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**TECHNICAL REPORT**

# **Canadian Droughts of 2001 and 2002 Crop Production Impacts and Adaptations in the Atlantic Provinces:**

**Adaptation and Impacts Research Division (AIRD)**

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*Canadian Droughts of 2001 and 2002:  
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## **EXECUTIVE SUMMARY**

The Technical Report for Crop Production Impacts and Adaptations in Atlantic Provinces consists of crop yield data represented as provincial totals for horticultural crops, fruit crops and field crops. The report investigates the trends in crop production in the Atlantic Provinces from 1997 to 2002, with a focus on yields in 2001 and 2002. The crop analyses were often incomplete due to missing data. The availability of long-term historic data varied from crop to crop. Details of the missing data can be found in the document “Technical Report – Overview of Missing Data”. This document highlights the number of years that data has been collected for each crop and the years of data that were not available for each crop in each province.

The provincial average is presented for each crop based on the annual range available. Furthermore, crop yields are ranked from the highest (1<sup>st</sup>) to the lowest. Data about the top 3 crops produced in a province, percentage of provincial production, percentage change in yield from the previous year, and the ranking of the years 2001 and 2002 within the record of data are presented.

### **Nova Scotia**

The primary field crops grown in Nova Scotia are alfalfa, corn and barley. For fruit crops, the most common were blueberries, apples and strawberries. Carrots, beans (wax and green) and peas were the most commonly grown vegetable crops.

The top 3 crops in the province by production were “All other tame hay and fodder crops” with a total of 58701 ha, “Blueberries” with a total area of 14430 ha, and finally “Alfalfa and alfalfa mixtures” with a total of 12801 ha of production.

#### **❖ Horticultural Crops:**

Water shortages in the 2001 growing season were more severe than previous drought years that occurred in the late 1990s. Irrigation activity was generally observed to be higher in 2001 than in previous years. Producers that used irrigation experienced only a 20-25% yield loss, whereas producers without irrigation in the Annapolis Valley experienced serious yield losses ranging from 50-100%. For example, the Cape Breton region (second largest producer of horticultural crops in the province) suffered a 20-70% average loss of crops but in most locations there were no existing irrigation ponds and a lack of equipment.

#### **Beets (Data from 1981-2004):**

- Yields in irrigated fields were 20% lower than normal and beets grown without irrigation were unmarketable due to the poor quality of the product
- Below the provincial average in 2001 at 45% and in 2002 at 54%
- Yields in 2001 were lower than in 2000 by 45% but increased by 17.5% from 2001-2002
- Ranked second last in 2001 and fourth from last in 2002

**Carrots (Data from 1981-2004 with 1 year without data):**

- Fresh market carrots that received irrigation had slightly above average yields while non-irrigated carrots had a 15-20% decrease in yield. Processing carrots also had yield decreases of 30-40%
- In 2001 was only 93% of the provincial average, but was slightly above the provincial average in 2002 at 101%
- Had a decrease of 19.6% in yield from 2000 to 2001, but in 2001 to 2002 had an increase in yield of 8%
- Ranked 17<sup>th</sup> and 11<sup>th</sup> in 2001 and 2002 respectively out of the 24 year record

**Parsnips (Data from 1981-2004 with 5 years missing data):**

- There was no data available for 2001 and 2002

**Cole Crops:**

- Losses of 80-100% occurred in 2001 for broccoli, cauliflower and early non-irrigated cabbage according to grower estimates, and Brussels sprout production decreased by 20% even with irrigation

**Cabbage (Data from 1981-2004 with 1 year missing data):**

- Below the provincial average in 2001 at only 80% (data was not available for 2002)
- Yields decreased by 10% from 2000 to 2001
- Year 2001 was ranked third from last out of a record of 24 years

**Lettuce (Data from 1981-2004 with 2 years missing data):**

- Yields in 2001 were above the provincial average at 147%. There was no data for 2002
- Production decreased slightly by 3.19% from 2000 to 2001
- 2001 was ranked 7<sup>th</sup> out of the record of 24 years

**Onions:**

- Production yields decreased 5-10% in irrigated fields, but without irrigation suffered a 100% crop loss

**Peas/Beans (Data for Beans from 1987-2004 with 4 years missing data):**

- Losses peas as high as 25% and losses of beans from 50-60% were indicated by growers of in 2001
- Bean yield was only 66% of the provincial average in 2001, but rebounded in 2002 having 102% of the provincial average
- Bean yields decreased by 39.5% from 2000 to 2001, but it mostly recovered from 2001 to 2002 with a 35% increase in yield
- 2001 was ranked 12<sup>th</sup> and 2002 was ranked 7<sup>th</sup> out of the record of 14 years

**Peppers:**

- Total production was up slightly from 125 tons in 2000 to 138 tons in 2001 despite cases of root rot and blossom end rot caused by calcium deficiency and drought conditions

**Potatoes (Data from 1981-2004):**

- Losses of 75% for non-irrigated fields and 35-40% for irrigated fields were estimated by growers
- The average yield in 2001 was substantially low with only 72% of the provincial average, but production was much improved in 2002 with yields representing 106% of the provincial average
- Yields decreased by about 37.5% from 2000 to 2001, but increase from 2001 to 2002 by 31.8%
- Yields in 2001 ranked last, but jumped into 6<sup>th</sup> place in 2002 out of the 24 year record

**Pumpkins and Squash:**

- Yields were higher in 2001 with a total of 1125 tons compared to 1040 tons in 2000, but fruits were reported to be smaller than average in size

**Rutabaga and Turnips (Rutabaga Data from 1981-2004 with 3 years missing data):**

- Losses of 100% were suffered in fields harvested in early summer, but there was less yield loss for late planted crops
- Production was below the provincial average at 71% in 2001 and minimally improved in 2002 with 72% of the provincial average
- The yield decrease from 2000 to 2001 was 34.6% and the increase in yield from 2001 to 2002 was only 0.625%
- Yields were ranked 20<sup>th</sup> in 2001 and 19<sup>th</sup> in 2002 out of the 24 year record

**Sweet Corn (Data from 1981-2004):**

- Drought conditions caused losses of an estimated 10%. Crop quality was also negatively affected early in the season
- Yields in 2001 were below the provincial average at 84%, but improved in 2002 being above the provincial average at 101%
- Crop production decreased by 32.1% from 2000 to 2001, but increased from 2001 to 2002 by 17.4%
- Ranked 17<sup>th</sup> in 2001 and 9<sup>th</sup> in 2002 out of the 24 year record

❖ **Berry Crops:**

The 2001 drought had a varied effect on different crops in the growing region, but wild blueberries were the most seriously impacted crop that year. The 2002 berry crop may also have been affected by drought-related stresses as fruit buds are formed during the summer previous to fruiting.

**Raspberries (Data from 1996-2004):**

- Yields in 2001 were only 91% of the provincial average, but yields in 2002 improved, representing 105% of the provincial average
- Crop production decreased from 2000 to 2001 by 15.6%, but increased by 13% in the period of 2001 to 2002

- Year 2001 was ranked 6<sup>th</sup>, and year 2002 was ranked 4<sup>th</sup> out of the 9 year record

**Strawberries (Data from 1996-2004):**

- In 2001, yields below the provincial average at 98%, but were above the provincial average at 110% in 2002
- Production decreased by 11.8% from 2000 to 2001, but rebounded to post an increase of 11.6% from 2001 to 2002
- Yields in 2001 was ranked 6<sup>th</sup>, and in 2002 was ranked 3<sup>rd</sup> out of the 9 year record

**Wild Blueberries (Data from 1996-2004):**

- Decreases in yield of 40-50% from two years ago were reported by some growers in 2001. Also, some growers reported an increase in harvest costs as much as 100%. Fruit bud development was also a major concern of the farmers
- Crop yield was substantially low in 2001 with only 76% of the provincial average, but was above the provincial average at 103% in 2002
- The crop yield in 2001 was also lower than the yield in 2000 by 34.7%, but increased by 26.5% from 2001 to 2002
- Yields in 2001 were ranked 7<sup>th</sup> and in 2002 were ranked 4<sup>th</sup> out of the 9 year record

❖ **Tree Fruits:**

**Apples (Data from 1996-2004):**

- Effects of the drought of apples were varied depending on orchard location. Fruit size was generally smaller and tended to drop more easily. Losses in 2001 was estimated by growers to be 10-20%
- Crop yield in 2001 was only 92% of the provincial average, but fared better in 2002 with 110% of the provincial average
- Production decreased from 2000 to 2001 by 10.2% but more than recovered the loss from 2001 to 2002 with an increase of 16%
- Year 2001 was ranked 8<sup>th</sup> and 2002 was ranked 2<sup>nd</sup> out of the record of 9 years

**Peaches (Data from 1996-2004):**

- Drought conditions in 2001 and 2002 did not impact peach yield negatively
- Yields in 2001 were above the provincial average 122% and 134% in 2002
- Production increase in both periods from 2000 to 2001 and 2001 to 2002 by 12.4% and 9.48% respectively
- Both years were the top ranked in terms of yield, with 2001 ranked second and 2002 ranked first out of the 9 year record

❖ **Other Crops:**

**Non-edible Horticultural Crops:**

- Products such as sod and nursery stock was severely impacted by the drought in 2001 with the deteriorating quality of plant materials

❖ **Field Crops:**

The impacts of the 2001 drought varied by crop. The drought impacts also directly affected the livestock sector since feed supplies were impacted.

**Cereals:**

- Winter cereals generally fared well in 2001. Winter feed, rye, and spring feed all experienced increase in yields from 2000 to 2001. All other crops, including barley, oat, spring milling wheat, winter milling wheat, and mixed grain experienced a decrease in yields

**Winter Wheat (Data from 1986-2004):**

- Yields in 2001 were not greatly affected with a yield representing 95% of the provincial average. In 2002, yields increased dramatically and was above the provincial average at 120%
- Production decreased from 2000 to 2001 by 3.4% but increased from 2001 to 2002 by 20.6%
- Yields in 2001 were ranked 12<sup>th</sup> and in 2002 were ranked 2<sup>nd</sup> out of a record of 19 years

**Spring Wheat (Data from 1981-2004):**

- In 2001, yields were only 77% of the provincial average, but dramatically improved in 2002 with yields above the provincial average at 121%
- Production experienced a substantial decline of 33.8% from 2000 to 2001, but showed an even larger change when it rebounded by 36.4% from 2001 to 2002
- Rankings for 2001 and 2002 were 22<sup>nd</sup> and 3<sup>rd</sup> respectively out of a record of 24 years

**Barley (Data from 1981-2004):**

- Yields in 2001 represented 90% of the provincial average and in 2002 represented 130% of the provincial average
- Production decreased from 2000 to 2001 by 12.2% but increased substantially by 31% from 2001 to 2002
- 2001 was ranked 20<sup>th</sup> and 2002 was ranked 2<sup>nd</sup> out of a record of 24 years

**Oats (Data from 1981-2004):**

- Yields were 97% and 123% of the provincial average in 2001 and 2002 respectively
- Production decreased by 11.6% from 2000 to 2001 and increased by 21.6% from 2001 to 2002
- 2001 was ranked 14<sup>th</sup> and 2002 ranked 2<sup>nd</sup> out of a record of 24 years

**Fodder/Grain Corn (Data for both Fodder and Grain Corn from 1981-2004):**

- General corn yields were variable by region in 2001, with estimated losses of silage corn at 20%. Quality of corn also decreased as a result of smaller cob size
- Fodder corn yields in 2001 were below the provincial average at 93%, but it was above the provincial average in 2002 at 106%

- Production of corn decreased from 2000 to 2001 by 6.25% but increased by 12.5% from 2001 to 2002
- Out of a record of 24 years, 2001 was ranked 15<sup>th</sup> and 2002 ranked 12<sup>th</sup> for corn yields
- Yields of corn for grain were above the provincial average in both years at 117% and 125% respectively
- Crop production between 2000 and 2001 decreased by 1.39% but increased between 2001 to 2002 by 5.71%
- 2001 was ranked 6<sup>th</sup> and 2002 ranked 3<sup>rd</sup> out of the 24 year record

**Forages (Data for Tame Hay from 1981-2004):**

- Yield and quality of first-cut hay was above average in general, but second-cut hay was severely affected by up to 75% reduction in yields. This was caused by army worm damage in forage crops along with the drought conditions
- In 2001, yields were only 79% of the provincial average, and even though there was improvement in 2002, yields were still below the provincial average at 94%
- Production decreased 19.2% from 2000 to 2001 but increased from 2001 to 2002 by 16%
- 2001 was ranked last in terms of yield and 2002 ranked 14<sup>th</sup> out of 24 years of record

**New Brunswick**

Crops most affected by the drought in 2001 were horticultural crops such as mixed vegetables, potatoes, and sweet corn. Specialty crops including blueberries, apples, vegetable crops, strawberries and raspberries experienced yield losses of 30-60%.

The top 3 crops in the province by production were “All other tame hay and fodder crops” with a total of 81048 ha, “Potatoes” with a total area of 22798 ha, and “Barley” with a total of 17948 ha of production.

**❖ Horticultural Crops:**

**Cole Crops:**

- Broccoli, cauliflower and corn were observed to suffer from poor quality, and yield losses were estimated to be at least 50%

**Potatoes (Data from 1981-2004):**

- Yields were 99% and 103% of the provincial average in 2001 and 2002 respectively
- Production decreased by 1.96% from 2000 to 2001 and 3.85% from 2001 to 2002
- Yields in 2001 ranked 15<sup>th</sup> and in 2002 ranked 8<sup>th</sup> out of a record of 24 years

**Beans (Data from 1987-2004 with 4 years missing data):**

- In 2001, yields were drastically low with only 56% of the provincial average and was only improved slightly in 2002 with 78% of the provincial average
- From 2000 to 2001, yields decreased by a dramatic 61.6%. From 2001 to 2002, there was a recovery of 28.1%
- 2001 was tied in last place, while 2002 was ranked 11<sup>th</sup> out of a record of 14 years

**Sweet Corn (Data from 1981-2004):**

- Reported losses ranged from 30-70% in 2001 with higher losses in the southeastern region of the province. Small cobs and poor tip fill were also noted
- Corn yield per acre was the same in 2001 and 2002 with 112% of the provincial average
- Corn production actually increased from 2000 to 2001 by 19.6%
- 2001 and 2002 were both ranked 5<sup>th</sup> out of a record of 24 years

**Vegetables:**

- Non-irrigated vegetable fields suffered losses in the range of 50-70% in 2001. Crops such as tomatoes, beans, and peppers all experienced large decreases in yield

❖ **Berry Crops:**

**Raspberries (Data from 1996-2004):**

- Production on non-irrigated fields were at least 40% lower than reported for those that were irrigated
- Yields in 2001 were only 74% of the provincial average but was much improved in 2002 with 113% of the provincial average
- Production decreased from 2000 to 2001 by 20.4% and from 2001 to 2002 increased by 35%
- 2001 was tied in last place in rankings while 2002 was third in rank out of a record of 9 years

**Strawberries (Data from 1996-2004):**

- Yields were above the provincial average in 2001 but below the provincial average in 2002 at 109% and 97% respectively
- Production increased by 24.1% from 2000 to 2001 but decreased by 11.2% from 2001 to 2002
- Yields in 2001 were ranked in 3<sup>rd</sup> and in 2002 ranked in 5<sup>th</sup> out of a record of 9 years

**Wild Blueberries (Data from 1996-2004):**

- Crop yield was below the provincial average in both years as 2001 only had 67% and 2002 had 94%
- From 2000 to 2001, production decreased by 24%, but from 2001 to 2002, production rebounded and increased by 28.5%
- 2001 was ranked in last place while 2002 was ranked in 6<sup>th</sup> out of a record of 9 years

❖ **Tree Crops:**

**Apples (Data from 1996-2004):**

- Many reported early apple varieties being smaller in size and also early fruit drop. This was due to the drought and high temperatures, as well as insect problems.

