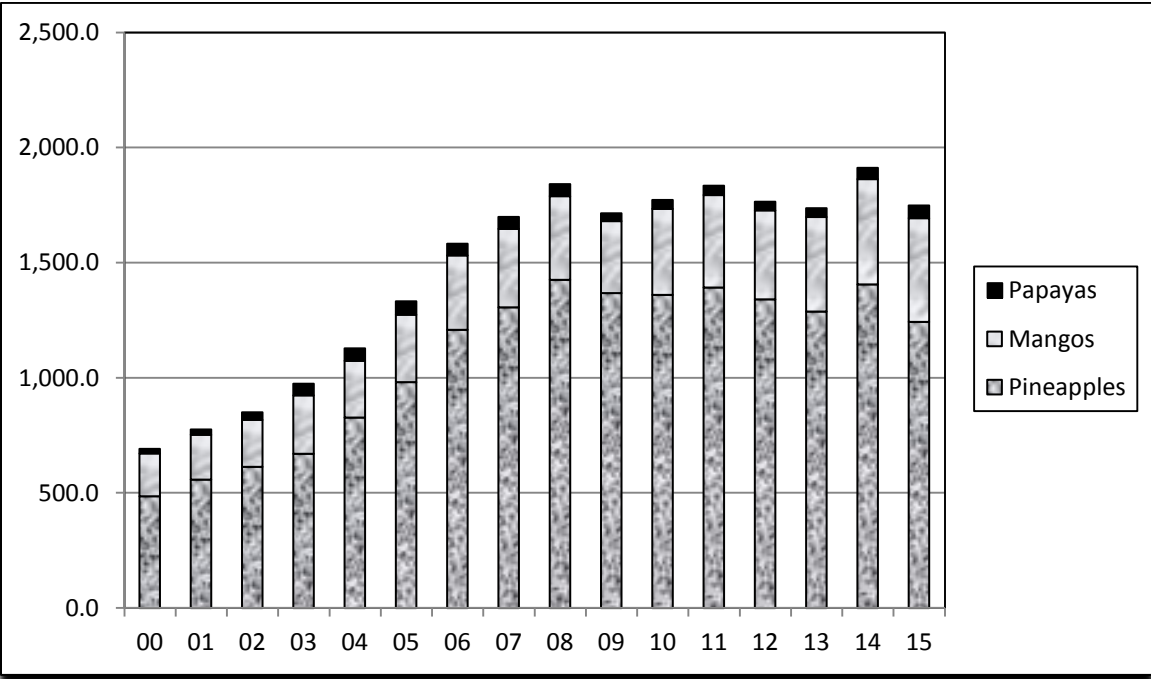
United States: Imports of Fresh Pineapples, Mangos and Papayas, 2000-2015
(1,000 metric tons)



The chart for the United States shows the long upward trend in the combined imports of these three fruits in the last 16 years. In 2015, they were more than 2.6 times as large as in the year 2000. Fresh pineapples were the largest and the fastest growing individual fruit over the period. Import growth slowed as the Great Recession hit in 2008, and international trade was temporarily disrupted, but has resumed since at different rates for the different fruits. In 2015, U.S. imports of fresh pineapples were 45 percent above the 2008 level, fresh mangos 36 percent above, and fresh papayas 49 percent higher.

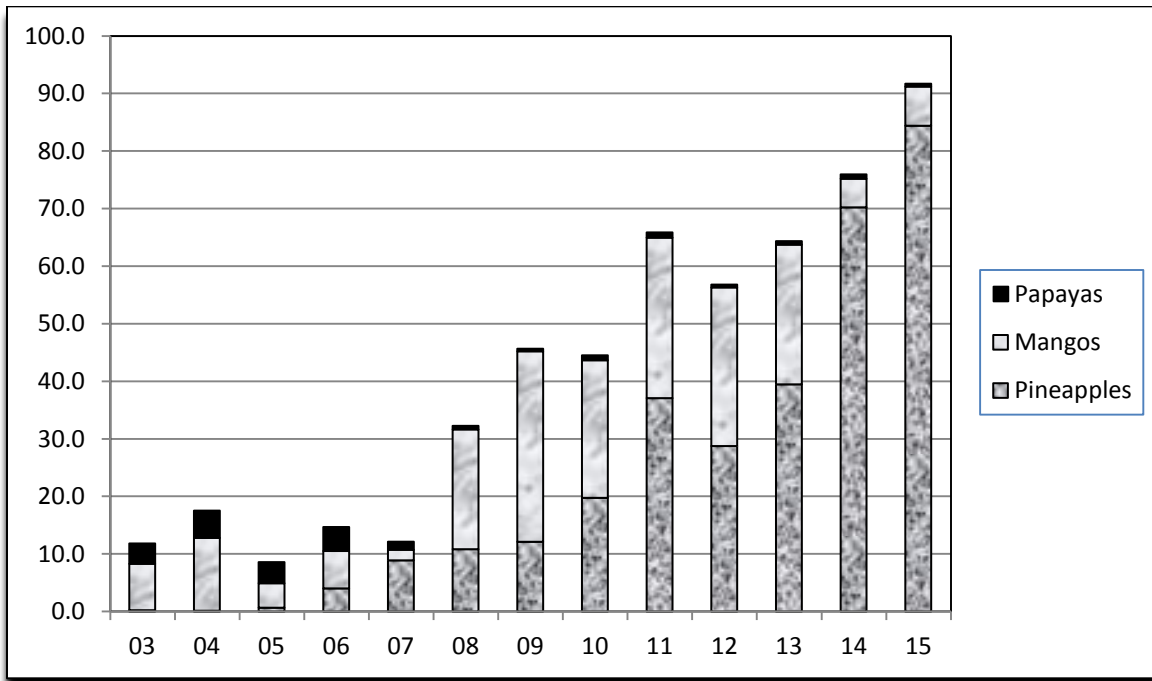
In the case of the EU-28, growth was dramatic between the year 2000 and 2008. However, since then, imports have stagnated at close to the 2008 level. Imports of mangoes surpassed the 2008 level in 2014 by 25 percent, but imports of pineapples and papayas remained below past record levels. Economic turmoil and economic setbacks have dampened demand for these imported fruits. Clearly, imports of higher-priced tropical fruits remained quite sensitive to the prosperity of the European economy.

EU-28: Imports of Fresh Pineapples, Mangos and Papayas, 2000-2015
(1,000 metric tons)



Pineapples have also been the most popular of the three tropical fruits imported by China, and have showed strong growth over time. In contrast, imports of papayas fell after 2007, while mango imports were heaviest between 2008 and 2013. Two major factors have influenced the different Chinese import pattern. The U.S. and EU-28 have minimal barriers to the free flow of imported fruit, whereas the Chinese government continues spasmodic interventions on selected fruits. In addition, China's imports of fruits like durian and rambutan have surged after China completed a free trade deal with Southeast Asian countries.

China: Imports of Fresh Pineapples, Mangos and Papayas, 2003-2015 (1,000 metric tons)



The willingness of major countries to import fresh fruit has both positive and negative implications for fresh kiwifruit exporters. On the positive side, kiwifruit can benefit from any increase in general demand for imported fruit. On the negative side, the more diverse the demand for imported fruit, the more competition kiwifruit exporters are likely to face.

Leading Kiwifruit Producing Countries

Data from various sources leave little doubt about which are the leading kiwifruit producing countries in the world. However, there is considerable doubt about the absolute levels of production and about the exact rankings in terms of volumes produced. The table on the next page gives best estimates of the average level of production in the top ten producing countries in 2003-06 and in 2013-16. There was only one change in the top ten between the two periods, with Spain being included in 2003-06, but replaced by Turkey in 2013-16.

Top Ten Kiwifruit Producing Countries, by Rank and Tonnage, 2003-06 and 2013-16

| Rank, 2003-06 | Country 2003-06 | Volume 2003-06 | Rank 2013-16 | Country 2013-16 | Volume 2013-16 |
|------------------|--------------------|-------------------|-----------------|--------------------|-------------------|
| (#) | | (metric tons) | (#) | | (metric tons) |
| 1 | China | 1,066,667 | 1 | China | 1,216,667 |
| 2 | Italy | 389,013 | 2 | Italy | 484,072 |
| 3 | New Zealand | 288,333 | 3 | New Zealand | 404,112 |
| 4 | Chile | 140,000 | 4 | Chile | 193,353 |
| 5 | France | 76,195 | 5 | Greece | 160,933 |
| 6 | Greece | 55,349 | 6 | France | 60,935 |
| 7 | Japan | 34,300 | 7 | Iran | 58,333 |
| 8 | Iran | 30,000 | 8 | Turkey | 42,545 |
| 9 | United States | 26,580 | 9 | Japan | 31,075 |
| 10 | Spain | 13,743 | 10 | United States | 24,419 |
| - | Top Five | 1,960,208 | - | Top Five | 2,459,137 |
| - | Percent | 91.0 | - | Percent | 90.0 |
| - | Top Ten | 2,096,280 | - | Top Ten | 2,676,444 |
| - | Percent | 97.3 | - | Percent | 97.9 |
| - | World Total | 2,153,361 | - | World Total | 2,733,795 |

Production of kiwifruit also remained highly concentrated over time. The top five producing countries accounted for 91 percent of the total in 2003-06 and 90 percent in 2013-16. The share of the next five countries remain low at 6.3 percent in 2003-06 and 7.9 percent in 2013-16.

The distribution of production has also changed over time. If China is excluded, the share of the three major EU producers, Italy, France and Greece, has fallen from 50.7 percent in 2003-06 to 46.5 percent in 2013-16. The share of the two leading Southern Hemisphere producers, New Zealand and Chile, has fallen from 41.7 percent to 39.4 percent. This means that other producing countries, in addition to China, are likely to become stronger competition in Northern Hemisphere markets than they now are. Iran and Turkey would have an obvious advantage in the surrounding countries, such as the Middle East and Russia.

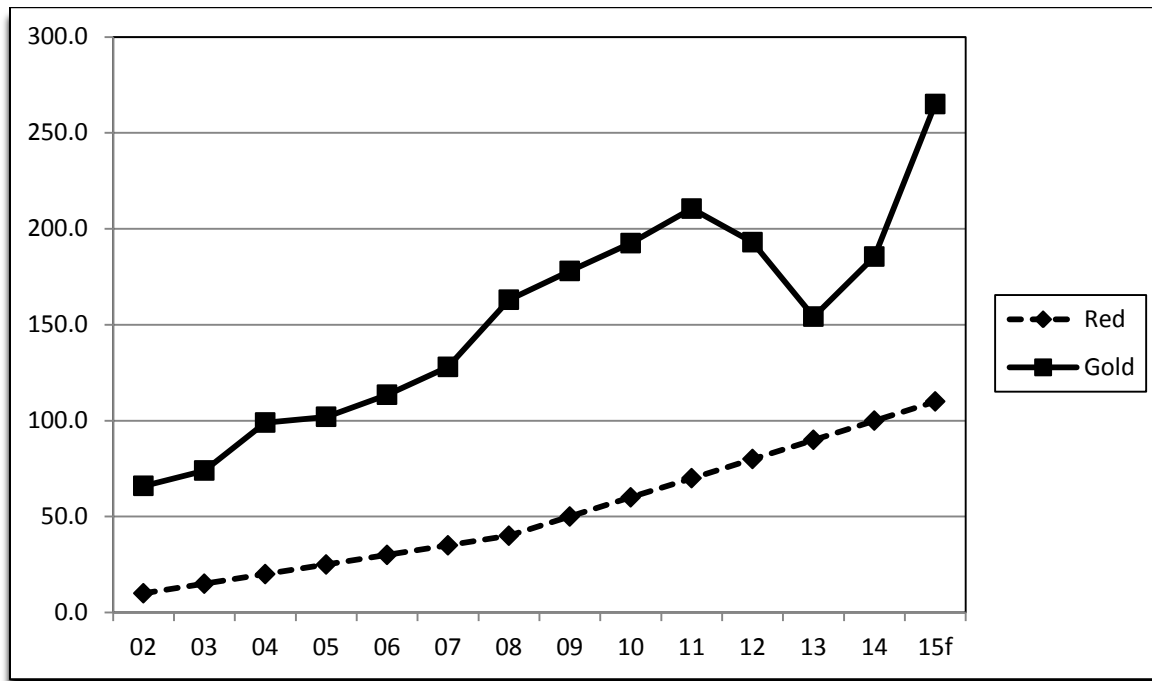
Kiwifruit Cultivar Mix Changing

For many years, production and marketing of fresh kiwifruit was dominated by the green Hayward variety developed in New Zealand from plant materials originally imported from their native China. However, after over-production of Hayward led to plummeting prices in the early 1980s, the search intensified for other kiwifruit cultivars that could compensate for Hayward's deficiencies. Among these were its late harvest timing, length of marketing season, and both production and marketing risks for the industry because of over-dependence on a single cultivar. Breeders sought new kiwifruit cultivars that would complement Hayward in the early or late seasons, in the organic market, or with consumers that were looking for different sizes, shapes, appearance or flesh colors of kiwifruit. In this respect, they were following a pattern that had been successful with other major fruits, such as apples or table grapes, where the introduction of new cultivars played a crucial role in sustaining and enervating the entire sector.

The early key to diversification of kiwifruit cultivars was cooperation between western breeders and organizations in China that controlled the germplasm available there in the wild. Among the early outcomes of such cooperation were cultivars like Jintao and Soreli. However, by far the most successful was a golden kiwifruit, Hort 16A, developed by breeders in New Zealand. Sub-licenses were granted to producers in the Northern Hemisphere to assure a twelve-month supply. That cultivar was gradually, and carefully, rolled out in world markets by New Zealand's monopoly marketing board, the Zespri organization, under the Zespri™ Gold trademark. Zespri™ Gold was unique in generating both higher average yields and higher returns in the marketplace than Hayward.

The ongoing success of Hort 16A encouraged kiwifruit breeders to intensify their search for other new cultivars that could provide similar twin benefits in production and marketing. By 2010, China's scientific capabilities in kiwifruit breeding had advanced dramatically, many public and private organizations outside China, sought to work with the Chinese industry, and the number and extent of cooperative programs had increased geometrically. New cultivars with green, yellow, yellow-green or red flesh colors were being developed and commercially tested. There was particular optimism about the potential for red-fleshed kiwifruit to complement the green and gold kiwifruit already widely available.

World: Estimated Production of Red and Gold Kiwifruit, 2002-2015 (1,000 metric tons)



The chart above shows International Kiwifruit Organization estimates of production of red and gold kiwifruit between 2002 and 2015. Red production was reported only for China. Its relatively straight-line increase may be due both to lack of exactness of the statistical estimates, and to the fact that production in China is not as sensitive to economic factors as it would be in a normal market economy. The same pattern was found for gold production in China (not shown separately). In contrast, total world production of gold kiwifruit grew erratically between 2002 and 2011. It then took a sharp downturn in the next two years, as Hort 16A were removed from production due to PSA, and surged upwards in 2014 and 2015 as Gold3 (Sungold) expanded rapidly.

Production of green cultivars other than Hayward were confined mostly to China where volume grew from 300,000 metric tons in 2002 to 640,000 metric tons in 2015. In contrast, production of other green kiwifruit in the rest of the world had only reached 14,000 metric tons by 2011 and 2012, and fell by half between 2012 and 2015. Thus, outside China, alternative green cultivars to Hayward have been slow to catch on with either producers or consumers.

Programs to commercialize new cultivars were temporarily overshadowed by the arrival of the PSA bacteria in New Zealand in late 2010. PSA infections spread so rapidly in the main New Zealand producing area of the Bay of Plenty that there was limited time to find effective treatments. PSA infections were particularly devastating for the Hort 16A cultivar, so much so, that there was rapid consensus in the New Zealand kiwifruit industry that production of Hort 16A would no longer be viable. Fortunately, there was already a new golden kiwifruit cultivar in the New Zealand Plant and Food Research development pipeline that appeared less susceptible to PSA. The Zespri organization, which controlled the commercialization rights, made the bold decision to speed up the introduction of this new gold cultivar, Gold3, marketed under the trade name Sungold™.

There was a real risk that either retail buyers or consumers of Zespri™ Gold would reject the new Sungold™ because of perceived differences in shape, color or taste. In fact, the transition from Zespri™ Gold to Sungold™ has been surprisingly smooth. Gold volumes (primarily Sungold™) from New Zealand sources are now expected to rise from 18.7 million trays in 2014-15 to 30 million trays in 2015-16, and to over 60 million trays by 2019-20. During the same period, production of Sungold by foreign sub-licensees of Zespri are expected to rise from 2.5 million trays in 2014-15 to around 15 million trays in 2019-20. Thus, by 2019-20, total gold kiwifruit produced outside China could approach 75 million trays, more than twice the approximately 30 million trays in 2011 when Hort 16A was at its peak.

Data from New Zealand Customs provides confirmation of how the recovery in exports of gold fleshed kiwifruit has progressed. The peak in exports of Zespri™ Gold (Hort 16A) occurred pre-PSA in 2011 when just over 100,000 metric tons of gold fleshed kiwifruit was exported. Gold accounted for over 25 percent of the total volume and over 38 percent of the total value (not shown). The volume of Green (Hayward) kiwifruit was still almost triple that of Gold kiwifruit. Other kiwifruit, neither Gold nor Green fleshed, were relatively unimportant at 0.6 percent of the total. The table below shows how exports changed in the following four calendar years. Gold volume fell by 17 percent from the 2011 peak in 2012 and a further 42 percent in 2013. There was a strong rebound in 2014. Then, in 2015, the volume of Gold kiwifruit (primarily Sungold) surged to a new record, 18.5 percent above the 2011 peak.

New Zealand: Exports of Fresh Kiwifruit, by Flesh Type, 2011-2015

| Flesh Type | Units | 2011 | 2012 | 2013 | 2014 | 2015p |
|------------|-------------|---------|---------|---------|---------|---------|
| Gold | Metric tons | 100,662 | 83,837 | 41,158 | 62,891 | 119,321 |
| | % of total | 25.1 | 22.8 | 12.9 | 18.2 | 26.3 |
| Green | Metric tons | 297,863 | 282,128 | 275,670 | 279,230 | 329,433 |
| | % of total | 74.3 | 76.8 | 86.5 | 80.8 | 72.5 |
| Other | Metric tons | 5,892 | 5,954 | 5,016 | 11,898 | 17,446 |
| | % of total | 0.6 | 0.4 | 0.6 | 1.0 | 1.1 |
| TOTAL | Metric tons | 400,792 | 367,336 | 318,632 | 345,665 | 454,170 |
| | % of total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

During the same period, the volume of Green kiwifruit slipped modestly (by 7.5 percent) between 2011 and 2013, and then surged 10.5 percent above the 2011 level in 2015. Another interesting development during the five-year period was the expansion of exports of other (neither Gold nor Green fleshed) kiwifruit from a low base. Other kiwifruit exports ranged between 5,000 and 6,000 metric tons between 2011 and 2013. They doubled in 2014, and experienced another large upswing in 2015. Clearly, the shock of PSA stimulated interest in diversifying the export offering, not just within the Gold fleshed category, but also in other innovative directions.

There are a number of reasons for believing that innovation in kiwifruit cultivars will only increase in the near future. As reported in the 2015 edition of the World Kiwifruit Review, China has been tapping its very large resources of kiwifruit germplasm, and using advances in genetic techniques, to breed and commercialize many new kiwifruit cultivars. Its partners in other countries are also continuing their search for new cultivars that can extend their kiwifruit product lines. At the same time, major retailers have been seeking innovative products in different fruit sectors in order to satisfy more discriminating customers and distinguish their produce offerings from those of competitors. Kiwifruit marketers are responding to the demands of their retail customers. Finally, the more successful innovations usually garner premium prices and help producers and marketers escape the downward price pressures that accompany increased volumes of standard products. While the risks of innovation are great, the potential rewards will remain a powerful incentive for progressive firms.

Production Trends in Major Producing Countries

While the overall trend in production of kiwifruit has been upward, the experiences of different major producing countries have varied both due to local economic conditions and to the extent of the problems caused by the PSA epidemic. Some of the key factors affecting kiwifruit production in different countries are discussed in this section.

China continues to be the world's largest producer of kiwifruit. While it is difficult to validate the Chinese statistics, it appears that China's commercial kiwifruit area has continued to grow in the last decade, while average yields per hectare have risen by more than 20 percent. As a result, commercial production of kiwifruit in China has continued its steady rise. Almost all of that production continues to be absorbed in the domestic Chinese market, although a substantial percentage is likely to be lost in harvesting, packing, storage and distribution. Imports have been increasing, but still account for less than 3 percent of total Chinese fresh kiwifruit consumption.

Both the increases in domestic consumption of fresh kiwifruit and the heavy investment in development of the kiwifruit industry have been enabled by the rapid growth of the Chinese economy, which averaged about 10 percent per year for almost two decades. However, under President Xi Jinping, China appears to be planning for slower growth of 7 percent or less per year, and to be attempting to replace industrialization and exports with increased domestic consumption as the primary engine of growth. However, so far, that transition has not gone as planned. While retail demand has remained strong, other parts of the Chinese economy have stalled, and unemployment has been rising. China has been losing foreign reserves, and may be tempted to allow the value of the yuan to decline to boost exports. That would simultaneously increase the cost of kiwifruit imports, and make Chinese kiwifruit more competitive on export markets. In addition, if Chinese kiwifruit production continues to increase, and domestic demand weakens, China may begin to export larger quantities of fresh kiwifruit. Any slowdown in the Chinese economy would also be likely to affect the government's willingness to invest in research and development in minor industries like kiwifruit. However, the effect of reduced R & D investment would not be felt for several years ahead.

Italy remains the second largest kiwifruit producing country in the world, and the largest that is actively involved in international trade. In addition to having a large domestic market, it is in close proximity to some of the world's largest fresh kiwifruit export markets, Germany, France and Spain. While peak production of gold Hort 16A kiwifruit accounted for less than 5 percent of Italy's kiwifruit production, much of the Hort 16A plantings were lost to PSA, causing a setback for total kiwifruit area. That area is only slowly being replanted to other cultivars. In the meantime, changes in production are most likely to be affected by changes in yields in any year.

Expansion of Italy's kiwifruit area is inhibited on the supply side by the wide choice of competing fruits that can be grown successfully in its numerous different microclimates. The success of new plantings of Gold3, or of other new kiwifruit cultivars will have a major influence on how much of the available orchard land might be converted to kiwifruit production. A second inhibiting factor (on the demand side) is the continued weak economic conditions in Europe that has dampened demand for many commodities. Finally, the closing of the Russian market to EU produce items has removed one of the export markets with the greatest growth potential for Italian kiwifruit, and has forced marketers to scramble to find comparable alternative markets. None of these negative forces appear near to resolution.

New Zealand has been a trend-setter in the world kiwifruit industry for almost half a century. Most of its production has been targeted towards export markets. Because it has a monopoly marketer, New Zealand has been able to impose stringent quality conditions on its producers and packers, to manage the volumes sold in individual export markets, and provide targeted promotional support. As a result, New Zealand has been able to consistently generate price premiums for its kiwifruit products. Its 2010 goal of doubling export value within a decade appeared attainable until the sudden, devastating appearance of PSA in November 2010. However, after the initial shock, an industry coalition, including the Zespri organization, producers, packers, suppliers, government bodies and research organizations, was able to develop and implement an effective recovery plan. The main elements of that plan were finding ways to mitigate the effects of PSA on existing orchards, and rapidly replacing the compromised Hort 16A plantings with plantings of Gold3. As previously noted, the volume of Gold3 is expected to rapidly surpass the peak production of Hort 16A.

As the disruptions caused by PSA begin to recede, New Zealand is back on track to double the value of its kiwifruit exports by 2020. It still has a comparative advantage in yields of marketable fruit over most of its competitors. The same procedures are in place as previously to assure export quality and premium prices. Exports are being expanded in promising, new markets. Sungold is set to surpass the former contribution of Zespri Gold to industry value. In addition, work on finding and commercializing other new cultivars continues to move ahead. Thus, New Zealand appears set to continue as a trend-setter for the global kiwifruit industry.

