

# B.C. Pomme Fruit Industry Opportunities Assessment

October 1, 2023

Final Report



Ministry of  
Agriculture  
and Food



Prepared for the B.C. Ministry of Agriculture and Food by Globalwise, Inc.  
in partnership with Belrose, Inc.

## ***Acknowledgments***

This report is authored by Globalwise, Inc. and Belrose Inc., consultants for this project. We gratefully acknowledge and appreciate the assistance from Chris Zabek, Regional Agrologist, B.C. Ministry of Agriculture and Food. Chris is the project lead for the Ministry and provides support and guidance for this project.

We also appreciate the contributions of the project working group. The members are Mani Gill, grower and Director of the B.C. Fruit Growers Association, Nick Ibuki, Business Development Manager, Summerland Varieties Corp, Lindsay King, Industry Specialist, Ministry of Agriculture and Food, Glen Lucas, General Manager, B.C. Fruit Growers Association, and Melissa Tesche, General Manager, Okanagan-Kootenay Sterile Insect Release Program. The working group members met with the consultants in virtual meetings, recommended interview candidates and made introductions, critiqued draft reports, provided documents for review and analysis, and provided insights on the B.C. apple and pear sectors.

Opinions expressed in this document are those of the authors and not necessarily those of the Government of British Columbia. The Government of British Columbia, and their directors, agents, employees, or contractors will not be liable for any claims, damages, or losses of any kind whatsoever arising out of the use of, or reliance upon, this information.

# Table of Contents

Introduction .....	1
The B.C. Apple Industry – A Decade of Change .....	2
Markets Served by the B.C. Apple Industry .....	3
Review of Previous Studies of the B.C. Apple Industry.....	5
SWOT Analysis.....	7
Gaps in Market Opportunities .....	8
Variety Selection.....	8
Controlled Atmosphere Storage.....	9
Marketing Support .....	9
Benchmark B.C. Apple Performance to Competitors .....	10
Pomme Fruit Technology Opportunities.....	11
Rationale for New Technologies in the Fruit Industry.....	11
Types of New Technologies of Value to the Fruit Industry .....	11
Industry Interviews .....	14
Top Markets & Product Opportunities .....	15
Obstacles to Capitalizing on Identified Opportunities.....	16
Mitigating Strategies .....	16
Observations on Pears .....	17
Recommendations .....	18
Fast Track Selection of a New B.C. Apple Variety.....	18
Restart Horticultural Extension .....	19
Controlled Atmosphere Storage.....	19
Getting the Right Fruit to the Consumer.....	19
Go Forward with a Replant Program.....	19
Appendix A: Metrics of Stakeholders Consulted .....	A-1

## List of Tables and Figures

Figure 1: B.C. Apple Farm Gate Value per Pound, Current and Deflated Prices.....	2
Figure 2: Apple Trade between British Columbia and Washington State, by Month, 2021-22 Season, (40-lb. box equivalents).....	5
Figure 3: Updated SWOT Analysis of B.C. Apple Industry.....	8
Table 1. Productivity of B.C. Apple Industry versus Major U.S. Apple Producing States, 2016-2021 .....	10
Table 2. Technological Advances Available to the B.C. Fruit Industry .....	13
Table 3. Average Comparative Performance of B.C. Pears, Apples, and Sweet Cherries 2011 to 2020 ...	18

# B.C. Pomme Fruit Industry

## OPPORTUNITIES ASSESSMENT PROJECT – FINAL REPORT

### Introduction

Globalwise, Inc. and Belrose, Inc. were retained by the B.C. Ministry of Agriculture and Food in May 2023 to conduct an up-to-date assessment of the opportunities for the B.C. fruit industry under current production and market conditions. This final report builds on a series of recent studies supported by the Tree Fruit Stabilization Project of the Ministry of Agriculture and Food that have examined various aspects of the fruit industry and includes recommendations with particular reference to the B.C. tree fruit replant program.

This work was conducted to support Recommendation #15 of the Tree Fruit Industry Stabilization Plan. The recommendations contained in this report are meant to act as guidelines to develop Stream 3 - Replant of the Perennial Crop Renewal Program.

This report also draws on three previous opportunities assessment reports prepared by the authors. The first report profiles the apple sector by reviewing production systems, the markets served, highlighting key information from a series of other recent tree fruit sector reports, and the economic contributions of the apple sector to the B.C. economy. The second report covers apple marketing opportunities and constraints, identifies gaps in market opportunities, benchmarks B.C. apple sector performance against competitors and summarizes technology opportunities. The third report covers responses to surveys with the B.C. apple industry and domestic fruit buyers, top market and product opportunities, conditions related to new apple varieties, major technology opportunities, and the obstacles to capitalizing on opportunities. The citations for the three previous reports are included in the bibliography below. Interested readers can request digital copies by contacting the Ministry of Agriculture and Food.

The apple sector in B.C. has faced major challenges in recent years which are given primary attention in this report. This project has emphasized the apple sector but also provides a brief assessment of pears. Other B.C. tree fruits are not covered.

The process of producing, storing, marketing, and distributing fresh fruit has become extremely complex. Yet the ultimate goal of the entire fruit system is to satisfy consumers both in the domestic market and in widely different export markets. The long-term success of each competing supplier, including the B.C. fruit industry, is dependent on consistently satisfying consumers in these different markets. While this report offers recommendations for changes or improvements in the B.C. industry, the actions of the industry must periodically be re-evaluated in terms of how well the changing needs of consumers are met.

