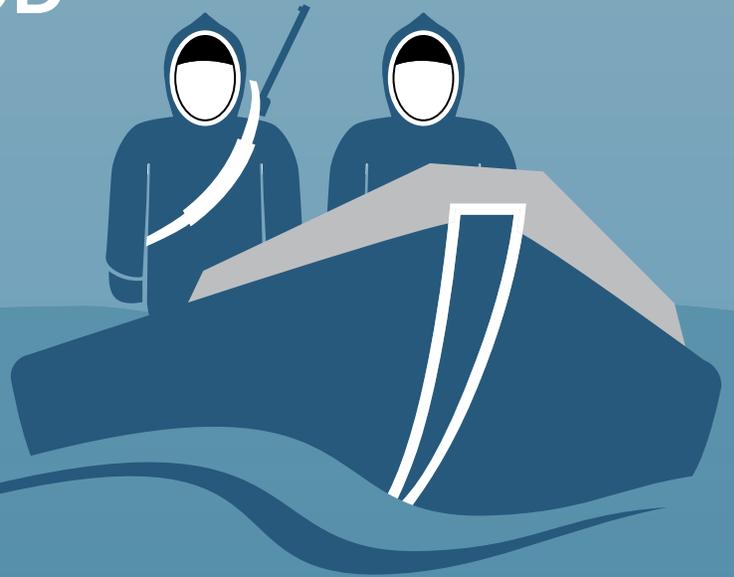




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# EVALUATING THE ROLE OF MARINE-BASED HARVESTING IN FOOD SECURITY IN THE EASTERN ARCTIC



**QIKIQTANI INUIT ASSOCIATION. 2018. EVALUATING THE ROLE OF MARINE HARVESTING IN FOOD SECURITY IN THE EASTERN ARCTIC. REPORT PREPARED BY IMPACT ECONOMICS FOR SUBMISSION WITH THE BAFFIN BAY AND DAVIS STRAIT STRATEGIC ENVIRONMENTAL ASSESSMENT. OCTOBER, 2018.**

# SUMMARY

This investigation is in response to the Nunavut Impact Review Board's (NIRB) Strategic Environmental Assessment (SEA) in Baffin Bay and Davis Strait for potential oil and gas related development activities. The NIRB wants to understand how this development might affect food security in affected communities as an indirect effect of a disruption to marine-based harvesting. The communities of Arctic Bay, Clyde River, Grise Fjord, Pagnirtung, Pond Inlet, and Qikiqtarjuaq are included in this study.

Food security exists 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. Food security is under threat in Nunavut. There are several contributing factors including low employment, minimal job growth, high dependency ratios, low education levels and graduation rates, and other geographic and environmental challenges.

The socio-economic conditions suggest that poverty levels are high in Nunavut. Indeed, the situation would be made worse if it were not for two important contributions. The first is Government of Nunavut's almost universal public housing program that provides more than half the territory's population with shelter. The second is the subsistence economy that produces a substantial amount of food that is broadly distributed throughout the community.

Using country food harvest data collected over five years from 1996 to 2001 and

pairing it with an estimated price based on food price data from 2017 and Nutrition North Canada's food transportation subsidies, it was estimated that the annual production of char, seal, and whale in the six study area communities is worth \$3.3 million, on average. Divided amongst the 5,700 Inuit residents, this is equal to \$580 of food per person in a year. This valuation is made more important by the fact that incomes in Nunavut are amongst the lowest in Canada while food prices are the highest.

A challenge for this report was to determine how future offshore oil and gas exploration and development would affect food security. Three areas were identified. The first, as stated, is a loss of production that can be evaluated based on the formula used in this report. The second is the loss of sharing. Inuit willingly share country food with their extended family, elders, and anyone else in the community that is unable to hunt or fish. This system can be described as a type of food assistance that operates with tremendous efficiency where those with more give to those with less. The third area is the displacement of labour. Unlike other economic opportunities, oil and gas development and especially exploration does not create a lot of jobs for local workers. This has a dual effect whereby it has the potential to disrupt harvesting activities while not creating jobs in the community.

The purpose of this report was to provide evidence of the contribution made by marine-based harvesting to food security in order to inform future decisions on how

offshore oil and gas development should be managed. The report establishes a substitute value for marine-based country food but a new survey is highly recommended to improve the accuracy of these estimates and to better inform our knowledge of the subsistence economy and how it is changing. The report also

concludes that offshore oil and gas development does not appear to offer Inuit much in the way of benefits with the potential to alter the sustainability of communities by disrupting an important food source and by displacing those currently engaged in its production.

## ASSUMPTIONS AND LIMITATIONS

This report provides an assessment of effects from a potential offshore oil and gas development. However, a clearly defined project was not completed in time for this research. The specific size and location of the development are obviously critical to the effects assessment. Without a specific project from which we could base an assessment, this report provides information on the marine-based harvesting of char, seal, and whale across six eastern Arctic communities without knowing the size or extent of disruption.

The lack of statistical evidence is a limitation for this report. Despite the critical importance of country food harvesting to the sustainability and quality of life of thousands of Nunavummiut, the only comprehensive survey on this subject is the Nunavut Wildlife Harvesting Survey conducted 20 years ago. There is evidence

suggesting changes in the environment and in the intensity of harvesting have led to a reduction in the amount of country food produced, however, we cannot confirm this through statistical survey data, nor do we know the actual extent of this decline.

There are assumptions made throughout the report. All efforts were made to state them clearly. Examples include the average size and edible weight of marine-based country food, the average cost of meat in the Study Area communities, the capital cost of harvesting equipment, and the rate of depreciation of that equipment. Changing these assumptions would alter the results of this research, however, we do not believe any such changes would alter the conclusions markedly.

## ACKNOWLEDGEMENTS

The Qikiqtani Inuit Association (QIA) was instrumental in the data gathering process required for this research. Its management and staff were able to survey households representing more than 200 residents, collecting data on harvesting production and costs and on sharing. The authors of this report would like to thank the QIA and all those who participated in the survey. In addition, Heidi Klein (Sanammanga Solutions) made invaluable contributions to this report through her in depth knowledge of the subject matter.

## EVALUATING THE ROLE OF MARINE-BASED HARVESTING IN FOOD SECURITY IN THE EASTERN ARCTIC

*The Qikiqtani Inuit Association (QIA) is a not-for-profit society which represents approximately 14,000 Inuit in the Qikiqtani (Baffin) Region of Nunavut, including 13 communities from Grise Fiord in the High Arctic to Sanikiluaq (Belcher Islands) in the southeast of Hudson Bay.*

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# 2017-2018

# INTRODUCTION

This report provides research results regarding the economic contribution of marine-based country food harvesting as it relates to food security in six Nunavut communities including Arctic Bay, Clyde River, Grise Fjord, Pangnirtung, Pond Inlet, and Qikiqtarjuaq. Collectively, these make up the Study Area communities.

The investigation is in response to the Nunavut Impact Review Board's (NIRB) Strategic Environmental Assessment (SEA) in Baffin Bay and Davis Strait for potential oil and gas related development activities. In the Final Scope List, NIRB identifies the following Valued Socio-Economic Components be considered:

## Listing of NIRB's Valued Socio-Economic Components related to Food Security

### Wellbeing and health of coastal communities

#### For the Qikiqtani region, with focus on the potentially interested communities:

- Description of the current individual and family well-being;
- Description of the current status of health, including physical, mental, and psychological; and
- Description of nutritional requirements with quantitative information on the diet habits of residents, including consideration of details such as the seasonal, gender, and age-related consumption of country foods.

