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High-tech vegetables: Canada's booming greenhouse vegetable industry

By Jake Purdy

When a hurricane hits Florida, Canadian consumers head for cover. They batten down their hatches – and their wallets.

In the fall of 2004, a series of four hurricanes pounded the Sunshine State, delaying the planting of tomato crops that would normally mature in December. At the same time, heavy rains in California left tomatoes rotting on the vines. Adding to the supply problem, Mexican crops fell victim to infestations of pests.

As a result, prices for North America's fourth most popular produce – after potatoes, lettuce and onions – more than doubled. Canadian consumers were paying nearly \$5 a pound in some cases to feed their passion.

Virtually the only supply available came from Canadian greenhouse operations, which during the past few years have mushroomed by leaps and bounds into high-tech growing environments.

Vista on the Agri-Food Industry and the Farm Community contains articles highlighting statistical insights on themes relating to agriculture, food and environmental issues.

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Symbols

The following standard symbols are used in Statistics Canada publications :

.	not available for any reference period
-	not available for a specific reference period
...	not applicable
P	preliminary
r	revised
x	confidential
A	excellent
B	very good
C	good
D	acceptable
E	use with caution
F	too unreliable to be published

During the 1990s, the total area under glass and plastic more than doubled to nearly 1,500 hectares. By 2003, it had reached nearly 1,900 hectares, the equivalent of about 4,400 Canadian football fields.

In 2003, revenue from greenhouse sales reached a record high of almost \$2.1 billion, nearly double what it had been just six years earlier. Flower sales accounted for about 70% of sales, and vegetables the remaining 30%.

In the early 1990s, revenues from the comparable greenhouse and field vegetables were roughly the same. However, since 1996, revenues from greenhouse vegetables have increased at a much more rapid pace than field vegetables.

For example, in 2003, the farmgate value of the four main vegetable crops produced under glass or plastic – tomatoes, cucumbers, lettuce and peppers – amounted to \$605.8 million. This was more than three times higher than the value of \$171.7 million for the same four vegetable crops produced in the field.

Farmers grow more tomatoes than any other vegetable crop, whether it's in the greenhouse or in the field. Tomatoes alone account for over one-half of revenues from the sale of greenhouse vegetables.

They also cross the border in both directions. Canadian greenhouse growers have been shipping hothouse tomatoes to the United States in rising numbers. In recent years, Canada has enjoyed a trade surplus in tomatoes, shipping far more south of the border than American farmers ship north.

This article analyzes the phenomenal growth in Canadian greenhouse operations, focusing on tomatoes because they are the most significant vegetable crop, both in

terms of volume and value. It also looks at trade disputes with the United States as well as the impact of exchange rates on the greenhouse vegetable sales.

Greenhouse tomatoes: High-tech crop under glass and plastic

During the past several years, greenhouse vegetable operations have become more technologically advanced.

Most growers use hydroponics, that is, they grow tomatoes and cucumbers in media such as rock-wool, using nutrient solutions. Computers control temperatures, moisture levels and nutrient elements, variables that enhance productivity, flavour and quality if they are optimized.

To fight pests, growers use biological controls, which simply involve good bugs eating bad bugs.

New technology has also produced tomato plants that grow vertically, which has resulted in higher yields. Because of this, there are more tomatoes grown in the same amount of greenhouse space. Between 1998 and 2003, tomato yields jumped 27%.

Ontario accounted for over half of total greenhouse vegetable area in Canada in 2003. The largest concentration of greenhouses in the country – and in North America as well – is in the strategically-located Leamington area of southwestern Ontario near Windsor.

Ontario's total greenhouse vegetable area in 2002 was larger than the entire United States greenhouse vegetable industry.

Its proximity to the border enables exporters of greenhouse tomatoes to take advantage of low transportation costs to reach an extensive

American market, as well as the huge Toronto market down Highway 401.

