Preliminary Report: Climate Change and Health Adaptation in Northern First Nations and Inuit Communities Program- 2010-2011

Arviat, courtesy of Maude Beaumier, Marie-Pierre Lardeau and Margaret Kanayok

Project Title: Determinants of food insecurity among Inuit women in Arviat, Nunavut: the role of climate change and multiple socio-economic stresses

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1. INTRODUCTION

Climate change is occurring at unprecedented rate in the Arctic regions. Temperatures are increasing at twice the global average, precipitation is increasing, sea ice extent and ice thickness are decreasing, and extreme weather events are more frequent and intense (Comiso 2003; ACIA 2005; Stroeve, Serreze et al. 2005; Stroeve, Holland et al. 2007; Comiso, Parkinson et al. 2008; Perovich and Richter-Menge 2009; Richter-Menge and Overland 2010). Scientific and traditional knowledge document the impacts of climate change on Inuit food systems across the circumpolar world. (e.g. Ford, Smit et al. 2005; Ford, MacDonald et al. 2006; Ford, Pearce et al. 2007; Ford, Pearce et al. 2008; Ford, Smit et al. 2008; Ford, Gough et al. 2009; Pearce, Ford et al. 2009; Wesche and Chan 2010). In Nunavut, where prevalence of food insecurity is particularly high (Ledrou and Gervais 2005; Egeland, Pacey et al. 2010; Egeland, Johnson-Down et al. 2011), concerns have been raised regarding the impact of climate change on Inuit food security. Women have been identified has being particularly susceptible to suffer from food insecurity (Lambden, Receveur et al. 2006; Government of Nunavut 2007; Ford and Berrang-Ford 2009; Beaumier and Ford 2010).

Arviat is a community of 2850 people located on western Hudson Bay, Territory of Nunavut (61°06N, 94°03W). Arviat is a traditional community where hunting is an important activity for diet, cultural identity and the local economy. The community has been regarded as having strong Inuit language and cultural practices. Cultural practices are highly respected and regarded by the community as important protective factors in terms of a community coping with rapid change (Tagalik 1998; Tagalik 2006). Inuit commonly hunt and consume caribou, seal, fish, geese, eggs, muktuk and berries which are viewed as core components of the community diet. Arviat is located in an environment rich in country foods. The community of Arviat is recovering from colonization which resulted in forced relocation in the 1960s to establish a settlement at then Eskimo Point. Arviarmiut are facing several key issues such as inadequate housing, poverty, unemployment, a large youth population and stresses on parents/grandparents. These issues were identified through a broad-based, community wide consultation process (Arviat Health Committee 2008). Previous community projects have also shown that food security is a problem for 50% of the community families, women being particularly at risk of suffering from food insecurity. Food insecurity may become an increasingly significant issue if changing climate challenges future harvesting efforts of Inuit now living in fixed settlements. The community of Arviat was seeking information about the role of environmental change as it was affecting food access, availability and quality and all other determinants of food insecurity among perhaps the most sensitive population: women. From 2009 to 2014, the community has been implementing a wellness strategy focusing on a Healthy Homes initiative which targets improving food security, including the access, availability and quality of foods consumed by families, as a key tool to improving community wellness.

This project provides solid baseline data in the area of Inuit women's food insecurity. Results show that socio-economic factors are most important in determining Inuit women's food insecurity in Arviat and that climate change has not yet significantly affected Inuit women's capacity to access food. Nevertheless, a better understanding of the vulnerability of Inuit women's food systems to climate change within the context of rapid socio-economic changes will allow the community to plan for the future, design and development responsive projects, and ultimately interventions and programs that will provide sustainable population health improvements.

2. CONTRIBUTORS

This community-based project was designed and implemented by the community of Arviat and McGill University. Local partners include members and most specifically the chair, Mrs. Shirley Tagalik, of the Arviat Health Committee (AHC). Mrs. Tagalik was the project coordinator at the community level. This involved several tasks including the elaboration of the research proposal, securing project approval from the Hamlet Council of Arviat, hiring and training of research assistants, establishing a fully equipped community research facility. Mrs. Tagalik also provided valuable information regarding community resources and contacts.

Mr. Ed Murphy, Senior Administrative Officer of the Hamlet of Arviat, and Michael Cohen, Director of Finance, provided financial and logistical coordination with Health Canada funders. Mr. Murphy also helped to find adequate research facilities and accommodation for external researchers.

Research assistants, Ms. Hilda Panigoniak and Ms. Sarah Curley, participated to the data collection, analysis and dissemination phases. They were first trained during the research workshop delivered by Gwen Healey, Executive Director of Qaijigiartiit/Arctic Health Research Network (AHRN). Then, they assisted Ms. Maude Beaumier and Ms. Marie-Pierre Lardeau (McGill University) during the two-day Photovoice workshop. They contacted and selected all participants, interpreted and led semi-structured interviews and focus groups, and gathered environmental data, such as local costs for the Northern Food Basket. Ms. Panigoniak and Ms. Curley transcribed all the interviews and the focus groups discussions. Ms. Panigoniak participated to a radio shows to update the community about the research process and open the lines for discussion. Ms. Diane Angma and Obed Anoee, Community Health Representatives, also were of great assistance with the radio show. Hilda Panigoniak and Sarah Curley presented the research project at the Pan Arctic Results Workshop held in Ottawa from the 8th to the 10th of February 2011. They were interviewed by Mrs. Sarah Rogers from Nunatsiaq News at the workshop who then published an article about the project on February 15, 2011 (see article at http://www.nunatsiaqonline.ca/stories/article/98789_getting_to_the_root_of_arviats_food_insecurity/).

Figure 1. Maude Beaumier, Sarah Curley and Hilda Panigoniak presenting at the Pan Arctic Results Workshop in Ottawa. (Credit: Sarah Rogers, Nunatsiaq News)

Mrs. Winnie Malla and Ms. Diane Angma helped with the interpretation of Elders focus group discussions, as well as Mr. Frank Nutarasungnik who helped recruit local hunters, lead hunters' focus groups and interpreted those discussions. Mr. Nutarasungnik and his family also accommodated Ms. Beaumier for many weeks of her visit to the community.

At the academic level, Dr. James Ford, assistant professor of the Department of Geography at McGill University coordinated the project, reviewed the proposal and final report, offered insight on qualitative data collection methodology and analysis, and provided research facility at the university and Nvivo software used for qualitative data analysis. Ms. Beaumier, MA candidate of Dr. Ford, helped with the elaboration of the research proposal and the final report, trained research assistants, led interviews with Inuit women, key informants and focus groups with women, elders and hunters, transcribed interviews, and analyzed the qualitative data. She returned to Arviat in August 2011 to help disseminate the final results.

3. RESEARCH AIM AND OBJECTIVES

Our general ***research aim--*** to identify and characterize the key factors determining the vulnerability of Inuit women to food insecurity within the context of significant socio-economic transformations as well as climatic and environmental changes, in the community of Arviat—has been largely addressed. Overall, we have collected valuable qualitative data on women's food insecurity, using a variety of methods, and improved our understanding of how multiple factors affect the vulnerability of their food system due to climate change.

Four ***short term objectives*** were set out in the original proposal. We have met the following three:

1. Identify and characterize the multiple cultural, socio-economic and environmental determinants of Inuit women's food insecurity and assess how they interact.
2. Identify components of Inuit women's food system that are sensitive to changing climatic conditions in the context of various stresses.
3. Document coping strategies adopted by women in response to food insecurity and identify the determining factors that enable them to cope or not.
4. Elaborate recommendations targeting community run programs as well as territorial and local policies to enhance Inuit women's food security and enhance adaptive capacity in the face of rapid climate change.

Three long-term objectives were set in the original proposal. According to the recommendations made by the community and depending on future funding sources directed to community-initiated programs targeting Inuit health and climate change, these objectives may be reached at some point in the future:

1. Improve Inuit women and their families' nutrition and overall health and wellbeing.
2. Enhance, over the long term, Inuit women's adaptive capacity in the context of rapid climate change.
3. Improve local interventions with the provision of adequate territorial and federal support.

4. PARTICIPATORY RESEARCH APPROACH

A community-based participatory research approach (CBPR) was used to draw upon the observations and knowledge of community members to identify and characterize factors

determining the vulnerability of Inuit women to food security. This approach is widely recognized to be essential for successful community-based health and geographical research and is increasingly the norm in northern regions (Duerden and Beasley 2006; Furgal and Seguin 2006; Skinner, Hanning et al. 2006; Parkinson, Bruce et al. 2008; Power 2008; Ford 2009; Pearce, Ford et al. 2009). For our research project, it was essential to elaborate significant research objectives and culturally relevant research outcomes while equally involving the community members and the researchers. Members of the Arviat Health Committee, two research assistants and researchers from McGill University were all involved in the elaboration and execution of the research. The evaluation of the research and dissemination of results occurred in August 2011, with the involvement of all partners.

5. METHODS

5.1 Mixed methods

A 'mixed methods' approach was employed in this research to study different aspects of Inuit women's food system, focusing on the access, availability and quality of foods, impacts of climate change and emerging coping mechanisms. The methods included photovoice, in-depth semi-structured interviews with Inuit women, and key informants, focus groups with women, elders and local hunters and an environmental scan. This research followed an iterative process, as the result of analysis was reviewed to continually integrate the community's feedback.

5.2 Sampling

Women participants in the photovoice activity volunteered based on community radio advertisements made by Ms. Panigoniak and Ms. Curley. The participants selected were Inuit women older than 18 years old and permanent residents of the community. Ten women participated, which is a good number for this type of research activity.
Women participants in the interviews were selected through a purposive sampling strategy. Ms. Panigoniak and Ms. Curley selected women using the same criteria. The number of participants (n=42) was directed by theoretical saturation. Participation was on a voluntary basis. All women interviewed were contacted three months later to participate in a follow-up focus group discussion. Twenty four women participated in focus groups (n=5) on a voluntary basis. Table 1 includes all women participants' characteristics.
Female elders who participated to the focus groups (n=3) were selected through a purposive sampling strategy. Ms. Panigoniak and Ms. Curley contacted and selected 19 Elders over 55 years old who permanently reside in the community. Participation was on a voluntary basis.
Hunters who participated to the focus groups (n=2) were selected through a purposive sampling strategy. Advertisements were made on the local radio to recruit experienced hunters. Research assistants selected from respondents and Frank Nutarasungnik contacted hunters recommended by the Hunters and Trappers Organization (HTO). Fourteen hunters participated on a voluntary basis.

Category	Sub-category	Quantity	Percent (%)
Age	20 to 29	8	19
	30 to 39	15	36
	40 to 49	10	24

	50 to 59	2	5
	60 to 69	3	7
	70 to 79	4	10
Marital status	Married	23	55
	Single	19	45
Employment status	Full time	5	12
	Part time	12	29
	Unemployed	25	60
Number of children per household	0 to 1	12	29
	2 to 3	13	31
	4 to 5	10	24
	6 to 7	7	17
Number of people per household	1 to 2	8	19
	3 to 4	10	24
	5 to 6	8	19
	7 to 8	8	19
	9 to 10	5	12
	11 to 12	2	5
Number of hunter per women's household	At least one hunter	22	52
	At least one full time hunter	6	14
	At least one part time hunter	12	29
	At least one occasional hunter	6	14
	No hunter	20	48
Presence of hunting equipment in women's household	Some hunting equipment	14	33
	- Skidoo	9	21
	No hunting equipment	28	67

Table 1. Sample population characteristics of women interviewed in Arviat, Nunavut

* It does not add up to 42 because 1 woman can have more than one subcategory of hunter in her household.

5.3 Photovoice

The first research method employed was Photovoice. This technique is increasingly used in community-based participatory research, notably with Aboriginal people (eg. Wang, Burris et al. 1996; Wang, Yi et al. 1998; Castleden, Garvin et al. 2008; Lardeau, Healey et al. 2011). It has been used to empower the participants and reduce the power relationship between them and the researchers. Here, photovoice allowed the research team to introduce the research project to the community in an interactive manner. It offered Inuit women the opportunity to be fully engaged in the research process and help them represent their reality through their own photography. During this activity, the participants were the researchers. A workshop was first conducted by Gwen Healey of the Arctic Health Research Network and then a follow-up session was launched by Marie-Pierre Lardeau and Maude Beaumier to explain the motive of this particular research,

key themes, ethical issues regarding taking photos of others and also to teach the participants how to use a digital camera. Then, during the following four days, the participants took their pictures to answer the following question: "What influence what you eat, when you eat and how much you eat". The most significant photos were selected by each participant and were discussed/interpreted in a focus group setting. Several themes emerged from the pictures that participants grouped into different categories. It was agreed that the photos are the property of each woman and, when permission was given, they were also kept by the AHC and McGill University. Dissemination of photos to the community (poster, calendar, booklet, exhibition, etc.) was agreed to by the participants, but this work is yet to be completed and is dependent on accessing funding. Results of the photovoice are included in Appendix II. Participants were compensated for their time with a $60 food vouchers each.

5.4 Semi-structured interviews

The second phase of the research conducted semi-structured interviews (n= 42) with Inuit women and key informants. Semi-structured interviewing is a standard method for gathering information in an open-ended format and has been used in various northern research contexts (Gearheard, Matumeak et al. 2006; Laidler 2006; Krupnik and Ray 2007; Carmack and Macdonald 2008; Laidler and Ikummaq 2008; Ford 2009; Beaumier and Ford 2010). For our project, it was an ideal way of collecting in depth qualitative data about the determinants of Inuit women's food security and the vulnerability of the Inuit food system to climate change drawing upon stories and personal experience. An interview guide identifying the key themes to be addressed was elaborated based on previous research on food insecurity (Ford, Beaumier et al. 2009; Beaumier and Ford 2010) and with the help of research assistants, avoiding a fixed list of questions. Inuit women were interviewed by Hilda Panigoniak, Sarah Curley and Maude Beaumier in order to develop a baseline understanding of food insecurity and its determinants. Interpretation occurred when necessary. Women were compensated for their time and for providing essential information with $40 food vouchers, which respects the current rate of compensation in the community. Key informants, such as professionals in the health and education sector, community and territorial government representatives and store managers, wildlife biologist and officer, were also interviewed to provide additional contextual information essential to identifying broader scale determinants of food insecurity.

5.5 Focus groups

Focus groups were carried out with *Inuit women* to expand on interview data in a group setting and also were used as a "respondent validation" strategy in order to get feedback on preliminary findings and verify the credibility of interpretation. Small groups of 4-6 women were favored as it is easier to manage than larger groups and it has been shown to enhance communication among participants and ensure effective translation (Ford, Gough et al. 2009). Women were again compensated for their time with a $40 food vouchers per participant. Ms. Panigoniak and Ms. Curley led women's discussion, and provided interpretation as needed for Ms. Beaumier. *Elder* and *hunter* focus groups were carried out to acquire additional information on women's food insecurity and expand on specific subjects, for example: traditional practices and beliefs, country food accessibility, quality and availability, hunting, trends of climate change over time. Elders and hunters were compensated with a $100 food vouchers and $100 gas vouchers respectively. Ms. Panigoniak and Ms. Curley led women's and elders' discussions, and provided interpretation as needed for Ms. Beaumier. Mrs. Winnie Malla and Ms. Diane Angma also

assisted with the Elders' discussion groups. Ms. Beaumier and Frank Nutarasungnik, an experienced hunter himself, led the hunters' focus groups.

5.6 Environmental community scan

Environmental community scanning was carried out to collect further contextual information and develop further insights about the determinants of food insecurity. The scan notably involved estimating the cost of a basket of goods to feed a family of four in Arviat for a week based on the Department of Indian and Northern Affairs' Revised Northern Food Basket (INAC 2007), in addition to collecting data on gas and oil price and other items such as cigarettes and pop (soft drinks) to better estimate the cost of living. The quality, accessibility and availability of foods were observed at the local grocery stores, as well as Inuit consumption patterns.

5.7 Secondary source

A literature review was carried out by Maude Beaumier using peer reviewed articles and local documentation available from the Hamlet, the Health Center, the Community Wellness Center, the Department of Environment. The Arviat Health Committee (AHC) has collected data on food security in 2005-2006, which provided valuable baseline information.

5.8 Data analysis

All data from interviews and focus group discussions were transcribed and analyzed thematically to create common groups or categories relating to food insecurity and the vulnerability of women's food system to climate change, and explore differences by participant characteristics (see Ford 2008). Analysis was conducted using QSR NVivo; a software package designed to organize, handle, and facilitate the analysis of qualitative data. Concept mapping was used to illustrate the vulnerability of Inuit women food system to climate change and how it creates conditions of food insecurity.

6. GENDERED DIMENSIONS OF THE FOOD SYSTEM IN ARVIAT, NUNAVUT

To determine how Inuit women's food systems in Arviat are susceptible to climate change, it is important to define the nature of the food systems and how they operates today. The western definition of a food system, whereby a food system is composed of "dynamic interactions between and within biophysical and human environments which result in the production, processing, distribution, preparation and consumption of food" was used (Gregory, Ingram et al. 2005: 2141; Ericksen 2008). Each component is described in the following section, specific to country food and store food systems, and located in a historical context.

