

***Food Security in the Canadian North:
Recent Advances and Remaining Knowledge Gaps and Research
Opportunities***

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Abstract and Methodology

This summary presents food security-related research gains, gaps and opportunities gathered by the Canadian Polar Commission in fulfillment of its mandate to monitor and communicate polar knowledge in Canada and around the world. It is focused on the Canadian North, comprising the Yukon, Northwest Territories, Nunavut, Nunavik, and Nunatsiavut, during the seven-year period beginning with the International Polar Year (IPY) in 2007. The following observations are organized under recent advances and knowledge gaps and research opportunities. They are based on semi-structured interviews with northern housing research experts and practitioners, which have been supplemented and validated with both peer-reviewed and 'grey' literature.

Overview

- The 2009 report by the Arctic Council's Arctic Monitoring and Assessment Program *Human Health in the Arctic* outlines some of the key factors affecting food security (i.e., access, availability, and use), including poverty and unemployment; the extent to which food sharing networks are in place; climate change; access to the land for subsistence harvesting; traditional knowledge; costs, availability and quality associated with store-bought foods and country foods (Arctic Monitoring and Assessment Program, 2009).
- Subsistence harvesting is important for many Aboriginal communities not only for food, but also as a way of life and a means to transfer culture and community values (Nickels et al., 2006; Schuster et al., 2011).
- There is a high cost of food associated both with transporting food from southern Canada to the North and with harvesting country foods given the high and rising costs of fuel, equipment, preparation and storage (Damman et al., 2008; Bolton et al., 2011). Challenges with respect to accessing food are experienced by many Aboriginal peoples in the North, especially those living in some remote communities who are unemployed or underemployed with low incomes (Lambden et al., 2006).
- Access to safe and nutritious food is fundamental to a healthy lifestyle. Food security issues can impact a multitude of health-related areas such as obesity and diabetes, as well as mental and spiritual health if unable to participate in some traditional activities (Kuhnlein et al., 2004; Guyot et al., 2006; Furgal & Seguin, 2006; Lambden et al., 2007; Council of Canadian Academies, 2014). There has been a transition away from country foods in the Inuit regions to foods transported from the south, which can have less nutritional value (Lambden et al., 2006; Aboriginal Affairs and Northern Development Canada, 2012a; Canadian Polar Commission, 2012).
- Climate change is having an impact in many areas of the North on the availability, accessibility and quality of key country food sources (Meakin & Kurvits, 2009), and on the ability to safely access harvesting areas as a result of reduced ice cover, low water levels, shorter winter season, and less predictable weather conditions (Ford, 2009a; Ford & Pearce, 2010).
- There is concern regarding the potential loss of traditional knowledge and skills that is important for food security in terms of hunting, predicting environmental conditions and carrying out sustainable harvesting activities (Furgal & Seguin, 2006; Ford, 2009a; Kativik Regional Government & Makivik Corporation, 2010; Bolton et al., 2011; Allard et al., 2012).
- While it is recognized that country foods are healthy and nutritious, the presence of contaminants can be a concern (Meakin & Kurvits, 2009), as well as zoonotic diseases (Prowse & Furgal, 2009).
- It can be difficult to monitor food security across the Arctic and to conduct comparisons given the large and varying number of indicators used which can limit comparability (Nilsson et al., 2013; Council of Canadian Academies, 2014).

