

Patterns of vulnerability:

Visualizing Northern Canadian food insecurity

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1.0 Introduction

The Canadian North is a vast expanse of mostly uninhabited tundra and ice, accounting for almost forty percent of the country's land mass. Though remote and often isolated from the rest of the country, the inhabitants of Canada's North represent an important piece of Canadian identity, culture and economy. The mostly Aboriginal population who resides in communities above the 60th parallel is a resilient community which faces unique difficulties as a result of their location. The presence of food insecurity in Canada is an issue across all provinces and territories, but especially the North. The disparity in the prevalence of food insecurity in the North compared to the South is staggering; surveys of Nunavut have reported as much as triple the amount of food insecurity among households as some provinces. This heightened insecurity in financial and physical access to the necessary food coincides with similarly elevated health and social disparities between Northerners and the general population of Canada. Food insecurity has implications on physical and mental health and wellbeing for adults, but even more so for children and their development. Also at risk is the preservation of Aboriginal traditions. The southern movement of younger generations combined with environmental factors and a shift towards market and imported diets among Aboriginal peoples is leading towards a serious cultural loss. Though the severity of the situation has been addressed through various studies, reports and government funding, there is still a downward trend when it comes to food security in Canada, and especially the North. The pattern of vulnerability therefore needs to be further addressed. A state of awareness needs to be broadened in order to provide adequate regulatory action towards the resolution of food insecurity and its implication on northern residents. This study will provide a unique look at life in the Canadian North, while advocating for a serious human rights issue currently affecting the area.

1.1 Premises

There are many government agencies, organizations and funds focused on the health and wellbeing of Canadians affected by food insecurity. The Canadian Community Health Survey (CCHS) has been collecting national data on food insecurity since 2004 through its annual Household Food Security Survey Module. The collection of the data, while optional for individual provinces and territories, provides a detailed glance at the situations in which food insecurity is occurring. Although efforts have been made to address issues of food security made known through this data collection, the past years have shown an increase in food security in almost all participating provinces and territories, especially the territories. If the methods currently in place to address and remedy this situation are not proving successful, what further can be done to increase the state of awareness, and further, provide positive action? Can more beneficial attention and action be brought to this issue through the visualization of the data? What insights can be generated through visualizing the data? The opportunity to visualize the data in a compelling narrative may provide a unique opportunity to highlight food insecurity in the Canadian North, the factors contributing to the issue, and the implications it has on the Canadian people.

1.2 Cultural & historical background

The population of Northern Canada has historically been an Aboriginal population. Though remote community locations make the availability of market and imported food logistically difficult, the Aboriginal peoples who inhabit the North have traditionally supplemented their diets through traditional hunting and gathering. Many factors, including environmental changes, improved transportation methods and—most significantly—the systematic disempowerment of Aboriginal traditions, have caused Aboriginal populations to become less reliant on the land for food. In addition to this phenomenon, factors such as the market (retail) food system, environmental warming

and rights and governance all play a role in the development of an insecure food environment in Northern Canada. While “many initiatives have addressed the food insecurity of northern Aboriginal peoples, including federal food mail programs (from the 1960s to 2011), [and] food subsidy programs such as Nutrition North Canada” (4, Aboriginal Food Security in Northern Canada), the issue still persists.

1.3 Audience

The implications and goals of this study are directed at multiple audiences. The obvious audience is individuals in positions of power in terms of regulation and governance surrounding this issue; Members of Parliament in the affected areas who are advocating for federal attention and resources; policy makers at the federal level who are in charge of the distribution of such resources. In addition, attention should be given to the affected individuals themselves. The issues being faced by Northern residents in relation to food security give them unique, first-hand insights into what processes are beneficial, which are not, and where the gaps remain for additional support. The idea of food sovereignty is therefore integral to this investigation.

1.4 Methods

Both qualitative and quantitative considerations are integral to framing the full and complex issue of Northern food insecurity. Food insecurity can be examined in the context of many contributing factors, which will be divided into qualitative and quantitative considerations as follows:

Qualitative considerations include

- demographics of affected individuals,
- cultural and traditional practices,
- regulatory issues and governance,
- market/retail food system data (logistics of transportation, etc.),

- and environmental changes.

Quantitative considerations include

- food insecurity numbers (by province and territory),
- comparison to average household size (number of family adults, children),
- comparison to average household income (type/\$),
- market/retail food system data (food cost),
- and environmental changes.

The data sources include the results from the CCHS Food Security Survey Module, as well as supplementary data collected through other Statistics Canada surveys. As suggested above, the main food insecurity data will be visualized against demographic data and data from other contributing factors. The relationships and patterns from the treatment of the data will ultimately provide an interface that can foster insights into the handling of food insecurity in the North.