### Traditional activity & knowledge and community knowledge including

- Land use
- Food security
- Cultural activities
- Description of cultural and traditional activities, including but not limited to travel routes, activity type, dependence on traditional foods (including cultural and financial significance), and type and location of species consumed; and
- Current land uses and limits/interference with existing uses.

Source: NIRB, 2018. Final Scope List for the NIRB's Strategic Environmental Assessment in Baffin Bay and Davis Strait.

The NIRB wants to understand how oil and gas exploration and development might affect food security as an indirect effect flowing from a disruption to or reduction of harvesting abilities. The effects assessment should consider:

- Disturbances to traditional harvesting activities, areas of importance to Inuit, and migration routes;
- Disturbances to food security through changes to harvesting activities and species availability, and through species ingesting contaminants;
- Conflict with other types of land use (including Aboriginal and Traditional fisheries, commercial fisheries, marine shipping, cultural and travel routes, and tourism activities);

To investigate this question, one must start with a basic understanding of food security and the role of marine-based harvesting in providing food to the residents of these communities. It is understood that the original inhabitants of the Study Area are reliant on this food source. The question is how reliant are they? Can this reliance be quantified? And, could monetary gains from industrial activity offset losses in local food production?

The answers require that we think not only about the value of the food being produced, but also its distribution. Inuit have a strong culture of sharing that revolves around food, and this sharing does not transcend into labour income to the same degree. Also, even if harvesting is marginal from a financial perspective, it is a productive activity for hundreds of Inuit living in communities without many opportunities for employment.

This report seeks to improve the collective understanding of how harvesting of marine-based country food – principally fish, seal, and whale (especially narwhal) – contributes to the food security of six Study Area communities that are in close proximity to Baffin Bay and Davis Strait. This knowledge will help the NIRB determine the economic and social cost of any disruption of this economic activity caused by offshore oil and gas developments.



## BACKGROUND INFORMATION ON THE STATE OF FOOD SECURITY IN NUNAVUT

Food security exists “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, 1996).”

More recently, the definition has been extended to include the concept of nutrition. Food and nutrition security exists “when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life (CFS, 2012).”

In academia, food insecurity is defined as an outcome of inadequate or uncertain access to an acceptable amount and quality of healthy food (Tarasuk, 2009). For most people, there is a simple definition: when the fridge is empty and the cupboards are bare. At its worst, it can be seen when adults or children go an entire day without eating because there is no food in the house and no other means to acquire some. In most cases, however, food insecurity is difficult to see. Families that are eating less or lower quality foods are not obvious, while observers can be quick to assume that poor or inadequate diets are simply the result of adults, parents, and kids making poor choices. But there is nothing about food insecurity that is simple, and we have to assume that families that are skipping meals and children who are going to school or to bed hungry are not doing so by choice.

Evidence has shown us that people who are food insecure are more susceptible to malnutrition and infection, as well as chronic health problems such as obesity, anemia, cardiovascular disease, diabetes, stress, and child developmental issues. Mental health effects of food insecurity include reduced ability to learn, depression, and social exclusion (Expert Panel on State of Knowledge of Food Security, 2014). The financial burden of dealing with these effects has not been calculated in Nunavut, but they are surely high and are no doubt higher than the cost of the meals being missed.

Research conducted in conjunction with the 2007–2008 International Polar Year Inuit Health Survey revealed a high percentage of Inuit families and children living in food insecure homes, where moderate food insecurity was defined as households with an “indication of compromise in quality and/or quantity of food consumed,” and where severe food insecurity was defined as households with an “indication of reduced food intake and disrupted eating patterns.”



heating and refrigeration, the cost of warehousing (some products are brought up on the annual sea lift and stored until sold a year later), labour, and the cost of buildings, repairs, and equipment. These overhead costs are higher in the small, isolated, remote Study Area communities than in a typical Canadian city and are the reasons food prices are so high.

The high prices do not tell the complete story of food insecurity. The bigger story involves family income levels and why, for too many Nunavummiut, food is unaffordable. Understanding why family incomes are so low is more complicated than looking at food prices, and require an investigation into economic, social, and historical factors including demographics, fertility rates, dependency ratio, employment growth, economic opportunities, non-market communities, minimum wage, and income inequality.

Some of these will be presented later in this chapter while others are beyond the scope of this research and can be studied in reports such as the Nunavut Economic Outlook series produced by the Nunavut Economic Forum.

**Food costs are much higher in Nunavut than other parts of Canada**  
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**Table 1: 2017 Nunavut Food Price Survey, 20 Selected Food Items**

	Volume/ Weight	Study Area Communities	Canada	Difference (%)
Milk, 2%	2 L	7.55	4.66	62%
Butter, Salted	454g	9.01	4.90	84%
Eggs	Dozen, Large	3.96	3.08	28%
Processed Cheese, Sliced	250g	6.40	2.75	133%
Frozen French Fries	650g-1kg	6.84	2.56	167%
Soda Crackers	450g	8.03	3.09	16%
Canned Salmon, Sockeye	213g	7.76	4.38	77%
Canned Baked Beans	398ml	3.97	1.30	205%
Canned Vegetable Soup	284ml	3.27	1.12	192%
Macaroni	500g	5.51	1.48	272%
Flour, All Purpose White	2.5kg	13.52	4.91	175%
Baby Food, In Jars	128ml	1.86	0.99	88%
White Bread	675g	4.47	2.81	59%
Apples	per kg	6.44	3.85	67%
Bananas	per kg	4.86	1.58	208%
Carrots	per kg	5.93	2.03	192%
Ground Beef, Reg.	per kg	15.46	12.21	27%
Pork Chops	per kg	16.49	11.86	39%
Hotdog Wieners	450g	5.90	4.26	38%
Potatoes	4.54kg	6.97	3.29	112%
		<b>144.2</b>	<b>77.11</b>	<b>87%</b>

Source: Nunavut Bureau of Statistics, 2017-2016 Nunavut Food Price Survey, Comparison of 24 Select Food Items Basket

## DEMOGRAPHICS AND RELATED STATISTICS

The Study Area is home to just over 6,000 people, the vast majority of whom are Inuit (94%) (Table 2). The largest community when measured by population is Pond Inlet with 1,663 residents as of July 1, 2016 while the smallest is Grise Fjord with just 167. Collectively, they are all small, remote and isolated. These are all factors that affect food security in their own way.

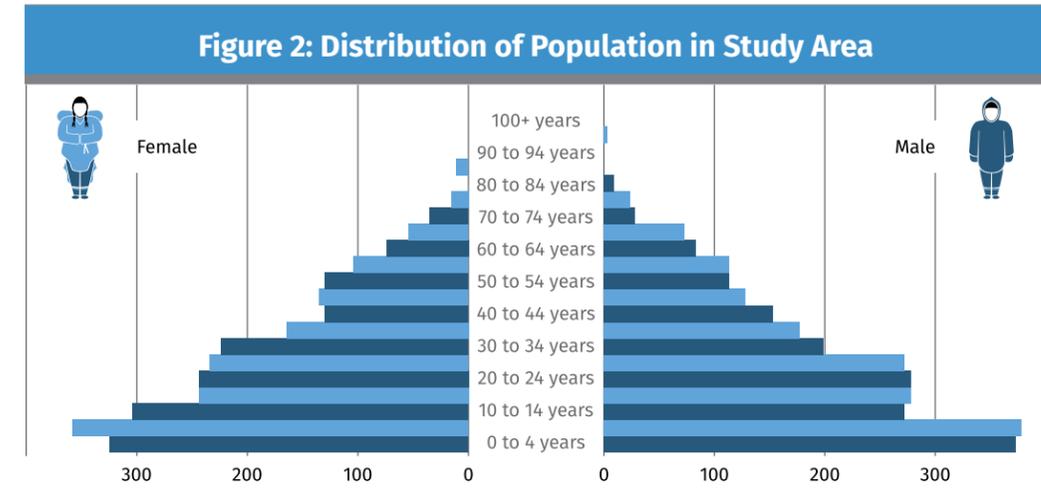
**Table 2: Study Area Population, by Inuit and Non-Inuit, 2016**