6.1 Country Food

Production: Traditionally, male hunters "[had] the sole responsibility of securing food" for their family (Van Stone and Oswalt 1959: 8). They were responsible for supplying food to women, children and elderly men (unable to hunt). Caribou Eskimo males harvested mainly caribou all year long with the high-season occurring during caribou migration in both spring and fall and fish such as arctic char (*Salvelinus alpinus*) and lake trout (*Salvelinus namaycush*) also important in the diet all year round (Birket-Smith 1976). In spring and summer about one quarter of

Caribou Eskimo[1] moved to the coast to hunt seal and walrus, although use of sea-mammals was less practiced than among neighboring Netsilik and Iglulik Inuit (Birket-Smith 1976). Seals were not normally hunted during the winter, except for Qaernermiut living at Chesterfield Inlet (Birket-Smith 1976). During the summer, Caribou Eskimo also harvested ducks, geese, ptarmigan, gulls and their eggs, ground squirrels and hares (Arima 1984: 449). A variety of berries and roots were collected by men and women in the summer. Before Musk-ox (*Ovibos moschatus*) was practically extinct in northern Manitoba and the southern Kivalliq region in the beginning of the 20th century, it was particularly important during times of caribou shortage, as well as fish and ptarmigan (Burch 1977; Arima 1984).

The interviews conducted here reveal that harvesting remains a male activity in Arviat, although, some women hunt as a group and/or with their husbands. Today, husbands, fathers, sons, grandsons, brothers and in-laws are the main providers of country food to women. Caribou is still the main (and preferred) country food in Arviat. People also harvest other species in season, most commonly being lake trout, arctic char, seal and beluga from which muktaaq is consumed (beluga skin). Entire families pick berries and eggs. As muskoxen return to the area, these animals are also being harvested using a tag system.

Distribution: Historically, "economic interactions [among Caribou Eskimo] were governed principally by residential association, which in turn was strongly influenced by kinship and exploitative task requirements. The land and its resources were held to be for all and not to be claimed by individuals or communities, although each group had a vaguely demarcated home area". (Arima 1984: 455). The harvest was the property of the local group and shared within a camp (Arima 1984). Whether within a camp or between different camps, Birket-Smith (1976: 257 vol. 1) notes *that* "the distribution of meat which takes place after the hunt […], in the minds of the Eskimos, is […] a right, which does not crave any direct return", given that everyone in the camp was an active member doing their share of the tasks. Indeed, in a Caribou Eskimo family, circle or camp social organization was based on practicality and labour was naturally divided between male and female (Table 2) (Birket-Smith 1976). On the opposite, when Inuit gave a gift (for example tools) to another Inuit, the giver would always expect a gift in return at some point in time. This practice is, according to Birket-Smith (1976), the result of contacts and gift exchange with Europeans.

Activity	**Male**	**Female**
Building snow house	x	
Pitching tent	(x)	x
Tending fire and lamp		x
Hunting	x	
Fishing	x	(x)
Collecting	x	x
Flensing	x	x
Cooking		x
Dog driving	x	
Working in stone, metal and bone	x	

[1] Caribou Eskimo including: the Harvaqtôrmiut, the coastal group of the Pâdlimiut, and 2-3 families of the Qaernermiut (Birket-Smith 1976: 125).

Skin preparing	(x)	x
Sewing		x
Thong making	x	

Table 2. Traditional division of tasks between Caribou Eskimo male and female (source: Birket-Smith (1976 : 257-58 vol.1))

Today, it is still a common practice for hunters to share meat with close relatives, and it is expected that good hunters provide meat to widows and single women. Yet interviewees noted that many families without a hunter are expecting relatives or others to hunt and provide for them without any attempt to reciprocate. This attitude is placing the sharing tradition under increasing stress as access to meat becomes more difficult (discussed in next section). Thus, compensating hunters for their time and expenses with money or gas was described as increasingly common. Hunters have also started to ask for money in return of country food. The announcement through the local radio or Citizen' Band Radio (CB Radio) that country food is available to be distributed for free or for sale within the community was described as common. According to the interviews and focus group discussion results, it is generally acceptable to sell fish, such as Arctic Char, white fish and trout, to other community members. Nevertheless, out of the 36 women, only 6 reported having to have bought Arctic Char from a local people over the past 5 years. Twenty women had never bought country food from a local hunter. Seven women had previously bought caribou, although it is not a common practice to sell caribou. Women who bought caribou were craving it and were not able to get it free of charge.

I bought a whole caribou for 100 bucks; sometimes I share it with my mom's because they're 17 people in one house" (single mother).
"*I bought fish and caribou (from Inuit before). The caribou is more expensive than fish; $100 for a caribou and $50 for half of it. I bought caribou a couple of times when I was pregnant, I really needed raw caribou for my heartburn*." (woman)

With the establishment of commercial fisheries in Northwest Territories by the Government of Canada (with Nunavut created from NWT in 1999), several arctic fish species and sea mammals became part of a market economy thus establishing legitimacy for Inuit to sell fish within the community. In past practice Inuit would have shared fish, seal, walrus and muktaaq as they did for caribou (Tagalik 2011, personal communication). In Arviat, some women mentioned that selling fish is an important source of revenue for hunters, and allows them to buy hunting supplies. As one woman said: "*Local people, I am ok with it (selling fish) because they're trying to make a living out of it. They probably don't have a job*." Compensating a hunter by offering him money to go hunting or directly buying him gasoline was mentioned by 14 women as a way of getting country food when none was available. Nine women bought caribou or fish or compensated a hunter for his expenses and of those three were single women.

"*(I buy gas for a hunter) when I am really hungry for country food, maybe once a year*." (single mother)
"*When my brothers are out of town, I say "I'll pay $100 for whoever can go hunting for me" through the CB and someone offers to hunt for me*." (single mother)

Country food is also distributed occasionally at the local stores; including dried caribou (caribou jerky), muktaaq, and Arctic Char. Twelve women had previously bought fish at one of the local stores. However, the high price of country food sold at the store prevented the 25 women interviewed from buying it. Indeed, it was mentioned by a local informant that the stores make a high profit from *country food* sales and they mark up the product almost 100%. In addition, caribou or other country meat has to be processed in a federally inspected meat plant which is then sold to stores at higher prices than locally harvested game would sell for. Stores add a mark up to the prices they pay the meat plants. For example, a fish sold at the store can cost $54 as opposed to $10-$20 from a local person.

There are diverging opinions regarding the sale of country food by the local stores. On one hand, some disagree with this practice because they argue that traditionally Inuit share country food and this practice is a central part of Inuit belief systems. On the other hand, 23 women (out of the 33 that were asked) agreed with selling more country food at the stores because it provides better access to country food to those who don't have a hunter to provide them with country food, particularly single mothers. Some also noted that the store should sell only country food that is not available around Arviat, such as walrus (which people obtain from Igloolik and Repulse Bay). As a woman explained: "*We are just adapting to start having country food at the store*". This quote from a woman illustrates well the duality of opinions regarding the selling of country food:

"[*The store should sell more country food], because older people would buy more, it is acceptable, it would increase the health of people. [But] It can also cause problem because there is an Inuit way of life; giving meat to each other.*" (woman)

Processing and preparation: Traditionally, meat processing was done in different ways depending upon the season. In general, whole families participated in the preparation of meat. For example, flaying and cutting up caribou was carried out by both sexes; however, for practical reasons, men flay walrus while both men and women skin seal (Birket-Smith 1976). The location of processing also determined which of the male or female or both participated in the processing of the meat: men would do the work if they were on a hunt and were not accompanied by women. If the game was brought back to the camp, women and children would participate (Birket-Smith 1976). See Birket-Smith (1976) for more details on the traditional way of processing meat.

Today, meat processing varies with season, and is much more challenging during the winter. Generally, it starts on the land and is done by the hunter himself where the hunters flay the caribou and cut it. Then he puts the skin at the bottom of the qamutik (sled) and wraps the meat parts inside the skin. Once the meat is brought back to the household, women, and sometimes both men and women, complete the meat processing by cleaning it and cutting it up in smaller parts that will be frozen, distributed to others in the community or further prepared to be eaten in the household. Women will prepare the caribou hides from the summer and early fall for sewing (Nutarasungnik 2011, personal communication).

Consumption: In the summer, meat was usually boiled. In the winter, especially when fuel was not available, meat was eaten frozen (Birket-Smith 1976). Traditionally, the main meal was eaten in the evening. In some camps (mainly in the Qikiqtani) men and women did not eat together

during this meal. Men would gather at the tent or iglu of the successful hunter to eat and women ate after the men had finished their meal or if they ate at the same time it was separately. For the smaller meals they often ate together. When men were hunting away from the camp, women did not cook meals; they would normally boil tea and eat a small snack of cold meat to save on fuel (Birket-Smith 1976). In the morning, Caribou Eskimo drank tea and did not eat much; they may have had "*a little dried or frozen meat, or if there should happen to be any leavings from the previous night, a piece of cold, cooked meat*" (Birket-Smith 1976: 267-68 vol. 1). Feasts would occur at no particular time of a year and were often accompanied by singing and drumming.

In addition, multiple prohibitions existed around food consumption of Caribou Eskimo. These rules varied within groups, camps and individuals, and were often implemented by shaman to restore harmony and ensure availability of and access to food (Birket-Smith 1976). Birket-Smith (1976: 138 vol. 1) notes that some of those rules applied to all Caribou Eskimo groups at all time, for example "the prohibition against eating fish which have died in the net, or frozen fish whose intestines have not been removed". Some rules were connected with seasons, for example, in the winter and summer, the Qaernermiut did not eat caribou meat and fish on the same day. For the Pâdlimiut, this rule only applied to women. Several other prohibitions applied only to women with small children, girls and elderly women, for instance: women were not allowed to eat wolverine meat, eggs, cloudberries nor whortleberries, they were not allowed to eat the meat of cached caribou if foxes had eaten it, they could not eat the muzzle, tongue, liver and kidneys of caribou, or the liver of bearded seal or walrus (Birket-Smith 1976). Other rules forbade women who were in their menstruation from eating raw or rotten meat; forbade women who had just given birth from eating anything else than the limbs of caribou; and forbade women after the death of a close relative from eating the head and stomach of caribou (Birket-Smith 1976).

Today, Inuit in Arviat consume raw meat, frozen meat or cooked meat in various ways (for examples roasted, fried, smoked, stir fried with vegetables). Some Inuit families can afford to eat three meals per day, and the main meal remains dinner, which men and/or women prepare. For breakfast, most people still only drink tea and do not eat or eat very little, as they did traditionally. Family feasts occur on various occasions, mainly at set holidays, such as Christmas and birthdays. The Hamlet of Arviat also organizes feasts for the entire community at one of the schools or the community hall for various occasions, such as Hamlet Day, Christmas and New Year's Eve. Interviews and focus groups reveal that today everybody eats at the same time or when they are hungry and there is no difference between what women, men and children eat. Those involved in this research, including elders, did not reveal any prohibition regarding food consumption as there used to be. Yet, allergies to country foods are now preventing some children from eating certain foods such as caribou, fish and mussels: *"some kids have allergies so we have to watch what we cook"* (elder).

6.2 Store Food Component

Production, processing: Tea, flour, baking soda and sugar were some of the first items introduced to Inuit. As of the 17th century, store foods produced and processed in the south were slowly introduced in the Kivalliq region by the Hudson Bay Company (HBC) at Churchill, which was officially founded in 1685 (Van Stone and Oswalt 1959) and Fort Prince of Wales on Churchill River founded at the beginning of the 18th century. In addition, as of 1860, whalers entered Hudson Bay and provided Inuit with food in times of famine, especially to Aivilingmiut (Inuit residing north of Hudson Bay) and Qaernermiut bands (Ross 1975). Missionaries and

Royal Canadian Mountain Police (RCMP) also offered relief (family allowance) to Inuit in times of food shortage (Tester and Kulchyski 1994). Flour, baking soda and lard are the main ingredients of "bannock", a bread widely considered as "traditional" food, which was introduced by the HBC employees. Nowadays, store foods consist of a larger selection of perishable and non-perishable items produced and processed in the south.

Distribution: Store food is transported over long distances to Arviat by sea-lift (once a year) and air (every week). It is then sold at three local stores: Northern Store, Coop and Eskimo Point Lumber Supply, as well as the three convenient stores and the RK'd. Members of a household buy food supplies which are shared within the household. Store food is also distributed amongst family members and friends through sharing, however not in the same manner as country food is. Store food is normally only shared if somebody asks for an item.

Preparation and consumption: People began to eat more store foods in the 1950's – 60's when they were relocated by the governement to the communities current location. This change in diet is refered to as "nutrition transition". Its impacts are extensively described (for example Kuhnlein and Receveur 1996; Kuhnlein, Soueida et al. 1996; Kuhnlein, Receveur et al. 2004; Kuhnlein and Receveur 2007; Kuhnlein, Receveur et al. 2008). Participants revealed that the main food items they buy at the store are pasta, soup, flour, rice, ground beef, sugar, eggs, bread, cereal, tea/coffee, ready-foods (frozen pizza, Kraft Dinner). Women buy food items required to make bannock and items that mix with caribou to make stew, for example frozen mixed vegetables. Few buy vegetables and fruits on a regular basis due to high prices and limited knowledge on how to prepare and cook them. Two anonymous informants revealed that the biggest sellers are ready made foods (pre-made sandwich, frozen pizza, fried chicken, fries), and canned and "junk foods" (pops, chips and bars). For some, store food has become easier and faster to prepare than traditional food given the increase in availability of pre-made foods. Fruits (especially canned fruits), vegetables, fruit juice and dairy goods are increasing in popularity according to store managers. Foods that are sold at the convenient stores and the RK'd are mostly fast foods and "junk foods", are also gaining in popularity, especially in the younger generation.

7. FOOD (IN)SECURITY STATUS AMONGST INUIT WOMEN IN ARVIAT, NUNAVUT

Note: Numbers are provided, yet it is important to keep in mind that it is the results of semi-structured interview and sometimes the question was not asked to or answered by every participant.

7.1 Food (in)security status among Inuit women in Arviat

Previous research and work conducted here indicates that country food *availability* in the community of Arviat has decreased over the past 20 years. Data from the Survey of Resource Harvesting 1975-1977 (McEarchern 1978) and the Nunavut Wildlife Harvest Study (Priest and Usher 2004), shows that the harvest of the three main staples, caribou, beluga and ringed seal has not increased from 1975 to 2001 (Figure 2), during which population increased by approximately 56% (Figure 3) (Statistics Canada 1997; Statistics Canada 2002; Statistics Canada 2007). Consequently, less country food is available per capita. Locally, women participants described a decrease in availability of traditional foods, especially during the winter when fewer hunters can go hunting. The period of fall and winter 2010 -2011 was particularly low in availability of caribou in Arviat, primarily due to a decrease in accessibility of caribou which, many said was very far away, more than 300 km from the community: "*Seems like there is not much caribou*

this year, they're really far from the town too, they're not hard to hunt every winter, but it's harder this year" (elders).

Accessing country food that is far away from the community is a challenge for many hunters in the community. Some do not have the time required to travel long distances from the community because they are working or must take care of their family. Other hunters do not have adequate financial resources to acquire equipment and gas required. For example, a young mother mentioned that her husband, who is a hunter, who has an ATV, is willing and has the time to hunt, can't afford it because they have other expenses to be made first, notably for their children. Reduced access to a hunting area decreases country food security.

Participants in this study did not note any problems or changes with regards the *quality* of country food which was described as very good – it tastes good, it is fresh and is the best food that Inuit can consume.

