

How soil carbon can help tackle climate change

May 13 2019, by Derek Lynch



Credit: AI-generated image ([disclaimer](#))

Maintaining soil organic matter is critical to tackling climate change because soil organic matter is rich in carbon. Soil carbon is also the keystone element controlling soil health, which enables soils to be resilient as droughts and intense rainfall events increasingly occur.

Given this tremendous importance of [soil carbon](#), are [economic incentives](#) and programs helping Canadian farmers maintain and enhance soil carbon on their farms?

On the Prairies, farm soil carbon levels have stabilized or increased over the past few decades, largely as a result of adoption of no-till cropping, which avoids disturbing the soil while growing a crop. In Eastern Canada, however, [most estimates suggest that the intensity of crop production](#) (especially reduced use of forage crops) is causing soil carbon levels to decline. This situation is made more challenging by the fact that in higher moisture regions such as Eastern Canada and British Columbia [no-till cropping does not enhance soil carbon](#). This [contrasting soil carbon performance of Eastern and Western Canadian farms](#) could even be a politically sensitive issue.

My research examines how different farming systems and cropping practices influence soil carbon and soil health. But it is increasingly evident that economic incentives are as important as technical approaches in developing solutions to this issue. Which policy tools, taxes or credits are needed to assist farmers, including those in Eastern Canada, prevent further soil carbon losses and move to a more positive soil carbon status?

Carbon credit markets

Some voluntary carbon credit markets such as [Nori](#) and [Puro](#) are primarily interested in supporting a reduction of current atmospheric carbon dioxide levels. They provide a marketplace for [carbon removal certificates](#), whether the CO₂ reduction is achieved by industrial methods or biological methods such as agriculture.

The funds raised support carbon farming initiatives globally. Farmers are paid where net gains in soil carbon can be verified.

These voluntary (that is, not driven by government regulation) carbon credit markets do not, however, support farms making headway in reducing their soil carbon losses.

Such a limited approach to carbon credits, if widely adopted by voluntary markets, would be unfortunate. Avoiding continued loss of soil carbon, which is often eventually accompanied by the irreversible loss of the soil itself, is critical to global efforts to tackle global [climate change](#).

Carbon taxes

On April 1, 2019, the Canadian government [launched a national carbon tax on CO₂ pollution from fossil fuel use](#), commencing at \$20 per ton of CO₂. This tax will be applied in provinces that don't have some other economic or pricing mechanism to reduce fossil-fuel CO₂ emissions.

The impact of this carbon tax on consumers is much debated, but the impact on farmers has been much less discussed. Some have argued that [the additional costs of farm inputs from a carbon tax will be difficult to recover by farmers](#). Indeed, one of the few such studies found [the carbon tax in B.C., in place since 2008, negatively affected farm economic performance](#).

Reduced farm profitability would limit farmers' options in adopting new soil management practices, or less intensive cropping, to maintain and enhance soil carbon levels. A recent report by the Senate's Standing Committee on Agriculture and Forestry [assessed the impact of climate change and a carbon tax on agriculture](#).

The study recommended farm fuel costs be exempt from the carbon tax. The report also highlighted the critical need for new mechanisms (offset protocols) to determine soil carbon credits for Canadian farmers in different agricultural sectors, and the need to characterize in detail

current farm soil carbon levels in Canada.

Cap and trade markets

Cap-and-trade markets to reduce CO₂ emissions, such as those in [Québec](#) and California, have generated substantial [green funds for climate change programs](#). In both jurisdictions, green fund dollars support on-farm projects for farmers to test out different farm practices that show promise for improving soil carbon levels.

Details on these programs were outlined and discussed at the excellent [recent symposium organized by Regeneration Canada](#). Regeneration Canada's mission is to support farmers adopting climate-smart farming and to bridge the gap in consumer awareness of these issues and farm challenges.

Reducing emissions

Declining soil carbon levels and associated losses in soil quality and soil productivity are a critical issue globally. Farmers, including those in Eastern Canada, are challenged in understanding the complex relationship between their [farm](#) management practices and their soil carbon levels. They also need support to test out and adopt changes in cropping practices to reverse often declining [soil carbon](#) levels.

A combination of innovative economic programs, incentives and credits, supported by all stakeholders including consumers, are needed to support farmers in this key challenge of a generation.

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