- Yield in 2001 was below the provincial average at 93% but improved in 2002 as yields were 115% of the provincial average
- Production decreased by 21.4% from 2000 to 2001 but this was mostly recovered from 2001 to 2002 as there was an increase in production of 19.6%
- 2001 was ranked 6<sup>th</sup> and 2002 ranked 3<sup>rd</sup> out of the record of 9 years

#### ❖ **Other Crops:**

##### **Non-edible Horticultural Crops:**

- The 2001 drought limited growth of turf and landscape plants. Drought stress symptoms include scorched leaves, stunted growth, bronzing from high mite populations and damage of lawns from Chinch bugs

#### **Prince Edward Island**

From 1996 to 2001, there have been increases in the production of horticultural crops such as carrots, cole crops (cauliflower and broccoli) and lowbush blueberries.

The top 3 crops in the province by production were “Potatoes” with a total of 43257 ha, “All other tame hay and fodder crops” with a total of 38610 ha, and in third was “Barley” with a total of 38610 ha of production.

#### ❖ **Horticultural Crops:**

##### **Cole Crops:**

- Cauliflower and broccoli crops were severely affected by the drought in 2001, with both crops suffering a loss of about 50% with very little crop harvested

##### **Potatoes (Data from 1981-2004):**

- Yields in 2001 were only 67% of provincial production but yield in 2002 was much better with 108% of provincial production
- There was a large decrease in production of 36.3% from 2000 to 2001. Potato production rebounded the next year with an increase in yield of 38.6% from 2001 to 2002
- 2001 was actually ranked in last place, while 2002 was ranked in 2<sup>nd</sup> out of the record of 24 years

##### **Rutabaga and Turnips (Data for Rutabaga from 1981-2004 with 2 years missing data):**

- 2001 had yields below the provincial average at 70% but 2002 had yields above the provincial average at 110%
- Production from 2000 to 2001 decreased by 33.8% but from 2001 to 2002 increased by 36%
- 2001 was ranked 22<sup>nd</sup> and 2002 ranked 5<sup>th</sup> out of the record of 24 years

❖ **Field Crops:**

**Barley (Data from 1981-2004):**

- 2001 yields were only 83% of the provincial average but improved in 2002 with 116% of the provincial average
- Production decreased from 2000 to 2001 but increased from 2001 to 2002 by 27.7% and 28.79% respectively
- Yields in 2001 were ranked in 23<sup>rd</sup> and in 2002 ranked 3<sup>rd</sup> out of the record of 24 years

**Soybeans (Data from 1991-2004):**

- Yields suffered in 2001 as it was only 72% of the provincial average, but in 2002 it was much better, having 103% of the provincial average
- Production decreased by 28.1% between 2000 and 2001 but increased 30.3% between 2001 and 2002
- 2001 was ranked last while 2002 was ranked in 6<sup>th</sup> out of a record of 14 years

**Raspberries (Data from 1996-2004):**

- Yields in 2001 suffered greatly, only having 59% of the provincial average. It was much improved in 2002, but still below the provincial average substantially at 73%
- Between 2000 and 2001, production decreased by 20%, but this was fully recovered between 2001 and 2002 as the 20% was gained again
- Ranked in last place was year 2001, while 2002 was tied for 6<sup>th</sup> out of the 9 year record

**Strawberries (Data from 1996-2004):**

- Yields in 2001 were healthy as it was 101% of the provincial average, yields were lower in 2002 with only 90% of the provincial average
- Production increased from 2000 to 2001 by 11.1% but decreased from 2001 and 2002 11.1% as well
- 2001 was ranked in 4<sup>th</sup> while 2002 was tied for 6<sup>th</sup> out of the record of 9 years

**Newfoundland and Labrador**

Tame hay and fodder crops are the most common crops in Newfoundland and Labrador because most areas are not suitable for agriculture due to poor soils, a lack of soil or poor drainage.

The top 3 crops in the province by production were “All other tame hay and fodder crops” with a total of 9028 ha, “Alfalfa and alfalfa mixtures” with a total of 1580 ha, and in third was “Potatoes” with a total of 335 ha of production.

❖ **Horticultural Crops:**

**Carrots, Turnips and Beets (Carrots and Beets Data from 1981-2004):**

- Many producers had to re-seed these crops due to poor germination rates caused by dry conditions. In 2001, yields of carrots and turnips fell, but beet yields were slightly higher than in 2000, but may be the result of a larger area planted
- Carrots yields were low in both 2001 and 2002, with only 76% and 80% of the provincial average respectively
- Production of carrots fell between 2000 and 2001 by 36.5%, and only slightly better by 2002 with a increase of 4.4% from 2001
- 2001 was ranked 21<sup>st</sup> and 2002 ranked 17<sup>th</sup> out of the record of 24 years
- Beet yields were relatively better than carrot yields in both years, with 95% of the provincial average in 2001 and 103% of the provincial average in 2002
- Production of beets from 2000 to 2001 only decreased by 1.25% while from 2001 to 2002 increased by 8.14%
- Yields of 2001 ranked 9<sup>th</sup> while it ranked 7<sup>th</sup> in 2002 out of the record of 24 years

**Potatoes (Data from 1981-2004):**

- Yields were well above the provincial average in both years with 2001 having 116% of the provincial average and 2002 having 119%
- Production increased throughout 2000 to 2002, with an increased of 6.25% from 2000 to 2001 and 2.62% from 2001 to 2002
- Rankings were high for both years, with 2001 in 4<sup>th</sup> and 2002 in 3<sup>rd</sup> out of the record of 24 years

**Cole Crops (Data for Cabbage from 1981-2004):**

- It was reported that early and midseason crop (cabbage, lettuce, broccoli and cauliflower) yields were below average with very low head weights. Late season crops were also affected by the dry conditions
- Cabbage yields were below the provincial average in both years at 81% and 90% of the provincial average for 2001 and 2002 respectively
- Production decreased from 2000 to 2001 by 17.5% but increased by 9.62% from 2001 to 2002
- Both 2001 and 2002 were low in the rankings placed in 19<sup>th</sup> and 17<sup>th</sup> respectively out of the record of 24 years

❖ **Field Crops:**

**Tame Hay (Data from 1983-2004):**

- Yields in 2001 was 83% of the provincial average and in 2002 was 92% of the provincial average
- Production did not change between 2000 to 2001, but increased by 9.52% between 2001 and 2002
- 2001 was ranked in 15<sup>th</sup> while 2002 was ranked in 11<sup>th</sup> out of the 22 year record

## **References**

Agriculture and Agri-Food Canada. 2001a. *Crop Conditions Report, Nova Scotia, September 21, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/10ns\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/10ns_e.phtml).

Agriculture and Agri-Food Canada. 2001b. *Crop Conditions Report, New Brunswick, October 19, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/12nb\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/12nb_e.phtml).

Agriculture and Agri-Food Canada. 2001c. *Crop Conditions Report, Prince Edward Island, September 21, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/10pei\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/10pei_e.phtml).

Agriculture and Agri-Food Canada. 2002a. *2001/2002 Canadian Fruit Situation and Trends – including apples, tender fruits, grapes and berries* [Web Report]. Accessed March 2003. Available at: [http://www.agr.gc.ca/misb/hort/2001\\_2002/pdf/fruit\\_eng.pdf](http://www.agr.gc.ca/misb/hort/2001_2002/pdf/fruit_eng.pdf).

Agriculture and Agri-Food Canada. 2002b. *2001/2002 Canadian Potato - Situation and Trends* [Web Report]. Accessed March 2003. Available at: [http://www.agr.gc.ca/misb/hort/2001\\_2002/pdf/potato\\_eng.pdf](http://www.agr.gc.ca/misb/hort/2001_2002/pdf/potato_eng.pdf).

New Brunswick Department of Agriculture. 2001. *New Brunswick Provincial Horticultural Crop Drought Report, August 22, 2001*.

Nova Scotia Department of Agriculture and Fisheries. 2001. *Estimated Impact of 2001 Drought on Nova Scotia Agriculture* [Web Report]. 29 pp. Nova Scotia Department of Agriculture and Fisheries, Agricultural Services Branch, Halifax. Accessed November 2002. Available at: <http://www.gov.ns.ca/nsaf/elibrary/agserv/drought.pdf>.

Statistics Canada. 2002a. *Census of Agriculture – Concepts, Methodology and Data Quality* [Web Page]. Accessed March 2003. Available at: <http://www.statcan.ca/english/freepub/95F0301XIE/quality.htm> and <http://www.statcan.ca/english/freepub/95F0301XIE/tables.htm>.

Statistics Canada. 2002b. *Census of Agriculture Data Summary* [Web Page]. Accessed March 2003. Available at: <http://www.statcan.ca/english/Pgdb/census.htm>.

Statistics Canada. 2002c. *Canadian Potato Production – Updates*. Catalogue No. 22-008-UIB. November 2002.

Statistics Canada. 2003a. *Canadian Potato Production – Updates*. Catalogue No. 22-008-UIB. January 2003.

Statistics Canada. 2003b. *Fruit and Vegetable Production*. Catalogue No.22-003-XIB, February 2003.

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## INTRODUCTION AND METHODOLOGY

This chapter examines the trends in crop production in the Atlantic Provinces from 1997 to 2002, with emphasis on 2001 and 2002 yields. Most of the data were obtained from Statistics Canada (2002a, 2002b, 2002c, 2003a, 2003b, 2003c). The data are represented as provincial totals and include information on horticultural crops, fruit crops and field crops.

Other provincial reports were used, where available. For example, the Nova Scotia Ministry of Agriculture and Fisheries produced a report titled “Estimated Impact of 2001 Drought on Agriculture in Nova Scotia”, which has proven to be a valuable reference source for this report.

Crop yield data for all available crops is presented at the provincial level in table format. The range of years data is available for varies from 5 years to 24 years. The provincial average for each crop is presented based on the annual range available. Crop yield ranks are presented from the highest (1st) to the lowest.

## NOVA SCOTIA

According to the 2001 Census of Agriculture, there are over 4200 farms in Nova Scotia (Statistics Canada 2002a). The principal agricultural regions in Nova Scotia are found in the Annapolis Valley (CAR 2), the counties of Pictou and Antigonish (CAR 4), Colchester and Cumberland (CAR 3), and in Cape Breton (CAR 5) (Figure 44: ). The primary field crops grown in Nova Scotia are alfalfa, corn and barley. Blueberries, apples, strawberries, carrots, beans (wax and green) and peas are the most commonly grown fruit and vegetable crops (See Figure 1: ) (Statistics Canada 2002b).

During the 2001 growing season, yields for non-irrigated crops grown in the Annapolis Valley, which is an area dominated largely by horticulture production and dairy farming, were reduced by 50 to 100%. Grain and forage crop yields were also significantly reduced. Second-cut hay was damaged by dry conditions and exacerbated by damage caused by armyworms. The blueberry industry experienced a 75% decrease in yield (Nova Scotia Department of Agriculture and Fisheries 2001). Information on specific crop yields and averages follow.

**Figure 1: Top 5 Crops Production by Census Division for Nova Scotia**

	1st (ha)	2nd (ha)	3 <sup>rd</sup> (ha)	4 <sup>th</sup> (ha)	5th(ha)
<b>Shelburne</b>	All other tame hay and fodder crops (24)				
<b>Yarmouth</b>	All other tame hay and fodder crops (873)	Blueberries total area (157)	Alfalfa and alfalfa mixtures (80)	Apples total area (12)	Strawberries total area (12)
<b>Digby</b>	All other tame hay and fodder crops (501)				
<b>Queens</b>	All other tame hay and fodder crops (329)	Alfalfa and alfalfa mixtures (68)	Oats (13)		

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<b>Lunenburg</b>	All other tame hay and fodder crops (3,384)	Blueberries total area (175)	Alfalfa and alfalfa mixtures (144)	Oats (52)	Strawberries total area (25)
<b>Annapolis</b>	All other tame hay and fodder crops (3,870)	Alfalfa and alfalfa mixtures (1,150)	Barley (439)	Corn for grain (337)	Corn for silage (221)
<b>Kings</b>	All other tame hay and fodder crops (7,082)	Apples total area (2,286)	Alfalfa and alfalfa mixtures (2,058)	Corn for grain (1,745)	Potatoes (1,689)
<b>Hants</b>	All other tame hay and fodder crops (8,242)	Alfalfa and alfalfa mixtures (1,657)	Corn for silage (597)	Blueberries total area (498)	Barley (290)
<b>Victoria</b>	All other tame hay and fodder crops (531)	Alfalfa and alfalfa mixtures (141)	Blueberries total area (19)	Rutabagas and turnips (5)	Potatoes (2)
<b>Halifax</b>	All other tame hay and fodder crops (2,716)	Alfalfa and alfalfa mixtures (400)	Corn for silage (162)	Blueberries total area (147)	Oats (142)
<b>Colchester</b>	All other tame hay and fodder crops (8,909)	Blueberries total area (2,510)	Alfalfa and alfalfa mixtures (2,021)	Barley (991)	Corn for silage (661)
<b>Cumberland</b>	All other tame hay and fodder crops (9,821)	Blueberries total area (8,597)	Alfalfa and alfalfa mixtures (1,044)	Barley (747)	Oats (629)
<b>Pictou</b>	All other tame hay and fodder crops (5,751)	Blueberries total area (1,204)	Alfalfa and alfalfa mixtures (977)	Barley (390)	Oats (310)
<b>Guysborough</b>	Blueberries total area (443)	All other tame hay and fodder crops (412)	Alfalfa and alfalfa mixtures (247)	Oats (15)	
<b>Antigonish</b>	All other tame hay and fodder crops (5,328)	Alfalfa and alfalfa mixtures (1,877)	Blueberries total area (511)	Barley (420)	Corn for silage (148)
<b>Inverness</b>	All other tame hay and fodder crops (3,204)	Alfalfa and alfalfa mixtures (448)	Blueberries total area (169)	Barley (86)	Oats (42)
<b>Richmond</b>	All other tame hay and fodder crops (86)				

<b>Cape Breton</b>	All other tame hay and fodder crops (1,022)	Alfalfa and alfalfa mixtures (489)	Barley (70)	Oats (67)	Spring wheat (excluding durum) (33)
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***Horticultural Crops***

The vegetable industry represents a diverse variety of crops, with an estimated \$30 million in farm gate sales. The variety of crops, access to irrigation equipment, and varying harvest dates make it difficult to assess the overall impact of drought on this sector.