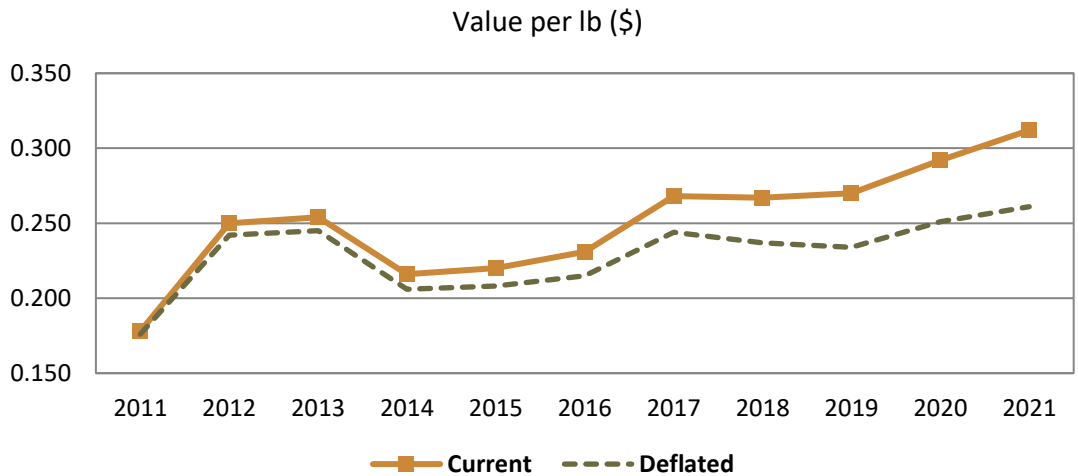
## The B.C. Apple Industry – A Decade of Change

Two initial trends are causing mounting concern regarding the B.C. apple sector’s health and long-term viability. First, the acreage planted to apples has fallen in the last decade and the trend appears to have no pause. Second, farmgate prices are not improving on an inflation adjusted basis.

Planted apple acreage trends worldwide are following the same trend as in B.C., falling by about 3% in the 2011-2021 period. There have been notable acreage declines in leading producing countries like Chile and France. Marketed production in B.C. fluctuated around 100,000 metric tons in the decade but dipped sharply in 2020 and 2021. The value of sales at the farm gate rose fairly steadily between 2011 and 2019 but fell back sharply in 2020 and 2021.

The farmgate value of apple sales has risen in the last decade. However, taking account of average B.C. inflation in the period, the deflated farm value remained below the 2012 and 2013 peak for the following six years. In 2020 and 2021, it averaged only 5.1% higher than the 2012-2013 peak (Figure 1).

**Figure 1: B.C. Apple Farm Gate Value per Pound, Current and Deflated Prices**



Sources: B.C. Ministry of Agriculture and Food. “Area, Production and Farm Gate Value of Apples, B.C.,” 2011-2021 and Stat Canada, Consumer Price Index (Annual).

These are other important trends:

- Apple acreage has declined annually since 2016.

- ▶ Most of the growers in B.C. are small and farm part-time with other sources of work or income. (The recent BRMB study of profitability found less than 5% of fruit growers had sales revenue greater than \$100,000 per year.<sup>1</sup>)
- ▶ The prohibitively high cost of land, at over \$100,000 per acre, constrains the expansion of all B.C. tree fruit production and inhibits the entry of new orchardists.
- ▶ The varieties of apples produced are changing. From 2015 to 2020, there has been large percentage increases in production of Honeycrisp (+470%), Ambrosia (+173%), and Pink Lady® (+161%), and over 40% decreases in McIntosh, Spartan, Red Delicious, and Granny Smith. Gala has increased moderately at +35%. Past replant programs have helped adjust the varieties as consumer demand shifts.

## Markets Served by the B.C. Apple Industry

The apple industry faces an uphill battle to retain its share of the fresh fruit market. The entire deciduous fruit industry, including the apple industry, in Canada has been losing ground to competition from many other types of fresh fruit, including tropical fruit, berries, and all other exotic fruits. This same consumption pattern is found in other developed countries.

The B.C. apple industry serves five different markets, each with different sets of apple competitors. However, the primary market is the province of British Columbia and secondarily in the nearby province of Alberta. The third major market is the more heavily populated provinces of Eastern Canada. The fourth market is cross border sales in the United States, and the fifth is overseas exports, primarily to Southeast Asia.

The United States, especially Washington state, is a major competitor in all five markets, as are Southern Hemisphere suppliers such as Chile and New Zealand during the summer season. In Eastern Canada, robust provincial apple industries in Ontario, Quebec, and Nova Scotia have strong locational advantages over B.C. apples. Markets in Southeast Asia are served by formidable competitors from Asia, Europe, North America, and the Southern Hemisphere.

Annual fresh sales of the B.C. apple industry have been estimated at 120 million pounds, about 3 million packed box equivalents. There are no definitive statistics available on how that is allocated to different markets. We estimate that about 2 million boxes are sold in British Columbia.

There is an opportunity for growth in the B.C. market. The available data suggest that the B.C. apple industry had less than a 40 percent share of fresh apple sales in the province. This means that the price of imported apples has a strong influence on the prices received by B.C. growers. The average price of B.C. apple imports in the 2021-22 season was \$1,510.86 per metric ton, equivalent to 68.5 cents per lb., or \$27.41 per 40-lb box. However, during the 2021-22 season, the average import price ranged from a low of \$18.03 per box in November 2021 to a high of \$37.30 per box in July

---

<sup>1</sup> Dollar prices are in Canadian dollars in this report unless otherwise indicated.

2022. This indicates how vulnerable the returns in the B.C. apple industry are to the price of imports from Washington state.

While the volume of fresh apples entering B.C. from Washington state is important, the makeup of those imports also has competitive implications. The data are only available for all of Canada. However, one can assume that a similar variety mix is shipped to British Columbia. The share of three mainstream varieties, Red Delicious, Golden Delicious, and Gala have fallen over time, those of Granny Smith and Fuji have remained stable, but the share of all other varieties has increased by almost 150%. Most of these newer varieties are proprietary varieties, and include Envy™, Jazz™, and the latest, Cosmic Crisp™. Canada is also an important market for U.S. exports of organic apples that are sold at a substantial premium to conventional apples.