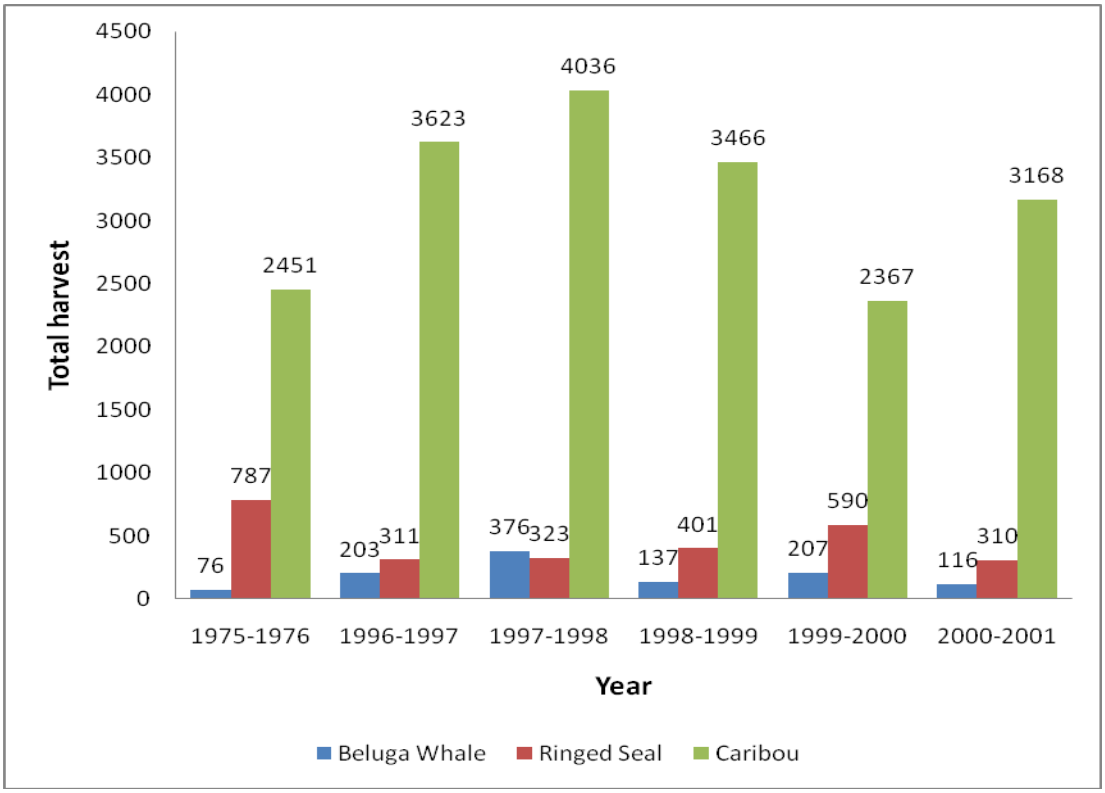

Figure 2. Number of beluga, ringed seal and caribou harvested in Arviat, NU, from 1975 to 2001 (McEarchern 1978; Priest and Usher 2004)

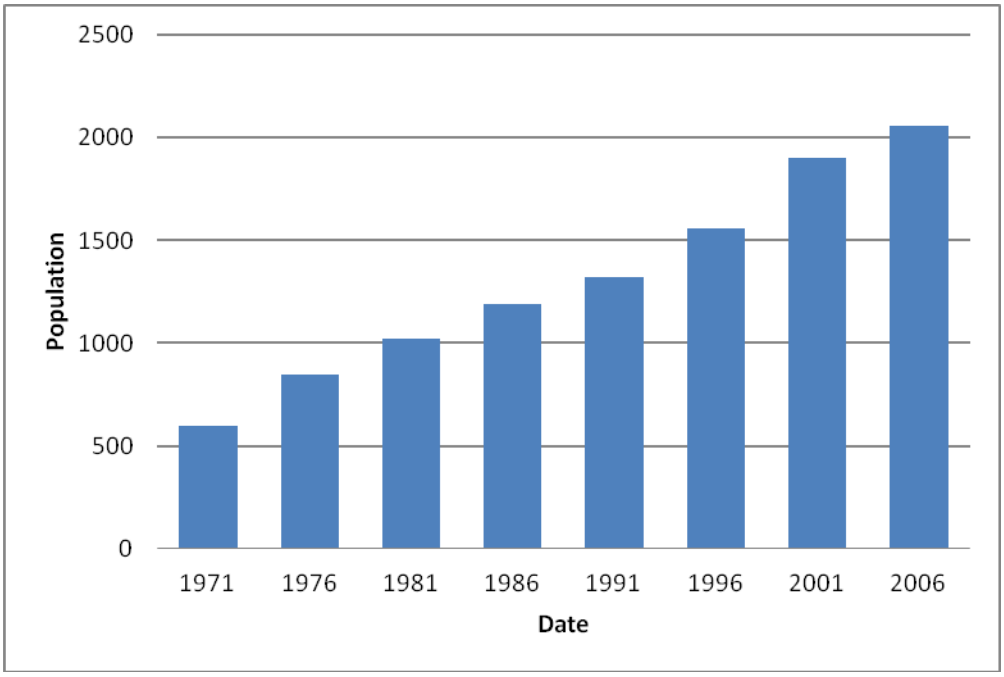

Figure 3. Population of Arviat, Nunavut from 1971 to 2006 (Statistics Canada 1997; Statistics Canada 2002; Statistics Canada 2007; Nunavut Planning Commission 2008)

Store food *availability* has increased over the years, with now three stores (Northern Store, Coop, Eskimo Point Lumber Supply), three convenience stores and one RK'd offering a variety of foods. According to store managers and elders, the variety of products offered in the stores is increasing, with more fruits, vegetable and fresh meat made available. However, the *accessibility* of store food is challenging for women due to high price of staples. According to women, *quality* of store food, including freshness, taste and types of food available, is satisfactory, although a few key informants mentioned that a disproportionate amount of "junk foods" are offered.

According to the Arviat Health Committee overall *food security* status was described as challenging and perhaps getting worse. In fact, more women and their families have been observed to be using the food bank during its short operating span. When the food bank started 3-4 years ago, 60-75 families were getting a bag of food supplies once a month. Today, at least 130-140 families are regularly using it. The community nurse mentioned that even people with good employment status benefit from the food bank, and the organizers must turn them away. She says: "*It's the rare person that would ever come to the food bank unless they really need it. They are very proud people here*". She adds that many women also go to the Health Center Clinic with their child to ask for food because they haven't eaten in several days.

Running out of food over the past 5 years, especially store food, occurred in 34 women's households (81%). Twenty women mentioned running out a few times per year. For 11 women, running out of food occurs on a regular basis, every month before they receive money, and sometimes twice a month: "*It happens often [that we run out of food], maybe the last few days before we get child tax, we don't have much, even pampers, we'll run out of that a day or couple day before*" (woman). One woman said that it occurred only in the past, when she used to live in

an overcrowded house, with 11 people. It was difficult to feed everybody. Only two women reported running out of country food, yet 12 women responded that they were not always able to get country food when they wanted it and almost every woman asked said that she would like to eat more country food. Of 42 women interviewed, 18 eat country food more than 3 times per week, 6 women eat it once or twice per week, and 13 women eat it 2-3 times per month. Women who are particularly susceptible to a lack country food are single women and women living in a household that do not have a man who is able to go out hunting due to lack of money, equipment, time or expertise.

Twenty women interviewed (including pregnant women) out of 42 reported eating less and/or skipping meals in times of store food or country food shortage in the past year. Most of these women do not experience this on a regular basis, only a few times per year. One woman interviewed reported experiencing chronic food insecurity, having constrained access and availability to food of adequate quality almost every week. Women that are food insecure eat less to let their children eat first. "*I eat less when the children are around. I want to feed them first*" (elder). One woman mentioned reducing her consumption of country food because she has limited access to it and prefers to let her children eat country food as it is good for them, she says: "*I try not to eat lots [of country food] because I want my boys to have a good health and energy*" (young mother). In addition, most women reported not eating breakfast, which is traditionally a common practice amongst Inuit. One participant mentioned skipping meals other than breakfast, even if she's hungry, because of "*the poorness of the food*" available.

Some women worry once in a while, but others worry on a regular basis. For example, women reported becoming stressed every month, usually a few days prior to getting paid, receiving their family allowance or income support check. Twenty-seven women report that they worry about not having enough food to feed their children. Two women described reducing their consumption of food in the past.

7.2 Health consequences related to food insecurity in Arviat

Food insecurity, especially when chronic, can lead to adverse health conditions (Galloway, Young et al.). Nurses report patients with stomach pain due to not eating for up to 5 days and drinking only tea to offset hunger pangs. Other evidence of lack of food for an extended period of time occurs on or immediately after Child Tax Benefit day when people come to the clinic with severe abdominal pain due to the consumption of a large amount of food in a short period of time. Losing weight as a result of lacking food was mentioned by two of the women interviewed. The change of diet from a nutritionally and culturally adequate diet composed mainly of country food to a store bought food based diet high in sugar, carbohydrates and salt as triggered the development of chronic disease. In 2006, the diet of 29% of Nunavumiut aged 15 and over contained less than half of country food (Tait 2008).The community nurse reported that the number of diabetics had skyrocketed over the past 15 years. In 1995, only 2 diabetics were reported in the community, and they were both of Caucasian origin. In December 2010, there are more than 20 Inuit diagnosed with type 2 diabetes, including 3 requiring insulin injections and others oral diabetic agents. Iron deficiency and anaemia has also been linked to the nutrition transition and the reduced consumption of high in iron traditional food. This low level of iron intake causes low haemoglobin level in newborns which is linked to an increase in susceptibility to respiratory infections and a low immune response. Dental decay associated to high sugar intake is another important issue in Arviat related to food insecurity, and the quality of the diet.

8. CLIMATE CHANGE IN ARVIAT, NUNAVUT

This section outlines manifestations and observations of climate change in the Eastern Arctic, more specifically in the Kivalliq region, based upon the scientific literature and traditional knowledge of Inuit elders.

8.1 Climate change in the Eastern Arctic: scientific observations

Past and Present

Since1900, the warmest temperatures Arctic-wide have been recorded during the last decade (Overland, Wang et al. 2011). In 2010, exceptionally warm air temperatures were recorded in the Canadian Arctic as well as record low winter sea extent ice (Richter-Menge and Overland 2010; NSIDC 2010, 2011). Arctic sea ice extent average during December 2010 and January 2011 was the lowest recorded since 1979 (Overland, Wang et al. 2011). In Hudson Bay, ice extent was particularly low. This area, which is normally covered in late November, did not completely freeze until mid-January (NSIDC 2010, 2011). This was also observed by elders in Arviat, who reported the ice on the bay forming about three weeks later in November (personal communication, Murphy November 2010.) This low ice extent occurred in conjunction with abnormally high atmospheric temperatures over the Hudson Bay, about 6°C above normal (NSIDC 2010, 2011). In the Biological Arctic Report Card, Gill (2010) notes that "changes in sea ice conditions and, more broadly, changes in the physical environment are impacting local populations and ecosystems". Arctic species are being affected due to encroachment of sub-arctic species and change in ecosystems (Gill 2010). Gill (2010) reports an important decrease in wild caribou (*Rangifer)* populations across the Arctic (figure 4). Regarding the Qamanirjuaq caribou herd from which Arviarmiut harvest the most, survey estimation shows that the herd went from 496 000 in 1994 to 350 000 caribou in 2008. Although this estimation shows that the caribou population has not increased over the past 14 years, it doesn't confirm with statistical certainty that it has declined (personal communication, Campbell October 2010). In addition, 496 000 might have been a unusually large number of caribou and the population stabilising or declining could be part of natural population cycle (personal communication, Campbell 2010). Lastly, the latest Musk-ox survey in the Kivalliq region conducted in 2010 shows a dramatic change in their distribution as compared with historical record as they are occupying more territories and more prevalent around Arviat (personal communication, Campbell October 2010).

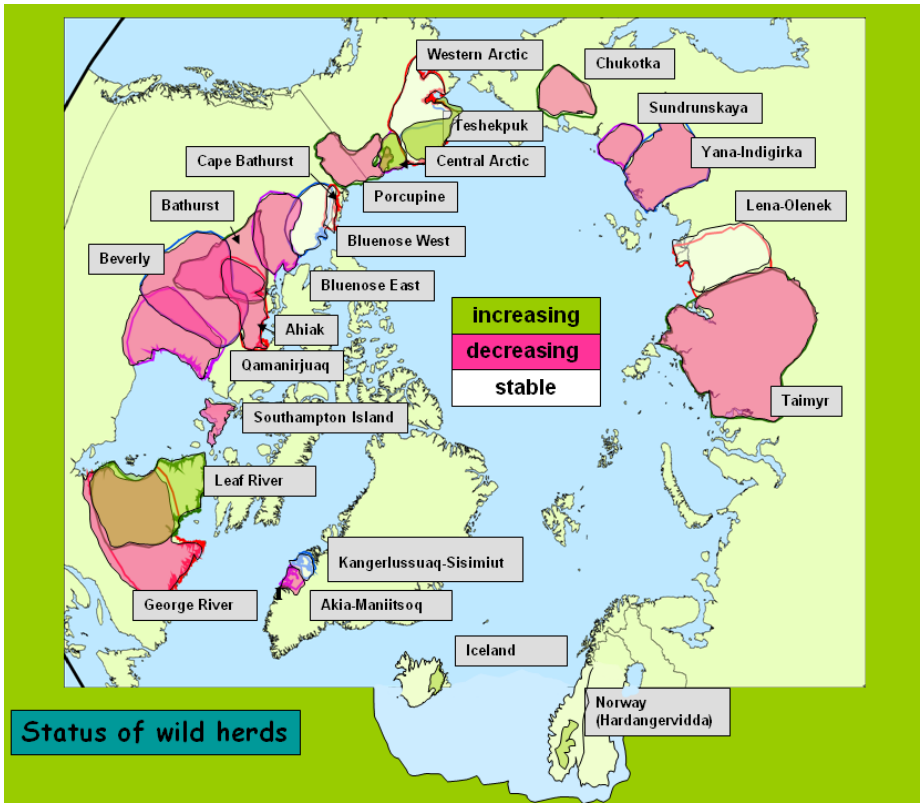

Figure 4. Current status of the main migratory caribou and reindeer herds across the circumpolar north. (Source: Russell 2010)

Predictions

The Arctic Climate Impact Assessment (ACIA) (ACIA 2005) predicts that average daily temperature of the circumpolar regions will increase of approximately 5-10 °C over the next 150-200 years. In addition, ACIA predicts a change in precipitation, a decline of ice and snow cover, and permafrost loss. In fact, studies are predicting permafrost loss in areas surrounding the Hudson Bay (Laidler and Gough 2003; Smith, Burgess et al. 2005), with one study estimating a permafrost loss of 50% by 2100 (Gough and Leung 2002). Permafrost degradation may cause infrastructural damage, and cause hunting trails to be less stable (Bolton, Lougheed et al. 2011; Forbes 2011).

Laidler and Gough (2003) report potential impacts of changes in salinity and surface water composition on marine productivity in the Hudson Bay and changes of river systems in Hudson Bay region on wildlife, especially fish productivity and behavior. Change in oceanic currents, water temperature and level are factors related to climate change that may impact the distribution of Arctic char which is predicted to shrink in the southern Hudson Bay (Forbes 2011).

Several studies document polar bear vulnerability to early ice break-up, and the potential negative impacts of climate change on polar bears population and their prey (seal) in the Western Hudson Bay region (Barber and Iacozza 2004; Stirling, Lunn et al. 2004; Stirling and Parkinson 2006; Regehr, Lunn et al. 2007; Laidre, Stirling et al. 2008; Durner 2009; Prowse, Furgal et al. 2009; Forbes 2011). A disappearance of ice platform, change in sea currents, change in sea ice

break up and freeze up pattern is projected to have significant impact on polar bear populations of south western Hudson Bay (Gagnon and Gough 2005) In addition, a reduction in sea ice cover could negatively impact polar bears' genetic diversity (Crompton, Obbard et al. 2008). There are diverging observations regarding the health and abundance of polar bears among scientist and Inuit (Tyrrell 2006; Dowsley and Wenzel 2008; Dowsley 2009). Whether or not climate change is or will negatively impact polar bear populations of the Western Hudson Bay, the perception that it might presents adverse repercussion for Arviarmiut in terms of a source of meat, hunter-bear relationship and revenue from sports-hunting (Wenzel 2005; Dowsley and Wenzel 2008).

8.2 Climate change in Western Hudson Bay from *Inuit Qaujimajatuqangit*

Inuit are intimately connected to the land and have an extended Traditional Ecological Knowledge (TEK) of the physical and biological attributes of the land and species. But more importantly is *Inuit Qaujimajatuqangit* (IQ), which is described as a set of beliefs, "values, world-views, language, social organization, knowledge, life skills, perceptions and expectations" (Wenzel 2004: 240) of which TEK is an important component and continues to be the basis of Inuit culture today. IQ provides information regarding climatic and environmental changes; it documents the impacts of and adaptations to these changes, and is widely recognized as a valuable knowledge base for assessing environmental change.

Elders have noted that most significant climate changes have occurred gradually over the past 5 to 10 years and that "the applicability of traditional Inuit seasonal terms has become uncertain due to changes in the environmental conditions normally associated with different times of the year" (Government of Nunavut 2005: 17). Detailed observations have been documented through workshops in the Western Hudson Bay region; they are included in Table 3.