Water shortages in the 2001 growing season were more severe than any experienced during the preceding drought years in the late 1990s (CBCL 2003). In general, there was more irrigation activity in 2001 than in previous years. However, exact increases in irrigation use are not available. All crops were strongly affected by the 2001 drought but the impacts varied from crop to crop and farm to farm. Although producers with access to irrigation experienced only a 20 to 25% yield loss, they also incurred additional costs associated with applying irrigation water. However, growers without irrigation in the Annapolis Valley experienced more serious crop losses ranging from 50 to 100%. Horticultural activities in the Valley are supported by surface water supplies and on-farm wells. Issues exist about impaired water quality in both rivers and wells in the Valley, with the Pereaux, Habitant and Canard rivers all exceeding the fecal coliform levels permissible for the irrigation of human crops at least 50% of the time (CBCL 2003).

The average loss of irrigable crops in the Cape Breton region (the second largest producer of horticultural crops in the province) was between 20 and 70% (CBCL 2003). Another issue is that although most crops are irrigable, about 20 to 25% of the fields under production in the Cape Breton region have no existing irrigation ponds, and irrigation equipment is also lacking (CBCL 2003). Therefore, access to water and water infrastructure was key to successful crops that year (Nova Scotia Department of Agriculture and Fisheries 2001).

***Beets***

Beet production yields in irrigated fields were 20% lower than normal. Meanwhile, beets grown without irrigation were unmarketable due to the poor quality of the product (Nova Scotia Department of Agriculture and Fisheries 2001). In 2001, total beet production was 58 tons, down sharply from 165 tons produced in 2000 (Statistics Canada 2003b). Beet production yields in Nova Scotia dropped drastically for 2001 and 2002 and were ranked 23 and 21 (lowest: 24) respectively (See Figure 2: ). In 2001 beet production was a meagre 45% of the provincial 24-year average, and in 2002 improved only slightly producing 54% of the provincial average.

**Figure 2: Beet Yield Data 1981-2004**

	<b><i>NS Yield/acre</i></b>	<b><i>NS % of Provincial AVG</i></b>	<b><i>NS Rank</i></b>
Year			
1981	6400	86.87782805	12
1982	3000	40.7239819	24
1983	5000	67.87330317	17
1984	6300	85.52036199	13

1985	6700	90.95022624	11
1986	13100	177.8280543	2
1987	13800	187.3303167	1
1988	11900	161.5384615	3
1989	10000	135.7466063	5
1990	5500	74.66063348	15
1991	9100	123.5294118	8
1992	10000	135.7466063	5
1993	4000	54.29864253	21
1994	10000	135.7466063	5
1995	11000	149.321267	4
1996	9000	122.1719457	9
1997	9000	122.1719457	9
1998	4700	63.80090498	19
1999	5500	74.66063348	15
2000	6000	81.4479638	14
2001	3300	44.79638009	23
2002	4000	54.29864253	21
2003	4800	65.15837104	18
2004	4700	63.80090498	19
<b>Provincial AVG</b>	7366.66667		

### Carrots

Fresh market carrots that received irrigation had slightly above-average yields while production from non-irrigated fields decreased by 15 to 20%. Processing carrots had reduced yields of 30 to 40% (Nova Scotia Department of Agriculture and Fisheries 2001). In 2001, total production of all carrots was 34,695 tons, down from the 5-year average production of 36,300 tons but up from the 2000 yield of 28,900 tons (Statistics Canada 2003b).

In 2001, Nova Scotia's carrot yield per acre was ranked 17 (lowest: 24) (See Figure 3: ). In fact, 2001 yield was significantly lower than the 5 years beforehand. In 2001 production of carrots was 34400 tonnes/acre, down 8400 tonnes from 2000's production of 42800 tonnes/acre and down 2526 tonnes from the 24-year provincial average of 36926.09 tonnes. This represents a yield which is 7% lower than the 24-year provincial average and 20% drop in yield from 2000 to 2001.

**Figure 3: Carrot Yield Data: 1981-2004**

<b>Carrots</b>	<b>NS Yield (tonnes/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS Rank</b>
Year			
1981	36300	98.30448604	14
1982	30700	83.13905569	19
1983	39200	106.1580125	9
1984	28200	76.36877428	21
1985	35700	96.6796185	15
1986	39700	107.5120688	7
1987	40700	110.2201813	6

1988	35200	95.32556222	16
1989	39400	106.699635	8
1990	41500	112.3866714	5
1991	36600	99.11691981	13
1992	27800	75.28552925	22
1993	25500	69.05687036	23
1994	37200	100.7417873	12
1995		N/A	
1996	49400	133.7807606	1
1997	44500	120.5110091	3
1998	48400	131.0726481	2
1999	38700	104.8039562	10
2000	42800	115.9072177	4
2001	34400	93.15907217	17
2002	37400	101.2834099	11
2003	31500	85.30554574	18
2004	28500	77.18120805	20
<b>Provincial AVG</b>	36926.08696		

*Parsnips*

There was no data available between 2000 and 2002.

**Figure 4: Parsnip Yield Data: 1981-2004**

<i>Parsnips</i>	<i>NS Yield / acre</i>	<i>NS % of Provincial AVG</i>	<i>NS Rank</i>
Year			
1981	8400	106.1876	10
1982	8400	106.1876	10
1983	8400	106.1876	10
1984	7000	88.48969	13
1985	3900	49.3014	17
1986	9000	113.7725	9
1987	12000	151.6966	1
1988	7000	88.48969	13
1989	10000	126.4138	2
1990	10000	126.4138	2
1991	10000	126.4138	2
1992	10000	126.4138	2
1993	10000	126.4138	2
1994	10000	126.4138	2
1995	10000	126.4138	2
1996		N/A	
1997		N/A	
1998	5900	74.58417	15

1999	2800	35.39587	19
2000		N/A	
2001		N/A	
2002		N/A	
2003	4500	56.88623	16
2004	3000	37.92415	18
<b>Provincial AVG</b>	7910.526316		

### *Cole Crops*

According to grower estimates, losses of 80 to 100% occurred in 2001 for broccoli, cauliflower and early cabbage that did not receive irrigation. Loss of quality in these crops was noted even with irrigation. Brussels sprout production decreased by 20% even with irrigation (Nova Scotia Department of Agriculture and Fisheries 2001). In 2001, 3,400 tons of cabbage were grown and produced, down from 3,805 tons in 2000 (Statistics Canada 2003b). In 2001, cabbage yield per acre was 10% lower than 2000, and 20% below 24-year average (See Figure 5: ). No values were available for 2002 from Statistics Canada for comparison.

### *Cabbage*

**Figure 5: Cabbage Yield Data: 1981-2004**

<b>Cabbage</b>	<b>NS Yield/Acre (Tons)</b>	<b>NS % of Provincial AVG</b>	<b>NS Rank</b>
Year			
1981	21100	84.90945674	16
1982	21000	84.50704225	17
1983	22700	91.34808853	13
1984	27000	108.6519115	8
1985	20500	82.49496982	18
1986	30600	123.138833	2
1987	32700	131.5895372	1
1988	30000	120.7243461	3
1989	26100	105.0301811	9
1990	28900	116.2977867	6
1991	27100	109.054326	7
1992	26000	104.6277666	11
1993	29800	119.9195171	4
1994	29600	119.1146881	5
1995		N/A	
1996	26100	105.0301811	9
1997	18800	75.65392354	21
1998	20400	82.09255533	19
1999	22100	88.93360161	15
2000	22300	89.73843058	14
2001	20000	80.48289738	20

2002		N/A	
2003	25300	101.8108652	12
2004	18600	74.84909457	22

**Provincial AVG**                      24850

*Lettuce*

Input costs increased significantly due to increased frequency of irrigation (up to three times per week) (Nova Scotia Department of Agriculture and Fisheries 2001). Total production decreased from 18800 yield per acre in 2000 to 18200 yield per acre in 2001 (See Figure 6: ). However, the yield in 2001 was still 147% of the provincial average.

**Figure 6:                      Lettuce Yield Data: 1981-2004**

<b>Lettuce</b>	<b>NS Yield/acre</b>	<b>NS % of Provincial AVG</b>	<b>NS Rank</b>
Year			
1981	6000	48.53	18
1982	7000	56.62	15
1983	6400	51.76	17
1984	5600	45.29	21
1985	7000	56.62	15
1986	6000	48.53	18
1987	2400	19.41	22
1988	6000	48.53	18
1989	10000	80.88	13
1990	20000	161.76	3
1991	15500	125.37	8
1992	25000	202.21	1
1993	14300	115.66	9
1994		N/A	
1995	18800	152.06	4
1996	21800	176.32	2
1997	11800	95.44	11
1998	18800	152.06	4
1999	13500	109.19	10
2000	18800	152.06	4
2001	18200	147.21	7
2002		N/A	
2003	11600	93.82	12
2004	7500	60.66	14
<b>Provincial AVG</b>	12363.63636		

*Onions*

Onion production yields in irrigated fields only decreased 5 to 10% in 2001. However, onion yields without irrigation suffered 100% crop loss (Nova Scotia Department of Agriculture and Fisheries 2001). No data were available from Statistics Canada for 2001 or 2002.

*Peas/Beans*

These crops are not normally irrigated in Nova Scotia since normal precipitation provides adequate moisture levels. Growers indicated that they experienced losses as high as 25% in peas in 2001. In 2001, average yields were 850 tons (Statistics Canada 2003b) which is approximately 9% lower than the 10-year average. Pea yields increased to 1,990 tons in 2002 (Statistics Canada 2003b).

In 2001, individual growers indicated they experienced losses as high as 50 to 60% in bean production. The largest losses were seen in processing beans. The average provincial yield was 1,320 tonnes in 2001 (Statistics Canada 2003b). In 2001, the Nova Scotia bean yield/acre was 2600 tons, which was significantly lower than 2000's yield of 4300 tons/acre (See Figure 7: ). This represents a 34% loss when compared to the 14-year average and a 40% loss when compared to the 2000 average (Nova Scotia Department of Agriculture and Fisheries 2001). The presence of the European corn borer, possibly related to warmer weather conditions, also negatively impacted corn yields, the extent of which was not reported.

**Figure 7: Bean Yield Data: 1987-2004**

<b>Beans</b>	<b>NS Yield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS Rank</b>
Year			
1987	4500	114.3375681	5
1988	4800	121.9600726	4
1989	5200	132.123412	3
1990	5500	139.7459165	1
1991	5400	137.2050817	2
1992	x		
1993	x		
1994	x		
1995	3600	91.47005445	9
1996	3400	86.38838475	11
1997	3800	96.55172414	8
1998	2500	63.52087114	13
1999	x		
2000	4300	109.2558984	6
2001	2600	66.06170599	12
2002	4000	101.6333938	7
2003	3500	88.9292196	10
2004	2000	50.81669691	14
<b>Provincial AVG</b>	3935.714286		

*Peppers*

Blossom end rot and root rot caused by calcium deficiency and drought conditions were reported as problems in this crop in 2001 (Nova Scotia Department of Agriculture and Fisheries 2001). Despite this, total production was 138 tons, up slightly from a total production of 125 tons in 2000 (Statistics Canada 2003b).

*Potatoes*

Growers estimated losses of 75% for non-irrigated crops and 35 to 40% loss for irrigated fields (Nova Scotia Department of Agriculture and Fisheries 2001). The substantial yield losses that took place irrigated fields indicate that existing irrigation methods or water management practices were not adequate during the 2001 drought. In 2001, the average yield was 150.0 cwt/acre, which is remarkably low compared to the 24-year average of 207.42 cwt/ac, and the 2000 average yield of 240.0 cwt/acre (Statistics Canada 2002c). This represents a 28% loss compared to the 24-year average and a 38% loss compared to the 2000 average (See Figure 8: ). In fact, Nova Scotia's 2001 potato yield/acre ranked 24, the lowest in 24 years. However, in 2002, Nova Scotia's potato yield/acre rebounded to 220 cwt, a yield/acre 6% above the 24-year average. Crop losses from insect damage also increased (i.e., aphids, potato beetles). Irrigation costs in 2001 were estimated at \$100.00 per acre (Nova Scotia Department of Agriculture and Fisheries 2001). Average yields recovered to 220.0 cwt/ac in 2002 (Statistics Canada 2003a).

**Figure 8: Potato Yield Data 1981-2004**

Year	<i>NS (cwt/acre)</i>	<i>NS % of Provincial AVG</i>	<i>NS Rank</i>
1981	195	94.01333166	19
1982	200.3	96.5685658	17
1983	205.1	98.88274012	14
1984	210	101.2451264	9
1985	190	91.60273341	20
1986	210	101.2451264	9
1987	210	101.2451264	9
1988	230	110.8875194	5
1989	245.1	118.1675261	2
1990	170	81.96034042	23
1991	190	91.60273341	20
1992	250	120.5299124	1
1993	220	106.0663229	6
1994	200	96.4239299	18
1995	210	101.2451264	9
1996	205.1	98.88274012	14
1997	190	91.60273341	20
1998	205	98.83452815	16
1999	210	101.2451264	9
2000	240	115.7087159	3
2001	150	72.31794743	24
2002	220	106.0663229	6
2003	215	103.6557246	8
2004	235.1	113.3463296	4
<b>Provincial AVG</b>	207.4173913		

### *Pumpkins and Squash*

Yield figures for 2001 were higher with 1125 tons produced compared with 1040 tons in 2000 (Statistics Canada 2003b). However, fruit size was reported to be smaller than average (Nova Scotia Department of Agriculture and Fisheries 2001).