2.0 Treatment

2.1 Defining key players; terminology and scope

Let's preface the investigation with a brief introduction of key terminology. Food security and insecurity are global conditions; this project works within the Canadian context of key terms in order to focus the scope of the food insecurity through a Canadian lens. Canada defines food insecurity by the definition given by the Food and Agriculture Organization (FAO) of the United Nations; in order for food security to exist, "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (United Nations Food and Agriculture Organization (1996), Rome Declaration on World Food Security, World Food Summit Plan of Action, paragraph 1, Rome: November 1996).

Available at: <http://www.fao.org/docrep/003/w3613e/w3613e00.htm>). Food insecurity therefore exists when this standard is not met. Health Canada categorizes the phenomenon into moderate food insecurity, occurring when “the quality and/or quantity of food consumed were inadequate,” and severe food insecurity, occurring when an individual “reduced their food intake and/or experienced disrupted eating patterns” (<http://www.statcan.gc.ca/pub/82-624-x/2015001/article/14138-eng.htm#n1>). The term food insecurity will henceforth encompass both moderate and severe food insecurity unless otherwise noted.

For the purposes of this study, the ‘Canadian North’ refers to Canada’s three territories: Yukon, Northwest Territories and Nunavut. Although the 60th parallel is the mainland boundary between the territories and four of the western provinces, there are geographical areas of the territories which dip below this latitude and therefore the popular phrase ‘north of 60’ is not consistent with this investigation. Regions of the global circumpolar north can be categorized into four basic levels health status, based on health indicators and differences between northern and southern, and indigenous and non-indigenous residents (AHDR, 302). Canada’s north is divided between two of these categories. Following the Nordic countries, which rank highest, the Yukon and the Northwest Territories (along with Alaska) have health statuses comparable to the Canadian national average but significant differences between indigenous and non-indigenous populations. Nunavut (along with Greenland) has a predominantly indigenous population and a large gap in health status compared to the national average, and ranks just above the Russian Arctic. Through the Canadian Constitution (1982), the indigenous people of Canada are legally referred to as the Aboriginal Peoples, and specified as including three groups: Indian, Inuit and Métis (Peoples and cultures of the Circumpolar north, 13).

2.2 Contextualization and framing on Northern food insecurity within life and culture in Canada's North

The current landscape of food insecurity in Northern Canada has emerged from an amalgamation of local determinants and external stresses (FTF) over recent decades. The integrated nature of this multi-faceted phenomenon must be broken down into its contributing components, in order to offer a contextualized and well-framed presentation of the current status of the issue before considering strategic solutions. Also at stake are the implications of food security, in both a general sense, and specific to residents of Northern Canada. The following discussion highlights the major factors that have been at play in the shaping of the current nature of food insecurity in Northern Canada; namely globalization and environmental changes, as well as the distinct local factors that stem from them, and the related implications.

2.2.1 Development and change over time

Once associated mainly with transient mining communities, Canada's north has evolved into a vibrant and increasingly significant part of the nation's social and economic spheres. The forces behind this transition most notably include "climate change and industrial development" which "continue to impact northern ecosystems and communities" (AFS, 2) in both beneficial and detrimental ways. While increased development brings modern opportunities north, a strain is felt on rural communities as youth are drawn away from traditional livelihoods to the new possibilities of the city. Modern issues associated with the recent financial and economic downturn are also prevalent in the newly developing north. The gap between those living in poor versus upper and middle income segments has been widening across Canada, but particularly in the north (RTF). Increasing commercialization puts pressure on traditionally financially unimpeded activities. As a people tied closely to nature living in an especially vulnerable

landscape, climate change can have detrimental effects on northern Aboriginal populations. Climate change acts as “a major factor in the deteriorating food and water security situation in the Arctic” (AHDR, 308) causing reduced ice coverage, changing migratory patterns of wildlife, difficulties in transportation and food storage, and a compromised opportunity for traditional hunting and gathering. As powerful catalysts for change, northern urbanization and the changing climate act as external stresses on local determinants; creating “socioeconomic and environmental changes... [putting] new groups at risk of marginalization” (ADHR, 308). The specific local determinants of food insecurity stemming from these overarching forces are important to study independently and in combination to determine where vulnerability exists, and where the opportunities for intervention are.

2.2.2 Human rights issue and public health problem; implications of food insecurity

Recently deemed “a serious public health problem” (HFI, 6) as well as an issue of human rights (AFS), the implications of food insecurity on Canada’s North are felt in both the health and cultural well-being of its residents. In order to strategize for future prevention, a holistic approach must be taken to address the “pattern of vulnerability” (HFI, 12) which mark groups living across the north.

