

Agriculture: in a changing climate

The average annual temperature, in Ontario, has increased by **1.4°C** over the last 60 years, and models suggest that by 2050 the average annual temperature could increase by an additional **2.5°C to 3.7°C (from baseline average 1961-1990)**¹. Even though projections of annual total precipitation, into the 2050's, show little change in the southern parts of the province², extreme rainfall events are expected to become more intense and occur more often³. This combined with warmer summer temperatures and increased evaporation may increase the likelihood of more intense dry periods with less water from run-off and low soil moisture². Furthermore, research suggests that extreme events may have greater impacts on sectors with closer links to climate, such as agriculture⁴. Farm systems have evolved to cope with modest variations in climatic conditions, but are susceptible to extremes⁵.

Agriculture in Ontario

Ontario is home to commercial hog, dairy and beef cattle farms, cash crops such as soybeans and corn, vegetables and fruit⁵. Climate change could continue to pose risks to individual farming enterprises, regional agricultural sectors, and rural communities⁵.

CROPS

- Research has shown that the growing season has been getting longer and warmer over most areas of agricultural land in Canada⁷. Although the warming trend is seen as a future benefit to the sector, research suggests that a decrease in water availability over the growing period may be the major limiting factor for future crop production⁸.
- Warmer temperatures and a longer growing season could benefit many crops including corn, soybeans, forages and horticultural crops, but climate change could pose significant risks including changes in drought frequency and severity, shifts in the timing of precipitation and changes in storm intensity present risks to production².
- Climate change could negatively affect farm production and profitability through changes in agricultural pests, invasive species, weeds and disease². For example, warmer winters may allow the spread of Asian soybean rust, a fungal disease of soybeans². Although not currently causing economic losses in Canada, unparalleled international cooperation resulted in the establishment of a comprehensive soybean rust “sentinel plot” monitoring program – an early warning system for soybean production areas of North America⁹.
- Climate change has the potential to exacerbate existing challenges for grape growers, such as winter injury and frost damage, severe heat, drought or cooler temperatures during the growing season, and excessive rainfall during the spring or harvest periods¹⁰. Adaptation measures include water conservation, effective irrigation techniques (e.g. drip), canopy management to conserve moisture and practices such as application of mulch to absorb water¹¹.
- Strategies could also be developed to reduce the financial consequences of variable weather conditions. For the agricultural sector, in addition to adopting appropriate farming methods/crops, economic initiatives could be considered to limit the financial risks that these weather conditions may produce¹⁰.



Adaptation

Ontario's farmers have a long history of adapting to, and meeting weather and climate challenges¹. Of key importance for agriculture is ensuring that adaptive measures are proactive rather than reactive¹. With proactive adaptation in the agri-food industry, Ontario producers may enjoy competitive advantages and strengthen their long-term economic stability¹.

Agriculture

LIVESTOCK

- Heat stress could impact health, production and profitability of farm animals¹². Cattle can withstand temperatures as low as -37°C but temperatures over 23°C can cause stress when combined with high humidity, low air movement or direct sun¹². Heat stress also lowers natural immunity making animals more vulnerable to disease in the days and weeks¹² following a heat event. Climate change may increase this risk. Providing shade and fresh water, increasing air flow over animals, and using sprinklers in pastures¹² are a few adaptation measures or best practices that can be used to reduce the risk of heat stress on livestock.
- Extreme weather events and flooding could increase the risk of illness and death, and could also increase the distribution of vector and non-vector borne infectious diseases in animals, such as *E. coli* enteritis, Leptospirosis (livestock), Salmonellosis (cattle, horses, swine) and Yersiniosis (sheep, pigs, goats)¹³.
- Researchers suggest that climate change will allow for the northward migration of insects and insect-borne diseases¹⁴. Over the next 20 years, researchers will be monitoring climate data, insects migrating from the US, and the diseases that may migrate with them¹⁴. Blue tongue virus, a serious threat to the livestock industry in the US, is one example of a vector-borne disease that could be carried northward with migrating insects¹⁴.



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