### *Rutabaga and Turnips*

Fields harvested in early summer suffered a 100% loss. Late planted crops sustained less yield loss (Nova Scotia Department of Agriculture and Fisheries 2001). In 2001, total production was 2,790 tons, down slightly from a total production of 2,850 tons in 2000 (Statistics Canada 2003b). In 2001 and 2002 rutabaga production was 29% lower than the 24 year provincial average, and witnessed a 35% drop from the year 2000 (See Figure 9: ). Nova Scotia's rutabaga yield/acre were ranked 20 in 2001 and 19 in 2002 (lowest: 22), and produced the lowest recorded yield/acre in the past 10 years.

**Figure 9: Rutabaga Yield Data: 1981-2004**

	<i>NS Yield/acre</i>	<i>NS % of Provincial AVG</i>	<i>NS Rank</i>
Year			
1981	23000	103.1390135	9
1982	20000	89.68609865	15
1983	17000	76.23318386	18
1984	24000	107.6233184	8
1985	26500	118.8340807	4
1986	30000	134.529148	2
1987	20700	92.82511211	13
1988	31000	139.0134529	1
1989	29200	130.941704	3
1990	22600	101.3452915	10
1991	13200	59.19282511	21
1992		N/A	
1993		N/A	
1994	26400	118.3856502	5
1995	25500	114.3497758	6
1996	22200	99.55156951	11
1997		N/A	
1998	20700	92.82511211	13
1999	21200	95.06726457	12
2000	24300	108.9686099	7
2001	15900	71.30044843	20
2002	16000	71.74887892	19
2003	19500	87.44394619	14
2004	19400	86.9955157	17
<b>Provincial AVG</b>	22300		

*Sweet Corn*

Sweet corn losses due to drought conditions are estimated at 10%. Crop quality was also down early in the season (Nova Scotia Department of Agriculture and Fisheries 2001). In 2001, total production was 1,225 tons, down slightly from a total production of 1,240 tons in 2000 (Statistics Canada 2003b). Yields increased to 1,500 tons in 2002 (Statistics Canada 2003b).

In 2001, Nova Scotia's corn yielded 3,800 tons/acre, down from a total yield of 5,600 tons/acre in 2000, and down from the 24-year provincial average of 4,520.83 tons/acre (See Figure 10: ). In fact, sweet corn yield/acre ranked 17 in 2001 (lowest: 24), as production dropped 32% from 2000 to 2001, and was 16% lower than the 24-year average. In 2002, Nova Scotia's sweet corn yield recovered to 4,600 tons/acre, and 2% higher than the provincial 24-year average.

**Figure 10: Corn Yield Data: 1981-2004**

<b>Corn</b>	<b>NSYield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS Rank</b>
Year			
1981	3600	79.63133641	21
1982	3800	84.05529954	17
1983	3700	81.84331797	19
1984	3300	72.99539171	22
1985	3700	81.84331797	19
1986	4400	97.32718894	13
1987	5100	112.8110599	6
1988	4600	101.7511521	9
1989	6100	134.9308756	2
1990	4600	101.7511521	9
1991	4500	99.53917051	12
1992	5600	123.8709677	4
1993	5100	112.8110599	6
1994	4400	97.32718894	6
1995	4200	92.90322581	15
1996	5700	126.0829493	3
1997	3300	72.99539171	22
1998	3200	70.78341014	24
1999	7000	154.8387097	1
2000	5600	123.8709677	4
2001	3800	84.05529954	17
2002	4600	101.7511521	9
2003	3900	86.26728111	16
2004	4700	103.9631336	8
<b>Provincial AVG</b>	4520.833333		

*Berry Crops*

The effect of the 2001 drought on berry crops was variable depending on the crop and the growing region. The most seriously impacted crop was the wild blueberry crop, which is one of the most popular fruit crops grown in Nova Scotia. Wild blueberry yields dropped 50 to 75% in 2001.

There may also be serious implications for the 2002 berry crop since the fruit buds are formed during the summer previous to fruiting. Plants that experienced drought-related stresses generally produce fewer and weaker fruit buds (Nova Scotia Department of Agriculture and Fisheries 2001).

### Raspberries

Crop yields increased 9% over the 10-year average, with a yield of 78 tons (Statistics Canada 2003b). The five-year annual average production is 67.6 tons, which has an estimated farm gate value of \$263,500.00.

Raspberry production declined slightly from 0.55 tons/acre in 2000 to 0.46 tons/acre in 2001, but rebounded and returned to 0.53 tons/acre in 2002 (See Figure 11: ).

**Figure 11: Raspberry Yield Data: 1996-2004**

	<b>NS Yield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1996	0.229885057	45.22013901	9
1997	0.4375	86.05957706	8
1998	0.53125	104.500915	5
1999	0.64375	126.6305205	2
2000	0.55	108.1891826	3
2001	0.464285714	91.32853075	6
2002	0.5333333333	104.9107225	4
2003	0.454545455	89.41254759	7
2004	0.730769231	143.747865	1
<b>Provincial AVG</b>	0.508368754		

### Strawberries

Some yields were down by 10 to 15% in 2001; however, total production yields in 2001 were 2,135 tons which is less than the 2,283 tons produced in 2000 (Statistics Canada 2003b). The five-year average annual production is 1,964 tons, and has an estimated annual farm gate value of \$3.7 million (Nova Scotia Department of Agriculture and Fisheries 2001). It is important to note that post-harvest inputs increased in 2001 with the increased need for irrigation. Some irrigation was continued into September, with irrigation frequency increasing to twice per week since July, in some cases. It is feared that fruit bud production, and development of daughter plants may have been reduced.

In 2001, Nova Scotia's strawberry production was 2.05 tons/acre, down slightly from 2000's total production of 2.3 tons/acre and the 24-year average of 2.1 tons/acre (See Figure 12: ). This represents a 12% yield/acre decline in strawberry production, within the province from 2000 to 2001. However, in 2002, strawberry yields recovered to 2.3 tons/acre, resulting in a yield 10% higher than the 9-year provincial average.

**Figure 12: Strawberry Yield Data: 1996-2004**

	<b>NS Yield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1996	2.282783229	108.3506602	4
1997	1.873291925	88.91445066	7
1998	1.670520231	79.29003838	9
1999	2.116756757	100.4703333	5
2000	2.329591837	110.572397	2
2001	2.054860443	97.53246943	6
2002	2.325	110.3544488	3
2003	1.75	83.06248831	8
2004	2.558823529	121.452714	1

**Provincial AVG      2.10684755**

*Wild Blueberries*

Canadian wild blueberry production is concentrated in Eastern Canada. In 2001, total production was 14,378 tons, a sharp drop from 21,150 tons produced in 2000 (Statistics Canada 2003b). Blueberry production in Cumberland County (CAR 3) was most severely affected by the 2001 drought. Yields were reported by growers to be 40 to 50% lower than yields of two years earlier. (Wild blueberries are harvested every two years from individual fields). Some fields were not harvested in 2001. Yields in Yarmouth (CAR 1), Pictou (CAR 4) and Cape Breton (CAR 5) counties were not as severely affected. Some growers reported increases in harvest costs, as much as 100% of a normal year. They also expressed concern for poor fruit bud development in sprout fields (2002 crop) and the potential loss of markets crop (Agriculture and Agri-Food Canada 2001a, Nova Scotia Department of Agriculture and Fisheries 2001).

Nova Scotia's provincial blueberry yield dropped drastically from 0.59 tons/acre in 2000 to 0.38 tons/acre in 2001 (See Figure 13: ). In 2001, the blueberry yield/acre was 24% below the 9-year average and 35% below the 2000 yield/acre. 2002 proved to be a better year for Nova Scotia blueberry growers, as the yield increased to 0.52 tons/acre, signifying production 3% higher than the provincial 9-year average.

**Figure 13: Blueberry Yield Data: 1996-2004**

<b>Blueberries</b>	<b>NS Yield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1996	0.489528277	94.55324384	6
1997	0.36308566	72.02135754	8
1998	0.341982199	67.83529331	9
1999	0.599797659	118.9753448	2
2000	0.586929374	116.4228031	3
2001	0.383331556	76.0373159	7
2002	0.521215296	103.3878153	4
2003	0.733627204	145.5216577	1

2004	0.517727639	102.6960067	5
<b>Provincial AVG</b>	0.504136096		

## Tree Fruits

### Apples

Apple production was affected by the hot, dry conditions that prevailed during the summer of 2001 (Agriculture and Agri-Food Canada 2002a). In 2001, total production was 39,005 tons, a drop from 45,430 tons produced in 2000 (Statistics Canada 2003b). The average annual production for apples is 51,570 tons, which has an estimated farm gate value of \$13.1 million (Nova Scotia Department of Agriculture and Fisheries 2001). The effect on apples was variable depending on orchard location. Fruit size was smaller and fruit tended to drop quite easily. Growers estimated that the loss in 2001 was 10 to 20%. Input costs for pest control and more frequent irrigation of young/dwarf trees also increased.

The provincial production of apples dropped from 6.68 tons/acre in 2000 to 6.00 tons/acre in 2001 (See Figure 14: ), signifying nearly a 10% decline in one year. In 2001, apple yield/acre ranked 8 (lowest 9), and at the time was lowest recorded in 6 years. In 2002, apple production recovered to 7.1 tons/acre, resulting in the 2<sup>nd</sup> highest yield/acre in 9 years.

**Figure 14: Apple Yield Data: 1996-2004**

<b>Apples</b>	<b>NS Yield (tons/acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1996	6.650179745	102.1273032	4
1997	6.448051948	99.02321161	6
1998	6.472638889	99.40079508	5
1999	7.25	111.3387873	1
2000	6.680882353	102.5988054	3
2001	6.000769231	92.15425777	8
2002	7.142857143	109.6933865	2
2003	6.349206349	97.50523242	7
2004	5.610327869	86.15822084	9
<b>Provincial AVG</b>	6.511657058		

### Peaches

The hot, dry conditions during the summers of 2001 and 2002 did not impact Nova Scotia peach production negatively. In 2001 peach yield production was ranked 2 (lowest: 8), and 2002 ranked number 1, signifying that 2001 and 2002 produced the highest yields of peaches in the past 9 years in Nova Scotia (See Figure 15: ). In fact, yield increased by 0.53 tons/acre from 2000 to 2001.

**Figure 15: Peach Yield Data: 1996-2004**

<b>Peaches</b>	<b>NS (tons/acre)</b>	<b>NS Provincial AVG</b>	<b>NS RANK</b>
Year			
1996	3.055555556	99.1047679	6
1997	2.514285714	81.54906616	7
1998	3.714285714	120.4702114	3
1999	3.428571429	111.203272	4
2000	3.285714286	106.5698024	5
2001	3.75	121.6285788	2
2002	4.142857143	134.3706204	1
2003	2.142857143	69.50204502	8
2004	1.714285714	55.60163602	9
<b>Provincial AVG</b>	3.083156966		

### ***Other Crops***

#### *Non-edible Horticultural Crops*

Non-edible horticultural crops include sod and nursery stock. This sector is valued at \$20 million annually, and was severely impacted by the drought in 2001. The cost of production increased significantly (i.e., irrigation, lost product, replacement of stock). Sales in July, August, and September 2001 were reduced because customers were not buying the product to plant (Nova Scotia Department of Agriculture and Fisheries 2001). Also, the quality of plant material had deteriorated due to the dry conditions. New and existing irrigation ponds are generally undersized in the province and could not meet the rising irrigation demands during the 2001 drought.

#### *Field Crops*

The impacts of the 2001 drought on field crops were varied by crop. The drought impacts also directly affected the livestock sector since feed supplies were impacted. These effects will therefore be echoed in the livestock production and pastures, grasslands, livestock feed section.

#### *Cereals*

Winter cereal crops, generally, fared well in 2001. Winter feed wheat yields averaged 4,200 kg/ha, an increase of 10% over 2000, and 40% over the 10-year average. Rye yields were 9% higher than in 2000 and 22% higher than the 10-year average. Spring feed wheat yields were 16% higher than the 10-year average and 90% higher than the 2000 crop. All other cereal crops (e.g. oats) had decreased yields (Nova Scotia Department of Agriculture and Fisheries 2001, Statistics Canada 2003c).

Barley yields were 9% below the 10-year average, and 19% below 2000 yields. Oat yields were 3% below the 10-year average and 20% below 2000 yields. Spring milling wheat yields were 29% below the 10-year average and 7% below 2000 yields. Winter milling wheat yields were 4% below the 10-year average and 22% below 2000 yields. Mixed grain yields were 42% below the 10-year average and 56% below 2000 yields (Nova Scotia Department of Agriculture and Fisheries 2001, Statistics Canada 2003c).

*Winter Wheat*

Nova Scotia's winter wheat was not greatly affected by the 2001 and 2002 droughts. (See Figure 16: ) In 2001, a slight decrease in average yield/acre occurred from 55.9 tons/acre in 2000 to 54 tons/acre in 2001. The average yield/acre in 2001 was only 5% below the 19-year recorded average. Winter wheat production in 2002 resulted in the highest ranking 68 tons/acre in the last 10 years, and was almost 20% above the 19-year average.

**Figure 16: Winter Wheat Yield Data: 1986-2004**

<i>Winter Wheat</i>	<i>Nova Scotia Yield/acre</i>	<i>NS % of Provincial AVG</i>	<i>NS RANK</i>
Year			
1986	55.2	97.35449735	10
1987	65	114.638448	5
1988	62.3	109.8765432	6
1989	66.7	117.6366843	3
1990	51.2	90.29982363	15
1991	33.3	58.73015873	19
1992	75	132.2751323	1
1993	65.2	114.9911817	4
1994	51.6	91.00529101	13
1995	55	97.00176367	11
1996	59.5	104.9382716	8
1997	51.4	90.65255732	14
1998	47.9	84.47971781	18
1999	49.1	86.59611993	17
2000	55.9	98.58906526	9
2001	54	95.23809524	12
2002	68	119.9294533	2
2003	50	88.18342152	16
2004	61	107.5837743	7
<b>Provincial AVG</b>	56.7		

*Spring Wheat*

Nova Scotia's spring wheat witnessed a drastic decline in 2001. In 2000, the spring wheat yield was 52.9 tons/acre and in 2001 the average yield only reached a meagre 35 tons/acre (See Figure 17: ). Nova Scotia's spring wheat yield for 2001 ranked 22 (lowest: 24). The growing season in 2002 proved to be much greater than 2001, as yields increased 36% to 55 tons/acre.