Chile, like Italy, has a wide range of alternative fruits, nuts and berries that can be grown in its many different climatic zones. Thus, its commitment to kiwifruit is heavily influenced by the profit outlook for that fruit relative to other alternatives. For much of the 1990s, kiwifruit area fell steadily. After the turn of the century, it again began to grow as a weak peso helped improve industry returns. Area rose by about one-third between 2008 and 2013. However, the enthusiasm for additional plantings has waned recently as Chile coped with PSA outbreaks, adverse weather and the effects of a strong peso. However, the last two of these negatives have weakened since 2013. Ultimately, the Chilean kiwifruit industry will be driven by the strength of international demand.

While Chile has not so far been able to breed its own premium kiwifruit varieties, it has been, and will continue to be, a leading choice as a partner for any new cultivars that are developed by Northern Hemisphere breeding programs. Also, as the second leading Southern Hemisphere supplier of kiwifruit, it is in a position to exploit any growth in off-season markets in the Northern Hemisphere, and is well placed to service growing markets in East Asia.

Greece has become an increasingly important player in the world kiwifruit industry. Despite the fact that the Greek economy has suffered many setbacks since 2010, the kiwifruit industry has continued to expand. Area planted more than doubled between 2007 and 2015. While the Greek domestic market is relatively small, Greece has become a major supplier of lower-priced kiwifruit to fast-growing markets in neighboring European countries, and more recently, in Russia. Access to the Russian market will be blocked while the current Russian ban on EU products remains in place. Greece's success in finding alternative export markets will strongly influence any plans for further expansion.

France has had the opposite experience to that of Greece. The gradual erosion of kiwifruit area and production has continued for the last decade. Since this has been similar to the experience of many other fruits in France over the same time period, it suggests that common factors have been involved. These include non-farm competition for scarce natural resources, relatively high costs, and intrusive regulations. While two successive presidents have proposed reforms, the business environment in France remains difficult. Like the rest of the French fruit industry, the kiwifruit industry has sought to offset higher costs by aiming for the premium end of domestic and export markets. However, that end has been under pressure due to Europe's continuing economic problems and the powerful influence of discount retailers on product prices. Any rebound in the French kiwifruit industry will depend on a healthy recovery in Europe's economic fortunes.

Iran Reliable data on the kiwifruit industry in Iran are difficult to obtain. Unofficial IKO statistics suggest that Iran could produce 100,000 metric tons of kiwifruit in the 2015 crop year, making it the world's sixth largest producer. The potential demand for Iranian kiwifruit is large, since Iran has a large domestic population and is situated close to major markets such as Russia, Central Asia, South Asia and the Middle East. However, Iran's rocky diplomatic relationships with many of its neighbors and with western powers have impeded the free flow of needed imported inputs and the export of final products.

Continuing declines in oil prices have also reduced the ability of the Iranian government to invest in development projects. Many western sanctions were due to be lifted after Iran agreed to curtail its nuclear program. However, Iran is unlikely to get full acceptance into the international community as long as it continues to support the discredited Assad regime in Syria and a network of groups deemed by the west to be terrorist groups. On the other hand, Iran remains among the few major suppliers of fresh fruit that are not subject to a Russian ban, so it will have favorable access to the Russian market as long as those bans persist.

Turkey is situated close to Iran in the volatile Middle East, and shares many similar challenges and opportunities. IKO data suggest that kiwifruit production has been growing rapidly and that Turkey produced 45,000 metric tons of kiwifruit in 2015. Almost all of that production was absorbed in the large Turkish domestic market.

Turkey can produce a wide diversity of fruits, nuts and grapes, so kiwifruit has to compete against many commodities that are better established and have strong export marketing programs. Until Turkey seeks to become a stronger competitor in kiwifruit export markets, it will have less incentive to apply sophisticated technologies in kiwifruit production, raise kiwifruit quality standards and improve its kiwifruit profile internationally.

Japan has seen the area and production of kiwifruit experience a long, slow decline. In 2015, area was about 15 percent lower than a decade earlier, and production about 20 percent lower. As a result, Japan has become heavily reliant on imports, primarily from New Zealand. A number of similar factors have contributed to the decline of fruit production in Japan. Many young people have been unwilling to take over the small farms that still dominate production. Without an influx of young farmers, the impetus for innovation is weakened. On the demand side, the Japanese population has peaked, and the average age has been rising. The Japanese economy has suffered almost two decades of stagnation. Under Prime Minister Shinko Abe, Japan undertook several measures to stimulate economic growth and inflation, with only limited success. A recent initiative has been the promise to open up Japanese agricultural markets under the Trans Pacific Partnership (TPP) agreement. However, it may be several years before the TPP is fully implemented and any stimulus to change from more open markets kicks in.

United States Kiwifruit production in the United States is confined primarily to three counties in central California where farmers have numerous choices of high-value fruits, nuts, berries, grapes and vegetables that they can produce. For many years, U.S. kiwifruit production was limited to the Hayward variety because the higher-valued Hort 16A did not thrive. However, producers are hopeful that some of the newer cultivars will be more successful than was Hort 16A. Without the availability of a new, premium-priced cultivar, the California kiwifruit industry is likely to remain a niche, specialty item for a small number of producers. Since the majority of the kiwifruit consumed in the United States are imported from top exporting countries like Chile, Italy and New Zealand, in order to survive, these niche, U.S. producers must be able to meet or exceed the standards set by imported products.

Portugal has experienced an influx of new, younger farmers into kiwifruit production in recent years, and an expansion into newer areas. As a result the industry is expecting substantial increases in production in the next few years after setbacks due to PSA, botrytis fungus and loss of key chemicals to control break bud. For most of its history, the Portuguese kiwifruit industry was heavily dependent on the Hayward variety. However, more new cultivars have been introduced. If fruit quality and storage life can be assured, this should help keep the Portuguese industry profitable even as production expands.

Spain is a large net importer of kiwifruit both from neighboring European countries and from the Southern Hemisphere. Most kiwifruit production takes place in the northwestern provinces of Galicia and Asturias. However, of the additional 90 hectares expected to be added in the next five years, only 20 hectares are expected to be added in the northwest. Spain remains almost totally dependent on the Hayward variety because of difficulty in establishing other cultivars such as Summer-Kiwi and Jingold. While Spanish production is expected to increase modestly in the next few years, both through extra plantings and higher average yields, Spain will continue to rely primarily on imports for its consumption needs.

South Korea for long had a policy of seeking self-sufficiency in fruit products. The effort for kiwifruit was limited by the amount of land that was suitable for kiwifruit production. However, in order to get access to foreign markets for its industrial exports, South Korea was forced to open its agricultural markets to imports. Kiwifruit is one of many fruits in which South Korean producers have had difficulty in competing against leading world exporters. For that reason, the kiwifruit industry in South Korea will have difficulty in maintaining even its present area and level of production.

Australia experienced rapid expansion of kiwifruit area and production in the 1980s. Area peaked at 1,128 hectares in 1986, and production at 5,500 metric tons in 1993 as many plantings were made in areas that were less suitable for kiwifruit production. Approximately 400 hectares are still in production, primarily in north-eastern and central Victoria and New South Wales. A major New Zealand company has now invested in facilities in Australia. That may indicate plans to again expand production there. In the meantime, Australia will continue to rely heavily for its kiwifruit supplies on exports from New Zealand.

Other Minor Producing Countries

UN,FAO reports kiwifruit production in eight other countries, Bulgaria, Canada, Cyprus, Israel, Kyrgyzstan, Slovenia, Switzerland and Tunisia. Total production in 2013 was estimated at 6,515 metric tons from 531 hectares harvested, but over 80 percent of the area harvested and almost two-thirds of that was in a single country, Israel. The IKO also reported kiwifruit production of 18 metric tons each in Argentina and Brazil in 2013. Clearly, minor producing countries continue to play a very limited role in the world kiwifruit industry.

Future World Kiwifruit Supplies

It now appears that while the PSA epidemic had a traumatic effect on the orchards and the countries most heavily affected, it has had only a temporary effect on the trajectory of global kiwifruit production. Indeed, in the most heavily affected country, New Zealand, the industry has moved from a focus on recovery to a focus on a new, and even stronger, phase of expansion. The reductions in production caused by PSA coincided with reduced production in other countries due to adverse weather. The combined effects led to sharply higher prices and higher value of kiwifruit orchards. These both provided an incentive to replacement plantings and the financial resources to increase investment in the kiwifruit industry.

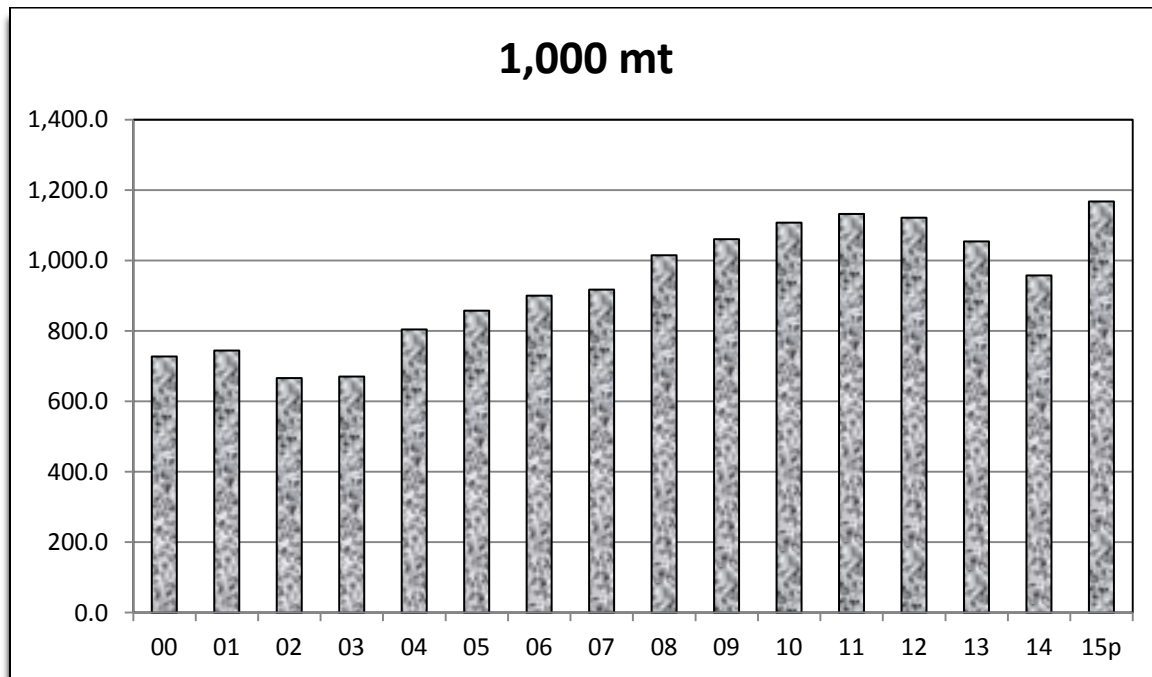
A continuation of present trends would mean that kiwifruit production in China could increase from 2.6 million metric tons in 2015 to 3.2 million metric tons in 2020. Similarly, production in the rest of the world could increase in the same period from about 1.6 million metric tons to 1.8 million metric tons. Thus, total world production could approach 5 million metric tons by 2020, an increase of almost 20 percent in five years. The extent of the challenges in handling these larger crops will depend on how much of China's production can be absorbed in the domestic Chinese market. If Chinese exports of fresh kiwifruit remain minimal, the rest of the world should be easily able to handle an annual increase in supplies of about 2.5 percent. However, if Chinese consumer demand falters, or the Chinese yuan is devalued, Chinese exports could become a major factor in world trade in fresh kiwifruit. The industry needs to be prepared for either outcome.

II. Trade in Fresh Kiwifruit

World Kiwifruit Exports Recovering

The volume of world exports of fresh kiwifruit enjoyed a period of strong growth between 2000 and 2010, as shown in the chart below. Exports in 2010-11 were 52 percent higher than in 2000-01. However, world exports stalled for the next four years, as supplies were reduced by the effects of PSA, and by adverse weather in major exporting countries like Chile and Greece. However, by 2015-16, exports bounced back strongly as these various problems were left behind, at least temporarily. The pressure for increased exports of fresh kiwifruit in the future is likely to remain strong because production is concentrated in a small number of producing countries with small domestic populations, so increased production is normally targeted at export markets. Countries like New Zealand, Chile and Greece fall into this category.

World: Volume of Exports of Fresh Kiwifruit, 2000-2015
(1,000 metric tons)



Top Ten Exporters of Fresh Kiwifruit

The most recent available information on exporters of fresh kiwifruit for all countries is for the calendar year 2013. This gives an indication of the relative importance of different exporters of fresh kiwifruit. In the table below, only those exporters are included that actually produce kiwifruit. As a result, major re-exporters, like Belgium and the Netherlands, are excluded. Despite that exclusion, it is possible that the export totals reported for countries like Italy, France and Spain may include some imports that were being re-exported.

Only Italy and New Zealand had exports of over 300,000 metric tons. Chile was in third place with over 200,000 metric tons, while exports from Greece came close to 100,000 metric tons. These top four exporters accounted for almost 90 percent of fresh kiwifruit exports from producing countries. After Greece, the volume and value of fresh kiwifruit exports dropped off sharply. Exports from tenth place China were less than 1,500 metric tons.

Top Ten Exporters of Fresh Kiwifruit, 2013 * (Quantity, metric tons, Value and Price, US\$)

| Rank (#) | Country | Volume (metric tons) | Value (\$1,000) | Average Price (\$/mt) |
|-------------|-----------------|-------------------------|--------------------|--------------------------|
| 1 | Italy | 340,802 | 512,557 | 1,503.97 |
| 2 | New Zealand | 318,651 | 659,559 | 2,069.85 |
| 3 | Chile | 217,878 | 245,384 | 1,126.24 |
| 4 | Greece | 98,858 | 103,778 | 1,049.77 |
| 5 | Iran | 45,238 | 44,053 | 973.81 |
| 6 | France | 28,108 | 56,539 | 2,011.49 |
| 7 | United States | 14,947 | 29,972 | 2,005.22 |
| 8 | Spain | 13,750 | 19,591 | 1,424.80 |
| 9 | Portugal | 12,231 | 14,179 | 1,159.27 |
| 10 | China, mainland | 1,478 | 3,026 | 2,047.36 |
| - | TOTAL | 1,091,941 | 1,688,638 | 1,546.46 |

* Excludes re-exporters.

Average prices for the main exporters varied widely, indicating considerable quality differences between major suppliers. The average price of exports from New Zealand, France, United States and China all topped \$2,000 per metric ton, while prices for Chile, Greece, Iran and Portugal averaged less than \$1,200.

Top Ten Importers of Fresh Kiwifruit

The table below shows the top ten importers of fresh kiwifruit in 2013, once again excluding major re-exporters like Belgium and the Netherlands. Spain was the largest single country importer, ahead of the Russian Federation and Germany, both of which recorded imports exceeding 100,000 metric tons. Three other countries, the United States, Japan and France, had imports close to 60,000 metric tons. Belgium would have placed ahead of the Russian Federation for the volume of imports, and the Netherlands ahead of the United States. Two countries, Mainland China and Italy, had imports greater than 40,000 metric tons, and six further countries, the United Kingdom, Taiwan, Brazil, Australia, Canada and South Korea had imports greater than 20,000 metric tons. The top ten importers accounted for a much smaller share of the world total than did the top ten exporters.

Top Ten Importers of Fresh Kiwifruit, 2013 * (Quantity, metric tons, Value and Price, US\$)

| Rank (#) | Country | Volume (metric tons) | Value (\$1,000) | Average Price (\$/mt) |
|-------------|--------------------|-------------------------|--------------------|--------------------------|
| 1 | Spain | 125,865 | 173,071 | 1,375.05 |
| 2 | Russian Federation | 109,578 | 142,504 | 1,300.48 |
| 3 | Germany | 100,816 | 182,822 | 1,813.42 |
| 4 | United States | 60,772 | 104,132 | 1,713.49 |
| 5 | Japan | 58,749 | 209,782 | 3,570.82 |
| 6 | France | 57,808 | 94,757 | 1,639.17 |
| 7 | China, mainland | 48,243 | 121,626 | 2,521.11 |
| 8 | Italy | 44,875 | 65,908 | 1,468.70 |
| 9 | United Kingdom | 31,577 | 46,314 | 1,466.70 |
| 10 | Taiwan | 30,250 | 61,687 | 2,039.24 |
| - | World Total | 1,293,847 | 2,158,802 | 1,668.51 |
| - | Top Ten | 668,533 | 1,102,603 | 1,649.29 |
| - | Top Ten % | 51.7% | 51.1% | 98.8% |

* Excludes re-exporters.

There was a similar wide spread in average import prices. Japanese import prices were more than double the world average, and those of China more than 50 percent above. European countries, including Spain, Russia, Italy and the United Kingdom, reported prices below the world average.

EU-28 Leading Driver of Kiwifruit Trade

World imports of fresh kiwifruit in any year are very similar to world exports, so there is no need to show the trend in imports separately. The main difference occurs between the times when exports and imports of the same shipment are recorded. For example, a December shipment in one year may not arrive at its destination until January of the next year. Statistical discrepancies also arise in accounting for re-exports and re-imports across unmonitored land borders.

The European Union of 28 countries (the EU-28) continues to be the leading driver of world trade in fresh kiwifruit. It accounted for almost two-thirds of world imports in 2013, the last year for which complete data are available. However, over two-thirds of EU-28 imports of fresh kiwifruit in 2013 came from other EU-28 member countries, so the EU-28 was also a major exporter of fresh kiwifruit. As the table below shows, the average prices of fresh kiwifruit imports from third countries were generally lower than those of EU-28 product.

EU-28: Total Imports and Extra-EU and Intra-EU Imports, 2008-2014 (Volume, metric tons, Value and Price, US\$)

| Item | Units | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-------------|----------|-----------|-----------|---------|-----------|---------|-----------|-----------|
| EU-28 Total | 1,000 mt | 732,247 | 773,753 | 731,251 | 703,491 | 718,967 | 679,383 | 638,695 |
| | \$1,000 | 1,258,612 | 1,006,576 | 959,834 | 1,082,179 | 956,809 | 1,039,270 | 1,138,244 |
| | US\$/mt | 1,719 | 1,301 | 1,313 | 1,538 | 1,331 | 1,530 | 1,782 |
| Extra-EU | 1,000 mt | 291,288 | 267,260 | 250,136 | 237,694 | 231,860 | 215,124 | 173,106 |
| | \$1,000 | 406,290 | 300,731 | 274,827 | 314,729 | 283,758 | 303,249 | 302,752 |
| | US\$/mt | 1,395 | 1,125 | 1,099 | 1,324 | 1,224 | 1,410 | 1,749 |
| Intra-EU | 1,000 mt | 440,959 | 506,493 | 481,115 | 465,797 | 487,107 | 464,259 | 465,589 |
| | \$1,000 | 852,322 | 705,845 | 685,007 | 767,450 | 673,051 | 736,021 | 835,492 |
| | US\$/mt | 1,933 | 1,394 | 1,424 | 1,648 | 1,382 | 1,585 | 1,794 |

North American markets, especially the United States and Canada, have also been major target destinations for fresh kiwifruit exporters. More recently, kiwifruit exporters have increasingly turned their attention to Asia. Japan has been the dominant Asian market for many years. However, other Asian markets have become more important as barriers to trade have gradually been removed. Many hopes are also being pinned on the potential of the Chinese market because of that country's large population of middle class consumers and rising affluence.

The table below shows how imports of fresh kiwifruit by the United States have grown over the last decade. Not all years are shown, to conserve space. Imports in 2015 were almost twice those in 2003. Surprisingly, off-season imports from the Southern Hemisphere have grown more slowly than those from the Northern Hemisphere, largely due to a decline in imports from New Zealand since 2011, when the effects of PSA were beginning to be felt. In contrast, imports from Western Europe more than tripled between 2003 and 2015, with Italy providing most of the supplies.

United States: Imports of Fresh Kiwifruit, 2003-2015 (metric tons)

| Partner | 2003 | 2005 | 2007 | 2009 | 2011 | 2012 | 2013 | 2014 | 2015 |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Chile | 17,422 | 18,054 | 20,580 | 19,679 | 22,180 | 31,668 | 32,589 | 20,654 | 29,897 |
| New Zealand | 10,500 | 13,112 | 18,477 | 20,398 | 20,334 | 11,062 | 7,263 | 8,879 | 14,412 |
| Peru | 0 | 0 | 0 | 13 | 8 | 0 | 0 | 0 | 18 |
| France | 20 | 56 | 0 | 40 | 22 | 21 | 0 | 83 | 85 |
| Greece | 760 | 961 | 730 | 214 | 180 | 172 | 300 | 968 | 465 |
| Italy | 6,153 | 8,892 | 10,778 | 13,188 | 14,691 | 19,408 | 20,600 | 24,831 | 23,389 |
| Spain | 16 | 0 | 0 | 0 | 86 | 35 | 19 | 0 | 13 |
| South Korea | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 11 |
| All Other | 0 | 33 | 70 | 21 | 21 | 6 | 1 | 21 | 13 |
| TOTAL | 34,871 | 41,108 | 50,635 | 53,550 | 57,522 | 62,372 | 60,772 | 55,436 | 68,292 |
| S Hemisphere | 27,922 | 31,166 | 39,057 | 40,087 | 42,522 | 42,730 | 39,852 | 29,533 | 44,327 |
| W Europe | 6,949 | 9,909 | 11,508 | 13,442 | 14,979 | 19,636 | 20,919 | 25,882 | 23,952 |

China Seen as Top Prize

As previously noted, many kiwifruit exporters, like other fresh fruit exporters that have seen worldwide production of their products rising, have been looking to China to take an increasing share of their exports. Their hope is that if China absorbs any increases in production, it will reduce downward pressure on world prices. The table below suggests that optimism about the Chinese market is not misplaced. Total imports of fresh kiwifruit rose from less than 3,000 metric tons in 2003 to over 90,000 metric tons in 2015. China's imports have rapidly overtaken those of former market leaders like Japan and the United States. On the other hand, risks from dependence on the Chinese market have increased.

China: Imports and Exports of Fresh Kiwifruit, 2003-2015 (metric tons)

| Partner | 2003 | 2005 | 2007 | 2009 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| Total Imports | 2,975 | 6,730 | 13,554 | 26,830 | 43,113 | 51,955 | 48,243 | 62,829 | 90,178 |
| New Zealand | 2,649 | 5,647 | 11,485 | 22,034 | 29,153 | 36,930 | 27,666 | 39,481 | 66,198 |
| Chile | 325 | 1,264 | 2,069 | 4,705 | 11,122 | 11,652 | 11,711 | 7,338 | 11,576 |
| France | 0 | 0 | 0 | 19 | 1,291 | 1,222 | 3,735 | 3,825 | 1,367 |
| Italy | 0 | 0 | 0 | 71 | 1,506 | 1,284 | 4,011 | 11,037 | 8,922 |
| Greece | 0 | 0 | 0 | 0 | 39 | 868 | 1,121 | 1,149 | 2,116 |
| Total Exports | 1,545 | 4,487 | 3,748 | 1,749 | 1,891 | 934 | 1,478 | 2,175 | 2,007 |
| Cent. Planned | 285 | 1,089 | 551 | 618 | 940 | 552 | 838 | 1,216 | 890 |
| NE Asia | 729 | 1,747 | 2,091 | 662 | 603 | 193 | 283 | 484 | 475 |
| SE Asia | 196 | 290 | 69 | 37 | 179 | 159 | 346 | 452 | 620 |
| Europe | 48 | 342 | 131 | 209 | 84 | 13 | 0 | 20 | 0 |
| N America | 280 | 741 | 327 | 15 | 0 | 0 | 0 | 1 | 0 |
| Middle East | 0 | 278 | 222 | 162 | 67 | 0 | 0 | 0 | 17 |
| Other | 7 | 0 | 357 | 46 | 18 | 17 | 11 | 2 | 5 |

However, the table above also shows that Chinese imports of fresh kiwifruit continue to be dominated by Southern Hemisphere suppliers like New Zealand and Chile. For example, in 2015, 73.4 percent of China's fresh kiwifruit imports came from New Zealand and 12.8 percent from Chile. Imports from France and Italy both fell in 2015. Imports from Greece have doubled from a low base, but the price of Greek products has been 15 to 30 percent below those from France or Italy. Clearly, the market window for imported fresh kiwifruit in the off-season is many times larger than that for product that would compete directly with Chinese producers.