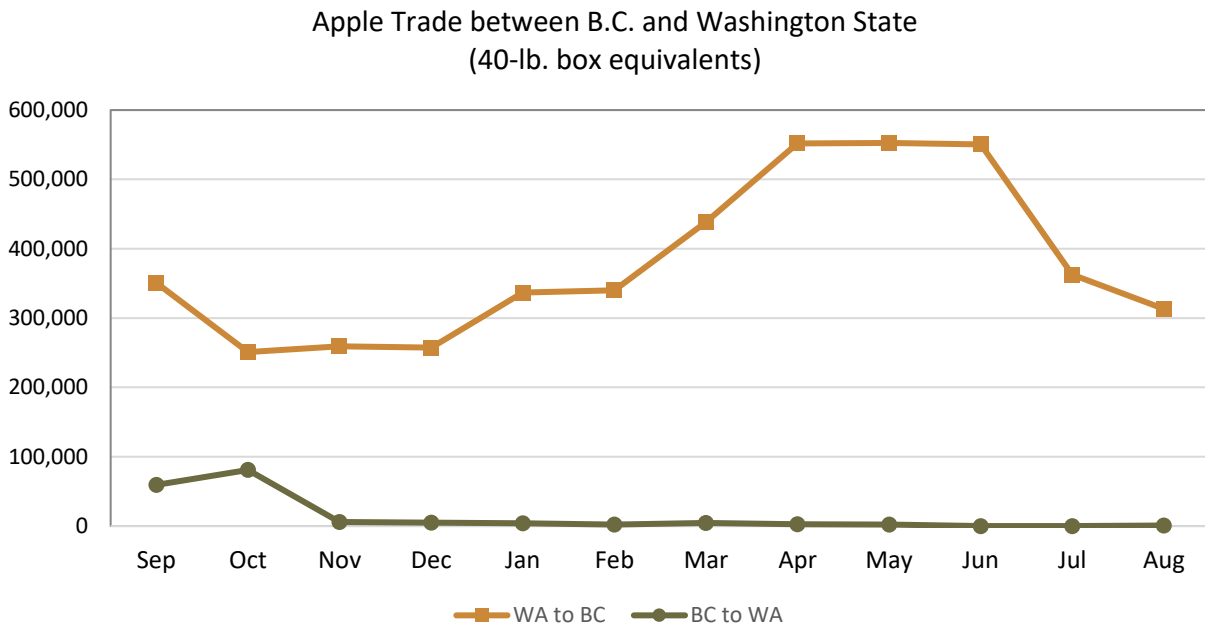
Apple exports from Canada were valued at \$34.7 million in the most recent, 2021-22, season. A majority of these (79.5%) were shipped to the United States. The next four most significant export markets were Vietnam (11.4%), Israel (2.6%), Mexico (1.5%) and Hong Kong (0.7%). There were also small sales to Cuba and several Central American markets.

British Columbia accounted for 21.8% of the value of all Canadian apple exports in 2021-22. Over 61% of the value and 57% of the volume of B.C. apple exports went to the United States through Washington state. The second most important destination for B.C. apple exports was Vietnam with about 32% of the value and 33% of the volume.

Figure 2 shows the marked disparity between B.C. fresh apple exports to Washington state and Washington state's fresh apple exports to B.C. by month for the 2021-22 season. The overall balance of trade was heavily in favor of Washington state. It was particularly pronounced in the April through June period as apple storage in B.C. became depleted. In contrast, the heaviest exports from B.C. to Washington state occurred in September and October while harvest was still ongoing in Washington state.



**Figure 2: Apple Trade between British Columbia and Washington State, by Month, 2021-22 Season, (40-lb. box equivalents)**



Source: Statistics Canada, “Canadian International Merchandise Trade Database, monthly”, (online), 2021 – 2022.

## Review of Previous Studies of the B.C. Apple Industry

The decline in the B.C. fruit industry in the last few years has led to a major effort between the public and private sectors to create a tactical plan to address the industry’s challenges. The B.C. Ministry of Agriculture and Food has played a lead role in involving the various sectors of the tree fruit industry in coming together to address the challenges and plot a path forward. After wide industry consultation, a Tree Fruit Stabilization Plan was developed with the title of “The Path Forward: A Blueprint for B.C.’s Tree Fruit Industry.” An External Advisory Committee including key Ministry personnel and key stakeholders has been set up to move the project forward, interpret findings and make final recommendations for plan implementation. Growers, packers, and marketers have been kept informed as the effort has moved forward.

Overarching themes brought up by industry participants have included:

- ▶ Lack of industry leadership or a long-term strategy.
- ▶ Access to labor and a long-term labor strategy.
- ▶ The need for targeted horticulture and extension services.
- ▶ A strategy regarding new varieties.
- ▶ A strategic, coordinated plan for marketing and sales.

- ▶ The need for consistent and reliable data to inform decisions.
- ▶ The need for a review of Government policies and programs.

A draft plan including these elements was delivered by the end of October 2021 and shared with all participants. It has been unanimously endorsed by the industry members of the Advisory Committee. The next step is to generate the information needed to move the plan forward. This current project is part of that process.

To better document the current difficulties faced by the B.C. apple industry, several recent studies have examined both production and marketing aspects of the industry.

The most recent study on the domestic market in British Columbia, “Domestic Tree Fruit Market Research,” was conducted by Advanis in February 2023. Some important findings from that study are:

- ▶ A majority (55% of respondents) claimed to buy primarily B.C. apples, but only 14% bought exclusively organic apples.
- ▶ Their favorite varieties were Ambrosia (19%), Royal Gala (19%) and Honeycrisp (14%), varieties that are available from both B.C. and Washington state suppliers.
- ▶ While 59% said taste was important to buying decisions, 68% were influenced by price and 78% said they had tried new varieties and would be encouraged to try other new varieties through in-store sampling or tasting.

Research by Euromonitor Consulting (2023, Euromonitor International) provided insights into the export markets for B.C. Their market review covered the potential for Canadian apple exports to China, Indonesia, Mexico, Singapore, South Korea, Taiwan, Thailand, and Vietnam. It concluded that Vietnam offered the best prospects among these eight countries for Canadian apple exports because of its large population, rising per capita income and low barriers to entry for imported apples. Currently, all Canadian apple exports to Vietnam are supplied from British Columbia.

However, competition in the Vietnamese apple market is quite intense. New Zealand was the major supplier in 2020, accounting for about 42% of imports. China replaced New Zealand as the number one supplier in 2021 with over 60% of Vietnamese imports. The United States was the second largest supplier in 2020 with one third of fresh apple imports, and the third largest in 2021. None-the-less, B.C. packers we interviewed are optimistic there is a market opportunity for expansion in Vietnam for high quality Ambrosia.

The Euromonitor Consulting report has key observations for B.C. to compete more effectively. Namely, the Canadian suppliers will have to build greater awareness of Canadian apples, invest more heavily in a marketing program in Vietnam and make a long-term commitment to that effort.

## SWOT Analysis

Strengths, weaknesses, opportunities, and threats (SWOT) analysis for B.C. apples have been reviewed over time. Earlier work by Globalwise and Belrose in 2015 was again reviewed with updates from the recent consumer research survey of apple consumers in B.C. (2023, Advanis) and the series of recent market studies addressing Asian markets (2023, Euromonitor International). The B.C. Ministry of Agriculture and Food has also identified key marketing opportunities and issues (2021, Ministry of Agriculture and Food).

