

Can the Agricultural Sector Expand in a Carbon Responsible Way?



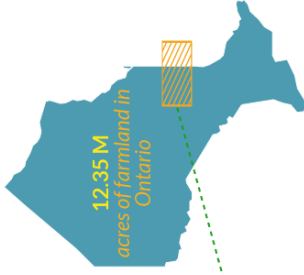
The Premise

There is great potential for agricultural production to

GROW...

by tapping

into the ~4.4 M acres suitable for cultivation in the Great Clay Belt (GCB)¹



This would come in addition to closing yield gaps on land already in production

... But reducing agriculture's 8% of Ontario's greenhouse gas (GHG) emissions is necessary to realize this potential sustainably²



Why is there interest in expanding production in northeastern Ontario?

1

Environmental Change

- Northern Ontario average annual temperatures are projected to increase as much as 3.7 C by the 2050s³

2

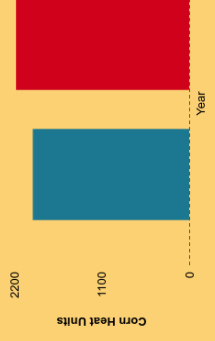
Northern Food Access

- Localization of food production in areas that have limited access to healthful foods
- Potential for larger scale production and greater diversity of crops

3

Economic Potential in the North

- Only 1.4% (approx.) of GCB has been developed for agriculture⁴
- Price of land in NE Ontario is approximately 10% of that in S Ontario⁵



What is the current state of carbon management in Ontario agriculture?



Currently, the majority of Ontario's agricultural soils are losing carbon to the atmosphere⁶

3 Mt CO₂ eq projected increase from Canada's agricultural production from 2016 levels by 2030⁷



The majority of these emissions are from crop production, while emissions from animal production and on-farm fuel use are projected to decrease

If agricultural expansion and intensification continues under these conditions there are risks in...

Advancing soil degradation

Soil health and conservation could continue to worsen in Ontario

Exacerbating Climate Change

Expansion can eliminate existing carbon sinks and more land in production may increase emissions

Source: OMAFRA 2018

! What can be done?

Improving soil health is part of Ontario's Climate Change action plan, but there is limited direct incentives or support for agricultural producers to reduce GHG emissions and sequester carbon⁸



Uncovering potential and mitigating risk

My research will test the ecological and economic impacts of GHG management mechanisms that could facilitate carbon responsible agriculture and its expansion in Ontario, such as...



Cost-shared funding programs
Producer participation in carbon offsetting
Performance-based incentive