

Canadian Food Security: Beyond 150

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Not only necessary for survival, food plays an important social, economic, and cultural role in our lives. Globally in the 21st century, food security faces many challenges including climate change and changing attitudes surrounding food and agriculture. In Canada over the past 150 years, the role of food in society has changed. In the early 20th century, a third of Canada's population lived on and derived their livelihoods from agriculture (Statistics Canada, 2009). Agriculture played a central role in the daily lives of Canadians. Urbanization and mechanization has allowed for more food to be produced in Canada with fewer people, to the extent that today only two percent of the population now lives on a farm. Only seven percent of Canadian land is suitable for agriculture production, yet Canada remains one of the few countries expected to continue to produce more food than it consumes in the next 50 years. The disassociation between the average Canadian and the source of their food creates unique challenges for food security that must be addressed moving forward as Canada celebrates its 150th birthday.

Keywords: food security, Canada, agriculture and climate change

Introduction

Food and resources have driven the human experience since the Stone Age. Around the world, nations and civilizations have risen and fallen based on the availability of resources. In the modern era, the end of the Second World War brought about many changes to the international order, including an emerging awareness of the fragility of the world food supply. To address this need, in 1945 the Food and Agriculture Organization of the United Nations (FAO) was founded to, “ensure humanity’s freedom from hunger” (Margulis, 2013). In the 21st century food security faces many challenges. Rising global population, limited land, and climate change are some of the key issues that will threaten Canadian and global food security. Climate change will directly impact food security through inter-annual occurrences. Extreme weather events, long run changes in average temperature, and shifting precipitation patterns will pose a challenge to food security in Canada and abroad (Baldos & Hertel, 2015). In recent years, the FAO (2015) has identified climate change as a principal threat to global food security. Climate change will add to the stress already placed on the global food supply trying to feed over seven billion people on land already threatened by urbanization, desertification, and rising sea levels. In order to ensure continued growth, security, and prosperity, policy makers need to take steps to ensure that climate change, rising global populations, and urbanization does not undermine global and Canadian food security.

What is Food Security?

The concept of food security has evolved over the past half century to encompass a magnitude of

determinants. The 1974 World Food Summit first sought to define food security as the, “availability at all times of adequate food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (FAO Economic and Social Development Department, 2015). This definition was expanded in 1983 by the FAO when it became clear that just because there was enough food to go around, did not necessarily mean people had access to it. Highlighting this problem of production versus access is an excerpt from the same 1983 document, which posited that countries must “ensur[e] that all people at all times have both physical and economic access to the basic food that they need” (FAO Economic and Social Development Department, 2015). Just three years later the World Bank Report “Poverty and Hunger” noted that while people might have access to basic caloric needs it was not enough to ensure a healthy life. Therefore, in 1986 the phrase, “access of all people at all times to enough food for an active, healthy life,” was added (FAO Economic and Social Development Department, 2015). At the 1996 World Food Summit, a new definition was settled that sought to address the policy and economic realizations of what food security manifests as. This resulted in a two decade process where the definition of food security was determined as, “at the individual, household, national, regional, and global levels [is achieved] when 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” (FAO Economic and Social Development Department, 2015). In 2001, the word “social” was added to physical and economic access rounding out the definition (FAO Economic and Social Development Department, 2015). This 2001 definition has served as the guiding principle in policy discussions surrounding food security.

As displayed in this definition, food security does not simply mean the production of crops and the management of livestock. At the international level, food security is driven by five strategic objectives, which are to:

- (1) Help eliminate hunger, food insecurity and malnutrition;
- (2) Make agriculture, forestry, and fisheries more productive and sustainable;
- (3) Reduce rural poverty;
- (4) Enable inclusive and efficient agriculture and food systems;
- (5) Increase the resilience of livelihoods to threats and crises (Margulis, 2013).

Food security therefore means the protection of fisheries, water and forest management, and reducing rural poverty. Moving forward policy makers need to keep the multifaceted nature of food security in mind when addressing the challenges facing the national and global food supply.