**Figure 17: Spring Wheat Yield Data: 1981-2004**

<i>Spring Wheat</i>	<i>Nova Scotia Yield/acre</i>	<i>NS % of Provincial AVG</i>	<i>NS RANK</i>
Year			
1981	43.9	96.26313385	17
1982	46	100.8679762	11
1983	46	100.8679762	11

1984	47.8	104.814984	8
1985	47	103.0607583	10
1986	41.9	91.87756967	18
1987	53.3	116.8752855	4
1988	48.6	106.5692097	7
1989	56.7	124.3307446	2
1990	40	87.71128369	20
1991	29.8	65.34490635	24
1992	60	131.5669255	1
1993	45.5	99.7715852	13
1994	47.7	104.5957058	9
1995	44	96.48241206	16
1996	45.3	99.33302878	14
1997	36	78.94015532	21
1998	41.3	90.56190041	19
1999	34.8	76.30881681	23
2000	52.9	115.9981727	5
2001	35	76.74737323	22
2002	55	120.6030151	3
2003	45	98.67519415	15
2004	51	111.8318867	6

### Barley

Nova Scotia's barley production declined a great deal from 2000 to 2001, but was only 11% below the 24-year average (See Figure 18: ). In 2000, the barley yield/acre was 55.8 tons, and in 2001 only an average of 49 tons/acre was produced.

**Figure 18: Barley Yield Data: 1981-2004**

<b>Barley</b>	<b>NS</b>	<b>NS % of Provincial</b>	<b>NS RANK</b>
Year	Yield/Acre	AVG	
1981	50	91.40071597	19
1982	52	95.05674461	15
1983	51.2	93.59433316	18
1984	54	98.71277325	12
1985	44.4	81.16383578	24
1986	52.4	95.78795034	14
1987	57.6	105.2936248	6
1988	55.8	102.003199	8
1989	59.3	108.4012491	4
1990	47.2	86.28227588	22
1991	46.2	84.45426156	23
1992	73	133.4450453	1
1993	56.5	103.282809	7
1994	55.5	101.4547947	10
1995	58.5	106.9388377	5
1996	63.7	116.4445121	3

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1997	51.7	94.50834032	17
1998	54.8	100.1751847	11
1999	48.3	88.29309163	21
2000	55.8	102.003199	8
2001	49	89.57270165	20
2002	71	129.7890167	2
2003	53	96.88475893	13
2004	52	95.05674461	15
<b>Provincial AVG</b>	45.60416667		

*Oats*

Oat yield/acre decreased 12% from 65.6 tons/acre in 2000 to 58 tons/acre in 2001 (See Figure 19: ). The 2001 average yield/acre represented 96% of the 24-year average. In 2002, oat yield/acre increased to 74 tons/acre, producing yields 23% higher than the 24-year average.

**Figure 19: Oats Yield Data: 1981-2004**

<b>Oats</b>	<b>NS Yield tons/acre</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1981	55	91.53318078	18
1982	58	96.52589973	14
1983	59.5	99.02225921	11
1984	59.5	99.02225921	11
1985	50.8	84.54337425	23
1986	60.9	101.3521947	8
1987	51.9	86.37403786	22
1988	60.6	100.8529228	10
1989	58.8	97.85729145	13
1990	55	91.53318078	18
1991	41.7	69.39879343	24
1992	90	149.7815685	1
1993	60.9	101.3521947	8
1994	54.2	90.20178906	20
1995	66.1	110.0062409	4
1996	66.7	111.0047847	3
1997	52	86.54046183	21
1998	56.2	93.53026836	17
1999	57.7	96.02662783	16
2000	65.6	109.1741211	6
2001	58	96.52589973	14
2002	74	123.1537341	2
2003	63	104.847098	7
2004	66	109.8398169	5
<b>Provincial AVG</b>	60.0875		

*Corn*

The corn yield was quite variable by region in 2001 with yields of silage corn are estimated to be down by 20% in some areas. Also, the quality is lower due to small cob size (Nova Scotia Department of Agriculture and Fisheries 2001, Statistics Canada 2003c).

Nova Scotia's fodder corn yields were below the provincial average in 2001 when there were only 10.5 tons/acre, which was 93% of the 24-year provincial average. However, 2002 was a more respectable year with a yield of 12 tons/acre, which was 106% of the 24-year provincial average (See Figure 20: ).

**Figure 20: Corn Yield Data: 1981-2004**

<b>Fodder Corn</b>	<b>NS Yield tons/acre</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1981	13.29	117.0194813	4
1982	14.56	128.2019298	1
1983	13.64	120.1012584	3
1984	13.71	120.7176139	2
1985	12.2	107.4219467	11
1986	12.62	111.1200793	8
1987	12.5	110.06347	10
1988	11.96	105.3087281	13
1989	12.89	113.4974502	7
1990	10	88.05077597	18
1991	10.1	88.93128373	17
1992	9	79.24569838	20
1993	8.8	77.48468286	22
1994	8.9	78.36519062	21
1995	13.1	115.3465165	5
1996	8.4	73.96265182	23
1997	7.4	65.15757422	24
1998	9.8	86.28976045	19
1999	10.5	92.45331477	15
2000	11.2	98.61686909	14
2001	10.5	92.45331477	15
2002	12	105.6609312	12
2003	12.6	110.9439777	9
2004	12.9	113.585501	6
<b>Provincial AVG</b>	11.3570833		

Nova Scotia's corn for grain yields were not detrimentally impacted by the 2001 and 2002 droughts. Average yield/acre dropped slightly from 100.4 tons in 2000 to 99 tons in 2001, while still producing 17% more than the 24-year average (See Figure 21: ). In 2002, grain corn yields increased yet again to 105 tons/acre, producing yields almost 25% above the 24-year provincial average.

**Figure 21: Corn for Grain Yield Data: 1981-2004**

<b>Corn for Grain</b>	<b>NS Yield tons/acre</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1981	76.1	90.29515005	19
1982	75.5	89.58323034	20
1983	80	94.92262817	14
1984	74.1	87.92208434	21
1985	53.9	63.95412073	23
1986	33.7	39.98615712	24
1987	84	99.66875958	11
1988	92	109.1610224	9
1989	94.3	111.890048	8
1990	71.4	84.71844564	22
1991	80.1	95.04128146	13
1992	90	106.7879567	10
1993	78.1	92.66821575	18
1994	80.2	95.15993474	12
1995	94.4	112.0087012	7
1996	79.4	94.21070846	17
1997	79.7	94.56666831	15
1998	103.6	122.9248035	4
1999	79.7	94.56666831	15
2000	100.4	119.1278984	5
2001	99	117.4667524	6
2002	105	124.5859495	3
2003	113	134.0782123	1
2004	105.1	124.7046028	2
<b>Provincial AVG</b>	84.2791667		

### *Forages*

In general, the first-cut hay was above average in terms of both yield and quality. Second-cut hay was severely affected with up to 75% reduction in crop in some fields. Army worm caused damage in forage crops throughout the province. This, acted in combination with the dry weather, reduced the yield and quality of the second-cut hay (Nova Scotia Department of Agriculture and Fisheries 2001, Statistics Canada 2003c).

In Nova Scotia the 2001 tame hay yield/acre was impacted greatly by drought, and ranked 24 (lowest: 24) (See Figure 22: ). The average yield/acre dropped from 2.6 tons/acre to 2.1 tons/acre, producing only 78% of the 24-year provincial average. A substantial recovery occurred in 2002, as tame hay yield returned to 2.5 tons/acre.

**Figure 22: Tame Hay Yield Data: 1981-2004**

<b>Tame Hay</b>	<b>NS (Yield / Acre)</b>	<b>NS % of Provincial AVG</b>	<b>NS RANK</b>
Year			
1981	2.4	90.09854528	16
1982	2.7	101.3608634	10
1983	2.8	105.1149695	8
1984	2.4	90.09854528	16
1985	2.34	87.84608165	19
1986	2.51	94.22806194	13
1987	2.28	85.59361802	21
1988	2.95	110.7461286	5
1989	2.95	110.7461286	5
1990	2.82	105.8657907	7
1991	2.14	80.33786954	23
1992	3.04	114.124824	4
1993	2.5	93.85265134	14
1994	3.5	131.3937119	2
1995	3.2	120.1313937	3
1996	3.8	142.65603	1
1997	2.8	105.1149695	8
1998	2.2	82.59033318	22
1999	2.3	86.34443923	20
2000	2.6	97.60675739	12
2001	2.1	78.83622712	24
2002	2.5	93.85265134	14
2003	2.7	101.3608634	10
2004	2.4	90.09854528	16
<b>Provincial AVG</b>	84.2791667		

## NEW BRUNSWICK

The primary agricultural regions in New Brunswick are: the Saint John River Valley in the northwestern part of the province (CAR 1), Central New Brunswick, including Fredericton and Sussex, Kent and Westmorland Counties in southeastern part of the province (CAR 1 and 2) and the northeastern part of the province (CAR 4) (Statistics Canada 2002a). These are shown in Figure 45:

During the 2001 drought, agriculture was affected in the Gloucester and Northumberland (CAR 4), Kent and Westmorland (CAR 3), Kings and Queens (CAR 2) and York (CAR 1) counties. Crops most affected by the drought were horticultural crops such as mixed vegetables, potatoes, sweet corn (See Top 5 Produced Crops - Figure 23: ). Specialty crops such as blueberries, apples, vegetable crops, strawberries and raspberries had 30-60% yield losses (NWSEP Canadian Drought of 2001-2002 Questionnaire 2003).

The economic impact of the drought conditions varied from moderate to severe throughout the affected area. The total damage to the horticultural crops from drought in 2001 was estimated to be \$5 million based on 60 farms surveyed (NWSEP Canadian Drought of 2001-2002 Questionnaire 2003).

**Figure 23: Top 5 Crops Production by Census Division for New Brunswick**

	<b>1st (ha)</b>	<b>2nd (ha)</b>	<b>3<sup>rd</sup> (ha)</b>	<b>4<sup>th</sup> (ha)</b>	<b>5th(ha)</b>
<b>York</b>	All other tame hay and fodder crops (6,929)	Alfalfa and alfalfa mixtures (816)	Barley (569)	Oats (435)	Spring wheat (excluding durum) (157)
<b>Carleton</b>	Potatoes (11,156)	All other tame hay and fodder crops (9,807)	Barley (6,749)	Oats (2,666)	Alfalfa and alfalfa mixtures (2,042)
<b>Victoria</b>	Potatoes (7,475)	All other tame hay and fodder crops (2,399)	Barley (2,354)	Oats (1,739)	Alfalfa and alfalfa mixtures (1,047)
<b>Madawaska</b>	All other tame hay and fodder crops (4,367)	Potatoes (3,626)	Barley (3,531)	Alfalfa and alfalfa mixtures (893)	Oats (363)
<b>Albert</b>	All other tame hay and fodder crops (2,438)	Blueberries total area (306)	Alfalfa and alfalfa mixtures (242)	Corn for silage (84)	Oats (70)
<b>Westmorland</b>	All other tame hay and fodder crops (12,747)	Alfalfa and alfalfa mixtures (1,622)	Blueberries total area (752)	Oats (671)	Corn for silage (607)
<b>Kent</b>	All other tame hay and fodder crop (4,297)	Oats (705)	Alfalfa and alfalfa mixtures (574)	Blueberries total area (525)	Barley (258)
<b>Saint John</b>	All other tame hay and fodder Crops (12,992)	Alfalfa and alfalfa mixtures (2,577)	Barley (1,034)	Oats (805)	Blueberries total area (577)
<b>Charlotte</b>	Blueberries total area (1,828)	All other tame hay and fodder crops (1,256)	Alfalfa and alfalfa mixtures (81)	Oats (70)	Barley (22)
<b>Sunbury</b>	All other tame hay and fodder crops (1,371)	Oats (72)	Sweet corn (69)	Potatoes (36)	Squash, pumpkins and zucchini (34)
<b>Queens</b>	All other tame hay	Alfalfa and alfalfa	Apples total area	Barley (74)	Oats (71)

	and fodder crops (3,263)	mixtures (325)	(88)		
<b>Kings</b>	All other tame hay and fodder crops (12,992)	Alfalfa and alfalfa mixtures (2,577)	Barley (1,034)	Oats (805)	Blueberries total area (577)
<b>Northumberland</b>	All other tame hay and fodder crops (1,825)	Oats (295)	Barley (236)	Alfalfa and alfalfa mixtures (144)	Potatoes (30)
<b>Restigouche</b>	Barley (2,345)	All other tame hay and fodder crops (2,264)	Alfalfa and alfalfa mixtures (511)	Oats (334)	Potatoes (329)
<b>Gloucester</b>	Blueberries total area (3,147)	All other tame hay and fodder crops (2,101)	Oats (327)	Alfalfa and alfalfa mixtures (165)	Potatoes (146)

### *Horticultural Crops*

#### *Cole Crops*

Poor quality in broccoli, cauliflower and corn were observed. Approximately 700 acres of land were under cole crop production in 2001 and yield losses were estimated to be 50% and higher. Higher losses were reported in the southeastern region of the province (New Brunswick Department of Agriculture 2001). Cauliflower production dropped to 363 tons in 2001 from 450 tons produced in 2000 (Statistics Canada 2003b).

#### *Potatoes*

New Brunswick produces 14% of Canada's potato crop. Potato yields in 2001 dropped to 250.0 cwts/ac compared with a yield of 255.0 cwts/ac in 2000 (See Figure 24: ) (Agriculture and Agri-Food Canada 2002b, Statistics Canada 2002c). Total production was 14,350,000 cwts in 2001 compared with 14,025,000 cwts in 2000. Yields increased in 2002 to 270.0 cwts/ac, with a production of 15,660,000 cwts (Statistics Canada 2003c).

**Figure 24: Potato Yield Data: 1981-2004**

Potatoes	NB Yield (cwts/acre)	NB % of Provincial AVG	NB Rank
Year			
1981	245.5	96.87741271	18
1982	245	96.68010637	19
1983	219	86.42017672	23
1984	222	87.60401476	21

1985	281	110.8861628	3
1986	236	93.12859226	20
1987	295	116.4107403	1
1988	260	102.5992966	8
1989	270	106.5454234	5
1990	260	102.5992966	8
1991	215	84.841726	24
1992	285	112.4646135	2
1993	260	102.5992966	8
1994	250	98.65316977	15
1995	220	86.8147894	22
1996	270	106.5454234	5
1997	260	102.5992966	8
1998	265	104.57236	7
1999	250	98.65316977	15
2000	255	100.6262332	13
2001	250	98.65316977	15
2002	260	102.5992966	8
2003	255	100.6262332	13
2004	280	110.4915501	4
<b>Provincial AVG</b>	253.4130435		

### Beans

New Brunswick bean production dropped drastically from 2000 to 2001 due to hot and dry summer conditions. In 2000, the total bean production was 6,000 tons, and in 2001 it was only 2,300 tons. This represents a 62% decline in provincial production from one year to the next, and a yield 44% below the 17-year average of 3,935.71 tons (See Figure 25: ). In 2002, bean yields rebounded slightly to 3,200 tons, still 47% lower than 2000's total production and 22% below the 17-year provincial average.