2.2.2.1 Implications on physical and mental well-being for adults, children

Households affected by food insecurity range from unattached adults to families with multiple children. It is important to note that while compromised access to food has staggering effects on any affected individual, there are also effects distinct to each age group. In general, food insecure individuals experience less than average health, development of chronic conditions, reduced ability to perform daily tasks due to health conditions, depression and a “perceived lack of social support” (<http://www.statcan.gc.ca/pub/82-624-x/2015001/article/14138-eng.htm#n1>). When

faced with food insecurity, adults caring for children often compromise their own well-being by reducing their food consumption to mask the severity of the situation from their children and to ensure adequate nutrition for other family members. Chronic conditions such as high blood pressure, obesity and diabetes are often consequences of this reduction in healthy eating; the management of which in turn may become stressed due to further compromised nutrition. Children experiencing food insecurity may not be ensured the variety and quantity of nutrients recognized with ensuring health development and growth. As for adults, the deficiencies in vitamins and minerals faced by food insecure children can lead to chronic disease, obesity and developmental issues.

Aboriginal populations in Northern Canada have historically survived off of, or supplemented a store bought diet with 'country foods'. Country foods, also called traditional foods, "derived from hunting and fishing are important components of the food systems, and [can] include ringed seal, caribou, Arctic char, walrus, beluga whale, and narwhal, and a variety of wild berries" (FTF, 46) depending on geographic location and seasonal patterns. Many factors—discussed in the following sections—have led to a dietary transition among northern Aboriginal people in recent years; characterized by a shift "from 'traditional' foods based on hunting and fishing to a 'western' type of diet" (AHDR, 311). The recent dependence on store bought foods consistent with a 'western' diet have also brought 'western' type health problems typically not common among Aboriginals maintaining a country diet, including those mentioned above; obesity, diabetes and other chronic diseases. Beyond these more typical health implications are the implications on the well-being of cultural identity. Northern Aboriginal peoples associate the act of living off the land, as well as the consumption of collected country foods, as "components of well-being" that are "vital to many household's well-being and cultural identity" (AHDR, 434). As dietary transitions take place, this identifying component of well-being may experience a correlated downturn. The determinant factors of this dietary transition in the north are worth noting in order to contextualize

the phenomenon and highlight the need for the preservation of northern Aboriginal traditions.

2.2.2.2 Preservation of Aboriginal traditions

In a quickly developing world, adapting cultural traditions is difficult. The combined effects of social, environmental and economic factors over the past 50 years has lead to a decline in the passing-down and implementation of cultural knowledge for Northern Canada's Aboriginal populations. This determinant of food insecurity is inherently generational in nature; Aboriginal peoples have had a long history of passing down cultural insights from generation to generation in order to preserve traditions essential to their cultural and functional identity. Canadian Aboriginal people have historically been recipients of repugnant acts of social and cultural abuse and neglect, creating "intergenerational consequences, many of which have critically impacted the social and cultural fabric of Aboriginal communities' identities" (AFS, 3). These marginalizing experiences have left many groups vulnerable to the negative side of urbanization and climate change previously discussed. Development in northern communities has introduced a proliferation of market foods to the typically traditional diets of residents. As commercialization of hunting practice has left Aboriginal hunter gatherers grappling with the increasing cost of necessary equipment, many families must rely more heavily on market food to supplement their diet. In addition, changing climates and geographical features has caused migratory shifts in the wildlife typically hunted as country food. These factors, along with changing tastes among younger generations, are contributing to the recent decline in "harvesting activities and the consumption of country food" (TFS, 4) among northern Aboriginal communities. Even if families do possess the traditional skills and knowledge, they "may not have the funds to purchase equipment for hunting or cookware to make nutritious meals" (TFS, 5). Notoriously high market food costs in remote northern communities often causes financially challenged families to choose less

expensive, and typically less nutritious, options when highly nutritious country food are inaccessible (RTF). Preventative initiatives are therefore focusing on “the necessary life skills and knowledge, such as food storage, preparation, and acquisition” (TFS,4) in regards to not only country food, but market food. Education and knowledge of life skills essential to ensuring food security are now being introduced in northern schools and communities through strategic initiatives and policy. Successful initiatives include the *Core Recipe Project*, *Aullak*, *Sangilivallianginnatuk*, and the Northern Farm Training Institute (NFTI). The key to the success of such programs include the consideration of “local food culture and the ways in which people manage food in their community” (TFS, 4) and the continuation of intergenerational passing of cultural knowledge, which has the momentum to be carried forward into future prevention (TSF). Involvement of organizations or government at any level of jurisdiction must work collaboratively with each uniquely affected community in order “to avoid the imposition of rules, frameworks, and discourses that may limit the ability of local actors to engage proactively” (AHDR, 451) with these initiatives.