The FAO (2015) has stated that, “climate change is a fundamental threat to global food security, sustainable development, and poverty eradication”. Extreme weather events such as floods or droughts have been key contributors to past food crises, sparking price volatility. These extreme weather patterns will only increase in frequency and severity if climate change continues unchecked (Collier, 2008). In addition, higher mean temperatures will put greater stress on agricultural land and food systems through soil degradation, desertification, fresh water shortages, and the development of new pests and diseases (Sage, 2013). The effects of climate change will be particularly felt in the developing world between 35 degrees south and 45 degrees north (Sage, 2013). Climate change will affect crop yields and food security differently from region to region and nation to nation (Parry et al., 1999). Therefore, continued progress in food security will require not only a recognition by policy makers that climate change represents a clear and present danger, but also a strong commitment to invest in innovative solutions.

Agricultural production can be a force for change in the fight against climate change. Climate smart agriculture recommended by the FAO and the Intergovernmental Panel on Climate Change (IPCC) could lower emissions from the sector helping decrease national greenhouse gas emissions (IPCC, 2007). Initiatives such as the Mitigation of Climate Change in Agriculture (MICCA) funded by Finland, Germany and Norway, work in partnership with the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) to monitor and assess greenhouse gas emissions and drive policy towards mitigating climate change through agriculture (FAO, 2015). Practices such as improved land and water management, more precise use of inputs, and agroforestry can mitigate the effects of climate change. Currently, very little progress has been made at the global level to implement technical advancements with the potential to mitigate greenhouse gasses in agriculture (IPCC, 2007). As the planet's population is projected to reach over nine billion people by 2050, the greater demand for food could result in higher emissions in the agricultural sector, especially if substantial changes are not made to implement measures to mitigate climate change.

In the last century one of the most important contributor to food crises and food shortages has been extreme weather shocks and patterns. These inter-annual extreme weather shocks such as “cyclones, droughts, floods, heat waves, hurricanes, tidal waves, tornadoes, tropical storms, typhoons, winter storms, hailstorms, dust storms, rainstorms, thunderstorms, and waves of cold weather”, are projected to increase in prevalence and severity as mean global temperatures rise above pre-industrial levels (Giddens, 2011). The sheer length and variety in the list of extreme weather events is a powerful reminder of how vulnerable our global food system is to climate fluctuations.

At the global level the number of weather related catastrophes has risen significantly over the past 30 years and is perhaps just a foreshadowing of what is to come (Giddens, 2011). It is very likely that increased weather volatility could spark food crises that will translate directly to the world's most vulnerable people (Headey & Shengen, 2008). In the long run, climate change is expected to put greater stress on agriculture by decreasing fresh water supplies, increasing soil degradation, desertification, and stimulating the development of new pests and diseases in the food production (Sage, 2013). In the 21st century, interdependence between climate change and food security is an inescapable part of our lives (Giddens, 2011). The governance of the world food system in the face of climate change is complex. The implementation of many mitigation and adaptation practices will rely on individual states such as Canada. However, “our civilization is truly global in scope”, and as the effects of climate change do not respect state boundaries (Giddens, 2011). The challenge we face will require a global effort led by individual action.

The Canadian Context

Food lies at the heart of the Canadian experience. Food security is defined by the FAO (2003) as “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life”. In 1921 agriculture was the single most common occupation for Canadians, accounting for 33% of jobs, with a third of the population living on farms. Today, that number in both categories is less than two percent (Statistics Canada, 2009). Despite Canada being the eighth largest producer of cereals and 10th largest producer of meat, only seven percent of Canada's land is suitable for agricultural production (Statistics Canada, 2009). By 2050 Canada is expected to be one of the few countries that continues to produce more food than it consumes. Approaching

Canada's 150th birthday it is important to take stock of Canada's future food security. Moving forward in the 21st century we must protect Canada's food security through adaptation and education.

In the latest census the Canadian population exceeded 35 million people for the first time (Statistics Canada, 2016). By 2050 the world's population is expected to reach over nine billion people, putting unprecedented strain on food systems around the world. To feed a growing population, scientists are projecting that the global demand for food will more than double by 2050. Canada will be one of the few countries capable of meeting this rising demand (Council of Canadian Academies, 2013). Rising global and national populations combined with greater mean incomes will increase demand for not only basic food items such as wheat and rice, but also more resource intensive products produced in Canada such as meat and dairy products that are produced in abundance in Canada. These products place a greater strain on natural resources and systems such as waterways (Council of Canadian Academies, 2013).