China's past record as an importer of various fresh fruits has been unreliable. While direct imports into Chinese ports has grown, there continues to be a substantial indirect trade through Hong Kong in order to avoid the substantial burden of import tariffs and value added taxes. The Chinese authorities have placed temporary bans on numerous produce imports, such as California oranges, New Zealand apples and Philippine bananas, under various pretexts. Their monitoring of unofficial imports through Hong Kong has also varied in intensity. Thus, exporters need to be cautious about undue reliance on the Chinese market.

Italy Pivotal to European Trade

Europe continues to be the largest market in the world for fresh kiwifruit. Italy, being by far Europe's largest producer, continues to play a pivotal role in European trade. The volume of fresh kiwifruit that Italy exports sets the tone for prices across the continent. The share of Italian exports to the EU-28 has slipped in recent years, but was still over 66 percent in 2013-14 and 2014-15. Italy has made strenuous efforts to diversify its exports, and has made large gains in many other countries and regions, as shown in the table below. The loss of the Russian market in 2014-15 has led to increased expansion efforts in non-European markets. That expansion has been aided by recent weakness in the euro currency.

Italy: Fresh Kiwifruit Exports, by Destination, 2008-09 to 2014-15 (metric tons)

| Destination | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
|---------------------|---------|---------|---------|---------|---------|---------|---------|
| Germany | 67,829 | 72,653 | 63,050 | 60,461 | 55,862 | 52,300 | 52,720 |
| Spain | 52,528 | 48,818 | 45,812 | 39,343 | 39,543 | 42,484 | 42,647 |
| France | 31,980 | 25,827 | 21,416 | 24,161 | 20,468 | 21,207 | 27,589 |
| United Kingdom | 18,781 | 15,719 | 14,467 | 15,691 | 13,657 | 13,612 | 15,259 |
| Netherlands | 17,372 | 15,159 | 13,380 | 12,392 | 14,687 | 14,119 | 15,746 |
| Poland | 16,450 | 20,502 | 20,279 | 26,024 | 18,266 | 17,410 | 14,278 |
| Other EU-28 | 62,567 | 74,505 | 68,824 | 67,210 | 48,624 | 48,641 | 48,134 |
| Subtotal EU-28 | 267,507 | 273,183 | 247,228 | 245,282 | 211,107 | 209,773 | 216,373 |
| Russia | 13,339 | 17,841 | 15,837 | 18,396 | 11,735 | 8,112 | 37 |
| Other Europe | 11,616 | 12,623 | 11,241 | 9,654 | 9,689 | 8,902 | 8,176 |
| Russia/Other Europe | 24,955 | 30,464 | 27,078 | 28,050 | 21,424 | 17,014 | 8,213 |
| United States | 12,960 | 13,259 | 10,178 | 16,460 | 20,419 | 21,449 | 22,455 |
| Canada | 6,350 | 9,870 | 8,001 | 9,312 | 8,565 | 8,902 | 9,348 |
| North America | 19,310 | 23,129 | 18,179 | 25,781 | 28,984 | 30,351 | 31,803 |
| Cen & South America | 5,403 | 11,159 | 12,726 | 18,383 | 14,573 | 17,023 | 19,505 |
| Middle East | 5,311 | 8,825 | 9,002 | 11,437 | 9,576 | 7,920 | 10,764 |
| Asia | 9,569 | 11,534 | 13,287 | 12,299 | 13,659 | 20,511 | 22,835 |
| Oceania | 4,575 | 6,336 | 5,702 | 4,761 | 5,546 | 5,550 | 6,522 |
| Africa | 2,002 | 4,020 | 4,645 | 10,036 | 6,471 | 7,512 | 7,095 |
| All Other | 334 | 377 | 218 | 790 | 745 | 281 | 119 |
| TOTAL | 338,966 | 369,027 | 338,065 | 356,819 | 312,085 | 315,935 | 323,229 |

New Zealand Recovery on Track

The New Zealand kiwifruit industry was badly disrupted by the PSA outbreak. Exports, as reported by New Zealand Customs, fell by 13 percent between calendar years 2012 and 2013. In general, reductions were kept to a minimum in key markets like Japan and Spain, and were most severe in North America and South Korea. Total exports recovered in 2014, and are reported at new record levels in 2015. While European markets remain important at over 40 percent of total exports, there has been increased focus on Asian markets. Exports to North America have rebounded somewhat, but remain below the levels achieved prior to the impact of PSA in 2012.

New Zealand: Fresh Kiwifruit Exports, by Destination, 2008 to 2015 (metric tons)

| Destination | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015p |
|--------------------|---------|---------|---------|---------|---------|---------|---------|
| Italy | 15,671 | 16,912 | 17,015 | 17,342 | 13,850 | 17,597 | 17,358 |
| Spain | 43,015 | 47,530 | 44,304 | 43,821 | 42,214 | 37,542 | 47,332 |
| United Kingdom | 537 | 148 | 0 | 0 | 0 | 0 | 0 |
| Other EU-28 | 115,795 | 110,404 | 116,883 | 118,450 | 105,900 | 109,865 | 126,992 |
| Subtotal EU-28 | 175,018 | 174,923 | 178,160 | 179,613 | 161,964 | 165,004 | 191,682 |
| Russia | 496 | 746 | 1,276 | 1,585 | 1,696 | 775 | 689 |
| United States | 21,719 | 17,985 | 20,549 | 13,159 | 8,291 | 10,018 | 14,405 |
| Canada | 643 | 1,852 | 1,409 | 2,212 | 1,745 | 2,421 | 3,608 |
| Mexico | 3,763 | 2,830 | 3,232 | 1,745 | 911 | 1,895 | 1,932 |
| Subtotal N America | 26,125 | 23,667 | 25,290 | 17,116 | 10,947 | 14,334 | 19,945 |
| China | 21,664 | 25,329 | 32,956 | 40,196 | 32,223 | 46,105 | 59,454 |
| Japan | 57,903 | 61,346 | 63,733 | 70,145 | 68,612 | 76,500 | 76,872 |
| South Korea | 22,070 | 23,939 | 25,743 | 22,935 | 15,051 | 17,844 | 17,203 |
| Taiwan | 19,652 | 20,537 | 26,124 | 33,704 | 24,878 | 26,471 | 33,682 |
| Other Asia | 16,006 | 16,835 | 22,114 | 24,115 | 22,762 | 25,785 | 27,329 |
| Subtotal Asia | 137,295 | 147,986 | 170,670 | 191,095 | 163,526 | 192,705 | 214,540 |
| Middle East | 3,815 | 2,260 | 3,365 | 3,198 | 2,779 | 4,832 | 5,953 |
| Oceania | 15,344 | 15,316 | 18,062 | 18,901 | 16,069 | 17,515 | 15,754 |
| All Other | 2,933 | 3,628 | 4,405 | 4,394 | 4,975 | 5,203 | 5,342 |
| TOTAL | 361,026 | 368,526 | 401,498 | 415,902 | 361,956 | 400,368 | 453,905 |

Chile's Exports Rebound

Chilean exports of fresh kiwifruit were affected primarily by adverse weather, rather than the effect of PSA, in 2014 when they averaged less than half the 2012-2013 levels. The volume going to most major markets showed similar relative declines. Exports regained 2013 levels in 2015 in Asian markets, but had notable declines of more than 20 percent in its three leading EU-28 markets and in Russia. Regional Economic weaknesses may have contributed to these declines.

Chile: Fresh Kiwifruit Exports, by Destination, 2008 to 2015 (metric tons)

| Destination | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------|---------|---------|---------|---------|---------|---------|---------|
| Italy | 32,821 | 27,920 | 23,785 | 23,117 | 22,902 | 7,650 | 14,616 |
| Netherlands | 24,903 | 22,198 | 19,858 | 24,797 | 27,453 | 12,198 | 20,640 |
| Spain | 19,276 | 19,475 | 14,611 | 17,402 | 14,708 | 3,337 | 9,401 |
| United Kingdom | 8,884 | 7,380 | 7,795 | 9,038 | 6,760 | 6,050 | 7,687 |
| Other EU-28 | 16,295 | 12,212 | 11,342 | 10,662 | 10,560 | 6,136 | 10,364 |
| Subtotal EU-28 | 102,179 | 89,185 | 77,401 | 85,017 | 82,260 | 35,371 | 62,708 |
| Russia | 11,899 | 14,116 | 16,061 | 16,127 | 18,622 | 9,952 | 14,448 |
| United States | 19,853 | 22,480 | 22,216 | 30,699 | 32,074 | 20,534 | 28,984 |
| Canada | 3,437 | 3,841 | 3,358 | 4,074 | 3,467 | 2,409 | 2,783 |
| Mexico | 3,314 | 4,791 | 4,811 | 6,426 | 6,816 | 2,428 | 6,752 |
| Subtotal N America | 26,604 | 31,112 | 30,385 | 41,199 | 42,357 | 25,371 | 38,519 |
| Cen & South America | 23,293 | 26,377 | 26,610 | 36,521 | 35,921 | 16,219 | 33,619 |
| China | 0 | 499 | 2,130 | 7,222 | 11,409 | 6,696 | 11,548 |
| Japan | 935 | 1,726 | 2,126 | 2,678 | 1,714 | 1,129 | 1,681 |
| South Korea | 5,428 | 5,806 | 4,056 | 8,269 | 6,681 | 3,155 | 6,263 |
| Taiwan | 804 | 76 | 291 | 1,582 | 1,316 | 1,092 | 1,486 |
| Other Asia | 5,587 | 4,475 | 6,269 | 3,567 | 1,447 | 854 | 2,067 |
| Subtotal Asia | 12,754 | 12,582 | 14,872 | 23,318 | 22,567 | 12,926 | 23,045 |
| Middle East | 4,752 | 7,779 | 8,220 | 7,329 | 8,922 | 1,378 | 7,585 |
| Oceania | 0 | 0 | 17 | 31 | 21 | 6 | 23 |
| All Other | 1,583 | 1,290 | 719 | 4,843 | 2,408 | 1,164 | 1,268 |
| TOTAL | 182,771 | 181,870 | 178,131 | 214,484 | 213,078 | 102,387 | 181,215 |

Greek Exports Recover

Total Greek exports of fresh kiwifruit recovered somewhat in the 2014-15 season after dropping by one third in 2013-14 season from the record levels of 2012-13. However, in the meantime, the Russian ban on imports of produce from the EU had kicked in. As the largest EU supplier of the Russian market, Greece had to scramble to find alternative markets. In 2014-15, it reached record levels of penetration of both western European markets such as the EU-15, and of Eastern and Central European markets that were newer member states of the European Union, the EU-NMS. This brought considerable downward pressure on prices in Western European markets. Greece also doubled its exports to Asia, the Middle East, and all other countries, primarily in Africa, and made big percentage gains in sales in Canada and China.

Greece: Fresh Kiwifruit Exports, by Destination, 2008-09 to 2014-15 (metric tons)

| Destination | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
|-----------------------|---------|---------|---------|---------|---------|---------|---------|
| EU-15 | 7,473 | 7,813 | 8,991 | 13,040 | 26,104 | 17,172 | 40,782 |
| EU-NMS | 14,264 | 21,213 | 17,257 | 16,179 | 28,096 | 17,393 | 33,606 |
| EU-28 Total | 21,737 | 29,026 | 26,248 | 29,219 | 54,200 | 34,565 | 74,388 |
| Russia | 16,463 | 15,260 | 19,071 | 29,076 | 33,185 | 22,915 | 0 |
| Other Europe | 11,387 | 18,706 | 18,193 | 19,902 | 22,812 | 15,021 | 15,502 |
| Russia/Other Europe | 27,850 | 33,966 | 37,264 | 48,978 | 55,997 | 37,936 | 15,502 |
| United States | 214 | 43 | 164 | 128 | 317 | 867 | 511 |
| Canada | 99 | 104 | 129 | 174 | 478 | 186 | 665 |
| Subtotal N America | 313 | 147 | 293 | 302 | 795 | 1,093 | 1,176 |
| China | n.a. | n.a. | n.a. | 548 | 1,167 | 1,210 | 1,846 |
| Other Asia | n.a. | n.a. | n.a. | 264 | 1,156 | 523 | 1,625 |
| Subtotal Asia | 93 | 301 | 302 | 812 | 2,323 | 1,733 | 3,471 |
| Turkey | n.a. | n.a. | n.a. | 2,393 | 367 | 59 | 1,037 |
| Other Middle East | n.a. | n.a. | n.a. | 3,454 | 3,000 | 3,467 | 6,310 |
| Subtotal, Middle East | 353 | 1,555 | 2,085 | 5,847 | 3,367 | 3,526 | 7,347 |
| All Other | 149 | 534 | 119 | 2,342 | 3,397 | 1,197 | 3,276 |
| TOTAL | 50,495 | 65,529 | 66,311 | 87,500 | 120,079 | 79,730 | 105,160 |

France Struggles to Diversify Exports

Exports of fresh kiwifruit from France have been heavily dependent on neighboring countries in Western Europe for many years. Like the French domestic market, those countries have been burdened by sluggish economic growth since the onset of the Great Recession. In addition, there is intense competition from other European suppliers like Italy and Greece. Efforts in the last decade to diversify exports to other countries in North America or Asia have been impeded by the strength of the euro. However, the value of the euro has fallen dramatically in the last two years, at the same time that French supplies available for export have been depressed. The unity of the 28-member European Union remains under stress, economic growth remains slow, and the 19-member euro currency system is under challenge. All of these factors create additional uncertainty for French kiwifruit exporters.

France: Fresh Kiwifruit Exports, by Destination, 2008-09 to 2014-15 (metric tons)

| Destination | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
|--------------------|---------|---------|---------|---------|---------|---------|---------|
| Germany | 3,248 | 2,992 | 2,653 | 2,877 | 3,592 | 2,992 | 2,611 |
| Spain | 6,341 | 5,801 | 4,497 | 3,419 | 3,627 | 3,493 | 3,028 |
| Belgium-Luxembourg | 5,751 | 5,852 | 3,758 | 4,990 | 6,297 | 5,953 | 5,317 |
| Other EU-28 | 3,583 | 3,887 | 3,127 | 2,507 | 2,214 | 1,664 | 1,807 |
| Subtotal EU-28 | 18,089 | 18,532 | 14,035 | 13,793 | 15,730 | 14,102 | 12,763 |
| United States | 42 | 101 | 0 | 21 | 0 | 83 | 80 |
| Canada | 20 | 224 | 267 | 115 | 62 | 123 | 0 |
| Subtotal N America | 62 | 325 | 267 | 136 | 62 | 206 | 80 |
| China | 0 | 769 | 1,169 | 1,465 | 3,649 | 3,484 | 1,750 |
| Hong Kong | 327 | 202 | 715 | 2,369 | 451 | 0 | 2 |
| Taiwan | 1,800 | 2,353 | 2,495 | 1,532 | 3,575 | 2,589 | 2,883 |
| Other Asia | 327 | 375 | 590 | 332 | 605 | 1,058 | 1,122 |
| Subtotal, Asia | 2,127 | 4,563 | 4,969 | 5,695 | 8,480 | 7,131 | 5,757 |
| Australia | 105 | 483 | 924 | 630 | 882 | 567 | 63 |
| All Other | 1,186 | 782 | 385 | 1,317 | 872 | 851 | 885 |
| TOTAL | 21,569 | 24,685 | 20,580 | 21,571 | 26,026 | 22,857 | 19,548 |

Iran Major Player

Little information has been available in the past on the export prowess of Iran in fresh kiwifruit. However, recent data from Iran Customs indicate that export volumes have continued to grow through the year 2013. As one might expect, most Iranian exports of fresh kiwifruit go to neighboring countries that can be accessed by land routes and that are not involved in western sanctions against trade with Iran. The average prices tend to be one-half or less of the prices received by large western exporters. The largest individual markets have been Russia, Iraq, Turkey and the United Arab Emirates. Exports have also been growing to Central Asia. However, exports to different destinations have been quite erratic from year to year, but there is insufficient information to explain these fluctuations.

Iran: Fresh Kiwifruit Exports, by Destination, 2010-2013 (metric tons)

| Destination | 2010 | 2011 | 2012 | 2013 |
|----------------------|--------|--------|--------|--------|
| | | | | |
| Russia | 7,333 | 9,387 | 11,494 | 28,616 |
| Other Eastern Europe | 430 | 2,126 | 2,274 | 3,715 |
| Subtotal | 7,763 | 11,513 | 13,768 | 32,331 |
| | | | | |
| Iraq | 16,644 | 44,490 | 35,833 | 14,869 |
| Turkey | 9,314 | 5,511 | 7,439 | 12,134 |
| United Arab Emirates | 5,023 | 4,289 | 7,872 | 9,027 |
| Other Middle East | 4,154 | 3,118 | 1,620 | 1,332 |
| Subtotal Middle East | 35,135 | 57,408 | 52,764 | 37,362 |
| | | | | |
| Central Asia | 2,120 | 1,996 | 5,315 | 6,955 |
| South Asia | 3,751 | 2,239 | 3,586 | 3,359 |
| | | | | |
| All Other | 81 | 26 | 90 | 631 |
| | | | | |
| TOTAL | 48,850 | 73,182 | 75,523 | 80,638 |

Recent geopolitical developments in the Middle East have brought improved relations between Iran and Russia. As a result, Iran should be able to capitalize on the Russian boycott of fresh produce from the EU-28, the United States and Turkey.

Other Fresh Kiwifruit Exporters

A number of other countries play a modest, or poorly documented, role in world exports of fresh kiwifruit. Of these, the three most important have been the United States, Portugal and Spain. Most United States exports have gone to its North American neighbors, Mexico and Canada. Most of Portugal's exports go to neighboring Spain, while most Spanish exports go to neighboring Portugal or France, or to markets in North Africa, like Algeria and Morocco. Other countries, like Belgium, the Netherlands, Germany and Hong Kong, are important re-exporters of kiwifruit produced in other countries.

Prospects for World Trade in Fresh Kiwifruit

World trade in fresh kiwifruit appears to have rebounded in 2015 and is likely to continue to expand in the near future as production increases in major producing-exporting countries like New Zealand, Chile, Italy and Greece. Much of the potential in Asia and other emerging markets remains to be tapped. The industry can now offer retailers and consumers a diversified portfolio of kiwifruit products, and more innovations are in the pipeline.

However, exporters will face a number of major headwinds, including sluggish economic growth in many traditional importing countries. The bans imposed by Russia due to the dispute over Ukraine, and the tiff with Turkey, have disrupted normal trade patterns. Countries not affected by the ban have remained wary of increasing sales to Russia because of the dramatic fall in Russian purchasing power. Economic growth in Russia has slowed as the price of oil and other key commodities has slumped, and as the value of the Russian ruble has plunged.

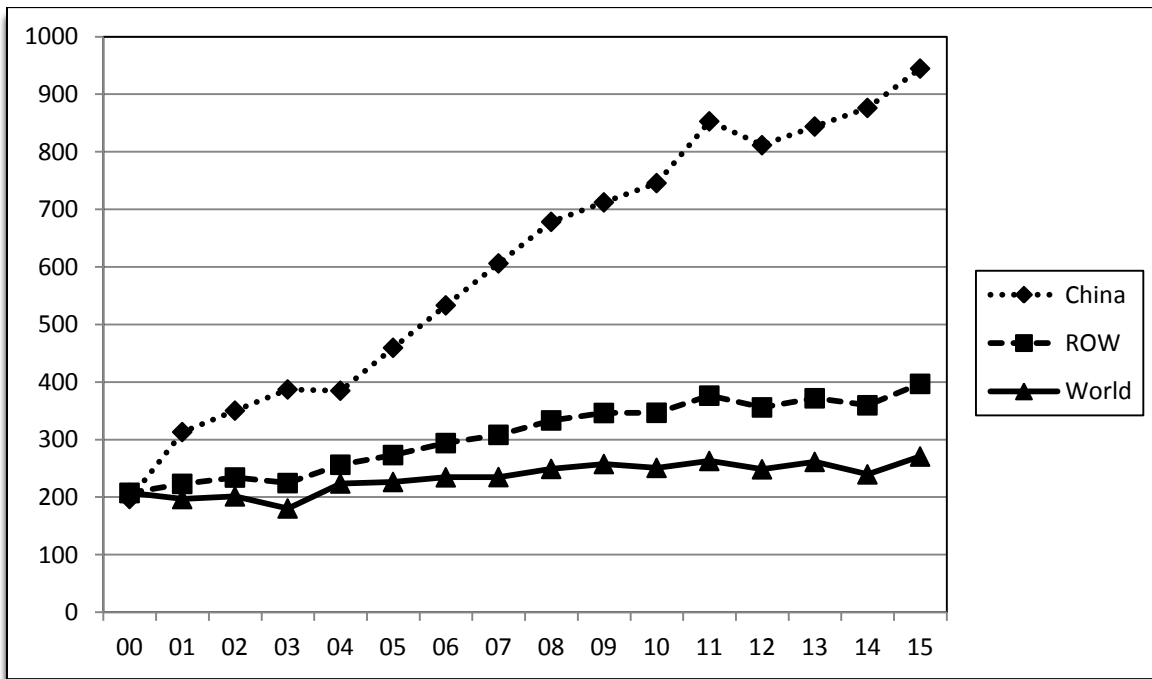
China continues to offer a growth market, particularly for off-season Southern Hemisphere supplies. However, the Chinese economy has also been slowing. In addition, China has the potential to enter the international market with unique kiwifruit offerings developed from its rich trove of kiwifruit plant materials. An increased Chinese presence in international kiwifruit markets could dramatically alter the global competitive landscape for fresh kiwifruit.

III. Consumption of Fresh Kiwifruit

Per Capita Kiwifruit Availability Skewed

Because the location of production of kiwifruit remains highly skewed, the per capita availability of kiwifruit is also highly skewed. Per capita availability provides the basis for domestic consumption and for exports to other countries. The chart below shows the per capita availability of kiwifruit in the largest producing country, China, and in the rest of the world where kiwifruit are produced. Per capita availability in China has been on a long, upward trend. Since almost all of that supply is consumed within China, it is also a good indicator of the trend in per capita consumption. Per capita availability among other producing countries has been rising, but at a lower level, and a slower rate than in China. By 2015-16, per capita availability in China was about three times that among all other producing countries. Per capita availability in other producing countries is not an accurate indicator of consumption trends because so much of that product is exported.

World: Kiwifruit Availability, China and the Rest of the World, 2000-2015
(grams per capita)



However, when total world production is divided by total world population, per capita availability throughout the world is dramatically lower than in the major producing countries. More importantly, the rate of growth in worldwide per capita availability has been relatively slow. This can be viewed both negatively and positively. On the negative side, it suggests that the kiwifruit industry has been slow to expand supplies for the rest of the world. On the positive side, it suggests that there may be considerable potential to expand supplies to bring per capita availability in non-producing countries up to the levels achieved in producing countries. Much can be learned from the trajectory of per capita consumption in producing countries.

Supplies for Consumption, by Country

In previous issues of the World Kiwifruit Review, we have examined supplies of kiwifruit for consumption among producing countries over long periods of time. However, the earlier years between 1960 and 1990 were periods of rapid over-expansion of supplies that were followed by periods of sharp contraction in most producing countries. It is only since 2000 that kiwifruit production has become more stable and fresh kiwifruit products have settled into a relatively secure niche for both retailers and consumers. Accordingly, in this issue, we focus on more recent developments among the major kiwifruit producing countries. Data are presented on the next page for the 12 major producing countries for which reasonably reliable data were available for the periods 2003-2006 and 2013-2016. The table shows how production, imports, exports, domestic disappearance, and domestic disappearance per capita have changed between the two periods.

In the 2003-06 period, per capita domestic disappearance of fresh kiwifruit exceeded 3 kilograms only in New Zealand, and was close to 3 kilograms in two other countries, Italy and Spain. It exceeded 2 kilograms in Greece, was close to 2 kilograms in Portugal, and about 1.75 kilograms in France. It was less than 1 kilogram in all the other (non-European) producing countries, with the United States by far the lowest at less than 0.2 kilograms. Between 2003-06 and 2013-16, per capita domestic disappearance increased in nine of the twelve countries. The greatest percentage increase was in New Zealand, but Greece, China and Chile, all major producers, also had very substantial percentage increases. Among European countries, only France had a significant percentage decrease.