Category	**Change observed in Arviat, Baker Lake and the Hudson bay area**	**Source**
Seasons	Change in duration and timing of season Rapid change of environmental condition during each season, decrease predictability	Government of Nunavut (2005)
Weather	Unstable weather condition (temperature fluctuation, wind shifting and intensity, storm behaviour) Change in weather patterns Less predictable weather patterns Lack of sunshine in the summer Earlier and faster spring thaw (days versus weeks)	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Temperature	General warming trend Less extremely cold temperature Cold temperatures Extreme cold period are broken down by warm period causing rainfall in the winter Less clothing required to hunt in the winter Extremely hot temperature during the summer (upinnigaaq and aujaq) Delay caching time up to one month due to long and intense warm period in August	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Winds,	Unpredictable wind direction	Government

Storms, blizzard, fog	Rapid shifting of the wind Shift in prevailing wind direction from northwest toward northeast Stronger winds Shorter and less calm period Difficulty in predicting where the wind will come from and its intensity Unpredictable snowstorm Change in snow behaviour during snowstorm Five day storm is not as common now More fog More thunder and lightning storms	of Nunavut (2005) Sullivan and Nasmith (2010)
Sky	Less clear sky in all seasons Sun is higher and brighter in the winter, from early November to early March Sun rays are much stronger	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Snow	Late and less snowfall from late September to early November Significant snowfall from early November to Early March Change in snow cover (less *Aput* and *qapiq*) harder packed snow Less snow accumulation Snow melts earlier due to warmer temperature and lighter snow coverage Snow drift used to be north-north, now north-northeast	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Rain	Unusual light rain during the winter Rain after snow accumulation Less rain from June to late September Less thunder storm during the summer	Government of Nunavut (2005)
Sea ice and current	Freezes and thickened later and over a longer time period in fall Brakes up and melts earlier Thinner ice throughout the year	Government of Nunavut (2005)
Freshwater Ice	Freezes and thickened later (November versus October) Earlier brake-up and more suddenly (June versus July) Ice much thinner in some area even where there are no or little snow coverage New and increased in area of *piqtait* and *aukarniit* (dangerous spots where there is open water or very thin ice) Smaller ponds and lake area	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Rivers and Lakes	Lower water levels in lakes and rivers Dried small ponds and lakes Can see higher water marks on Magus River Increase sedimentation in mouth of rivers	Government of Nunavut (2005) Sullivan and Nasmith (2010)

Vegetation and Land	Introduction of dandelions More moss growing Increased in birch, willow and grasses growth and distribution, resulting from warmer temperature and dryer conditions Rapid movement of tree line northward Taller trees Smaller berries and impaired growth of edible plants and berries due to dryer conditions More *qitquat* (sea weed) in ocean Permafrost melts earlier Near shore islands are now points or peninsulas or new islands are appearing due to low sea level (eg. Qikitaaryuk used to be an island near Arviat, now it's a point)	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Wildlife	Low water levels in rivers and stream affect Char seasonal migration and distribution Thinner caribou, which are not eating properly (dried grass) and bothered by heat in the summer, and hard packed *Aput* (snow) makes it difficult to eat Decreased caribou skin quality, toughness Increase of diseased caribou being hunted Fewer caribou Fewer char Fewer ring and harbour seals Introduction of new species in new area: insects (bees, wasp, hornet, mosquitoes, dragonflies and others), birds (sparrows, snow buntings), moose, killer whale and fish Polar bears found in new areas and in higher numbers around Arviat More geese and ducks More harp seal (pushes ring and harbour seal out of the area) Seal are seen more further south (Nunala and Manitoba border) More ravens, other birds, staying longer in the fall Seals and fish are not as healthy, less meat Sedimentation in mouths of river affects fish stock	Government of Nunavut (2005) Sullivan and Nasmith (2010)
Health	More sunburns today, need for sunscreen Concerns that introduction of new species will results in new germs	Government of Nunavut (2005) Sullivan and Nasmith (2010)

Table 3. Climatic changes documented by IQ in Western Hudson Bay regions (sources: Government of Nunavut (2005) in **black**; Sullivan and Nasmith (Sullivan and Nasmith 2010) in **blue**; both reports in **red**.

8.3 Observations of climate change by Inuit women and hunters in Arviat

Women observations

Some women described noticing a **change in the timing of the seasons**, with winter arriving later and the summer longer in duration. Twelve women reported noticing a **delay in the timing of snowfall** at the beginning of the winter and/or a **reduction in the snow accumulation** at the end of October and beginning of November. Women trust the knowledge of elders' and hunters' who travel on the land and witness manifestations of climate change over time and through their regular interaction with 'the land': "*the elders are saying the summer is too long and the ice is late*" (woman). Women notice a **warming in temperature** according to the clothing hunters wear: "[*today*] *men use rain coats and rain pants to go hunting*" (woman) as opposed to warmer garments and caribou clothing used before. Warming has also altered the timing of activities: "*Now [end of October] there is no snow and no ice yet. Usually at Halloween, we are driving our snow machines*" (woman). **Extreme temperatures** were also reported: "*weather is getting too cold sometimes and too warm sometimes*" (woman) "*2-3 years ago, we were over 30 degrees Celsius for a week*" (woman). It is important to note that there are some contradictions in women's observations of climate change. Three women said that it is getting colder. This may due to the change in atmospheric moisture content. Thus while the average temperature may be higher, it is damper and "feels" colder (personal communication, Tagalik 2011). Four women reported seeing **fewer blizzards** today; however, three women said the opposite. One woman mentioned that the texture of the snow had changed: "*it seems like the snow was more cleaner and tougher and harder*" (woman). Four women noted that the bay is covered by **ice** later than in previous years, and one woman noticed that the ice was also thinner. One woman remembered the winter 2006-2007, when "*the ice was so thin*" that she could easily make a hole in the ice all winter long to install her fish nets. Seven women noticed that it **rains** less nowadays and that the land is dryer, with fewer ponds, lower water level in lakes and rivers: "*I remember 1980s, it used to rain lots and today it doesn't rain as much*" (woman).

One woman mentioned that the **sun** is not as strong as it used to be: "*during spring time, (the sun) would hurt our eyes,[..] you would have to wear sunglasses, that used to be really strong. But today, when it's spring time, you still need sunglasses, but it's not as strong*" (woman)
An elder, said that the **weather** is "*not predictable anymore*". Before, she would always be able to predict the weather. Today, she says, "*it rains once in a while when it used to rain a lot and the ground is drying up*". Women notice a change in the weather in general, but few could tell if it is affecting their access to country food or the quality of the food. Few women associated climate change to the perceived decrease in caribou numbers, the delay in caribou southern migration until later in the fall and the presence of more grizzly and polar bears around Arviat. An elder noted a change in the health of caribou, which she says are "*skinny*"; Another elder said that "*bigger lightning*" is killing the animals today. She is most likely referring to the 13 caribou that were killed by lightning near Arviat few years ago.

Hunters observations

Various manifestations of climate change were observed by hunters interviewed. One hunter mentioned that an elder said to him that the **weather** changes every 50 years and that the winter is not as cold as it used to be. Another hunter noted that it used to be colder by the coast about 50 years ago, when they were relocated to Arviat; "*Right now, it's not that cold anymore*". The

same hunter also noted a change in the **water turbulence** "*when we used to go boating, the sea water used to be very clear, but right now, it's always making waves*". They mentioned a shift in prevailing wind direction from the northeast to the northwest. One group of hunters agreed that they have seen changes in the moon, which seems bigger and closer to the land.

The majority of hunters who participated in focus group discussions did not believe that climate change affects the wildlife. Some noticed a change in **taste of caribou** which are less fatty today; however, they did not make any relationship to climate change. Mostly, the taste of caribou changes depending on where they feed, closer to the sea or further away inland, and their diet. They mentioned that he **caribou are skinnier** because of they are running around too much due to too many mosquitoes and airplanes which are flying too close to the land. Only one hunter associated the increase in **water temperature** to seal being far away. Another hunter has noticed that arctic **char** are smaller, whiter, and taste different at Nuvuk, the point. Knowing that arctic char becomes whiter in warmer water, it could be due to a warming of water temperatures. Hunters said that there is less **snow** on the ice which makes travelling, and thus access to hunting areas more difficult and dangerous. Mitch Campbell**,** the regional wildlife biologist, and hunters report an important expansion in **grizzly** population in the area.

9. HUMAN DRIVERS OF FOOD INSECURITY

Food insecurity is the result of multiple factors, as food systems are affected by household, community, territorial and global drivers, along with historical and environmental contexts. In this section, the human factors driving food insecurity among Inuit women in Arviat, Nunavut, are identified and described. Figure X illustrates how these drivers at different levels interact. This section starts by providing an overview of Caribou Inuit origin and relocation history, which is integrated to the analysis of human drivers.

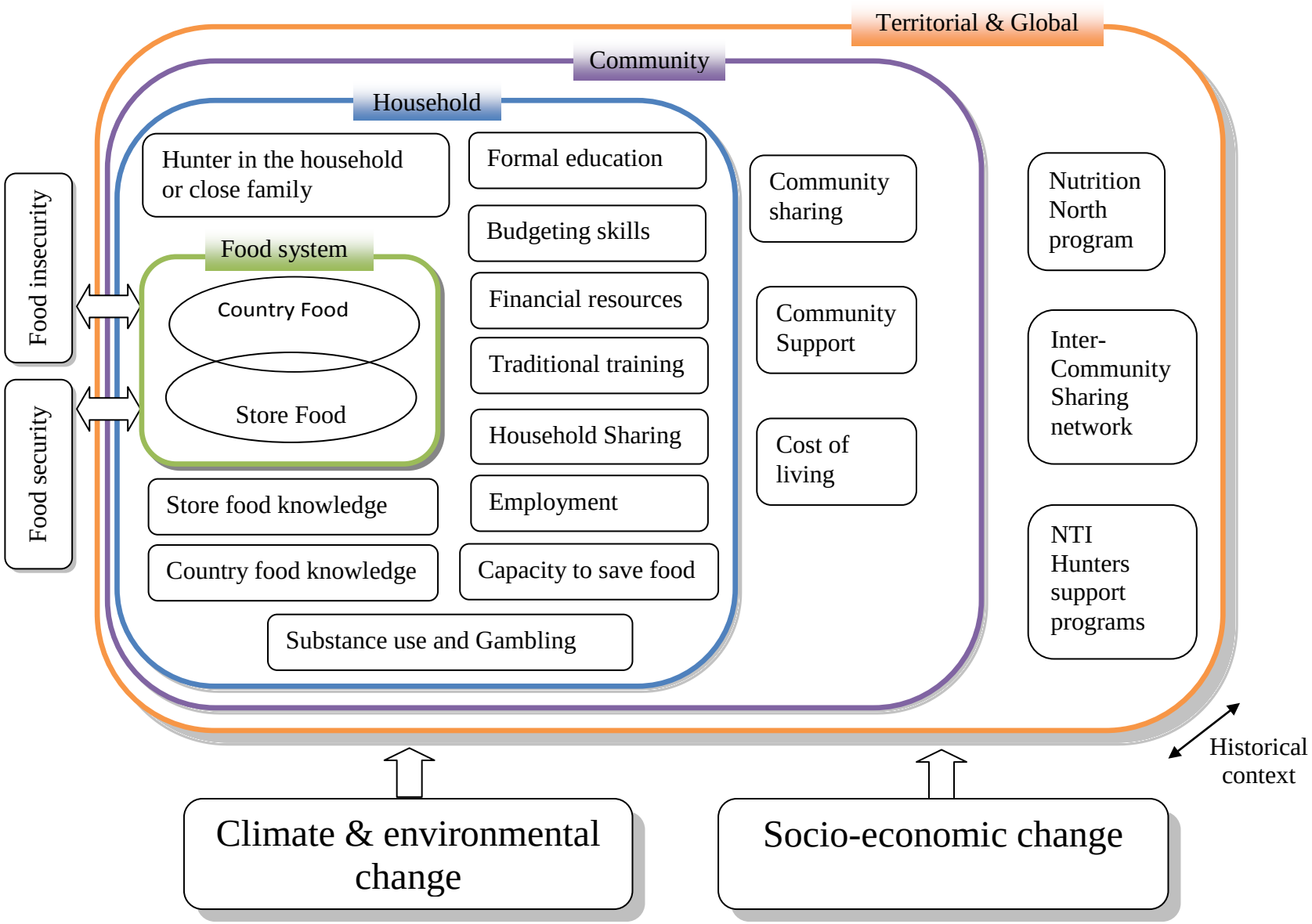

Figure 5. Human drivers of Inuit women food insecurity in the context of climate change and socio-economic change in Arviat, Nunavut,

9.1 Historical Context

Origin of Arviarmiut

Inuit living in Arviat belong to different groups of inland Inuit inhabiting the Barren Lands. They were named "Caribou Eskimo" by the Fifth Thule Expedition (1921-1924) (Rasmussen 1926; Birket-Smith 1976) . Different hypotheses exist regarding the origin of Caribou Eskimo (Jenness 1925; Birket-Smith 1976; Burch 1978). The latest is that of Burch (1978) who proposes that a group of Copper Eskimo traveled down from central arctic region, and then along the Thelon River up to the Hudson Bay coast were they were as of the 18th century. During the first and second decade of the 19th century, they would have moved inland. Thus, the Caribou Eskimo culture of the early 20th century was developed *in situ* in the southern Kivalliq region (formally Keewatin, in the N.W.T.), rather than derived from earlier Thule people who occupied this territory in the beginning of the A.D. second millennium (Burch 1978). During The Fifth Thule Expedition (1921-1924), five main Caribou Eskimos bands were identified: Qaernermiut, Hauneqtôrmiut, Harvaqtôrrmiut and Pâdlimiut (Birket-Smith 1976). In1930's, Jean Gabus (1944) added another group, the Ahiarmiut.

Cultural characteristics of Caribou Eskimo

The culture of Inuit inhabitants of the western Hudson Bay was characterized by its inland nature and the harvest of Barren Grounds caribou (Arima 1984). Caribou Eskimo culture was much different from coastal Inuit cultures, as Knud Rasmussen (1926: 131) observed:

> "The Eskimo of this period [1921-24] looked at the sea for their means of subsistence, hunting seal, walrus, and especially the whale. The present inhabitants [of the Barren Grounds], on the other hand are far more dependent on land animals. Consequently, they live a nomadic life, following the herds on their migrations up-country during summer and autumn. Only in winter and spring are they to be found on the coast, hunting seal from the sea ice."

Caribou Inuit did not nearly use, consume and know about sea mammals as much as their neighbors the Netsilingmiut, Aivilingmiut and Iglulingmiut; their way of living was dependent on caribou harvesting (Rasmussen 1926). Seals were not normally hunted during the winter, except for Qaernermiut living at Chesterfield Inlet (Birket-Smith 1976). Only in spring and summer (two months) about one quarter of Caribou Eskimo[2] moved to the coast to hunt seal and walrus (Birket-Smith 1976). Caribou Eskimo consumed caribou all year round when possible. Caribou had many other usages, for example: skins for clothing, bedding, tent and kayak; antlers and bones for tools, knives and utensils (Arima 1984). During the summer Caribou Eskimo consumed ducks, geese, ptarmigan, gulls and their eggs, ground squirrels and hares (Arima 1984). Their diet did not include much plant material; most of their plant matter intake came from eating caribou and ptarmigan stomachs (Birket-Smith 1976; Arima 1984). A variety of berries and roots were also collected and eaten in the summer time. Caribou Eskimo would acquire adequate amounts of vitamins by consuming fresh caribou meat and fish (Arima 1984). Musk-ox was an important complement to Inuit diet before they became practically extinct in the

[2] (1) the Harvaqtôrmiut, (2) the coastal group of the Pâdlimiut, (3) 2-3 families of the Qaernermiut (Birket-Smith 1976: 125)

southern Kivalliq region in the beginning of the 20th century (Burch 1977). Fish such as arctic char and lake trout also represented an important part of their diet all year round. Fish, musk-oxen and ptarmigan were particularly important during times of caribou shortage (Arima 1984).

Relocation

As of the 1930's, Inuit were relocated for different reasons; for example to sanatoriums for tuberculosis treatments, to Hudson Bay trading posts as employee in order to exploit the full potential of fox fur trade, and for schooling (Tester and Kulchyski 1994). During the 1950's, the main relocation to settlements occurred and was coordinated by the federal government. The collapse in fur trade at the end of the 1940's resulted in hardship among populations already living closed to HBC posts and RCMP stations in Hudson Bay. For more than 10 years prior the relocation, Inuit populations were encouraged by HBC to trap valuable white fox in exchange for food, a system which de-emphasized subsistence hunting (Tester and Kulchyski 1994). When fox became scarce and difficult to hunt, while at the same time the amount of food that could be obtained from it declined, Inuit were not prepared and had very little meat in reserve for the winter. Consequently, relief from the government administered by the RCMP and relief credited by the HBC trading post became particularly important to prevent starvation (Tester and Kulchyski 1994). With many complications related to the allocation of relief to semi-nomadic groups, the federal government encouraged Inuit to move to settlements such that provision of welfare and family allowance would be ensured (Tester and Kulchyski 1994). Thus, during the 1940's, Inuit families who were still living on the land, in hunting and trapping camps, were resettled by the military to rudimentary housing. (Tester and Kulchyski 1994). By 1960, almost all Caribou Eskimos were relocated to settlements where their "existence became heavily subsidized" (Arima 1984: 460). Based on data from 1982, Arima observed that the majority of Qaernermiut and Pâdlimiut were located at Eskimo Point (Arviat).