As aforementioned, in Canada only a small portion of the land is suitable for agriculture production. Canada's food security is based on only approximately seven percent of its total landmass (Statistics Canada, 2009). Of the land suitable for farming the majority of it (80%) is located in Western Canada. Some 38 percent of total farmland is in Saskatchewan, while Alberta and Manitoba contain 31 percent and 11 percent, respectively. Ontario accounts for eight percent of farmland, Québec for five, British Columbia for four, while Nova Scotia, New Brunswick and Prince Edward Island each accounts for less than one percent and Newfoundland and Labrador for a fraction of one percent (The Canadian Encyclopedia, 2009).

Nationally, we have seen a trend towards fewer farms that are larger in size. In 1941 the number of farms reached its peak at 732,832 farms spread out across the country with the average farm size just 96 hectares. In 2011, that number had fallen to just 205,730 while the size of these farms had more than tripled to 315 hectares (The Canadian Encyclopedia, 2009). This trend in farm numbers and sizes reflects a national trend of urbanization and a move away from the family farm. While 98% of farms today are still family owned, most Canadians are now several generations removed from the farm (Agriculture More Than Ever, 2013). Therefore, Canada needs to be careful not to sacrifice good agriculture land in favor of urban development. So little of our land is suitable for agriculture and Canadians must be careful not to dismantle systems such as the Agriculture Land Reserve, thereby threatening our own food security.

One of the challenges of having larger and fewer farms in Canada, is that few Canadians now view agriculture as a suitable career path. Unlike in the 20th century when many immigrants came from agricultural backgrounds, today our immigration system focuses on selecting those with advanced degrees in fields such as engineering. Looking into the future, the shift from agrarian to urban creates a growing problem in Canadian food production. Globally the average age of the farmer is rising rapidly and Canada is no exception to this trend. In 2011 just under 50% of Canada's farmers were over the age of 55 (The Canadian Encyclopedia, 2009). While technological advances decreased the number Canadians to be employed in agriculture in real terms, increased demand for food will clash with a lack of skilled professionals. Moving forward in Canada, greater efforts need to be made to encourage agricultural and food management career paths.

Canadian food security not only faces challenges on the production side as it turns 150. At consumption, individual choices by Canadians have a massive impact on Canadian food security. Every year, the average Canadian household throws away 51% of the food it purchases. According to Statistics Canada this amounted to about 172kg of waste per capita (2009). Broken down even further by food group, each year the average Canadian throws away 122 kg of fruits and vegetables, six kg of dairy products, 10 kg of poultry, 16 kg of red

meats, and 18kg of oils, fats, sugars, and syrups (CBC News, 2012). Nationally this adds up to approximately \$31 billion a year of wasted food (Vuchnich, 2015). While some municipalities have taken steps to reduce garbage waste that accounts for 20% of Canada's methane emissions through composting and recycling programs, greater national efforts must be made to reduce food waste (Vuchnich, 2015). One example on how a state can reduce food waste comes from France. There, legislation was passed forbidding large supermarkets from destroying unsold food, encouraging them to donate to charities or farms instead. This piece of French legislation aims to reduce national food waste by 50% by 2025 (The Associate Press, 2015). This type of legislation could work in Canada. Private organizations such as Second Harvest, Canada's largest food rescue, are doing similar work at the local level (Vuchnich, 2015). Greater consumer education and government inducements are needed to drastically reduce Canadian food waste.

One of the overarching challenges facing Canadian food security at Canada's 150th birthday is the lack of knowledge by the average Canadian about where their food comes from. Many members of the public have a desire to know where their food comes from, as displayed with the 100-mile diet, buy local campaigns, and the ongoing popularity of farmer's markets. Nonetheless, the average Canadian today is so far removed from the production of their food that they do not have the knowledge to make informed decisions. This reflects ongoing trends in urbanization. For example in 1921, "agriculture was the single most common occupation, employing one million Canadians and accounting for one-third of all jobs" (Statistics Canada, 2009). By 2008 agriculture accounted for only 1.8% of the labor force (Statistics Canada, 2009). The disassociation between Canadians and the source of their food is an ongoing challenge.