	Total Population	Inuit	%	Non-Inuit	%
<b>Nunavut</b>	37082	31234	84%	5848	16%
Study Area	6082	5718	94%	364	6%
Arctic Bay	876	828	95%	48	5%
Clyde River	1127	1085	96%	42	4%
Grise Fiord	167	150	90%	17	10%
Pangnirtung	1633	1513	93%	120	7%
Pond Inlet	1663	1569	94%	94	6%
Qikiqtarjuaq	616	573	93%	43	7%

Source: Nunavut Bureau of Statistics

Note: Population estimates are based on the 2011 census counts adjusted for net census under coverage.

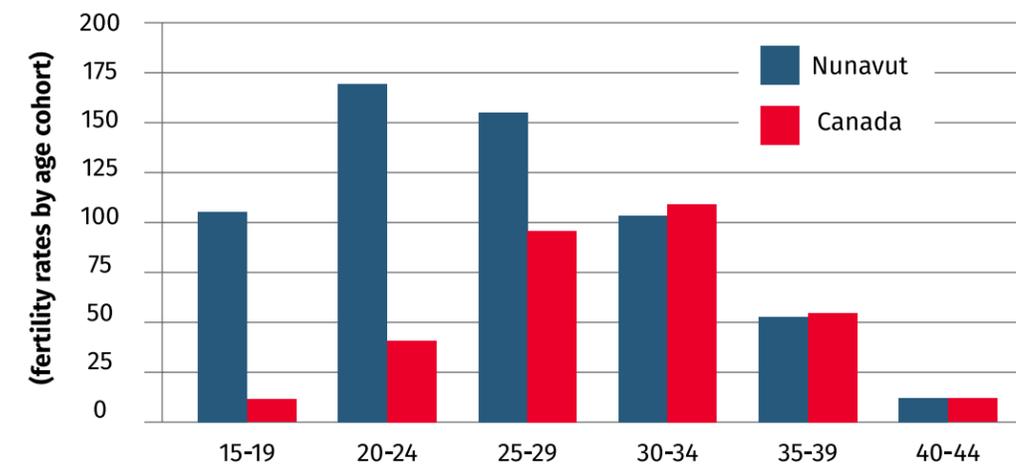
The Study Area communities are young, with a median age of 23.1. As a point of reference, Canada’s median age is 41. The population pyramid illustrates what this demographic profile looks like (Figure 2). There are so many children that the dependency ratio in some communities is almost 100%—meaning that for every resident of working age (aged 20 to 64), there is one additional resident dependent on them (either between the ages of 0 and 19, or 65 and over). A high dependency ratio causes increased financial stress on those earning an income.



It is also important to note that fertility rates amongst Nunavummiut women are the highest in the country (Figure 3). The majority of women in Nunavut have children at a young age. The fertility rate of women aged 15 to 19 is higher in Nunavut than the fertility rate of women aged 30 to 34 across Canada (which is the age cohort where Canadian women are most likely to have children). This is one of the reasons why graduation rates and participation in post-secondary education is low. Teenage girls are leaving school to have children. It is also common for young women in Nunavut to have large families—three or more children. Pond Inlet, in particular, is a community where families are particularly large with an average family size of 4.6 (Table 3).

Source: <https://www150.statcan.gc.ca/n1/daily-quotidien/180430/dq180430f-eng.htm>  
<https://www150.statcan.gc.ca/n1/pub/91-209-x/2018001/article/54956-eng.htm>

**Figure 3: Fertility Rates, Nunavut and Canada**



Source: Statistics Canada, CANSIM Table #102-4503











## UNDERSTANDING THE ECONOMICS OF MARINE-BASED HARVESTING IN THE STUDY AREA

That fish, seal, and whale are important contributors to Inuit diet in Nunavut is undisputed within the Study Area communities<sup>4</sup>. Its importance is so great that, a priori, the NIRB's SEA demands that its contribution be accounted for in any future offshore development that might disrupt the animal population or the ability of Inuit to harvest. It is therefore surprising to learn that very little statistical research exists on the economic contribution of this activity. Despite the importance of harvesting, it is not possible to immediately answer the question "How important is marine-based harvesting?" with any substantial quantitative evidence. The last Nunavut Wildlife Harvesting Study was conducted from June 1996 to May 2001 (Nunavut Wildlife Management Board, 2004).

Several data collection methods were employed in order to complete this research in the absence of a comprehensive and relevant database.

- The Nunavut Wildlife Harvesting Study results were reviewed in detail, and represent a starting point for the research. The use of these data requires caution given it represents harvesting results from 20 years ago. Most recent literature on the subject describes a decline in the number of harvesters, the volume of output, and consumption over the past 20 years. However, in the absence of a follow up survey, it is not possible to determine, with great precision, the size of this decline.
- The QIA conducted two surveys in association with this research. The first asked questions related to food sharing and was broadly distributed. The second asked respondents detailed questions on country food production, consumption, costs, frequency, duration, and sharing. The sample size of the second survey was small and distributed amongst active members of community Hunters' and Trappers' Organisations.
- Data collected for academic research was reviewed, and where relevant, was incorporated into the analysis. In the absence of up-to-date institutional survey results, the work by academia was critical to the completion of this report.
- Interviews with knowledge holders at the QIA and in the communities supplemented the data collected and helped in providing context.
- The QIA visited high schools with the NIRB to discuss the Strategic Environmental Assessment and was able to talk with students about food sharing in their community. Those discussions helped to inform this report.

This chapter contains a summary of the data collected in an effort to describe the role of marine-based country food in the economic lives of Inuit in the six Study Area communities. The key questions to be answered are:

- **How much marine-based country food is produced annually in the Study Area communities?**
- **What is the value of this production?**
- **What is the cost of production?**

<sup>4</sup>QIA 2017a, QIA 2017b, QIA 2018a, QIA 2018b, QIA 2018c

- Disturbances to traditional harvesting activities, areas of importance to Inuit, and migration routes;
- Disturbances to food security through changes to harvesting activities and species availability, and through species ingesting contaminants;
- Conflict with other types of land use (including Aboriginal and Traditional fisheries, commercial fisheries, marine shipping, cultural and travel routes, and tourism activities)

Source: Nunavut Impact Review Board, 2018

## COUNTRY FOOD PRODUCTION

The harvesting results from the Nunavut Wildlife Harvest Study are presented in Table 8 below:

**Table 8: Results from the Nunavut Wildlife Harvesting Survey, five-year average, 1996 to 2001**

	Char	Ringed Seal	Narwhal	Beluga
<b>Arctic Bay</b>				
Harvest Volume	10237	1450	74	14
# of Harvesters	175	195	75	31
<b>Clyde River</b>				
Harvest Volume	8463	2004	20	1
# of Harvesters	174	190	37	1
<b>Grise Fjord</b>				
Harvest Volume	488	653	5	8
# of Harvesters	51	54	17	24
<b>Pangnirtung</b>				
Harvest Volume	35065	6098	34	35
# of Harvesters	208	208	61	74
<b>Pond Inlet</b>				
Harvest Volume	12114	2113	119	1
# of Harvesters	244	270	110	4
<b>Qikiqtarjuaq</b>				
Harvest Volume	8350	2950	25	1
# of Harvesters	139	138	38	1

Source: Nunavut Wildlife Harvest Study, 2004.

