

Masters Projects: Characterizing the carbon footprint of organic crops produced in the Western Canadian, Ontario or Quebec/Maritimes Regions

Funding is available to support three (3) Masters students at a rate of \$20,000 annually for two years (plus possible additional paid internship for summer 2020)

Organic agriculture continues to be among the fastest growing sub-sectors of the agri-food industry in Canada and around the world. Currently occupying ~330,000 ha, the production of organic field crops is of central importance in the context of Canadian organic agriculture as well as the production of a wide range of secondary organic products (e.g. breakfast cereal, bread, animal feeds, etc.) derived from field crops.

Organic agriculture is often perceived to be, and promoted as, a climate-friendly alternative to conventional agriculture. However, farm size, production practices, yields and efficiencies can be much more heterogeneous than in conventional agriculture. While some specific organic practices may be relatively climate friendly, others may not be. The implications of this heterogeneity for the greenhouse gas (GHG) emissions of Canadian organic field crops are not well understood. Moreover, a robust comparison of the GHG emissions from organic products to those from conventional, non-organic field crop production systems in Canada, taking into account regionally-specific production conditions and efficiencies, has not been possible to date.

As part of a multi-institutional project aiming to quantify the net GHG emissions for major organic field crops Canada-wide, we are seeking three students, one student each to be enrolled in the:

- MSc program based at the University of British Columbia – Okanagan campus under the supervision of Dr. Nathan Pelletier (will assess Western Canadian organic cropping systems),
- MES program based at the University of Waterloo under the supervision of Dr. Goretty Dias (will assess Ontario-based organic cropping systems), and
- MES program based at Dalhousie University under the supervision of Dr. Peter Tyedmers (will assess Quebec- and Maritime province-based organic cropping systems).

Though based at three different institutions, the students will collaborate closely with each other throughout their programs and additional supports are available to help facilitate this interaction. Using a common approach (life cycle assessment) to characterize farming activities and estimate emissions from both on farm and associated upstream activities (e.g. equipment and fuel production and delivery, nutrient procurement strategies, management of crop residues, etc.), as well as potential sinks of carbon on farms, our study will provide the first, nation-wide profile of greenhouse gas emissions across the organic field crop sector in Canada.

Successful candidates for these fully-funded research-based Masters opportunities will ideally have backgrounds in agriculture and/or agricultural engineering, industrial ecology, or environmental science/studies, and a strong interest in sustainable food systems research. All successful candidates will possess a driver's licence that is valid in Canada and access to a vehicle would be an asset. Candidates interested in working in Quebec and the Maritime provinces must be functionally fluent in both French and English.

Successful candidates will each begin their respective Masters programs in September 2020. However, they may also be eligible for a paid internship during summer of 2020 to begin data collection prior to formally starting their Masters program.

For more information and instructions for applying to the:

- MSc Program at UBC-O, please visit the "Prospective Students" page at www.prismlab.weebly.com.
- MES program at Waterloo, please see <https://uwaterloo.ca/school-environment-enterprise-development/graduate/mes-sustainability-management> and contact Goretty Dias at gdias@waterloo.ca,
- MES program at Dalhousie, please see <https://www.dal.ca/academics/programs/graduate/environmental-studies.html> and contact Peter Tyedmers at peter.tyedmers@dal.ca.