**Figure 25: Bean Yield Data: 1987-2004**

<b>Beans</b>			
	<b>NB</b>	<b>NB % of Provincial AVG</b>	<b>NB Rank</b>
Year			
1987	3700	90.55944055	8
1988	5100	124.8251748	4
1989	3900	95.45454545	7
1990	3100	75.87412587	12
1991	6800	166.4335664	1
1992	x		
1993	x		
1994	x		
1995	4300	105.2447552	5
1996	4300	105.2447552	5
1997	3300	80.76923076	10
1998	5500	134.6153846	3

1999	x		
2000	6000	146.8531468	2
2001	2300	56.29370629	13
2002	3200	78.32167832	11
2003	2300	56.29370629	13
2004	3400	83.21678321	9
<b>Provincial AVG</b>	4085.714286		

### Sweet Corn

Approximately 625 acres of sweet corn were under production in 2001. Reported losses ranged from 30 to 70% with small cobs, and poor tip fill noted. Higher losses were reported in the south-eastern region of the province (New Brunswick Department of Agriculture 2001).

Overall, New Brunswick's sweet corn yield/acre increased from 2000 to 2001 from 3,700 tons to 4,600 tons respectively (See Figure 26: ). In 2001 and 2002 the average yield/acre was actually 12% above the 24-year provincial average.

**Figure 26: Sweet Corn Yield Data: 1981-2004**

<b>Sweet Corn</b>	<b>NB Yield (tons/acre)</b>	<b>NB % of Provincial AVG</b>	<b>NB Rank</b>
Year			
1981	3400	83.01119023	19
1982	4900	119.6337742	3
1983	4400	107.4262462	10
1984	3600	87.89420142	18
1985	4100	100.1017294	12
1986	3200	78.12817904	22
1987	3900	95.21871821	15
1988	4000	97.6602238	14
1989	4300	104.9847406	11
1990	4500	109.8677518	8
1991	4600	112.3092574	5
1992	3400	83.01119023	19
1993	3700	90.33570702	16
1994	3300	80.56968464	21
1995	4500	109.8677518	8
1996	5900	144.0488301	1
1997	4700	114.750763	4
1998	3000	73.24516785	23
1999	2700	65.92065107	24
2000	3700	90.33570702	16
2001	4600	112.3092574	5
2002	4600	112.3092574	5
2003	4100	100.1017294	12
2004	5200	126.9582909	2
<b>Provincial AVG</b>	4095.833333		

### Vegetables

Hot, dry weather has compromised many non-irrigated vegetable fields, with farmers facing losses of 50-70%. The effect of high heat was showing up in the form of poor fruit set and abortion of flowers on tomatoes and peppers (New Brunswick Department of Agriculture 2001). Total bean production dropped to 154 tons from a total of 1395 tons in 2000. Peppers production in 2001 totalled 83 tons, a drop from 138 tons produced in 2000 (Statistics Canada 2003b).

### Berry Crops

#### Raspberries

Approximately 165 acres of raspberries were produced in 2001. Production from non-irrigated fields was at least 40% lower than that reported for irrigated fields (New Brunswick Department of Agriculture 2001).

New Brunswick raspberry production dropped slightly from 0.467 tons in 2000 to 0.371 tons/acre in 2001 (See Figure 27: ). In 2002, growing conditions proved to be excellent, as raspberry production ranked 3 (lowest: 8), and was better than the four years prior. The total raspberry yield reached 0.571 tons/acre an astounding 35% higher yield than 2001 and 13% above the 8-year provincial average.

**Figure 27: Raspberry Yield Data: 1996-2004**

<i>Raspberries</i>	<i>NB Yield (tons/acre)</i>	<i>NB % of Provincial AVG</i>	<i>NB RANK</i>
Year			
1996	0.597014925	118.317315	1
1997	0.592857143	117.4933194	2
1998	0.517241379	102.5076738	5
1999	0.503225806	99.73004647	6
2000	0.466666667	92.48470122	7
2001	0.371428571	73.6102724	8
2002	0.571428571	113.2465729	3
2003	0.371428571	73.6102724	8
2004	0.55	108.9998264	4
<b>Provincial AVG</b>	0.504587959		

#### Strawberries

Approximately 800 acres of strawberry production was reported in 2001. More irrigation was required in 2001 (New Brunswick Department of Agriculture 2001). Total production of strawberries was 154 tons in 2001, down from 172 tons produced in 2000 and the five-year average of 186 tons (Statistics Canada 2003b).

The strawberry average yield/acre increased from 1.19 tons/acre in 2000 to 1.56 tons/acre in 2001 (See Figure 28: ). In fact, the 2001 average yield/acre was almost 9% above the nine-year provincial average. In 2002, a minor decline was evident, as the average yield/acre was 1.39 tons, producing almost 97% of the nine-year provincial average.

**Figure 28: Strawberry Yield Data: 1996-2004**

	<b>NB</b>	<b>NB % of Provincial AVG</b>	<b>NB RANK</b>
Year			
1996	1.943181818	135.4519729	1
1997	1.363636364	95.05401604	6
1998	1.320610687	92.05485624	7
1999	0.88	61.34152502	9
2000	1.186440678	82.70236424	8
2001	1.5625	108.91606	3
2002	1.387272727	96.70161898	5
2003	1.545454545	107.7278848	4
2004	1.722222222	120.0497017	2

**Provincial AVG** 1.434591005

*Wild Blueberries*

Wild blueberries were compromised by hot, dry weather in 2001. Total blueberry production in New Brunswick was 4,785 tons in 2001, down 12% from a five-year average of 5,415 tons and 21% from a 2000 production of 6,083 tons (Agriculture and Agri-Food Canada 2002a).

Blueberry yield/acre ranked 9 (lowest: 9) in 2001 (See Figure 29: ). Production declined from 0.34 tons/acre in 2000 to 0.25 tons/acre in 2001, and reached only 67% of the nine-year provincial average. However, blueberry yields recovered in 2002 to 0.36 tons/acre, producing 94% of the nine-year provincial average.

**Figure 29: Blueberry Yield Data: 1996-2004**

<b>Blueberries</b>	<b>NB Yield (tons/acre)</b>	<b>NB % of Provincial AVG</b>	<b>NB RANK</b>
Year			
1996	0.371956	97.71142481	5
1997	0.397567	104.4393613	4
1998	0.311438	81.8137037	8
1999	0.415174	109.0648357	3
2000	0.335082	88.0249972	7
2001	0.254671	66.90118112	9
2002	0.35602	93.52533619	6
2003	0.549977	144.4771206	1
2004	0.434121	114.0420394	2
<b>Provincial AVG</b>	0.504587959		

## Tree Crops

### Apples

There were numerous reports of early apple varieties being smaller in size. Insect problems, particularly mites, developed much more quickly in the hot, dry weather (New Brunswick Department of Agriculture 2001). Early fruit drop occurred due to drought and high fall temperatures for several varieties, especially McIntosh (Agriculture and Agri-Food Canada 2001b). Total production in 2001 was 4,175 tons, down sharply from 5,600 tons produced in 2000. Yields increased to 5,150 tons in 2002 (Statistics Canada 2003b).

Apple yield in 2001 (tons/acre) was 93% (4.06 tons/acre) of the nine-year average minus outliers (See Figure 30: ). Apple yield dropped from 5.16 tons/acre in 2000 to 4.06 tons/acre in 2001, a difference of 21%.

**Figure 30: Apple Yield Data: 1996-2004**

	<b>NB</b>	<b>NB % of Provincial AVG</b>	<b>NB RANK</b>
Year			
1996	3.727134146	85.16220405	7
1997	3.685	84.19947059	8
1998	3.333333333	76.1641525	9
1999	4.239130435	96.86093307	5
2000	5.161290323	117.931591	2
2001	4.057337221	92.70709525	6
2002	5.049019608	115.3662898	3
2003	4.636363636	105.9374121	4
2004	5.5	125.6708516	1
<b>Provincial AVG</b>	4.376512078		

### Other Crops

#### Non-edible Horticultural Crops

The drought limited the growth of turf and landscape plants in 2001. Plants showed various obvious symptoms of drought stress including scorched leaves, stunted growth and bronzing from high mite populations. Chinch bugs in lawns were a significant problem in some areas and the drought accelerated their development and increased damage (New Brunswick Department of Agriculture 2001).

## PRINCE EDWARD ISLAND

Agriculture is important across the three counties of the province: Kings (CAR 1), Queens (CAR 2) and Prince (Figure 47: ). According to the 2001 Census of Agriculture, there were 1,845 farms in the province (Statistics Canada 2002a). In 2001, cattle farms accounted for 26% of all Prince Edward Island farms, while potato farms comprised 19% and dairy farms 17% (Figure 31: ). There have also been increases in the production of horticultural crops from 1996 to 2001 such as carrots, cole crops (cauliflower and broccoli) and lowbush blueberries (Statistics Canada 2002b).

**Figure 31: Top 5 Crops Production by Census Division for PEI**

	1st (ha)	2nd (ha)	3 <sup>rd</sup> (ha)	4 <sup>th</sup> (ha)	5th(ha)
<b>Kings</b>	Potatoes (7,862)	Barley (7,685)	All other tame hay and fodder crops (7,513)	Alfalfa and alfalfa mixtures (1,862)	Blueberries total area (1,786)
<b>Queens</b>	All other tame hay and fodder crops (21,647)	Barley (12,755)	Potatoes (11,417)	Spring wheat (excluding durum) (6,436)	Alfalfa and alfalfa mixtures(5,275)
<b>Prince</b>	Potatoes (23,978)	Barley (18,170)	All other tame hay and fodder crops (16,598)	Alfalfa and alfalfa mixtures (5,190)	Oats (2,398)

### *Horticultural Crops*

#### *Cole Crops*

The cauliflower and broccoli crops were severely affected by the 2001 drought. About 50% of both crops were lost with very little being harvested (Agriculture and Agri-Food Canada 2001c). No data was available from Statistics Canada for these crops.

#### *Potatoes*

Prince Edward Island is the largest provincial producer of potatoes, producing approximately 20% of Canada's potato crop (Agriculture and Agri-Food Canada 2002b). The 2001 drought had significant impacts on potato production in the province, with yields ranked 24 (lowest: 24), dropping 33.5% from the 24 year provincial average (See Figure 32: ). The potato yield rebounded in 2002, with yield figures at 108% of provincial average.

**Figure 32: Potato Yield Data : 1981-2004**

<i>Potatoes</i>	<i>PEI Yield (cwt/ac)</i>	<i>PEI % of Provincial AVG</i>	<i>PEI Rank (24 year rank)</i>
Year			
1981	252.6	97.73965756	18
1982	265	102.5376455	8
1983	243	94.02508625	22
1984	264	102.150711	13
1985	256	99.0552349	17
1986	275	106.4069906	3
1987	242	93.63815174	17
1988	268	103.698449	7
1989	270	104.4723181	3
1990	250	96.73362783	19
1991	250	96.73362783	12
1992	290	112.2110083	1
1993	260	100.6029729	14
1994	245	94.79895528	10
1995	265	102.5376455	8

1996	260	100.6029729	14
1997	265	102.5376455	8
1998	265	102.5376455	8
1999	260	100.6029729	14
2000	270	104.4723181	4
2001	172	66.55273595	24
2002	280	108.3416632	2
2003	265	102.5376455	8
2004	270	104.4723181	4
<b>Provincial AVG</b>	258.4416667		

### *Rutabaga and Turnips*

Rutabaga crops were under stress and yields were ranked 22 (lowest: 22), 30% below the 24 year provincial average (See Figure 33: ). Production returned to 110 % of the 24 year provincial average in 2002.

**Figure 33: Rutabaga Yield 1981-2004**

<i>Rutabagas</i>	<i>PEI Yield (tonnes/acre)</i>	<i>PEI % of Provincial AVG</i>	<i>RANK</i>
Year			
1981	31000	123.6179083	1
1982	20800	82.94362878	20
1983	25000	99.69186152	13
1984	26600	106.0721407	8
1985	22500	89.72267537	17
1986	24000	95.70418706	15
1987	25200	100.4893964	10
1988	24000	95.70418706	15
1989	19000	75.76581475	13
1990	27000	107.6672104	7
1991	26400	105.2746058	7
1992	27500	109.6610477	5
1993	28600	114.0474896	3
1994		N/A	
1995	28600	114.0474896	3
1996	29100	116.0413268	2
1997		N/A	
1998	25700	102.4832336	11
1999	25000	99.69186152	13
2000	26600	106.0721407	8
2001	17600	70.18307051	22
2002	27500	109.6610477	5
2003	22000	87.72883814	18
2004	22000	87.72883814	18
<b>Provincial AVG</b>	25077.27273		

**Field Crops**

**Grains**

Barley yields in 2001 ranked 23 (lowest: 24), 17% below the 24 year average (See Figure 34: ).

**Figure 34: Barley Yield Data 1981-2004**

<b>Barley</b>			
	<b>PEI Yield (tones/ac)</b>	<b>PEI (% provincial avg)</b>	<b>PEI (Year Rank)</b>
Year			
1981	52	91.48218736	17
1982	57	100.2785515	11
1983	45	79.16727753	24
1984	48	84.44509603	22
1985	55	96.76000586	13
1986	58.8	103.4452426	9
1987	59.1	103.9730245	8
1988	55.7	97.99149685	12
1989	68.7	120.8620437	2
1990	50.6	89.0192054	15
1991	54.3	95.52851488	14
1992	75	131.9454625	1
1993	52	91.48218736	17
1994	53.2	93.59331476	9
1995	53.8	94.64887846	15
1996	60	105.55637	5
1997	62	109.0749157	6
1998	65	114.3527342	2
1999	51	89.72291453	20
2000	65	114.3527342	2
2001	47	82.68582319	23
2002	66	116.112007	3
2003	52	91.48218736	17
2004	58	102.0378244	10
<b>Provincial AVG</b>	56.84166667		

Soybeans matured early in 2001 due to drought stress and yields were ranked 14 (lowest: 14), 28% below the 14 year average (See Figure 35: ). In 2002, the yields returned to above normal. Yields for other spring grains were 25-35% below average in 2001 (Agriculture and Agri-Food Canada 2001c). No data were available from Statistics Canada for these crops.