Caribou Inuit relocation was highly criticized, notably by Mowat (1952) in the book *People of the Deer*, who blames the poor administration of the federal government in the relocation of Ahiarmiut, which almost reached extinction. Missionaries also played a role in the relocation of Inuit: "while church was encouraging Inuit to come to the settlements to attend mass and to have their children attend church-run boarding and day schools, the RCMP and some administrators were encouraging Inuit to spend time on the land, hunting and trapping for a living. The overwhelming fear of many government officials and the RCMP, responsible for the delivery of welfare services, was that Inuit would become dependent on social assistance in the settlements" (Tester and Kulchyski 1994: 54). It is important to note that the role of the churches and the HBC in creating conditions of dependency is a subject of controversy (Tester and Kulchyski 1994).

Cultural and socio-economic changes

This relocation gave rise to a myriad of cultural and socio-economic changes among the Caribou Eskimo population, and across the Canadian Arctic (Wenzel 1991; Damas 2002). The collapse of fur prices, changes in education, dramatic changes in the welfare system, the pressing medical needs of a generation exposed to tuberculosis, polio, outbreaks of flu, typhoid and other contagious disease, medical evacuations, and possibilities of wage employment put pressure on Inuit culture to conform to the foreign social relations characteristic of permanent settlements" (Tester and Kulchyski 1994: 44-45). Environmental dispossession resulting from forced

relocation and assimilation policy of the federal government has negatively affected Inuit identity, physical and mental health (Richmond and Ross 2009). The foundation of Nunavut in 1999, was an important step for Inuit to re-take ownership of their land, their resources and articulate their culture. Yet, even if "the persistence of [Inuit] identities and the re-creation of traditions show that indigenous cultures can thrive in the modern world" (Csonka and Schweitzer 2004: 45), several psychosocial challenges associated with recent colonization and paternalistic policies of the welfare state remain to be overcome (Tester and Kulchyski 1994; Csonka and Schweitzer 2004; Lehti, Niemela et al. 2009). Ultimately, these changes and acculturative stresses provide the context within which the contemporary Arviat food system operates, and shapes how socio-economic-environmental stresses are experienced and responded to.

9.2 Household level factors affecting women food security

Financial resources

Limited access to financial resources is an important factor affecting women's capacity to access store foods and country food. Unemployed women reported struggling to purchase enough food at the store for their children. Amongst the women interviewed, 25 (60%) were unemployed, 12 had a part-time or occasional employment and 5 were working full time (Table 4). The sample population unemployment rate is much higher than that of 2006 Census, with 8.5% unemployment rate among women in Arviat (Statistics Canada 2007), although this is likely a significant underestimate.

Formal education is a requirement for most community employment; employment enables a family to both purchase sufficient quality foods and to afford hunting. An anonymous key informant affirms that there are well-paid positions for those who have the appropriate training. However, the school dropout rate was anecdotally reported to be increasing. In 2006, 80% of people over 15 years old in Arviat did not have a postsecondary certificate, diploma or degree, and only 9% had a high school diploma (Statistics Canada 2007). An elder said: "*It's really hard when you don't have an [formal] education. I am a good translator in Inuktitut, but I don't have education, so people don't hire me*". Thus seeking casual work, such as cleaning houses, doing laundry or babysitting, was a strategy used by women without formal education to make extra revenue in order to purchase groceries. In 2006, the median income (after tax) for all family types[3] in Arviat was $34,304 and for female single-parents $16,352 (Statistics Canada 2007). This is considerably lower than the median income for Nunavut and Canada (Table 4).

Population and family characteristics	**Arviat**	**Nunavut**	**Canada**
Median after-tax income all families	$34,304	$44,837	$55,111
Median after-tax income female lone-parent	$16,352	$22,069	$32,609
Employment rate all	43.3	55.2	62.4
Employment rate female	43.5	54.5	57.5
Unemployment rate all	13.0	15.6	6.6
Unemployment rate female	8.5	13.0	6.6
Percentage of population over 15 years with	71%	57%	24%

[3] Married-couple, common-law couple, female lone-parents and male lone-parents families

no certificate, diploma or degree			
Percentage of women over 15 years with no certificate, diploma or degree	70%	59%	23%
Percentage of population over 15 year with high school certificate or equivalent	9.3%	11%	26%
Percentage of women over 15 year with high school certificate or equivalent	14%	11%	27%

Table 4. Population and family characteristics for Arviat, Nunavut and Canada in 2006 (Statistics Canada 2007)

With low employment rate, many women are relying on income support to meet their family needs. According to the Income Support Division (2011), in 2010, 46% of families in Arviat claimed income support. The income support program is based on family size and income, rent and heating fuel bills. One woman reported that, once rent and power bills are deducted from her allowance, she had $813 left per month to meet the needs of a family of 4 (in addition to other governmental support discussed subsequently). Income support allowance is normally divided into cash and a cheque restricted to food only. On a monthly basis, one woman with a large family obtains $200 in cash and a single individual $100 in cash; the remaining amount differs according to variables noted previously and is allocated as a cheque which must be spent at the local stores. Women stated that this restriction constrains their access to country food, because only the cash portion can be used to buy gas and other supplies to go hunting.

In addition to income support, families with children under 18 years old are eligible to receive the Nunavut Child Benefit (NUCB) and the National Child Benefit Supplement (NCBS). The majority of women interviewed had NUCB as a source of revenue. During the benefit year from July 2010 to June 2011, the basic benefit was $1,348 ($112.33 per month) for each child with a supplement of $94.00 ($7.83 per month) for the third child. Families who have an income above $40,970 receive a reduced benefit[4]. NCBS provides $174.00 per month for the first child, $154.00 per month for the second child and $146.50 monthly for each additional child[5]. Families with modest income can also qualify for GST (Goods and Services Tax) credit which is paid four times per year. The credit is allocated to people over 18 of age, and depends on the number of children registered for the NUCB and net family income[6]. Elders aged 65 and over may receive an allocation from the Canadian Pension Plan (CPP) and/or Old Age Security (OAS)[7].

Selling arts, including carving, sewing clothing (parka, amautiit, mitts, hats), making kamiit and wall hangings, is another source of revenue: "*I look for ways to make money, I sew wall hangings, and add beads to them, cause I love doing art work*" (woman) Selling arts and craft is also a way women use to earn money quickly in order to be able to afford foods in times of food and money shortage. "*I have to brain storm 'how I could I get it [money to buy food]?' So I am really good at sewing so I just work on my sewing, bring it everywhere for whoever wants to buy it so I get the money then think about what's the most important thing that my kids*

[4] For more information - Canada Revenue Agency, National Child Benefit, http://www.cra-arc.gc.ca/bnfts/ncb-eng.html

[5] For more information - Canada Revenue Agency, National Child Benefit, http://www.cra-arc.gc.ca/bnfts/ncb-eng.html

[6] For more information – Canada Revenue Agency, Goods and Services Tax/Harmonized Sales Tax (GST/HST) credit, http://www.cra-arc.gc.ca/bnfts/gsthst/menu-eng.html

[7] For more information – Human Resources and Skills Development Canada, Canadian Pension Plan and Old Age Security, http://www.hrsdc.gc.ca/eng/oas-cpp/index.shtml

can share, noodles, macaroni, anything that is useful" (woman). Selling items from their households such as a couch, washer and dryer or clothing was mentioned by 7 women as a way of making money rapidly in times of food shortage: "*[we sold little items from our house] before, when we didn't have a job*" (anonymous).

Budgeting

Whether women have high or low incomes, planning well is important especially given the high cost of living in the north. However, women interviewed noted money management to be a challenge and most have had little or no training on budgeting. Most women have learned on their own, a few have learned from elders, parents, friends or through the Healthy Moms, Healthy Babies Program (available only to high risk pregnant women). In Arviat, there is no financial planning service available. There are four ATM machines at two local stores and one at the RK'd from which Arviarmiut can only draw money with a fee depending on the amount withdrawn and the location of the withdrawal. In Nunavut, only three banks have banking services, the Royal Bank of Canada (RBC), the Canadian Imperial Bank of Commerce (CIBC) and the First Nations Bank. All banking is done online or through phone/mail. Only ten women reported having a bank account where they deposit their NUCB cheque automatically. This service has helped some saving: "*I save money when I get my Child Tax [...]. I get my Child Tax put in my account directly*" (woman). Many women do not own a credit card and may not qualify to obtain one given their financial status. Nevertheless, the Northern store sells DirectCash Bank cards for $18 each, onto which money is to be added before use. The Northern store and Coop also offers a credit account, which allows people to purchase what they need without having the funds to do so and pay their accounts monthly, with substantial interest, if the balance is not paid off monthly. This provides consumers with some flexibility, although it may put people into debt and thus reduce their ability to deal with future shortages in the food system.

According to an education professional working in Arviat, one of the main problems impeding people's ability to budget is the provision of income support on a monthly basis. With almost no means of savings, people cash their "*cheque on the 19th and by the 22nd, probably 70% [of beneficiaries] have spent it all"* (key informant). Many women said that it is difficult to wait one month to get money again to buy food: "*[we run out of food] at the end of the month [because] it's hard being on income support, no job, when [the payment] is only once a month*" (woman). The interviews provide evidence that women beneficiaries of income support have difficulty planning adequately for one month. An anonymous informant reported that many women beneficiaries ask for a money advance on a monthly basis from the income support office. Money advances are, for the vast majority, requested by women and must be based on a child's special need supported by a Health Certificate. On one hand, many women beneficiaries interviewed mentioned that the basic amount allocated to them is hardly enough to meet their own and their children's needs. On the other hand, according to the informant's experience, those who know how to budget their resources well and select food carefully, rarely ask for a money advance. It is important to note that there are multiple factors, other than "carefully buying foods" which impede women's ability to buy enough food for their families, regardless of their financial status. In fact, 81% of women interviewed mentioned running out of food before they could be able to afford or get more, when only 60% were unemployed at the time. Particularly, women with children are not able to save, as one said: "*We go pay cheque to pay*

cheque, we don't save, we can't with little kids, cause we have to get what we have to get for them" (woman).

Budgeting skills and knowledge about store foods (discussed subsequently) is limited, food purchases are often directed by taste and preference regardless of price and nutritional value. Women interviewed reported that the food items they buy the most are the cheapest and the ones that would last the longest, such as pasta and rice; yet observations at the local store as well as information from the store managers shows evidence that food selection is highly influenced by preferences. The most popular food items in Arviat are ready-foods and "junk foods" which are expensive. As an elder states: "*when money is available our younger children are eating more junk food than country food"* (elder). Thus, "*sometimes [more] money means poorer health status because of what people are spending their money on*" says a dietician working in Nunavut for over 10 years. Lack of budgeting skills and financial resources is particularly problematic when extra purchases are made, which constrain resources available for food purchasing thus creating conditions of food shortage: *It [running out of foods] happens when my nephew wants my money to buy something for him, games or whatever, or when she [my mom] is saving money to buy big equipment like Honda or ski-doo machine"* (young woman).

Store food knowledge

There is an indication that the knowledge of store foods and how to prepare them is limited amongst women in Arviat. The principal in charge of the food programs at the schools, illustrates well in this statement: "*95% [of Arviarmiut] know how to make bannock. They know they need flour, baking powder sugar and lard. As far as anything else, they don't know.*" This can be explained in part by the fact that only 50 years ago the selection of store food was limited to basic items such as flour, sugar, tea, lard and canned meat. Southern foods were mainly introduced to Inuit by HBC in early 18th century when permanent trading posts were established at Churchill and Fort Prince of Wales (Ross 1975). In 1944, when Inuit were experiencing hardship due to fur trade collapse, the Federal government established Family Allowance to provide healthy foods and good clothing for Inuit children only (Tester and Kulchyski 1994). The allowance which was provided "in kind" allowed further incorporation of southern food into Inuit diet. The items provided to mothers were selected from a specific list of southern foods including milk formula, pablum, peanut butter, sugar, and some items that were not available in most arctic communities such as fresh eggs (Tester and Kulchyski 1994). Tester (1994) notes that Family Allowance was often only provided as relief. Store food selection only began to expand in the 1980's.

Given this recent history of southern foods consumption, and the large variety of food available as compared to 30 years ago, education on nutrition, meal preparation and cooking is most important. Indeed, as many health practitioners confirmed, education is a priority. Yet, most women interviewed had never participated in any cooking classes. Four women remembered learning about how to cook at elementary or high school, Arctic College or the Adult Education Center. Five women reported learning to cook by watching cooking shows on television or by consulting cookbooks. Nineteen women have learned to bake, to cook with vegetables and to make a meal last longer, by adding rice to a country food meal for example through Healthy Moms, Healthy Babies (HMHB) programs. HMHB is sponsored by Canada Prenatal Nutrition

Program (CPNP)[8] and provides a small number of high-risk pregnant women with useful information about nutrition and healthy foods as well as cooking skills. Although this program was described as useful, it has its limitation as it is only available to high-risk pregnant women and mothers can only continue in the program until their new child reaches six months. In addition, even when women were given information, they might not have had the possibility of practicing their new cooking skills at home because of missing ingredients, equipment or the material required, and/or because they were busy with a large family to care of.

Four women mentioned that the CPNP program provides information about healthy eating once a week at the Arviat Health Center and this is available to all pregnant women. Winnie Malla, the Community Wellness Coordinator along with Obed Anoee and Diane Angma, the Community Health Representatives, host weekly radio programs to discuss community health issues and provide advice on healthy foods, nutrition and disease prevention. The Arviat Wellness Center, in a partnership with local stores promotes strong foods and healthy products through promotions and occasional food tasting in stores and twice weekly cooking classes open to the public. However, these classes are based on successful access to third party funding.

Country food knowledge

Country food is the healthiest food for Inuit according community and territorial health professionals and Inuit women. Traditionally, Inuit women would learn by watching and helping older women in the camp preparing the meat. Today, most women have learned to cook country food from their mothers or elders. Yet, some women report that knowledge on country food preparation is not as readily transferred to the young generation as it used to be: "*we should learn more from our elders how to prepare or take care of country food better. I haven't eaten some buried [cached] caribou for a long time*" (young woman). This decrease in women's knowledge translation about country food preparation may contribute to reduce women's consumption of traditional foods. Data from interviews and focus groups shows that in general elders eat more country food than youth, and have integrated less southern foods into their diet: "*we get heartburns from eating fast food so elders eat more country food to get rid of their heartburns or to avoid them*" (elders). In addition, elders stated that they would eat more country food if it was available and they miss eating some parts of the caribou that are not consumed as much anymore such as caribou rectum, kidney, heart, liver, tongue and guts, and other country foods such as goose, ptarmigan, seal, walrus, muktaaq, mussels, oysters, cloudberry, blueberry and crowberry. Nevertheless, women and elders confirmed that country food is still regularly consumed and prepared by all generations when available in Arviat. Country food and store food knowledge are now combined to create dishes that many Inuit enjoy, especially the younger generation. Some elders now teach young women how to integrate both knowledge's in order to prepare a healthy meal for them and their families, such as caribou stir fry and fish stew.

Traditional training

Training in hunting is important to secure a long term supply of country foods to Inuit women and their families. However, nowadays, young men are not being trained as they used to be. Traditionally, young men would follow hunters, notably elders, and learned by watching and doing: "*Long time ago, there was no transportation, we used to go by dog team and learn when*

[8] "CPNP is a community-based program delivered through the Public Agency of Canada" http://www.phac-aspc.gc.ca/hp-ps/dca-dea/prog-ini/cpnp-pcnp/index-eng.php

we follow our father (hunter). Elders would teach young hunters about the laws of nature and hunting. This is illustrated by the following quote from Barnabas Peryouar, a Qaernermiut, in the book *Uqalurait* "*Our elders told us to shoot the [caribou] bulls only in June, July and August, as that is the time when they are the fattest and the skins are good for clothing. When an elder looked over our kill upon arriving home and saw that we broke one of the laws, we got scolded*" (Bennett and Rowley 2004: 51). Caribou Eskimo leaders were successful hunters and important guides. They were called *ishwhomattapok* , *isumatak* or *Kulawak*, which means "the one who is thinking", in other words, "a thinking individual", able to locate and harvest caribou repeatedly over a period of time (Van Stone and Oswalt 1959: 9). Leaders had no definite authority over others, who had the freedom to follow their suggestions or not, and did not exert specific effort to teach younger males. Leaders were changing according to success rate; the greater the success the more families would join his camps, and vice versa. "Families who once had an influential leader often experienced a difficult time surviving after his abilities had begun to fail." (Van Stone and Oswalt 1959: 10).

Today, there are many experienced full time hunters in Arviat who have extended knowledge related to hunting, fishing and meat processing. However, many factors are reducing the opportunities of young men to go hunting with them and learn as it was done traditionally. First, the establishment of schools in Nunavut has reduced children's time to go out hunting with their family to nights and weekends. In addition, schools include traditional knowledge in the school curricula; however, the southern education system promotes a passive way of learning that is hardly applicable to hunting skills. The schools, along with community elders, organize trips to bring students on the land and teach them traditional skills. However, some hunters believe that those trips are not long enough to properly learn hunting skills: "*We have to be out on the land for two full weeks to learn how to hunt and butcher meat, staying out there and not come back to the town in between. It seems like we haven't done that for a couple of years now*" (hunters). Other hunters believe that traditional training should be done by parents, and if the schools are to be involved, they should work with the parents: "*The school is taking over parent's role to teach hunting and survival to their children. Parents and school should work together*" (hunters).