Little has changed in the SWOT since the earlier analysis described above. Figure 3 is a summary of the four elements of the SWOT assessment. Bold type shows where more significant changes are taking place over the last decade.

Strengths have not changed and opportunities currently revolve around market development domestically. Exports remain an opportunity but are principally confined to Vietnam. Weaknesses can be traced back to financial distress among growers. Except for the climate extremes and variability now apparent in the last five years, threats are unchanged and are based on competitor cost and market access advantages.

**Figure 3: Updated SWOT Analysis of B.C. Apple Industry**

<p style="text-align: center;"><b>Strengths:</b></p> <p>Access to western Canada markets with trade relationships.</p> <p>Advantageous image of clean resources including innovative OK SIR Program</p>	<p style="text-align: center;"><b>Opportunities:</b></p> <p><b>Restructuring the industry to regain a greater share of B.C. markets.</b></p> <p>Expand export foothold, especially in Vietnamese market.</p> <p><b>Expand market channels like Feed B.C.</b></p>
<p style="text-align: center;"><b>Weaknesses:</b></p> <p><b>Grower financial distress has led to distrust and lack of cooperation.</b></p> <p><b>Smaller orchard units with greater difficulty selecting and paying for new orchard technologies.</b></p> <p>Lack of new varieties that can deliver premium prices.</p> <p><b>Fractionation of packing and marketing efforts.</b></p>	<p style="text-align: center;"><b>Threats:</b></p> <p>Powerful, well-financed competitors.</p> <p>Competitors’ strong ties with major retailers.</p> <p>Competitors’ ability to sway consumer preferences for newer apple varieties.</p> <p><b>Cost increases and yield impacts due to climate change.</b></p>

*Compiled by Bruce Prenguber and Dr. Desmond O’Rourke*

## Gaps in Market Opportunities

Interviews with wholesalers and retailers revealed gaps in markets that need to be addressed.

### Variety Selection

The first gap in market opportunities is apple variety selection. Most newer varieties, even the successful ones like Ambrosia and Honeycrisp, have an initial premium price window that gradually fades with time. Finding new varieties is therefore a key to long term success for the apple industry of B.C.

For this project, we did an exhaustive analysis of new varieties potentially available to B.C. growers. In a previous project, Nick Ibuki of Summerland Varieties Corp (SVC) developed a list of branded and nonbranded apple varieties available for commercialization in B.C. He listed 25 branded and 11 nonbranded varieties broken up by their position on the sweet-tart taste continuum, their color (Red, Bicolored or Yellow) and their harvest timing, (early, mid, mid-late and late harvest). From

previous studies, the authors themselves had identified 25 branded and 9 nonbranded apple varieties that might be candidates for planting in B.C. In general, the nonbranded varieties aroused little interest among B.C. growers, while the branded varieties were not authorized for planting in B.C. or had prohibitively expensive acreage and franchise fees. A potential alternative would be one or more new varieties from the Summerland Research Station breeding program. However, only Snowflake is being evaluated commercially at this time.

To date, the one exceptional new apple variety from B.C. is Ambrosia. Some Canadian retailers are limiting their Stock-Keeping Units (SKUs) to fewer apple varieties in order to have merchandising space for other fruits in the produce department. It is getting easier for produce managers to justify eliminating a slower selling variety. In this environment, B.C. needs a major commitment to new variety introduction.

Retailers are always looking for the next new variety to successfully introduce. Finding one or more varieties that have the characteristics to draw that consumer attention and meet the competition from new apple varieties is a major task.

### **Controlled Atmosphere Storage**

Some retailers as well as packers note that B.C. lacks an adequate amount of Controlled Atmosphere (CA) storage. With the recent influx of independent packers, many are thought to rely solely on refrigerated storage. That means that by about December of the marketing year, apples have to move from refrigerated storage into the market channels before fruit quality deteriorates. A large movement of fruit in a brief time period depresses prices, which has a negative effect for the remainder of the marketing year. Retailers are aware of this and are said to sometimes withhold B.C. orders as the critical winter sales deadlines approach so that they gain a price advantage over packers.

### **Marketing Support**

The lack of marketing support in western Canada for B.C. apple promotion helps to turn retailers and their customers toward the club varieties like Envy™, Jazz™, and Cosmic Crisp™ that are rising in popularity. In particular, Envy™ was mentioned as having significant funding for in-store promotion. The gap in marketing support needs to be reversed at least to some extent with targeted and creative promotion to turn attention back to B.C. apples.

Some market research indicates that consumers favor local apples but retailers report that most consumers expect “good value” from their apple purchases. Retailers say this means both superior quality and an acceptable price. Except for the highest income consumers, price is always a factor in purchase decisions. In more challenging economic times, such as now with inflation, consumer loyalty waivers for support of locally grown fruit.

## Benchmark B.C. Apple Performance to Competitors

Table 1 shows average productivity measures for the apple industry in British Columbia and Ontario and in four leading U.S. apple producing states, Washington, New York, Michigan, and California. B.C. had a smaller bearing area of apples than Ontario and the four U.S. states shown. Its average yield per acre was higher than that of California but was more than 20% lower than that of Ontario, Michigan, or New York, and only 54% of that of its major competitor, Washington state. All value and price data in Table 1 were converted to Canadian currency using USDA, ERS data on nominal exchange rates at an average rate of 1.3032 Canadian dollars per U.S. dollar. The value of B.C. farm sales of apples lagged even that of California. The average farm price of apples in Canadian currency lagged that in Ontario, Michigan, California, and New York and was less than 70% of the price received by growers in Washington state. The average revenue per acre in B.C. was 75% of Ontario's revenue and only 37% of that in Washington state.

**Table 1. Productivity of B.C. Apple Industry versus Major U.S. Apple Producing States, 2016-2021**

State/Province	Bearing Area (acres)	Production (million lbs.)	Yield per Acre (lbs.)	Value of Farm Sales (\$Can000)	Average Farm Price (\$Can)	Average Revenue per Acre (\$Can)
California	12,140	233.3	19,218.5	78,788.3	\$0.344	6,611.2
Michigan	32,000	944.6	29,523.3	358,460.8	\$0.383	11,307.4
New York	43,200	1,348.0	31,219.1	410,404.0	\$0.307	9,584.3
Washington	170,800	7,112.0	41,670.0	2,771,299.1	\$0.409	17,043.0
British Columbia	9,424	212.7	22,570.0	59,654.6	\$0.282	6,364.7
Ontario	12,558	332.8	26,502.5	106,383.2	\$0.320	8,471.4

Sources: B.C. Ministry of Agriculture and Food. *Area, Production and Farm Gate Value of Fruit, B.C., 2011-2021*; USDA, NASS. *Noncitrus Fruits and Nuts. May issues, selected years*; and. *Ontario Fruit Growers, Annual Reports*.