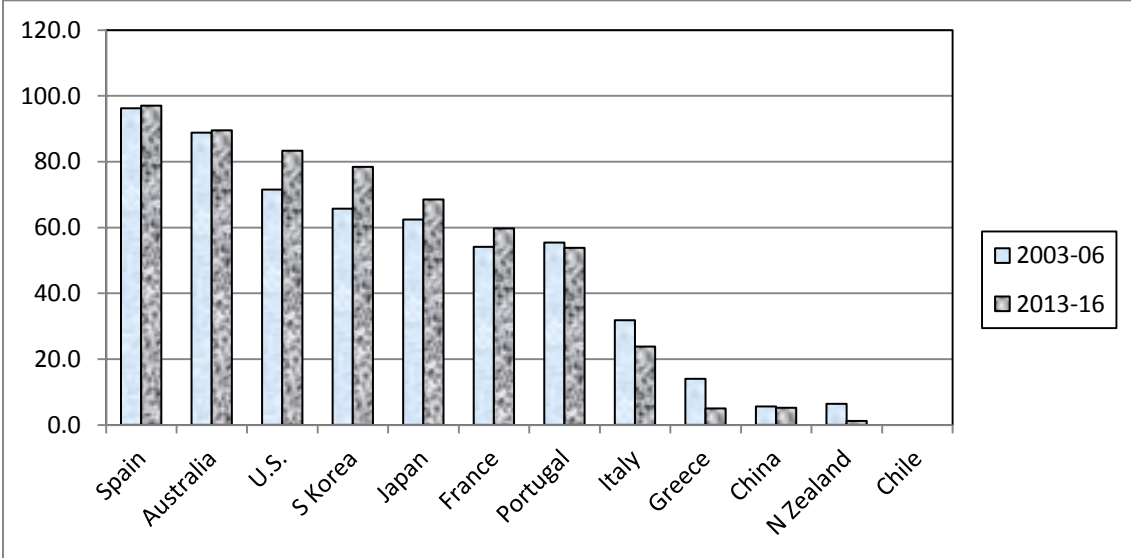
Major Kiwifruit Producing Countries: Production, Trade and Domestic Disappearance, Selected Three-year Periods.

| Country | Period | Production | Imports | Exports | Domestic Disappearance | Domestic Disappearance |
|---------------|---------|------------|---------|---------|------------------------|------------------------|
| | | (mt) | (mt) | (mt) | (mt) | (grams per cap) |
| Italy | 2003-06 | 389,013 | 55,436 | 269,864 | 174,585 | 2,992.8 |
| | 2013-16 | 484,072 | 43,482 | 345,055 | 182,499 | 3,052.5 |
| | % chg | + 24.4 | - 21.6 | + 27.9 | + 4.5 | + 2.0 |
| France | 2003-06 | 76,195 | 57,501 | 27,356 | 106,340 | 1,747.4 |
| | 2013-16 | 60,935 | 56,665 | 22,642 | 94,958 | 1,480.9 |
| | % chg | - 20.0 | - 1.5 | - 16.2 | - 10.7 | - 15.3 |
| Greece | 2003-06 | 55,349 | 3,646 | 32,933 | 26,062 | 2,358.7 |
| | 2013-16 | 160,933 | 2,554 | 112,620 | 50,867 | 4,622.7 |
| | % chg | + 190.8 | - 30.0 | + 242.0 | + 95.2 | + 96.0 |
| Spain | 2003-06 | 13,748 | 122,205 | 8,851 | 127,097 | 2,944.4 |
| | 2013-16 | 18,832 | 131,397 | 14,742 | 135,487 | 2,927.6 |
| | % chg | + 37.0 | + 8.8 | + 66.6 | + 6.6 | - 0.6 |
| Portugal | 2003-06 | 10,909 | 11,175 | 1,915 | 20,169 | 1,931.7 |
| | 2013-16 | 22,014 | 11,536 | 12,124 | 21,426 | 2,059.4 |
| | % chg | + 101.8 | + 3.2 | +533.1 | + 6.2 | + 6.6 |
| United States | 2003-06 | 26,580 | 37,715 | 11,555 | 52,740 | 179.7 |
| | 2013-16 | 24,419 | 61,500 | 12,066 | 73,853 | 231.2 |
| | % chg | - 8.1 | + 63.1 | + 4.4 | + 40.0 | + 28.7 |
| China | 2003-06 | 533,333 | 31,729 | 578 | 564,484 | 434.7 |
| | 2013-16 | 1,216,667 | 67,140 | 1,826 | 1,281,981 | 936.2 |
| | % chg | + 128.1 | + 111.6 | + 215.9 | + 127.6 | + 115.6 |
| Japan | 2003-06 | 34,300 | 57,034 | 0 | 91,334 | 720.5 |
| | 2013-16 | 31,075 | 67,486 | 31 | 98,530 | 777.2 |
| | % chg | - 9.4 | + 18.3 | n.a. | + 7.9 | + 7.9 |
| South Korea | 2003-06 | 10,898 | 20,900 | 0 | 31,798 | 669.2 |
| | 2013-16 | 7,000 | 25,355 | 2 | 32,353 | 646.1 |
| | % chg | - 35.8 | + 21.3 | n.a. | + 1.7 | - 3.5 |
| Australia | 2003-06 | 3,392 | 17,133 | 1,230 | 19,295 | 964.8 |
| | 2013-16 | 3,000 | 21,883 | 421 | 24,462 | 1,035.4 |
| | % chg | - 11.6 | + 27.7 | - 65.8 | + 26.8 | + 7.3 |
| Chile | 2003-06 | 140,000 | 0 | 124,876 | 15,124 | 950.4 |
| | 2013-16 | 193,353 | 6 | 168,176 | 25,183 | 1,417.8 |
| | % chg | + 38.1 | n.a. | + 34.7 | + 66.5 | + 49.2 |
| New Zealand | 2003-06 | 288,333 | 836 | 276,113 | 13,056 | 3,201.5 |
| | 2013-16 | 404,112 | 937 | 326,217 | 78,832 | 17,532.6 |
| | % chg | + 40.2 | + 12.1 | + 18.1 | + 503.8 | + 447.6 |

The table on the previous page allows us to spotlight what factors contributed to the changes in per capita domestic disappearance. In the cases of Greece, China, Chile and New Zealand, large increases in domestic production made greater supplies available for domestic consumption. Italy also had large increases in production, but most of that was steered towards increased exports. In the case of France, decreases in production were not offset by significant increases in imports. In Spain and Portugal, increased production was offset to some extent by increases in exports. In South Korea, reduced production was not quite offset by increases in imports. The United States, Japan and Australia experienced reduced production, but substantial increases in imports helped lead to increased per capita domestic disappearance. Thus, for three of the twelve countries, increased per capita domestic disappearance was heavily influenced by increased production, and in three other countries by increased imports.

Excluding Greece and New Zealand, that are heavily export-oriented, the disparity in levels of per capita consumption had narrowed somewhat over the decade. It indicates that the kiwifruit industry has lost some ground in the markets that were traditionally most receptive, and has been successful in increasing per capita disappearance in markets that were traditionally weaker. Per capita domestic disappearance has generally avoided erosion in Europe, and has increased in major import markets like the United States, China, Japan and Australia.

Major Kiwifruit Producing Countries: Import Dependence, 2003-06 and 2013-16 (percent)



The chart above shows what percentage of domestic disappearance in each country came from imports in the two periods. In general, import dependence increased in all six major importing countries between 2003-06 and 2013-16, although the increase only exceeded 10 percent in two countries, the United States and South Korea. In general, it decreased, or remained the same in all six other producing countries. Thus, there continued to be a disparity in the role imports played in kiwifruit consumption in major producing countries.

Non-Producing European Union Member Countries: Per Capita Consumption of Fresh Kiwifruit, Calendar Years, 2002-2015 (Annual average grams per capita)

| Region | Country | 2002-04 Average (grams) | 2005-07 Average (grams) | 2008-10 Average (grams) | 2011-13 Average (grams) | 2014-15 Average (grams) |
|------------|----------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| EU-15 | Austria | 915 | 1,228 | 1,270 | 1,321 | 1,139 |
| | Belgium | n.a. | 1,897 | 2,329 | 1,404 | 1,086 |
| | Denmark | 680 | 774 | 992 | 748 | 605 |
| | Finland | 490 | 578 | 627 | 632 | 619 |
| | Germany | 1,081 | 1,397 | 1,371 | 1,184 | 1,134 |
| | Ireland | 609 | 852 | 970 | 872 | 577 |
| | Luxembourg | 1,539 | 1,529 | 2,102 | 2,000 | 1,774 |
| | Netherlands | 992 | 1,280 | 2,053 | 2,779 | 1,601 |
| | Sweden | 934 | 1,102 | 1,124 | 1,101 | 1,020 |
| | United Kingdom | 528 | 653 | 556 | 491 | 453 |
| | Subtotal | 849 | 1,121 | 1,173 | 1,084 | 914 |
| EU-28, NMS | Bulgaria | 316 | 421 | 232 | 340 | 365 |
| | Croatia | 425 | 479 | 741 | 736 | 559 |
| | Cyprus | 789 | 963 | 1,004 | 877 | 834 |
| | Czech Republic | 1,065 | 1,299 | 1,158 | 723 | 545 |
| | Estonia | 558 | 749 | 922 | 588 | 821 |
| | Hungary | 688 | 424 | 337 | 305 | 510 |
| | Latvia | 785 | 802 | 827 | 860 | 630 |
| | Lithuania | 503 | 370 | 354 | 267 | 159 |
| | Malta | 1,427 | 1,209 | 1,369 | 1,313 | 1,017 |
| | Poland | 421 | 661 | 590 | 540 | 589 |
| | Romania | 111 | 359 | 289 | 344 | 412 |
| | Slovakia | 709 | 1,174 | 975 | 850 | 707 |
| | Subtotal | 478 | 640 | 570 | 513 | 529 |

Consumption in Non-Producing Countries

Since there many more non-producing countries than countries that produce kiwifruit, consumption trends in those countries are of great importance to the future expansion of kiwifruit sales. The table above shows trends in per capita consumption of fresh kiwifruit in two categories of non-producing countries in Europe. The first category includes original members of the EU-15, countries with highly developed economies and relatively high per capita incomes. The second category includes New Member States (NMS) that joined the European Union after 2004. In general, EU-28 NMS have economies in transition to free markets, and per capita incomes half or less of those in the EU-15. Per capita consumption in each country and region was measured as fresh imports minus fresh exports divided by the appropriate population. The data are shown for three-year averages of calendar years between 2002 and 2013, and for the two-year average of 2014 and 2015.

On average, per capita consumption in the non-producing member countries of the EU-15 were close to one kilogram in each period, less than half the estimated per capita domestic disappearance in producing countries. In turn, average per capita consumption in the EU-28 NMS countries was about half that of the non-producing EU-15 countries. In both cases, estimated per capita consumption in 2014-15 was lower than in either 2005-07 or 2008-10. Six of the ten non-producing countries in the EU-15 had per capita consumption above one kilogram in 2014-15, while only one of the twelve EU-28, NMS countries (Malta) attained that level. However, in all of these countries per capita consumption in 2014-15 was below previous peak levels.

The remaining four EU-15 non-producing countries reported per capita consumption of 0.6 kilograms or less. All tended to be Northern European countries furthest removed from the producing areas in Southern Europe. Sweden was the exception in being a Northern European country with per capita consumption of at least one kilogram. Only two other EU-28, NMS countries, Cyprus and Estonia, had per capita consumption exceeding 0.8 kilograms. Three countries, Bulgaria, Lithuania and Romania, had per capita consumption of less than one half kilogram. Romania was the only country where per capita consumption exceeded the recent peak in 2014-15. In general, the trend in per capita consumption of fresh kiwifruit has been negative in these countries.

Data for non-producing countries outside the EU are less complete and less up to date than those for the EU. However, using the same methodology as for EU non-producing countries, the results provide useful guides to consumption trends in many different countries and regions around the world, displayed in the table below. Data were only available through calendar year 2014.

Non-Producing Countries outside the EU: Per Capita Consumption of Fresh Kiwifruit, Calendar Years, 2002-2014 (Annual average grams per capita)

| Region | Country | 2002-04 Average (grams) | 2005-07 Average (grams) | 2008-10 Average (grams) | 2011-13 Average (grams) | 2014 p (grams) |
|----------------------|--------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------|
| Europe, Non-EU | Iceland | 862 | 870 | 713 | 718 | 736 |
| | Norway | 766 | 960 | 1,066 | 1,041 | 869 |
| | Switzerland | 1,197 | 1,396 | 1,599 | 1,403 | 1,260 |
| | Subtotal | 1,148 | 1,219 | 1,374 | 1,250 | 1,100 |
| Russian Federation | Subtotal | 193 | 348 | 476 | 695 | 488 |
| East Asia | Hong Kong | 728 | 1,022 | 1,491 | 1,575 | 1,565 |
| | Singapore | 486 | 541 | 681 | 701 | 863 |
| Middle East | Bahrain | 2,381 | 1,911 | 1,733 | 525 | 961 |
| | Saudi Arabia | 324 | 287 | 283 | 475 | n.a. |
| | UA Emirates | 1,002 | 783 | 1,237 | 253 | n.a. |
| | Oman | 812 | 578 | 284 | 347 | 692 |
| | Qatar | 2,030 | 1,192 | 1,364 | 339 | 661 |
| | Subtotal | 164 | 191 | 202 | 178 | n.a. |
| Americas | Canada | 452 | 582 | 644 | 615 | 532 |
| | Mexico | 73 | 90 | 96 | 109 | 72 |
| | Argentina | 81 | 116 | 198 | 284 | 120 |
| | Brazil | 31 | 38 | 76 | 133 | 110 |
| | Colombia | 21 | 33 | 46 | 97 | 100 |
| Africa | All | 5 | 14 | 20 | 40 | 23 |
| C America/ Caribbean | All | 10 | 17 | 21 | 32 | 22 |
| Southeast Asia | All | 13 | 13 | 28 | 32 | 43 |
| South Asia | All | 0.2 | 0.9 | 1.5 | 3.9 | 5.1 |

The table above shows the wide variability in per capita consumption of fresh kiwifruit both between regions and between countries within regions. The long term trend has generally been upwards in all regions except the non-producing countries in Europe that are not in the EU. However, there was a general slowdown in per capita consumption in 2014. Presumably, with lower total world exports, suppliers focused more of their efforts on their largest, traditional markets. The decline in 2014 may also have been affected by economic distress in many of the countries and regions featured here.

The highest per capita consumption was in the non-EU countries of Western Europe, and the high-income city states of East Asia and the Middle East. However, per capita consumption was exceptionally erratic in the Middle East. It is not clear whether this reflects actual consumption or is the result of inconsistent reporting of trade data in that region. A number of countries had strong percentage gains in consumption between 2002-04 and 2011-13, including Hong Kong (+116%), Saudi Arabia (+47%), Singapore (+44%) and Canada (+36%). Latin American countries had even stronger rates of growth from a much lower base, including Colombia (+362%), Brazil (+329%), Argentina (+251%), and Mexico (+49%). Rates of growth from an even lower base were also strong for Africa, Central America and the Caribbean, Southeast Asia and South Asia. The latter offer great future potential both because of their large populations and their resistance to the economic downturn in 2014.

Many other countries and regions not discussed here, appear to have the potential to increase per capita consumption of fresh kiwifruit in the next decade. However, the major exporting countries will need to make strategic decisions on how to allocate their marketing and promotional efforts in order to maximize the volume and value of their export sales.

IV. Prices of Fresh Kiwifruit

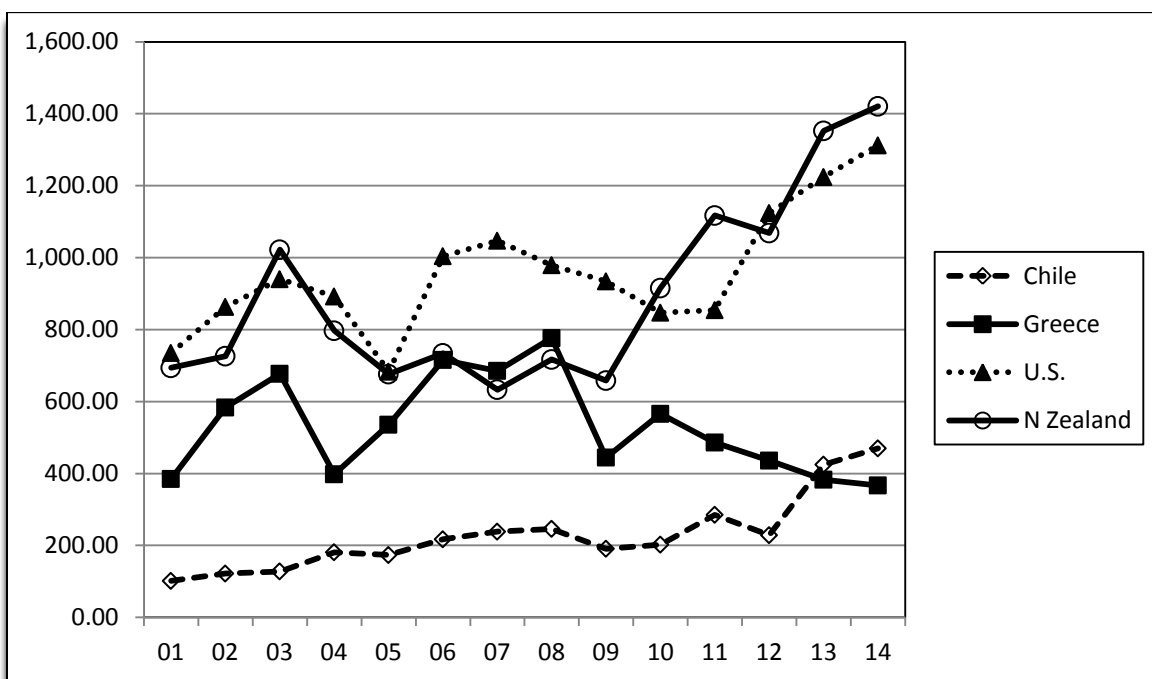
Importance of Price Trends

Much of the discussion in previous chapters has focused on the volume of kiwifruit produced or traded in various countries and regions. However, in many cases, larger volumes are associated with lower prices, revenues and profits for producers. Thus, it is vital to know how prices have been, and will be, affected by different market situations.

International Price Trends

There are limited data available comparing price trends for producers of kiwifruit in different countries. The UN,FAO has recently updated a series of annual producer prices of kiwifruit in selected countries. However, data are not available for some prominent producing countries like Italy. The chart below shows producer prices in US\$ per metric ton for four major producing countries, Chile, Greece, the United States and New Zealand, on four different continents.

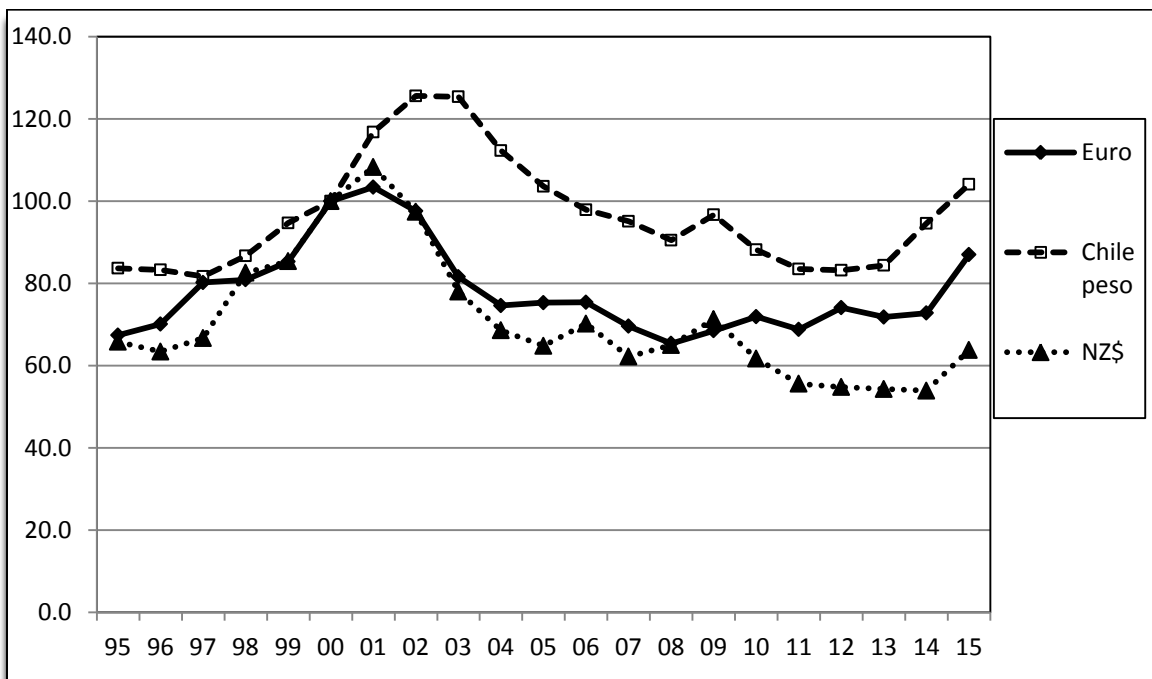
**Major Producing Countries: Producer Prices of Kiwifruit, 2001-2014
(US\$ per metric ton)**



During the period covered, by far the highest producer prices were received by growers in the United States and New Zealand, with U.S. prices higher in 8 of the 14 years, and Chile in 6 years. Both showed a strong upward trend between 2010 and 2014 after generally moving sideways in the previous decade. By far the lowest producer prices for 12 of the 14 years was for Chile. Prices in Chile had a gradual upward trend between 2001 and 2012 before moving upward sharply after 2012. Producer prices in Greece generally occupied a mid range between the highest and the lowest prices. However, prices moved down gradually after 2008, before dropping below the level in Chile in 2013 and 2014. The lower producer prices in Greece coincided with very large increases in production and exports discussed in previous chapters.

Converting producer prices in each country to US\$ makes international comparisons possible. However, it also introduces distortions if the exchange rate between the U.S. dollar and the local currencies deviate significantly over time. The chart below shows how the euro, Chilean peso and New Zealand dollar have fared against the US\$ since 1995.

**Major Producing Countries: U.S. Dollars
per Selected Currency, 1995-2015**
(Index, Year 2000 Rate = 100)



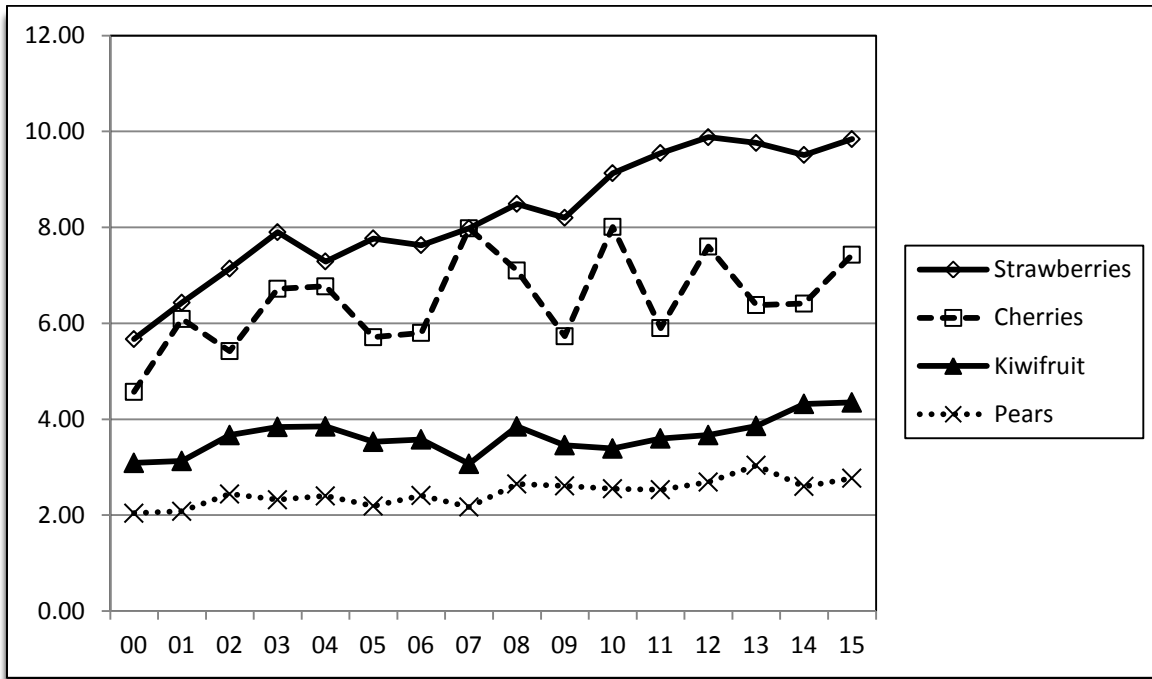
In the last few years of the 1990s, all three currencies weakened against the U.S. dollar. That meant that the price received on the international market in U.S. dollars converted to a higher return in the domestic currency. Between 2000 and 2002, this relationship peaked for all three currencies. Thereafter, for the next decade, all three currencies strengthened against the U.S. dollar, leading to lower returns in domestic currencies for any sales made in US\$. However, beginning in 2012, and continuing through 2016, the trend reversed. All three currencies weakened against the U.S. dollar, and provided windfall gains in the domestic currencies. While the general trends have been similar for all three domestic currencies, the extent of producer gains or losses from changes in exchange rates have varied over time between countries. While exporters can divert some product to different markets to take advantage of such distortions, and can hedge against unfavorable movements in exchange rates, they remain at the mercy of volatility in exchange rates.

