June 7-12, 2026
Nanjing, China
https://www.23wcss.org.cn/

Cover Copping for Soil Health Improvement in North-western Canada

Bharat Shrestha[1*], Bishnu Pandey[1], Kirsten Hannam[2], and Shabtai Bittman[3], Akim Omokanye[4]

[1] Agriculture and Agri-Food Canada, Beaverlodge Research Farm, Beaverlodge AB T0H 0C0
[2] Agriculture and Agri-Food Canada, Summerland Research and Development Centre, Summerland, BC V0H 1Z0
[3]Agriculture and Agri-Food Canada, Agassiz Research and Development, Centre, BC V0M 1A2
[4]Peace Region Living Lab, PRFSA, 401-114 Ave Dawson Creek, BC V1G 2Z7
*bharat.shrestha@agr.gc.ca

ABSTRACT

Climate change is bringing opportunities and challenges to the agricultural sector in northern Canada, where the rate of warming is three times higher than the global rate (Bush and Lemmen, 2019). In the context of climate change, agricultural management mimicking nature is a climate-resilient approach for sustainable agriculture. Recognizing the importance of farmers' role in agricultural sustainability, the Canadian government launched the Peace Region Living Lab (PRLL, 2022-2027) to test better management practices (BMPs) and promote their wider adoption. Farmers in this Region are practicing cover cropping as one of the BMPs to improve soil health. Soils of this region are clay-rich and acidic in nature, with many challenges to crop production and soil health improvement. We assessed the effect of cover cropping on soil health in producers' farms participating in the PRLL, using soil samples collected in the first year of the project. Key soil health parameters, namely soil organic carbon (SOC) concentration, aggregate stability, and mineralizable carbon, were measured from the top (0–15 cm) soils. The SOC was determined by dry combustion using a LECO CN828 elemental analyzer. Aggregate stability was assessed using the SLAKES smartphone image-analysis application. Mineralizable carbon was quantified as CO_2 evolved over 24 h after rewetting air-dried soils, using an infrared gas analyzer (PP Systems' EGM-4). The SOC content ranged from 2.74 ± 0.81 to 3.18 ± 0.73% in cover-cropped farms, whereas 3.03 ± 0.57 to 4.01± 0.45% in conventionally cropped farms. Overall aggregate stability index was 0.61 ± 0.12 and did not differ between cover-cropped and conventional farms. Mineralizable carbon was numerically higher under conventionally managed farms than in cover-cropped farms, but the difference was not statistically significant. These results might indicate the fact that farmers have recently started cover cropping as a BMP to improve soil health in farms with poorer soils than the conventionally cropped, better farms. Effects of cover cropping will be re-assessed in soils collected at the end of the project period (2027) to determine clearly whether cover-cropping truly has an effect on soil health improvement in the Northwestern region of Canada.

Acknowledgments (if any)

This project was funded by the Agricultural Climate Solution- Living Lab Initiative of the Agriculture and Agri-Food Canada. Producers, applied research associations and field team made this project possible through their active participation.

References (if any)

Bush, E. and Lemmen, D.S., editors (2019): Canada's Changing Climate Report; Government of Canada, Ottawa, ON. 444 p.