Given the lower productivity in the B.C. apple industry, and the similarity in costs across North America, one would expect the B.C. apple industry to be less profitable. However, the Business Risk Management Branch (BRMB) in the Ministry of Agriculture and Food reviewed the profitability of B.C. apple orchards and concluded that most fruit farms in B.C. were profitable. This discrepancy may be due to the methodology used in the BRMB study. Capital cost allowances and interest costs were not included in the BRMB study. Inclusion of those costs would have rendered many B.C. fruit farms unprofitable in the long run.

## **Pomme Fruit Technology Opportunities**

### **Rationale for New Technologies in the Fruit Industry**

The adoption of the latest technologies in the fruit industry is being driven by both availability and necessity. Depending on the current processes and technologies used by growers and packers, what is new to one might be “old” to another. Not all growers for example can justify or need to buy a \$100,000 harvest platform. In many cases, larger growers and packers have more financial incentive to adopt new technologies as a cost-saving measure. This drive for cost-savings puts more financial pressure on any grower who is not finding ways to cut costs.

There have also been advances in the understanding that there is no average orchard or orchard block that will respond to uniform management practices. Even within an orchard block, there are differences such as soil type, mineral content, level of the water table, porosity, and electrical conductivity. These differences can now be measured more precisely with various devices and sensors.

Two other forces are driving the need for improved technology. One is the process of climate change which is altering environmental conditions in orchards in terms of extreme heat, cold, and wind. National leaders have also become more concerned about the external effects of agricultural practices on air, soil, and water resources.

Labor remains a major element of the cost in fruit production and packing. Its availability has been falling and its price has been rising. Any process that makes labor use more efficient or replaces labor with a machine can be beneficial to growers and packers.

Major retail buyers and consumers have been demanding improved quality and services with their food purchases. They have been requiring growers and packers to certify that their activities place the least possible burden on land, water, workers, or wildlife and reduce the health and safety risks for consumers.

Governments have been placing more requirements on the use of natural resources such as soil, water, and air. The effects of climate change, such as more extreme incidences of heat, cold, wind, rain, and hail, are bringing new challenges to the fruit industry. Many innovative technologies have been modified to help meet those challenges.

### **Types of New Technologies of Value to the Fruit Industry**

A wide array of innovative technologies can be of value to different segments of the fruit industry. The newest technologies vary in their cost, complexity, and usefulness to different types of operations. Many that require little modification can be used to increase the efficiency of orchard or packing house operations. In contrast, some may require additional new personnel, equipment, training, or technical knowledge that can be a challenge for smaller operators. At the extreme, some may require a rethinking of how an orchard or packing house can best be operated.

One innovation, the widespread introduction of unmanned autonomous vehicles (drones) has added a new dimension to growers' ability to monitor their orchards. We understand that drones are not common B.C. orchards, but they are taking an expanded role in larger orchards. However, drone technology is advancing so rapidly in increased capabilities, lowered cost, and wider applicability that it is becoming more accessible for smaller growers.

In the packing house, all of the activities on the packing line, from the performance of the equipment to the productivity of workers to the quality of the fruit can be monitored from a single computer. Hazards can be quickly spotted, and line operation or worker placement can be adapted rapidly to improve efficiency and fruit quality. The advantage in the packing house is that the environment is stable, unlike the orchard where the environment is constantly changing.

There have also been variants to the traditional storage regimes. For example, controlled atmosphere technology required the expense of sealed rooms and constant monitoring of the controlled atmosphere. Now, sachets available from Hazel Technologies or AgroFresh can be dropped in each packed box to preserve fruit quality in storage or shipping.

Table 2 summarizes some of the technological changes already available that could be incorporated in the B.C. tree fruit industry. The decline in costs of computer hardware, sensors, etc. and the increased miniaturization of products has made many new technologies more scalable for smaller orchards and packing houses. Advances in wireless communication have made it possible to control many functions via a portable computer or smart phone at a distance from the orchard or packing house.

One of the biggest decisions facing orchardists is the best orchard configuration to use for new plantings. The decision is complicated by the explosion in the number of competing rootstocks being offered by rootstock developers. There is also intense debate about the form and density of trees to plant. For example, the Italian firm Mazzoni has patented the bibaum® double leader tree and there have been experiments with multileader trees. Mazzoni claims that the bibaum® system requires fewer trees per acre and leads to more consistent quality, higher yields, and greater profitability and has been adopted in many European countries. However, trials have been limited in North America. While the 2' x 10' planting will continue to be reliable under B.C. conditions, growers seeking replant funding should be able to make a case for using bibaum® or other multileader systems.



**Table 2. Technological Advances Available to the B.C. Fruit Industry**

Target	Example Technologies
Orchard	Improved configurations. Vertical fruiting walls for mechanized harvesting, leaf removers.
Rootstocks	Wider choices: EMLA, Bud, Geneva. Disease resistance.
Trees	Numerous varieties and mutations. Density, precocity, height, etc.
Supports	Trellis systems. Alternate materials: wood, polyvinyl, concrete, etc.
Water	Precision irrigation. Irrigation flow meters, Improved sprinklers, soil moisture sensors, microtensiometers
Environment	Wind machine tracking, reflective ground covers, Drape nets
Root health	Ground penetrating radar (MALA Proex system)
Soil	Moisture sensors, Ph measurements, health status.
Plant nutrition	Plant growth regulators, calcium, Retain, fertigation.
Pest control	Improved emitters, adjuvants, automated spraying, variable rate spraying, aerial scouting, pheromone dispensers. Bio controls, beneficial insects, insect lures, sterile moths, lidar canopy sensors
Thinning	Chemical thinners, portable string thinner
Pruning	Powered hand tools
Tractors	GPS enabled, self-driving, electric powered, tracking sensors
Drones	Remotely controlled for mapping tree health, fruit set, pest or disease infections, irrigation coverage, chemical spraying, etc..
Preharvest	Test of starch, firmness, etc. (Harvista)
Harvesting	Picking platforms, robotic pickers, machine vision technology, self-driving tractors, vertical fruiting walls.
Crop forecasting	Helps predict labor, tractor, trailer, and bin needs
Climate change	Retractable roofs, reflective ground cover, sunburn protectants, foggers.
Labor	Training aides, safety, optimal allocation, equipment, machine compatibility, labor management software
Storage	SmartFresh in storage, sachet inserts (SmartFresh and Hazel Technologies)
Packing	Electronic quality sorters, automatic packing systems, automated pallet stackers, electronic record-keeping, detailed lot reporting.
Packaging	Use of biodegradable/sustainable materials, corrugated consumer packs
Regenerative agriculture	Natural crop buffers, worker empowerment, carbon capture

Source: Dr. Desmond O'Rourke

The array of new technologies that are available to the B.C. apple industry is quite wide and changing rapidly. However, implementing any of these technologies will require growers to adjust their thinking on all of their orchard operations.