Prices of Kiwifruit versus Major Fresh Fruits

An important constraint on the prices paid for an item like fresh kiwifruit is where it sits in the hierarchy of consumer preferences as expressed in actual purchases. The chart below shows the annual average retail prices of fresh kiwifruit in France compared to the prices for fresh pears, fresh sweet cherries and fresh strawberries. Prices of pears tended to move closely in step with those of the main deciduous fruit, fresh apples, so they are a good proxy for mainstream fruits. Sweet cherries are a highly seasonal item that generally sell at a very substantial premium to the mainstream deciduous fruits. Because sweet cherry supplies are highly sensitive to occasional adverse weather, retail prices of sweet cherries tended to fluctuate widely from year to year. In contrast, producers have much greater control over the volume of strawberries that will be placed on the market at any time, so prices tended to be more stable both within and between seasons.

Retail prices of fresh kiwifruit in France between 2000 and 2015 were consistently about 50 percent above the prices of fresh pears. However, they also averaged about 56 percent of the prices of fresh sweet cherries and 44 percent of the price of fresh strawberries. While the prices of all four fruits increased over time, there is evidence that the fruits with higher prices in 2000, had greater percentage increases in prices between 2000 and 2015. This suggest that consumers have been showing increasing preferences for the higher-priced items.

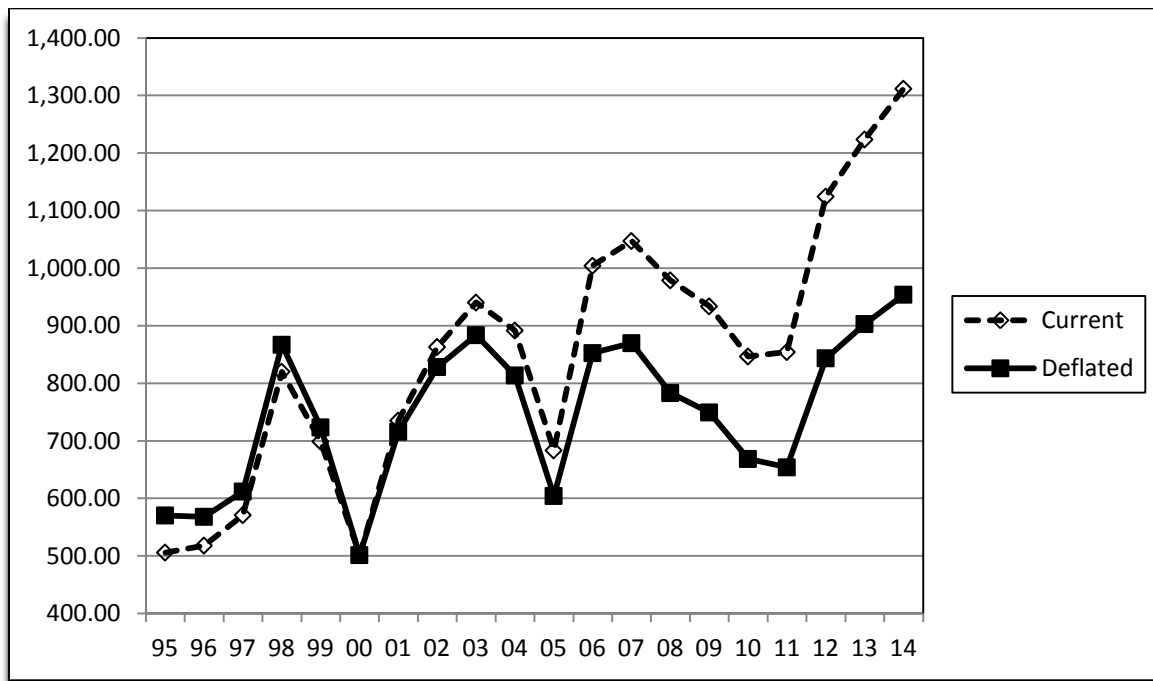
France: Retail Prices of Kiwifruit and Competing Fruits, Calendar Years, 2000-2015 (euros per kilogram)



Effect of Inflation on Prices

The previous chart on French retail prices did not take account of the changes in prices due to general inflation. Even a very low level of inflation, for example, 2 percent per year, can have a large distorting effect on prices over a longer period of time. An average inflation rate of 2 percent means that in a decade average costs and prices will rise by almost 22 percent. Thus, at the end of a decade, producers would need to receive current prices at least 22 percent above those at the beginning of the decade just to stand still. The chart below shows how inflation in the United States affected grower prices in the two decades between 1995 and 2014. In current dollar terms (dashed line), grower prices set new records in 1998, 2003, 2007, and each year between 2012 and 2014. However, after accounting for inflation using the 2000 year as a base (solid line), the 1998 peak price was not clearly exceeded until 2014. In many seasons after 1998, grower prices in real terms were actually far below the 1998 peak.

United States: Current and Deflated Grower Prices of Kiwifruit, 1995-2014 (US\$ per metric ton)



While U.S. grower prices of kiwifruit rose by 159 percent in current terms between 1995 and 2014, they rose by only 67 percent in deflated terms. This shows the extent of the erosion of purchasing power over those two decades. Inflation is not all bad for farmers. It usually contributes to an escalation in land values. It also means that long-term borrowings can be repaid with cheaper dollars. Thus, growers have learned how to cope with moderate inflation. However, because of recent economic conditions in many countries, monetary authorities are worried that the opposite phenomenon, deflation, is becoming more of a threat. Deflation indicates a general decline in price levels. If deflation became widespread, it could cause land values to decline and mean that long-term borrowings would have to be repaid in more expensive dollars. An economy-wide worry about deflation is that it would cause consumers to delay purchases of durable goods, such as cars and appliances, as they anticipated further price drops. This would slow overall demand, and, in turn, cause businesses to postpone new hires and new investments. Because there has been little recent experience with deflation, its full implications for farmers are little understood.

Influence of Marketing Margins

While the retail price of any fresh fruit reflects the amount consumers are willing to pay for the quantity they demand, the actual price returned to growers is heavily impacted by the marketing costs incurred between the consumer and the grower. These costs include mark-ups for retailers and wholesalers, transportation costs, packing and marketing charges at shipping point, and other costs for finance, insurance, inspections, promotion and other services. Unfortunately, information on such marketing charges has always been limited, and some key price and cost series that permitted rough estimates of marketing margins have been discontinued because of government cost-saving measures.

However, data available in France through the year 2013, indicated that the price to the grower averaged about 18 percent of the retail price. Charges incurred in storing, packing and preparing for market accounted for a further 18 percent. Thus about 64 percent of the retail price was incurred in getting the packed product to the final consumer. A major share of that cost involved the mark-ups charged by retailers, a share over which growers have no control.

In the United States, while seasonal grower prices continue to be reported, reporting of retail prices of fresh kiwifruit was discontinued a decade ago. However, in the 2015-16 season, the USDA,AMS began to include fresh kiwifruit in its weekly National Retail Report - Specialty Crops, which summarized the number of ads and the advertised prices for a wide array of fresh fruits and vegetables. The surveys covered more than 360 retailers and comprised over 28,000 individual stores with online weekly advertised features, so they offer an exceptional sampling of U.S. grocery stores.

As we went to press, data were available for the period from November 2015 through February 2016. In that period, the average advertised price per pound for conventional kiwifruit was \$1.91, and for organic kiwifruit \$2.38, an organic premium of about 25 percent. Assuming that advertised prices were discounted by 20 percent, this would imply normal retail prices of \$2.39 for conventional kiwifruit and \$2.98 per lb for organic kiwifruit, for an overall average of \$2.45. The grower price during the same period was estimated at 54 cents per lb. Thus, the grower price would have been 22 percent of the retail price, quite similar to the experience in France.

Trade Links to Domestic Prices

Because the world kiwifruit industry is so heavily involved in trade, kiwifruit prices in most countries can be affected by export and import activities. An example of the links between domestic and external prices can be seen in the case of the United States, which is a large importer, and modest producer and exporter of fresh kiwifruit.

United States: Export, Import and Grower Prices of Fresh Kiwifruit, 1996-2015 (US\$ per metric ton)



The chart above shows the average grower prices for all kiwifruit, and the export and import prices for fresh kiwifruit, for the seasons from 1996-97 to 2014-15. While all three price series have tended to move together, there have been occasional deviations due to special situations. The large gap between import prices and export prices reflects the suppliers and markets involved in each. However, it is clear that domestic grower prices in the United States are strongly influenced by import and export prices. This would be even more true for countries like Chile and New Zealand that are heavily export-oriented.

European Competition for Export Markets

What happens in European markets has a powerful influence on kiwifruit prices throughout the world, due both to Europe's importance as a market and to the export clout of its major producers, Italy, Greece and France. That competition has become even more intense in recent years with the dramatic expansion of Greek supplies, and the equally traumatic closing of the Russian market to exports from all three countries. The table below shows five-year average prices between 1991 and 2011, and annual average prices since 2001-02. Italian export prices have hovered close to the three-country average, as befits the largest exporter. French export prices have held a substantial premium over the three-country average. In contrast, Greek export prices have generally been below the three-country average. The actual premiums and discounts in any season are affected by both volume and quality factors. For the five most recent seasons, the French premium was 44 percent and the Greek discount 26 percent.

Italy, France and Greece: Export Prices of Fresh Kiwifruit, 1991-92 to 2014-15 (euros per kilogram)

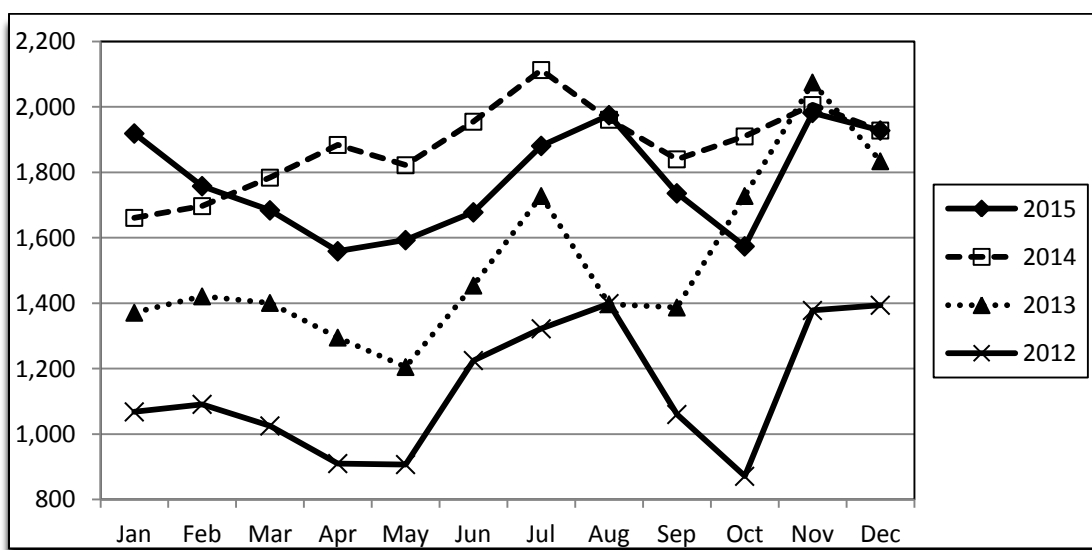
| Season | Italy | France | Greece | 3 Countries |
|-----------------|-------|--------|--------|-------------|
| 1991-96 Average | 0.70 | 0.90 | 0.69 | 0.72 |
| 1996-01 Average | 0.80 | 1.18 | 0.58 | 0.83 |
| 2001-06 Average | 0.93 | 1.46 | 0.68 | 0.98 |
| 2006-11 Average | 0.95 | 1.42 | 0.70 | 0.96 |
| 2001-02 | 1.09 | 1.46 | .077 | 1.12 |
| 2002-03 | 1.01 | 1.55 | 0.72 | 1.06 |
| 2003-04 | 1.00 | 1.57 | 0.74 | 1.08 |
| 2004-05 | 0.72 | 1.28 | 0.53 | 0.77 |
| 2005-06 | 0.86 | 1.38 | 0.63 | 0.90 |
| 2006-07 | 0.81 | 1.29 | 0.63 | 0.84 |
| 2007-08 | 1.15 | 1.62 | 0.80 | 1.17 |
| 2008-09 | 0.93 | 1.46 | 0.74 | 0.96 |
| 2009-10 | 0.82 | 1.26 | 0.59 | 0.82 |
| 2010-11 | 1.02 | 1.49 | 0.76 | 1.00 |
| 2011-12 | 0.83 | 1.23 | 0.72 | 0.85 |
| 2012-13 | 1.12 | 1.54 | 0.72 | 1.04 |
| 2013-14 | 1.22 | 1.56 | 0.86 | 1.13 |
| 2014-15 | 1.28 | 1.67 | 0.80 | 1.18 |

Lingering Effects of PSA

While the PSA outbreak had notable effects on production, particularly of Golden kiwifruit, it had very substantial indirect effects on kiwifruit prices at each level of the marketing system. Fortunately, there were limited negative effects among retailers or consumers due to fear of contaminated product. However, there were strong positive effects because of reduced supplies in many markets. The next two charts examine possible lingering effects of the PSA outbreak in two key import markets, the United States and Japan.

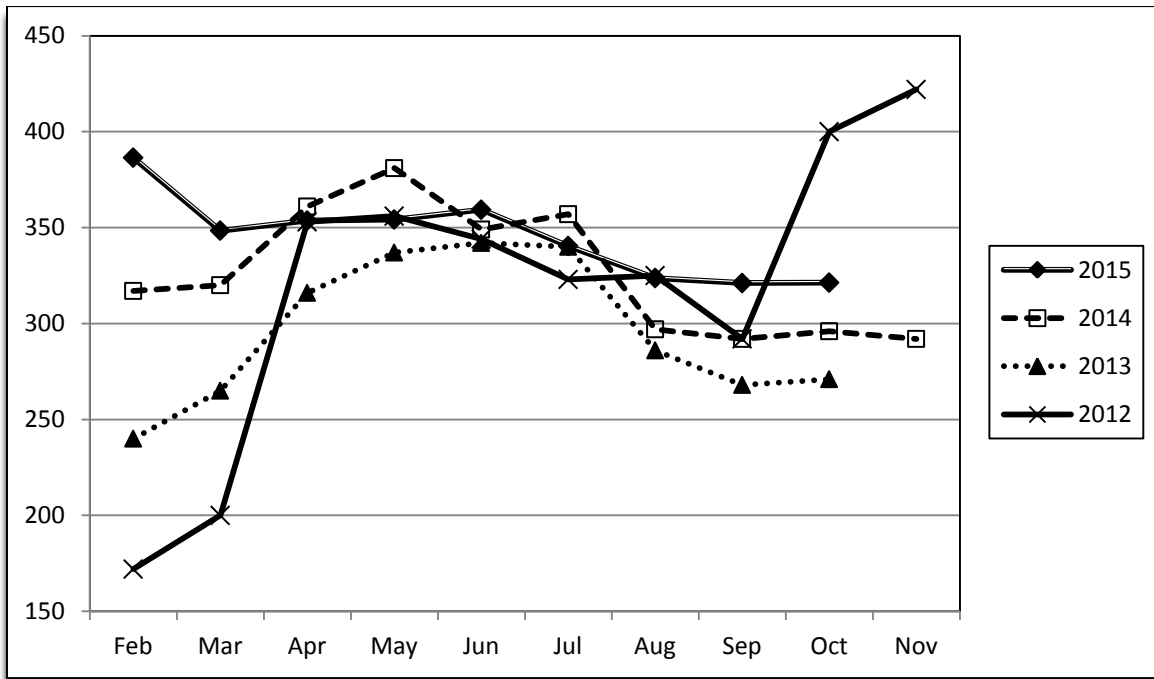
In the case of the United States, average monthly import prices in 2012 had a relatively normal seasonal pattern with prices ranging between \$900 and \$1,400 per metric ton. In both calendar years 2013 and 2014, the general level of prices moved sharply upwards. During 2014, prices ranged mostly between \$1,700 and \$2,100 per metric ton, a very significant increase over the 2012 base. However, by March of 2015, import prices had moved below the 2014 level, and remained at or below the 2014 level for the rest of the year. It appears that prices had begun to adjust downwards, but remained buoyed somewhat by the lagged effects of the PSA crisis.

**United States: Average Monthly Prices of All Fresh
Kiwifruit Imports, 2012-2015**
(US\$ per metric ton)



The effects of the PSA outbreak were much more difficult to discern in Japan. In 2012, the seasonal increase in import prices between January and March was much more pronounced than normal. So, too, was the increase in price near the end of 2012. However, between March and August, import prices in all four years remained in a narrow band around 350,000 yen (about \$US 3,000) per metric ton. One of the main reasons for the relative stability of prices in Japan was that its dominant supplier, New Zealand, was able to smoothly transition Japanese customers from Hort 16A to Sungold. Also, New Zealand gave priority to supplying the lucrative Japanese market while rationing available supplies to less important markets like the United States. This strategy was justified since exports to Japan earned over 20 percent more than the average for all markets. While New Zealand's supplies to Japan fell in 2012, the volume supplied actually increased in each of the next three years. Whatever price effects were induced in Japan by the outbreak of PSA were rapidly mitigated by New Zealand's ability to maintain or increase its volume of exports to that country. However, that tactic could only be followed successfully in the few, most important, markets.

**Japan: Average Monthly Prices of All Fresh
Kiwifruit Imports, 2012-2015**
(1,000 yen per metric ton)



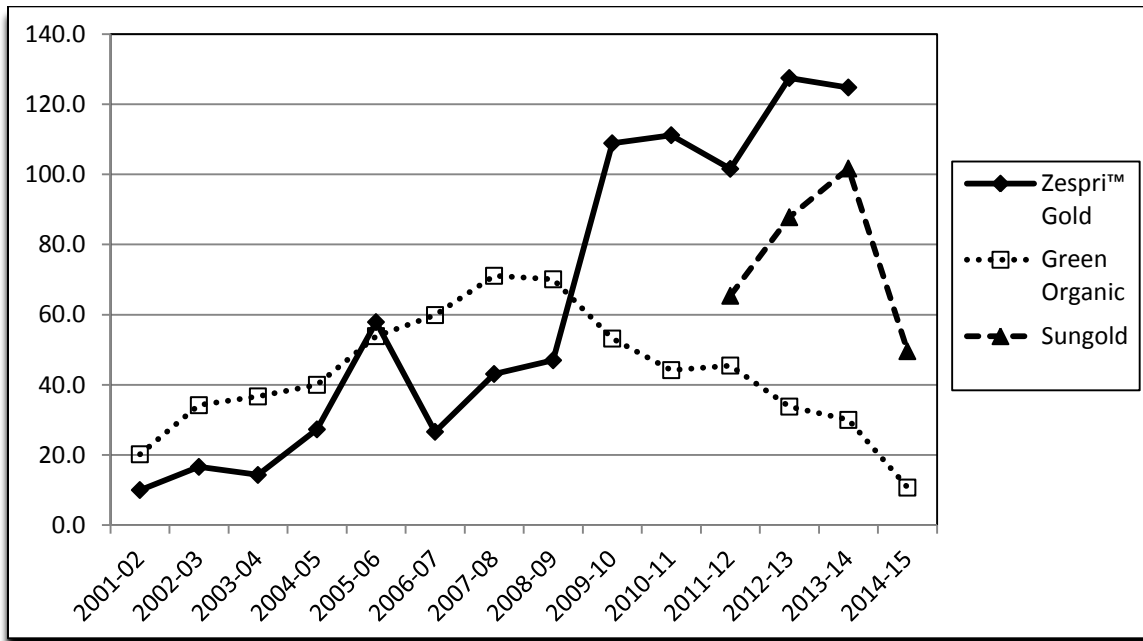
Influence of Cultivar on Kiwifruit Prices

There is little consistent data available on the influence of different cultivars on price except in New Zealand where the single desk marketing system allows close monitoring of price and quality. However, even in New Zealand, different cultivars are sold under different brands, so the contribution of cultivar differences to price differences is impossible to separate. The Zespri™ trademark has been used for almost two decades to distinguish New Zealand kiwifruit products that were deemed to be superior in value to comparable cultivars grown in other countries. The table below shows annual average prices returned at the orchard gate to New Zealand producers for three of the key products, Zespri™ Green Hayward, Zespri™ Green Organic (also Hayward), Zespri™ Gold (Hort 16A) for the seasons beginning in 2001-02. It also shows data for two newer product categories, Zespri™ Sweet Green, and Gold3, the primary replacement for Hort 16A. While prices of the different products have tended to vary in step as overall supply varied, the premiums have varied over time, as shown in the chart below.

New Zealand: Orchard Gate Returns, by Product, 2001-2016 (NZ\$ per tray)

| Season | Zespri™ Green Hayward | Zespri™ Green Organic | Zespri™ Gold (Hort 16A) | Zespri™ Sweet Green | Gold 3 (New) |
|---------------------|-----------------------|-----------------------|-------------------------|---------------------|--------------|
| 2001-02 | 4.51 | 5.51 | 4.96 | n.a. | n.a. |
| 2002-03 | 5.65 | 7.58 | 6.59 | n.a. | n.a. |
| 2003-04 | 6.35 | 8.68 | 7.26 | n.a. | n.a. |
| 2004-05 | 4.32 | 6.05 | 5.50 | n.a. | n.a. |
| 2005-06 | 3.47 | 5.34 | 5.48 | n.a. | n.a. |
| <i>Ave. 2001-06</i> | <i>4.24</i> | <i>6.63</i> | <i>5.96</i> | <i>n.a.</i> | <i>n.a.</i> |
| 2006-07 | 4.09 | 6.54 | 5.18 | n.a. | n.a. |
| 2007-08 | 3.11 | 5.32 | 4.45 | n.a. | n.a. |
| 2008-09 | 3.68 | 6.26 | 5.41 | n.a. | n.a. |
| 2009-10 | 3.70 | 5.67 | 7.73 | n.a. | n.a. |
| 2010-11 | 4.21 | 6.07 | 8.89 | n.a. | n.a. |
| <i>Ave. 2006-11</i> | <i>3.76</i> | <i>5.97</i> | <i>6.33</i> | <i>n.a.</i> | <i>n.a.</i> |
| 2011-12 | 3.80 | 5.53 | 7.66 | n.a. | n.a. |
| 2012-13 | 4.62 | 6.18 | 10.51 | 6.65 | n.a. |
| 2013-14 | 5.23 | 7.07 | 12.91 | 9.77 | 9.50 |
| 2014-15 | 6.01 | 7.37 | 9.80 | 7.08 | n.a. |
| 2015-16 Prelim | 4.94 | n.a. | n.a. | n.a. | 7.98 |

New Zealand: Orchard Gate Returns. Premiums for Zespri™ Green Organic and Zespri™ Gold over Zespri™ Green, 2001-15 (Percent above Zespri™ Green Price)



The chart above traces the remarkable record of Zespri™ Gold from its early launch until its virtual destruction by PSA. Its premium over Zespri™ Green moved strongly upwards over time even as the volume of Zespri™ Gold increased. Its replacement, marketed as Sungold, has also gained a substantial premium over Zespri™ Green in its early years. That premium is estimated to have fallen in half in the 2014-15 season. It remains to be seen how the premium for Sungold will evolve as its volume increases.