British Columbia accounted for about one-quarter of greenhouse area in 2003, and Quebec about 12%. All three provinces have been able to develop niche markets in nearby American states with the decline in tariffs since 1989. In addition, revenues from greenhouse vegetables surpass those for field varieties in all three provinces.

Field versus greenhouse: What's the difference?

In total, Canadian growers produced just over 215,600 tonnes of greenhouse-grown tomatoes in 2003, valued at nearly \$377.7 million.

In contrast, farmers produced 494,000 tonnes of field tomatoes in 2003. However, the farm-gate value of the field crop was only \$70.4 million.

In general, about three-quarters of field tomato revenues consist of sales to companies for processing into products such as tomato paste. Field tomatoes are sold to processors at much lower prices than greenhouse tomatoes because of contracts and differing input costs.

Greenhouse tomatoes are generally considered to be higher quality than those grown in the field, and do not compete directly on price. They are picked ripe and sold immediately to consumers, while field tomatoes sold to the fresh market are often picked green and ripen in the market.

Farmers in Canada harvest field-grown tomatoes between July and October. Production peaks in August and September when exports include both field and greenhouse products.

Greenhouse tomatoes are available from March to December, with production peaking in May. Greenhouse farmers are attempting to provide a year-round supply. However, the economics

of producing a crop when temperatures and levels of sunlight are at their lowest would dramatically increase production costs between December and February.

Trade with the US: Surplus in tomatoes

Three provinces – Ontario, British Columbia and Quebec – account for most greenhouse tomato production in Canada. In the United States, four states – California, Arizona, Colorado and Minnesota – account for the bulk of production.

Canadian exports of fresh tomatoes to the United States are predominantly high-value greenhouse tomatoes. An estimated one-half of Canada's greenhouse tomato production is shipped south of the border. American exports of fresh tomatoes to Canada are mainly field-grown varieties.

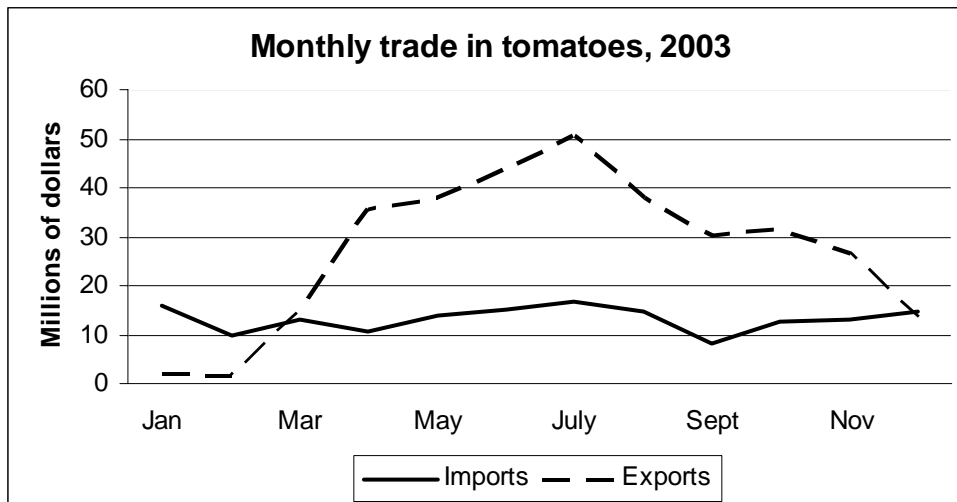
Overall, Canada has a trade deficit with the United States in fresh vegetables, that is, we import more than we export. Until 1998, this was the case with tomatoes.

Since then, however, Canadian farmers have been exporting more tomatoes, principally to the United States, than their counterparts in other countries have been shipping into Canada.

Between 1995 and 2003, Canada's total exports of fresh tomatoes increased more than 13-fold. In contrast, our imports went up only about 50%.

In 2003, Canada exported fresh tomatoes worth \$327 million, while imports amounted to \$235 million.

Monthly imports of field tomatoes from the United States are fairly stable, that is, there does not appear to be much of a seasonal pattern, unlike exports.



