

Towards Climate and Environmental Resilience in Canadian Agriculture

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Recent Findings on Climate Change Impacts in Canada

Climate change is impacting farmers today and agriculture impacts the environment.

• Increased risks and some potential benefits.

Future projections (2030 and beyond) include:

- More extreme heat, less extreme cold, longer growing seasons, earlier spring peak streamflow, and some increased in precipitation overall, but drier summers.
- More frequent and intense droughts and greater soil moisture deficits across the southern Canadian Prairies and interior British Columbia.
- More frequent and intense temperatures will increase the severity of heatwaves and contribute to increased drought and wildfire risks.

Increasing pace and severity of climate change will require more support for adaptation planning.



Climate Impacts on Agriculture Sector



impacting crop yields, crop and

livestock health, and increased

risk of contamination and runoff

Need to be more proactive and build back smarter and better, lessen disruptions and increase recovery More frequent and intense droughts will lead to increased soil health risks, water shortages, livestock mortality, reduced yields, and increased demand for irrigation and drainage

Solutions – Areas of Focus

Evaluate and Demonstrate Farm Level Practices

Precision Agriculture; enhanced water management; natural climate solutions.

Develop Decision Support Tools and Planning

• Regional adaptation plans; agricultural pest forecasting; irrigation scheduling; Species at risk assessment modules.

Landscape/Regional Analysis and Monitoring

• AgriEnvironmental Indicators, Soil Moisture Monitoring Network, Drought Watch, Climate Impact on Crop Suitability.

Transformative Science and Technologies

 Climate resilient crop varieties, alternative pesticides, vertical farms; smart-fertilizers



Case Studies and Success Stories – Adaptation Research

Canadian research helps farmers to adapt to changing conditions for over 100 years:



AAFC has a history of research exploring various climate-resilient cultivars including traits on drought resistance and flooding stress, improved nutrition under higher carbon dioxide and disease resistance. Research on perennial forages is leveraging native plant species to mine these previously-unexplored genetic resources for their climate adaptation potential.



Support for food production and food security in Northern Canada, including projects that will help this region adapt to changing climates. This includes vertical farming (potential for food production in northern greenhouses), and sustainable northern agriculture production systems.





- Researchers are exploring innovative solutions to help farmers adapt to the increased likelihood of extreme weather. Solutions such as controlled tile drainage to manage water levels in their fields, and intercropping can help to protect soil from becoming eroded by heavy rain.
- Irrigation and water conservation technologies and practices, such as variable rate irrigation technology, promoting the increased adoption of irrigation scheduling technologies, and increased water-use efficiency in the horticulture sector.



Case Studies and Success Stories – Decision Support Tools

• Tools to help farmers adapt their operations to climate change:



- The Drought Watch website <u>www.agr.gc.ca/drought</u> is AAFC's main method of outreach for a suite of agroclimate data, information and tools. Users can access, view and use a variety of products, many of them interactive and map-based.
- A capacity to forecast the potential for drought a month to three months ahead is highly desired. Canada is developing Drought Outlook in collaboration with US partners, to generate monthly and seasonal outlooks for droughts across Canada.



Soil moisture is critical in agriculture, providing water for crop growth as well as controlling soil health and fertility. Canada is working to develop innovative ways of mapping surface and plant root zone soil moisture to monitor drought or excess water, and to predict yields.



Publicly-available software and application tools include the Computer Centre for Agricultural Pest Forecasting, which can predict the development of insects and diseases based on weather data, and advising farmers on optimal timing for pest control approaches to protect crops; and Holos – a simple user-friendly model that helps producers green their agriculture operations by monitoring, and adjusting farming practices to lessen GHG's.



Increasing Need for Science and Innovation

We don't have all the solutions needed

- Transitioning to a net-zero economy, prepared for future climate challenges.
- Balancing demands to increase food production, while maintaining and improving environmental issues.
- Understanding the trade-offs between maximizing production efficiencies and reducing impacts.

New and expanded areas of science and collaboration are required



Key Messages

Climate impacts on the agriculture and food sector are being felt today, and will intensify in the future, exacerbating water, land and biodiversity issues.

Need to transition to be more proactive and less reactive – this is key to increasing preparedness to future extreme weather events and recovery from disasters.

Canada is well-positioned to build on past successes to meet the challenges in developing climate-resilient agriculture.

Science and knowledge transfer activities are vital to meeting the challenge. Canada will collaborate with our international partners to enhance the resilience and productive capacity of agricultural production systems around the world.



Thank you

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