Second, for the past 30 years, Arviat has had one of the highest per capita birth rates of Canada with an average of 60-70 births per year (data available at the Arviat Health Centre, 2009). Thus with a very young community (1600 under the age of 18), there is an inequality between the high number of young men that could be trained and the fewer number of experience hunters to trained them. As a hunter says: "*There are too many kids, too many to teach! They are mostly waiting for trips with the school*".

Third, hunters mentioned the lack of hunting equipment and transportation as being important factors impeding young man to learn how to hunt. Hunting today requires expensive equipment such as firearms, bullets, nets, skidoo, boat or four-wheelers and replacement parts which many young men and even more experienced hunters can't afford. This equipment was introduced by whalers and the Hudson Bay Company and replaced traditional hunting and fishing techniques (Arima 1984). When hunters were making money from the fur trade, it was possible to afford gas and new equipment to go hunting. However, today the fur trade is not a viable option and hunters have to cope with increasing price of gasoline, food and supplies with limited financial resources: "*Everything is expensive [now]. I used to make money selling fox furs, and other animal with furs. Almost everybody was making lots of money. Today, most of us can't afford*

gas" (hunters). Yet, hunters who have a full time employment and who can afford hunting have limited time to go. Families in which women have a well-paid employment can afford having men hunting full time.

Fourth, youth have access to a greater variety of activities today in Arviat, which they may favor over hunting: "*Today, there are too many things they want to do. Before, there was no computer, no mp3, only TV and radio. We wanted to go out hunting with hunters*" (hunters). Young people in Arviat have many interests such as playing video games, dancing, singing, playing musical instruments, social networking and church youth groups. Traditional activities such as hunting remain important for youth's cultural identity, but now they balance their time amongst many other modern past times.

The erosion of land-based skills and knowledge among the younger generation has been documented across the Canadian Arctic (Condon, Collings et al. 1995; MacDonald 1998; Ford 2006; Ford 2009; Pearce, Wright et al. 2011). Youth now having less ability to hunt efficiently and ensure their own safety while travelling on the land due to reduced skills and knowledge related to, for example, reading the weather, the snow and ice condition, navigating in storms, making emergency snow shelter, their vulnerability to climate risk higher than knowledgeable hunters and their ability to access country food lower (Ford, Smit et al. 2006; Ford, Pearce et al. 2007; Ford, Smit et al. 2008; Ford, Gough et al. 2009; Laidler, Ford et al. 2009). Ultimately, it reduces the availability of country food in the community of Arviat, which has a large population of young men (Ford 2009; Beaumier and Ford 2010; Ford and Beaumier 2010).

Presence of a hunter in close family

Full time hunters are the main providers of country foods, not only for their immediate family but for many others in the community. They ensure a regular supply of country food to the community, especially caribou which is the preferred food. Women are worried that the lack of training for young people will even further reduce country food availability in Arviat in the future and thus their consumption of it. Already, many don't have a hunter in their family and depend on others sharing meat: *"Widows don't have hunters, also people who lost their parents, or don't have a son are those who don't have a hunter"* (hunters). Commonly, hunters providing country foods are between 50 and 60 years of age, which further increases their susceptibility to sudden inability to hunt and is indicative of the precarious nature in which many households find themselves. Even households that are food secure can rapidly become food insecure with the death, injury, or illness of a hunter.

"There should be more, when they're not in school they don't know how to hunt or what to do, no transportation, not being taught makes them lazy and start making trouble so it's better if we just go ahead and tell them to follow when their father or whoever's going out on the land when they're taught they learn."(elder)

"*There are lots of hunters. When they can afford to go out hunting, they go*" (hunters).

Substance use and Gambling

Substance use, such as tobacco and drugs, and gambling are important drivers of food insecurity: substances are widely used and expensive. Women, health and education professionals have confirmed that there are "*tremendous high rates of smoking and tobacco use*", including chewing tobacco (snuff). In Nunavut, 58% of the adult population smokes tobacco on a daily basis (Tait 2008). This rate is three times that of the Canadian average (17%). One pack of cigarettes in Arviat cost approximately $16. General food security literature highlights higher prevalence of food insecurity among children and adults living in households with smokers (Cutler-Triggs, Fryer et al. 2008).

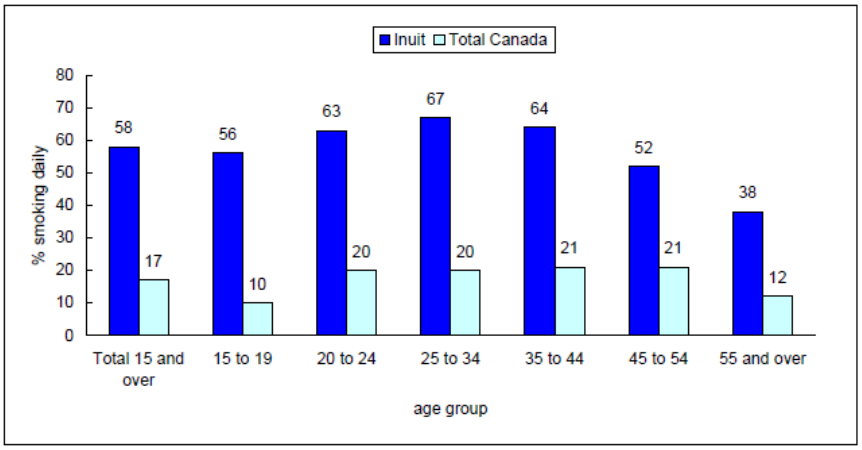

Figure 6. Daily smokers among Inuit and total Canadian population aged 15 and over, 2005/2006 (Source: Tait (2008))

Drug use also occurs in Arviat, although no data is available to determine the extent. A community nurse said that dependence on drugs is high. Mainly, people consume "*soft drugs*" such as marijuana, and there have been a few cases of cocaine use. Nunavut has the highest prevalence of drug use in Canada, with 60% of residents reporting using marijuana or hash in 1996, with drug use particularly widespread among Inuit women (Bureau of Statistics 1996; Muckle, Boucher et al. 2007).

Women confirmed that gambling is widespread in Arviat. Local Bingo and Nevada (instant lottery ticket) are the most popular, and Arviarmiut may spend a considerable share of their revenue to play: "*People are very addicted to Nevada; the floor of the radio station is covered with cards of Nevada*" (middle age woman) (Figure 7); "*child tax was on the 19th, the following 24th or 23rd, if they haven't any money left over, they bought Nevadas for the chance of taking their $50 in tickets and making $100. And those are the same people that come to the food bank. […] I think if we had a bingo every day, they would be playing. I know 3 people that spent on payday $600 of their cheque on Nevadas, and they come on Monday, no money left*" (key informant). Bingo is played every week Thursday, Saturday and Sunday. Cards are sold for $10 for a single and $20 for a double. Nevada cards are sold by packs and the amount spent depends of how many are bought. Commonly people buy more than one pack. Pattik is a local card game that is popular and involves money. Online gambling such as poker has gained in popularity amongst Arviarmiut over the past 10 years.

Figure 7. Nevada tickets covering the floor of the radio station building (Credit: Winnie Malla)

Substance use and gambling are taking away money from purchasing food and engaging in hunting activities. Regarding gambling, some are able to limit the amount of money they spend: "*I like to play Bingo but I don't spend too much on Nevada, I always limit myself to $10 or $20 when I play Nevada*" (woman). However, it is not true for all. Some interviewees described the situation of women going into debt, not able to buy food and essential infant care supplies due to losses of money playing Bingo, to the extent that they would try selling personal items to make a little bit of money. There is a controversy regarding Bingo as once a month, the money collected is used to fund the Arviat Food Bank Program, yet many of the food bank users spend their money on Bingo.

Drug and tobacco use, as well as gambling are a phenomenon often associated with acculturative stresses related to the assimilation policies implemented by the federal government from 1940's to 1970's (Krummel 2009; Lehti, Niemela et al. 2009). Rapid social changes and identity loss among adults has also been linked to suicide, which has increased rapidly over the last decade and is much higher among Inuit than the Canadian average (Silviken and Kvernmo 2008). In communities of the Kivalliq region, 13 to 23 % of individuals reported having suicidal behavior and 20% have planned or attempt suicide (Silviken and Kvernmo 2008). Yet, little has been published regarding the mental health consequences of acculturative stresses among Inuit (Lehti, Niemela et al. 2009).

9.3 Household and Community level factor affecting women food security

<u>Sharing</u>

Strong social bonds help establish to strengthened Inuit women's food system. The ability of women to obtain country foods depends highly on hunters in their family or extended family. Sharing country food is embedded in Inuit culture. Traditionally, before contact with Europeans, sharing revolved around food and country food would be distributed within people of a family, or camp. Within a camp, everybody had his/her own responsibilities and those who were not

hunting were accomplishing other tasks, assuming that a *general reciprocity* took place as many small scale societies (Sahlins 1965). In times of food shortage, sharing was an important coping strategy to ensure survival of the group. Little literature has been found describing how Caribou Eskimos sharing system function, such as exist for Baffin region Inuit (Mathiassen 1928; Damas 1972; Wenzel 1991; Wenzel 1995).

Today, the family is still central to the sharing network. Women mostly ask their close family members for food or go to their house to eat a meal: "*Sometimes [for] 2 weeks we don't have food so well go eat at my mom's when we don't have food. I don't go anywhere or ask anyone for food so only to my mom's or go eat at my sisters when we run out of food we try to go eat there"* (single mother). Although, women noted that there are less family feasts than there used to be. When family live in another community, women may still get country food shipped by air. One woman who has family outside of Arviat asks her family to ship her country food, mainly caribou, when it is scarce. There is a program that reduces the shipping cost for country food, yet the cost remains high and prohibitive.

Money is not as readily shared as food; mainly it is shared within the nuclear family. Ten women interviewed asked relatives in the past for money to buy food in times of a food shortage. Although, money is in most cases borrowed, it must be reimbursed. Only one single mother reported asking for money every month from her parents. Ten women reported borrowing money from friends or relatives which they have reimbursed. Within a household, food sharing has been disrupted by the introduction of money which often belongs to one individual rather than the entire household such as food. Some mentioned that the purchase of large quantity of junk foods by one family member, who doesn't share, impedes the family's capacity to buy enough food to feed everybody in the household. Financial resources can also be borrowed in an informal lending system that has developed in the community. These loans are usually at high interest rates. More often, someone in need will simply publically ask for money or the thing that is needed. Again, this is evidence of a shift in cultural social values where publically soliciting aid would have been seen as shameful to your extended family and where any request for help would have been prefaced with an indication of how the person could barter the implied reciprocal obligation (Tagalik 2011, personal communication).

Store food is also not shared as country food is because of its high 'direct' cost and it not being shared traditionally, but traded for fur and provided during times when food is hard to get. In addition, there is a higher demand for store foods from the younger generation than there ever was, due to a large young population and their taste for store foods that is further developed than that of their parents or grandparents. An elder affirmed that: *"It's always hard to have money, so we don't always share store food. Plus, we run out of store food faster than country food when you have a lot of kids or grandkids*" (elder).

When family cannot provide women with country food, women obtain it from other hunters in the community. Some women get country food from people who offer it to anybody in need through the local radio or CB. Offering country food is common, however, asking is perceived differently. Indeed, only a few of the women interviewed had previously asked on the local radio or CB for country food. Some mentioned being "*embarrassed*" to ask through those means of communication. However, to understand better how food is distributed today at the community level, it is essential to understand the community structure and societal divisions. First, there is a

division related to origin, as mainly two Caribou Eskimos bands were resettled into Arviat: the Qaernermiut and the Pâdlimiut (Arima 1984). Qaernermiut are "dwellers of the flat land" and lived inland along the Thelon River, near Baker Lake. Pâdlimiut, "people of the willow" were the most populous and most southerly group. They lived inland and on the coast, between Churchill and Rankin Inlet (Birket-Smith 1976; Burch 1986) (Figure 8)[9]. Also a few remaining Ahiarmiut (56 people) were relocated to Arviat and are quite distinctive (Personal communication, Tagalik 2011). Fossett (2001) explains that in the 1940's a hierarchy existed among Eskimo bands of the Western Hudson Bay and it was widely recognized by Inuit. The Aivilingmiut was the highest group due to their economic status, and greater involvement with 'qallunat' (white men), notably whalers. Ahiarmiut were ranked lower because of the lower degree at which they had accepted socio-economic changes. Second, there is a division related to religious association. Van Stone and Oswalt (1959: 8) describes the different "small social segments composed of individuals who interact casually with one another" at Eskimo Point (Arviat) in the 1950's. Church alliance was one of the most obvious ones, as families lived near their church during the summer and social cohesion of Catholic or Anglican was promoted. This was facilitated by provision of food and supplies to members of each church. The competition between the two missions who attempted to recruit most successful families led to hard feelings between the missionaries. This was felt among Eskimo who "were aware of the factionalism and tend to assume the same attitude toward Eskimos of other faiths" (Van Stone and Oswalt 1959: 8). This religious division influenced further social organization of the community as Eskimos of the same religion tend to marry.

It is not clear how these two divisions may play a role (if any) in food sharing network today in Arviat. One woman explained that because she was of Pâdlimiut descent, some Inuit in the community would not share with her. Yet, there is indication in the literature that Pâdlimiut have shared with Arhiarmiut in times of starvation, but were also sharing food and drum dancing together (Bennett and Rowley 2004). Andy Mamgark, a Pâdlimiut, explains in the book *Uqalurait* that when living on the land, if one camp lacked food, another camp would allow them to get meat from their caribou cache by indicating the location of the cache with an inuksuk (Bennett and Rowley 2004). Of course, there are other societal divisions (e.g. societal class) existing today which are not addressed here and that must be considered to further understand Arviarmiut's current sharing network.

[9] Inuit were semi-nomad and moved frequently within a large region. There were no definite boundaries defining a territory, which may change according to environmental changes. Birket-Smith alludes that Qaernermiut territory may have once been more south than it was when the 5th Thule Expedition was there, from1921 to 1924.

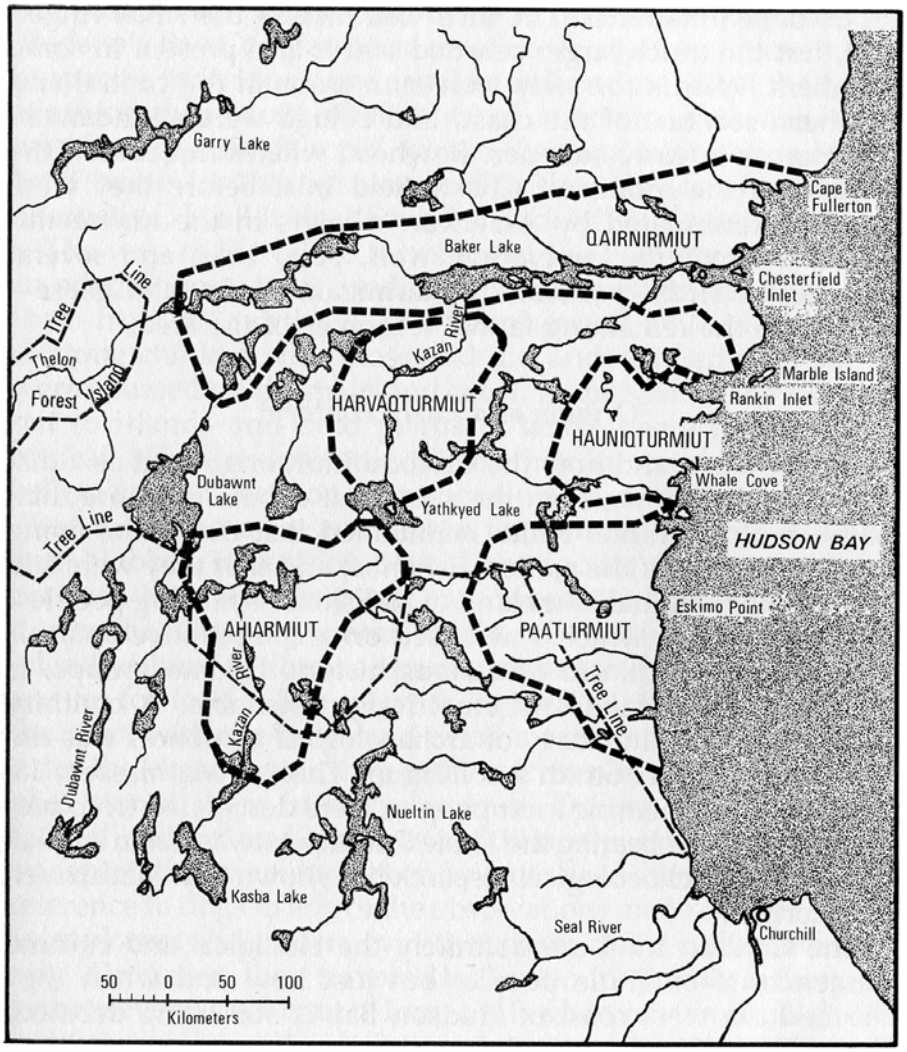

Figure 8. Caribou Inuit societal territories 1890 (source : Burch (1986))

Although sharing food strengthens the Inuit food system in many ways, it may also impede Inuit independence and create conditions of food insecurity in families who give a lot. The notion of sharing has evolved concurrently with societal changes. The provision of 'free' food relief (Family Allowance) by missionaries and RCMP officers, and later on by income support from the federal governmental, as well as by community support such as food banks, have contributed to change perceptions of sharing and self-reliance over time. Community members have been accustomed to obtaining money and goods through these support systems, without having to give back, consequently developing a dependency on others, which some do not agree with: *"you have to learn up north to live on your own, not depend on other people all the time, or else, you'll get the habit of depending on other people, so you have to learn it on your own"* (full time employed woman). "In [traditional] Inuit society, one of the most important and respected characteristics of a successful person is their capacity for self-reliance and their ability to meet life's challenges with innovation, resourcefulness and perseverance" (Pauktuutit Inuit Women of Canada 2006: 32). Yet, with introduction of modern Canadian law, education and welfare systems, Inuit saw their traditional values, knowledge and way of living diminished which led to reduction of self esteem and ability to care for one-self (Richmond and Ross 2009).