Applying new technologies effectively will require B.C. growers to be exposed to practical learning experiences. Thus, we highly recommend growers receive assistance to (1) attend trade shows where the new technologies are being marketed, (2) attend demonstrations of the new technologies in orchard tours, and (3) visit orchard sites in countries like Italy or New Zealand that showcase new technology. These learning opportunities can be tailored to the tools that B.C. growers can more readily adopt for fruit quality improvement, labor efficiencies, water savings, etc.

B.C. growers who are small scale and farm part-time are usually the most challenged to evaluate the most appropriate technology and deploy it for maximum advantage. Capital spending has to be considered against orchard and packing cost savings, but also in relation to improved fruit quality.

## Industry Interviews

Globalwise and Belrose interviewed over 30 key contacts in July - August 2023. The interviewees included twelve apple growers, two integrated grower-packers, two other packers, eleven wholesalers and retailers, and eight others who are closely associated with the B.C. apple industry.

We found these to be the key insights from the interviews:

### Among **GROWERS** –

- ▶ Those not integrated with packing operations said their net returns in recent years are below the cost of production and small growers often rely on off-farm jobs.
- ▶ Some believe the marketing of lower quality apples is a factor in the depressed grower prices.
- ▶ Many growers have changed packers in recent years.
- ▶ There is mistrust of packers and/or retailers that may be widespread and a reflection of overall grower dissatisfaction.
- ▶ There is strong support for the replant program and hope that it restarts, but growers vary in how they think it should operate.

### Among **PACKERS** –

- ▶ Some packers say they need a larger grower base to be cost competitive.
- ▶ They agree that price sharing should continue, and even non-participating packers should see the information.
- ▶ Established packers see the expanded number of independent packers as unfair, “low-ball” competition. One example is the use of refrigerated storage instead of Controlled Atmosphere storage by new independent packers.

- ▶ The newer independents did not participate in the interviews so their input and responses are unknown.

Among Canadian **RETAILERS** –

- ▶ Retailers did not have a uniform view of conditions in the B.C. apple sector. More than one called it the “wild west,” meaning too many packers for a small sector.
- ▶ Some retailers are narrowing the B.C. apple variety selection because produce space is scarce, and others say they try to maintain a wide seasonal selection of B.C. apples.
- ▶ One retailer stood out as saying they are in favor of minimum quality standards, but most say the concept is not workable.
- ▶ A new apple commission is generally not favored because of concern that the levy assessment would add to the product price paid by retailers. But two said they see benefits for both the grower and the consumer if the commission increases retail promotions.

Our retailer interviews covered those that represent almost two-thirds of total Canadian grocery sales.

## Top Markets & Product Opportunities

Consumer research in Western Canada to date and interviews with retailers reveal that the best place to increase sales of B.C. apples is “close to home,” in B.C. and by extension in Alberta. There are reasons for this beyond lower freight cost to reach markets. First, consumers are already familiar with B.C. apples and there is some degree of loyalty to local foods. Second, B.C. features the iconic Western Canada apple – Ambrosia. It remains a top selling variety but it needs marketing support to withstand the club varieties that are well supported by their marketers. Meanwhile the earnest search is needed for the next great Canadian apple that can be brought to consumers.

Royal Gala is the higher volume variety that B.C. produces but it is also lower in net margin for most growers. With greater dissatisfaction over net returns, many growers are anxious for a new variety to replace Gala.

In the export realm, Vietnam is by far the number one target. One reason Vietnam stands out is that U.S. apples are assessed an 8% customs duty while Canada has no duty under the Comprehensive and Progressive Agreement for Trans-Pacific Partnership. High quality Ambrosia have a proven market opportunity in Vietnam. Other Asian markets can also be tapped but at this time there is no definitive direction for which countries are the most promising.

Our report, “B.C. Pomme Fruit Market Opportunities and Requirements: Opportunities Assessment” has a long discussion of the critical elements for evaluation of a new variety. It can take 20 or more years to develop a new variety “from scratch” with a breeding program. That report also contains background on how some of the prominent club varieties have emerged in recent years.

## Obstacles to Capitalizing on Identified Opportunities

The most apparent obstacle to expanding the B.C. apple sector and improving grower returns is that alternative crops like wine grapes, sweet cherries, and blueberries are more profitable. At the same time, the cost of all the major inputs such as land, water, trees, labor, and purchased inputs used in apple production have continued their rapid rise. Recent estimates of the cost of planting apples from the B.C. Ministry of Agriculture show a per acre range from \$28,000 for an unprotected cultivar planted at low density with low trellising costs to \$67,200 for a protected cultivar planted at high density with high trellising costs.<sup>2</sup>

A second obstacle is the direct access to Canada, especially Western Canada, by Washington state apple marketers. Washington has a group of vertically integrated companies that target North American markets. Washington has now supplanted B.C. as the number one supplier in total apple sales. Additionally Washington shippers have strong export market development support from the Washington Apple Commission.

Disagreements within B.C. on how to best move ahead in the apple sector are hampering action. It has been alleged that overall quality standards in the industry have been slipping, but there is disagreement about if and how quality standards should be set and how they should be monitored. We have directly heard about the distrust at the grower and packer levels.

The decreasing volume of production has created difficulty for all packers to effectively build their brands, set aside promotional funds, and gain consumer awareness for their apples.

