

Agricultural Sustainability



Noteworthy:

- The amount of cropland increased by 57% between 1961 and 2003.
- The percent of cropland to which herbicides and other pesticides were applied grew from 33% to 77% between 1971 and 2001.
- On average, wheat, barley and canola yields per acre increased by about 3% annually between 1961 and 2001.
- The area on which pesticides or herbicides are used increased by an average of 4% per annum between 1961 and 2001.
- Between 1971 and 2003, total farm debt increased from about \$4 billion (1998 \$) to \$8 billion (1998\$).
- On a per-acre basis, the real debt burden has increased 103% since 1961, for an average annual increase of 2%.
- Farm debt increased from approximately \$175 (1998 \$) per acre in 1961 to \$356 (1998\$) per acre in 2003.
- The number of farms declined from 73,212 in 1961 to 53,652 in 2001, with a 9.1% decline occurring in the five years leading up to 2001.

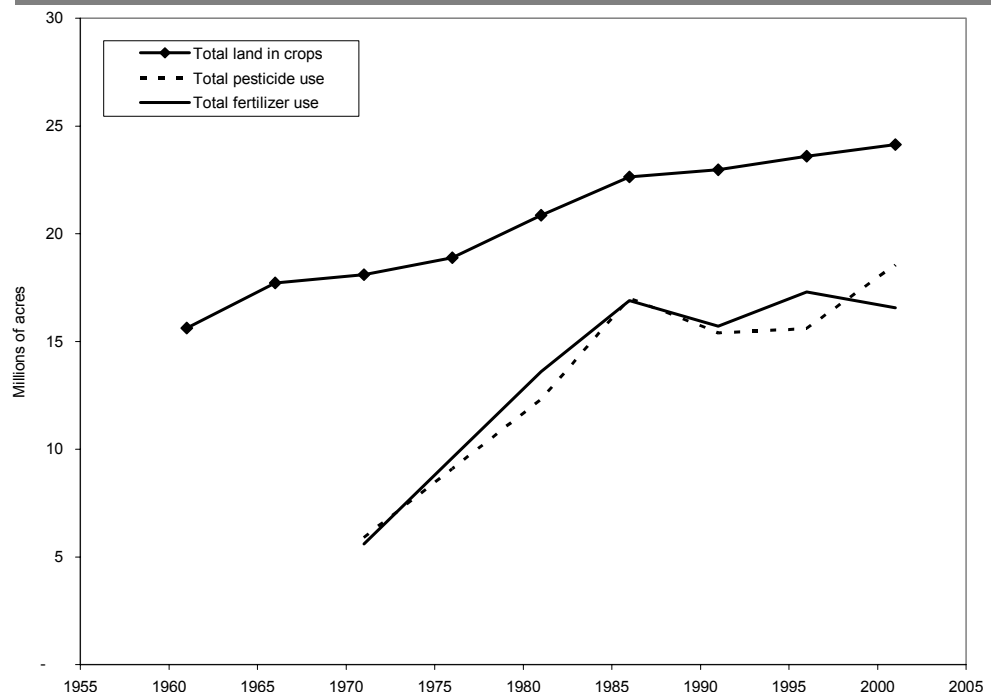
Is Alberta's Agriculture Sustainable?

Agricultural production increased dramatically between 1961 and 2003, with total wheat production increasing by 144%, barley by 108% and canola by 77%. These increases were possible due in part to crop breeding and increasing use of inputs such as fertilizers and pesticides. According to Statistics Canada data, the area of land on which pesticides were used increased from 5.9 million acres

in 1971 to 18.6 million acres in 2001. Similarly, the area of land on which fertilizers were applied increased from 5.6 million acres in 1971 to 16.6 million acres in 2001. At the same time, farm debt increased by approximately 111%. The figure below shows the trend in fertilizer, pesticides and crop production since 1961.

Practices such as reduced summerfallow and increased conservation tillage have improved, and the rate of loss in soil organic carbon is slowing. However, further conservation improvements are needed. One growing problem is salinity, as surveys of central and southern Alberta show the area affected by visible salinity has expanded by about 6% since the 1950s.