Some families, mostly those with a full-time workers or hunters, experience strong pressure from relatives and other community members to share their food resources. "Sharing" thus becomes problematic when food resources get depleted by others in need, especially when they do not give in return: "[*my common law's] relatives have been coming to our place and they just feel at home and cook whatever they want. [We are only left] with rice"* (young woman). Country food is often perceived as 'free' by many because it comes from the land and has not entered the market economy, except for fish, seal, walrus and whale[10]. "Free country food" is a recurring theme enunciated by women during the photovoice activity (Figure 9), interviews and focus groups. One middle-age woman considered selling country food as "*not using your Inukness*".

However, the assumption that country food is free is challenged by other community members who believe that sharing should be reciprocal and one can not only receive from others, they must also "share" in return, whether it is by offering material goods or services. Harvesting country food is expensive, and hunters and their families are not as willing as they used to be to give out country food free of charge outside of their family. Some women agree with local people selling country food: "*Local people. I am ok with it because they're trying to make a living out of it. They probably don't have a job*". However, women who cannot obtain country food from their family, have more difficulty accessing it: "*When we want some [country food] for free, no one answers but when we want to pay them someone offers*" (single mother).

Some women said that country food sharing is in decline in the community due to high cost of harvesting and individualistic behaviour: "[*When we don't have country food*] *we can't do anything, we can't go anywhere so we just stay home, what else can we do? Nobody wants to do anything for anyone anymore*" (young mother). One elder mentioned that her family does not share country food with her and even when she asks through the CB radio, it is difficult to get country food. She has bought Arctic Char and caribou from local hunters. Nevertheless, elders who are still hunting are believed to continue giving meat to other community members without asking for anything in return.

Figure 9. Photo selected during the photovoice activity to illustrate that "country food is free" (source: Margaret Kanayok)

[10] There is a caribou meat processing plant in Rankin Inlet.

9.4 Community level factors affecting women food security

Community support

Arviat is an active community which has implemented a number of food education and provision programs. Past programs include: a community kitchen, a harvesting and cooking with country food project, and Healthy Dads harvesting program. Current programs include: (1) the Healthy Moms, Healthy Babies which serves food to and educates high-risk pregnant women, (2) the monthly Community Food Bank providing 80 to 150 families with a bag of non-perishable store food items, (3) the Breakfast Program serving the three community schools (Levi Angmak Ilinniarvialaaq Elementary, Qitiqliq Middle School, John Arnaludjuaq High School) as well as the community at large which offers a hot breakfast every morning, (4) the Soup Program at the middle and the elementary schools which serves soup with chicken stock, barley, red lentils and rice to all student at 10am, and the snack program at the John Arnaludjuaq High School offering fruits to all students in the afternoon. A community-based nutrition project, funded through Aboriginal Diabetes Initiative funding, was planned in Arviat in 2009 and is ongoing. The Arviat Health Committee is running a community kitchen offered to all community members. It teaches participants how to prepare healthy meals, provides them with the ingredients, notably country food, the material and space to prepare the meat all together and eat afterwards.

Educational programs have been evaluated as successful by the Arviat Health Committee (AHC). However, though food provision programs are useful to families in need, they may contribute to increase Inuit dependency on governmental and community support, especially when no educational component is included. In addition, the lack of funding prevents the educational programs to run over the longer term. Chronic under-staffing in various health positions such as Home and Community Care, no dedicated Public Health nurse positions, prevent the community from addressing specific needs such as food insecurity, poverty, hygiene and communicable disease. Arviat is a large community with large needs, and a significantly lower ratio of Health and Social Services (HSS) staff to population than many other Nunavut communities (Government of Nunavut 2008). The Health Committee attributes this to the belief by HSS officials that a community with a strong cultural foundation such as Arviat does not require mental health services (AHC; meeting with Health and Social Services Minister, April, 2005).

Cost of living

The cost of living is high in Nunavut, where southern goods and material must be transported over long distances, long cold season, and high operating costs for businesses. Store food is expensive in Arviat due to costs associated with transport of food by plane or ship, higher operating cost of stores in the north and high store mark ups, up to more than 100% the retail value. In fact the price of a weekly basket of food for a family of four in Arviat ($521.28) costs more than twice the same basket in of Montreal, Québec ($223.12)[11]. Food is one of the main expenses for women in Arviat. The high price of food combined with low income reduces considerably women's consumer capacity: "*I can't afford to buy all the meat at the store because they're expensive. I got used to buying pasta, for example macaroni, spaghetti, noodles mostly, cereal, flour, baking powder and lard*" (young mother).

[11] Price of the basket of food calculated according to items included in INAC revised Northern Food Basket for a family of four for one week (2007) http://www.ainc-inac.gc.ca/nth/fon/fc/pubs/nfb/nfb-eng.asp#tab1

Rent and electricity are also important expenses, but the majority of families are living in subsidized housing where these costs are minimal. For those few who own their houses, mortgage, heating and electricity bills were significant expenses. Infant products such as diapers, milk formula and wipes were reported as being part of women's main expenses: "*with little kids too, it's so expensive up here! A box of pampers cost almost $100 and I have 2 little kids at home who are on dippers*" (woman). Women worry about not being able to afford these items.

Country food is most often obtained through local distribution in Arviat. Hunters and the store today sell country foods. Harvesting cost is high and is most often covered by hunters and their family. Acquiring and maintaining hunting equipment (ski-doo, ATV, boat, riffles, qamutiq [sled], net) require important investment in addition to paying for gasoline ($1.19/L in 2010) and ammunitions for every trip. The high cost of hunting has resulted in a recent trend of hunters selling country food to other community members. Generally, only fish (Arctic Char) is sold between $15-20 per fish by people who own a commercial fishing licence issued by the Government of Nunavut. Caribou is rarely sold due to traditional belief that it should be shared, sharing being a reciprocal activity. One woman reported having bought a piece of caribou for $50 where it is occasionally sold. However, it is more expensive than from a local hunter as it must come from a meat processing plant where it is inspected according to federal regulation. Rankin Inlet is the only plant in the Kivalliq regions and it provides Arviat stores with dried caribou and Arctic Char. The stores also sell muktaaq (beluga skin) and fish.

9.5 Territorial and Federal Level

Food Mail Program & Nutrition North Canada

The Food Mail Program is a Federal program that subsidizes nutritious perishable and non-perishable food items as well as other essential items (such as toilet paper and diapers) to northerners living in isolated communities. As of April 1st 2011, the Food Mail Program was replaced by Nutrition North Canada, but the list of eligible items had already started to change since October 3rd 2010. Until October 1, 2012, the new program is in a transitory period as it is adjusting to northerners and stores requests and concerns. Right now, two levels of subsidy exist. Level 1 ($1.10/kg) is applied to the most nutritious, perishable foods (fruits, vegetables, bread, meat, milk and eggs). Level 2 ($0.05/kg) is applied to eligible foods with longer shelf-lives (flour, crackers, and frozen foods).[12] Prior to April 1st, shipping freight of items part of the Food Mail Program was $1.30/kg, $0.20 cheaper than regular shipping price of $1.50/kg.

Women also have the possibility of ordering individually at participating grocery stores in the south to benefit from the Nutrition North freight reduction. It is not clear whether it is less expensive to order individually or buy at the local store. Even if it is, there are several barriers preventing women from using the Nutrition North program: the majority of women do not have a credit card, are not aware how to access the program, do not have a computer with internet access, or cannot save enough money to buy in bulk a year in advance.

[12] For further details about Nutrition North Canada program, refer to: http://www.ainc-inac.gc.ca/nth/fon/fm/index-eng.asp

Nunavut Harvesters Support Program

NTI Nunavut Harvesters Support Program (NHSP) was established in 1993 by the Government of the Northwest Territories and the Tunngavik Federation of Nunavut. NHSP manage four different programs through which financial assistance is provided to Nunavut residents who need equipment for hunting or sewing and promote traditional learning skills: Capital Equipment Program, Small Equipment program, Community Harvest Program and Atugaksait Program. In Arviat, the Hunters and Trappers Organization hire hunters in December-January to hunt caribou which is then distributed to people in need, such as elders, single parent families and families that have no mean or transportation to hunt. Approximately 70 caribou are provided to the community. Participants were quite satisfied with this program which provides people who are country food insecure with caribou meat. The Capital Equipment Program is administered by the Arviat HTO. Every year, a draw is done among selected community members who fill out an application form and the application of those who meet the criteria are sent to the NTI for final approval. The successful applicant receives a snowmobile, a boat and motors or an ATV delivered to their community on the sealift. There have been some criticisms of this program by those who believe that the equipment distributed is not being used for harvesting purposes. There is also no requirement for the recipients to harvest and give back to the community. There have also been cases of recipients who immediately sell the equipment locally and use the money for other purposes. Participants have suggested that the HTO monitor more closely how recipients use their equipment.

Inter-community sharing networks

Inter-community sharing networks can be a way of coping with country food scarcity. People who have family in other communities may benefit from their proximity to country food when it is not available in Arviat. However, it is more often Arviat which has access to the best harvesting conditions for country food except seal and walrus. One woman receives caribou few times a year from relatives in Whale Cove, Repulse Bay and Baker Lake. Nevertheless, this remains an expensive strategy as country food must be transported over long distances by plane as no community in Nunavut (except for Apex and Iqaluit), has road access. Most airlines provide a subsidy through Nunavut Tunngavik Inc. (NTI) for country foods being shipped between communities for beneficiaries.

10. VULNERABILITY AND ADAPTATION OF THE INUIT FOOD SYSTEM

This chapter brings together understanding on the women's food system, determinants of food (in)security, and climatic and environmental conditions of the Arviat region developed above, to examine vulnerability and adaptation to climate change.

10.1 Current vulnerability of the country food system to climatic risks and change

Experience with climatic risks, some of which could be linked to climate change, provides insights onto sensitivity and adaptive capacity of the country food system. The shortage of caribou during winter 2010-2011 and the following spring in the community of Arviat shows how vulnerable the Inuit food system is to environmental variability. During the fall 2010

migration to wintering grounds in northern Manitoba, Saskatchewan and southern Northwest Territories, the majority of caribou passed far away from the community, about 800 km away. To travel such a distance by snowmobile, it would have taken an experienced hunter 4-5 days in good weather conditions. Given current socio-economic conditions characterized by sedentary lifestyle and wage economy, almost no hunter had the time to do or the money to afford such a trip, especially the high price of gasoline. Thus the people in the community had very little meat saved for the winter, which has always been the hardest time to hunt caribou. In addition, only a few 100 of caribous, mostly cows and calves, were found scattered within a range of 160 km from Arviat in the winter 2010-2011. Very few bull caribous were harvested, which is what hunters prefer to hunt, notably for the large amount of meat per animal. In the spring 2011, caribou migration north to calving ground occurred four weeks later than usual, at the end of May rather than the end of April.

This particular situation created an important caribou meat shortage from October 2010 to May 2011 in the community, especially amongst the poorest families which could not afford to travel long distances to look for caribou and those who did not have a reserve of caribou meat. Inuit were not able to save meat during the fall for the winter, and had to wait almost one more month before obtaining some from the caribou spring migration. This event confirms the precarious nature of the country food system and concurrently the instability of Inuit women's food security. Traditionally, this exceptional event might have triggered event of mass starvation among the Caribou Inuit population, because, caribou most likely migrated too far inland even for semi-nomadic groups.

This event also shows the precarious nature of the country food security which largely dependent upon caribou access and availability. The caribou herd harvested by Arviatmiut is believed to be stable according to recent wildlife data (personal communication, Campbell 2010). Yet, the global vulnerability of *Rangifer* to climate warming and landscape change suggests that this herd may also be affected by the effects of climate change and mining development in the Kivalliq region (Vors and Boyce 2009)

Transitory caribou shortage also affects food security of Inuit women in Igloolik (Beaumier and Ford 2010). However, Igloolik being on an island, the access to caribou is not only affected by the change in migration pathway (ACIA 2005; Furgal and Prowse 2008), but also by changing ice dynamics which are affecting access of hunting area (Ford, Pearce et al. 2008; Ford 2009; Ford, Gough et al. 2009). Arctic Bay has a similar situation than Arviat as it is located on the mainland. In Arctic Bay, and Arviat, thinner snow cover and melting permafrost makes travelling on the land more difficult (Ford, Smit et al. 2006). In both communities, this result in a restricted access to inland caribou herds.

An important difference between Inuit food system in Arviat and those of Igloolik and Arctic Bay is the high reliance on caribou of Arviatmiut, especially in the winter, which increases their risk of being food insecure in times of caribou scarcity. Traditionally, Caribou Inuit did not harvest sea mammals during the winter (except few coastal Qaernermiut) as opposed to all other Inuit groups which lived on the coast and harvested seal, walrus during the winter (Rasmussen 1926; Birket-Smith 1976). Indeed, Caribou Inuit annual visit to the coast was no longer than 2 months in the summer, and that is when they harvested seals at the floe edge and from kayaks (Birket-Smith 1976). Thus, caribou was their main staple during most of the year. Other country

foods were harvested such as ptarmigan, musk ox and hares to cope with caribou shortage (Arima 1984). Elders still consume these foods today, when caribou seal and beluga skin are not available. Yet, different factors affect country food flexibility of elders and the younger generation today. First, musk ox, which was a critical resources in the nineteenth century (Burch 1977), can no longer be considered as a substitute for caribou as its harvest is controlled by a quota system; 25 muskoxen are allocated to the community of Arviat from July 1 2011 to June 30 2012. Second, the younger generation, did not develop a country food diet as diversified as elders who were born 'on the land' and survived starvation period by eating country food alternatives. Oppositely, when caribou, fish or muktaaq is not available, young women rely on store foods. The reduced flexibility of women's country food diet today increases their vulnerability to food insecurity related to changes in access and availability of critical country foods, as little healthy alternatives are available or affordable at the local store. Some women may buy meat (ground beef or chicken) or fish at the local store, when they have the means. Yet, meat at the store does not compare with country food: it has a different taste, does not provide the same feeling of satiety, is expensive and nutritionally inferior. Most often, women turn to cheaper foods, ready meal and non-perishable goods when caribou is not available: "*When we can't get country food, we have to [change diet], but we have no [store] meat, so we have to eat what's in our cupboards*" (woman). Caribou meat, bone marrow, liver, tongue, brain, heart and stomach content contain essential nutrients and are important sources of protein to Inuit, which they do not acquire with store foods(Lawn and Harvey 2003; Berti, Soueida et al. 2008; Sharma, Cao et al. 2010; Egeland, Johnson-Down et al. 2011). Some women would like to find more country food sold at the store, at reasonable price, such as dried meat (nipku/mikku) and smoked fish, to cope with caribou scarcity. Traditional training on how to prepare different types of country foods available near Arviat (hare, ptarmigan, goose) is most important to pursue in order to provide an affordable and healthy alternative to caribou and enhance Inuit women food security.

Furthermore, increases in temperature and permafrost loss in the area surrounding the western Hudson Bay (Gough and Leung 2002; Laidler and Gough 2003; Smith, Burgess et al. 2005) creates vulnerability to climate change. Inuit, of all generations, enjoy eating caribou meat that has been cached in the fall and undergone processes that give it a definite taste. Traditionally, people made pirujaq (cache meat) in the fall to store and preserve caribou meat during the winter. Cached meat is buried under stones and boulders and rest over bones, laid over the frozen ground, such that air can circulate (Figure 9). With permafrost period already shortened around Arviat, caching meat period is also shortened. People are adapting by making pirujaq later in the fall, if necessary, and removing the meat before the temperature gets too high in the spring (Government of Nunavut 2005; Sullivan and Nasmith 2010)

Figure 9. Inuit meat cache on Kazan River, Keewatin District, N.W.T, 1930 (source: Library and Archives Canada/PA-101294)

Moreover, the high number of grizzly and polar bears in the area of Arviat, makes it difficult to preserve caribou meat in pirujaq as more bears eat it: "*Today, I think it's useless [to do pirujaq] because of polar bears or grizzly bears will eat it. […] Back then, there were hardly any polar bears, and today, they are all over. […] Polar bears used to eat only sea animals, but today they eat anything they can find. […] Grizzly bears never used to be around, but they are now*" (hunters). This additional stress further reduces flexibility of country food diet, especially for those who do not have a large freezer and require pirujaq to save enough meat for the winter. An adaptation strategy would be to store meat in the community freezer during the winter (Figure 17). However, this freezer is only open during the summer and women, hunters and elders believe that it is too small to accommodate a population of nearly 3000 people.