## Mitigating Strategies

The first step is for industry members to recognize that for the fruits focused on in this project, apples and pears, revitalization is possible. One promising sign is that average prices have recovered somewhat from the lows of 2019. The B.C. Ministry of Agriculture and Food has assembled a team within the agency and reached out to leaders in the industry to brainstorm solutions. Leading growers have been evaluating potential new varieties that could generate premium prices in the next decade. Other growers have been investing in new technologies that can increase the efficiency of their orchard operations. Nurseries are studying alternative rootstocks that are available to the tree fruit industry from Europe and North America for potential application in B.C. Several marketers have been successful in accessing foreign markets. Many of the sweet cherry growers and marketers that have successfully revitalized that industry can bring the same spirit of enterprise to the apple industry.

A second prerequisite for moving ahead is a renewal of trust among the different segments of the industry. It will be important to recognize that the recent downturn in the industry's fortunes was due to circumstances beyond the control of growers, packers, or marketers. Among these were the effects of the heat dome and other adverse weather on yield and quality, the disruptions to

---

<sup>2</sup> L. King, B.C. Ministry of Agriculture and Food (personal communication, September 12, 2023).

domestic shopping patterns and foreign trade caused by the Covid outbreak, and the surge in inflation that has reduced the purchasing power of lower- and middle-income consumers.

Building trust will require free and open debate about what has happened in the recent past and transparency about measures planned for the future. While numerous previous studies have shown the benefits of an industry wide promotional program, it is important that a proposal for such a program for B.C. apples be debated openly with full recognition of the costs, benefits, and limitations. If a program is put in place, it will be vital that its operations are transparent and communicated effectively to all industry participants.

While it would be desirable to find a new, winning apple variety that would generate higher returns for B.C. apple growers, it is our contention that the current leading varieties, Ambrosia and Gala, can continue to be the core of a successful B.C. apple marketing program. Ambrosia holds a special place because of its unique association with British Columbia. Gala remains the variety of choice for many lower- and middle-income consumers. However, low returns to B.C. growers for Gala has lessened the incentive to add new Gala plantings to the existing acreage. The industry can also supply niche markets for Honeycrisp, Pink Lady®, and Granny Smith.

However, if prices for these varieties are to be strengthened, they need to be supplied in the most desirable sizes and appropriate packaging, and supported by point of sale, in-store demonstrations, promotional events, and social media messages. The B.C. name alone will not assure higher prices.

## Observations on Pears

While production of pears in B.C. is small relative to that of apples and sweet cherries, pears still offer good returns to growers in selected districts and are suitable candidates for a replant program. While cultivated area fell by 10% between 2011 and 2021, this was much less than the 20% reduction in apple area.

Table 3 shows the comparative performance of B.C. pears, apples, and sweet cherries for the 2011-2020 decade. While the average yield of pears in the decade was 14% below that for apples, the average farmgate value per hectare was almost 15% higher due to higher average prices per ton.

Pear production in British Columbia is heavily weighted towards the domestic market. Between 2017 and 2022, exports averaged about 120 metric tons, about 2 percent of domestic production, worth on average \$145,330. In contrast, B.C. pear imports averaged 20,767 metric tons valued at over \$37 million. This indicates that B.C. pear producers supplied about one quarter of the provincial market.

About 4% of pear imports were organic and earned a price premium of about 36%. While it is known that some B.C. pear production is grown with organic methods, especially in the Cawston district, separate data are not available on the share of B.C. production that is organic. Some of the B.C. production may be directly marketed through farm stands and direct pick.

**Table 3. Average Comparative Performance of B.C. Pears, Apples, and Sweet Cherries 2011 to 2020**

Item	Units	Pears	Apples	Sweet Cherries
Marketed Production	(metric tons)	5,672	99,073	17,241
Farm Gate Value	(\$'000)	4,052	53,288	63,233
Cultivated Area	(hectares)	256	3,882	1,919
Harvested Area	(hectares)	239	3,601	1,813
Farm Gate Price	(\$/mt)	714.39	537.87	3,667.59
Average Yield	(mt/ha)	23.73	27.51	9.51
Average Revenue	(\$/ha)	16,954	14,798	34,878

Source: B.C. Ministry of Agriculture and Food. Area, Production and Farm Gate Value of Fruit, B.C. 2011-2021, 2022.

Historically, Bartlett and D 'Anjou varieties account for most of the pears grown in B.C. Innovations in planting systems, rootstocks and new variety development have been much slower for pears than for apples. However, there is considerable interest among B.C. pear growers in new planting systems, rootstocks, and pear varieties that are becoming available from other countries.

## Recommendations

Based on the conditions in the B.C. apple industry at this time, the following actions are recommended. Most of these recommendations would also benefit the pear sector, though that sector is not always referenced in the recommendations.

### Fast Track Selection of a New B.C. Apple Variety

The time and expense to develop a proprietary apple variety is incompatible with the need for a suitable variety now. We recommend an all-out effort be launched to obtain the rights to a managed variety, as has been done in Nova Scotia and Ontario. It would be advisable to visit growing areas with prospective varieties and observe them in commercial production. Trials in B.C. should start with perhaps four or five potential varieties strategically selected to match several growing areas in the Okanagan. SVC would logically be tapped for this assignment. This needs a priority because of the time required to negotiate with Variety Management Organizations, finalize plans for early stage investigation, etc.

## **Restart Horticultural Extension**

Many growers need more technical assistance, with direct contact and “in their orchard” advice in order to effectively upgrade their cultural practices. This would also benefit the replant program which we recommend for restarting as soon as possible. The goal of enhancing Extension by 2024 might be too ambitious but should be considered with at least some initial staff. It is vital that some assistance, even if not full-fledged Extension, is available to support those growers with greater need to succeed with complete replant applications. This assistance will be much more effective if Extension staff mirror the ethnicities of the growers, especially East Indian.

Even if Extension provides services to packers, seminars or field days for packers should also be considered. Examples would include technical representatives from services and equipment vendors speaking about success and demonstrating equipment options. Packers from outside B.C. could also be invited to share their experiences and advice.

## **Controlled Atmosphere Storage**

Many interviews with retailers and some packers have said a fundamental marketing problem is the lack of CA storage for B.C. apples. Packing line capacity has expanded but the storage to hold fruit for the full marketing season has not matched line capacity. This has led to a “sell it soon” mentality that has fed into the lower pricing structure. This is part of why retailers are able to work this system to their advantage and the grower’s detriment. Lack of CA storage essentially ceded much of the late season market to U.S. and Southern Hemisphere competitors.