Recent Advances

- The Council of Canadian Academies assessed the state of knowledge regarding Aboriginal food security in Canada's North. It was found that there is a food security crisis that has long-term implications for the health and well-being of Aboriginal Northerners (Council of Canadian Academies, 2014).
- An international workshop was held in 2012 to identify some universal, accessible and informative summary measures that could be used to better monitor and understand changes in food and water security in the circumpolar Arctic over time. Some of the food security indicators that were promoted included traditional food proportion in diet, healthy weight, and monetary food costs (Nilsson et al., 2013).
- The Integrated Regional Impact Study report for Nunavik and Nunatsiavut includes a number of important findings pertaining to food security including declining populations of large caribou herds, Arctic char as a food resource that is at risk, and the predicted decline in berry production with increased shrub cover (Allard & Lemay [Eds.], 2012).
- A symposium was held in 2013 to identify food security priorities for Nunavut in the areas of country food access, market food access, policy and legislation, life skills, local food production, and programs and community initiatives (Government of Nunavut & Nunavut Tunngavik Inc., 2013) to inform the *Nunavut Food Security Strategy and Action Plan 2014-16* (Nunavut Food Security Coalition, 2014).
- There is increased understanding of the significance of country food from a physical and mental health perspective (Lambden et al., 2007; Owens et al., 2012).
- The Inuit Health Survey conducted during the International Polar Year (IPY) facilitated an assessment of the prevalence of food insecurity in Inuit households, which found that Nunavut experienced the highest rates (Rosol et al., 2011). It was also found that food insecurity was associated with other socio-economic issues such as overcrowded housing (Huet et al., 2012).
- The *Dimensions of Social Inclusion and Exclusion in Yukon*, 2010 report, which examined conditions that lead to social inclusion and exclusion and poverty, provided a better understanding of food security in the Yukon. For example, it was found that young people, Aboriginal people and those living in more rural Yukon were among those who were more affected by food insecurity (Health and Social Services – Yukon Government, 2010a).
- There is increased understanding of the ways in which traditional food systems are changing and the associated implications for communities, as well as increased understanding of the changing dietary habits of Northerners and associated nutrient intake (Ford et al., 2012). The Inuit Health Survey enabled better understanding of the impacts of the shift away from country foods to foods transported from the south, which is contributing to health problems for Inuit with respect to nutrition and chronic illness (Huet et al., 2012; Canadian Polar Commission, 2012). An evaluation of nutritional status and nutrient intakes by country food and food

- security status among Inuit found that with food insecurity and the transition away from country foods, there are negative implications for the nutritional status and diet of Inuit, which can lead to nutrition related diseases and conditions (Egeland et al., 2011).
- Food security research in Nunavut noted high hunting costs and changing lifestyle and cultural practices as barriers to food security and recommended more support for hunting and community freezers and better access to market food that is less expensive and higher in quality (Chan et al., 2006).
 - Numerous projects in the areas of human health research; environmental and community-based monitoring and research; and communication, capacity and outreach have been undertaken with funding from the Northern Contaminants Program (NCP) in order to reduce and/or eliminate contaminants in country foods and provide information to inform decision making with respect to food use. The NCP's *Synopsis of Research Conducted under the 2011-12 Northern Contaminants Program* provides more information regarding some of the more recent projects that have been undertaken. Contaminant monitoring is also carried out through the NCP program to inform international agreements that aim to reduce trans-boundary and long-range contaminant levels (Aboriginal Affairs and Northern Development Canada, 2012b).
 - Community-focused food security related research has led to a number of research gains. For example, in Igloolik, NU, there is increased understanding of: 1) how climate change and associated impacts in terms of weather and sea ice are affecting subsistence harvesting; and the factors that can enhance adaptive capacity such as the ability to manage risks involved with sea ice travel, or constrain adaptive capacity such as loss of sharing networks and loss of traditional knowledge and skills; and, 2) the multiple determinants of food security, including affordability and budgeting, food knowledge and preferences, quality and availability, environmental stress, less hunting activity, and costs associated with subsistence harvesting, and how these determinants interact (Laidler et al., 2009; Ford & Beaumier, 2011). It has also resulted in the development of a conceptual vulnerability-based model that can be used to assess food security-related implications of climate change in Inuit communities (Ford, 2009b).
 - Research by Mead et al. which examined food acquisition patterns and preparation behaviours of Inuit adults in Nunavut, along with psychosocial and socioeconomic factors, highlighted the importance of targeting healthy food knowledge, self-efficacy and intentions when using nutrition interventions for Inuit that aim to produce changes in behaviour (Mead et al., 2010).
 - Research has compared dietary guidelines in the circumpolar Arctic and identified some key elements for consideration when developing or revising dietary guidelines such as the provision of additional information for vulnerable groups such as those with diabetes (Jeppesen et al., 2011).

