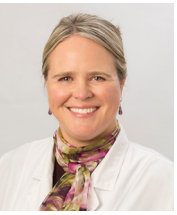
Regenerative and Sustainable Agriculture for Climate Change Adaptation and Carbon Sequestration: Rebuilding Soil Health and Increasing Crop Productivity of Canadian Potato Production Systems



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To ensure the long-term viability of agricultural operations, this research activity is using regenerative and sustainable agricultural practices (RSAPs) to study soil degradation and loss of biodiversity caused by intensive farming practices. Healthier soils are capable of supporting enhanced plant growth and higher crop yields.

RSAPs being studied include cover cropping, soil amendments and forages for livestock grazing. These practices will increase soil health through carbon sequestration, biodiversity and reductions in greenhouse gas emissions.

This research activity will provide a socio-economic study to understand the challenges and costs of implementing RSAPs. Knowledge, technologies and a support network are being supplied to help growers use sustainable practices effectively. Growers are collaborating with each other and experts. Trials are being conducted across diverse pedoclimatic conditions in Canada. A decision tool for growers to evaluate what RSAPs will work in their operations will be developed.

KEY TAKEAWAYS:

- Potato growers who will be evaluating RSAPs on their farms in Alberta, Manitoba, Ontario, Quebec, New Brunswick and Prince Edward Island were identified in 2023; growers in Manitoba and P.E.I. started trials.
- At McCain Foods Farm of the Future in New Brunswick during the 2023–24 growing season, two trials were planted and harvested. Soil, plant and greenhouse gas emission samples were taken during the growing season. Potato yields were measured. One potato field had three management zones laid out based on previous data, with soil samples collected to measure soil properties and potato yields.
- During the 2023 growing season, a field trial at the Agriculture and Agri-Food Canada Harrington Research Farm was in its second forage year. The above-ground biomass of the forages was measured, with the field plowed in the fall to incorporate the cover crops. It will be seeded to potatoes in 2024.
- Two trials in Quebec were planted to potatoes in 2023. In the fall, soil samples were collected to measure the baselines for physical, chemical and biological properties. Potato yields and soil-borne diseases were measured.
- A trial in Ontario was conducted during the 2023–24 growing season to investigate different cover crops and the use of fumigation

A group does soil sampling in a field under pasture at McCain Foods Farm of the Future in New Brunswick.
Photo credit: McCain Food's Farm of the Future

An experimental potato field design made by Stephanie Arnold with the University of Prince Edward Island for the research activity.
Photo credit: Stephanie Arnold with the University of Prince Edward Island