Total land in crops, pesticide use and fertilizer use, 1961 to 2001



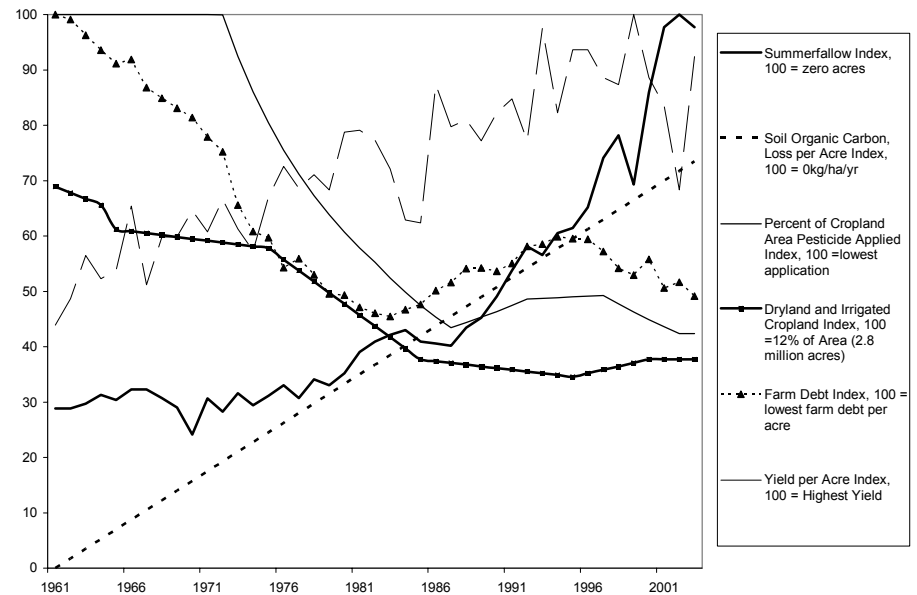
So What?

Six indices were used to assess agricultural sustainability, including (see figure at the upper right):

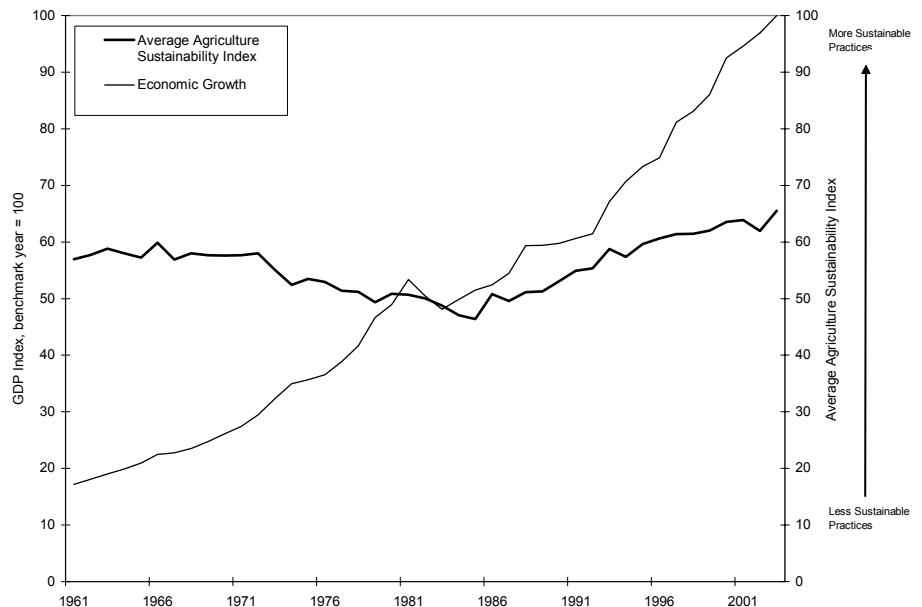
- 1) the cropland area in summerfallow (100 = 0 ha)-trend improving;
- 2) the percent of cropland on which pesticides are used (100 = best year: 32.6%)-trend improving;
- 3) dryland and irrigated land salinity (100 = 0 ha)-trend worsening;
- 4) the rate of loss of soil organic carbon (100 = 0 kg/ha/yr)-trend improving;
- 5) average yield per acre for wheat, barley, and canola as a proxy for productivity (100 = best year: 19,521 kgs/acre)-trend increasing; and,
- 6) average farm debt per farmer (100 = lowest debt per acre: \$175)-trend worsening).

As this figure shows, the rate of loss in soil organic carbon on agricultural land and the amount of cropland area in summerfallow have improved since 1961. But the percent of cropland area to which pesticides are applied, and the area affected by salinity have worsened. Can the increase in production seen over the last 40 years be maintained? Is it environmentally and economically sustainable? While improved tillage practices have cut wind and water erosion, reduced yields due to salinity could be costing farmers over \$60 million a year. Fertilizers, manure and the return of other organic matter (such as straw) to the soil can retain soil nutrient levels. However, it is possible that the trend in increasing yields may be depleting the productivity of cropland. In addition, it is doubtful that farmers will be able to continue covering the cost of increasing inputs, given the rapidly rising costs of fuel, fertilizers, and herbicides; increasing farm debt; and declining net income. The burden of debt is significant and continues to be a factor in the long-term viability of farming.

Agriculture Sustainability Indices, 1961 to 2003



Average Agriculture Sustainability Index, 1961 to 2003



The cost of unsustainable agriculture in 2003 are estimated as: \$6.6 million for on-site costs of erosion on bare soils; \$1.4 million for off-site costs of erosion on bare soils; \$8 million due to reduced yields from salinity on irrigated land; and \$55 million due to reduced yields due to salinity on dryland cropland, for a total of \$71 million. In 2003, the average agriculture sustainability index was 65 (an increase from 57 in 1961).