2.2.3 Role of regulations and governance

Legal regulations and policy are important actors in the establishment and sustainment of food security among Canadians. In his visit to Canada in 2012, the United Nation’s Special Rapporteur on the right to food made several important observations regarding the current legal and policy frameworks and their relation to the current food security situation (RTF). These observations stated that due to the absence of a constitutional right to food “Canada would benefit from a national right to food strategy” (RTF, 7). While this gap in overarching legal framework is important to note, this investigation will hereon focus on specific rules and regulations that can be attributed to specific determinants or implications of food insecurity.

It has been made clear through many sources that preservation of Aboriginal traditions is key to combating northern food security. The promotion of traditional knowledge and action around local food systems through the support governing organizations allows for communities to gain food sovereignty; an essential achievement towards food security. Food sovereignty is defined by Food Secure Canada as the “right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.” One way of promoting successful local food systems in northern Canada is by ensuring that local hunters and gatherers have adequate access to the land (RTF). Due to historically recognized ties to the land, Aboriginal peoples generally have “broader rights to natural resources under international human rights law” (RTF, 18) including using natural resources for the continuation and support of their cultural identity through hunting, fishing and agricultural activities. However, “many Aboriginal communities [have] expressed concerns regarding federal government policies that have disrupted and, in some cases, devastated the traditional practices of indigenous people, including through removing control over land and natural resources” (RTF, 19) . It is therefore paramount that with the continued effects of globalization and environmental change outlined above, Aboriginal peoples of the north are allowed continued and sufficient access to land. Collaboration between local participants and government officials “[is] needed to avoid the imposition of rules, frameworks, and discourses that may limit the ability of local actors to engage proactively with change on their own terms” (AHDR, 451)

2.2.4 State of awareness

Food insecurity requires a holistic solution in order to successfully address all issues at play. Holistic refers here not only to identifying and addressing all determinants of food insecurity and the intersections between them, but also the involvement of a range of groups with the appropriate knowledge, influence and means to strategize and carry out

remedial action. Necessary involvement should be expected from stakeholders including federal, territorial and municipal governments, non-government organizations and initiatives, as well as individuals and groups within affected areas. Collaboration between these groups is necessary to avoid Southern or Western biases by linking theory and practice with local participants (Collaborative research in northern communities). Much progress has already been made in this area, with numerous organizations monitoring and reporting annual statistics, and strategically implementing measures for future prevention. However, despite the range of measures recently being taken, there is a recognizable gap in the visual presentation of statistics and information regarding food insecurity. As a highly accessible form of presenting information, a visual (as opposed to textual or verbal) method of communicating relevant data and information would allow for a baseline of knowledge to be shared across all stakeholders; from government officials to affected northern residents. Shared knowledge promotes the collaborative atmosphere so integral to the success of food security initiatives. It is also important to note the engaging characteristics of visualizations. Visual presentations of data have become exponentially more present in the media over recent years, likely due to engaging aesthetics and the ability to synthesize complex datasets to highlight key patterns. Although “the food security crisis in northern Canada has become the focus of a public discussion, advocacy and action at the national and regional levels” (TFS, v), the visual presentation of the situation may catch the attention of influential organizations that are not currently involved but wish to be. The channels of dissemination for a digital visualization can allow widespread sharing of knowledge that other forms of information may not be accessible through. The following summary of the data available for visual communication will present the foundation for the visualization.

2.3 Discussion of determinants

2.3.1 Determinants for which quantitative data is available

2.3.2 Determinants for which qualitative data is available

2.4 Discussion of implications

2.4.1 Implications for which quantitative data is available: health indicators,

2.4.2 Implications for which qualitative data is available

3.0 Methodology

3.1 Research, framing

The reigning leader in Canadian statistical surveying is Statistics Canada. Beyond conducting the Canadian census every five years, Statistics Canada is actively involved in surveying all aspects of Canadian life. As the scope of this investigation did not allow for any firsthand data collection, data gathered by and accessible through Statistics Canada was heavily relied upon. Apart from Statistics Canada, other major sources for Arctic and Circumpolar North related data include the Circumpolar Health Observatory (CircHOB), the Survey of Living Conditions in the Arctic (SLiCA), and ArticStat. While all sources provided a unique depth and breadth of data for comparative analysis of Arctic peoples and regions, only Statistics Canada offered the particular variables and geographic areas inherent to the analysis discussed in this study. Data sourced from Statistics Canada was accessed in the form of tables from CANISM; Statistics Canada's socioeconomic database. The amalgamation of CANISM table data utilized to visualize Canada's food insecurity in this project was influenced by the discrepancies between the various variables and their collection.