Note: # of harvesters represent the number of individuals participating in harvesting at least once per year. Many would participate more than once.

The amount of food from this harvest is a function of the edible weight of each fish, seal, narwhal, and beluga (Table 9). Average weights and edible percentages for narwhal and beluga were determined from the research report Estimating the Economic Value of Narwhal and Beluga Hunts in Hudson's Bay (C. Hoover et al., 2013). Average weight of ringed seals was taken from a Government of the Northwest Territories publication Edible Weights of Wildlife Species used for Country Food in the Northwest Territories and Nunavut (Bruce Ashley, 2002). The size and weight of arctic char have great variation. Evidence of arctic char size was gathered from Stock Assessments for Arctic Char conducted by the Canadian Science Advisory Secretariat for Fisheries and Oceans Canada (2010, 2013).

**Table 9: Weight and Edible Percentage of Country Food, kilograms**

	Minimum Weight	Maximum Weight	Average Weight	Edible weight (%)	Average edible weight
Arctic Char	1	10	3	25%	0.75
Ringed Seal	13	21	15	10%	1.5
Narwhal (female)	800	1000	875	10%	87.5
Narwhal (male)	1500	1800	1600	10%	160
Beluga	600	1100	725	10%	72.5

Source: Estimating the Economic Value of Narwhal and Beluga Hunts in Hudson's Bay (C. Hoover et al., 2013), Edible Weights of Wildlife Species used for Country Food in the Northwest Territories and Nunavut (Bruce Ashley, 2002); Stock Assessments for Arctic Char conducted by the Fisheries and Oceans Canada (2010, 2013)

## VALUE OF THE MARINE-BASED HARVEST

The value of this country food is a function of output, edible weight, and an assigned monetary value. There is much debate over the best methodology for this valuation. If sold in a supermarket, country food would be considered similar to other free range, organically raised food and would sell at a premium price. There is an argument that this premium price should be used in assigning the country food a value. Another argument is to look at nutritional content. Arctic char, for example, is nutritionally similar to trout and salmon. It should therefore be given a value similar to these products. Still, a third methodology is to use the wholesale price of the equivalent foods rather than the retail price because the latter price includes additional input costs and retail margins. All of these methodologies are based on the idea of assigning a value based on a replacement that is a close comparison to the country food in question—essentially assigning the country food a commercial or market price.

A different approach is to assign value-based on available substitutes. This methodology looks at the food prices in local grocery stores and assigns the country food a value based on what a family might purchase if the country food was not available. It is unlikely that a family would purchase premium-grade meat or fish priced at \$50 per kilogram or higher when fresh char or seal is available, but would instead look at ground beef, chicken, or pork chops. The average price of these choices becomes the replacement cost and therefore the basis for valuing the country food output.

The latter methodology is the one used in this study. The research question is one of food security not commercial viability of country food. Does or can country food replace store bought food affordably? Adopting the substitution methodology is the practical approach given the purpose of this report, but it has to be acknowledged that this methodology does return a lower valuation than the other options.

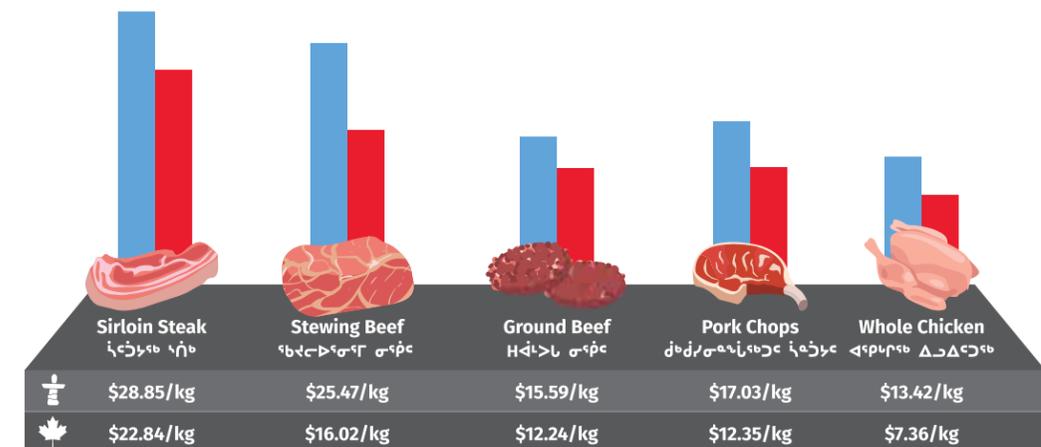
The Government of Nunavut publishes food prices across the territory. Table 10 contains the average price of meat in the Baffin region in 2017. In addition, the Government of Canada subsidizes the transportation of perishable, nutritious food to remote and isolated communities throughout northern Canada through its Nutrition North Canada program (Government of Canada, 2017). The average subsidy across the six communities in our Study Area is \$8.00 per kilogram for Level 1 perishable food that would include fresh meat (Table 11). Without this subsidy, the average price of meat in the Baffin Region would be \$28 per kilogram.

Combining these data on marine-based country food production from the Nunavut Wildlife Harvest Survey, average weights, edible percentages, and an average substitute price of \$20 per kilogram produces a valuation for the harvest of \$2.35 million (Table 12). Using the non-subsidized average price of \$28 per kilogram raises the value to almost \$3.3 million.

**Table 10: Average meat prices in Baffin Region, 2017, \$ per kilogram**

Sirloin Steak	28.85
Stewing Beef	25.47
Ground Beef	15.59
Pork Chops	17.03
Whole Chicken	13.42
<b>Average Price</b>	<b>20.07</b>