The largest year-over-year increases in Canada’s greenhouse vegetable revenues took place in the late 1990s. This expansion of the industry is consistent with the increase in exports from 1995 to 2003.

American farmers account for over 65% of all tomatoes imported into Canada. Mexico is the other major supplier to Canada.

The fact that Canada both exports and imports tomatoes indicates the lack of trade barriers and the interconnectedness of the North American economy. The current market dictates that the economic gains resulting from exports to the United States are greater than what Canadian consumers are paying. The weaker Canadian dollar over the past few years has likely played a major role in this.

Tomato wars: Tit-for-tat anti-dumping actions

Rising imports of Canadian greenhouse tomatoes triggered an anti-dumping action in the United States in 2001.

Six American greenhouse tomato companies filed an anti-dumping petition against Canada.

They alleged that imports of greenhouse tomatoes were being sold in the United States at less than fair value, and were materially injuring or threatening to injure American greenhouse tomato producers.

Between 1996 and 2001, US imports of tomatoes from Canada more than quadrupled in value from \$53 million to \$266 million.

Preliminary duties were levied against exports of greenhouse tomatoes from British Columbia.

However, in April, 2002, the U.S. International Trade Commission subsequently ruled that imported greenhouse tomatoes from Canada had not materially injured or threatened the United States industry.

Although all duties were eventually returned to producers, the actions caused significant industry disruption while the duties were in place.

In September 2001, Canadian greenhouse growers followed up the American action by filing a formal anti-dumping complaint against American fresh tomato imports. They were unsuccessful as well.

The degree to which technological advancement has improved greenhouse operations is reflected in the outcome. Industry analysts later commented that the rulings showed that both cases were indistinguishable from normal competition in international markets. Some firms acquire some competitive advantage or increased efficiency from improved technology or favourable exchange rate movements. They act to exploit those advantages in competitive markets.

For their part, Canadian growers have been constantly upgrading and improving their greenhouse operations, which gave them a competitive advantage. Technology used in Canadian greenhouses is on the leading edge, making them more efficient than their American counterparts.

Revenues show relationships with exchange rates

Between 1992 and 2002, the value of the Canadian dollar fell about 20% from \$0.82US to \$0.64US. However, during the 1990s, as the loonie weakened, the Canadian greenhouse vegetable industry expanded greatly.

At the national level, the relationships are different for greenhouse and field vegetables. Greenhouse vegetable revenues show stronger relationships with the exchange rates than do field vegetables. The stronger relationships between the exchange rates and revenues may suggest that certain commodities, such as greenhouse tomatoes, are more sensitive to exchange rate fluctuations.

Provinces in which revenues from greenhouse vegetables are higher than field vegetables also show differences in the relationship between a historically falling dollar and rising greenhouse vegetable revenues.

In the two major greenhouse provinces, Ontario and British Columbia, the relationship between exchange rate and revenues are stronger for greenhouse vegetables than field vegetables.

For example, in Ontario in 2002, when the loonie had hit \$0.64US, the province's growers sold \$327.2 million worth of greenhouse vegetables, tomatoes accounting for about two-thirds of the value. As the Canadian dollar grew stronger throughout 2003, tomato revenues in Ontario fell for the first time.

The comparisons between the annual exchange rates and revenues may lead to the conclusion that the large increases in revenues for greenhouse vegetables are in part due to the historical increase in exports. The large American population near Leamington enables exporters of greenhouse tomatoes to take advantage of low transportation costs to reach this large population.

Field vegetable revenues do not appear to be as strongly related to the exchange rate. This may be because most field vegetables are purchased by domestic consumers and processors.

Market factors determine where greenhouse tomatoes are sold and the geographic concentration of the industry makes exporting greenhouse tomatoes to a large US market favourable.

Future constraints on growth may include a strengthening Canadian dollar, which could narrow the trade surplus, a saturation of the market, which may depress prices, and higher energy costs which are generally 30 to 40% of production costs for greenhouse vegetable growers.