Increase in temperature has already impacted hunting. Some hunters have stopped hunting during the hottest months to prevent meat wastage: "*I don't hunt too much when it's too hot, July through August, because the meat spoils fast and it taste different, the meat gets really soft*" (hunter).

10.2 Current vulnerability of the store food system to climatic risks and change

Store food is also sensitive to climatic risks and change. Delays due to fog, high wind, blizzard or white-out, in transport of fresh produce are common in the Arctic; they are particularly problematic with perishable produce often close to, and in some cases exceeding, expiry dates on arrival in communities. In addition, the sea-lift which transports non-perishable food items to the communities is susceptible to sea ice variation and changing weather conditions. On one hand, delays in re-supply are common and can cause temporary shortage of certain non-perishable food items at the stores. On the other hand, earlier ice-break ups has lengthened shipping season. In spring 2011, the NSSI vessels were loaded 10 days earlier than it was 10 years ago. Longer ice free season allows the vessels to do four trips rather than three (Rogers 2011).

Generally, women are satisfied with the availability of foods at the local stores. When women cannot access store food because they do not have the means or because food is not available, they rely on country food, if available. Twelve participants mentioned increasing their consumption of country food (caribou, fish) or bannock (flour, water, baking soda, lard) to cope with store food shortage: "*we run out of store food sometimes […] we eat more country food*

when we run out". Families with adequate financial resources can allow men to go out hunting to provide country food and alleviate period of store food insecurity. The replacement of country food with store food represent may have an important negative impact on household economic sustainability (Myers, Fast et al. 2005).

10.3 Current vulnerabilities of Inuit food system are associated to socio-economic stressors

This research shows that food system is vulnerable to climate risks, but that climate change is not yet an important determinant of food insecurity among Inuit women. Food security is complex and results from the interactions between multiple human and environmental determinants at different levels and scales. Currently, socio-economic and historical context are most important in determining food insecurity. Some of the main drivers of food insecurity today emerge from the rapid changes in livelihood that Inuit have experienced in the last 60 years: decrease in the practice of hunting and transmission of traditional knowledge, poverty, lack of budgeting skills, limited knowledge on store foods, gambling and substance use. The caribou shortage event of 2010-2011 shows how "Inuit food security is inherently dynamic, as reflected in its transitory nature and influenced by the changing nature of the Inuit livelihoods, social relations and the Arctic environment" (Beaumier and Ford 2010; Ford and Beaumier 2010: 58). Indeed, caribou scarcity itself did not result in food insecurity; but it did when coupled the historical context of change from semi-nomadic to sedentary lifestyle, hunters' lack of money, time, skills or willingness needed to go hunting far away from the community and the lack of healthy and affordable alternative at the local stores.

Current vulnerabilities have emerged with changing Inuit society and climate change, but "western" modernity also made possible current adaption strategies. For example, the introduction of store food now secures availability of food all year long and prevents Inuit from starvation. Community and territorial financial support also play an important role in providing food relief, minimum financial security through income support program, family allowance and Nutrition North program, and hunters support program.

Modernity has also benefited hunters who commonly use modern tools to facilitate harvesting and adapt to change in environmental condition. To predict the weather, weather forecasts are now commonly used: "*a long time ago, we used to see the weather through our eyes, not by calling the weather forecast or searching online*" (hunter). The Global Positioning Systems (GPS) is used by hunters to orient themselves, which can decrease their travelling time, reduce gas consumption and prevent wastage of meat during the summer. Caribou collaring information is also available to certain hunters to locate caribou which can also reduce travelling time. The Maguse road is another way many hunters use to access easily a hunting area. However, this road has some negative aspects, as it has increased significantly traffic to Maguse Lake, which some elders and hunters believe to disturb caribou and changes their migration pathway. With increasing difficulty in predicting the weather (Sullivan and Nasmith 2010), these tools will facilitate future adaptation to climate change. Although, the use of, and dependence on new technologies has also been shown to limit adaptation. For example, the use of snowmobile allows hunters to travel great distances from the community, yet it does not provide the warning or locate dangers as a dog team would have when it was still used to travel about 50 years ago (Ford, Smit et al. 2006). Ford et al. (2006) has associated an increase in risk taking behaviour with the development of modern technologies such as GPS and two-way radio, which provide a 'false' sense of security.

Inuit have long adapted to changing climate within certain coping limits thanks to extensive knowledge of the land, the wildlife and hunting techniques (Ford, MacDonald et al. 2006; Ford, Smit et al. 2006; Ford, Smit et al. 2008; Wenzel 2009). Sharing resources is the foundation of traditional Inuit subsistence economy (Wenzel 1991; Condon, Collings et al. 1995; Collings, Wenzel et al. 1998) and was an important coping mechanism in times of country food shortage (Fossett 2001; Bennett and Rowley 2004) still maintain basic food supply in times of food shortage, and is the most important coping strategy of Inuit women in Arviat in times of food insecurity. Even if the conception of sharing is changing, Yet, when caribou are far away, hunters harvest fewer caribou and can only share with close family members: "*When it's bad weather for 1-2 weeks, it's hard to get country food […] people go on air if they want to buy some, […] even form other communities, they go on air and say: I want to buy complete caribou, here's my phone number*.

11. RECOMMENDATIONS

This section outlines the many recommendations that were made by research participants and key informants as well as the Arviat Health Committee. The recommendations aim to strengthen Inuit women food system and ensure constant food security.

Offer training on budgeting and money management in Arviat to all community members: "*There should be a meeting on how to manage money because some elders run out of money quickly by their family*" (elder).

Offer training on traditional foods led by Elders (value, meaning, how to prepare and cook it) to women and young people.

Offer cooking classes to learn about both country food and store food and how to mix them, and how to prepare meals that are cost effective. "*We need to have classes here to teach people how to make meal that per serving is cost effective*" (key informant).

Nunavut Child Benefit cheque should be distributed on a bi-monthly basis.

Nunavut Child Benefit should be provided as cards limited to certain items such as healthy food and gas.

Increase the number of health professional in Arviat to address pressing issues such as nutrition. Continue supporting Hunters and Trappers Organization.

Increase number of programs supporting children and youth traditional learning and empowering their culture."*I think that's a the focus on traditional food from a public health stand point is really where a lot of our energy went because it such a good bank for your buck having people eating traditional food*" (dietician).

Increase the size of the community freezer where hunters can keep country food for their family and also food to share with the community.

Caribou hunt should be monitored better by Inuit: "*When caribou herds are passing by, HTO or wildlife officer should made money available to watch those who hunt and leave meat behind*" (hunters). Hunters affirm that when meat is left on the land, it is left in the way of caribou migration and makes them change direction. Consequently: "*When they go to different route, throughout the winter we have no caribou*" (hunters). In addition, hunters assert that "*there are not supposed to be anything in the way of the caribou pathway, hunters are not supposed to put tents up. Hunters never used to stop to have tea during caribou season. There never used to be anything around, like cabins, so because of this caribou are constantly changing direction*".

Arviarmiut should start a geese feather market where people can buy the feather, where they make jackets such as they do in Nunavik. It could be a good source of revenue for hunters.

12. Capacity Building

In Arviat, as part of the overall wellness initiative, two research assistants were trained to accomplish various research tasks: photovoice, interviews, focus groups discussion, transcription, dissemination of results through local radio shows and national conferences. They worked with this research project and also on several others going on in the community at the time. Four computers, one color laser printer with ink toners were bought with Health Canada funding through this project and have been able to also serve these other research projects.

In addition, photovoice, interviews and focus groups were not uniquely an extracting process, but increased awareness amongst the participants about food security issues and provided them with opportunities to reflect, discuss and consider their situation and potential solutions. In engaging with women in talking about food security, we hope to have increased their consciousness about certain aspects such as food purchasing decisions, the importance of country food in a healthy diet, the potential impacts of climate change and increased their interest in money management. Furthermore, by discussing with women about sensitive issues related to food insecurity, we hope to have encouraged them to give voice to their concerns and created the opportunity to share previously unheard experiences. The inherent reflexive process has also served to build knowledge regarding food security and climate change and increased the capacity of the community to prepare for and adapt to climate change.

13. Next steps & dissemination of results

Preliminary results have already been communicated to the participants and the community of Arviat in March-April 2011 through a radio show and women's focus group sessions. In general, women participants agreed with the results. Few interpretations were modified and information was added to clarify some points. We did not get feedback from the community based on the radio show.

The final findings were disseminated to the community of Arviat in August 2011 through a feast for participants and leaflets. The posters exhibition and calendar promised as a deliverable for the photovoice project will be completed. Academic articles and newspaper articles will be written and forwarded to peered reviewed journals and local and territorial governments based on consultations and agreements with the community of Arviat. Ms. Beaumier will also attend conferences and meetings at the international level to communicate the results.

14. BIAS

There are few factors that may have caused bias during the research process. First, this research was conducted by two local women. Arviat being a small community, the proximity of the interviewers and interviewee may have changed the answer of the participants. Interviews were also conducted by a university researcher, which can create condition of "power" in which participants are intimidated and try to provide the researcher with the right answer. In addition, some participants may have misunderstood meaning of questions and words, most notably because the researcher did not speak Inuktitut and translation was required. The researcher has tested some questions when realizing that it was misunderstood by asking differently the same question.

15. CONCLUSION

This research investigates the vulnerability of Inuit women's food systems to climate change in the context of socio-economic stresses to ultimately assess the conditions that creates food insecurity. Results show that several human drivers impact Inuit women's food systems and create condition of food insecurity for many. These drivers also impede their capacity to cope with future climate change, as it is not yet impacting significantly Inuit in Arviat, the land and wildlife. Most Inuit women experience transitory food insecurity and have developed strategies to alleviate period of food shortage. However, some strategies, such as buying cheaper food products at the store or borrowing "free" food are not sustainable over time, as they negatively impact on physical health and community well being.

By improving our knowledge and understanding of the food insecurity of Inuit women and the vulnerability of their food systems to climate change, this research project help target future community-run programs and make policy recommendation to local, territorial and federal governments to ultimately enhance adaptive strategies in the face of changing climatic and non-climatic stresses at the community and territorial level.

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NUNATSIAQ ONLINE

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Getting to the root of Arviat's food insecurity

Local women delve into dining habits

SARAH ROGERS

From left, McGill University researcher Maude Beaumier, Arviat research assistants Sarah Curley and Hilda Panigonak present their project at an Ottawa conference Feb. 10. (PHOTO BY SARAH ROGERS)

Sarah Curley and Hilda Panigonak clutch their notes tightly.

The two young women from Arviat are at a conference presenting a research project on access to nutritious food among local women.

It's nerve-wracking, but the women know they have a captive audience.

Statistics tell part of their story: Arviat, one of the largest communities in Nunavut, has the highest birth rate in the territory.

More than 60 per cent of its population is under the age of 16.

Almost half of the community's families are on income support and between 80-150 of them use the local food bank every month.

And that number is growing.

When Arviat's local health committee decided to take the problem into their own hands, they drew bits of funding from various projects to hire Curley and Panigonak as research assistants to help track data.

"We knew that food security was an issue, but there was little evidence available," Panigonak said. "It's up to us to promote health and support in our community."

So for the past several months, Panigonak and Curley have worked alongside McGill University researchers Maude Beaumier to interview local women and other community leaders.

Their goal: to get to the root of the "food insecurity" among Arviat women in order to present a long-term strategy that will improve women's - and their families' - nutrition and overall health.

Their research will offer the baseline information the community needs to shape that strategy, because the issue is far from black and white.

Arviat's health committee chair Shirley Tagalik points out that local women do not actually identify themselves as food insecure –meaning they believe they have access to food.

"On the other hand, they are going to the food bank or asking for money to buy – for the most part – non-nutritious food for their children," Tagalik said. "So we assume that with so many families reliant on the food bank, that there is food insecurity."

But Arviat women's role as family caregivers makes them the target for the research.

As Tagalik says, women have access to plenty of country foods in Arviat, which is the staple of their diet.

The problem is, the children aren't eating it as much. Tagalik credits that to lack of public health information about how to eat a balanced diet.

Local focus groups will be held throughout the spring will give researchers a clearer picture of that, and present some possible solutions.

In Igloolik, for example, a similar study was carried out in 2008-09 which found the majority of women there worried about how to access nutritious food themselves and their family.

That study produced recommendations for the creation of education programs, better hunter support and a local cooking class.

In Arviat, research will continue through the spring and findings will be presented to the community in August 2011.

Curley and Panigonak, who are involved with a handful of other community initiatives, are optimistic of their progress.

"Maybe people are going to want to participate more," Curley said, "and maybe we'll get more funding for future projects."

This particular study on determinants of food security among Arviat women is funded through Health Canada's climate change and health adaptation program.

More than 30 community-based projects in northern First Nations and Inuit communities have been funded through the program since 2008.

Curley and Panigonak were among those researchers gathered at the program's Pan-Arctic results workshop in Ottawa Feb. 8 to Feb. 11.

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Inuit women and food issues in Arviat

A photovoice project

Team of women researchers

Bonnie Kuksuk, Elizabeth St. John, Sarah Iblauk, Winnie Malla, Linda Pameolik, Winnie Panigoniak, Sheila Konik, Betty Curley, Margret Kanayok, Kukik Baker

Sarah Curley and Hilda Panigoniak, Research assistants

Shirley Tagalik, Chair of Arviat Health Committee

Maude Beaumier and Marie-Pierre Lardeau, McGill University researchers

The project

What is the purpose:

- Identify what affects Inuit women's access to store foods and country food in the community of Arviat.

The question:

- What influence what you eat, when you eat and how much you eat?

Why:

- Inuit women have been identified in other communities (Igloolik, …) as having the most difficulty getting enough food of adequate quality nutritionally and culturally.

The Method: Photovoice

- We used photography to express our point of views regarding what affect *what we eat, how much we eat and when we eat*.
- We became journalists in our own community to document issues around food

- **Photovoice:**
  - Gives a voice to Inuit women in Arviat
  - Is another way of sharing ideas to influence policy makers and communicate issues to the community

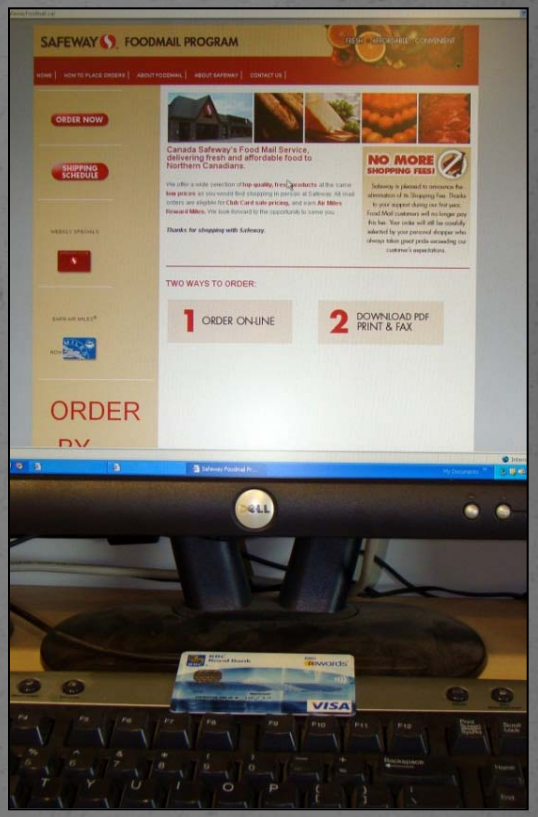
The Results

Gambling

Gambling takes away money from providing food

Money

Even though you are unemployed, there are other ways of making money to buy food such as carving



Preserving country food

The Community freezer is used to store our country food, that we will share during the winter

Food sharing

We are sharing food not only with family but within the community

Women preparing food

Women prepare healthy meals for their family using country foods

Quick meals

Differences between southern and country food: we can prepare quick meals with both; country food is the healthiest option here!

Weather affects country food access

Bad weather means …….. an empty catch

Changing Taste

Changing tastes: traditional food mixed with frozen vegetables.

Passing on traditional skills

While mother makes nipku, children learns to help out by preparing fathers fresh catch

Free

Country food is free and is healthy

Kids enjoying healthy foods

Kids enjoy country foods and fruits especially if they are taught to eat them at a young age.