Source: Nunavut Bureau of Statistics, 2017 Nunavut Food Price Survey



**Table 11: Subsidy for Eligible Level 1 Foods**

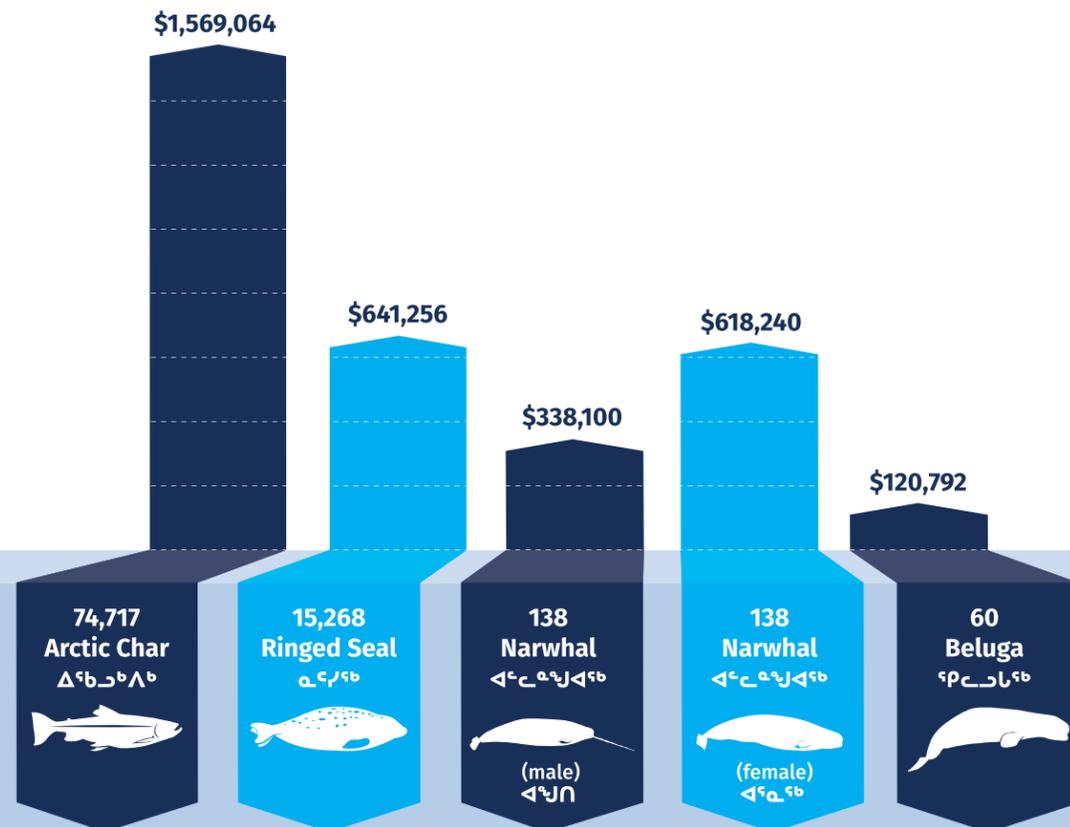
	\$/kg
Arctic Bay	8.60
Clyde River	6.60
Grise Fjord	16
Pangnirtung	4.10
Pond Inlet	8.10
Qikiqtarjuaq	4.80
<b>Average</b>	<b>8.03</b>

Source: Nutrition North Canada

**Table 12: Marine-based Country-food Harvest Value**

	Units harvested	Edible Weight (kilograms)	Substitute Value (including NNC subsidy) (\$20/kilogram)	Substitute Value (excluding NNC subsidy) (\$28/kilogram)
Arctic Char	74,717	56,038	\$1,120,755	\$1,569,064
Ringed Seal	15,268	22,902	\$458,040	\$641,256
Narwhal (female)	138	12,075	\$241,500	\$338,100
Narwhal (male)	138	22,080	\$441,600	\$618,240
Beluga	60	4,314	\$86,275	\$120,792
<b>Total</b>		<b>117,409</b>	<b>\$2,348,170</b>	<b>\$3,287,452</b>

**Marine-based country food Harvest Value**  
**Marine-based country food Harvest Value**



A final methodology for assigning value is to not convert the food into a monetary value, but instead, view it in terms of the number of portions of food it represents. If one serving is 200 grams, the harvest volume shown in Table 12 represents 587,000 individual portions; enough to provide every Inuit man, woman, and child living in the Study Area with just over 100 portions annually.

The value of marine-based country food could also be viewed as a means to address food insecurity exclusively. Depending on how many people this represents (for example, one could assume the 40% of households living below the LIM would benefit the most from the country food), we could determine how far the harvest could be stretched. Distributed amongst the estimated 2,300 people living below the LIM, the annual harvest represents 51 kilograms of meat annually—approximately 255 servings per person per year, two servings every three days.

Whether we look at the annual harvest in terms of total edible weight (117,409 kilograms) or its substitute value (\$3.3 million), this is a lot of food for a population of 5,700. But it could be argued that its greatest value is in its distribution. Unlike income earned in the wage economy, country food is shared across a wide network of family, friends, and people in need throughout the community (Wenzel, 2000). From the survey conducted by the QIA, only one household of the 40 surveyed reported no sharing, while 60% of the households surveyed indicated sharing beyond their network of family and friends; that is, sharing with people they have no particular relationship with. Several respondents added notes to indicate they give country food to anyone in need. In economics, this system of distribution is ensuring food finds its way into households where it has the highest marginal value<sup>5</sup>.

Others have mapped food distribution more carefully and have found similar results, and in fact, have demonstrated the tremendous complexity within the system of distribution (Harder, 2013). Inuit sharing is dynamic and is able to adjust quickly from one day to the next based on changing needs within the community. Researchers have also demonstrated that the distribution of money is far less complex, that money is not given as freely or as broadly as country food, and that its movement is usually limited. Most typically, money passes between close family members, and unlike food, it is generally given only when specifically asked for and for a specific purpose (Wenzel, 2000).

It is easy to see why and how country food is viewed as a potential solution to solving food insecurity in Inuit communities, and why it is common to find recommendations for increased country food harvesting. Given the volume of food produced and the system of distribution, country food finds its way into the households that need it most. Viewed in a different way, this system likely outperforms the bureaucratic process of social assistance that is, at its core, trying to serve the same purpose of redistribution from those that have more to those that have less.

Drawing this discussion back to potential offshore oil and gas development, we must ask the question of mitigation. That is, what is the cost of disrupting marine-based harvesting on Inuit communities? The answer must be something greater than the simple substitute value of the harvest. It must also account for the cost of redistribution. It would also have to consider the cost of moving a society that is, today, able to manage its food security through its own resources, ingenuity, and government support to one that is entirely dependent on subsidies (mitigation payments). What is the cost to society for that disruption? Is there a way back to a subsistence-based economy after the development is completed? And, if not, would the mitigation payments continue in perpetuity?

<sup>5</sup>As the amount of food available within a household declines, the value of an additional portion of food goes up. Marginal value refers to this last portion of food received or consumed.