The chart above also shows how the premium for Zespri™ Green Organic Hayward over conventional Zespri™ Green Hayward has evolved over time. The organic premium rose from about 20 percent in 2000-01 to over 70 percent in 2007-08 and 2008-09, but has moved steadily downward since then. This has occurred even though New Zealand producers were very reluctant to expand the area dedicated to organic production. Recessionary conditions may have made consumers more reluctant to pay a premium for organic kiwifruit. For whatever reason, consumers have been less eager to switch to organic kiwifruit than they have been in other popular fruits and vegetables.

New Zealand: Returns from Kiwifruit Exports, 2001-15 (Volume (million trays) and Grower Payments¹ (NZ\$ per tray))

| Product | Unit | 2001-03 Average | 2007-09 Average | 2010-12 Average | 2012-13 Annual | 2013-14 Annual | 2014-15 Annual |
|-----------------------|-----------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|
| Zespri™ Green | Trays (m) | 50.7 | 73.3 | 73.8 | 70.4 | 68.9 | 69.3 |
| | NZ\$/tray | 8.04 | 6.91 | 7.53 | 7.68 | 8.15 | 8.98 |
| Zespri™ Green Organic | Trays (m) | 2.4 | 3.1 | 3.3 | 2.5 | 3.1 | 3.5 |
| | NZ\$/tray | 9.75 | 8.94 | 9.16 | 9.07 | 9.78 | 9.94 |
| Zespri™ Gold | Trays (m) | 7.3 | 22.5 | 25.2 | 24.6 | 11.1 | 18.6 |
| | NZ\$/tray | 10.38 | 10.40 | 13.12 | 14.42 | 16.44 | 13.43 |
| Kiwi Green | Trays (m) | 1.9 | 1.0 | 1.6 | 1.0 | 1.0 | 1.0 |
| | NZ\$/tray | 5.51 | 4.31 | 4.20 | 3.97 | 4.73 | 5.22 |
| Kiwi Green Organic | Trays (m) | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| | NZ\$/tray | 6.74 | 5.45 | 4.37 | 4.81 | 6.39 | 6.81 |
| Kiwi Gold | Trays (m) | 0.7 | 0.2 | 0.6 | 0.8 | 0.3 | 0.4 |
| | NZ\$/tray | 4.19 | 5.54 | 6.73 | 7.33 | 9.45 | 7.85 |
| Non-standard | Trays (m) | 1.4 | 0.5 | 1.2 | 0.9 | 1.1 | 1.4 |
| | NZ\$/tray | 4.45 | 5.27 | 7.59 | 7.64 | 8.12 | 5.75 |
| Green 14 | Trays (m) | n.a. | n.a. | 0.0 | 0.4 | 0.4 | 0.9 |
| | NZ\$/tray | n.a. | n.a. | n.a. | 10.11 | 13.26 | 10.57 |
| Sungold | Trays (m) | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| | NZ\$/tray | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Total All Pools | Trays (m) | 64.5 | 100.0 | 104.6 | 102.1 | 86.5 | 95.7 |
| | NZ\$/tray | 8.91 | 7.69 | 8.87 | 9.32 | 9.26 | 9.81 |

¹ Total fruit and service payments, including loyalty payments.

² Includes Gold3 and Gold9 cultivars.

The table above shows the number of trays of the different cultivars produced in, and marketed by, New Zealand, and the average grower payments per tray. In addition to top-quality products sold under the Zespri™ brand, some products not meeting the Zespri™ standards were sold under the Kiwi brand, as nonstandard packs, or under new brand names. To save space, data are reported for three-year averages for 2001-03, 2007-09 and 2010-12, and annually since then. The long upward trend in volume was broken in 2012-13, largely because of the precipitate decline of Zespri™ Gold. Recovery was just getting under way in 2014-15. The shorter supplies due to PSA boosted prices across the board in 2013-14, but some slippage in prices was beginning to appear in 2014-15. Kiwi branded, and non-standard fruit continued to be sold at a substantial discount.

Wholesale Market Prices in 2015-16

Wholesale markets continue to have a significant influence on trade in fresh kiwifruit despite the growing influence of direct transactions between large suppliers and large retail and institutional customers. Large retailers continue to use wholesale markets to supplement direct supplies, while many smaller retailers, wholesalers, jobbers and food service outlets still rely on wholesale markets for their major needs. In many cases, they issue daily or weekly market reports that are publically available. Thus, wholesale markets provide transparency about qualities and prices that is not available in other arenas.

In previous issues of the World Kiwifruit Review, we presented price information from key wholesale markets by calendar year. However, in the 2016 issue, information is provided for the season from May 2015 to March 2016. This gives better coverage of both Northern Hemisphere and Southern Hemisphere suppliers. In particular, it includes most of the latest marketing year for the Northern Hemisphere, and provides more current information. It also better accounts for the period of overlap between the Northern Hemisphere and Southern Hemisphere seasons. The same major wholesale markets are covered as previously, New York, Montreal and Toronto in North America, and Rotterdam and Paris in Western Europe.

Wholesale market price quotes are only available for items that are available in sufficient volume to establish a reliable price. This means that the largest suppliers and the highest-volume items get better coverage. Quotes are available for most markets for fresh kiwifruit supplies from Italy, New Zealand and Chile. Quotes are also available for supplies from California in North American markets, and from Greece in Western European markets. While price quotes were available for numerous pack types, quotes were most consistently available for single layer packs of 3 or 3.2 kilograms, and for loose containers holding either 9 or 10 kilograms. To preserve space, most quotes reported here refer to those pack types. For the major suppliers in many markets, quotes were available for a wide range of sizes from size 18 to size 49. In general, we focused on a narrower range of sizes, from size 23 to size 39. In the 2015-16 season, more price quotes were available for yellow-fleshed kiwifruit. While most price quotes reported in the following tables refer to green Hayward kiwifruit, reports on yellow-fleshed kiwifruit are noted in the tables for New York, Rotterdam and Toronto.

New York: Wholesale Prices of Fresh Kiwifruit, May 2015-March 2016 (mid-month prices, US\$, selected packs)

| Origin & Pack | Size | May 15 | Jun 15 | Jul 15 | Aug 15 | Sep 15 | Oct 15 | Nov 15 | Dec 15 | Jan 16 | Feb 16 | Mar 16 |
|----------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 layer packs | | | | | | | | | | | | |
| Italy | 27 | 9.50 | | | | | | | | 8.50 | 8.50 | 8.50 |
| 10 x 2-lb | | | | | | | | | | | | |
| Local repack | 33 | 23.50 | 23.50 | 23.50 | 23.50 | 24.00 | 24.00 | 24.00 | 22.00 | 21.00 | 21.00 | |
| Chile | 27 | | | 10.00 | 10.00 | 9.50 | 9.00 | 9.50 | | | | |
| California | 36 | | | | | | | 18.00 | | | | |
| 9 kg loose | | | | | | | | | | | | |
| California | 25 | | | | | | | 18.00 | | | | |
| | 30 | | | | | | | 18.00 | | | | |
| Italy | 23 | | | | | | | | 15.00 | 15.50 | 16.00 | 16.00 |
| | 25 | | | | | | | | 16.00 | 15.50 | 16.00 | 16.00 |
| | 27 | 18.00 | | | | | | | 16.00 | 15.50 | 16.00 | 17.00 |
| | 30 | 18.00 | | | | | | | 14.00 | 16.00 | 15.00 | 15.00 |
| | 33 | 18.00 | | | | | | | 14.00 | 15.50 | 15.50 | 15.50 |
| | 36 | 16.00 | | | | | | | | 14.00 | 14.00 | 14.00 |
| | 39 | 16.00 | | | | | | | | 14.00 | 13.00 | 13.00 |
| Chile | 23 | | 21.00 | 19.50 | 20.00 | 16.00 | 13.50 | 16.00 | | | | |
| | 25 | | 20.00 | 19.50 | 20.00 | 16.00 | 13.50 | 16.00 | | | | |
| | 27 | 19.00 | 20.00 | 17.50 | 20.00 | 16.00 | 13.50 | 16.00 | | | | |
| | 30 | 19.00 | 19.50 | 17.50 | 20.00 | 16.00 | 13.50 | 12.00 | | | | |
| | 33 | 19.00 | 19.00 | 17.50 | 21.00 | 16.00 | 13.50 | 12.00 | | | | |
| | 36 | 17.00 | 17.00 | 16.50 | 19.00 | 15.50 | 12.50 | 12.00 | | | | |
| | 39 | 17.00 | 17.00 | 16.50 | 19.00 | 15.00 | 12.50 | 12.00 | | | | |
| New Zealand | | | | | | | | | | | | |
| | 22 | | | | | | 24.00 | | | | | |
| | 25 | | | | 28.00 | 24.00 | 24.00 | | | | | |
| | 27 | | | 28.00 | | 24.00 | 23.50 | | | | | |
| | 30 | | | 28.00 | 28.00 | 24.00 | 23.00 | | | | | |
| | 33 | | | | | 24.00 | 23.00 | | | | | |
| | 36 | | | | | | | | | | | |
| | 39 | | | | | | 22.50 | | | | | |
| 6 kg loose | | | | | | | | | | | | |
| Yellow | | | | | | | | | | | | |
| Italy | 25 | | | | | | | | 21.00 | | | |
| | 27 | | | | | | | 27.00 | 21.00 | | | |

As in previous years, there were significant differences in the reported prices for different supplying countries, different pack types and different fruits sizes. In general, products from New Zealand received substantial premiums. In contrast, products from Greece tended to sell at a substantial discount to those from France or Italy. Products from Chile and Italy alternated price leadership in the 2015-16 season.

Rotterdam: Wholesale Prices of Fresh Kiwifruit, May 2015-March 2016 (mid-month prices, US\$, selected packs)

| Origin & Pack | Size | May 15 | Jun 15 | Jul 15 | Aug 15 | Sep 15 | Oct 15 | Nov 15 | Dec 15 | Jan 16 | Feb 16 | Mar 16 |
|-----------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 3 kg container | | | | | | | | | | | | |
| Greece | 25 | | | | | | | | | | 3.89 | |
| | 27 | | | | | | | 4.29 | | | 3.60 | |
| | 30 | | | | | | | 4.03 | 4.53 | 3.55 | | |
| | 33 | | | | | | | 4.03 | 4.53 | | | |
| | 36 | | | | | | | 4.03 | | | | |
| 10 kg loose | | | | | | | | | | | | |
| Greece | 20 | | | | | | 13.06 | 9.13 | 15.87 | 11.48 | 11.66 | |
| | 23 | | | | | | 12.77 | 10.47 | 14.36 | 10.93 | 10.55 | |
| | 25 | | | | | | 12.77 | 10.20 | 15.12 | 8.20 | 9.72 | |
| | 27 | | | | | | 12.49 | 10.45 | 13.98 | 7.93 | 9.45 | |
| | 30 | | | | | | 12.49 | 10.33 | 13.41 | 10.93 | 9.31 | |
| | 33 | | | | | | 12.20 | 10.20 | 13.23 | 9.84 | 9.17 | |
| | 36 | | | | | | 11.64 | 10.07 | 12.66 | 8.20 | 8.61 | |
| | 39 | | | | | | 11.64 | 8.86 | 11.53 | 8.20 | 8.34 | |
| | 42 | | | | | | 11.64 | | 11.71 | | | |
| Italy | 23 | 17.69 | | | | | | | | | | |
| | 25 | 17.12 | | | | 16.01 | 14.33 | | | | | |
| | 27 | 17.69 | | | | 16.01 | 13.76 | 12.35 | 16.62 | 11.48 | 11.66 | |
| | 30 | 17.12 | | | | 15.73 | 13.20 | 11.81 | 15.87 | 12.57 | 11.94 | |
| | 33 | 16.83 | | | | 15.44 | 12.77 | 10.61 | 15.11 | 10.94 | 11.39 | |
| | 36 | 15.98 | 12.95 | | | 15.15 | 12.06 | 10.60 | 14.36 | 9.57 | 10.28 | |
| | 39 | 15.40 | | | | 13.72 | 11.49 | 9.66 | 12.28 | 10.93 | 10.28 | |
| | 42 | 14.83 | 12.95 | | | 14.30 | 11.07 | 9.39 | 12.66 | | 8.05 | |
| Chile | 20 | 19.97 | 16.33 | 14.68 | 15.61 | 15.44 | | | | | | |
| | 23 | 19.40 | 16.61 | 15.50 | 14.50 | 15.44 | 11.92 | | | | | |
| | 25 | 19.12 | 16.61 | 15.23 | 15.61 | 15.15 | 11.64 | | | | | |
| | 27 | 18.83 | 17.17 | 14.96 | 15.89 | 15.73 | 11.92 | | | | | |
| | 30 | 17.98 | 16.33 | 15.50 | 14.22 | 15.16 | 11.07 | | | | | |
| | 33 | 17.69 | 15.76 | 15.23 | 13.94 | 14.59 | 10.08 | 10.20 | | | | |
| | 36 | 17.12 | 15.20 | 14.68 | 13.38 | 13.44 | 10.22 | 9.66 | 11.71 | | | |
| | 39 | 17.12 | 14.64 | 14.96 | 14.78 | 16.01 | | | | | | |
| | 42 | 16.26 | 13.80 | 14.41 | 16.17 | 13.15 | 9.08 | | | | | |
| 3 kg container | | | | | | | | | | | | |
| Yellow | | | | | | | | | | | | |
| Greece | 36 | | | | | | | | | | 4.37 | |
| Italy | 23 | | | | | | | 7.78 | | | | |
| | 25 | | | | | | | 8.32 | | | | |
| | 27 | | | | | | | 6.44 | | | | |
| | 30 | | | | | | | 10.47 | | | | |
| | 39 | | | | | | | 4.29 | | | | |
| 10 kg loose | | | | | | | | | | | | |
| Yellow | | | | | | | | | | | | |
| Italy | 25 | | | | | | 33.49 | 21.47 | 9.07 | | | |
| | 30 | | | | | | 32.35 | 18.79 | | | | |
| | 33 | | | | | | 31.22 | | | | | |

**Paris: Wholesale Prices of Fresh Kiwifruit, May 2015-March 2016
(mid-month prices, US\$, selected packs)**

| Origin & Pack | Size | May 15 | Jun 15 | Jul 15 | Aug 15 | Sep 15 | Oct 15 | Nov 15 | Dec 15 | Jan 16 | Feb 16 | Mar 16 |
|----------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 layer flats | | | | | | | | | | | | |
| France | 30 | 1.94 | | | | | | 2.24 | 1.43 | 1.69 | 1.73 | 1.65 |
| | 33 | | | | | | | 1.92 | 1.11 | 1.58 | 1.62 | 1.54 |
| Greece | 33 | | | | | | | 1.28 | 0.79 | 1.03 | 1.06 | 1.21 |
| Italy | 27 | | | | | | | 1.39 | 0.86 | 1.20 | 1.23 | 1.21 |
| Chile | 30 | | 2.19 | 1.86 | 1.90 | | | | | | | |
| New Zealand | 33 | 2.97 | 3.35 | 2.85 | 2.90 | 2.94 | 2.96 | 2.67 | | | | |
| | 36 | 2.85 | 3.23 | 2.74 | 2.79 | 2.82 | 2.85 | 2.56 | | | | |

Prices also tended to vary with the size of the fruit. In general, the larger the fruit, the higher the wholesale price. However, on a number of occasions, this did not strictly hold true. Prices for a particular fruit size can be lower than expected because of a surplus of that size, or higher than expected because of a shortage. Price anomalies can also arise from quality differences that are not noted in the official market reports. From the limited evidence available, yellow-fleshed kiwifruit from the same supplier received a substantially higher price than the dominant green Hayward variety. The price per kilogram was also generally substantially higher for fruit in single layer tray packs than in the loose 9 or 10 kilogram containers, reflecting quality differences in the fruit packed.

**Montreal: Wholesale Prices of Fresh Kiwifruit, May 2015-March 2016
(mid-month prices, US\$, selected packs)**

| Origin & Pack | Size | May 15 | Jun 15 | Jul 15 | Aug 15 | Sep 15 | Oct 15 | Nov 15 | Dec 15 | Jan 16 | Feb 16 | Mar 16 |
|------------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 9 kg container | | | | | | | | | | | | |
| Italy | 27 | | 19.60 | | | | | | | | | |
| Chile | 27 | | 22.80 | 22.40 | 22.40 | | | | | | | |
| | 36 | | 14.80 | 19.98 | 21.60 | | | | | | | |
| 10 kg container | | | | | | | | | | | | |
| California | 27 | | | | | | | | 29.48 | | | |
| Italy | 39 | | | | | | | 13.20 | 13.60 | 14.00 | 14.20 | 14.00 |
| Chile | 42 | | | | | | | 16.00 | | | | |
| New Zealand | 42 | | | | | 34.80 | 24.58 | 25.60 | | | | |

Toronto: Wholesale Prices of Fresh Kiwifruit, May 2015-March 2016 (mid-month prices, US\$, selected packs)

| Origin & Pack | Size | May 15 | Jun 15 | Jul 15 | Aug 15 | Sep 15 | Oct 15 | Nov 15 | Dec 15 | Jan 16 | Feb 16 | Mar 16 |
|------------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 9 kg container | | | | | | | | | | | | |
| California | 27 | | | | | | | | 29.48 | | | |
| Chile | 23 | | | 25.11 | 24.08 | 24.14 | 24.33 | 22.91 | | | | |
| 10 kg container | | | | | | | | | | | | |
| Italy | - | | 28.80 | | | | | | | 22.10 | 20.80 | |
| New Zealand | | | | | | | | 33.60 | 33.60 | | | |
| 9 kg container | | | | | | | | | | | | |
| Yellow | | | | | | | | | | | | |
| Italy | 23 | 21.50 | | | | | | | | | | |
| 10 kg container | | | | | | | | | | | | |
| Yellow | | | | | | | | | | | | |
| New Zealand | 27 | | 33.84 | 33.60 | | | | | | | | |

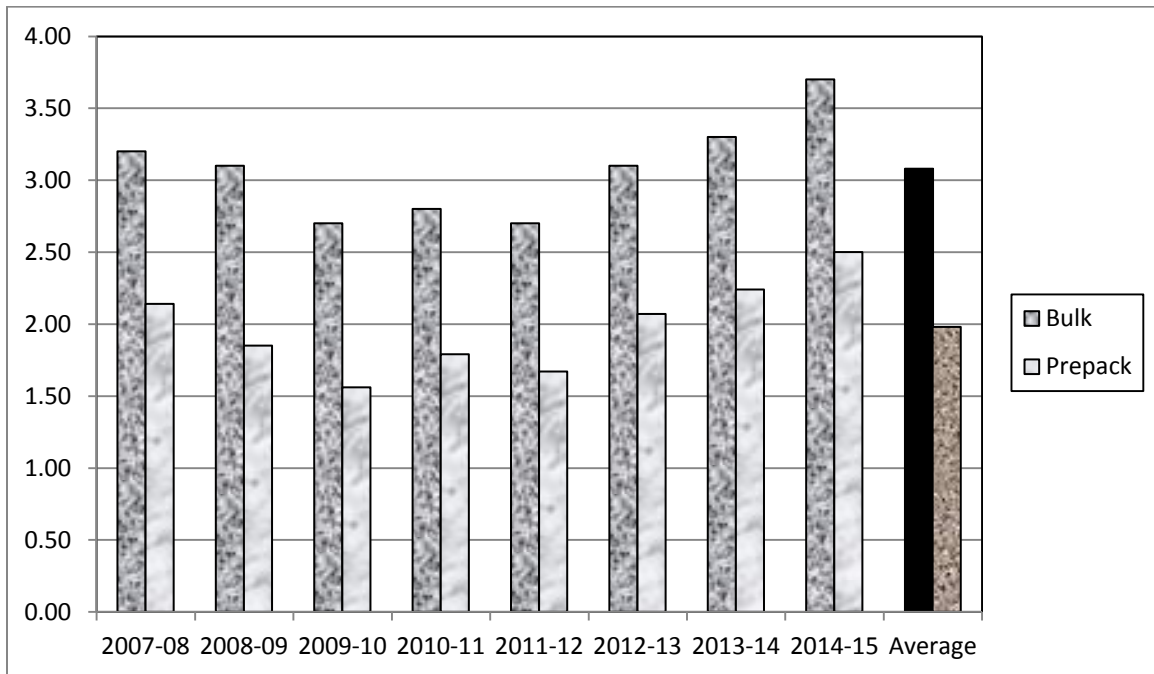
The overlap between supplies from the Northern Hemisphere and Southern Hemisphere was relatively short in 2015-16. However, there was heavy overlap (as reflected in the number of price quotes) between the major Northern Hemisphere suppliers. By far the greatest number and diversity of price quotes were available for the New York and Rotterdam wholesale markets. Price quotes also tended to decline as each supplier's shipping season progressed, but sometimes rebounded late in the shipping season as supplies dwindled.

Effects of Fruit Size and Retail Pack

Price quotes for the major wholesale markets showed that, in general, the larger the size, the higher the price paid for fresh kiwifruit. Those price differences by size are also reflected back at the grower level. In the past, having more fruit in the mid-size range, size 27 to size 36, tended to be most profitable for growers, where increased volume compensated for lower prices. However, in fresh kiwifruit, as in many other fresh fruit, there appears to be a growing bias among consumers and retailers for larger sizes. Analysis is complicated somewhat by the fact that the numerical sizes reported here do not exactly convert to the same weight in grams in different countries. Production practices can be used to some extent to obtain the most desirable mix of sizes. However, adverse weather can disrupt the best laid plans.

One response by the kiwifruit industry has been to pack larger fruit in prepacked punnets, and smaller fruit in bulk (loose) packs. The chart below compares the retail prices for prepacked punnets compared to the prices for 10 pieces loose for the seasons between 2007-08 and 2014-15. As might be expected, year to year changes in prices moved closely in step. Both moved downward between 2007-08 and 2009-10, and moved upward between 2011-12 and 2014-15. For the eight year period, the price of prepacks averaged 64.3 percent of the price of 10 bulk pieces. The ratio was similar to the average in most years. The differential pricing reflects the reality of available fruit sizes while providing consumers with choices about which sizes and pack types to buy.

France: Retail Price Comparisons, Bulk versus Prepacked, 2007-08 to 2014-15 (euros per kilogram)



V. Analyzing Demand for Fresh Kiwifruit

Demand: Linking Quantity and Price

In the previous chapters, for convenience, trends in quantities and prices were treated separately. However, in general, discussion of one without the other is of little commercial value. It is only when both are discussed simultaneously within a demand framework, that relationships can be measured, and predictions about future behavior made.

The economic concept of "demand" is extremely robust. At the level of any individual, demand is the quantity of any product that a person will buy at any given price. One can measure an individual's demand schedule, that is, the different quantities that a person will buy as price changes. Two other major factors can alter the individual's demand schedule. The first is changes in personal income. As a person's income rises, he or she can afford to buy more of a given product at any price level. If income falls, he or she can afford to buy less. The second major factor is the price of competing products. The lower that price, the more likely a person is to substitute the competing product. Conversely, the higher the price of the competing product, the less likely will a person be to substitute.

What makes the demand concept so robust is that it is equally applicable to groups of individuals as to a single individual. For example, it can be applied to a single marketplace, or to a local community, or to broader communities like districts, states, nations or groups of nations. It can be applied to one retail store, or to many retail stores. It can be used for comparisons between communities, or types of retail outlets, or different nations. In all these situations, the demand schedule relates to the quantity that will be bought at any given price.

Shifts in any specific demand schedule will be affected primarily by changes in income within the relevant population, and by changes in the prices of competing products. In the case of fresh kiwifruit, which competes indirectly with many fruit products, it will be difficult to measure the influence of competing products. However, trends in income are under continuous scrutiny from state, local, national, and even international governments, and from monetary authorities, because they can affect demand for so many products.

