Call for Proposals: Water use in Canadian Agriculture

Synopsis of Opportunity

The Canadian Agri-Food Policy Institute (CAPI) is looking forward to partially funding up to 6 Ph.D. candidates whose researches focus on the various aspects and implications of water use in the agricultural and agri-food sectors. Water is a critical component of Canada's natural capital. Although it is a topic of increasing interest, there is a need for further research and transdisciplinary studies in the field of water management in agriculture.

Context

Agriculture and agri-food sector was selected as the pilot sector to test the growth strategy that aims to increase Canada's agri-food exports to $75 billion by year 2025, which was set out by the Advisory Council on Economic Growth to the Government of Canada. At the same time, the next Federal, Provincial and Territorial (FPT) Policy Framework is charting the way forward on trade, innovation, environment and the Business Risk Management (BRM) suite. Pan Canadian National Food Policy is focusing on increasing access to affordable food, improving health and food safety, conserving our soil, water, and air, as well as growing more of our high-quality food. These recent developments put new pressures on Canada's natural capital and create new demands to secure a sustainable growth. Canada's commitment to meet our Greenhouse Gas (GHG) emission reduction targets adds another level of complexity to the environment in which agriculture and agri-food sector operates.

A 2017 survey of over 2,000 Canadians found that 45 per cent of respondents rated water as Canada's most valuable natural resource, compared with 24 per cent who chose oil and gas, 14 per cent who chose agricultural land, 13 per cent who chose forests, and 4 per cent who chose another resource (RBC Blue Water Project, 2017). In the same survey, 91 per cent said that water is part of Canada's national identity and natural heritage (RBC Blue Water Project, 2017).

Water plays a crucial and pivotal role upon which agriculture depends. As a result, agricultural activities constitute a significant source of pressure on water resources. This relational interaction between the two subsequently leads to potential risks for water quality and quantity, as well as agricultural productivity and sustainability.

In addition, four distinct aspects of agricultural water use in Canada stand out:

- While 70 to 80 per cent of global harvested area is fed by precipitation in the form of rain and snow (de Fraiture & Wichelns, 2010; Molden et al., 2007b), this ratio is more than 97 per cent of Canadian harvested area (AAFC, 2011c). Other agricultural activities, such as irrigation and intensive livestock watering, withdraw water from rivers, lakes, reservoirs and groundwater;
- Agriculture accounts for a small component of overall water withdrawal and use in Canada, about 5% (ECCC, 2013). However, it is the largest consumer of water in that it does not return about 80% of water to its original source (ECCC, 2013);
- The majority of agricultural lands are concentrated in two main areas: south-east region (southern Ontario and Quebec), and the Prairies (southern Manitoba, Saskatchewan and Alberta) (Statistics Canada, 2011). Yet, most of Canada's fresh water is flowing north

(Sprague, 2007), which is opposite way of agricultural lands. Furthermore, the majority of Canada's population is concentrated in the south of the country (Statistics Canada, 2007), which potentially creates a spatial availability issue; and

- Virtual water is the amount of water consumed in the production process of a good or a service (Council of Canadians, 2011). A significant amount of water is therefore exported and imported within agricultural products. While Canada remains a net importer of virtual water in agricultural goods, the virtual water exported in 2010 reached 78 billion m^3 (Schreier and Wood, 2013). Therefore, virtual water is an indicator that could be adopted to encourage sustainable use of water, especially by focusing on the efficiency in the use of four distinct types of water: blue, green, grey and black (Schreier and Pang, 2014).

The Canadian context regarding water and agriculture is thus uncommon: Canada remains a major agricultural producer and exporter, requiring therefore significant amounts of water. As a result, one could ask the following question: how can Canada become a leader in sustainable agriculture, by conserving its natural capital, but yet aiming at being a preeminent actor in the agricultural markets?

Creating a Trans-Disciplinary Network of "Water in Agriculture" Researchers

Given the complexities of the issues and plurality of sources of information and expertise, CAPI proposes to develop a transdisciplinary network to study water related issues in agriculture. Future growth in global demand for food and Canada's agri-food growth strategy (Advisory Council on Economic Growth, 2017) could add new pressures on natural capital, including water. Development of policies and strategies towards sustainable management and use of natural capital, in general, and water in agriculture, in particular, will be increasingly knowledge intensive.

CAPI's objective is to develop expertise, original tools and strategies to address issues arising from the interactions of agricultural production and water use, including both quality and quantity related issues. As a policy research institute, CAPI is looking forward to facilitating dialogue and ultimately to coordinating the production and dissemination of reports dedicated to this topic. By the nature of water issues and their implications on all the aspects of life, a transdisciplinary approach, which will include expertise of a multidisciplinary team merged with practitioners, to water related research is critical to not only the future of agricultural production but also to quality of life in Canada.

In order to encourage innovative and multi-disciplinary learnings, CAPI is seeking a set of Ph.D. candidates from both natural and social sciences, with diverse specialities related to agriculture, such as policy, economics, hydrology, agriculture and biological sciences, geography, law, etc. CAPI, as a partner to this project, will (1) provide the necessary venue for transdisciplinary research and interactions, and (2) take research results to policy makers and stakeholders towards integration of knowledge into policy and strategy development.