Niagara Agriculture
Municipal Learning
Network

10 FACTS ABOUT CLIMATE CHANGE AND AGRICULTURE

1. What is climate change?

Climate change refers to long-term shifts in temperatures and weather patterns. Although these shifts may occur naturally, since the 1800s, human activities have been the main driver of climate change, primarily due to activities like burning fossil fuels[i], and agriculture.[ii] These activities generate greenhouse gases that make the earth warmer[iii] by trapping the sun's heat, raising temperatures, and consequently impacting the environment, human health, and the economy[iv].

2. Agricultural greenhouse gas emissions contribute to climate change

Crop and animal production are examples of agricultural activities that influence a series of physical, chemical, and biological interactions between the Earth's surface and the atmosphere.[v] Agricultural activities such as crop and livestock production result in the release of three primary greenhouse gas emissions: methane (CH4) from ruminant livestock belching and manure; nitrous oxide (N20), which is released from soils as a result of the application of synthetic nitrogen fertilizers and manure; and carbon dioxide (CO2), which is emitted during fossil fuel combustion in the manufacture and use of farm machinery[vi] , in the manufacture of agrochemicals, and the conversion of land to agriculture production are all examples of indirect emissions from agriculture.[vii] Crop and livestock production account for 10 percent of greenhouse gas emissions in Canada[viii] , and 5 percent of emissions in Ontario.[ix]

3. Climate change is linked to food insecurity

Future food insecurity is projected to be significantly exacerbated by climate change, raising food prices, and decreasing food output.[x] Climate conditions such as rainfall and temperature primarily influence food production and hence food security through impacts on water yields and flows. Other climate-related factors that can affect food production include impacts on freshwater, biodiversity, soil degradation.[xi] As energy prices rise due to attempts to combat climate change, food may become more expensive. In addition, the water needed for food production may become scarce due to droughts and increasing crop water demand. Also, as some regions become climatically unsuited for production, competition for land may increase.

4. Climate change presents opportunities and challenges for agriculture

Agricultural production is highly dependent on weather and climate.[xii] While the weather has always presented a challenge for farmers, climate change adds to the uncertainty.[xiii] Climate change is expected to impact Canada's agricultural sector in several ways. Rising temperatures, longer growing seasons, shifting precipitation patterns, and a rise in the frequency and severity of extreme weather events present both opportunities and challenges for Canadian agriculture.[xiv]

5. Warmer temperatures present new opportunities for agriculture

Weather statistics across Canada show that since 1998, the average yearly temperature has increased.[xv] The length of the growing season is a significant factor influencing plant growth. In Ontario, warmer weather is expected to lead to a longer growing season with more frost-free days, fewer instances of cold stress, and less winterkill. These could boost productivity and open up new prospects for expanding cultivation of warmer-weather crops like corn and soybeans in more northern regions of the province.[xvi]

6. Extreme weather events will impact crop and livestock production

The relationship between climate change and more frequent and severe weather events has been established by scientists.[xvii] Some of these extreme weather events include hurricanes, blizzards, storms, heavy rainfall, flooding, heat waves, droughts, and wildfires.[xviii] Livestock operations may be affected as extreme weather could affect livestock health and result in reduced milk, egg, and meat production, as well as the loss of livestock. These weather events may result in damage to crops,[xix] and crop yields could be as much as 50% lower than they would be under typical growing conditions.[xx] Droughts and intense rainstorms in the western provinces have caused poor grain harvests. In Prince Edward Island, challenging growing conditions have left potato growers searching for new varieties that can endure extreme weather. Grape growers in Ontario have also been affected by early frosts.

7. Wetter springs pose a challenge for planting activity

In most of Canada, summers are expected to get hotter while winters become milder. However, it is anticipated that springs will become wetter. For agricultural operations, this presents a difficulty because wetter than normal springs could lead to waterlogged fields, increased soil erosion and nutrient runoff, as well as a delay in seeding and planting activities.[xxi]

8. Climate-induced extreme weather threatens Ontario's agricultural infrastructure

Climate change can have both short-term and long-term effects on agricultural infrastructure. In the short term, extreme weather events like droughts, floods, and heat waves can damage infrastructure such as irrigation systems, storage facilities, and transportation networks. In the long term, rising temperatures and changes in precipitation patterns can make certain areas less suitable for certain crops, requiring farmers to adapt or move to different regions.[xxii] According to the Financial Accountability Office of Ontario (FAO), extreme weather events in Ontario could cost municipalities millions of dollars more in the future if infrastructure is not modified to withstand the effects of climate change. For example, the FAO reports that Ontario municipalities may need to spend an additional $700 million annually to maintain stormwater and wastewater infrastructure.[xxiii] Extreme rainfall could cause runoff from stormwater and wastewater which could potentially introduce pollutants, contaminants, and debris into irrigation systems.[xxiv]

9. Canadian farmers are contributing to climate change adaptation and mitigation[xxv xxvi]

Although agriculture contributes to climate change and is especially susceptible to climate change's effects, it is well-positioned to contribute to the solution. An essential first step in addressing the climate crisis is adapting agricultural operations to the changing environment, which requires a significant technological, societal, and economic shift to reduce greenhouse gas emissions. These changes are geared towards sustainable practices like improving soil health by increasing its organic carbon through no-tillage, crop rotation, and using cover crops. According to the 2021 Census of Agriculture, approximately 65% of farms in Canada are participating in climate-smart sustainable practices.[xxvii] For 20 years, Canadian farmers have kept their emissions steady while almost doubling production, resulting in a 50% reduction in the intensity of greenhouse gas emissions. Through organizations like the ***Farmers for Climate Solutions***, Canadian farmers are forming coalitions that aim to make agriculture part of the solution to climate change.

10. Public policy supports climate-smart agriculture

The Canadian government is collaborating with farmers, scientists, and other stakeholders through Agriculture and Agri-Food Canada's Agricultural Climate Solutions (ACS) initiative to develop projects that invest in natural climate solutions that reduce Canada's environmental impact and increase climate resiliency. The ACS program is a three-year, $200 million fund (2021-2024) that helps farmers implement beneficial management practices (BMPs) that store carbon and reduce greenhouse gas emissions in the areas of nitrogen management, cover cropping, and rotational grazing practices.[xxviii] The federal government has set a fertiliser emissions reduction target of 30% below 2020 levels as part of its plan, ***A Healthy Environment and a Healthy Economy.***[xxix] Genome Canada has launched the Climate-Smart Agriculture and Food Systems initiative, a $30m program focusing on research and agri-innovations that reduce the carbon footprint of Canada's food production systems.[xxx]

Endnotes

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