Past Income Changes

In general, since the end of World War II seventy years ago, most parts of the world have experienced growth in incomes that have boosted demand for products like fresh kiwifruit. Developed countries in Western Europe, North America, Japan and Oceania were the first to experience rapid growth. This was partly out of the need to rebuild from the destruction caused by the war. They were able to rapidly restore their physical infrastructure, and had the education and knowhow, to generate sustainable growth. In the 1970s, a succession of countries in East Asia and Latin America were able to generate growth by expanding exports to the developed countries. They included the so called "Asian Tigers", Hong Kong, Singapore, Taiwan and South Korea and the "Mini Tigers" of Indonesia, Malaysia, and Thailand. In Latin America, Chile was the most successful in generating export-driven growth.

A number of other key breakthroughs in world economic growth came later. In 1978, President Deng set China on a deliberate growth path that succeeded beyond his wildest dreams. Beginning at a very low level, the Chinese economy grew so rapidly that in 30 years it had moved ahead of Japan as the world's second largest economy. The economy of Mexico received a major boost after Mexico joined the North American Free Trade Agreement in 1994. The European Union expanded to 15 member countries, still primarily in Western Europe, and created a single market for goods and services. In the early 1990s, came the collapse of the central planning system that had dominated most of Eastern Europe and the Union of Soviet Socialist Republics, headed by Russia, since World War II. Many of these Eastern European countries joined the European Union in 2004 in the hope of sharing in the prosperity of the existing member countries.

In the mid-1990s, India, the world's second most populous country after China, began to liberalize its economy and trade, and to enjoy significant economic growth. China signaled its commitment to global free trade by joining the World Trade Organization in 2002. In 2001, Jim O'Neill of Goldman Sachs coined the term "BRICs", the initials of the four major countries, Brazil, Russia, India and China, which O'Neill expected to outgrow the advanced western countries in future decades. The BRICs countries did indeed outgrow the advanced western countries for the next decade. Prior to 2008, with the world economy performing on all cylinders, there was a dramatic growth in world incomes and trade.

However, the period of affluence carried within it the seeds of its own destruction. Personal, business and government debt expanded rapidly at low interest rates. Consumers became increasingly indulgent in their purchase of a wide array of goods and services. Food processors, retailers and restaurants expanded to cater to broader consumer needs. Governments expanded their commitments for education, health care, retirement and other social safety nets.

That long era when economic growth was the expected norm received a rude shock in 2008 when bubbles in housing and finance burst almost simultaneously. Many people in many countries lost their jobs, homes, pensions and other assets. While capitalist societies had experienced many previous recessions that were short, shallow and self-correcting, it rapidly became clear that the 2008 event was much more severe, and unlikely to be self-correcting. It became known as the "Great Recession", and governments and central banks took unprecedented measures to prevent it from turning into another Great Depression like that of the 1930s. Governments increased spending through hundreds of stimulus programs, while central banks pumped more liquidity into their economies to persuade banks to lend again, and encourage businesses to renew investments and hire back laid-off workers. Governments and central bankers assumed ever broader roles in attempting to stimulate income growth.

The results of their efforts have been mixed at best. The BRICs countries bounced back rapidly after 2008, while exporters of oil, metals and other commodities in the Middle East, Africa and Latin America again prospered, but recovery in the United States remained sluggish. Among advanced countries, Japan lurched from recession to recession while Western Europe's recovery was hindered by the euro currency crisis, continuing banking woes, and a flood of refugees from the Middle East and North Africa. The so called "Arab Spring" of 2011 led to the overthrow of many governments in that region. However, instead of western-style democracy flowering there, as was originally hoped, these countries have either returned to repressive regimes or have succumbed to anarchy.

More recently, prosperity in the BRICs countries has faced severe setbacks. China's economic growth has faltered. The Chinese government under President Xi Jinping, has struggled to get its economic house in order. It has appeared increasingly hostile to western values of free speech, freedom of the press, free trade and respect for territorial boundaries.

For several years after the Great Recession, China's demand for commodities was the major driver of growth in many Asian, African and Latin American countries. As that demand has slowed, many of these countries have again sunk into, or flirted with, recession. Russia has also become a less cooperative partner in world trade and diplomacy. Its invasion of the Crimea led to western sanctions. Russia responded by banning many products from the European Union, the United States, Australia, Canada and Norway. The Russian economy was hurt by the subsequent decline in oil prices, and the collapse of the ruble. As a result, Russia is no longer the world's leading driver of demand for many fresh fruits. Among the BRICs, only India has been able to maintain a moderate rate of growth.

Even in countries like the United States and Germany, where recovery from the Great Recession has been solid, if not spectacular, there has been a notable bifurcation in the rate of recovery among consumers. In general, upper income groups have seen their incomes and asset values restored to pre-Recession levels. They have returned to relatively indulgent lifestyles where they can purchase a rich variety of goods and services. In the fruit category, this means that they are willing to pay premium prices for new, unique or exotic product variations.

This bifurcation has had a significant influence on the development of many products, and has left different retailers scrambling to adjust to the changing needs of their customers. In fresh produce, high income consumers have demanded a greater mix of fresh fruits and vegetables, and greater diversity within each category. For example, in the case of fresh kiwifruit, higher income consumers have been willing to pay premium prices for the newer, yellow-fleshed kiwifruit, and for organic kiwifruit. Breeders and researchers in the industry see opportunities for additional premiums for red-fleshed kiwifruit, or for different kiwifruit brands or packages.

Retailers continue to scramble to adjust to the changing preferences of different categories of consumers. Prior to the Great Recession, even discount retailers were attempting to move upscale to service more indulgent consumers. However, the Great Recession triggered a surge in interest, particularly among lower and middle-income consumers, for thrifty shopping, private label brands and lower grade products. Many outlets that traditionally did not sell food began to cater to shoppers who less frequently made major shopping trips to hypermarkets and super stores, and bought their occasional needs closer to home.

The retail food business, that had, for decades, been trending towards ever larger chains with ever larger stores, began to experiment with smaller stores with less space for produce items. Discount stores moved into food and beverage categories once dominated by natural, organic and specialty stores. In response, upscale stores attempted to expand into discount outlets and discount categories. In this dynamic situation, it is still not clear how demand for the total fresh kiwifruit category, or for items within that category will be affected.

What is clear is that sluggish income growth remains a worry in many major economies. Governments and monetary authorities are taking increasingly desperate measures to restore growth. In the United States, the Federal Reserve Board delayed increases in interest rates in 2015 and 2016 as economic prospects remained uncertain. In the euro zone, and in other European countries like Sweden, Denmark and Switzerland, monetary authorities have experimented with negative interest rates and bond buying programs in the hope of stimulating economic recovery. Japan, under Prime Minister Shinzo Abe, put its faith in the "three arrows" of increased government spending, monetary easing and regulatory reform to get prices and incomes rising, with little sustained benefit. The Chinese government and its monetary authorities have used various means to speed the rate of growth of the Chinese economy, so far with limited success.

However, almost all these efforts at economic stimulus have had a common result, namely, to weaken the currency of these countries relative to those of their international competitors. This has effectively made their goods cheaper in other countries and reduced their purchasing power on international markets, thus bringing increased uncertainty to international trade. Such uncertainty tends to weaken global demand. It also increases the danger that countries will engage in competitive devaluations in order to protect their share of international markets. On the other hand, negotiations are nearing an end for two major free trade agreements that could provide new impetus to international trade. One is the Transatlantic Trade and Investment Partnership (TTIP) between the United States and the European Union, that would liberalize trade and investment between the world's two largest economic blocs. The other is the Trans Pacific Partnership (TPP) that would reduce trade barriers and streamline trade rules between the United States, Japan and 10 other Pacific Rim countries. However, many obstacles remain before these agreements can be ratified or implemented.

World Demand for Fresh Kiwifruit

In previous issues of the World Kiwifruit Review, we analyzed import demand for fresh kiwifruit both for the OECD countries (most of the world's richest countries) and for the world in total. In the past, most fresh kiwifruit was consumed in the richest OECD countries. However, in recent years, fresh kiwifruit have penetrated most markets, so it makes more sense to look at import demand for the entire world. Data are now available through calendar year 2013, providing a total of 21 years for analysis.

The per capita quantity of world imports of fresh kiwifruit was regressed against world GDP per capita and deflated average import prices for the period. Those two variables explained 91 percent of the variation in per capita imports. On average, each 10 percent increase in world per capita GDP was associated with a 23 percent increase in per capita imports of fresh kiwifruit. The price variable was negative as expected, but not statistically significant, indicating that increases in world GDP were the major drivers of increased imports of fresh kiwifruit.

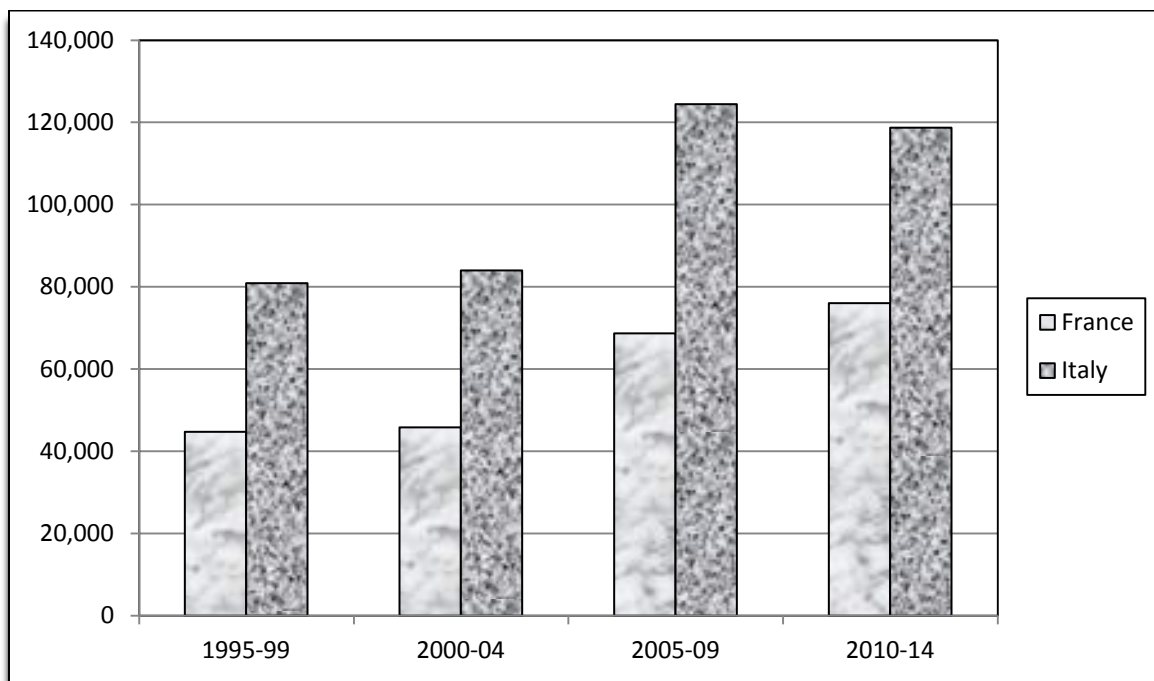
The period studied included years before, during, and after the Great Recession. Between 1993 and 2007, world GDP per capita increased in every year except 2002, when it fell by 0.1 percent. However, in 2009, it fell by 3.2 percent, before bouncing back by 2.8 percent in 2010. Average import prices also declined in 2009 and 2010, bounced back in 2011, but fell by 7.2 percent in 2012 before the full impact of PSA was felt. These results suggest that, other things being equal, increases in world per capita GDP are likely to be associated with increases in import demand for fresh kiwifruit. Thus, the continued failure of governments and monetary authorities to stimulate their economies could weaken future demand for fresh kiwifruit.

A separate study conducted by Belrose, Inc. in 2013, "Asian Import Demand for Apples, Pears, Sweet Cherries and Kiwifruit, Potential to 2020," found similar results for nine individual Asian countries, Indonesia, Malaysia, Singapore and Thailand in Southeast Asia, and China, Japan, Hong Kong, South Korea and Taiwan in Northeast Asia. Increases in income were strongly related to increases in import demand for fresh kiwifruit. An updated analysis for mainland China through 2015 confirmed those results. Thus, economic prosperity in that region will be key to continued growth in import demand for fresh kiwifruit.

Retail Demand in Europe

Information on retail demand for fresh kiwifruit in Europe is relatively limited. The most complete series are for France and Italy, and cover sales in mainstream retail chains that are included in retail audits. Thus, they do not cover all retail sales of fresh kiwifruit, but should reflect significant trends for all kiwifruit. A comparison of estimated retail sales for five-year intervals between 1995 and 2004 suggests that even though populations of Italy and France are relatively similar, sales in Italy have consistently far outdistanced those in France. However, as shown in the chart below, both France and Italy showed similar large increases in retail sales in the most recent decade. It is difficult to determine how much of this was due to an overall increase in all retail sales, to an increased share of retail sales by large retail stores, or to more complete coverage by retail audits. In France, average sales in 2010-14 were higher than in 2005-09, whereas in Italy, they were lower. Again, there are no obvious explanations for these differences.

Italy and France: Estimated Retail Sales of Fresh Kiwifruit, by Five-year Intervals, 1995-2004 (metric tons)



Statistical analyses of the retail sales data were used to probe for possible explanations for these differences. Annual equations were run for France for the 1990-2014 period and for Italy for the 1994-2014 period, providing enough observations to test the significance of the results shown here:

Annual equations

France: Retail Sales per capita = 0.761 - 0.24878 Deflated retail price
(2.121)* (2.975)*

+ 0.006047 GDP per capita R²= 0.700
(3.532)*

Italy: Retail Sales per capita = -1,196.9 - 1,255.06 Deflated retail price
(1.478) (4.689)*

+ 1184.49 GDP per capita R²= 0.742
(6.135)*

The annual equations for both France and Italy explained over 70 percent of the variation with just two variables, the deflated retail price and the per capita GDP. Each 10 percent increase in retail price in France was associated with a 6 percent decrease in per capita retail sales, and in Italy with about an 11 percent decrease. Thus retail sales were more influenced by price changes in Italy than in France. Conversely, each 10 percent increase in per capita GDP was associated with a 28 percent increase in per capita retail sales in Italy, but only an 8 percent increase in France. That is, demand in Italy was more responsive to increases in income than in France.

The retail sales data were also available on a quarterly basis over the same years for both France and Italy. In France they were available through the second quarter of 2015, a total of 86 observations. In Italy, they were available through the fourth quarter of 2014, a total of 84 observations. In the analyses for both countries, variables were introduced to capture the effects of the recession, from quarter 4, 2008 to quarter 1, 2012, and to measure seasonal differences between the two winter quarters and the two summer quarters. Neither of these were significant for Italy and were omitted from the final equations.

Quarterly equations

France: Quarterly retail sales per capita = 92.654 - 191.331 Deflated retail price
(1.107) (11,681)*

+ 93.759 GDP per capita + 40.974 D Winter + 17.824 D Recession $R^2 = 0.800$
(6.718)* (3.884)* (1.233)

Price el = -1.74

Income el = 1.866

Italy: Quarterly retail sales per capita = 62.061 - 456.483 Deflated retail price
(0.290) (9.805)*

+ 262.413 GDP per capita $R^2 = 0.593$
(5.124)*

While the equation for France explained a higher percent of the variation in quarterly per capita retail sales than did the equation for Italy, that was largely due to the measured shifts in France caused by seasonal differences in sales and by the impact of the Great Recession.

However, when the average responsiveness of retail sales to price or income changes were measured on a quarterly basis, the results were quite similar for France and Italy. A 10 percent increase in deflated retail price was associated with a 17.4 percent decrease in per capita sales in France and a 16.0 percent decrease in Italy. A 10 percent decrease in price would have had the opposite results. This suggests that in both countries demand was price inelastic within any quarter, that is, higher prices would have led to reduced revenue at the retail level.

A 10 percent increase in GDP per capita was associated with an 18.7 percent increase in per capita sales in France and a 24.5 percent increase in Italy, both strongly positive. This implies that retail sales of fresh kiwifruit would benefit from increases in personal incomes in both countries. Unfortunately, per capita incomes have been growing very slowly in both France and Italy in the last decade. In real terms, GDP per capita in France rose by less than 9 percent between 2008 and 2014, while that in Italy fell by 8 percent. This does not bode well for future retail sales of fresh kiwifruit, especially in Italy.

Demand in the United States

Retail data comparable to that for European countries are not publically available for the United States. In the past, we were able to use grower level data provided by the USDA's Economic Research Service to analyze the forces affecting demand in the United States. That data series was updated through the 2014-15 season for the results presented here, giving a total of 27 annual observations. An inverse demand equation was used to measure the effects on grower price of U.S. per capita consumption of fresh kiwifruit and of U.S. income per capita. Both income and price variables were deflated (adjusted for inflation) and consumption and income variables were adjusted for population changes in order to measure the real effects of the explanatory variables. The results were as follows:

United States: Deflated Farm Price = 1068.611 - 1860.54 Consumption per capita
(4.460)* (4.999)*

+ 0.0.201 Deflated income per capita $R^2 = 0.534$
(2.486)*

Deflated grower price was affected negatively and significantly by the level of per capita consumption, and positively and significantly by changes in income. On average, a 10 percent increase in per capita consumption was associated with an 11.6 percent decrease in farm price. A 10 percent increase in per capita income was associated with a 6.3 percent increase in farm price.

An alternative formulation of the demand equation allowed us to quantify the separate effects on deflated farm price of domestic shipments and net imports, the two main contributors to domestic consumption. The results are shown below:

United States: Deflated Farm Price = 943.224 - 8.873 Domestic Shipments
(2.758)* (4.237)*

-4.851 Net Imports + 0.025 Deflated Income per capita $R^2 = 0.532$
(2.942)* (1.714)

The coefficients for both domestic shipments and for net imports were significant at the 5 percent level and had the expected negative signs. The deflated income per capita variable had the expected sign and was significant at the 10 percent level. The goodness of fit, as shown by the R^2 value, was almost identical for the two equations. The second equation allows us to measure the sensitivity of grower price to the two quantity variables. A 10 percent increase in domestic shipments was associated with an 8 percent reduction in grower price, while a 10 percent increase in net imports was associated with a 5.5 percent reduction in grower price. Thus, grower price was more sensitive to changes in domestic shipments. However, the results also indicate that both domestic shipments and net imports can continue to increase without reducing total grower revenue.

Influence of New Cultivars on Fresh Kiwifruit Demand

Until the Hort16A cultivar was devastated by the PSA epidemic, the available evidence suggested that new cultivars provided a significant boost to total fresh kiwifruit demand. For example, New Zealand was able to expand the total demand for fresh kiwifruit as it gradually expanded sales of its Zespri™ Gold without negatively affecting the demand for its Zespri™ Green. In addition, since average yields of Hort16A were higher than for the Hayward variety, the demand response at the grower level was even greater.

However, with Hort 16A being phased out, and New Zealand planning rapid expansion of its golden replacement, Sungold™, it is too early to measure how much Sungold™ will complement, and how much it will substitute for, the Hayward variety. The initial indicators appear promising, but much will depend on how responsive markets are to increased volumes of Sungold. Similar considerations apply to other new cultivars that are in the pipeline.

While both consumers and retailers appear to welcome novelty in many different fruit categories, ultimately any new cultivar must earn a reputation for having consistent and sustained quality advantages over existing cultivars before it can provide a net addition to total fresh kiwifruit demand. It will be several years before such assessments will be possible for most new cultivars.

VI. Marketing Initiatives

Multifaceted Challenges Ahead

The world kiwifruit industry, and major producing countries, face numerous challenges in the immediate future. Their success in meeting these challenges will be heavily dependent on their ability to adapt their marketing initiatives appropriately.

Many of these challenges have been outlined in the preceding chapters. The first major challenge will arise from the fact that the slowdown in kiwifruit production because of the damage from PSA, and the resultant favorable prices, has now come to an end in most countries. In the next few years, supply could grow faster than demand. This situation would be exacerbated if even a small share of China's enormous production became competitive on world markets.

At the same time, as shown in chapter 1, there is unlikely to be any let-up in the supply of competing fruits that will become available in many world markets. This will include both expansion within existing fruit categories and the continuing popularization of fruits that have not previously been important in world markets as affluent consumers seek new taste experiences.

Population Challenges

Another major challenge will lie in the differential changes in populations around the world. In general, population growth is either slowing or will soon peak in many of the developed countries that have until now been the dominant consumers of fresh kiwifruit. Most of the population growth will, for the foreseeable future, occur in the poorer countries of Africa, Asia, the Middle East and Latin America where consumption of fresh kiwifruit is currently limited. In the developed world, the share of the population in older age groups is rising, and the share of children and of persons in the workforce is falling. That is, the share of the population that generates income will rise, while the share that uses up income in welfare and pensions, will rise. In general, the working population with larger households has been the core consumers of most products. In contrast, as consumers age, the quantity of products that they consume begins to fall. This means that in the developed world, marketers of many fruits will have difficulty in either sustaining or expanding sales.

In contrast, in the developing world, while the populations are relatively young and growing, their economic welfare is hindered by high unemployment, low wages, income insecurity and lack of access to modern supermarkets where products like fresh kiwifruit are available year-round. It will be an uphill struggle to persuade consumers in these countries to adopt or expand consumption of fresh kiwifruit. Indeed, until average incomes exceed \$5,000 per year, prospects in such markets tend to be very limited.

Breakdown of Western Consensus

Another major threat to world markets is the gradual breakdown in the so called "western consensus" about how world society should be organized. After the traumas of World War II, there was increasing agreement that societies needed to be organized around certain freedoms, including human rights, due process under the law, freedom of speech, freedom of movement of people, and freedom of movement of goods, services, information and capital. The three richest economies in the postwar era, the United States, the European Union and Japan, supported this consensus, and the international institutions, like the United Nations, the World Bank and the General Agreement on Tariffs and Trade (GATT), that would promote the consensus.

Two major world powers, the Union of Soviet Socialist Republics, led by Russia, and China under its communist government, promoted an alternative philosophy which placed the needs of the state above the rights of the individual, and favored isolation from the rest of the world. They offered central planning as an alternative to the market solutions favored by the western consensus. Many other countries remained unwilling to commit to either philosophy. These so-called "non-aligned" nations included large countries like India and Brazil.

By the 1990s, the nations that supported the western consensus were enjoying prosperity many times that of the central planned economies. As per capita incomes in China increasingly lagged behind those of much smaller Asian neighbors, President Deng in 1978 began the process of introducing market mechanisms into the Chinese economy. It took another decade before Russia and its neighbors recognized the failures of the central planning system, and, over the next decade, introduced market reforms, ended their economic isolation and made very painful transitions to free markets. During that same period, many non-aligned nations reluctantly came to accept the western consensus.

A major indicator of the triumph of the western consensus was that by 2008 most countries in the world had joined the World Trade Organization (WTO), the successor organization to GATT, that promoted free trade in goods, services and investment. China became a WTO member in 2002 and Russia in 2012. The widespread belief in the rest of the world was that after ending their isolation and liberalizing trade, China and Russia would also gradually converge towards the western consensus in all other respects.

It is now clear that this belief is wrong. Under President Putin, Russia has trampled on human rights, freedom of speech and due process within Russia, has forcibly seized part of another independent country, the Ukraine, has fomented unrest in former satellite countries like Estonia, and has attempted to weaken the democratic influence of the European Union in the region. Worse still, President Putin appears to have underestimated the pain that his policies would inflict on Russia itself. Unless quickly reversed, these policies may set back the economic development of Russia for years to come.

In China, President Xi Jinping has attempted to restore the stranglehold of the Communist Party on Chinese society and business, has clamped down on freedom of information, and imprisoned political enemies without due process. While willing to use the institutional structure set up under the western consensus when it suits China's short-term international needs, he has asserted China's right and willingness to reject that structure as it sees fit. For example, China obeys some of the WTO rules on trade and flagrantly violates others. China has also sought to put western businesses and products at a disadvantage in the Chinese market, and has aggressively used state enterprises to expand China's clout in many different industries around the world.

Another challenge to the western consensus has emerged in radical Islam. This includes both established, internationally recognized, regimes, like that of Iran, and a host of militant groups, like the Islamic State of Iraq and the Levant (ISIL), the Al Nursa Front in Syria, and Boko Haram in Africa, that are claiming legitimacy and are openly hostile to western values and western societies. Together, these parties are intent on re-making much of the Middle East and North and Central Africa according to their own value systems. Trade has already been seriously disrupted by the ongoing hostilities in those regions. Were these parties to gain power, not just trade would be disrupted.