3.2 Data

3.2.1 Determinants, status and implications

As the historical discussion of food insecurity in Canada's north reveals; a combination of local determinants and external stresses acts upon individuals and communities faced with food insecurity (FTF). Advocates and scholars will agree that the road to achieving food security in Canada's north requires attention to be placed not only on the determinants causing the food insecurity status in various regions, but also the implications felt in those regions. A visual portrayal of the landscape of food insecurity must therefore address its cyclical nature by presenting determinants, year-over-year food insecurity status, and resulting implications in unison.

The factors contributing to food insecurity are vast, and cannot be entirely represented given the data sourced for this investigation. However, through the information available through Statistics Canada, a representative selection of determinants were sourced. Accessible variables include *median total income by family type*, and *after tax median total family income by family type (including low income families)*. Although Canada does not hold an official measure of poverty, Statistics Canada's Low Income Measure (LIM)—which is “50% of median household income, adjusted for household size”—speaks to the relationship between poverty and food insecurity, and demonstrates that “the lower household income is in relation to the LIM, the greater the likelihood of severe food insecurity” (HFI, 12). A number of determinants, including food costs (through the annually collected Consumer Price Index) and in-/out-migration, were accessible through Statistics Canada, but did not offer the granularity necessary to be meaningfully representational of residents across the territories. Income therefore serves as the main determinant to be visualized, representing the fact that a household's financial means to access food is directly tied to food insecurity.

Data collection on the general health of Canadians is collected annually through the Canadian Community Health Survey (CCHS), an initiative launched in 2000 which collects “population-level information on health determinants, health status and health system utilization”

(<http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/index-eng.php>) from an average 60,000 Canadians annually. Since 2004, the Household Food Security Survey Module (HFSSM) has been included in the CCHS as an optional module for the collection of food insecurity related data over a 12-month period. The HFSSM questions target both adult and child food insecurity. Food insecurity status is visualized based on HFSSM collection, using *household food insecurity measures, by living arrangement*.

As discussed in depth above, and similar to the determinants of food insecurity, the implications associated with compromised access to adequate food are numerous. Effects are seen across the realms of physical and mental health, the preservation of traditional practices, and the wellbeing of the affected communities. Accessible quantifiable data that addresses these variables has been sourced from the Health Indicator Profile; another component of CCHS. Variables for visualization include *percent of persons aged 12 and over with high blood pressure, percent of persons aged 12 and over with diabetes, and percent of persons aged 18 and over with a self reported body mass index (BMI) of 30.00 or greater (overweight or obese)*.

3.2.2 Discrepancies between the datasets and other data issues

3.2.2.1 DATE OF COLLECTION

Sampling data from various data sets, collected through various surveys, as is done in this study, has lead to discrepancies within the annual collection date of each set. Special consideration was given to ensure that the data selected for visualization would overlap for as many relevant years as possible, allowing for adequate comparison of year over

year records and the opportunity for visual patterns to emerge. However, there remain a number of years in which data for certain surveys was not collected for various reasons, resulting in several gaps in representation within the visualization. Additionally, the officially reported *household food insecurity measures, by living arrangement* data has been aggregated to represent two year periods of time. This collection is at odds with all other data utilized, which are reported on an annual basis. Please refer to Appendix ABC for a detailed record of annual data collection within each data set used.

3.2.2.2 AGE (12+ versus 18+)

3.2.2.3 GEOGRAPHY/GRANULARITY

Canada's population is largely concentrated across its southern half, with the majority of the territories considered sparsely populated—the exception being the capital city of each territory. It is likely this low population density and lack of major cities that has caused territorial data to typically be collected as an aggregation of the entire territory, or focuses only on the capital city, instead of by region or CMA-CA as is the case with the majority of southern Canadian data collection. As a result, there is a definite lack of granularity in the data available from Statistics Canada concerning Northern Canada's smaller towns and communities. As the remote locations, inaccessibility and lack of infrastructure of these smaller communities often heightens the resident's vulnerability to food security, more granular data collection would be greatly benefit to assess food insecurity outside of the larger capital city areas. From the variables outlined above, only *after tax median total family income by family type (including low income families)* splits the data collection into territorial, CMA and non-CMA regional data, with all other data reporting only territorial averages.

3.2.2.4 MISSING DATA

3.2.3 Aggregation, data structure