**Figure 35: Soybean Yield Data 1991-2004**

<b>Soybeans</b>	<b>Yield (tones/acre)</b>	<b>% of provincial average</b>	<b>RANK</b>
Year			
1991	36.6	114.7078576	2
1992	34.6	108.4396687	4
1993	32	100.2910231	7
1994	34.7	108.7530781	2
1995	25.9	81.17304679	13
1996	28.9	90.5753302	12
1997	30	94.02283412	6
1998	32	100.2910231	7
1999	40	125.3637788	1
2000	32	100.2910231	7
2001	23	72.08417282	14
2002	33	103.4251175	6
2003	34	106.559212	5
2004	30	94.02283412	10
<b>Provincial AVG</b>	31.90714286		

*Raspberries*

Raspberry production in Prince Edward Island suffered greatly in 2001. (See Figure 36: ). The 2001 raspberry yield ranked 9 (lowest 9), and dropped from 0.33 tons/acre in 2000 to 0.27 tons/acre in 2001. The 2001 raspberry average yield/acre was 42% below the 9-year average and 20% below the 2000 average. In 2002, production returned to 0.33 tons/acre, although this was still 27% below the 9-year provincial average.

**Figure 36: Raspberry Yield Data: 1996-2004**

<b>Raspberries</b>	<b>PEI Yield (tons/acre)</b>	<b>PEI % of Provincial AVG</b>	<b>PEI RANK</b>
Year			
1996	0.5	109.9860335	4
1997	0.8571429	188.547486	1
1998	0.5142857	113.1284916	3
1999	0.4333333	95.32122905	5
2000	0.3333333	73.32402235	6
2001	0.2666667	58.65921788	9
2002	0.3333333	73.32402235	6
2003	0.3333333	73.32402235	6
2004	0.52	114.3854749	2
<b>Provincial AVG</b>	0.4546032		

*Strawberries*

In 2001, Prince Edward Island strawberry yields were higher than the previous 4 years recorded (See Figure 37: ). In fact, strawberry yields increased 11% from 1.42 tons/acre in 2000 to 1.59 tons/acre in 2001, and in 2002 strawberry production declined 11% and returned to 1.42 tons/acre.

**Figure 37: Strawberry Yield Data: 1996-2004**

	<i>PEI Yield (tons/acre)</i>	<i>PEI % of Provincial AVG</i>	<i>PEI RANK</i>
Year			
1996	1.9494949	124.1894085	1
1997	1.56	99.37726555	5
1998	1.36	86.63659048	8
1999	1.25	79.62921919	9
2000	1.4166667	90.24644841	6
2001	1.5933333	101.5007114	4
2002	1.4166667	90.24644841	6
2003	1.7818182	113.5078324	3
2004	1.8	114.6660756	2

**Provincial AVG** 1.5697755

**NEWFOUNDLAND AND LABRADOR**

Most of Newfoundland and Labrador is not suitable for agriculture due to poor soils, or a lack of soil, and a lack of adequate drainage. Tame hay and fodder crops are the most commonly produced crops (See Figure 38: ). The main agricultural areas on the island of Newfoundland are the Avalon Peninsula, the Codroy and Humber valleys; Lethbridge and Woodale (Figure 46: ) (Statistics Canada 2002a).

**Figure 38: Top 5 Crops Production by Census Division for Newfoundland and Labrador**

	<b>1st (ha)</b>	<b>2nd (ha)</b>	<b>3<sup>rd</sup> (ha)</b>	<b>4<sup>th</sup> (ha)</b>	<b>5th(ha)</b>
<b>Division No. 1</b>	All other tame hay and fodder crops (2,198)	Alfalfa and alfalfa mixtures (340)	Blueberries total area (314)	Potatoes (63)	Rutabagas and turnips (42)
<b>Division No. 2</b>	Alfalfa and alfalfa mixtures (55)	All other tame hay and fodder crops (38)	Potatoes (7)	Rutabagas and turnips (6)	Cabbage (5)
<b>Division No. 3</b>	All other tame hay and fodder crops (157)	Rutabagas and turnips (19)	Potatoes (15)	Cabbage (14)	Oats (12)
<b>Division No. 4</b>	All other tame hay and fodder crops (755)	Alfalfa and alfalfa mixtures (147)	Potatoes (38)	Rutabagas and turnips (26)	Cabbage (13)
	All other tame	Alfalfa and	Potatoes	Rutabagas	Cabbage

<b>Division No. 5</b>	hay and fodder crops (1,755)	alfalfa mixtures (346)	(33)	and turnips (16)	(13)
<b>Division No. 6</b>	All other tame hay and fodder crops (157)	Rutabagas and turnips (19)	Potatoes (15)	Cabbage (14)	Oats (12)
<b>Division No. 7</b>	All other tame hay and fodder crops (379)	Potatoes (62)	Rutabagas and turnips (24)	Cabbage (11)	Carrots (8)
<b>Division No. 8</b>	All other tame hay and fodder crops (79)	Potatoes (36)	Rutabagas and turnips (19)	Strawberries total area (15)	Cabbage (11)
<b>Division No. 9</b>	All other tame hay and fodder crops (1,755)	Alfalfa and alfalfa mixtures (346)	Potatoes (33)	Rutabagas and turnips (16)	Cabbage (13)
<b>Division No. 10</b>	All other tame hay and fodder crops (1,755)	Alfalfa and alfalfa mixtures (346)	Potatoes (33)	Rutabagas and turnips (16)	Cabbage (13)

### *Horticultural Crops*

#### *Carrots, Turnips and Beets*

Poor germination rates caused by dry conditions forced many producers to re-seed these crops. Producers were concerned that yields from late season crops would be low (Agriculture and Agri-Food Canada 2001d). Yields dropped for carrots in 2001 to 738 tons in 2001 from 1095 tons in 2000; turnip yields in 2001 dropped to 2,500 tons from 4,140 tons in 2000; beet yields in 2001 were slightly higher (48 tons) than 2000 yields (45 tons) but this is likely due to an increase in area planted (Statistics Canada 2003b).

In 2001, carrot production dropped 37% to 8,700 tons, compared to the 2000 total production of 13,700 tons (See Figure 39: ). In 2002, production improved slightly to 9,100 tons, but was still 21% below the 23-year average of 11,395.8 tons. The total carrot yields for 2001 and 2002 ranked 21 and 17 respectively when compared to the last 24 years of production in Newfoundland and Labrador (lowest: 24).

Beet production was not affected to the same degree as carrots were by the hot and dry conditions of 2001 and 2002. Newfoundland and Labrador's beet production dropped slightly from 8,000 tons in 2000 to 7,900 tons in 2001 (See Figure 40: ). In 2002, the beet production reached 8,600 tons, and was actually 3% higher than the 24-year provincial average.

**Figure 39: Carrot Yield Data: 1981-2004**

<b>Carrots</b>	<b>NFLD Yield(tonnes/acre)</b>	<b>NFLD % of Provincial AVG</b>	<b>NFLD Rank</b>
Year			
1981	10000	87.75137114	14
1982	9000	78.97623403	19
1983	9900	86.87385743	15

1984	11700	102.6691042	10
1985	9000	78.97623403	19
1986	8700	76.34369289	21
1987	12800	112.3217551	9
1988	11100	97.40402197	11
1989	16200	142.1572212	3
1990	9400	82.48628887	16
1991	14000	122.8519196	5
1992	7700	67.56855578	23
1993	10400	91.26142599	13
1994	9100	79.85374774	17
1995	5800	50.89579526	24
1996	15500	136.0146253	4
1997	10800	94.77148083	12
1998	16700	146.5447898	1
1999	16700	146.5447898	1
2000	13700	120.2193785	7
2001	8700	76.34369289	21
2002	9100	79.85374774	17
2003	13500	118.464351	8
2004	14000	122.8519196	5
<b>Provincial AVG</b>	11395.83333		

**Figure 40: Beet Yield Data: 1987-2004**

<b>Beets</b>	<b>NFLD Yield/Acre</b>	<b>NFLD % of Provincial AVG</b>	<b>NFLD Rank</b>
Year			
1987	9300	111.4513981	5
1988	7700	92.27696405	10
1989	13000	155.792277	2
1990	9600	115.0466045	4
1991	5200	62.31691079	18
1992	7500	89.88015979	12
1993	5500	65.91211718	17
1994	7700	92.27696405	10
1995	6500	77.89613848	15
1996	7000	83.88814913	14
1997	7200	86.2849534	13
1998	10800	129.4274301	3
1999	14000	167.7762983	1
2000	8000	95.87217044	8
2001	7900	94.67376831	9
2002	8600	103.0625832	7
2003	8800	105.4593875	6
2004	5900	70.7057257	16
<b>Provincial AVG</b>	8344.444444		

*Potatoes*

In 2001 and 2002 Newfoundland and Labrador's potato production was not greatly affected by the hot dry weather (See Figure 41: ). From 2000 to 2001 production actually increased from 150 cwt/acre to 160 cwt/acre, which may be attributed to an increase in potato acreage in Newfoundland and Labrador.

**Figure 41: Potato Yield Data: 1981-2004**

Year	NFLD Yield (cwt/acre)	NFLD % of Provincial AVG	NFLD Rank
1981	125	90.6282508	18
1982	120	87.00312076	20
1983	130	94.25338083	14
1984	140	101.5036409	9
1985	150	108.753901	5
1986	145.1	105.2012735	8
1987	123.3	89.39570659	19
1988	115	83.37799073	23
1989	110	79.7528607	24
1990	140	101.5036409	9
1991	120	87.00312076	20
1992	130	94.25338083	14
1993	120	87.00312076	20
1994	150	108.753901	5
1995	140	101.5036409	9
1996	135	97.87851086	12
1997	130	94.25338083	14
1998	134.3	97.37099266	13
1999	126	91.3532768	17
2000	150	108.753901	5
2001	160	116.004161	4
2002	164.3	119.1217728	3
2003	214.3	155.3730732	1
2004	190	137.7549412	2

**Provincial Average**            137.926087

*Cole Crops*

Reports indicated that early and mid-season crop (cabbage, lettuce, broccoli, and cauliflower) yields were below average with very low head weights and that late season crops were being affected by dry conditions (Agriculture and Agri-Food Canada 2001d). In 2001, the cabbage production was 14,001 tons/acre, which was 18% below the 2000 production of 17,100 tons/acre (See Figure 42: ). The 2001 the cabbage yield was 19% below the 24-year average, and the 2002 yield was 10% below. 2001 represented the lowest ranked cabbage yield/acre in the last 16 years. Yields dropped for broccoli in 2001 to 68 tons from 80 tons in 2000 (Statistics Canada 2003b).

**Figure 42: Cabbage Yield Data: 1981-2004**

<b>Cabbage</b>	<b>NFLD Yield/acre</b>	<b>NFLD % of Provincial AVG</b>	<b>NFLD Rank</b>
Year			
1981	16000	92.32988697	16
1982	12600	72.70978599	23
1983	13000	75.01803317	22
1984	13300	76.74921855	21
1985	10900	62.8997355	24
1986	18700	107.9105554	9
1987	21200	122.3371002	3
1988	13700	79.05746572	20
1989	27000	155.8066843	1
1990	22100	127.5306564	2
1991	20200	116.5664823	4
1992	18900	109.064679	7
1993	19200	110.7958644	6
1994	16800	96.94638132	14
1995	18800	108.4876172	8
1996	17900	103.2940611	12
1997	15500	89.44457801	18
1998	18100	104.4481846	11
1999	18400	106.17937	10
2000	17100	98.6775667	13
2001	14100	81.3657129	19
2002	15600	90.0216398	17
2003	16800	96.94638132	14
2004	20000	115.4123587	5
<b>Provincial AVG</b>	17329.16667		

**Field Crops**

*Tame Hay*

In 2001 and 2002 Tame Hay production was only mildly affected by the drought conditions experienced throughout Canada (See Figure 43: ). Tame hay was 17% below the 22-year average in 2001, and 8% below the 22-year average in 2002. The last 6 years of statistical data for Newfoundland and Labrador's tame hay production indicate a definite decline in average yield/acre.

**Figure 43: Tame Hay Yield Data: 1983-2004**

	<b>NFLD Yield/Acre</b>	<b>NFLD % of Provincial AVG</b>	<b>NFLD RANK</b>
Year			
1981			
1982			
1983	1.77	77.27723755	20
1984	1.81	79.0236158	18
1985	1.83	79.89680492	17

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1986	1.98	86.44572336	14
1987	1.51	65.92577892	22
1988	2.16	94.30442548	10
1989	2.17	94.74102004	9
1990	2.08	90.81166898	13
1991	2.29	99.98015479	8
1992	2.89	126.1758285	5
1993	2.9	126.6124231	4
1994	2.8	122.2464775	6
1995	3.6	157.1740425	1
1996	3.5	152.8080968	2
1997	3.2	139.71026	3
1998	2.5	109.1486406	7
1999	2.1	91.68485811	11
2000	1.9	82.95296686	15
2001	1.9	82.95296686	15
2002	2.1	91.68485811	11
2003	1.8	78.58702123	19
2004	1.6	69.85512999	21

**Provincial AVG**            2.290454545

## CONCLUSION

Many crops were impacted by the 2001 drought but the severity of the effects varied from crop to crop and from province to province. Major crops for Nova Scotia such as wild blueberries suffered a 50 to 75% production loss. Likewise in Prince Edward Island, potato yields dropped by 50% in 2001.

In terms of adaptation measures used, irrigation was used more frequently, where available, in 2001. Growers with access to irrigation experienced smaller yield losses but in turn, incurred additional costs for applying irrigation. Growers without irrigation experienced 50 to 100% crop loss.

In general, crop yields returned to near normal for 2002.

## REFERENCES

Agriculture and Agri-Food Canada. 2001a. *Crop Conditions Report, Nova Scotia, September 21, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/10ns\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/10ns_e.phtml).

Agriculture and Agri-Food Canada. 2001b. *Crop Conditions Report, New Brunswick, October 19, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/12nb\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/12nb_e.phtml).

Agriculture and Agri-Food Canada. 2001c. *Crop Conditions Report, Prince Edward Island, September 21, 2001* [Web Page]. Accessed December 2002. Available at: [http://www.agr.gc.ca/policy/crop/cr2001/10pei\\_e.phtml](http://www.agr.gc.ca/policy/crop/cr2001/10pei_e.phtml).