- Research by Damman et al., which included a focus on Nunavut, examined ways in which government policies and other factors that are not within the control of indigenous communities can have an impact on the transition from diets with less country foods to more foods imported from the south, noting that policies such as those which involve food aid can encourage this transition, while policies that are supportive of the culture of indigenous peoples can discourage this (Damman et al., 2008).
- A number of community-based initiatives have been developed and implemented in an attempt to increase food security such as community freezers and gardens and farmers' markets (Prowse & Furgal, 2009). Information is, however, lacking regarding the extent to which some of these community initiatives are effective (Organ, 2012; Ford et al., 2012). A case study of community food programs in Iqaluit, NU such as soup kitchens and food banks was conducted. Policy recommendations that followed included the incorporation and promotion of traditional foods; more support to ensure ongoing access to hunting equipment; education regarding how to best to store foods available at the food bank; and facilitation and preservation of sharing networks for country food distribution (Ford et al., 2012). A case study undertaken by Jennifer Organ of a past community freezer program in Nain, Nunatsiavut provided some insight with respect to key factors that should be considered with respect to how community freezers are managed in order to support food security, including supply, dependency, potential stigma or social exclusion associated with accessing food from the freezer, and the impact of operations on traditional values, in addition to more community-specific contextual factors (Organ, 2012). This community freezer program has evolved into its present form, which includes a youth outreach component. A participatory evaluation is currently underway for this program, which was established to provide access to healthy and culturally appropriate food while improving cultural connections and facilitating the transmission of harvesting skills by pairing at-risk youth with harvesters (Yaffle, 2012).
- Greenhouses have also been identified and explored as a way to provide locally grown food and promote community well being. The International Centre for Northern Governance and Development's 2012 Workshop *Northern Food Security: The Greenhouse Solution* explored community perspectives, socioeconomic considerations, greenhouse design and operation, and food production, and culminated in the Centre's subsequent release of *Guidelines for Establishing a Northern Greenhouse Project* (International Centre for Northern Governance and Development, 2013). The sustainability of northern greenhouse production was examined, including design components, technologies, management, marketing and cost-benefit considerations, as a way to create economic development opportunities and support food security in a northern, remote context (Agriteam Canada Consulting Ltd., 2013). Yukon College and Research Centre's experimental greenhouse is used to teach construction and

- greenhouse production techniques, conduct plant research and assess greenhouse technologies (Yukon College, 2012). Aurora College and Research Institute will be undertaking design work and business planning to support the development of LED-based greenhouses in the NWT (Canadian Northern Economic Development Agency, 2012).
- Larrat et al. examined the assets and limitations of a community-based program that was established in Nunavik to prevent the parasite *Trichinella nativa* that can infect walrus harvested for food. Some of the assets noted included the role of the program in both preventing trichinellosis while increasing food diversity in terms of preventing nutritional diseases, the use of community participation, and the ability to use a simple and inexpensive analytic method for rapid detection of the parasite. Some of the limitations noted include the need for more insight regarding Inuit perception of the program to better understand how they deal with meat during quarantines and the lapse in time between landing a walrus and the release of results (Larrat et al., 2012).

Knowledge Gaps and Research Opportunities

- Further research is needed to evaluate the effectiveness of federal, regional/territorial and local food security related policies and programs at the community and regional/territorial levels as well as across the North more broadly (Institute of Nutrition, Metabolism, and Diabetes, 2010). Further research is also needed to examine the connection between food security related policies and the development of chronic diseases (Damman et al., 2008).
- There is a need to establish “standardized and culturally appropriate methodologies to assess food security and insecurity” (Council of Canadian Academies, 2014).
- Further research is needed to better understand the relationship between food insecurity, food choices, and obesity among Aboriginal peoples living in the North (Institute of Nutrition, Metabolism, and Diabetes, 2010).
- There is a need for further research to better understand and address the more social related determinants of food security such as loss of traditional knowledge, lack of food preparation and budgeting skills and poverty (Government of Nunavut & Nunavut Tunngavik Inc., 2013; Council of Canadian Academies, 2014).
- The *Yukon Nutrition Framework* identifies further work needed to address food security in the Yukon including an assessment of the need and feasibility of school-based meal programs in Whitehorse and rural areas; increased nutrition screening and assessment of children and youth in Whitehorse and rural areas; and an assessment of the availability and need for community-based supports such as ‘meals on wheels’ for elders, particularly in rural areas (Health and Social Services – Yukon Government, 2010b).