This disconnection between Canadians and the source of their food has led to several challenges in promoting food security. One debate that will affect how we produce food in the coming century is the perceived benefits of organic foods. These foods are usually more labor intensive and produce less per acre of land due in part to the restrictions placed on the use of pesticides and herbicides. As a result organic foods are often twice as expensive as their traditionally grown counterparts. Researchers have found little to no health benefits from children and adults consuming organic versus conventional foods (Brandt, 2012). Another challenge is the lack of consumer understanding of the differences between Canadian and American food standards. One example of this would be ads run by fast food chains such as A & W advertising beef without hormones and steroids or eggs from hens fed a vegetarian diet. The amount of hormones in Canadian beef is negligible. The Canadian Food Inspection Agency conducts ongoing checks to ensure hormone levels do not exceed specific limits. "The World Health Organization, United Nations Food and Agriculture Organization, the European Community Scientific Committee and the Joint Expert Committee on Food Additives agree that hormones used in beef cattle production don't pose a health risk to humans" (Furber, 2014). To address the second A & W commercial, chickens are omnivores. In their natural state a chicken will of course eat plants, but they will also eat bugs, worms, and other meat protein sources (Food and Farm Care, 2016). The ongoing lack of public knowledge surrounding the agriculture industry is a threat to Canadian food security.

Around the world and in Canada, biotechnology has sparked hot debate from scientists, politicians, economists, development workers, environmentalists, farmers, big companies, and small civic organizations. Debates have run the gamut of opinions over the application of transgenic crops, the potential uses, the nutrition and health benefits and risks, bio property, and the environmental impact of these crops to name but a few. The term Genetically Modified Organism (GMO) has become, as Herring (2007) would call it, biologically ambiguous and politically loaded. While the rhetoric of GMO crops being a technology for the

poor does seem to be one created by the biotech companies as an ad hoc marketing tool, there is potential for GMO crops to be another tool in the fight against global hunger (Herring, 2007).

Resistance to GMOs and its subsequent enshrinement in state policy demonstrates the growing influence of citizen organization in the policy making of states (Falkner, 2007). For many critics food safety is the number one concern and images of Frankenstein foods and the idea of fish genes in a tomato come across as unnatural and repulsive to the average consumer (Falkner, 2007). Environmentalists lament the supposed loss of biodiversity and the perceived environmental impacts though to date no evidence supports either claim. However, the uncertainty of science alone is often enough to spark the doubts and the suspicion of citizens towards large biotech companies. As Glover (2010) points out, Monsanto became the face of the enemy of, “local, national, and globally networked coalitions of farmers’ movements and campaigns against globalization, intellectual property rights, free trade, and corporate concentration”. As Herring (2007) astutely highlights, the public greets medical applications of genetic engineering such as insulin for the large part with acceptance (2007). In Canadian supermarkets this push back on GMOs can be seen in products proudly labeled GMO-free along with other health trends such as Gluten-free. Yet despite the hype, many Canadians remained uninformed regarding the science of GMOs and the role it plays in Canadian food security. The lack of public education surrounding Canadian food security poses policy challenges moving into Canada’s 150th year.

Conclusion

At 150 years old, Canadian agriculture accounts for 6.6% of Canada’s GDP and one in eight Canadian jobs. Canada remains the world’s fifth largest exporter of agriculture and agri-food products and remains poised to be an important contributor to global food security moving forward (Agriculture and Agri-Food Canada, 2016). Some key challenges facing Canadian food security moving forward include climate change, extreme weather events, loss of agriculture land, a growing and aging population, food waste, and a disconnected public. Greater efforts must be made to provide public education so Canadians can make informed decisions about their food and limit food waste. Governments at all levels need to make a concerted effort to protect agriculture land and water supplies. Though we are a large nation, only seven percent of our land mass is suitable to make enough food to not only feed Canadians, but the rest of the world as well. As we celebrate Canada’s 150th birthday it is crucial that we recognize the important role that food and agriculture plays in not only Canada’s past, but also its future.

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