## **Getting the Right Fruit to the Consumer**

Small apples do not return the highest prices to growers. Bulk Ambrosia and Gala, at sizes 88 and larger, command much higher prices than smaller fruit. Some growers need the pricing facts which should incentivize them to aim for larger sizes. In the U.S., there is reasonable demand for smaller Gala and Ambrosia when sold in bags. Is the packaging equipment of most B.C. packers capable of putting up attractive bags of smaller apples? Along with CA storage, fruit size sorting and packaging are important for managing inventory to maximize grower returns. Industry needs to execute such a strategy.

## **Go Forward with a Replant Program**

Recommendations for the Investment Agriculture Foundation delivered Perennial Crop Renewal Program that was launched in April 2023:

Past replant programs in B.C. and elsewhere have helped growers to better position their product offerings to compete more effectively. The B.C. apple and pear industries are clearly again at a critical juncture where they need to invest in varieties whose demand is increasing among consumers and retailers. A replant program is an effective incentive for growers who are now struggling to remain in the apple and pear business. In addition, since the replant program requires

a major commitment from the growers themselves, it sends a signal to government that the growers are willing to play their part in ensuring a healthy orchard industry into the future.

The replant program is envisioned as a multi-year program and is based on conditions as of mid-2023. The following recommendations will need to be adjusted as newer apple varieties become available and industry conditions change.

The following are our recommendations.

1. Continue to support the Perennial Crop Renewal Program through a multi-year replant approach as part of the overall blueprint for revitalization of the B.C. apple industry. We envision first plantings beginning in 2025, due to the lack of high-quality planting stock that can be ordered for 2024 planting.
2. The tree density preference is 2' x 10' trees per acre (2,175 trees) which appears to work well for the B.C. tree fruit industry. However, density must be in the range of 1,200 to 2,200 trees per acre. Horticultural justification should be required if the density is not in this range. In their replant applications growers are encouraged to consider and propose alternatives like the Mazzoni bibaum® training system that show promise as trials proceed in B.C. Given the recent erratic weather patterns, the uncertainties accompanying climate change and the diverse behavior of different rootstocks when paired with different varieties, we believe applicants should rely on the recommendations of horticulturalists and other experts who are familiar with local conditions.
3. Growers must be in the top three quartiles for yield and fresh packout among all B.C. growers for the last three years to be eligible for participation. Data for one of the least three years can be excluded to allow for weather variation. Growers must also be in good standing with SVC and/or other relevant organizations with respect to variety royalties.
4. Growers must provide an overview of their marketing strategy as developed with their packer/marketer.
5. Give first priority initially to plantings of Cripps Pink, Granny Smith, Honeycrisp, and Ambrosia. For all varieties, geographic location and the suitability of the micro-climate should be taken into consideration.
6. Reallocate \$500,000 from the Tree Fruit Industry Stabilization Fund to the Perennial Crop Renewal Program for trials of newer apple and pear varieties. Growers must identify and justify the pear varieties they propose. Gradually increase the percent of replant funds committed to newer varieties over the duration of the replant program. To increase the pace of apple and pear orchard renewal, the replant program should be considered annually for redirecting available Stabilization Program funding.
7. Require successful applicants to provide detailed records of future performance total yield and fresh packout. The length of time for future reporting should match the recommendations for the payment schedule as determined in #9 below. Encourage groups of growers to collaborate with their packer/marketers to generate adequate volumes of any newer variety for retail testing.
8. Require growers to apply to plant/replant a minimum of one acre in any combination of apple and/or pear varieties.



9. Total funding requests can be up to \$10,000 per acre in 2024 and can increase by the CPI for applications received after 2024. On-site audits must be conducted before funds are disbursed. Audits will confirm all proposed planting activities in the application have been followed and all benchmark performance measures for yields and fresh packouts are submitted with explanation for any deviations from the original plan noted. The payment schedule and final grower eligibility criteria will be made based on the recommendations of an IAFBC horticultural advisory committee.
10. Applicants should be encouraged, but not required, to propose techniques and technologies for increased yields and higher quantity and quality of fresh packouts. Applicants must explain why these technologies are proposed.

## Bibliography

Advanis, *Domestic Tree Fruit Market Research*, conducted for B.C. Ministry of Agriculture and Food, February 2023.

B.C. Ministry of Agriculture and Food, Analysis and Program Performance Unit, Business Risk Management Branch (BRMB). *Profitability Analysis for the Tree Fruit Industry*, undated.

B.C. Ministry of Agriculture and Food. *The Path Forward: a Blueprint for B.C.'s Tree Fruit Industry: Report + Recommendations*, 2021.

B.C. Ministry of Agriculture and Food. *The Path Forward: a Blueprint for B.C.'s Tree Fruit Industry: Analysis + Audit of Organizations*, 2021.

B.C. Ministry of Agriculture and Food. *Area, Production and Farm Gate Value of Fruit, B.C., 2011-2021*, 2022.

Euromonitor Consulting. *International Tree Fruit Market Research (Apples)*, conducted for B.C. Ministry of Agriculture and Food. Includes sub report on for Singapore, Taiwan, and Vietnam. April 2023.

Globalwise Inc. and Belrose, Inc. *B.C. Pomme Fruit Industry & Market Profile: Opportunities Assessment*, prepared for B.C. Ministry of Agriculture and Food, June 15, 2023.

Globalwise Inc. and Belrose, Inc. *B.C. Pomme Fruit Industry Market Analysis: Opportunities Assessment*, prepared for B.C. Ministry of Agriculture and Food, July 10, 2023.

Globalwise Inc. and Belrose, Inc. *B.C. Pomme Fruit Market Opportunities and Requirements: Opportunities Assessment*, prepared for B.C. Ministry of Agriculture and Food, July 20, 2023.

Globalwise Inc. and Belrose, Inc. *Strategic Development of B.C. Apple and Cherry Varieties*, prepared for B.C. Ministry of Agriculture, 2015.

Statistics Canada, (online). *Canadian International Merchandise Trade Database, monthly, September 2021 to August 2022*.

U.S. Department of Agriculture, National Agricultural Statistics Service. *Noncitrus Fruits and Nuts*, May issues, 2017 to 2022.

## Appendix A: Metrics of Stakeholders Consulted

Appendix Table A-1: Contract Metrics

Category	Count
B.C. Fruit Growers	12
B.C. Packers	4
Canadian Retailers and Wholesalers	11
Industry Specialists, Researchers and Related	8
<b>Total</b>	<b>35</b>

*Contacts by authors during this project.*