- Further assessment is needed of the viability of, and measures to adapt crops to northern regions, especially in the face of climate change (Furgal, 2008; Université Laval, 2012). Identification of enhanced production or cultivation methods for berries is also needed (Kativik Regional Government & Makivik Corporation, 2010).
- Further assessment is needed of the viability of agricultural and food-processing options (e.g. aquaculture, ranching/domestication, etc.) through pilot projects (Kativik Regional Government & Makivik Corporation, 2010; Université Laval, 2012).
- With the increasing commercialization of harvesting (Ford & Beaumier, 2011), there is a need for further research to better understand and respond to the associated impacts (Government of Nunavut & Nunavut Tunngavik Inc., 2013).
- Further research is needed, including both traditional knowledge and western science, to inform sustainable wildlife harvesting levels (Allard & Lemay [Eds.], 2012; Government of Nunavut & Nunavut Tunngavik Inc., 2013).
- Further research is needed to better understand and predict future direct and indirect impacts of climate change on marine species that serve as important sources of food to inform sustainable management strategies (Prowse & Furgal, 2009; Prowse et al., 2009). Further research is also needed to identify and sustainably develop commercial fisheries opportunities (Rompkey & Patterson, 2010), and to adapt fish farming to northern environments and markets (Université Laval, 2012).
- There can be differing affordability and access related issues that pertain to country foods and foods that have been transported from southern Canada (Lambden et al., 2006). Communities also have different levels of adaptive capacity in terms of food security given differences in a range of factors such as dependence on country foods, extent of access to other food sources, agricultural viability, and nutrient levels of potential 'substitution species' (Wesche & Chan, 2010). Given the range of community-specific contextual factors that impact food security, there is a need for further development and implementation of pilot programs that have been co-designed and co-produced on a community or regional level, such as community freezers and gardens, especially those which address food security issues more holistically, combining nutrition related research and education opportunities and the transfer of traditional knowledge (Government of Nunavut & Nunavut Tunngavik Inc., 2013). Further research is also needed to evaluate the impact of both current and future community-based initiatives (Organ, 2012) and identify factors for success and lessons learned.
- Further research is needed to continue identifying and implementing effective strategies for transmitting traditional knowledge pertaining to country food (Meakin & Kurvits, 2009; Université Laval, 2012; Allard et al., 2012; Government of Nunavut & Nunavut Tunngavik Inc., 2013).

- Further research is needed regarding population dynamics and habitat productivity of species that provide significant contributions within the country food system (i.e., caribou, Arctic char, etc.) (Université Laval, 2012). Further research is also needed regarding the impact of changing food webs on contaminant exposure and the occurrence and behaviour of wildlife and marine species that are important country food sources (Arctic Monitoring and Assessment Program, 2009; Conservation of Arctic Flora and Fauna, 2010 & 2013). Further research is also needed to identify specific regional sources of contaminants that are present in country foods, as well as the impacts of climate and socioeconomic change on the safety and availability of country foods (Donaldson et al., 2010). With the invasion of new species, research is needed to identify other country food sources (i.e., “species substitution”) and examine their nutrients (Wesche & Chan, 2010). Further research is also needed regarding the impact of a warmer climate on wildlife diseases, as well as research (e.g. ecology, life cycle, genetics, etc.) and monitoring of new and emerging wildlife diseases that are zoonotic or have an effect on the wildlife population health (Prowse & Furgal, 2009; Davidson et al., 2011).
- More community-based monitoring is needed to track and assess environmental, social and economic changes affecting the food supply and the ability to safely access hunting areas for country foods in order to inform appropriate adaptation measures (Allard et al., 2012; Ford & Pearce, 2012).
- Multi-disciplinary community-based assessments of the impacts of climate change on food security are needed, with links to similar assessments on a more regional and pan-northern level to inform appropriate responses to the impacts of climate change on food security (Furgal, 2008; Meakin & Kurvits, 2009).

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