Agriculture and Agri-Food Canada. 2002a. *2001/2002 Canadian Fruit Situation and Trends – including apples, tender fruits, grapes and berries* [Web Report]. Accessed March 2003. Available at: [http://www.agr.gc.ca/misb/hort/2001\\_2002/pdf/fruit\\_eng.pdf](http://www.agr.gc.ca/misb/hort/2001_2002/pdf/fruit_eng.pdf).

Agriculture and Agri-Food Canada. 2002b. *2001/2002 Canadian Potato - Situation and Trends* [Web Report]. Accessed March 2003. Available at: [http://www.agr.gc.ca/misb/hort/2001\\_2002/pdf/potato\\_eng.pdf](http://www.agr.gc.ca/misb/hort/2001_2002/pdf/potato_eng.pdf).

New Brunswick Department of Agriculture. 2001. *New Brunswick Provincial Horticultural Crop Drought Report, August 22, 2001*.

Nova Scotia Department of Agriculture and Fisheries. 2001. *Estimated Impact of 2001 Drought on Nova Scotia Agriculture* [Web Report]. 29 pp. Nova Scotia Department of Agriculture and Fisheries, Agricultural Services Branch, Halifax. Accessed November 2002. Available at: <http://www.gov.ns.ca/nsaf/elibrary/agserv/drought.pdf>.

Statistics Canada. 2003a. *Canadian Potato Production – Updates*. Catalogue No. 22-008-UIB. January 2003.

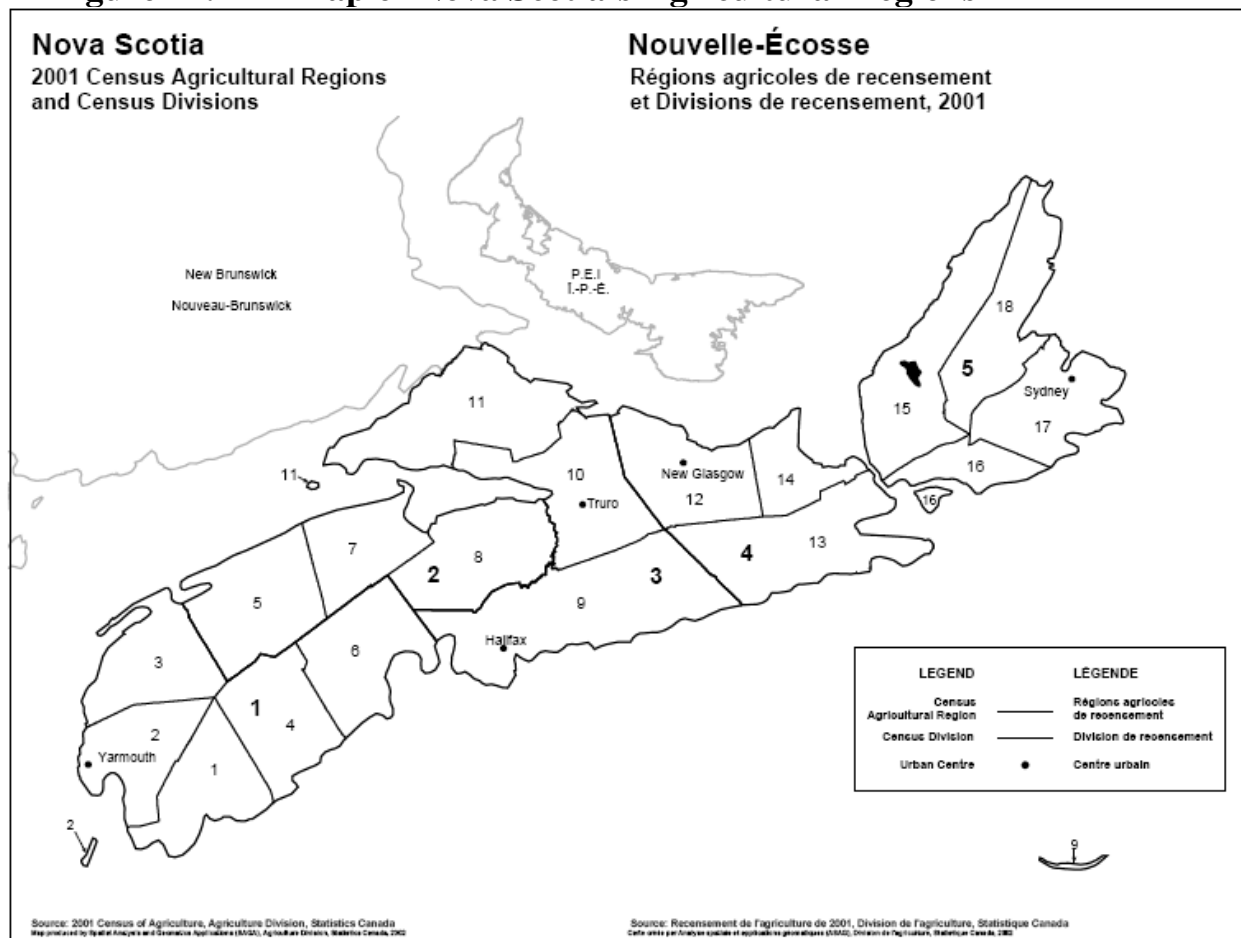
Statistics Canada. 2003b. *Fruit and Vegetable Production*. Catalogue No.22-003-XIB, February 2003.

Statistics Canada. 2002a. *Census of Agriculture – Concepts, Methodology and Data Quality* [Web Page]. Accessed March 2003. Available at: <http://www.statcan.ca/english/freepub/95F0301XIE/quality.htm> and <http://www.statcan.ca/english/freepub/95F0301XIE/tables.htm>.

Statistics Canada. 2002b. *Census of Agriculture Data Summary* [Web Page]. Accessed March 2003. Available at: <http://www.statcan.ca/english/Pgdb/census.htm>.

Statistics Canada. 2002c. *Canadian Potato Production – Updates*. Catalogue No. 22-008-UIB. November 2002.

**Figure 44: Map of Nova Scotia's Agricultural Regions**



- 1 Agricultural Region 1**  
**Région agricole 1**
- 1 Shelburne County
  - 2 Yarmouth County
  - 3 Digby County
  - 4 Queens County
  - 6 Lunenburg County

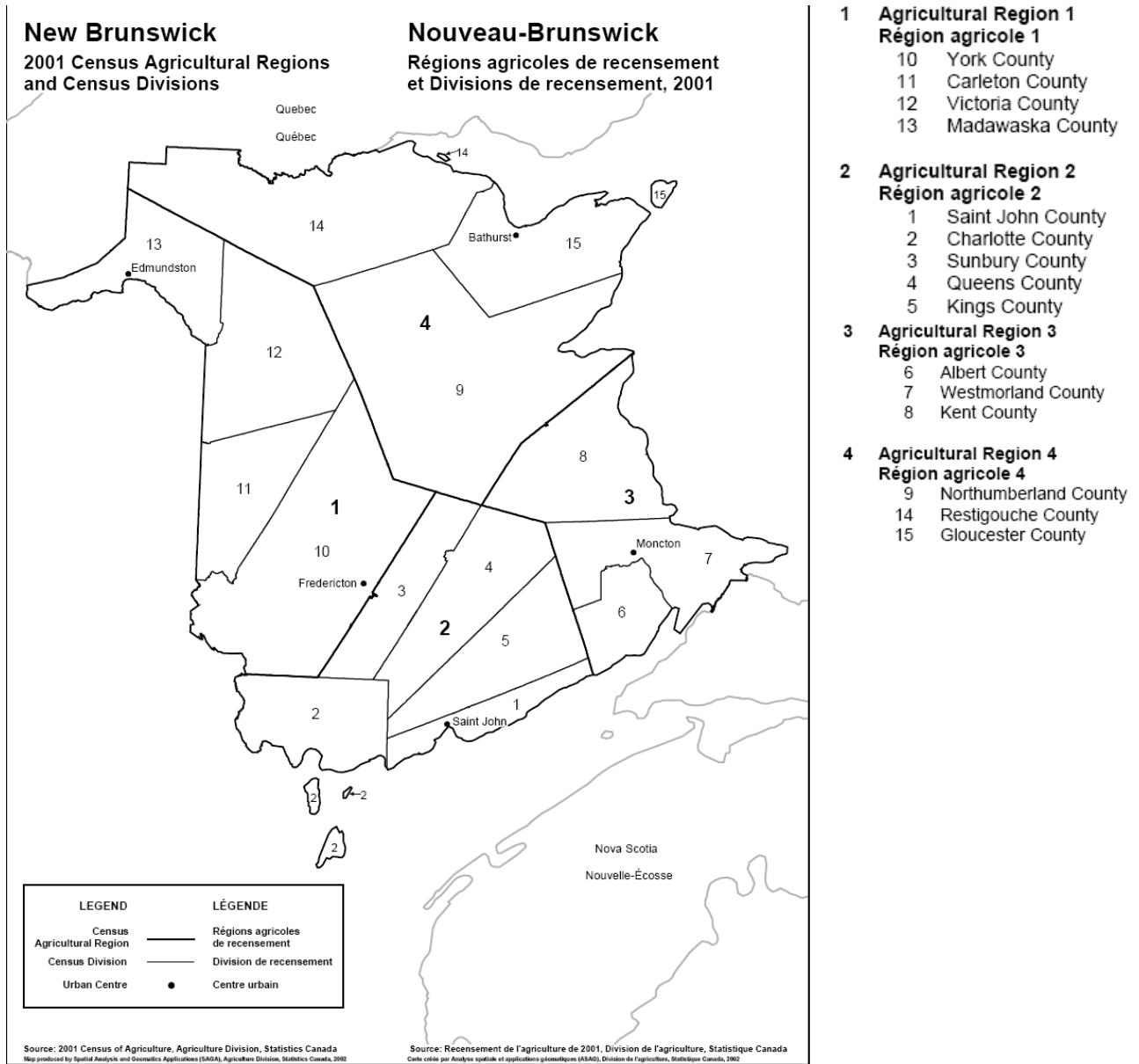
- 2 Agricultural Region 2**  
**Région agricole 2**
- 5 Annapolis County
  - 7 Kings County
  - 8 Hants County

- 3 Agricultural Region 3**  
**Région agricole 3**
- 9 Halifax County
  - 10 Colchester County
  - 11 Cumberland County

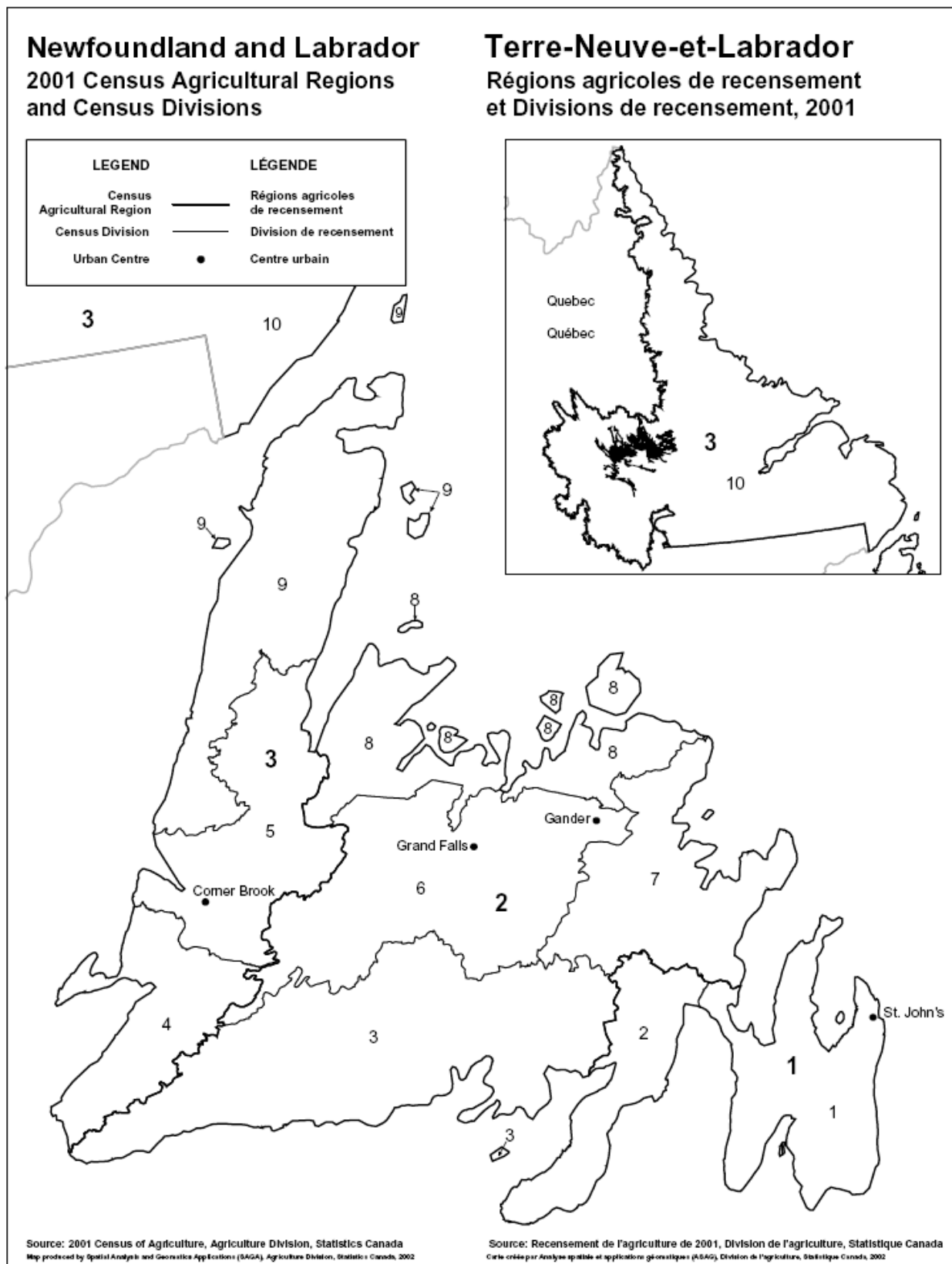
- 4 Agricultural Region 4**  
**Région agricole 4**
- 12 Pictou County
  - 13 Guysborough County
  - 14 Antigonish County

- 5 Agricultural Region 5**  
**Région agricole 5**
- 15 Inverness County
  - 16 Richmond County
  - 17 Cape Breton County
  - 18 Victoria County

**Figure 45: Map of New Brunswick's Census Agricultural Regions**



**Figure 46: Map of Newfoundland and Labrador's Census Agricultural Regions**



**Figure 47: Map of Prince Edward Island's Census Agricultural Regions**