Struggles in Europe

Perhaps one of the greatest societal achievements since World War II has been the restoration of peace in Europe and the growth and expansion of the European Union (EU) itself. The EU has used its influence both to spread western values across Europe and also to advocate for those values in world forums. It has succeeded in tearing down both physical and psychological barriers within Europe. A single market has been created for over 500 million people in 28 countries. Other European countries have been willing to embrace EU standards in order to win membership in the union. And, many non-European countries have sought to maintain close trade and diplomatic ties with the EU.

However, the sustainability of this great European experiment has come under attack on numerous fronts. The Great Recession hit many member country economies hard, particularly in Southern Europe, leading to persistently high unemployment, falling incomes and halting recoveries. The euro currency zone, to which 19 EU countries are committed, faced a crisis when Greece became technically bankrupt. Even after a number of bailouts, Greece may never be able to repay its accumulated debts. Even larger economies like Italy and France remain at risk of a similar fate. The European Commission responded by seeking the power to vet member country budgets before they are implemented by member governments. The dispute with Russia over its annexation of the Crimea caused divisions among members on how aggressively the EU should respond. Another stress arose from the hundreds of thousands of refugees, fleeing civil war and political and economic disasters in the Middle East and Africa, flooding EU member countries. Many member countries sought to restore the land borders that had been mostly removed as the EU moved closer to a single market.

Disagreements over how the EU should deal with these accumulating stresses fostered antiunion sentiment within many member countries and weakened support for the EU among member country governments. Some member countries favored a two-tiered union, in which a few stronger economies would remain fully integrated, while weaker economies could have more limited participation in EU activities. Exacerbating the problem was the decision by British Prime Minister David Cameron to hold a referendum on whether or not Britain should remain a member. A British exit would open the door for other disgruntled countries to seek similar deals. It would be a severe setback to the single market concept, and to the concept of "an ever closer union".

Another strong supporter of the western consensus, Japan, also continues to lose clout in the world. Japan once was a major driver of world growth, and was particularly influential in the economic development of Asia. However, an aging population, and over two decades of faltering economic growth, have eroded its influence in world affairs. Without its two powerful partners in Europe and Japan, the United States has been less effective in promoting the western agenda.

BRICs on the Rocks

As previously noted, many economists forecast that much of the future growth of the world economy would be powered by the large BRICs countries, economies like Brazil, Russia, India, China and South Africa. The problems of Russia and China have already been discussed. However, countries like Brazil and South Africa, that were heavily dependent for growth on export commodities, have been hard hit by the decline in demand from China. Dramatic declines in their exchange rates have sharply reduced their ability to purchase goods and services from other countries, thus passing on the BRICs' woes to smaller, neighboring economies.

In combination, these developments have slowed growth, and impeded recovery, of the world economy. They have created new obstacles to freer trade, which has become so much more important to the world kiwifruit industry as its production continues to expand. While the Russian ban on produce imports is an explicit obstacle to trade in kiwifruit, the widespread economic weaknesses in many other importing countries may present an even greater, future challenge.

Retail Turmoil

Many of the factors discussed above have either reduced overall demand at the retail level, or caused shifts in the demand for products, prices or retail services. The shape of the retail system of 2008, when the Great Recession hit, had evolved during a long period of affluence. It favored large, multinational retailers with large standard formats that could cater to consumers' every need. However, as consumers became more thrifty during the Great Recession, and as consumer preferences became more fractionated during the slow recovery, the mega-retailers increasingly found themselves out of step with their customers' needs.

Smaller regional and local retailers had greater flexibility in responding to changing consumer demands. In seeking to buttress sales, different specialty retailers increasingly encroached on the traditional territory of other specialty retailers. Many different types of outlets increased their food offerings. Dollar stores, hard discount stores, drug stores, convenience stores and other outlets offered increased selections of raw, prepared and processed foods and beverages. Discount chains encroached on upscale chains and upscale chains attempted to increase their popular appeal.

A major disruptor of the retail food business was the rise of the limited assortment chains like Aldi and Lidl. Their emphasis on value appealed to newly-thrifty shoppers. In addition, they burnished their image with reluctant middle-income shoppers by upgrading their packaging and improving the physical appearance of their stores. In many cases, they were able to wrestle away the title of lowest cost retailer from their hypermarket and supercenter rivals.

Their success triggered a re-appraisal of the importance of continued expansion of chain size and store size in retail food competition. Mega-chains, like Walmart, Carrefour and Tesco, have exited numerous markets in order to deploy their resources more effectively in their remaining markets. They have also placed greater emphasis on opening smaller stores that provide more convenient access for shoppers. Finally, retailers of every size have begun to make more intensive use of the detailed customer information they are now collecting, and applying the enhanced computing power now available to determine how different items contribute to increased store traffic, dollar sales, or sales of related or complimentary items. Products that do not outperform on these criteria will not be retained in many stores.

These changes in food retailing are presenting new challenges for kiwifruit marketers. One challenge is how to serve the diversity of retail outlets that now sell food. A second challenge is how to retain shelf space as the size of many retail outlets begins to shrink. More limited shelf space will make it more difficult for the kiwifruit industry to extend the number of product variants that can be sold in any outlet. Finally, the kiwifruit industry will have to understand and be able to utilize the metric their retail customers are using to make decisions on what products to stock and how they should be priced and promoted.

Response of Key Players to Marketing Challenges

Like every other produce sector, the kiwifruit industry has, to the best of its ability, been attempting to adapt to these changes in the economic, political, trade, retailing and consumer environments. The task was less urgent in recent years when supply was reduced by PSA and other negative forces. However, it will become more pressing as kiwifruit supplies return to more normal levels. The rate of response has varied by major producing district and country.

New Zealand Betting on Growth

The kiwifruit industry in New Zealand would appear to be in a favorable position to adjust to market changes. Support for its single desk selling arrangement has been confirmed in the last few years. That gives it unusual ability to control the quality that it sells, to use branding to distinguish different levels of quality, and to allocate different products, sizes and qualities to different markets in order to maximize returns. The need to adjust to the ravages of PSA has led to newer orchards using the best available technology. Consolidation, and upgrading of storing, sorting and packing technology has also continued onshore. Offshore, the Zespri organization has the scale to employ similar analytics to those being employed by the more progressive retailers.

However, the response of the Zespri organization to the PSA setback has been very aggressive. Its recovery plan includes not just replacing lost production capacity, but increasing production to new, record levels, with the new Sungold variety playing a leading role. This strategy faces two major risks. One is that the Sungold variety will be vulnerable to as yet unknown quality problems as expansion continues in years of different production challenges. Most new varieties go through such teething troubles. On the other hand, New Zealand is attempting to reduce product risk by continuing to seek other new cultivars that can be added to its product portfolio. The second major risk is that total New Zealand production will expand too fast, at the same time that production in the rest of the world is also growing, and that markets are shrinking because of the various setbacks discussed in the previous section. New Zealand is becoming increasingly dependent on the two major Asian markets, Japan and China. There are no other markets of comparable size that could compensate for reduced demand in those markets. An ambitious program carries equal risks and rewards.

Italy Hits Repeat

The kiwifruit industry in Italy appears to cycle through similar concerns with little ability to change its destiny. It is favored by its ability to grow different kinds of kiwifruit effectively in many different regions of Italy, and by having both a large domestic market, and large nearby export markets. As a result, production, packing and marketing is dispersed among numerous entities that differ in size, technological expertise and marketing clout.

This means that swings in total Italian kiwifruit production lead to wide swings in prices for Italian producers and for their European competitors. In large crop years, suppliers are tempted to place immature fruit on the market in order to capture early-season price premiums. However, experience with such immature fruit slows repeat purchases by retailers and consumers and tends to depress prices in subsequent periods. Efforts to enforce minimum quality standards or marketing dates have so far not been successful. Consolidation, either by merger or alliances, has continued, but has not yet solved the quality control problem. Thus, the high overall reputation of Italian kiwifruit continues to be damaged by aberrant marketing decisions.

The Italian kiwifruit industry has become much more aggressive in expanding export markets since the Russian ban was instituted in 2014. It has been involved in programs spearheaded by the Centro Servizi Ortofrutticoli (CSO) to provide research, information and promotion support for Italian fruit, partly funded by the EU and Italian governments. It will continue to be a powerful force in global kiwifruit markets.

Chile Pauses Growth

Fresh kiwifruit from Chile are produced and marketed worldwide by a diverse array of companies with different levels of dependence on kiwifruit. They include large multinational businesses, Chilean corporations and small groups of producers. Because Chile exports to so many markets, each of these entities has been able to find profitable niches. However, the diversity of competencies has created problems in maintaining quality standards in export markets. In response, the Chilean growers and exporters associations set up the Chilean Kiwi Committee that devised quality protocols in the orchard, packing house and beyond.

Currently, about 80 percent of the Chilean industry voluntarily follows these protocols. However, the Committee's efforts have been weakened by the need to address the persistent problem of PSA in Chilean orchards. A news report of March 2016 estimated that about 20 percent of green and 30 percent of gold kiwifruit orchards in Chile continued to be affected by PSA.

Chile continues to be an effective worldwide marketer of fresh kiwifruit. Major individual companies have alliances with major importers and retailers in many different countries. In addition, the Chilean Exporters Association (ASOEX) has established research and promotional programs in Europe, North America and Asia. The Chilean fruit industry remains very responsive to the relative returns being received for the wide array of fruits and berries that it can grow. Until the relative rewards for kiwifruit improve, little additional growth can be expected in the kiwifruit industry in Chile.

Greece on the Rise

Greece has dramatically increased plantings, production and exports of kiwifruit in the last decade. The domestic market in Greece is relatively small. In addition, the purchasing power of Greek consumers has been hard hit by the economic crisis that is now in its fifth year. Thus, the growth of the Greek kiwifruit industry has been heavily focused on export markets. Initially, Greece was able to expand its exports to neighboring countries as a low-cost supplier. Even in the more affluent countries of Western Europe, recession has led many consumers to choose lower-priced products, and discount retailers have become more influential. However, some of the more progressive Greek exporters have improved their technology and begun to use branding and geographic indicators to earn premium prices for their products.

Greek exporters have not been deterred by the loss of Russia, their largest single market, but have increased sales both to other EU countries and to third countries. Larger crops in Italy and in other supplying countries are likely to depress returns in the current season. This, in turn, will curb desire for further expansion. However, at its present scale, Greece is likely to remain a major force in world kiwifruit markets.

France Treads Water

The kiwifruit industry in France has slowly eroded in area and production while its two major competitors, Italy and Greece, have expanded. Since this phenomenon is occurring in other fruits in France, it is generally blamed on the country's high costs of production, excessive regulation and competition from urbanization, factors that will not be rapidly reversed. Falling production also means that the pressure from imports has been increasing.

In response, the French kiwifruit industry has focused on serving premium niches in both domestic and export markets. Most packing and marketing is organized under modern cooperative organizations that have effectively used branding to distinguish their products. France also has a well-established support structure for its major fruits. Most kiwifruit industry research, promotion and service activities are performed by an organization dedicated to kiwifruit, the Bureau Interprofessionnel du Kiwi (BIK), while a national promotional body, Interfel, conducts promotions in export markets in conjunction with major exporters.

Iran Destination Unknown

During 2015, lengthy negotiations took place between Iran and six major world powers in order to persuade Iran to abandon its nuclear weapons program. The reward for Iran was to be the unfreezing of Iranian assets held in western banks and the removal of various embargos that had reduced Iran's ability to import needed technology and export its surplus products. As a major exporter, this would have enabled the Iranian kiwifruit industry to diversify its markets.

However, although the agreement was concluded, there is considerable uncertainty about when, or if, it will be implemented. The outcome of the presidential election in the United States could determine whether or not the new president will accept the deal approved by President Obama, but opposed by many in the U.S. Congress. In addition, the Iranian government has continued to support various organizations and regimes considered to be terrorists, has continued its verbal threats against the country of Israel, and has continued to test ballistic missiles that would further threaten peace in the Middle East. This means that normalization of Iran's relationship with the rest of the world could be further delayed.

China Stirring

Perhaps the biggest uncertainty about international markets for kiwifruit surrounds developments in China. Currently, China is the world's largest producer of kiwifruit, but virtually all of its production stays in China, and in addition, it has been increasing its imports, especially from the Southern Hemisphere. The first unknown is the future trajectory of demand in China. Clearly, the period when China's economy, personal incomes and markets were growing at double digit rates has come to an end. The question is whether growth will slow gradually, as government leaders now forecast, whether China will experience the shock of a "hard landing", or whether it will face the prolonged slowdown experienced by its neighbor, Japan. In either case, demand for many goods would be likely to slow.

On the supply side, China's productive capacity appears to be set to increase further as younger plantings mature. The Chinese government and industry have invested heavily in breeding new kiwifruit cultivars, that could have potential in sophisticated western markets. This, combined with a slowing domestic market, could encourage the Chinese kiwifruit industry to place more emphasis on exports. To date, China has not demonstrated the ability to break into western markets. However, this could be easily achieved, either through acquisition of major western marketers, or through marketing alliances. The greater the shock to the Chinese economy, the more likely is the Chinese kiwifruit industry to seek new opportunities in other countries.

VII. Strategic Issues

Focus on Quality

The quality of any fruit product is crucial if consumers are to choose it from the wide selection of fruits now available in major retail outlets. It is equally crucial if consumers are to make repeat purchases. In the case of fresh kiwifruit, consumers initially define quality with their eyes as it sits on the retail shelf. If the product looks tired, misshapen, bruised or discolored, consumers are likely to pass it by. Since many consumers prefer a size in the mid-range, the product on display may fail inspection because it is too small or too large. Unfortunately, marketers are rarely present when consumers make these initial judgments. Too often, they are not aware of the frequency of such lost sales. Even retail assistants stocking produce shelves may be too busy with their other duties to recognize that product appearance or presentation is discouraging sales. In addition, they have no particular motivation to check the kiwifruit section ahead of any other fruit or vegetable.

Even after the product is purchased, there is no guarantee that consumers will be satisfied enough to make repeat purchases. Kiwifruit present a special challenge for consumers in determining when any particular piece is at the optimal stage of ripeness for eating enjoyment. Outward appearance alone is a poor guide to internal quality. After a kiwifruit is sliced open, the consumer (like Goldilocks) may find that it can range from being too hard, to being too soft, to being just right. It is only the third outcome that will encourage repeat purchases. Another limiting characteristic of kiwifruit is that consumers are deterred from eating them unless they have the proper utensils handy. The consumer needs to be properly equipped to enjoy a kiwifruit without undue mess.

Ultimately, the grower, packer and marketer have to bear responsibility for the quality of their kiwifruit products on the retail shelf and in the consumer's home. This is a formidable task when the product is placed on sale, and consumed, many miles and many months after it has been picked, packed, stored and shipped. While some suppliers do a superb job of preparing their product for the arduous journey to market, many do not.

Particularly in years when supplies are plentiful and the marketing season becomes elongated, the process of preparing product for sale to consumers requires deep understanding of the physiological resilience of the kiwifruit and of how quality is impacted by each process on the way to market. To some extent, there is a trade-off between the efficiencies gained from moving large volumes of product through the system at optimal speed, and the ability to maintain product integrity. There are no easy answers to this dilemma. However, the long-term sustainability of the industry in a competitive world depends on getting quality right to the maximum extent possible.

Importance of New Technology

Growers, packers and marketers of perishable crops such as kiwifruit, today face many challenges not faced in the past. As noted previously, products have to be delivered at greater distances and over longer seasons than in the past to much more demanding retailers and consumers. In addition, operators face many restrictions on their use of labor, water and chemicals. They face stricter standards for food safety, emissions, residue levels, farming practices and plant operations from government regulators, general certification agencies and major individual customers. They face rising costs of materials, labor, equipment and farm services. Sustaining farming and processing operations demand levels of organizational skills and technologies not required in the past.

Many new technologies have been introduced to make the growing, packing and marketing of perishable crops more efficient and effective. In some cases, such as automation, new technology substitutes for hand labor. In an industry where labor is becoming ever more scarce and expensive, this is a considerable advantage. In other cases, new technology allows operators to perform operations that could not previously be performed. For example, electronic scanners can detect both external and internal defects that would not be visible to the naked eye. However, often it is the adoption of generic technologies that are not specific to agriculture or to the fruit industry that can allow firms to generate information that would not otherwise be accessible. For example, very large numbers of observations can be made on different aspects of growing, storing, packing and shipping any lot of kiwifruit. High speed computers allow that data to be mined to meet various management goals.

Computer analyses can be used to explore cause and effect between one or more inputs or processes, and one or more outcomes, for example, to link specific growing practices to incidence of specific product defects, or to link new line technologies with quality outcomes in packed fruit. Computer analyses can also be used to generate the records demanded by various certifying agencies. Indeed, so much data can be generated that much time can be wasted on keeping meaningless records.

Mindless use of new technologies or new analytical techniques is more likely to mislead than to improve management decisions. Managers need to have a very clear idea of the outcomes they desire from the use of any technology. In a sense, new technologies and new computing power allow each orchard, store, or packing shed to become its own research laboratory. In such a setting, a scientific approach is required.

A good scientist first formulates one or more hypotheses about the relationship being studied. For example, the scientist (manager) might hypothesize that as the speed of a sorting line is increased, the proportion of defective fruit being missed also increases. This hypothesis could then be tested by running different batches of fruit through the sorting machine at different rates of speed. If it appears that factors other than speed affect sorting effectiveness, those other factors also need to be subjected to similar objective tests.

The key to improved understanding is asking the right questions about the operation or the data. Often, the right questions will only emerge after a period of systematic trial and error. It is also prudent to be willing to test the validity of conventional wisdom. More often than not, a good scientist will find that his or her preconceptions are not supported by objective analysis. It requires a large dose of humility to admit that one's initial hypothesis is wrong and to rethink one's approach to a problem.

The new capabilities mean that the old style top-down management is unlikely to be as effective as it was in the past. It will need to be replaced by collaborative management based on the objective information that each managers can bring to the discussion. Managers will need to be hired that recognize that learning should be a continuous process. Wisdom must be recreated on the job every day.

Embracing Social Media

The internet provided new ways for individuals in any part of the world to connect with individuals in any other part of the world instantaneously. Initially, those connections were limited by fixed computer locations, bandwidth speed and cost, and by cumbersome applications. However, the limitations of pipeline space and speed have been gradually removed, and connectivity has been enhanced by numerous applications that can be accessed 24 hours per day by ubiquitous mobile phones. The revolutionary developments have included search engines like Google, that dwarf all previous encyclopedias, smart phones, like the Apple iPhone and its numerous competitors, social media like Facebook, that currently claims over 1.4 billion regular users, messaging services like Twitter, video transmissions like U-tube, online malls like Amazon and Alibaba, and on demand entertainment like Netflix.

These developments share a few common characteristics. First, they have reached mass popularity in extremely brief time spans. Second, they can be very rapidly rendered obsolete by some new technology or application. Finally, most individuals and businesses have only begun to scratch the surface of the potential uses of these developments. In the meantime, companies like Google (now re-named Alphabet), Apple, Facebook, Amazon and Alibaba are increasingly encroaching on each other's territory in a battle to provide more services to more consumers.

Firms in the produce industry continue to struggle with how to best use these new social links, in particular, how much to invest in the different approaches in order to advance their business goals. For example, in the use of Facebook, should the firm hire a specialist to present the company point of view, or should they encourage employees in general to participate actively on Facebook on the firm's behalf? How much should be invested in developing story lines or in producing professional videos that can show the firm in a good light on Facebook? How much should be spent on creating networks of food bloggers or celebrity chefs that can extol the virtues of the firm's products? How closely should the firm's Facebook activities be linked with those of major retail or institutional customers? How much should be spent attempting to communicate directly with consumers, through entertainment or competitions? And, which groups of consumers should be targeted? The young, housewives, the elderly? Who?

Unfortunately, firms in the produce industry have only just begun to ask those questions, and no clear answers have yet emerged. Some firms and organizations have been much more aggressive in testing various ideas on social media. However, measuring results remains very difficult.

What we do know is that the new connectedness engendered by social media is having a major influence on consumers. That influence is likely to grow and change over the next few years. While individual produce firms need to be experimenting with potential uses, there would appear to be a role for industry organizations in supporting more comprehensive trials on what uses might be most beneficial for different products and with different audiences.

Disruptive Technologies

Harvard Business School professor, Clayton Christensen popularized the notion of "disruptive technologies," that is, innovations that disrupt an existing market and value network and that create a new market and value network. As the pace of innovation has increased in recent decades, the number of industries that have been upended by disruptive technologies has increased geometrically.

The introduction of the Model T Ford disrupted the market for horse-drawn vehicles, while the emergence of powered tractors ended farm dependence on horses. Plastics and synthetics undermined the market for traditional materials like wood and steel. The distributed power of cheap, personal computers ended the dominance of expensive mainframe computers. At the same time, it undermined the demand for the computer experts that were needed to run and maintain mainframe computers. Personal computers have, in turn, been displaced in many uses by tablets and smart phones. Cloud computing is gradually replacing the storage of computer files on individual corporate computer servers.

However, disruptive technologies need not primarily involve machines. Some of the most disruptive recent technologies have involved organizational changes that have revolutionized entire industries. For example, Zillow has replaced many of the functions of real estate agents. LinkedIn has disrupted recruitment systems. Uber has revolutionized the taxi business, and Airbnb has provided new competition in the hospitality business.

It is easy to assume that a traditional business like growing storing, packing or marketing fresh kiwifruit is not vulnerable to similar disruption. However, few in the steel business, or in the mainframe computer business, or in the taxi business, ever imagined that they could be blindsided by innovations that came from outside their industry. The kiwifruit industry, like the entire produce industry, needs to be aware that innovations both from within the produce industry, and from unrelated industries, could emerge at any time to alter existing produce markets and value networks.

The only security is to continually assess each aspect of one's business, to see how related businesses may be undergoing change, and to keep an open mind about what changes might be needed in your business to avoid being blindsided by disruptive systems or technologies. The genie of disruptive innovation is out of the bottle, and no business is immune to change.

Escaping GMO Dread

It is over 60 years since Crick and Watson unraveled the secret of DNA. In subsequent decades, many thousands of dedicated scientists have made dramatic advances in the understanding of plant, animal and human genetics, and in using the science of genetic engineering to improve breeding of plants and animals, and to develop "miracle" medicines that have greatly reduced human suffering and extended human lives.

However, a notable exception to the acceptance of applications of the improved genetic knowledge has been in the case of human food. Genetic engineering of food has come under continuous attack on many fronts. It was wrongly associated with the outbreak of Mad Cow disease. Its products were pilloried as "frankenfoods", that is, somehow monsters that would destroy their human creators. And, the term genetically modified organisms (GMOs) was used in a derogatory fashion to attack the firms and scientists that used genetic engineering technology in food, the genetically engineered plants they developed, and the genetically engineered foods developed from those plants.

In fact, compared to traditional breeding methods, genetic engineering offers a more precise, efficient, safer, and more closely monitored method of improving plants and foods. Hundreds of millions of people have eaten genetically engineered foods derived from corn and soybeans without evidence of a single negative health consequence.

However, the virulent campaign of opposition has caused many countries in Europe to reject any form of genetically engineered plant or food. Worse still, opposition in Europe has influenced many developing countries to reject a technology that would bring enormous benefits to their agriculture and their food supply, and to the nutrition and health of their children.

The dread of GMOs is relevant to the threat that the world kiwifruit industry has faced, and still faces, from PSA. One potential avenue for combating PSA, and similar pathogens, would be to genetically engineer resistance into kiwifruit vines. However, the New Zealand kiwifruit industry has for many years taken an anti-GMO stance in the dubious belief that it would bolster New Zealand's reputation as having a pristine environment. It would require a major about face to admit that genetic engineering might not be harmful, indeed, might bring considerable benefit to the industry.

The industry has paid an enormous price in terms of assets and incomes destroyed because it adopted an anti-science posture two decades ago. It is surely time to put the dread of GMOs behind, and apply the best that modern science has to offer to protect the kiwifruit industry in the future. As a side benefit, doing so might also allow millions of children in poorer countries to share in the benefits of scientific advances.

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