## COST OF THE MARINE-BASED HARVEST

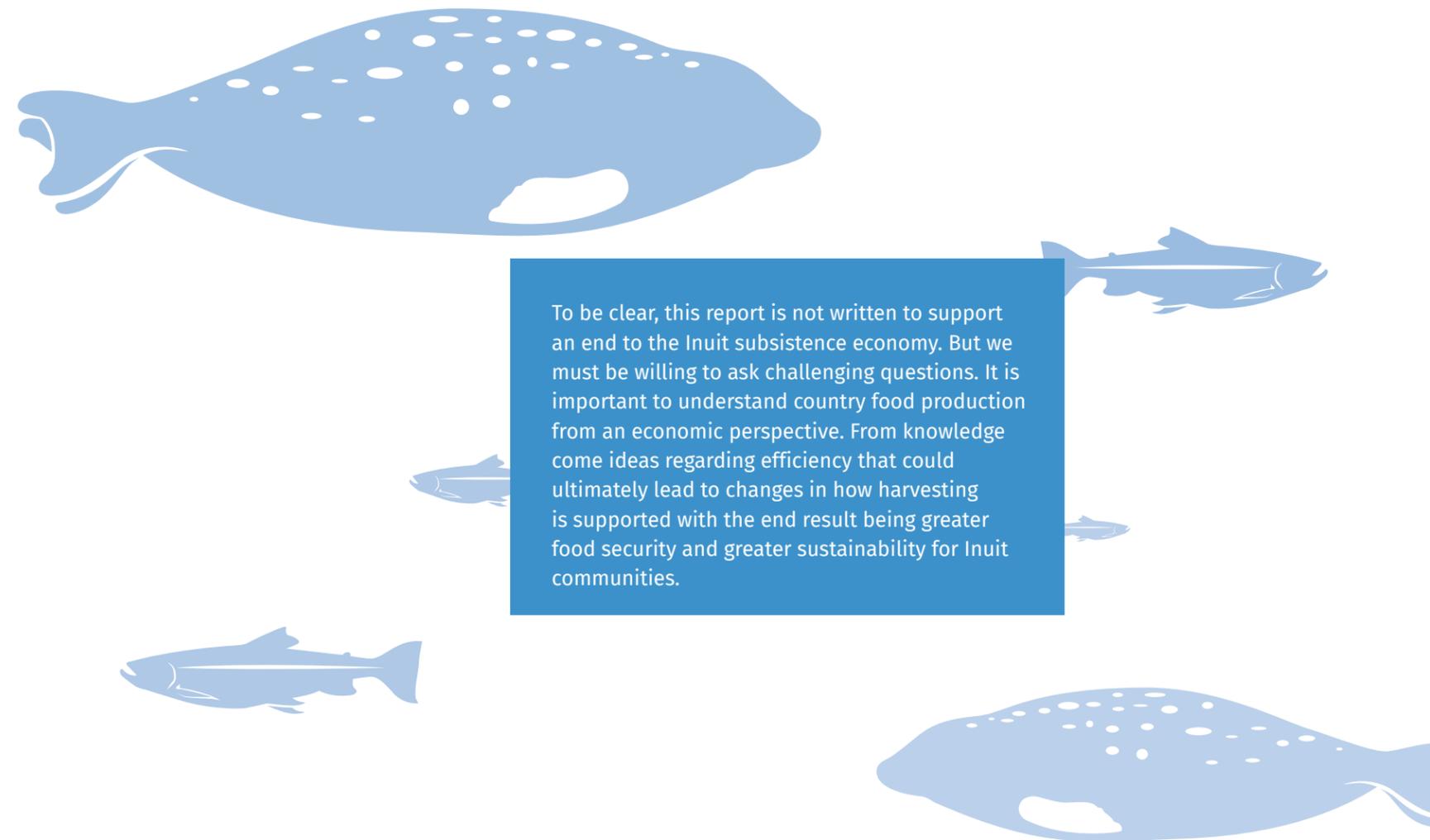
Before moving ahead with conclusions regarding local food production and whether it can lower food insecurity, there are important economic questions to ask related to the cost of this production. Viewing only revenues without any concern for costs doesn't make for good business. If the cost of hunting and fishing is greater than the value of the food harvested, one might argue that communities would be better off using the money to purchase meat from the grocery store rather than on hunting expenses. By doing so, not only would it increase food consumption, but presumably it would also free up the time of harvesters to do other productive work. The net result of more groceries and higher overall labour income would be greater than the net value of harvesting. Taking this example to an extreme, one could argue that public funds used to support harvesting could then be redirected toward additional support for low-income families or higher food subsidies.

It is imperative that we gain an understanding of the cost side of harvesting given the possibility of these negative conclusions. Costs include basic expenditures such as fuel and other supplies, maintenance and repairs to machinery, and the depreciation of capital (sometimes referred to as rent).

Data collection is an obvious challenge. Most hunters do not typically keep a record of their expenditures. It is also not clear how capital depreciation should be determined, especially when boats, snowmobiles, and ATVs are used for recreational and transportation purposes in addition to harvesting. There are also different levels of participation, with some hunters engaged in the subsistence economy on a full-time basis, while others participate only occasionally. Should they be treated the same? And, what about those participating solely for recreational, cultural, and spiritual reasons; that is, where subsistence is not a motivation?

There has never been a comprehensive survey of production costs in the subsistence economy, undoubtedly because of the difficulties in collecting accurate data and establishing a clear methodology for what is to be included and how. This represents an important limitation within this research endeavour. Without these expenditures, it is not possible to determine the net benefit from small-scale, community- or family-based fishing, sealing, and whaling.

In an effort to close this gap, the QIA conducted a survey of harvesting across a small sample of residents in the Study Area to collect data on country food production, sharing, and costs. The results from this survey provide information on the economics of harvesting, but the small sample size (40 households were surveyed across five communities) increases the probability of sampling error (higher margin of error) and therefore should not be the basis for policy design or decisions.







a percentage of the depreciation must be given to those other activities (driving around town, recreational uses). And finally, equipment is occasionally shared. It is not uncommon for a hunter to borrow a boat or ATV for a day, weekend, or even for several weeks over the year. This adds another level of complication to any methodology devised to calculate the value added or GDP of harvesters.

Subsidies are an important consideration. In economics, subsidies are removed from the total GDP because they artificially raise profits. Harvesting subsidies come in the form of programs that preserve and promote traditional Inuit activities.

There are several programs that support different aspects of the subsistence economy in Nunavut. Listed below are some of the more prominent ones administered by the Government of Nunavut and Nunavut Tunngavik Incorporated. We have not included subsidies for such things as fuel that are provided more generally to all Nunavummiut and that do not target harvesting specifically.

#### **Government of Nunavut:**

- Country Food Distribution program: \$1,868,000
- Sustainable Livelihood Fund: \$128,000
- Support to HTOs and RWOs: \$540,000
- Department of Environment: \$885,000, which includes several programs including
  - Wildlife Damage Compensation program
  - Wildlife Damage Prevention program
  - Hunters and Trappers' Disaster Compensation program
  - Community Harvesters Assistance program
  - Support to Community Organized Hunts
  - WSCC Harvesters program
- Nunavut Tunngavik Inc.:
  - Nunavut Harvesters Support Program was reinstated in April 2017 with NTI committing \$1.2 to \$2.0 million for its first year<sup>11</sup>.

These subsidies amount to \$5 million annually (assuming NTI's contribution is \$1.6 million). For simplicity, we assume the distribution of funds is on a per capita basis, meaning the Study Area communities received their representative share (18%) of the funds or \$900,000 during the 2017-18 fiscal year, which is approximately \$160 per person. This assumption might not be entirely accurate because the government provides larger sums to special projects that skew the distribution of resources. For example, in 2015-16, the government gave a total of \$700,000 to three community freezer projects in communities outside our

Study Area. Furthermore, harvesting support programs are not focussed exclusively on marine-based harvesting. Shares are these payments support caribou hunting, in-shore fishing, gathering, and numerous other subsistence activities. If we can ignore these caveats, the \$900,000 contribution can be measured against the estimated \$3.3 million harvest. A more detailed study is needed to learn exactly how the subsidies are applied, who are applying for and receiving funds, how the program's outcomes are being measured, and importantly, which methods of support are most effective in expanding food production and improving food security<sup>12</sup>.

It is worthwhile to note that other researchers who have looked at the cost of harvesting have found similar results to this study. In the report *Estimating the Economic Value of Narwhal and Beluga Hunts in Hudson Bay, Nunavut*, the authors Hoover, C. et al. (2013), demonstrated the challenges in "breaking even" in the harvest of narwhal and beluga. Their study determined hunting whales in Hudson Bay was not financially viable on the whole (the harvest operated at a net loss), but the authors conceded some flaws in their study. Namely, that the cost of labour used was probably too high given that many of the hunters were not a part of the labour force and that any harvesting of other animals (seals, birds, fish) while hunting whales was not accounted for in their formula. There were also some questions about how to properly account for capital depreciation. Our study encountered some of these challenges as well. For example, some of our survey respondents reported harvesting clams and kelp while fishing for char. Also, our valuation formula did not account for the value of sealskins, narwhal tusks, or other materials that might be sold or fashioned into clothing or jewellery and then sold.

Ultimately, the information collected through the QIA survey is not adequate in forming conclusions with great certainty, but it does provide a starting point for discussions about the contribution of marine-based harvesting to a community's food security and about the basic economics of harvesting. For active and intensive harvesters, with more time and better skills, the value of country food they produce through marine-based harvesting appears to exceed the cost of production, though it is clear that maintaining and extending the life equipment is of critical importance. There is not enough evidence to determine whether the same can be said for occasional hunters and fishers, though it is reasonable to hypothesize that the value of output from these harvesters would not cover all fixed and variable costs.

There are numerous exceptions to these general conclusions. For example, we have also learned that the sharing culture extends beyond food and includes sharing of tools and equipment needed to harvest. An occasional hunter with some money for gas but no tools might be able to borrow a boat or ATV. The culture of sharing means that equipment is used more, lowering its cost relative to its contribution, and allows more labour into the industry, resulting in more production.

When discussing capital costs, there must also be some measure of accounting for depreciation however. The "free" use of a boat or ATV does have a cost related to wear and tear even if that cost is not actually paid for by the user. Eventually, equipment must be replaced, and that a portion of that cost should be factored into the value of every

unit of food produced. Equipment costs constitute an ever-increasing portion of the overall harvesting costs. We don't have a study or survey that confirms what this cost is, but we can hypothesise that if we factor in all harvesters (including occasional, part time, and intensive hunters) and all of their fixed and variable costs, the "profitability" of harvesting is likely marginal for the traditional economy.

<sup>6</sup>The methodology introduced to the Nunavut Wildlife Harvest Study was applied to the results of QIA's survey to determine a value.

<sup>7</sup>It must be stressed that the sample size is too small to have complete confidence in the accuracy of results. <sup>8</sup>This range was determined through a closer look at the survey responses that provided adequate details on both production costs and total harvest. <sup>9</sup>Note that there is no labour income in this case. Labour income equates to profits, which is the surplus of country food after accounting for costs. <sup>10</sup>Numbers based on informal discussions with hunters and fishers on the cost and depreciation of their equipment, and from survey respondents who were able to report their experience with capital depreciation. <sup>11</sup>Financial reporting for the program's first year was not available in time to include in this report. <sup>12</sup>There is a difference between funding harvesting for the purpose of subsistence/food security and harvesting as a means to preserve and encourage cultural practices.

**More research is needed to inform future investment aimed at increasing country food production. This is especially the case for any investment or public program that purports to be in support of greater food security.**

## SUBSISTENCE ECONOMY, FOOD SECURITY, AND OFFSHORE OIL AND GAS DEVELOPMENT

Thus far in the report, we have found overwhelming evidence that food security is under threat in the Study Area communities. This is not so much because the price of food is too high—food prices are a reflection of the cost of doing business in Nunavut—but rather, families do not have adequate income levels to purchase the food they need on a weekly or even daily basis. Importantly, there is evidence that suggests the challenges with income will not be easily or quickly solved.

This leads into the second important point, which is that the subsistence economy remains a vital part of the survival of Inuit in the region—providing a substantial amount of food to a wide network of people throughout the community including those that need it most. This same conclusion was found during an extensive participatory research effort by the QIA in 2017 in its report *Inuusiup Asijjiqpalianingnik Ujjiqsurniq* (Scott, 2017).

These points—the prevalence of food insecurity, the volume of food produced in the subsistence economy, and the system of food sharing—are key in understanding how and where a disruption of harvesting from future oil and gas developments would affect

Inuit in the Study Area and how such a disruption should be managed. To understand this better, we need to introduce more information about Inuit community economics, with some emphasis on the integration of the wage economy and the traditional economy.

The study of economics is largely one of choices related to maximization. For the majority of Inuit families, one such choice is between (a) participating in the wage economy to earn an income to pay for food, shelter, clothing, and all their material wants and needs or (b) participating in the traditional economy where a successful harvest can mean food for the entire community.

- More time in the wage economy can mean enough money for extras like more and better quality imported foods and clothing, housing, consumer goods, modern technologies such as cellular phones, Internet, and computers, and even luxury goods such as vacations. More money can also be invested into additional education or savings.
- More time in the traditional economy means forgoing the extra consumer choices that money brings, but in its place, the traditional economy offers the potential of producing food that can be distributed throughout the community feeding many families. It is also more culturally relevant, produces a high quality product, contributes positively to one's health, and produces materials that can be used in clothing and in arts and crafts.

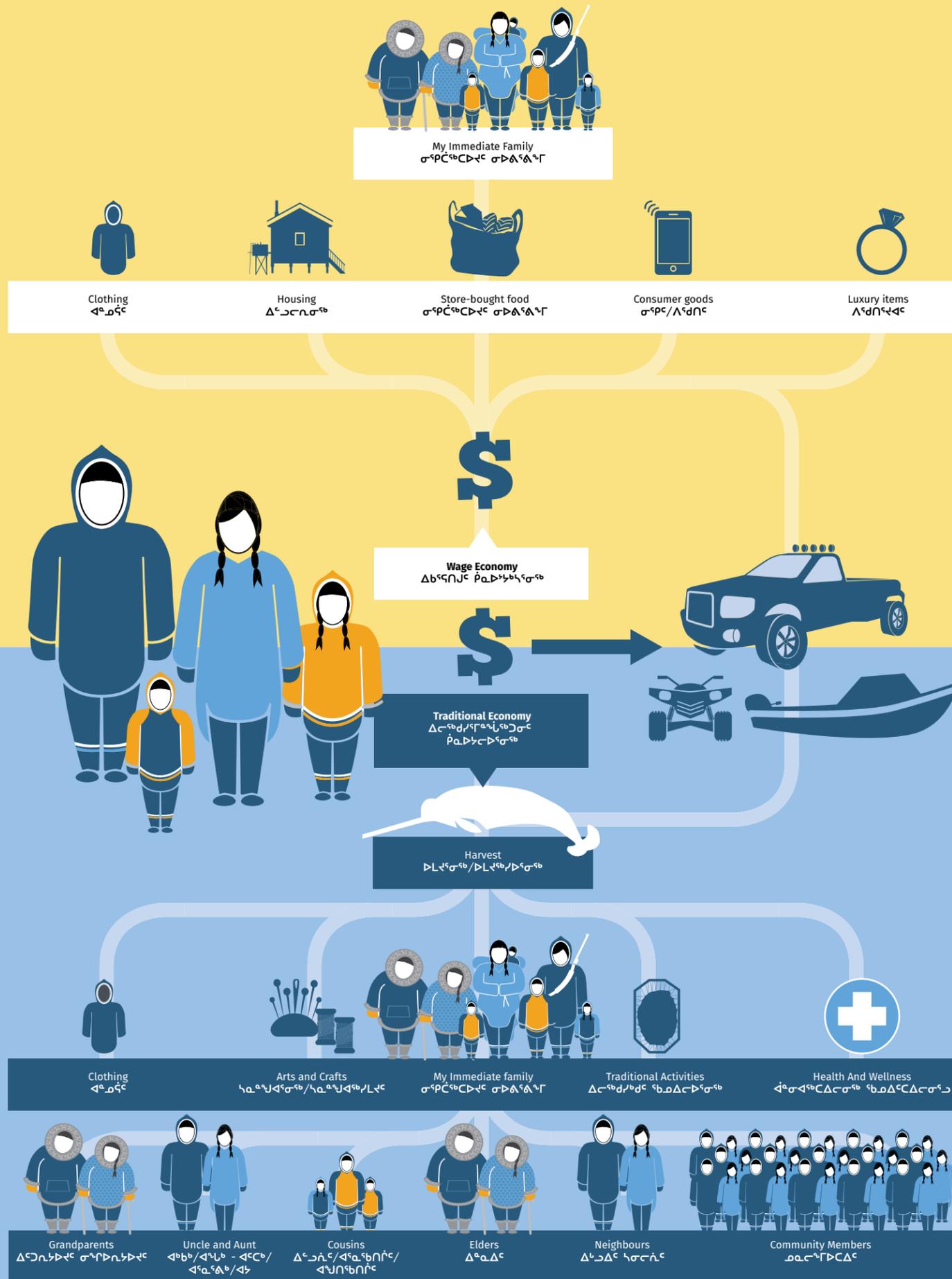
**Food insecurity is a function of inadequate income and not the price of high food.**

**Food insecurity is therefore a challenge for the wage economy in creating jobs and increasing financial wellbeing.**

**Increased country food production has been suggested as a means to food security, but the evidence does not verify whether this is the case or the most effective path to food security.**

**Country food production is being threatened by several factors. Hunters have less time and money, and as a group, their skills are suffering. Meanwhile, environmental factors are affecting wildlife stocks and access to the land and sea ice.**

**These challenges are intensifying as a result of an expanding Inuit population, changing tastes and interests.**



A hunter with enough money to purchase the gas and other supplies needed to get onto the land can turn \$100 of gas money into food for many families. A hunter would require 10 times that dollar amount to achieve the same result in the wage economy by purchasing imported food from the grocery store.

Of course, this only works if the hunter has already acquired all the necessary tools and equipment, or is able to borrow from another hunter. Either way, someone in the community has to have acquired the money to purchase the equipment. The only source of money is the wage economy, whether through employment or transfer.

It is a difficult choice to make. First, to be absolutely clear, this is not a choice between work and play. As this report has demonstrated, the traditional economy is one of subsistence for many Inuit families. It was reported earlier that food insecurity is a major threat throughout Nunavut where **40% of Inuit residing within the Study Area live below the Low Income Measure**, and that 98% of Inuit surveyed by the QIA consume country food as a part of their weekly diet. But the choice is still difficult. The costs associated with harvesting have risen to a point where hunters need more and more time in the wage economy to afford the cost of harvesting (or must rely increasingly on others to provide that financial support). Also, there is evidence to suggest productivity of hunters has declined through a combination of environmental factors and a loss of skills. Hunters have to travel further to harvest from an even declining stock of animals. Meanwhile, the Inuit population is growing faster than any other in Canada. It is becoming increasingly difficult to feed the community with country food. A vicious cycle is forming as a result.

The obvious flaw or error in the decision-making diagram shown earlier and why this vicious cycle is intensifying is that the wage economies in the Study Area communities are not creating enough new jobs and too few Inuit have skills and training that allow them to move seamlessly between the two economies. If not harvesting, most full-time hunters would be unemployed. This is a critical point that cannot be ignored. It means money is running short regardless of whether it is needed to purchase imported food or gas for a hunting trip.

There are other considerations. With the growing population, we must ask whether the natural environment can sustain increased pressure from more hunters and fishers? If harvesting is a part of the food security solution, are we endangering the sustainability of existing hunters by “flooding the market” with new, inexperienced, but publically supported hunters? There is also evidence that Inuit dietary preferences are changing and that country food is not as desirable as it once was (Egeland, 2011). This is undoubtedly an unintended consequence of increased time and effort spent in promoting growth and participation in the wage economy.

Earlier, the employment rate in the Study Area was shown to be below 50%. We also learned that 50% of the adult population is without a high school education and that graduation rates are below 40%. Given the speed at which the population is growing and how fast it is ageing, there is an immediate need of work throughout the Study Area.

Until the outcomes from Nunavut's education system improve and without any significant change in the region's economic outlook, we can surmise that the near future will bring more unemployment, more food insecurity, more demand for at least some types of country food, and perhaps more interest in harvesting itself.

It would appear Nunavut's communities are approaching an impasse. The wage economy is not growing in a way that is offering Nunavummiut the quality or quantity of jobs needed. There are growing pressures on the subsistence economy, including the cost of participation and the loss of skills needed to be productive. Yet the growing population demands more of both. Nunavut needs more and a greater diversity of jobs in the wage economy and there are repeated calls for more participation in the increasingly expensive subsistence economy. Opportunities for economic development are therefore of tremendous importance to the region and its population, as are innovations that improve productivity in the subsistence economy.

Enter the potential oil and gas development in Baffin Bay and Davis Strait. Any opportunity to grow the economy and create wage employment must be examined carefully. If this development were to proceed, it would bring hundreds of millions of dollars in investment to the eastern Arctic for many decades. However, we have learned that it is an activity that does not create many jobs, and the labour that is needed is highly specialized and not found in Nunavut's labour force. While offshore exploration might create indirect opportunities in transportation, logistics, catering, and other services, there would be virtually no direct benefits to the economies and labour market in the Study Area communities. So, unlike other forms of economic growth that would offer an alternative to subsistence hunting and fishing, offshore oil and gas development does not. What's more, it has the potential of disrupting wildlife and/or access to it. By how much has not been determined, but in essence, it has the potential to put harvesters out of work while not creating replacement jobs.

One could speculate that any disruption to harvesting caused by oil and gas development would be mitigated through some form of financial compensation. The calculations made in this report to determine the value of marine-based harvesting can be used in assessing the dollar value of that compensation, but we have learned that the true value of this harvest is greater than the substitute value of the food. Inuit distribute country food in a way that ensures no one in the community starves. It is akin to social assistance in the wage economy, yet appears to be far more effective. On a day-to-day basis, this system can determine who needs food the most and can get it to that family quickly and with no additional administrative cost. It was also suggested that displacing a generation of harvesters from their employment in the traditional economy would forever change the social, cultural, and economic landscape of Inuit society. Amongst the greatest fears must be that the potential industrial development will bring about losses that are intergenerational from which Inuit culture could not recover.

## CHALLENGES MOVING FORWARD: NEEDED RESEARCH

The purpose of this report was to provide evidence of the contribution marine-based harvesting makes to food security in the Study Area communities in order to inform future decisions on how offshore oil and gas development should be managed. To that end, the report has established a substitute value for marine-based country food based on the Nunavut Wildlife Harvest survey. A new survey is highly recommended, not only to improve the estimations made in this report, but also as a means to understanding the subsistence economy of today and how it is changing.

The Study Area communities have some mounting challenges related to their sustainability. As evidence of this, the report compiled statistics from recent surveys that demonstrate the existence and growing problem of food insecurity (2016 Canadian Census; Canada Health Survey; Inuit Health Survey). Too many Nunavummiut cannot afford to provide themselves or their families with the quality or quantity of food that most Canadians would deem acceptable.

The subsistence economy is the means by which Inuit ensure their food security. This is clearly demonstrated by the volume of food produced and the manner in which it is distributed (Harder, 2013). The small survey conducted as a part of this research did show that full-time harvesters are able to operate sustainably. We need to learn whether this success can be replicated so that we can determine if it is truly a means to further reduce food insecurity.

The potential development of offshore oil and gas does not appear to be an immediate solution. Unlike other economic opportunities, it does not offer a mix of jobs and capital investments that are commonly associated with economic growth. In fact, it has the potential to alter the sustainability of some communities by disrupting an important food source and by displacing those currently engaged in its production.

Future work in this area should focus on improving our understanding of the state of development in the Study Area communities and the interplay between the wage and traditional economies. Decisions regarding future development should be based on a solid understanding of how the population, the whole economy, and the environment will change over time. And, in the case of our Study Area communities, we must understand better the traditional economy and its relationship with food security.

**More research is needed to understand the transition that is taking place in the economic landscape.**

**Oil and gas development will not solve food security issues because it will not create job opportunities for Study Area residents.**



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